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Message from the Chairman



Dear IEEE Members,

I am happy to write to you in this fourth and final issue of IEEE ICNL for 2018, which will also be the last issue of ICNL during my tenure as IEEE IC Chair. I would like to express my sincere thanks to Mr. HR Mohan, IEEE ICNL Editor, for his untiring efforts to bring out ICNL issues unfailingly in every quarter of 2017-2018. It was a herculean job done admirably well.

It was a great honour for me to serve the IEEE fraternity of India as the IEEE IC Chair for two years during 2017-2018. I sincerely thank the IEEE members in India to repose their faith on me. From my side, I have tried my best within my capabilities, the outcome of which are to be judged by the IEEE

fraternity at large.

I take this opportunity to express our happiness for the fact that Sri Deepak Mathur, former IEEE India Council Chair, has been elected as the IEEE R10 Chair-Elect in the IEEE Annual Elections held in 2018. On behalf of IEEE India Council, I would like to profusely thank the IEEE voting members in India to cast their votes in large number in this election and make it happen. It has been clearly shown by this election that, if IEEE India fraternity works in unison, many positive things can happen in the years to come. I am also happy to note that Prof. Toshio Fukuda, former IEEE R10 Chair, has been elected as IEEE President—Elect for 2019. It is for the first time that an IEEE volunteer from R10 has been elected as IEEE India Council extends its full support to both Sri Deepak Mathur and Prof. Toshio Fukuda during their tenure in office.

Indicon 2018, the flagship conference of India Council, was organized by IEEE Madras Section with Amrita Institute of Science and Technology, Coimbatore, as the local host during 16-18 December 2018 with technical support from IIT Madras. It was a neatly organized and well attended conference, for which the full credit goes to the organizing committee.

IEEE Mini POCO 2018 co-sponsored by IEEE Region 10 was organized jointly by IEEE Malabar Sub-Section, IEEE Kerala Section and IEEE India council on 10th November 2018 in NIT Calicut. India Council Meeting with IEEE President was held on 22nd Oct 2018 at IEEE Bangalore office. India Council CAS Chapter and Saintgits College of Engineering organized 2018 International Conference on Circuits and Systems in Digital Enterprise Technology (ICCSDET) on 21st Dec 2018 at Kottayam, Kerala. Computational Intelligence Society Chapter organized one week Summer School on "Computational Intelligence: Theory, Implementation and Applications" during 22-27 November 2018 in Hyderabad. I express my heartfelt appreciation of the hard work of IEEE volunteers in making all these programs successful and in the process making IEEE IC a vibrant entity.

I congratulate all the IEEE leaders and volunteers, who have extended their strong support to IEEE IC team over the last two years. With a happy frame of mind, our IC team would hand over the charge to the new team under the leadership of Prof. SN Singh wef Jan 2019. I look forward to active cooperation of IEEE members in IC activities in greater numbers in the years to come.

With warm fraternal greetings,

Sivaji Chakravorti IEEE IC Chair 2017-2018 s chakrav@yahoo.com



Message from Editor H.R. Mohan, hrmohan.ieee@gmail.com

Dear readers,

We are happy to present the fourth quarterly issue of India Council Newsletter (ICNL) for the year 2018. This current issue of ICNL in 108 pages (largest so far) has 15 articles (two more than last issue), along with reports of few Section events, India Council activities. The Secretary's Report of

IEEE IC for the year 2018 and the report of the flagship event INDICON-2018 are also published. We thank the chairs of the sections and the conveners of the events for sending the reports as per guidelines and IC Chair and Secretary for their coordination. We look forward to receiving matter from all the organizers of events directly at the newsletter email id ieee.icnl@gmail.com as per the guidelines published in the newsletter and also available at https://goo.gl/DcVPmx

ICNL thanks the authors who have responded to our request and contributed the following informative and interesting articles included in this issue.

- Cyber Physical Systems Overview and Evolution -- A tool for continuous evolution of systems by Mr. Abhilash Gopalakrishnan
- Hardware Trojan Horses: The New Face of Cyber Terrorism by Krishnendu Guha, Debasri Saha, and Amlan Chakrabarti
- Artificial Intelligence: Impact on Labour and Employment by Dr. Parasuram Balasubramanian
- Incubation Centres A Need for Successful Innovations via. Entrepreneurs! By Dr. Shajulin Benedict
- Contextual Knowledge Digitisation and its Application in Software Development by Mr. Manoj Kumar Lal
- System on chip methods for Autonomous Cars by Mr. V. P. Sampath
- Teaching Learning Centre for Design and Manufacturing Education at IIITDM Kancheepuram-Toward Extremely Affordable DIY Laboratory Education by Dr. S. R. Pandian
- Active Learning in Computer Science @ UT Dallas by Dr. Jey Veerasamy, Mr. John Cole & Dr. Miguel Razo
- Research Trends and Opportunities in Machine Learning in Biotech & Health Sciences by Dr. Kolla Bhanu Prakash & Dr. B. Mahendran
- Setting up Super Silicon Valley Smart City in India A High-tech Innovation through Secured Governance by Dr.
 P. Sekhar & Dr. Venkata Rayapati
- Digital Forensics As we know it today... by Dr K Rama Subramaniam
- Shaping India's Future in Enterprise AV-IT Convergence by Mr. Gaurab Majumdar
- The importance of HiST(ory) for S&T by Dr. John Bosco Lourdusamy
- Next What? -- PPR (Possibility, Potential and Reality) Quotient by Mr. M. K. Anand
- Atal New India Challenges A first step towards becoming an Innovation Nation by Mr. R. Ramanan

We are happy to have published the following excerpts with the permission of the author & publisher.

• The Chapter-end Takeaways from the book Neoskilling for Digital Transformation and the Artificial Intelligence Revolution

As usual, the Chairman message (last one) by Dr. Sivaji Chakravorti is comprehensive. The IT in Oct-Dec 2018 by Prof. S. Sadagopan, Director, IIIT Bangalore, the regular column in ICNL provides a broad overview on various important happenings in the IT and Telecom sectors. We are sure that readers will find the information provided in the column "Information Resources" compiled by the editor Mr. H.R. Mohan will be of interest to ICNL readers.

We have also included briefs on nine books -- From Internet of Things to Smart Cities: Enabling Technologies; Neoskilling for Digital Transformation and the Artificial Intelligence Revolution; Gene Machine: The Race to Decipher the Secrets of the Ribosome; Films from the Future: The Technology and Morality of Sci-Fi Movies; Lean Impact: How to Innovate for Radically Greater Social Good; SHAPE IT: A Perfect Gift for Budding Engineers to Become Industry Ready; 36 Golden Rules - Build Your Business for Generations...; The 99 Day Diversity Challenge: Creating an Inclusive Workplace; and Life Skills 101 - The Science of Personal Mastery.

We request the readers to make note of the announcements on Late Shri Pralhad P Chhabria Award 2019 and send their nominations. The membership renewal for 2019 is due and we request the members to renew in time for continued benefits from IEEE and its societies.

ICNL thanks the various internet sources, inshorts (https://www.inshorts.com) for the information nuggets and Mr. Sunil Agarwal and Mr Ajit Ninan for granting permission to use their cartoons in this issue. ICNL wishes to add that the articles published in this issue are not peer reviewed and are also not checked for plagiarism for which the authors are responsible. Further, the views expressed in these articles are that of the authors and ICNL is not responsible for any consequences of using the information provided in these articles.



IEEE India Council Secretary's Report – 2018

The India Council Executive Committee -2018 comprises the following Members along with all the Section Chairs as its ex- officio members-

Name	Office		
Sivaji Chakravorti	Chair	Kolkata	
S.N.Singh	Chair Elect	UP	
Deepak Mathur	Immediate Past Chair	Gujarat	
Preeti Bajaj	Secretary	Bombay	
S M Sameer	Treasurer	Kerala	
Abhay Phanshikar	Vice Chair, Membership Development	Bombay	
Suresh Nair	Vice Chair, Conferences	Kerala	
Rajesh Ingle	Vice Chair, Awards	Pune	
Atul Negi	Vice Chair, Educational Activities	Hyderabad	
Puneet Mishra	Vice Chair, Industrial Relations	Bangalore	
J. Ramkumar	Vice Chair, Student Activities	UP	
B. Satyanarayana	Vice Chair, Technical Activities	Bombay	
Rajashree Jain	Vice Chair, WIE Affinity Group	Pune	
Gitansh Anand	Vice Chair, Young Professionals	Delhi	
M. Ponnavaikko	Ombudsman	Madras	
HR Mohan	Vice Chair, Professional Activities & Newsletter Editor	Madras	
Suryanarayana Doolla	Webmaster	Bombay	
Amit Kumar	Coordinator- Branding	Hyderabad	
Jayakumari	Chair- IEEE Circuits and Systems Society Chapter (CAS04)	India Council	
Shaligram	Chair- IEEE Chapter of Electronic Devices Society (ED15)	India Council	
Deepak Bhatnagar	Chair- IEEE Microwave Theory & Techniques Society (MTT17)	India Council	
Madheswaran	Chair- IEEE Oceanic Engineering Society Chapter (OE022)	India Council	
Hitesh Mehta	Chair- IEEE Photonics Society Chapter. (PHO36)	India Council	
Madheswaran	Chair- IEEE Solid Circuits Society Chapter (SSC 037)	India Council	
Mahadevan Ramachandran	Chair- IEEE Education Society Chapter (ED25)	India Council	
Q. Bakir	Chair- Joint IEEE Chapter of Aerospace & Electronic Systems Society, and Communications Society (AES10/COM19)	India Council	
Annappa Basava	Chair- IEEE Computer Society (C16)	India Council	
A.K.Tripathy	Chair- PES chapter	India Council	
Indranil Sengupta	Electronic Design Automation Council Chapter, CEDA-44	India Council	
Bikash Kumar Dey	ımar Dey Information Theory Society Chapter, IT12		
Ex-Officio	All IEEE Section Chairs of India		

1. EXECOM MEETINGS:

Total 9 execom meetings were conducted in 2018. The Minutes of all 9 meetings held (4 online and 5 F2F) were circulated to the EC Members, which were duly approved in subsequent meetings. 10th Meeting of IC is scheduled to be held on 16th December.

Executive Committee Meetings held during 2018:

Online throgh Webex :		F2F meetings			
SN	Date	SN	Venue	Date	
1.	7 th January 2018	1	Rajkot	17 th Feb 2018	
2.	5 th February 2018	2	Langakavi	4 th March 2018 (on the sidelines of R-10)	
3.	14 th April 2018	3	Pune	23 rd June 2018	
4.	26 th August 2018	4	Mysore	30 th September 2018 (On the sidelines of AISYWC-18)	
		5	Bangalore	Special Meeting with IEEE President	
		6	Amrita Vishwa Vidyapeetham, Coimbatore campus	Scheduled on the sidelines of INDICON 2018 at Amrita Vishwa Vidyapeetham, Coimbatore campus on 16 th December 2018	

2. Highlights of IC Students Activities 2018:

- **A. SB WhatsApp Group:** WhatsApp group was formed in 2017 for all student branch chairs across India with constant support and guidance regarding functioning of SB and was helpful for networking and peer learning. It continued for 2018 with more involvement.
- **B. AISYWC 2018:** 2018 version of IEEE India Council's flagship event 'All India Students-Young Professional-Women in Engineering Congress' was hosted by IEEE Bangalore Section at Vidya Vikas Institue of Engineering and Technology, Mysore, on Sep 28-30, 2018. Nearly 450+ delegates attended the congress including speakers, India Council Execom members, Bangalore Section Execom Members. This year's theme of the AISYWC was "Aspire, Ideate, Sychronize, Widen Thpught, Capture the Goal". This was the largest AISYWC till date. IEEE UP, Kerala, Gujarat, Hyderabad, Madras, Pune and Kolkata Sections financially supported the Congress. AISYWC 2018 was also financially supported by IEEE HAC, IEEE GRSS, IEEE MTT-S, IEEE PES, IEEE ComSoc, IEEE TEMS, IEEE YP, IEEE WIE, Entuple & Intel. 60 Speakers from Industry, Academia, Startups, Legal, IEEE Societies and Committees gave talks on various topics and mesmerized the delegates. AISYWC 2018 has introduced 2 new tracks namely Branch Counselors track and Hands-on-Track in addition to Students, YP and WIE Tracks. In another first, AISYWC 2018 conducted cultural program on both days of the Congress.
- C. Several outreach sessions were conducted by IC SAC Vice Chair Prof. J Ramkumar at MNNUT, WIT, Dehradun, GLA University, Mathura in Uttar Pradesh section. The sessions were primarily focused towards best practices within IEEE and volunteering opportunities available to students and women.
- **D.** Mr. Gitansh Anand gave a session on various opportunities available to students within IEEE during Delhi Section Student Congress held at Delhi Technological University in November 2018.
- **E.** SAC Outreach activity was conducted by Mr. Jeet Dagha & team members in Bombay Section making students aware about student activities during IEEE Day celebration.
- **F.** MV Chavhan Paper Contest: In 2018, this contest was clubbed with INDICON 2018 and is scheduled to be held on 16-18th December at Coimbatore. Prizes shall be announced and delivered during Banquet at Coimbatore.
- **3. IC Women-In-Engineering:** IC Women-in-Engineering Affinity group initiated and successfully organized various activities for the benefit women to "Inspire, Encourage, Empower and Engage".
 - **A.** National level IEEE Women-in-Engineering Symposium 2018 (22-23 June 2018): The venue was at Hope Foundation and Research Centre, Pune and I²IT Pune with the motto 'Bring back women scientists and

- engineers to re-join the workforce'. The three tracks were on 'Empower, Innovate and Engage'. About 32 speakers from Industry and research organizations guided the gathered audience. A focused team of 67 delegates attended the symposium. They represented 12 states, 29 of them were IEEE members. The closing ceremony witnessed one of the historical event of IEEE IC, WIE AG and IEEE Pune section, viz. Late Shri Pralhad P Chabaria Awards-2018.
- **B.** WIE Track at AISWYC 2018: An IEEE WIE Track was conducted on behalf of IEEE WIE AG and IEEE IC during AISYWC 2018 held on 29 September 2018 at Mysure. Dr. Rajashree Jain chaired the track and conducted the proceedings for the day. Ms. Lakshi S, Senior Leader, TCS, inspired the gathering on setting goals and objectives that can help grow in our career to audience. Ms Gunjan Shukla from 'Thoughtworks' spoke on challenges for women in computing. A panel discussion on WIE Awards and Scholarships was also arranged. Ms. Jayati and Ms. Samhita were the panelists. As part of this activity, a call for WIE AG activities poster submission was sent and in response 12 posters were received. Top 4 were asked to present report during the congress. IEEE WIE AG, Kolkata Section, was the winner AG for the year 2018.
- C. Late Shri Pralhad P Chabaria Awards-2018: In the honour of Late Shri Pralhad Chhabria, Hope Foundation and Research Centre, IEEE India Council and Women-in-Engineering (WIE) Affinity Group, IEEE Pune Section, announced two awards that were designed to recognize and applaud outstanding female students specifically from the faculties of Science, Engineering or Technology as well as young women Scientists, Engineers or Technocrats, who are in their early career stage. Shri Pralhad P Chhabria Awards 2018, was launched on 16th December 2017. Each award carries a cash prize of 1, 25,000/- (Rupees One Lakh Twenty Five Thousand only), a medal and a citation. The awards' applications window for the year 2019 is open till December 31, 2018. The awards were open to Indian nationals and exclusive only to IEEE Student Member for Award No 1 and IEEE Member for Award No 2. The other critera for evaluation were demonstration of originality and innovation in the respective fields of work. Winners of 2018 were announced on the eve of Founder's Day, i.e. Late Shri Pralaha Chahabria's birth anniversary on 12th March 2018.

Best Outgoing Student: Jayati Vijaywargiya, final year of B.Tech Computer Engineering at Mody University, College of Engineering and Technology, Madhya Pradesh.

Best Women Engineer (professional in early career) – Dr. Soma Biswas, Assistant Professor at Department of Electrical Engineering, Indian Institute of Science, Bangalore.

- **4. IC Young professionals Activities :** Two events were conducted under YP in 2018.
 - **A.** Young Professionals Track in AISYWC 2018 was conducted wherein 80+ participants from India participated, networked and discussed on new ideas. The track received 1500 USD funding from MGA. IEEE TISP workshop was also conducted in Young Professionals Track.
 - **B.** "Research Workshop 2018" was organized by IEEE Hyderabad YP and IC YP under IEEE IC Branding on 23rd-24th June 2018 in Collaboration with Department of CSE, JNTU College of Engineering, & IEEE India Council with support from WIE Hyderabad. This event was successfully carried out over two days with the lectures delivered by eminent resource persons.
- **5. Technical Activities**: Following two events were organized in 2018-
 - A. Tutorials cum Workshop on AI&ML: India Council in collaboration with the IEEE Bombay Section organised a day-and-half long 'Tutorials cum Workshop on AI&ML' on August 10-11, 2018, at the Centre for Technology and Innovation Management, NITIE, Mumbai. The event was supported by the IEEE Technology and Engineering Management Society (TEMS) and the Standards Association (SA). In this tutorial cum workshop, distinguished researchers as well as experts from industry and academia gave insights on AI, Machine Learning and Deep Learning frameworks, algorithms and applications of ML and DL in different sectors. They also covered challenges and opportunities using these cutting edge technologies. There were two tutorials and six lecture sessions in all. The participants mainly comprised data scientists, data analysts, automation, manufacturing, finance and other industry application users, faculties and students. About 150 participants attended the event.
 - **B.** 'Furthering Indian Perception of IEEE' project: On the Engineers Day 2018, three engineers from 'Team Indus' shared their exciting experiences of building a 'Moonshot' (the micro-class exploration rover tailored to explore the lunar surface) from the science and engineering behind the mission to the challenges of building a spacecraft and a space-grade rover. They demonstrated a working rover along with a whole lot of exotic materials and instruments that they designed as part of the project. Three back-to-back events were organised on three consecutive days for three different types of audiences (a) At Tata Institute of Fundamental Research, Colaba on Sep 14th, 2018 for Scientists, (b) At Don Bosco Institute of Technology, Kurla (W) on Sep 15th, 2018 for academicians and students and (c) At D. G. Ruparel College of Arts, Science

and Commerce, Matunga (W) on Sep 16, 2018 for local public of all ages. About 1000 in total participated in these string of events.

- **6. Industry Activities:** Following two major activities were organized in 2018:
 - A. 5G Technology Workshop: IEEE India Council as part of Industry Relations initiative organized a 2 days workshop on 5G Technology Workshop in Bangalore. 5G Technology Workshop was organized on June 29-30 at Hotel Sterlings Mac, Bangalore. 250+ delegates attended the workshop. Workshop was technically sponsored by DoT, GoI, TSDSI, ComSoc Bangalore Chapter, IEEE Bangalore Section, IEEE 5G Initiative and IEEE AP/MTT Joint Chapter. Nearly 30 speakers shared their knowledge and vision towards 5G Technology. A panel discussion on "Is India 5G Ready" was also organized. Excellent feedback was received from the delegates and they requested to organize few more workshop on 5G Technology. Workshop was Inaugurated by Dr. Vipin Tyagi, ED, C-DoT, in the presence of Mr. Rajesh Pathak, DDG(IC), DoT, Govt of India, Prof. Sivaji Chakravorti, Chair, IEEE India Council, Ms. Pamela Kumar, DG, TSDSI, and Mr. Puneet Kumar Mishra, Vice Chair-Industry Relations, IEEE India Council. Workshop was financially sponsored by Keysight, National Instruments and Anritsu Technologies.
 - B. **IEEE Intrapreneurship Workshop:** IEEE India Council, IEEE TEMS Bangalore Chapter, in association with IEEE Bangalore Section organized an Intrapreneurship workshop on July 28-29, 2018, at Hotel Sterlings Mac, Bangalore. Workshop was conducted by Mr. Tathagat Varma, Country Head, Chinasoft. He covered following topics: What is Intrapreneurship, What is Creative Process, How does Innovation Happen in organization, How to measure Intrapreneurship Initiatives and on Design Thinking. Mr. Anuj Magazine, Director Citrix shared his story of Intrapreneurship in his organization. Program Concluded with Fireside Chat with Mr. Sunder Ramakrishnan, Founder & CEO Sharanga Technologies. A live webcast using Facebook live was also experimented and nearly 200 viewers benefitted from the same. Feedback received from the participants was excellent.
- 7. Conferences 2018: The emphasis of Conference Activities team was to create guideline and unify the process of accepting conferences and sponsoring them across various sections of India council. The Conference activities team of India council decided not to compromise on the standard of any of the conferences sponsored by IEEE, and also came up with a standard unification procedure for the same. This is now approved by India Council Execom and is being implemented. A thorough scrutiny of the proposals are done at the Councils' conference activity level, and measures are made to have proper review of the papers. It is also made mandatory to get a 'No Objection' from respective Section for sponsorship by India Council. This makes a smooth organization of the conference with the respective Section's full co-operation. Following conferences were organised during 2018 and few were approved for 2019.
 - A. Indicon 2018, the flagship conference of India Council is scheduled at Amrita Institute of Science and Technology, Coimbatore during 16-18 December 2018.
 - B. India Council SSC Chapter and Kongu Engineering College, Bannari Amman Institute of Technology 2018: 9th International Conference on Computing, Communication and Networking Technologies (ICCCNT) was held on 10th July 2018, in Bengaluru.
 - C. Uttar Pradesh Section, India Council Computer Society Chapter, Uttar Pradesh Section PE/IA Joint Chapter and Galgotias University, 2018 organized International Conference on Computing, Power and Communication Technologies (GUCON) on 28th-29th September 2018 at Radisson Blu Greater Noida, Uttar Pradesh, India
 - D. India Council CAS Chapter and Saintgits College of Engineering are organizing 2018 International Conference on Circuits and Systems in Digital Enterprise Technology (ICCSDET) on 21-Dec-2018, in Kottayam.
 - E. India Council ED Chapter, Mahendra Engineering College, organized 2018 Conference on Emerging Devices and Smart Systems (ICEDSS) on 2nd Mar 2018, in Tiruchengode.
 - F. 2018 International Conference on Smart Electric Drives and Power System (ICSEDPS) was held on 12-13 June 2018 at G.H. Raisoni College of Engineering, Nagpur, under PES Chapter of IC.
 - G. Conferences approved for 2019:
 - 2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICICT).
 - 9th International Conference on Emerging Trends in Engineering & Technology (ICETET-SIP 2019) at GH Raisoni College of Engineering.
 - INDICON 2019 to be organized by IEEE Gujarat Section
 - H. Mini POCO organised by Kerala Section: IEEE Mini POCO 2018 was organized jointly by IEEE Malabar Sub-Section, IEEE Kerala Section and IEEE India council on 10th November 2018 in NIT Calicut and was co-

sponsored by IEEE Region 10. Some of the topics covered in the workshop are, viz. Building the Conference-Starting to Finish- IEEE Timelines, Strategic Planning of IEEE Conferences, Managing CFPs, TPC Formation & Management, Quality Reviews, Challenges in Peer Review, Technical Program preparation, Budget planning and Financial Management of a Conference, Demo on YepDesk- a sample payment gateway, Conference Management Systems- EDAS and Easy Chair- Demo, Plagiarism Checking Tools & Publishing Proceedings in IEEE Explore- Demo, Role of Publication Chair, Guidelines towards applying for Co-Sponsorship of IEEE Kerala Section and India Council. The workshop was well attended with 64 registered participants including two nominees from IEEE Kolkata section. Potential conference organizers deputed from more than 25 engineering colleges in Kerala attended the workshop.

I. Important Decision: Any conference or symposium organized by institutions or organizations outside IEEE but technically co-sponsored by IEEE India Council either directly or in association with any of the society chapters of Council shall require a payment of one-time processing fee of Rs.25000 and a security deposit of Rs.75000 towards mandatory TCS fee charged by IEEE MCE for extending IEEE technical co-sponsorship. The IC Chair will approve conference application only after receiving these payments in the IC account. The security deposit of Rs.75000 will be returned to the organizers once they produce the proof that IEEE MCE receives the TCS fee of USD 1000 payable to IEEE MCE for Technically co-sponsored conferences and a report of the conference is submitted to IEEE India Council. The security deposit is collected from the organizing institute to make sure that changes happening at the leadership of the organising team/Institute at any stage of the conference after the approval shall not affect the commitment made to IEEE MCE. In case the organising team/Institute fails to make the payment to IEEE MCE after the conduct of the conference, IEEE IC will make the payment to MCE on behalf of the organizers and the security deposit will be forfeited.

In lieu of the one time non refundable processing fee of 25000 charged, IEEE IC will facilitate two e-notices across all IEEE members in India provided the organisers provide the appropriate content at the specified time by giving two weeks of time for processing an e-notice request.

If IEEE IC or any of its society chapters either individually or jointly organise a conference with substantial financial stakes, the one time processing fee and security deposit are not required to be paid.

8. Newsletter: This year so far three issues of IEEE India Info, the newsletter of IEEE India Council, relating to the first three quarters of 2018, have been published. Apart from the usual items such as reports from the IEEE Sections & IC Society Chapters, important announcements, regular columns -- IT Happenings in India, Information Resources, book reviews, messages from Editor and Chairman, interesting articles were published from academic community & professionals on a variety of trendy topics.

In the 1st issue of Jan-Mar 2018 in 82 pages, there were 10 articles. In the 2nd issue of Apr-Jun 2018 in 72 pages, there were 13 articles and two book chapters. In the 3rd issue of Jul-Sep 2018 in 90 pages, there were 13 articles and two book chapters. The fourth issue relating to the period Oct-Dec 2018 is under compilation and will be published by end of this year or in early 2019. All the newsletter issues are also archived and can be accessed at http://sites.ieee.org/indiacouncil/newsletter/

- 9. IEEE Professional Activities: IEEE India Council & IEEE Sections & Chapters have cordial relations with likeminded professional & technical associations and societies in India and have organised a number of joint programs across the country. IEEE India Council as a founding member of Engineering Council of India (ECI), a council of 40+ technical associations in India, continues to support the activities of ECI relating to engineering education in India. IEEE & few of the Societies such as IEEE Computer Society have formal MoUs with Indian counterparts such as IETE, IEI, CSI and efforts are on in continuing the MoUs and work closely in various events. In a major development in 2018 IEEE and AICTE have signed a MoU for strengthening and uplifting the quality technical education in India.
- 10. Education Activities: Following activities were carried out.
 - A. "Research Workshop 2018" was organized on 23rd -24th June 2018 jointly by IEEE Young Professionals Hyderabad, Department of CSE, JNTUH College of Engineering & IEEE India Council, with support of WIE Hyderabad at JNTUH College of Engineering, Kukatpally, Hyderabad.
 - B. Computational Intelligence Society Chapter organized one week Summer School on "Computational Intelligence: Theory, Implementation and Applications" on 22-27 November 2018. This program was jointly organized by IEEE Computational Intelligence Society Chapter (CIS) of Hyderabad Section in Association with Muffakham Jah College of Engineering and Technology (MJCET), IEEE Hyderabad Section & IEEE MJCET SB Hyderabad.

- There were 9 International Speakers of 6 nationalities and also speakers from IIT, ISI Kolkata, UoH, with about 35 registered participants.
- C. Training Programs on 'Recent Trends in Data Science and Computing' (with Mr. Swayam Prakash) and 'Build your own IoT Hands on' Workshop (with IEEE Hyderabad Section CAS/EDS Chapter) were organized.
- 11. PES Chapter Dissolution: It was decided by the founding Chapter Chairs and further in IC to dissolve the PES chapter of IC.
- 12. Branding activities: IEEE Hyderabad Section and IEEE India Council have continued its leadership role in conference organizing by successfully conducting the Fourth Conference Organizers Workshop on 20th May 2018 with support from IEEE Region 10, IEEE Meetings, Conferences and Events and other IEEE Indian Sections. Over 70 participants joined from nearly every leading Indian city, representing many leading Academics institutes and Industries. This workshop was designed to serve the needs of the IEEE conference organizer through education, discussion, and access to experts. Emphasis was placed on some of the most important issues for conferences in the changing world, such as ethical practices, publication in IEEE Conferences and Journals and conference best practices. MiniPOCO 2018 was comprised of talks from experienced IEEE Conference Organizers and panel discussions with focused sessions and opportunity for participants to exchange ideas, success stories and challenges with other trained and experience IEEE Conference organizers. Conferences and Journals, Conference best practices were discussed. This workshop discussed most important issues for the conferences in the changing world. Issues like Plagiarism, Publications in IEEE Conferences and Journals; Conference best practices were discussed during one-day workshop at Vishakhapatnam.

13. Other IEEE Events/Activities/News:

- A. Immediate Past Chair of IEEE India Council, Sri Deepak Mathur, has been elected as the IEEE Region 10 (Asia-Pacific) Director-Elect for the two-year period 2019-2020. He will serve as IEEE Region 10 Director for the years 2021 and 2022 and will be a member of IEEE Board of Directors. Deeapk, a member of IEEE Gujarat Section, has served IEEE in various leadership roles at Section, Council, Chapter, Society, Region and MGA levels.
- B. India Council Meeting with IEEE President at IEEE Bangalore office was held on 22nd Oct 2018.
- C. Prof Hari of IISC Bangalore has been elected on Board of Governers of Signal Processing Society of IEEE.
- D. R10 WIE VEEP Fund proposals Considering the projects objectives, impacts as well as the budget plans, the R10 WIE committee have selected 5 proposals out of 20 submissions to fund Grant of 400 USD and out of 5, two were from India IEEE Hyderabad Section ----"Women in Robotics", for USD 400 funding support and IEEE Gujarat Section ----"Programming Competition for Girls", for USD 400 funding support.
- E. 3rd Chapter of IEEE HKN has been inducted at G.H. Raisoni College of Engineering
- F. Flood Relief Activities by Kerala Section: The State of Kerala has witnessed a massive flood of the century during August 2018. Motivated by the tagline "Advancing Technology for Humanity" volunteers of IEEE Kerala Section came forward to start a website Keralarescue.in which became the central coordination point of the rescue efforts by Government of Kerala and volunteers from various places. This portal, which was set in a matter of less than a day, could mobilize relief aids and life support to thousands of flood affected people. IEEE volunteers in large number of student branches assembled emergency lamps and portable power banks and supplied to relief camps and for airdropping in flood affected areas. As one important requirement after the flood was restoration of electricity in flood affected houses where the electric wirings were completely damaged, Section developed a temporary electrification board costing Rs.2500 and supplied 500 such boards to the poor and needy people with the support from NIT Trichy. Many student branches also made such boards and supplied to the needy people.

14. Membership snapshot: IEEE India Council Membership Development highlights 2018 (1 Oct 2018 Comparison)

- A. The ratio of high-grade members to total for IEEE is 80%, which was 83% in 2017, wherein the same for R-10 is 74% which was 68% last year and for India it is 35%, which was 40% in 2017. The ratio of Student members to total numbers for IEEE is 20%, wherein the same for R-10 is 29% and for India it is 65%.
- B. 15500+ Higher Grade Members, a 5% Increase over 2017; Whereas Student Member Number remains almost the same around 30,000 (1 Oct 2018 Comparison). Total Membership is 45,890.
- C. India Council Geographic domain contributes to 23% of Region 10 Higher Grade Members, and 60% of Student Members in Region 10, resulting in an overall membership contribution of 38.5% in R10.
- D. India Council sections, viz. Madras, Bombay, Kerala & Bangalore Sections, continue to occupy the top five positions in R10 along with Beijing.

- E. For Recruitment and Retention goal winners, 15 sections were from R10 while Kolkata & Hyderabad Sections achieved this distinction from India Council.
- F. For Recruitment goals, 15 sections won from R10 while Uttar Pradesh & Bangalore Sections achieved this distinction from India Council.
- G. For Retention goals, 7 sections won from R10 while Kharagpur, Madras & Delhi Sections achieved this distinction from India Council.

The membership split across various grades is as

Honorary Member	1	Senior Member	2399
Life Fellow	25	Member	12098
Fellow	47	Associate	534
Life Senior	159	Graduate Student Member	2399
Life Member	35	Student Member	25947

15. IEEE India Council Awards Program: IC has initiated two awards in 2015 – One for IEEE India Council Outstanding Student Branch award and second for IEEE India Council Outstanding Volunteer award.

IEEE India Council Outstanding Student Branch Award is to recognize a student branch selected based on various factors like the current membership count, growth of members, number of seminars, symposiums, colloquiums conducted in the year, Papers published/presented in various forum by members, awards won by members, significant value addition to the campus. IEEE India Council Outstanding Student Branch Award – 2018 is awarded to Sri Sivasubramaniya Nadar College of Engineering (Madras Section) (Branch Code: STB 60551)

IEEE India Council Outstanding Volunteer Award is given on the basis of the enthusiastic support of the volunteer to the section/chapter activities, new initiatives and contributions, which have significantly benefited the Section, demonstrated administrative abilities and leadership skills, supporting, advancing and promoting work & objectives of the IEEE in general, and of the Section in particular, Chapter or Student Branch level, or in some other IEEE volunteer activity in 2018. IEEE India Council Outstanding Volunteer Award – 2018 is awarded to: Mr. Hareendralal A G (Kerala Section)

Both awards shall be presented to the winners in the Execom meeting to be held at the sidelines of INDICON 2018.

16. Slate for 2019

The nomination Committee for the year 2019 was formed by IEEE IC Chair as per By-laws of IC. The IC Nomination Committee is as below.

Chair - Mr. Deepak Mathur, Immediate Past Chair of IC

Member - Mr. Debatosh Guha, Past Chair of Kolkata Section

Member - Mr. J Ramkumar, Past Chair of UP Section

After evaluating all the received nominations and after detailed deliberations, the committee has nominated Dr K Suresh Nair (Kerala Section) as Chair-Elect 2019.

17. Liaison with IEEE India Office:

Mr Harish Mysore, Director IEEE India Office in Bangalore, continues his close association with the activities of India Council and is regularly present at EC meetings. India Council acknowledges the various efforts of IEEE India Office, which have added value to members in India.

18. ACKNOWLEDGEMENTS:

I wish to place on record my sincere thanks to the IC Chair, Past Chair, Chair-Elect, Tresurer, Section Chairs, all IC Vice-Chairs and Executive Committee Members, Ombudsman, Editor IC Newsletter, Webmaster, Office bearers of various IC Chapters of IEEE Societies, IC and Section volunteers, who have worked hard throughout the year and helped us in organising meetings, conducting events and taking India Council to new level.

Preeti Bajaj

Secretary, IEEE India Council

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The 15th Edition of IEEE INDICON 2018 international conference kicked-off on 16th Dec 2018 at Amrita Vishwa Vidyapeetham, Coimbatore Campus. Scheduled from 16 to 18 Dec 2018, INDICON 2018 is the flagship conference of the IEEE India Council organized by IEEE Madras Section at AMRITA with technical support of IIT Madras. Conference highlights included 862 paper submissions, 233 selected papers, 300+ delegates, five plenary talks, 12 keynote addresses, one industry track keynote, 7 Tutorials, three workshops, 362 reviewers, 7 tracks, and four poster sessions.

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Various conference tracks included circuits & systems, signal & image processing, power electronics & drives, power systems, control & instrumentation, computer science and communication & networks.

All submissions went through a double-blind peer review process and eligible manuscripts were scrutinized by at least two reviewers. Additionally, the reviewers' comments were critically reviewed and the decision was taken based on the scores obtained. The manuscripts were evaluated based on their novelty, relevance to the theme of the conference, their presentation, their technical correctness as well as the overall decision of the reviewers.

Dr. Sasangan Ramanathan, Dean-Engineering, Amrita Vishwa Vidyapeetham said, "AMRITA is thankful to IEEE for giving us the opportunity to host the prestigious flagship international conference, IEEE INDICON. This is the first time, a private university has hosted INDICON, which in the past has been held at premier institutions like IISc Bangalore and IITs at Madras, Kharagpur, Roorkee and Delhi. The conference theme, "Harnessing Technology for Humanity" is very close to our Chancellor AMMA's vision of 'Compassion-Driven Research' and a theme that is very close to every Amritian. On behalf of Amrita, I would like to thank the reviewers and the programme technical committee members for setting a high bench mark on the quality of research articles being accepted for this conference".

He added, "AMRITA Varsity and IEEE have a long-standing partnership with active IEEE student branches in campuses, numerous awards for our faculty and students and organizing of premier IEEE events such as All India Student Congress and conferences in cutting-edge areas such as Smart Grid, Technology Enhanced Education and Robotics for Humanitarian Applications"

Prominent international and national speakers who addressed INDICON 2018 included:

- Dr. Merlyne M. deSouza, University of Sheffield, UK
- Dr. Subhas Chandra Mukopadhyay, Macquarie University, Australia
- Dr. Seshadri Srinivasan, Berkeley Education Alliance for Research in Singapore
- Dr. Salil Kanhere, University of New South Wales (UNSW), Australia
- Dr. Sivaji Chakravorti, IEEE India Council Chair & Director, NIT Calicut
- Mr. Deepak Mathur, IEEE Region 10 Director Elect for 2019
- Dr. S.N. Singh, IEEE India Council Chair elect & Vice-Chancellor, Madan Mohan Malaviya University
- Dr. Bodh Raj Mehta, Dean (R&D), IIT Delhi
- Dr. C.E. Veni Madhavan, Indian Institute of Science (IISc), Bangalore
- Dr. Somnath Chanda Roy, IIT Madras

- Dr. Venkataraman S., Additional Director, ISRO Hyderabad
- Dr. Harish Barshilia, Head, Surface Science Division, NAL
- Mr. Radhakrishnan K., Royal Philips

Salil Kanhere, Associate Professor at UNSW Sydney, Australia and a Senior Member of the IEEE said, "It is has been an eye opener attending this conference as I never realized that such young minds could come up with such innovative and ingenious ideas. The conference was very well organized and planned and the organizers took good care of all the participants and guests. The talks were very insightful and paper sessions were absolutely brilliant. Presentations made by students were very impressive and I am sure these minds will give a big push to quality research in the future in our country. We are in an age where everything is very fast moving and research can be a slow and time consuming process but I would advise students to stay focused on their research and not look for quick fix solutions."

The IEEE India Council EXECOM and AGM were also held on 16th Dec 2018 on the sidelines of the conference. The organizing departments @ AMRITA School of Engineering, Coimbatore were Electronics & Communication Engineering (ECE), Electrical & Electronics Engineering (EEE) and Computer Science & Engineering (CSE). Dr. Jagadeesh Kumar, Professor of Electrical Engineering, IIT Madras and AMRITA Chairpersons of ECE, EEE & CSE departments, Dr. M. Jayakumar, Dr. K.C. Sindhu Thampatty and Dr. Latha Parameswaran served as the general chairs. Dr. S. Mahadevan, Deputy Dean, AMRITA and Dr. Madhu Mohan N., AP/ECE, AMRITA served as the organizing chair and secretary respectively for the conference.





















Report by: Mr. Prashant R Nair

Report on AISYWC 2018



2018 version of IEEE India Council's flagship event-All India Students-Young Professional-Women in Engineering Congress was hosted by IEEE Bangalore Section at Vidya Vikas Institue of Engineering and Technology, Mysore during 28-30 Sep 2018. Nearly 450+ delegates attended the congress including speakers, India Council Execom members, Bangalore Section Execom Members. This year theme of the AISYWC was "Aspire, Ideate, Sychronize, Widen Thought, Capture the Goal". This was the largest AISYWC till date. IEEE UP, Kerala, Gujrat, Hyderabad, Madras, Pune and Kolkata sections supported the congress. AISYWC 2018 was financially supported by IEEE HAC, IEEE GRSS, IEEE MTT-S, IEEE PES, IEEE ComSoc, IEEE TEMS, IEEE YP, IEEE WIE, Entuple & Intel. 60 Speakers from Industry, Academia, Startups, Legal, IEEE Societies and Committees gave talks on various topics and mesmerized the delegates. AISYWC 2018 has introduced 2 new tracks namely Branch Counselors track and Hands on Track in addition to Students, YP and WIE Tracks. In another first AISYWC 2018 delegates were accommodated in 3 star hotels & cultural program were conducted on both days.



Day 0 (27 September'18)



The day before the conference started with all delegates checking in to their hotels at 12.PM and then there was a half a day trip arranged for the delegates by the AISYWC team to show the culture and heritage of Mysuru. At 2:00 PM, buses were arranged from all the respective hotels to the Mysore Palace, where the delegates from all around India visited the culture rich palace of Karnataka. Followed by the palace visit was YP Meet up arranged at the palace premises, where all the delegates had an ice breaking session to get to know each other and bond with people

from different sections. After the palace, the delegates were taken to Chamundi hills, where they relaxed and saw the amazing view of the entire Mysore city and the sunset. The delegates were then taken to the famous shopping street of Mysuru called Devraj Urs road where they were provided with the famous Mysuru Pak and Samosas. After shopping they were picked up and then dropped to their respective hotels to gear up for the amazing 3 days.

Day 1 (28 September '18)

Inauguration



The Annual Flagship event of IEEE India council and IEEE Bangalore for the year 2018-19 that is All India Student - Young Professionals - Women in Engineering Congress (AISYWC) inauguration ceremony began after the registration process where the kits were distributed to the participants. The dignitaries were escorted to the dais with the state anthem. The program began with a significant notion of watering the plant and an invocation song. Mr. Puneet Kumar Mishra, General Chair, AISYWC'18 briefed out the AISYWC'18 statistics and explained how tremendously unique is this year's AISYWC and welcomed all the delegates to this amazing event. Ankita Ks, Secretary of AISYWC'18 introduced the

honorable chief guests Dr. M Annadurai and Dr. Justice N Kumar and they were felicitated with great honor.





The plenary talk on Engineering Nature and Inside Story of Chandrayaan-1 and Mars Orbiter Mission by Dr. M Annadurai, Distinguished Scientist & Former Director, U R Rao Satellite Centre, ISRO explained briefly from the basics of the space to the stories of Chandrayaan covering the various technical aspects of the space vehicles another one by "Mental Competence for Self and National Development" was given By Hon'ble Justice N Kumar, Ret. Justice, High Court of Karnataka. The next keynote was by Daniel Lottis, SIGHT Chair, and later was an interesting session on Chasing your dreams and passion by a renowned Actor and an entrepreneur Miss. Padmaja Rao. Followed by which was a talk on Workshop on Skills for Employability by Sudeendra Koushik, Founder, Prasu. The session concluded with the talk on RF, Microwave Industry Trends and Road Map: Opportunities for Students, Young Professionals and Women in Engineering by Damodar M S, Entuple.

Student track

The tracks kicked off with talk by Anupama Gowda, the co-founder of workbench projects, the very first makerspace in Bangalore, continued to an informative session on introduction of societies PES, ComSoc, MTT-S and TEMS. Continued with inspiring sessions on Creativity & IPR by Dr. YVS Lakshmi, Stay Competent and Connected with IEEE by Kristen MacCartney, IEEE UPP, the IEEE Xplore Digital Library, Your Source of Emerging Technology by Dhanukumar Pattanashetti, IEEE Client Service. Remote Sensing - Opportunities by Munir Mohammed, Sr Program Manager, IEEE.IEEE BLP for Students by Malay Harsha, Sr Manager Blended Learning Program, HAM Introduction and Hands-On Workshop on Disaster Management.

Young Professionals Track



The power packed session started with "Introduction to IoT and its Challenges" by Nihal Kashinath Founder and CEO, Applied Singularity followed by TISP functions essentially as a professional development workshop aimed at helping teachers bring exciting hands-on engineering lessons into their classrooms continued How Storytelling, Design Thinking and Radical Innovation can help build sustainable communities, products and business by Rohan Goswami, COO & Director, Ycentre India. Then we had a talk on Understanding the Blockchain and its Use Case by Abhinav Ramesh, Founder & CEO WandX. The session on Building a Community of Young

Professionals by Nivas Ravichandran, IEEE R10 Coordinator seemed extremely useful which lead to another wonderful talk on Best Practices of IEEE Bangalore Young Professionals by Abhishek Appaji from BMSCE. Then the last one on Building Technical Communities Through Entrepreneurship Activities in India by Dr Amit Kumar, Bio Axis DNA Research Centre.

Women in Engineering Track



Ms. Chaya from Necter Fresh gave an inspiring session, her journey as a women entrepreneur, challenges and techniques which helped in creating an impactful brand in the society. Building Your Personal Brand by Vijaya K Matt, Workforce Diversity Program Manager, HR, IBM then "Truly Essential, yours truly" - Akshara Kumar, Founder, Truly Essential sharing her journey and experiences from design to product and the customer satisfaction. Women in Computing by Lakshmi Subramanian, TCS. WAPSI initiative of Thoughtworks, Gunjan Shukla, Thoughtworks on initiating and directing women in

technology with career breaks. Opportunities and Excellence Recognition for Women in Science and Technology was a short discussion which helped participants to divulge into multiple perspectives of creating an inclusive atmosphere for women in science and technology. WIE Poster Session had an interactive participation sharing the research and information in their presentation.

Branch Counsellors Track



IOT Ecosystem and IEEE Standards by Sri Chandra, Sr. Director Standards & Technology IEEE discussed smart cities, Embedded Perspective by Gautham Sriprakash, Embedded/IOT Specialist, IEEE ,IEEE BLP for Student Branches by Malay Harsha, Sr Manager Blended Learning Program, IEEE ,TISP Workshop helped participants in understanding the functions essential for a professional development, BC Training by Shrikant Tangade Reva University discussed on influencing and shaping the minds of young, bright and energetic professionals around the world.

MTT-S hands-on Workshop

Modeling and Simulation of Microwave Antennas & Devices has been conducted only for selected set of people and the workshop was hands on with four set of batches comprising of 30 attendees per batch.

Professional Night



Day 1 of AISYWC '18 ended with a professional night where it was a night for all to suit up. The professional Night started with a Standup Comedy by Dr. Jagdish Chaturvedi, who is a dentist turned Standup Comedian. With roars of laughter everyone enjoyed the humor and fun being generated there. After that were few dance performances from Bangalore section which included fusion of Bharatanatyam and Kathak and various other dance forms which also included the famous fisherman's dance from Mangalore Subsection. Everyone enjoyed the performances as they did bring color to the atmosphere.

Day 2 (29 September'18)

Day 2 of AISYWC started with a keynote by Puneet Kumar Mishra, General Chair, AISYWC'18 and from ISRO on "Antennas for Satellite Communication". Followed by this were few other notable sessions by Ravikiran Annaswamy, Founder and Director of Innohobit Technologies on Entrepreurship and a design thinking workshop by Tathagat Varma, Country Head, Chinasoft. After the session by Prof. Debabrata Das, IIIT-B on How Wi-Fi Works, the morning sessions of Day 2 ended. The afternoon sessions after the lunch were again divided into multiple tracks like Day 1, like Student track, Young Professionals Track, Women in Engineering Track, Branch Councilors Track and MTS Hands-on Workshop.

Cultural Night







After a full packed day with much learnings, the evening of Day 2 was dedicated just for enjoyment. It was the cultural night where all the delegates were requested to represent their respective states and culture from where they come from. Everyone was dresses in beautiful attires and the performances were too by each section, representing their dance forms, songs and videos exhibiting their culture. The best cultural performance was bagged by Delhi Section and the best Video contest went to Bangalore and Bombay Section. It was a night of enjoyment fun and photoshoots, Day 2 ended with dinner and dropping all attendees back to their respective hotels.

Day 3 (30 September'18)

Day 3 and the last day of the AISYWC'18 started with a Session on Project Management – A Life Skill By Lt Col L Shri Harsha followed by which a session on Role of Microwave Remote Sensing in Quantifying and Managing Subsurface Water Resources: Mahta Moghaddam, IEEE GRSS. After this was an interesting session by Dr. Balakrishna Shetty, VC, SAHE on Spirituality, Science and Ethics. Followed by this was a session on AI and ML in Healthcare by Dr Preeti Bajaj, Director, GHRCE & Secretary, IEEE India Council and How to Organize an IEEE Technical Conference and its Best Practices: Prof. S N Singh, Technical Conference Coordinator, IEEE Region 10, and VC, MMMTU.

Valedictory



The valedictory function began by inviting the dignitaries Prof. SN Singh, Dr. Sivaji Chakravorti, Mr. Kaveesh, Mr Sudeendra Koushik and Puneet Kumar Mishra on the stage. Mr Kaveesh was invited to speak a few words about the event. After this there were multiple awards given for the various contests conducted during the span of 3 days, which included Video contests, poster presentation contests, logo contest and Mysuru foodie activity contest for which a Fitbit was given as the prize. Following this was the felicitation of Prof SN Singh and Dr. Sivaji Chakravorti by IEEE Bangalore Section. Mr.

Kaveesh was felicitated by the AISYWC team and then Mr Sudeendra Koushik and Puneet K Mishra was felicitated by Chair and Chair-Elect of IEEE India Council. The session ended with a vote of thanks and calling up all the volunteers who has tirelessly worked for months onto the stage for a photo.

Report by: Mr. Puneet Kumar Mishra, General Chair, AISYWC

Report on IEEE Sensors 2018 Conference

IEEE Sensors is a flagship annual conference which brings together people from different parts of the world with average strength of 600+ participants including Professors, Scientists, Research scholars and students. It was held in Pullman Hotel in New Delhi, India from 28-31 October 2018. The lead organizers included Anil Roy and Yogesh Gianchandani as General co-chairs and Rudra Pratap and Ravinder Dahiya as Technical Program co-chairs. The other attractive elements of the conference were 'Tutorial sessions', co-chaired by Krikor Ozanyan and Lina Sarro, 'Women in Sensors (WiSe)' co-chaired by Zeynep Celik-Butler and Enakshi Bhattacharya and 'Young Professionals (YP)' co-chaired by Sinead O'Keeffe and Saakshi Dhanekar. The conference was majorly supported by IEEE Sensors council and IEEE Gujarat Section.

The Plenary Speakers included Nitish Thakor from John Hopkins University, USA and National University of Singapore, Margit Zacharias, Vice President, Albert Ludwigs University, Fac. of Eng. (IMTEK), Freiburg, Germany and Ramgopal Rao, Director, Indian Institute of Technology Delhi, India. K. VijayRaghavan, Principal Scientific Advisor to the Government of India and Mylswamy Annadurai, Distinguished Scientist & Former Director, ISRO Satellite Centre, Bangalore were the special keynote speakers who talked on 'Engineering Nature' and 'Mangalyaan: the success story of India's first mission to Mars' respectively. (Shown in the picture).













One of the other attractive sessions of the conference was 'Women in Sensors (WiSe)' which had a Program Keynote Speaker as Veena Misra from North Carolina State University, USA. Her talk was entitled as 'Role of Advanced Wearable Sensor Systems in Healthcare'. This was followed by a Panel discussion with panel consisting of Lina Sarro, Professor and Chair, Department of Electronic Components, Technology and Materials, Delft University of Technology, Netherlands, Khalil Najafi, Biomedical Engineering Professor, Electrical Engineering & Computer Science Chair, Electrical and Computer Engineering, University of Michigan Ann Arbor, USA, Radislav Potyrailo, Principal Scientist, GE Global Research and Vikram Kumar, Dr Raja Ramanna DRDO Distinguished Fellow, Solid State Physics Laboratory Delhi, India; Honorary Professor, CARE, IITD, India. The panel discussed on Career Opportunities in Academia, Industry and Government Laboratories. This session was open to all men and women.

A session called as 'Young Professionals and WiSe Mentoring Round Table: Lunch with the Experts' was held during lunch time of one of the days of the conference. This session focussed on unique issues related to young professionals and women in sensors career development and gave the opportunity to all Young Professional and female participants to interact with experts in key areas of sensors. Participants were assigned a table based on their relevant topics (with an additional table specifically for Women in Sensors) in a setting that fostered attendee/expert interactions and provided networking opportunities with leaders in the field.

The last session of WiSe was only Women's session called as 'Women's Networking Session' which was an informal session for women working in different fields of sensors. It commenced with brief talks by the keynote speakers, Zeynep Celik-Butler, Professor, University of Texas, Arlington and Anitha Biddappa, Director, Enterprise Systems Division, IBM, India (please see the picture for reference) and was then open for discussions and networking between women in all stages of their careers.

The IEEE YP Program drew a lot of attention by beginning with YP reception and Halloween party followed by a dinner. This was co-ordinated by Saakshi Dhanekar, IIT Delhi and Sinead O'Keeffe, University of Limerick, Ireland.

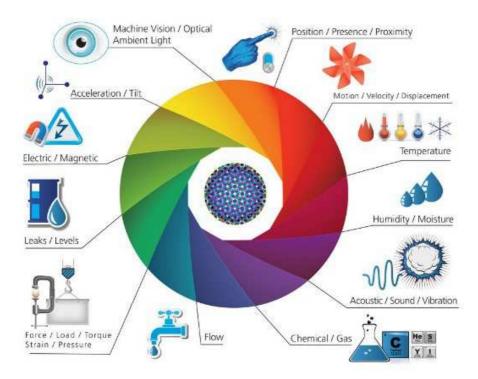


Around 80 YPs interacted informally and discussed about their present work, future collaborations and scope to work outside their organizations (the picture shows the strength of the YPs). The following day, there was Professional Development Program-I with a Panel discussion on 'Publishing in Journals and the Review Process'. The panelists were Sandro Carrara, EPFL Lausanne, Switzerland, Srinivas Tadigadapa, Northeastern University, Boston, MA, USA, Zeynep Celik-Butler, Professor, University of Texas, Arlington and Krikor Ozanyan, The University of Manchester, UK. This was followed by a talk by the IEEE Sensors Council Young Professional Representative, Hadi Heidari, University of Glasgow, Scotland, UK and IEEE Sensors Council Young Professional Award Committee Chair, Alper Bozkurt, North Carolina State University, USA. The Professional Development Program-II consisted of a talk by Elfed Lewis, University of Limerick, Ireland who is IEEE Sensors Council VP Technical Operations on 'IEEE Sensors Council Activities'. This was followed by a Panel discussion 'Work of the future' moderated by Bruce Hecht, Analog Devices, USA and Sinead O'Keeffe.

The conference also had many other poster, lecture, demo and industry track sessions. A detailed information and more pics of different sessions can be found at http://ieee-sensors2018.org. In all, this IEEE Sensors held 1st time in India was a grand success.

Report by: Dr. Saakshi Dhanekar, sdhanekar@care.iitd.ac.in

IoT Sensors and Actuators



Source & Courtesy: https://www.postscapes.com/what-exactly-is-the-internet-of-things-infographic/

IEEE Kerala Section Events

Sanitation Design Challenge

"Everyone must be his own scavengers"~ M.K Gandhi

To throw light to this very quote of M.K Gandhi, IEEE Kochi hub in association with Paytm build for India, Kerala Suchitwa Mission and Kerala Startup Mission conducted Sanitation Design Challenge, the finals of which was conducted on 1st December 2018 at Kerala Startup Mission, Kochi.

The event was meant to build solutions to the below mentioned problem statements: Railway toilets, Sanitation during natural disasters. Safe drinking water, Sewage and garbage disposal, Toilets in long distance buses, More number of public toilets, Proper toilet facilities during big events.

The design challenge was widely accepted by the IEEEians and received quite a good amount of entries from all over India.

After the abstract filtration and IEEE paper submission, 22 teams were selected to the finals with the total count of participants being 102. For the smooth conduction of the finals, 10 enthusiastic volunteers were also on board!





The event was graced by the presence of IEEE Kerala Section Chairman Dr. S.M. Sameer, IEEE Kerala Section Secretary, Mr. Shahim Baker and the Executive Director of Kerala Suchitwa Mission, Dr. Ajay Kumar Varma.



The event was judged by a panel comprising of Mr. Saurabh Jain, Vice President, Paytm, Dr. Nirmala Padmanabhan, Professor of Economics, St. Teresas and Mr. Siju Thomas, District Coordinator, Suchitwa Mission, Kochi.

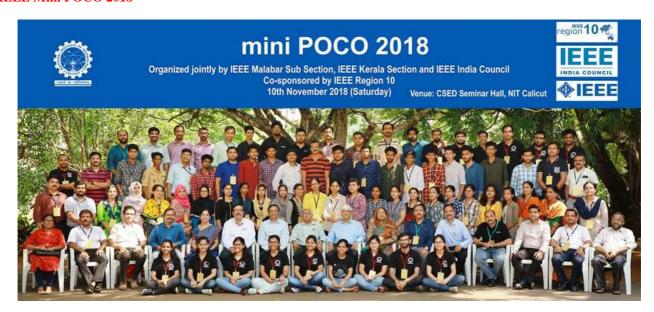
First prize of INR.25,000 was bagged by the team AHCSR comprising of E. Harikrishnan, V. Lavanya, and T.R. Haritha of NSS College of Engineering, Palakkad for their project Advanced Hygienic Cleaning System for Railways.

The second prize of INR 15,000 was bagged by the team Mechatrons comprising of Keerthi Vasan, Pirabu Kannan, Selva Kumar, Nishanth, and Suriya Prakash from Kongu College of Engineering, Erode for their project Autonomous oil spills removing robot.

The third prize of INR 10,000 was bagged by the team GT Labs comprising of Geo Jose, George Phili Puthiyote, Prabhav Rajeev, and Sayooj Surendran from Government Engineering College, Thrissur for their project Incinerating toilet.

IIT Hyderabad to launch India's first BTech course in AI: IIT Hyderabad is launching a full-fledged BTech program in Artificial Intelligence (AI) from the coming academic year 2019-20. The institute claims it has become India's first educational institution to do so, and likely the third globally besides Carnegie Mellon University and Massachusetts Institute of Technology (MIT). The course will enrol around 20 students through the JEE-Advanced exam.

The government has reportedly asked drone manufacturers to install safety chips for switching off drones remotely to avoid mishaps.



The mini Panel of Conference Organizers workshop sponsored by IEEE Region 10 was conducted on 10th November 2018 at NIT Calicut. Prof. Sivaji Chakravorti, Chairman, IEEE India Council inaugurated the event. Dr. S.M. Sameer, Chairman, IEEE Kerala Section, Dr. K.P. Mohandas, Senior IEEE Life Member, Dr. S.D. Madhu Kumar, Vice Chair, IEEE Malabar Sub Section and Mr. R. Nandaa Kumar, Convenor, Conference Activities Board, Kerala Section spoke on the occasion. Dr. S.D Madhu Kumar, was the convenor of the workshop.

Building the Conference - Starting to Finish, IEEE Timelines, Strategic Planning of IEEE Conferences, Managing CFPs, TPC Formation & Management, Quality Reviews, Challenges in Peer Review, Technical Program Preparation, Budget Planning and Financial Management of a Conference, Demo on YepDesk, a sample payment gateway, Conference Management Systems - EDAS and Easy Chair - Demo, Plagiarism Checking Tools & Publishing Proceedings in IEEE Explore - Demo, Role of Publication Chair, Guidelines towards applying for Co-Sponsorship of IEEE Kerala Section and India Council, were some of the topics covered in the workshop.

The speakers included: Mr. Harish Mysore form IEEE India office, Dr. Lilly Kutty Jacob, Professor, NIT Calicut, Dr. S.M. Sameer, Professor, NIT Calicut, Dr. G. Santhosh Kumar, Professor, CUSAT, Dr. Bijuna Kunju, Professor, TKM Engineering College, Kollam and Mr. R. Nandakumar, NIELIT, Calicut The workshop ended with an open forum moderated by Dr. K.P Mohandas.

The workshop was well attended with 64 registered participants including two nominees from IEEE Kolkata Section. Potential conference organizers deputed from more than 25 engineering colleges in Kerala attended the workshop. Dr. S.M. Sameer, Chairman IEEE Kerala Section and Dr. S.D Madhu Kumar, Convener of the workshop distributed the certificates.

Web page of the event: https://sites.google.com/nitc.ac.in/minipoco2018/

Shashi Tharoor introduces bill to regulate online gaming: Congress leader Shashi Tharoor introduced a private member's bill in the Lok Sabha that seeks to regulate online gaming. The bill aims to legitimise online games of skill and allow online gaming websites to apply for licenses to earn revenue.

Cybersecurity researchers have discovered a fake Google Chrome extension which steals credit card data via web forms on visited websites. The extension, by the title 'Reader Flash', is spread by means of JavaScript injection attacks, which display warnings like "You don't have Flash installed, use this Chrome extension instead". The extension had been reportedly available since February 2018.

The picture of an egg has become the most liked photo on Instagram with over 20 million likes (at the time of reporting), beating the previous record of 18 million held by Kylie Jenner's picture of her daughter Stormi.

German auto parts manufacturer Continental unveiled a concept delivery system at CES 2019 in Las Vegas. In the demo, a four-legged robotic dog hopped out of a driverless delivery van, crossed an obstacle, climbed stairs, and rang a doorbell with one of its limbs to deliver the package. Continental partnered with Swiss robotics company ANYbotics for the dog named 'ANYmal'.

IEEE Hyderabad Section Events Women in Engineering

Women in Robotics -- Phase I & Phase II

IEEE WIE Affinity Group, Hyderabad Section In Collaboration With **IEEE WIE MJCET** Presented **Workshop On** "**Design of Voice Controlled Robotic Arm**" Sponsored Under IEEE Asia Pacific(R10) WIE Visibility Enhancement Through Events Program(VEEP)

This event got overwhelming response from the students and participants. With low budget we can able to reach many high school students to inculcate STEM in their young minds. Also all the Engineering girl student participants had enjoyed the event while designing the "Voice Controlled Robotic Arm". This leaded us to organize many such events in future.





Phase I of Women in Robotics



Phase II of Women in Robotics

Leadership Opportunities for Professional Women at Vijayawada



mission of WIE AG, "Connect Support Inspire". This unique workshop

Women in Engineering Affinity Group, IEEE Hyderabad section in association with IEEE Guntur sub-section organized a two day workshop on "Leadership Opportunities for Professional Women", at Efftronics Systems Pvt. Ltd. Vijayawada, AP, on 27th & 28th October, 2018. The main aim of this event is enabling empowered women to work and exceed in all *PRODUCTIVE* sectors, energize them to Excel in contributing towards the socio-economic growth of the nation. This event has taken place to match the vision and

- Had featured some exemplars and achievers from different walks of life to share their Vision, Mission, and Journey to success and life lessons on Leadership!
- Opened up opportunities for women to pick-up courage, overcome hurdles and build leadership skills to excel.

The first day speakers are Ms. Vanitha Datla, Vice Chairperson, Elico Ltd., spoken on "Beat the c-suite blues", Dr. V. Nagalakshmi, Joint MD, IMIS, Pharma, spoken on "Ski jump the gender barrier", Ms. A. R. Anuradha, IPS, spoken on "Women Rights", Ms. D. Aparna, spoken on "Realize your dreams", and Dr. D. Ramakrishna, MD, Efftronics spoken on "Global women development". The second day speakers are Ms. Atreyi Choudhari, Nomura Research Institute, spoken on "Journey into future- tools to stay tuned", Ms. Chandini Chandana, CEO, AVERA Electric Vehicles, spoken on "start-ups challenges for women", Mr. S. Bhavani Shankar, spoken on "Goal setting game", Mr. D. Ramakrishna, MD, Efftronics, chair IEEE Guntur-subsection spoken on "Ideate, create, deliver- the success mantra", Dr. G. Sree Lakshmi chair, WIE Hyd. Section and Dr. S. L. N. Lalitha, vice-chair, IEEE Guntur sub-section spoken on "Building cradles of leadership at University level". Over 120 participants attended this event from academia and industry and the event got excellent feedback. Good numbers of speakers are drafted for this event to motivate every woman and spread that to many more women to build a sustainable global world. This event created an opportunity for every woman to excel in her roles and also getting awareness about the importance of WIE and the benefits and events organised by WIE. Mr. Ramakrishna, Chair, Guntur sub-section, Dr. Lalitha Madam and the Efftronics team played a key role in organizing this event.

Leadership Challenges for Professional Women at Tirupathi



Women in Engineering Affinity Group, IEEE Hyderabad section in association with IEEE Anathapuram sub-section organized a two day workshop on "Leadership Challenges for Professional Women" on 16-17 November, 2018 at SVECW, Tirupathi. The theme of the event is "INSPIRE CHANGE". Participants got an opportunity to get inspired and to get empowered themselves, in order to fearlessly break the barriers. This charge makes them to "Transform their world & Transform their life". "Be the Change, Be the Success". It's a great opportunity for every woman to overcome hurdles and to build leadership skills in order to excel in her roles. This event has attracted members towards research activities, self-reliant and independently empowered.

The event started with inaugural, Dr. D. M. Mamatha, Registrar, SPMVV, Tirupathi, addressed the gathering regarding "Women in

science and global development", Dr. Kalpalatha Reddy, Principal SVEW, Dr. N. Sudhakhar Reddy, Principal, SVCE also addressed the gathering in the inaugural session.

The first day speakers are Ms. Geeta Goti, Women Independent Director, National Small Industries LTD. Spoken on "Future skills for women leaders", Dr. P. Vijayalakshmi, Gynaecologist, spoken on "Women from Infancy to Menopause", K. Shyamala, DALLM, Advocate, spoken on "Legal Issues for Women", Dr. Sadhana, Opthomolgist, Dermatology, spoken on "Opportunities and Challenges", Dr. S. A. Thasleem, Director of Abhaya kshetram, spoken on "Special women and challenges", Ms.Sasi Bindhu, spoken on "Entrepreneurship: Opportunities and challenges for women", Dr. G. Sree Lakshmi, Chair WIE, spoken on "Balancing research and job for working women".

The second day speakers are Mini Chhabra, Deputy General Manager - Human Resource, BHEL Electronics Division, Bangalore, spoken on "Understanding Your Blocks to Excellence", Suja Warriar, Corporate sustainability, Reporting and Governance, Infosys Limited, spoken on "Social Leadership", Mr. Madhav Negi Associate Director solutions, DXC technology spoken on "Habits of successful professionals/IEEE membership benefits", Dr. Madhavi, Professor, Principal, SVIMS Tirupathi, spoken on "Women and power, overcoming barriers to leadership and influences", Dr. Latha Christie spoken on "Women leaders: The change makers", Dr. R Suguna, Dean Academics, Vel Tech, Chennai, spoken on "Changing role of women's in society", Sudarshan Chakrapani, Vice President, Head of the Brand and Customer Experience management, spoken on "So, you want to change the world? Great! Get ready NOW", and Dr. Madhavi, IEEE Anathapuram Sub-section, spoken on "Research Funding options for Women Researchers".

Over 150 participants both from academia and industry attended this event and made grand success. Dr. Shankar, Chair IEEE Anathapuram sub-section, Dr. Madhavi, coordinated for this event to take place at Tirupathi.

Research & Start-up Opportunities for Professional Women at Warangal



Women in Engineering Affinity Group, IEEE Hyderabad section in association with Vaagdevi group of Engineering Colleges organized a one day workshop on "Research & Start-up Opportunities for Professional Women" on 1st December, 2018. The theme of the event is "Dare to Dream and Work to Achieve". The workshop has focused on opportunities for women towards start-ups and how to work for research, how to write papers for journals and conferences. Dr. Amit Kumar, Vice-Chair, IEEE Hyderabad Section has spoken on "Do we live in Androcentric cities", Dr. Yedukondalu Professor, ECE, CVRCE, spoken on "How to publish research work", Ms. Sri Vidya Valdlapudi, Managing Director Innovivi center of excellence, spoken on "Research linked to start-ups", Mr. Sourav Karmakar, CEO Infinos, spoken on "Research to Entrepreneurship" and Dr. G. Sree Lakshmi, chair WIE AG IEEE Hyderaabd Section, spoken on "Best Practices in IEEE & WiE" Over 150 faculties from various engineering colleges around Warangal zone has attended the event and got benefited. The management of Vaagdevi College, Principal and Mr. Nagaraju helped in coordinating this event at Warangal.

Leadership Challenges for Professional Women at Hyderabad







Women in Engineering Affinity Group, IEEE Hyderabad section organized a one day workshop on "Leadership Challenges for Professional Women" on 16th December, 2018 at The Hotel Plaza, Begumpet, Hyderabad. The theme of the event is "Together we can change the World". Mrs. Ramalakshmi first IFS officer, spoken on Leadership qualities for Women, Mrs. Deepthi Ravula, CEO of WE HUB has spoken of 10 rules for successful women, Mrs. Vijayasree Orugnati has spoken on Change Management, Dr. Lakshmi Narayana Sadasivuni has spoken on Female Managers- Role in Economic Development", Mrs. Minni Chhabra spoken on Improving your emotional intelligence and Dr. Latha Christie spoken on "Women Leaders: The change Makers". Over 50 professionals participated for the event and got motivated by the eminent inspiring speakers.

First Flagship Lalitha Memorial Lecture (LML)





Women in Engineering Affinity Group (WIE AG), IEEE Hyderabad Section has initiated a New Lecture Series in the memory of "Ayyalasomayajula Lalitha", the first Woman Engineer in India. This is a first flagship event of WIE AG, IEEE

Hyderabad Section. The vision of initiation of this lecture is "minimizing the gender gap and assist sustainable development of our country for Science, Technology, Innovation and Entrepreneurship among woman". The mission of this lecture is to promote, to excel, to motivate young girls towards STEM, to make every woman to participate and reach their goals professionally, to emphasize, to retain and bring back the women dropping out in large numbers in mid-career into work force and to inculcate a "career identity" in strong young brains, which makes them to handle the demands of their personal and professional lives. The first LML talk was given by Dr. V. R Lalithambika, Director, DHSP, ISRO Hq. on the topic "New Horizons"

Abstract: "New Horizons"

Certain qualities of dynamic women such as the illustrious Smt. A. Lalitha enable them to be path breakers. How these qualities can be nurtured and developed to enable professionals, especially women, to expand their horizons and realize their full potential is the major topic of the talk. The current status of Science, Technology, Engineering and Mathematics (STEM) in India, the education aspects, and the challenges in STEM based jobs, especially for women are discussed. The talk also focuses on the new horizons which are opening up and the opportunities for the women professional.

This LML is aimed to attain the below objectives

- 1. To encourage more young women to enter the STEM fields for profession and to continue their careers.
- 2. To encourage participation of women in our country in all aspects of the scientific fields including education, teaching, research, leadership, employment and decision-making.
- 3. To promote the recognition of the scientific and technological achievements of women scientist and technologist in our country,
- 4. To increase the access of women to the socio-economic benefits of science and technology.
- 5. To promote collaboration and communication among women scientist and technologist with international scientific community.
- 6. To increase understanding of the role of science and technology in supporting Women's development activities

InCAP2018 Women in Engineering Special Session



The first InCAP was held in Hyderabad on December 16-19, 2018 at the Hyderabad International Convention Center (HICC) that is conveniently connected to the Novotel Hotel. InCAP2018 recognized contributions of prominent WiE in India and provided a platform for attendees to learn upcoming technologies, innovations and getting connected and network with the people belonging to their own domain. InCAP2018 has celebrated the vibrant & diverse community of women scientists and engineers. This session included invited talks from 9 women from academia and industry, who shared their research experiences and contributions. It was opened for both women and men.

Dr. G. Sree Lakshmi, Professor EEE Department, CVRCE, Hyderabad, Chair Women in Engineering Affinity Group, IEEE Hyderabad Section, glad to be a part of organizing committee of InCAP2018 Women in Engineering (WiE) special session on 18-12-2018. The WiE session got fabulous response from audiences; a good number of talks took place from various women scientist in the area of Antennas and Propagation. The session was started by Dr. Latha Cristie, Scientist, DRDO followed by Dr. Hema Singh, Principal Scientist in Centre for Electromagnetics, (CSIR-NAL) and Dr. G. Sree Lakshmi, Chair WIE AG IEEE Hyderabad Section.

List of speakers included Dr. Chandrika Sudhendra Scientist G, Group Director, ADE, Bangalore, Dr.Beenamole K.S. Scientist F, DRDO-LRDE, Bangalore, Dr. Balamati Choudhury Scientist, Centre for Electromagnetics, CSIR-NAL, Bangalore, Dr. Soni Singh, DST SERB Post-Doctoral Fellow, Department of Electronics and Communication Engineering, Indian Institute of Technology Roorkee, Dr. Jigyasa Sharma, UGC Post-Doctoral Fellow, ECE Department, Delhi Technological University, Delhi Dr. Latha ChristieScientist 'G', DRDO, Jalahalli, Bangalore - 560013, Dr. Runa Kumari Assistant Professor, EEE, BITS-Pilani, Hyderabad Campus, Dr. Naina Narang Assistant Professor, School of Computing and IT, Manipal University, Jaipur and Ms. Vinisha C.V, Ph.D. student, Department of Electronics, Cochin University of Science & Technology, Kochi (IEEE Student member).

At the end of the talks, the organizers coordinated a panel discussion with all the speakers about their views on WiE and taken the questions from the attendees.

Report by: G. Sree Lakshmi, Chair WIE AG, IEEE Hyderabad Section

IEEE Madras Section Events

miniPOCO 2018



IEEE Madras Section had organised a Panel Of Conference Organizers (miniPOCO) 2018 on 15th Aug 2018 at Heritage Hotel, Madurai. This event was conducted for the benefit of the IEEE Members, Volunteers, Academicians and Industrialists who are interested to organize quality IEEE Conference by understanding the IEEE Conference Policies.

The inaugural function of miniPOCO was conducted at 9:30 a.m. Dr. D. Devaraj, Excom. Member, IEEE Madras Section welcomed the gathering. The event was inaugurated by Dr. Ramakrishna Kappagantu, Past Director, IEEE R10 (Asia-Pacific). In his inaugural address, Dr. Ramakrishna Kappagantu stressed the importance of adhering to the IEEE polices to maintain the quality of the IEEE conference. Dr. P.A. Manoharan during his presidential address briefed the audience about the steps taken by the IEEE Madras Section to support the IEEE conference organizers.

The event had five sessions. The speaker for the first session was Dr. Ramakrishna Kappagantu and he gave a presentation on "Key issues and challenges in organizing IEEE conference". The next session was handled by Dr. Amit Kumar, Vice Chair, IEEE Hyderabad Section and the session was on "Heart of Conference-Focusing on Constituting a Technical Committee and Creating Peer Review Process". In his presentation, he highlighted the various steps to be followed in successfully organizing a conference. This was followed by a presentation on "Publications in IEEE Conferences and Journals".by Dr. B. Chitti Babu, Assistant Professor, IIITDM Kancheepuram

In the afternoon Dr. Ramalatha Marimuthu, Past Vice Chair, WIE-Technical Activities, R10 handled a session titled "The Good, The Bad and The Ugly: Organising a Conference". She explained the various best practices which can be adopted by the conference organizers. The session titled "e-processing of Conference Application" was handled by Dr. P.A Manoharan, Chairman, IEEE Madras Section, in which he presented the details of the web-portal developed by IEEE Madras Section for the benefit of conference organizers. Finally, Dr. Michael. N. Kumar, Secretary, IEEE Madras Section answered to various questions raised by the participants

About eighty senior level faculty members from various parts of Tamilnadu attended the event which provided a platform for them to gain the knowledge on how to organise and conduct a good quality IEEE Conference. The participants expressed satisfaction about this one day event. The valedictory function was conducted at 4.30 p.m.. Dr. D. Devaraj, thanked the gathering for their participation. Dr. P.A. Manoharan, distributed the certificates to the participants.

Report by Dr. S. Joseph Gladwin

Microsoft has revealed that it will not provide any security updates or support for PCs running on 'Windows 7' after January 14, 2020. Users can still use 'Windows 7' but the company has said PCs "will become more vulnerable to security risks" after the support ends. 'Windows 7' was first released in October 2009.

Nike recently unveiled its self-lacing smart basketball shoes, 'Adapt BB', that can be controlled through an app. The shoes contain a motor and gear train that senses the tension required by its user's foot and adjusts accordingly. A user can then tighten or loosen the shoes as required through physical buttons on the shoes or through a connected app.

US startup makes wristband that can control body temperature

IEEE Day 2018



IEEE itself resonates with aspects of learning through a community effort and this aspect was yet again proven right in the IEEE Day celebrations held in Chennai on behalf of the madras section in Koodal Hall, Anna University on 13th Oct 2018. It began with a warm reception by the IEEE members registering themselves and freshening up with a cup of tea following which they occupied the seats graciously put up in the hall. The program began with the reading IEEE code of conduct guided by Mr R. Nivas followed by the chief guest and the honorary office bearers of IEEE gracing the dais set up.

This was followed by Mr Manoharan delivering the welcome address and also briefing about the IEEE Day and its importance. Mr Sundaresh then introduced the chief guest of the evening Dr M Ponnavaikko and also spoke about his laurels and achievements. Following this, the chief guest delivered the keynote address covering on topics of how membership drives are very important and how each section and student branch must work hand in hand to make the working of IEEE more effective. He also spoke of the different funding schemes and how students and teachers can benefit from them. He reiterated the importance of checking the various announcements / call for events and the official IEEE website for events and other important details.

On a befitting note the chief guest also gave away the various prizes and accolades to the different IEEE competition winners and honoured different teachers who were supportive in making the IEEE difference in the section as a whole. To break the official monotone the members of the Comsoc Exec committee along with the IEEE office bearers cut the cake to commemorate the IEEE Day celebrations. After this a quiz on IEEE and its various facets was conducted where the participants who got the answers right were given a prize as a token of appreciation.

After the quick session of ice breaking and quizzing, Dr Hariprakash gave a talk on Know Your IEEE and how one can understand it's working. A talk on Membership Development by Dr. S. Elangovan, was delivered sharing his experiences of how he had done different activities and ideas to boost membership drive in colleges. Following the faculty talks was a R10 SYWL Congress 2018 report by Ms. Angelin Indira, IEEE ADSF SIGHT was a visual treat to the attendees as she picturised the different events and had put up lively photos of the congress. Dr Vaidehi also gave a lecture on how WIE is impactful in daily research and how women participation is welcomed and is crucial for an inclusive environment.

Presentation by student branches was done where a set of five colleges presented their IEEE student branch activities that were conducted in their colleges. Following this the event came to an official close where the vote of thanks was delivered by Dr. T. Michael Kumar beyond which the goodie of the vent a T shirt was given to all attendees and happy picture was clicked to celebrate the day. At last not the least a sumptuous dinner was served where all of them interacted in a casual way networking with each other.

Report by Dr. S. Joseph Gladwin

US-headquartered startup Royole displayed the world's first commercial foldable smartphone FlexPai at Consumer Electronics Show (CES) 2019 in Las Vegas. The device, with a 7.8-inch display, works on a Snapdragon 855 chipset and runs a customised version of Android Pie. Royole said that FlexPai is already on sale in China for 8,999 yuan (over ₹93,000) and can be ordered online.

India 2nd highest contributor to IBM's 2018 US patent record: IBM recently announced its inventors received a record 9,100 patents in 2018 in the US, to which India was the second highest contributor with over 800 patents. This marks the company's "26th consecutive year of US patent leadership" and crossing of the 1,10,000-patent milestone, IBM revealed. The patents were granted to over 8,500 IBM inventors in around 48 countries.

Facebook CEO Mark Zuckerberg in a Facebook post revealed his plans to host public discussions about the future of technology in society as his personal challenge for 2019.

IEEE UP Section Events

UPCON-2018: 5th IEEE UP Section International Conf. on Electrical, Electronics and Computer Engg.



The 5th IEEE UP Section International Conference On Electrical, Electronics and Computer Engineering , ÜPCON-2018" was organised on November 2-4, 2018 jointly by Madan Mohan Malaviya University of Technology, Gorakhpur, Uttar Pradesh and University of the Ryukyus, Okinawa, Japan in the Campus of Madan Mohan Malaviya University of Technology, Gorakhpur.

The inaugural Session was opened with address by Vice-Chancellor of the University and General Chair of the conference Dr. S N Singh welcoming special guest Mayor of Gorakhpur City Sri Sitaram Jaiswal and Sri Madhusudan Gulati, chief guest Prof. P. Nagabhushan, Director IIIT Allahabad, Prof. Tomohisa Wada, Department of Information Engineering, University of the Ryukyus, Okinawa, Japan and other delegates. Other delegates, plenary speakers, Keynote speakers and Session Chairs include:

- 1. Prof. (Dr.) Jay Giri, Ex. Director, PSTSI at GE Grid Software Solutions, Washington USA
- 2. Dr. Kang Dongshik, Faculty of Engineering, University of the Ryukyus, Japan
- 3. Dr. Bhim Singh, HAG Professor, Department of Electrical Engineering, IIT Delhi, India
- 4. Prof G C Nandi, Professor (HAG) IIIT, Allahabad, India
- 5. Dr. Kumar Vaibhav Srivastava, Department of Electrical Engineering, IIT Kanpur, India
- 6. Prof John Thompson, School of Engineering, The University of Edinburgh, UK
- 7. Dr. Masato Saito, Faculty of Engineering, University of the Ryukyus, Japan
- 8. Prof. (Dr.) Vassilios Agelidis, Professor, Technical University of Denmark (DTU), Denmark
- 9. Dr Aristides Kiprakis, University of Edinburgh, UK
- 10. Dr. Yogesh Singh Chauhan, Department of Electrical Engineering, IIT Kanpur, India
- 11. Dr Naran M. Pindoriya, Department of Electrical Engineering, IIT Gandhinagar, India
- 12. Professor Asheesh Kumar Singh, MNNIT Allahabad, India
- 13. Dr. Seema Awasthi, IIIT Allahabad, India
- 14. Dr. Satish Kumar Singh, IIIT Allahabad, India
- 15. Dr. Dilip Kumar Sharma, GLA University, Mathura, India
- 16. Dr. Aseem Chandel, REC Manpuri, India
- 17. Dr. Vinay Rishiwal, MJP Rohilkhand University, Bareilly, India

We received total 551 papers and 62 thesis for Ph.D. Symposium. The 244 papers were presented in 6 parallel technical sessions in total 33 sessions, The 11 Ph.D. thesis were presented in one Symposium session. There were 3 special sessions including one Women in Engineering (WIE), one IEEE Special Interest Group on Humanitarian Technology (SIGHT) and one Young Professional (YP) session. In each technical session one paper was awarded the best paper. Three Ph.D. thesis were awarded with 1st, 2nd and 3rd prizes with citation and cash prize of Rs. 8000/-, Rs. 5000/- and Rs. 3000/- respectively.

This conference was the biggest ever event organised by MMMUT, Gorakhpur. It became memorable for attendees and delegates after evening cultural program "Phoolon ki holi" performed by specially invited artists from Mathura on first day and "Kavi Sammelan" had been the evening attraction on second day of the event. The Valedictory Session was presided over by Vice-Chancellor Dr. S. N. Singh with gracious presence of IEEE Region 10 Director-Elect-2019 Sri Deepak Mathur and Dr. Bhim Singh, HAG Professor & Dean, IIT Delhi, India.

Report by: Dr. Prabhakar Tiwari

CCTES-2018: International Conference "Computational and Characterization Techniques in Engineering & Sciences"



The latest iteration of the IEEE International Conference on Computational and Characterization Techniques in Engineering & Sciences was organized by the Dept. of Electronics and Communication, Physics and Electrical Engineering, during 14-15, Sep 2018 at Integral University, Lucknow. The conference was attended by eminent academicians, faculty members, professionals, and students from various universities and representatives of government

institutions from all over the Indian subcontinent.

The Conference started with the welcome address by Prof. S.Hasan Saeed (Conference General Chair, Head Electronics Department), who also briefed about the achievements of Integral University in the fields of research and technology. Dr. Nadeem Akhtar (Dean Engg., Director Planning & Research) shared his views on how CCTES has been an important part of Integral University. Prof Aqil Ahmad (Vice-Chancellor), added towards the influence of CCTES, and how it encourages the different flows of ideas. Our Honble' Chancellor Prof. S.W. Akhtar, described how Integral University has had been carrying out the legacy of hosting the CCTES and its success.

The Conference was then addressed by guest Prof. Ing Sian Lun Lau Sian (Associate Dean, (Academics) Malaysia), and the Guest Of Honor, Dr. Khalid Khan, (CEng, Bombardier Transportation, Derby, UK), who were extremely grateful to be a part of it, and then all gathered for the release of the CCTES 2018 Souvenir, and furthermore mementos were presented as a token of gratitude felt. Prof. Monauwer Alam (Convener, Head Electrical Department) proposed the Vote of Thanks.

In the conference papers were presented in 7 major tracks:

- Advanced Computing, Software Engineering and IOT
- Data Communication and Signal Processing
- Electronics and Communication
- SS Application of Power Electronics in Renewable Energies
- Power Engineering, Digital Control System and Materials
- Renewable and Sustainable Energy
- Cybersecurity and IPR.

On 15th September, in the keynote address, Prof. Ekram Khan (AMU, Aligarh) described the Advancements of Digital Signal Processing, along with the Scope of IOT in the field of Agriculture, Temperature Monitoring. Prof. Ekram Khan, further talked about the Image Processing Devices and the typical encoders used, however his sheer focus was on the emerging trends of the digital signal & image processing. While concluding his keynote, he asked a very subtle yet impactful question, quoting "Everybody has a smartphone today, but do you even know why you have one? Do you even need one?"

In the conf. the papers were presented on topics that ranged from, Data Communications to Signal Processing, to Renewable Energy systems to Control Systems and IPRs. Every single paper presented here, had an edge over each other, as they all had described the emerging trends successfully, even explaining scenarios that have raised attention, as well as criticizing the existing methods and how they can be evolved, furthermore detailed surveys had an expert side to itself, as they were rich in data that had already been analyzed by the experts and were true to its form. A Skype Presentation session was also held that focused on authors presenting the Recent Trends of either tracks, showcasing a few newer methods that improved application of subjects, and deep surfaced reviews.

At the valedictory session, mementos were presented to best papers in all the seven tracks of the conference. The conf. came to an end with the vote of thanks by Dr. Imran Ullah Khan, Conference Chair & Organizing Secretary.

Report by: Dr. Imran Ullah Khan

Shares of the world's first trillion-dollar public company, Apple, have fallen over 38% between October 2018 and January 2019, costing it over \$450 billion in market capitalisation. CEO Tim Cook recently cut Apple's quarterly revenue forecast for the first time in nearly 20 years, adding the company expects to make \$84 billion, lower than the previous estimate of \$89-93 billion.

CICT-2018: Conference on Information and Communication Technology



The second edition of the conference CICT'2018 held at PDPM IIITDM Jabalpur during 26-28 October 2018. CICT is a joint annual event of the four centrally funded Indian Institute of Information Technology (IIITs) viz. ABV IIITM Gwalior, IIIT Allahabad, PDPM IIITDM Jabalpur, and IIITDM Kancheepuram. CICT is focused on information & communication technology (ICT) domain and provides a forum to professionals from industry, academia, government agencies and other institutions to exchange their latest research information and ideas in the field of ICT. CICT'2018 is technically sponsored by IEEE Bombay Section, IEEE UP Section, IEEE Madras Section, IEEE MP-Subsection, IEEE UP Section SP/C Joint Chapter and IETE Gwalior Sub-Centre. The conference is also financially sponsored by Brahmos Aerospace, MP Council of Science and Technology (MPCST) and IETE Gwalior Sub-Centre. The technical program of CICT'2018 features an array of keynote talks by eminent experts in the field of ICT along with two Tutorial Sessions, and a Women in Engineering (WiE) mini conference. The Conference also had a PhD symposium for providing a platform for recently graduated students to showcase their PhD work.

In the CICT2018, original unpublished research papers were presented in the following eight tracks:

- Track 1: Signal and Image Processing
- Track 2: Communication Systems
- Track 3: Networks and Information Security
- Track 4: Electronic Devices and Circuits
- Track5: Computational Intelligence & Machine Learning
- Track 6: Cloud and Big Data Management
- Track 7: Computer and Software Systems
- Track 8: Robotics and Control

The conference received total 143 papers in all the tracks out of which 82 papers were accepted for the presentation during 20 technical sessions of the conference. CICT2018 also witnessed 06 Keynote speeches by the eminent researchers of India and Abroad. The details of Keynote speeches are given below:

- 1. "Advances in C4I" by Dr. Sudhir Kumar Mishra, CEO & MD, BrahMos Aerospace.
- 2. "Geometric Modeling and Image Processing as Visual Informatics" by Prof. Yasushi Yamaguchi, University of Tokya, Japan.
- 3. "Modelling and analysis of communication systems with energy harvesting" by Prof. Vinod Sharma, IISc, Bangalore, India
- 4. "Role of NPCIL simulation technologies in Nation building" by Ms. Lipika Behl, Chief Engineer (Scientific Officer-H+), NPCIL.
- 5. "Machine Learning in Speech Processing" by Dr. Sunil Kumar Kopparapu, Principal Scientist, TCS Research & Innovation, Mumbai.
- 6. "Data-driven Performance Optimization for IoT Communications" by Prof. Swades De, Department of EE, IIT Delhi.

CICT'2018 also featured two tutorials on "Visualizing Feature Extraction and Classifier Design: An Application to Face Recognition" by Prof. Jamuna Kanta Sing, Jadavpur University Kolkata and "Introduction and Applications of Deep Learning" by Prof. Shekhar Verma, IIIT Allahabad along with the PhD. Symposium in which two PhD thesis were awarded with First and Second Best PhD Thesis Award.

Report by: Dr. Matadeen Bansal

IAC3T-2018: International Conference on "Advances in Computing, Control & Communication Technology



IEEE sponsored 3-days International Conference on "Advances in Computing, Control & Communication Technology (IAC3T-2018)" under the aegis of IEEE University of Allahabad Student Chapter was organized during September 21-23, 2018 at the Centre of Computer Education, Institute of Professional Studies, and University of Allahabad. This Conference has been technically sponsored by IEEE Computer Society, IEEE Signal Processing Society UP Section and IEEE Computational Intelligence Society UP Section. In the Conference, papers were invited under five tracks, namely, Communication Technology, Electronics and Control Systems, Software Engineering and Multimedia, Intelligence System and Advanced Computing. Total 24 quality papers in these areas were sorted out to be presented in four Technical Sessions. Eight keynote addresses were delivered by eminent speakers such as Prof. D.C. Pande, Distinguished Scientist, DRDO, Bengaluru; Dr. R.K. Sharma, Director, SSPL, DRDO; Dr. Narain Panigrahi, Distinguished Scientist, CAIR, DRDO; Prof. Subarna Shakya, Tribhuvan University, Nepal; Prof. Rubaiyat Yasmin and Prof. Mirza, University of Rajshahi, Bangladesh; Dr. Sandeep Paul, Dayalbagh Educational Institute, Agra and Dr. Tanveer J. Siddiqui, University of Allahabad.

A Software Development Competition under various themes such as Brain Inspired; Knowledge & Reasoning Based; Motion & Manipulation Based; Natural Language Processing Based; Spam Detection; Automated Governance through Improvised Learning and Recommender System was also held.

The Conference began with a Tutorial on "Knowledge Based System Design" by Prof. Anupam Agarwal of IIIT, Allahabad which covered the basics of Artificial Intelligence and the Demo Session providing glimpse of how an expert system should be designed.

In the Inaugural session, the chief guest, Prof. D.C. Pande, Distinguished Scientist, LRDE, DRDO said that tremendous growth has taken place in the field of Communication Technology. Mobile has reached every household and we are exploiting that region of electromagnetic spectrum which was not yet touched. At the same time it has thrown lot many challenges as a health hazard. So, it is realized that it has to be used in a limited way to avoid any serious health problem.

Dr. R.K. Sharma, Director, Solid State Physics Lab, DRDO, Guest of Honour said that all our activities are being governed and monitored by the cyber space. Battle space and cyber space has conversed because of all these three factors that have been taken up in the Conference i.e. Computing, Control and Communication. He said that it is required that the South Asian countries collectively look at its control in this direction. Prof. Rajeev Tripathi, Director, MNNIT talked about advances that have taken place in the abovementioned areas. He emphasized that ideas must not be limited by any kind of tool including the simulation tool. The Welcome Address was delivered by Prof. R.R. Tewari, General Chair, IAC3T-2018. The Vote of Thanks was delivered by Prof. Vivek Kumar Singh from BHU, Varanasi.

The Conference was well attended by around 50 delegates and experts from different Universities and eminent Technical organizations from India and IEEE University of Allahabad Student Chapter.

Report by: Rajiv Ranjan Tewari

US-based startup Volo Beauty showed a ₹28,000 cordless hair dryer at ongoing technology event CES 2019 in Las Vegas, which uses infrared bulbs and radiant heat to dry hair. Its maker claims the dryer cuts down frizziness and the time taken to completely dry hair. It lasts up to 13 minutes on high heat and 24 minutes on medium.

French startup makes smart glasses to alert sleepy drivers

ICACCCN-2018: International Conference on Advances in Computing, Communication Control and Networking



Two days, IEEE International Conference on Advances in Computing, Communication Control and Networking (ICACCCN-2018), was organized by department of CSE, IT and MCA, Galgotias College of Engineering & Technology, Greater Noida, India during 12-13 Oct 2018. The conference was technically co-sponsored by IEEE U.P. Section

The ICACCCN-2018 provides a rich environment of current & futuristic research topics to the delegates. All research topics were broadly categorized in 10 tracks from the field of Engineering and Sciences.

The technical program was rich and varied with keynote addresses and technical paper presentation sessions. There were 10 Keynote Speaker from National & International reputed Universities, Institutions and Industries, to enlighten the research scholars and participants. In total 42 technical sessions were organized for the paper presentations, including 4 technical sessions via Skype. Paper presentations in each technical session were evaluated by internal and external session chairs.

The conference IACCCN2018 got tremendous response from all over the world & received over 567 research papers from more than 15 countries. All these submissions & review process were done through on line Easy Chair software. All the papers gone through rigorous review process & were reviewed by three reviewers. Reviewers from different countries participated in this review process & contributed significantly by providing their valuable review comments. After quality filtration by review committee, 245 papers were accepted & 225 papers were registered for final presentation. All the papers were checked through plagiarism detector software Turnitin.

Apart from this, two workshops were organized in the field of Computer Science & Engineering. One workshop was organized on the "IOT- Internet of Things" and another workshop on the "Machine Learning". Around 50 delegates participated in these workshops. More than 300 delegates participated in conference including, Authors, Co-Authors and Attendee (Conference and Workshop). The conference was stimulating, vibrant, constructive and well organised.

Report by: Prof. (Dr.) Vishnu Sharma

South Korean startup The Little Cat showed its nearly ₹1.2-lakh smart cat treadmill to keep pet cats fit in the ongoing technology event CES 2019 in Las Vegas. The wheel-shaped device uses LED lights, which move along the centre of the ring, encouraging cats to follow it. The device can be controlled by users through a connected app.

Japanese startup mui Lab showed its smart wooden plank that can play music at the ongoing technology event CES 2019 in Las Vegas. The touch-sensitive smart plank lets users adjust the temperature and use Google Assistant through its interface. The device also gives users the option to display text responses instead of audio responses.

Infosys Co-founder Narayana Murthy has said that technologies like AI won't render people jobless in future but create more opportunities. Giving the example of the UK, the US and Japan, he said, "[T]hose countries that absorb technology more enthusiastically, have reduced their unemployment much more than those which didn't".

IEEE Day Celebrations at Rajkiya Engineering College Mainpuri



IEEE Student Branch, Rajkiya Engineering College Mainpuri celebrated IEEE DAY 2K18 along with the birth anniversary of Mahatma Gandhi and Shri Lal Bahadur Shashtri on 2nd October which started with the lamp lightening ceremony by Director Prof. Baikunth Nath Rai, Dean of Academics Dr. Aseem Chandel, Mr. Prakash Kumar Singh, Mr. Baljeet Yadav and other faculty members. The event was attended by about 100 members.

The IEEE Day celebration started with cake cutting ceremony and continued with various events. In association with different student branch chapters of IEEE, a "Newsletter Making Competition" with the theme of "GREEN ENERGY, CLEAN ENERGY" was organized to inspire the upcoming generation about the future goals towards Renewable Energy.

A presentation about IEEE and its benefits was given by the Student Activity Convenor U.P. Section Dr. Aseem Chandel for making the students aware about the institute whose core mission is to restore research, innovation, excellence for the benefit of humanity the IEEE "Institute of Electrical and Electronics Engineers."

The Student Branch Chair, Aman Shah, gave a brief report of the programs and events that had been organized in recent months.



On the same theme, a "Student Solar Ambassador Workshop" was organized in successful collaboration with IIT Bombay under which 40 pre-university students of class 10th to 12th from different schools like Aman International School Mainpuri, SBRL Academy Mainpuri etc were called for Solar Lamp Making. They had been provided with all the equipment and kit necessary for the construction of a solar - powered lamp along with the solar panel. The students were gifted with their self-made lamps and were made aware about the present innovations in these sectors.

Director, Prof. B.N. Rai appreciated the efforts of IEEE volunteers and Department of Electrical Engineering for organizing such a wonderful techno-social events. The student volunteers are provided with 'Certificate of Organizing' for their motivation.

Report by: Aseem Chandel

SEEMS-2018: International Conference on "Sustainable Energy, Electronics & Computing Systems



The Department of Electrical & Electronics Engineering of I.T.S Engineering College, Greater Noida hosted an International Conference on "Sustainable Energy, Electronics & Computing Systems, SEEMS-2018" in technical sponsorship of IEEE U.P. Section during October 26-27, 2018. The Conf. was inaugurated by Hon'ble Chief Guest, Prof. Salvatore Baglio, University of Catania, Italy, and Distinguished Keynote Speakers: Dr Jay Giri, Former. Director, GE Grid Software, Dr. Kumar Vaibhav Srivastava, Chairman, IEEE U.P. Section, Dr. Asheesh Kumar Singh, Vice-Chairman, IEEE U.P. Section, Mr. Raghav Agarwal, Director, Rotomag Motors & Controls Pvt. Ltd. Gujrat, Dr. Aseem Chandel, IEEE Conference Observer & Dr. Vikas Singh, Executive Director, I.T.S Group of Education, in the presence of delegates, authors, faculty & scholars.

General Chair, Dr. Monika Jain, Prof. & Head-EEE presented objectives & program highlights of SEEMS-2018. The Executive Director, Dr. Vikas Singh welcomed the gathering. Chief Guest, Prof. Baglio delivered inaugural talk on "Cantilevers, Magnets and Stoppers.. for Vibrational Energy Harvesting and other assorted Zero-Threshold "Diode Less" Applications. It was followed by a Keynote talk of Dr. Jay Giri, on "Managing Uncertainties of the Future Grid: Evolution of EMS Control Centers – PMU Synchrophasor Solutions "Keeping the Lights On! Yesterday, Today & Tomorrow!"

Next to this, a series of Plenary Session talks were delivered by Dr. Kumar Vaibhav, IIT Kanpur, on "Design Challenges of MIMO Antenna Systems for 5G Applications", Dr. Asheesh Kumar Singh, MNIT Allahabad on "Power Quality Issues: Existing & Emerging Challanges", Mr. Raghav Agarwal, Rotomag, Gujrat on "Solar Pump: Best Solution with BLDC Motor". Mr. Akshat Jain, Cyware Labs USA, Banglore on "Cyber Security in Sustainable Energy Infrastructure".

It was followed by Skype session talks by distinguished international speakers Dr. Jai Govind , Asian Institute of Technology , Thailand on" Distributed Power Grids: A Future Energy System and Dr. Sheldon S. Williamson, Canada Research Chair, University of Ontanio on "Power Electronics Enabled Electrified Autonomous Transportation and Emobility.

After lunch, authors & research scholars presented their papers under four tracks: Energy, Electronics, Advance Computing & Interdisciplinary in the presence of reputed Session Chairs. A Student Conclave was also organized by IEEE UP Section Student Activity Convener., Dr. Aseem Chandel and Dr Asheesh K. Singh, MNIT-A.

The second day was started with welcome address by General Chair, Dr. Monika Jain followed by tutorial talk of Mr. Saurabh Nishad, CEO, Nexotron Infotech Ltd on "Industrial IoT: Its Vertical Applications in Real Time Systems". Next Plenary Session: "Cloud Computing Paradigm: Access Control Models" was delivered by Prof. Shabana Mehfuz, JMI Central University, India. It was followed by Skype sessions "The role of pneumatic actuation in haptic-enabled VR/AR systems by Dr. Aishwari Talhan, Postdoc Researcher, Kyung Hee University, South Korea,

The conf. ended with a valedictory session chaired by Mr. Nitin Kathuria, the organizing chair of SEEMS-2018 in which Best Papers Award was presented along with certificates for paper presentation to the authors

Report by: Dr. Monika Jain

US company Chico's FAS' Soma brand showed a smart bra that can determine its user's "accurate" bra size at the ongoing technology event CES 2019 in Las Vegas. The bra, which is equipped with a measurement sensor and Bluetooth, captures key body measurements when slipped on by a user. It then sends the "accurate" bra size to a connected app.

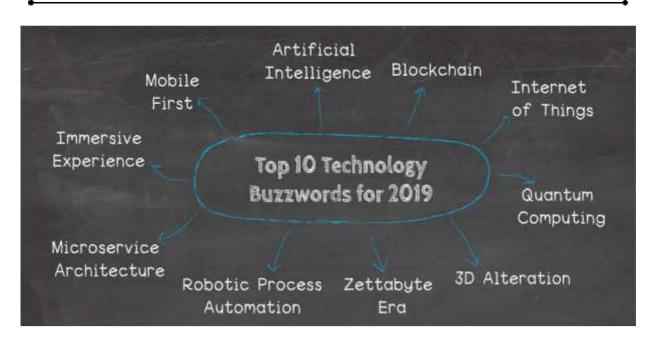
ICMETE-2018: International Conference on Micro Electronics and Telecommunication Engineering



The 2nd 2018 International Conference on "Micro Electronics and Telecommunication Engineering" was held on 20-21 September 2018 at SRM University, NCR Campus, Ghaziabad, Uttar Pradesh,. The conference was technically sponsored by the IEEE UP Section and held in collaboration with IEEE CPS USA. The theme of the conference was chosen to provide a forum for engineers, academicians, scientists and researchers to present the result of their research activities in the field of Micro Electronics and Telecommunication Engineering. The primary focus was to create an effective medium for research and education institutions to share ideas, innovations and problem solving techniques.

The conference sessions included 10 eminent speakers sharing their knowledge and ideas with the group of scholars, faculties and professionals. Out of 134 papers received across the world, 76 papers were accepted and the authors of 68 papers registered at the conf. and 66 papers were presented in nine different tracks.

Report by: Dr. Rohit Sharma



Source & Courtesy: https://www.datapine.com/blog/technology-buzzwords/

IT in Oct - Dec 2018



Prof. S. SadagopanDirector, IIIT-Bangalore
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Universities, R &D and S &T

- QS India rank is out in October 2018; IIT Bombay and IISc score real high
- MIT sets up AI College with \$ 1 Billion investment in October 2018
- Atos gets the Super Computer order worth hundreds of crores from National Supercomputer Mission on November 23, 2018
- **ISRO** puts G29 Satellite on November 14, 2018, a heavy duty satellite in orbit on December 5, 2018; communication satellite GSAT 7A on December 20, 2018; launches 29 satellites including HiSys on November 29, 2018;
- India's Exseed Communications satellite launched by SpaceX on December 4, 2018
- Gujarat creates history by **tele-robotic coronary intervention surgery** in Ahmedabad on December 5, 2018
- Robots to manufacture Robots in the ABB plant in China from October 2018
- Algo Art fetches \$ 430K on October 27, 2018 a milestone for computer generated Art

Markets

- **Microsoft** becomes the **most valued company** with \$823.9 Billion on November 23, 2018; Apple at No 2 and Amazon at No 3 on that date; earlier, Apple and Amazon had gone past one trillion dollar mark (the first time ever in history)
- **IBM** acquires **Red Hat** on October 29, 2018 for a whopping \$ 43 Billion!
- SAP buys Seattle-based survey software company Qualtrics, for \$ 8 Billion on November 12, 2018
- \$ 24 Billion **Softbank IPO** was on as per plan on December 18, 2018; loses \$ 9 Billion on Day 1!

Products

- Samsung launches foldable phone on November 8, 2018
- Microsoft launches new models of Surface Tablet and Surface Laptop and MS Audio Headsets on October 2, 2018
- Google launches Pixel 3 and Pixel 3 XL phones in October 2018
- Apple announces new iMac, MacBook, Mac Mini on October 30, 2018

Indian IT Companies

- HCL creates history; decides to acquire select IBM software products for \$ 1.8 Billion in December 2018
- TCS makes its first digital acquisition of London-based W12 Studios on November 1, 2018; and its second acquisition of BridgePoint, a US-based consulting company specializing in retirement services, on November 28, 2018
- Infosys acquires 81% stake in Hitachi Procurement Services and forms a JV in Japan on December 14, 2018
- MPhasis buys Virginia, US based cloud technology services company Stelligent Systems for \$ 25 Million on November 8, 2018

MNC IT Companies in India

- **Facebook** signed up for 2,20,000 square feet space in Bangalore; with this the entire new generation IT biggies **FAAMG** (Facebook, Amazon, Apple, Microsoft, Google) are present in Bangalore
- Xiaomi starts 500 stores on a single day in rural India on October 29, 2018; plans to have 5,000 stores in India
- OnePlus India R&D Center starts operations in Hyderabad in December 2018
- Mobile manufacturer **Oppo** starts its **R & D enter** in Hyderabad on December 14, 2018
- Qualcomm announces its plan to set up its largest campus in Hyderabad on October 6, 2018
- Ericsson launches its global accelerator program in Bangalore in December 2018
- Siemens Gamesa starts India R & D Center in Bangalore on December 6, 2018

- SAP does ground-breaking for its 40-acre second campus in Bangalore on November 29, 2018
- vmWare to invest \$ 2 Billion in India in the next 5 years
- Chinese TV manufacturer **TCL** performs ground-breaking ceremony for a new **plant** in Tirupati on December 22, 2018
- Elbit of Israel and Adani commission their Drone manufacturing facility in Hyderabad on December 14, 2018

People

- ISRO Infosys Science Prizes get announced on November 13, 2018; Professor Navakanta Bhat of Indian Institute of Science for the Engineering & Computer Science; Professor Kavita Singh of JNU for Humanities; Professor Roop Mallik of TIFR for Life Sciences; Professor Nalini Anantharaman of Strasbourg for Mathematical Sciences; Professor SK Satheesh of Indian Institute of Science for Physical Sciences and Professor Sendhil Mullainathan of University of Chicago for Social Sciences
- Wipro Chairman Premji conferred "The Legion d'Honneur (Legion of Honour) the highest French civilian award - on November 28, 2018
- Thomas Kurien, earlier with Oracle, takes charge as **Head of Could business for Google** on November 22, 2018
- India sees lots of changes in key person in economic management in December 2018; **Urjit Patel** resigns suddenly as Reserve Bank Governor on December 11, 2018; **Srikanth Das** takes over as the new RBI Governor within 24 hours; **Krishnamurthy Subramanian** is the new **Chief Economic Adviser** to the Government; **Sunil Arora** is the new **Chief Election Commissioner** and **AN Jha** is the new **Finance Secretary**
- Mysore-born Dr Gita Gopinath is IMF Chief Economist from October 2018
- PV Sindhu is the first Indian to win Gold in BFW World Tour Finals on December 15, 2018
- Airtel CEO and Reliance Jio CEO on the GSMA, the influential global GSM Body in November 2018
- FedEx names Rajesh Subramaniam as its new CEO on December 29, 2018
- Huawei CFO (daughter of CFO Founder) arrest in Canada in early December causes serious global implications
- **FlipKart** Founder **Binny Bansal** leaves the organization in November 2018 (after the completion of Wal-Mart acquisition)
- Microsoft co-founder Paul Allen passes away on October 15, 2018 at the age of 65

Start-up Scene

- PayTM technology powers Japan's Pay Pay starting October 2018
- Wal-Mart Labs acquires Int.AI in Bangalore on December 13, 2018
- Google acquires Sigmoid the owner of "where is my train" App on December 10, 2018
- **Softbank** to invest \$ 1 Billion in **Ola** in December 2018
- **Swiggy** gets \$ 1 Billion capital infusion in December 2018
- **Baiju** gets more investment; market value soars to \$ 3.6 Billion on December 10, 2018
- Automation Anywhere (Robotics Process Automation software leader) gets \$ 300 Million funding from Softbank Vision fund on November 15, 2018
- Hotel rooms aggregator **Oyo enter UAE** in October 2018
- **IDG Ventures** become **Ciruthe** on October 15, 2018

Interesting Applications & Apps

• HDFC's new mobile App behaves erratically and HDFC had to pull the App back on December 3, 2018

Interesting numbers

- Indian stock market index Sensex though turbulent, is the best globally in 2018 with nearly 6% rise!
- Kaiga nuclear plant creates a world record with 941 days of continuous production in December 11, 2018
- FlipKart sells 1 million smartphones in one hour on its Billion Days

General

- Indian government sticks to its deadline of October 15, 2018 for "local storage" of payment data
- Supreme Court upholds the constitutional validity of GST Act on October 4, 2018; Data interception order of the Government on December 23, 2018 causes lots of heartburn
- This quarter saw unprecedented **uncertainty**, economically, politically and in general
 - Oil price fluctuation, Rupee weakening, RBI Governor change and global stock market fluctuation
 - BREXIT uncertainty in UK, protests in France and Government lock down in USA; and,
 - cyclone Gaja in South India, Californian fire in USA, and Indonesian Tsunami

About the author: Professor Sowmyanarayanan Sadagopan (ss@iiitb.ac.in) is the Director of IIIT-Bangalore. These are his personal views. He has been writing on "What's Hot in IT" from an Indian perspective continuously from 1997; Times of India, Financial Express, IT Magazine carried the monthly (and yearly columns) till 2016; IEEE India has been carrying the quarterly columns since 2017.

Information Resources



Compiled by
Mr. H.R. Mohan

Editor, IEEE India Info – The Newsletter of IEEE India Council ICT Consultant & Former AVP (Systems), The Hindu, Chennai hrmohan.ieee@gmail.com

Essential Software Developer Skills, Technologies & Languages for 2019: This article covers the biggies for technical languages, front-end and back-end (plus full-stack), app dev, machine learning, methodologies, and more. It's packed with all the best technologies to brush up on to get ahead in 2019. https://goo.gl/XcaEXm

The Public Relations (PR) Guide for Engineers: PR (public relations) can be an effective way to drive a lot of awareness around what you're building, and help your team increase signups, lift sales numbers, or generate interest from investors. And unlike ads you might pay for, PR is earned media, which is free, and can feel more authentic because it comes from an unbiased source. This is a tactical beginner's guide to PR for developers, meant to help you get started with your press outreach and PR strategy. https://goo.gl/pXCrXZ

Product Management for Engineers: Product managers or PMs are responsible for the overall product experience. They decide what to build, and — just as importantly — what not to. PMs and Heads of Product answer the question, "What problems are worth solving?" Whereas project managers answer, "Are we on track to deliver on time and on budget?" Translating the voice of the customer into prioritized product requirements requires PMs to wear many hats, and a core responsibility is that they ensure what's being built is what people actually need. This article deals with five key traits for what makes a good PM. https://goo.gl/JP6XY8

Marketing for Engineers: Marketing is "the exchange of goods and services aimed at satisfying the needs and wants of buyers and sellers." That's a business school way of saying it's marketing's responsibility to understand your customers' needs and wants, and to make sure they're heard by your team. We'll outline the marketing planning process and the basic language of marketing to help you better understand marketing's role in the product development process. https://goo.gl/75M5ac

Sales for Engineers: It doesn't matter if you're a junior developer or the Head of Sales — everyone on your team should know your sales pitch and be able to describe what you're building. For example: "PullRequest is code review as a service using a combination of automation tools and professional, on-demand reviewers to help development teams catch bugs and improve code quality." In one sentence, we describe our product (code review as a service), who it's for (development teams), and how they'll benefit (write vetted, high-quality code). Understanding how to craft your sales pitch will help you better describe your own projects, and make it easier to get buy-in. https://goo.gl/KKBFrb

How to Create a Programming Style Guide: A programming style guide is an opinionated guide of programming conventions, style, and best practices for a team or project. Some teams call it their coding guidelines, coding standards, or coding conventions. While these each have their own meaning in programming, they generally refer to the same thing. For this post, I'm referring to any set of guiding programming standards used by a team in hopes of making their code more consistent as a style guide. A team following a style guide helps everyone write code in a consistent way, and consistent code is easier to read and faster to update. Consistent code is easier to read and understand making it faster to add new features. https://goo.gl/g6kX6N

IoT's upcoming trends and business opportunities: Earlier what was called machine to machine was merely an idea and now IoT which is a giant network of connected things is no longer a nascent dream. McKinsey predicts the IoT market will be worth \$581B for ICT-based spend alone by 2020, growing at a Compound Annual Growth Rate (CAGR) between 7 and 15%. According to Statista, for 2020, the installed base of Internet of Things devices is forecast to grow to almost 31 billion worldwide. "The IoT will continue to deliver new opportunities for digital business innovation for the next decade, many of which will be enabled by new or improved technologies," said Nick Jones, research vice president at Gartner. Whether you are thinking of creating your own IoT startup or considering adding IoT applications to your business or just inquisitive, it is essential to know some of the key trends that will shape IoT in 2019. https://goo.gl/yqQGvo

10 Key Aspects To Consider When Managing Tech Projects: Nowadays there is a natural progression for senior software developers (either in startups or more corporate style companies) to make the jump from their current technical role to a more leadership/management oriented role. This progression is usually motivated by several needs which arise from the evolution of the company/team/product and require the senior dev to dedicate his time to training/onboarding, planning/road mapping and leading the team, contributing to more macro level decisions and coaching while becoming less and less involved in day-to-day engineering activities. The title of the job is not always "Manager". It's usually something along the lines of VP of Engineering or Tech/Team/Project Lead, which carries a different meaning from having Manager in your job title, even though it requires a lot of management activities. In this article, I'm going to introduce how and why the jump from a more technical oriented role to a more management oriented one happens and the issues it may carry along with it. I've drawn some inspiration from this lovely article from Charity Majors, you should definitely check it out. I'll also go in depth on the challenges facing you when you make the jump. https://goo.gl/tZ7S19

Plagiarism Detection: Explore the latest articles, projects, and questions and answers in Plagiarism Detection, and find Plagiarism Detection experts. https://goo.gl/fwDM4K

Whitepaper on using electromechanical design to streamline the design process: Today's products have become ultrasophisticated cyber-physical systems. They have software, interconnected circuits and attached sensors, actuators and communications interfaces. Download this whitepaper to learn how working on an integrated platform with cross-domain technologies, common data backbones and shared libraries helps engineers make faster, more informed decisions; ultimately delivering better designs. https://goo.gl/kk7rZN

Amazon and Google can change how we use energy: Big tech—in this case, Amazon and Google—is starting to make its way into the energy industry on the backs of voice technology and in-home devices. Over the next few years, we'll see the two companies help carve out a new landscape for residential energy management. For those familiar with Silicon Valley's strategies, this might come as expected: enter an old industry, solve some of its inefficiencies, and dominate it. However, the energy industry is unique. Big tech's story in energy—at the moment we're in—won't be about domination. Instead, it will help support the electric grid, teach us how to use electricity more efficiently, and even promote the use of renewable energy. https://goo.gl/zPd6Xg

Unbundling The Autonomous Vehicle: Autonomous vehicles rely on several advanced technologies to self-navigate. We unbundle the AV to see how these technologies work together and which companies are driving them forward. Autonomous vehicles rely on a set of complementary technologies to understand and respond to their surroundings. https://goo.gl/M7foKo

An Introduction to Dew Computing: Definition, Concept and Implications: Since the end of the 1990s, the world has witnessed a tremendous growth in the area of information and communication technology (ICT), starting with grid computing, cloud computing (CC), and fog computing to recently introduced edge computing. Although, these technologies are still in very good shape, they do heavily rely on connectivity, i.e., Internet. To address this challenge, this paper proposes a novel dew-cloud architecture that brings the power of CC together with the dew computing (DC). Originally, the dew-cloud architecture is an extension of the existing client-server architecture, where two servers are placed at both ends of the communication link. With the help of a dew server, a user has more control and flexibility to access his/her personal data in the absence of an Internet connection. Primarily, the data are stored at the dew server as a local copy upon which instantiation of the Internet is synchronized with the master copy at the cloud side. Users can browse, read, write, or append data on the local dew site, which is a local Web form of an actual website. With the incorporation of the dew domain naming system and dew domain name redirection, mapping between different local dew sites has become possible. Novel services, such as infrastructure-as-a-dew, software-as-a-dew service, and software-as-adew product, are, hereby, introduced along with the DC. This paper presents the following as key contributions: 1) a precise and concrete definition of DC; 2) detailed and comprehensive discussions of its concept and working principle; 3) application potentials; and 4) technical challenges. The motto of this paper is to conceptualize the fact of empowerment of the ICT-user base with almost an Internet-free surfing experience in coming days. https://goo.gl/rPQx9A

Cheat Sheets for AI, Neural Networks, Machine Learning, Deep Learning & Big Data: The Most Complete List of Best AI Cheat Sheets. Over the past few months, I have been collecting AI cheat sheets. From time to time I share them with friends and colleagues and recently I have been getting asked a lot, so I decided to organize and share the entire collection. To make things more interesting and give context, I added descriptions and/or excerpts for each major topic. This is the most complete list and the Big-O is at the very end, enjoy... https://goo.gl/HVS6HN

The Moral Machine experiment: With the rapid development of artificial intelligence have come concerns about how machines will make moral decisions, and the major challenge of quantifying societal expectations about the ethical principles that should guide machine behaviour. To address this challenge, we deployed the Moral Machine, an online experimental platform designed to explore the moral dilemmas faced by autonomous vehicles. This platform gathered 40 million decisions in ten languages from millions of people in 233 countries and territories. Here we describe the results of

this experiment. First, we summarize global moral preferences. Second, we document individual variations in preferences, based on respondents' demographics. Third, we report cross-cultural ethical variation, and uncover three major clusters of countries. Fourth, we show that these differences correlate with modern institutions and deep cultural traits. We discuss how these preferences can contribute to developing global, socially acceptable principles for machine ethics. All data used in this article are publicly available. https://goo.gl/4qedSi

Top Tech Trends In 2019: Technology is now central to every industry — from building construction to healthcare administration to food production. CB Insights looks at the top tech trends poised to reshape industries in 2019 in its 57 pages report. https://goo.gl/b6cvX9

Ministry Of Home Affairs Issues Handbook For Students/Adolescents On Cyber Safety: Recently, the Ministry of Home Affairs (MHA), Government of India, in consultation with Cyber Security experts prepared a 38 pages Handbook for Students/Adolescents on Cyber Safety. The Handbook aims at creating awareness among citizens, especially students, about various cyber threats that can impact them and ways to safeguard themselves against cybercrimes. https://goo.gl/Er9iiR

17 ways you should invest your time in your 20s for long-term success: Don't waste time, because that's "the stuff life is made of." It was good advice when Benjamin Franklin said it, and it's good advice now, no matter your age. But your 20s are a particularly crucial time in life. Many call these the "formative" years, and the habits you form now can carry you through the rest of your life. So what's the best way to spend this time? https://goo.gl/Vig5W2

10 Trends That Will Shape the Digital Workplace in 2019: The digitalization of the workplace is challenging businesses globally to adapt quickly to meet the needs of their talent and customers. While a simple solution is to update current business technology to the latest and greatest, business leaders quickly find that this is not a sustainable practice in the long run. The solution for most enterprises is to introduce a digital transformation strategy, which, in turn, is posing a direct threat to traditional business models and companies. Technologies such as social media, mobile applications, analytics, the cloud and the internet of things (IoT), have been successful in attracting and keeping talent and customers. But, it goes beyond changing technology — company culture needs to change. When we asked a number of C-Suite executives what they thought would be trending in the digital workplace over the coming year, 10 trends emerged, many of which had already been identified at the beginning of 2018 as disruptors. https://goo.gl/T1VjH6

The Top 10 Books of 2018 for Entrepreneurs: From the stacks of books received for review and picked up from overseas visits, here are some of the best titles of the year for startup founders, social entrepreneurs, innovators and changemakers! 2018 has been another outstanding year for books about entrepreneurship and innovation, with more of a focus on scaling approaches -- reflecting increased maturity of the startup ecosystem. See our earlier lists of 'Top 10 Books for Entrepreneurs' from the past six years as well: 2017, 2016, 2015, 2014, 2013 and 2012. https://goo.gl/rs8j3e

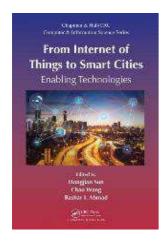
Favourite science news stories of 2018: Every year, Science publishes hundreds of news stories, both online and in our weekly magazine. And whereas many of these highlight huge advances in research (some of which get a nod in our breakthroughs of the year), a lot are simply cool stories that resonated with us, our readers, or both. And that's what this list focuses on—some of our coolest and most popular online news stories of the year. It's an eclectic mix, and you're sure to find at least a few you'll want to read—or read all over again. https://goo.gl/cWKN1K Video: 2018's Breakthrough of the Year and runners-up. https://goo.gl/MTa5P5

eBook: A "Quotable" Life: Mr. G. Sankar, a writer, speaker, and trainer on individual and organizational growth, who has been a resource person at the workshop on "Change Management" jointly organised by CSI & IEEE CS, IEEE PCS has come out with a book on quotations on the growth dimensions of health, wealth, education, relations, and spirituality. The book -- A "Quotable" Life is a book of 320 inspiring quotes and is available for free download. The author hopes it will serve as a daily dose of guidance, and blessing for all to enjoy life fully. Download it from https://www.slideshare.net/sankarspeak/a-quotable-life

190 universities just launched 600 free online courses: If you haven't heard, universities around the world are offering their courses online for free (or at least partially free). These courses are collectively called MOOCs or Massive Open Online Courses. In the past six years or so, over 800 universities have created more than 10,000 of these MOOCs. In the past four months alone, 190 universities have announced 600 such free online courses. I've compiled a list of them and categorized them according to the following subjects: Computer Science, Mathematics, Programming, Data Science, Humanities, Social Sciences, Education & Teaching, Health & Medicine, Business, Personal Development, Engineering, Art & Design, and finally Science. Many of these are completely self-paced, so you can start taking them at your convenience. https://goo.gl/CPwrGo

For more information resources and interesting reads, please https://goo.gl/fWnCwy for the archives of the blog pos of t Interesting Reads

BOOKS



From Internet of Things to Smart Cities: Enabling Technologies

Edited by Hongjian Sun, Chao Wang, Bashar I. Ahmad 2017 / 430 Pages / hardcover / UKP 92

ISBN: 9781498773782 / Chapman and Hall/CRC

This book explores the information and communication technologies (ICT) needed to enable real-time responses to current environmental, technological, societal, and economic challenges. ICT technologies can be utilized to help with reducing carbon emissions, improving resource utilization efficiency, promoting active engagement of citizens, and more. This book in three parts, aims to introduce the latest ICT technologies and to promote international collaborations across the scientific community, and eventually, the general public. The first part explores the involvement of enabling technologies from basic machine-to-machine communications to IoT technologies. The second part of the book focuses on state of the art data analytics and security techniques, and the last part of the book discusses the design of human-machine interfaces, including smart home and cities. Some of the features of

the book include: Extended literature review of relevant technologies, in addition to detailed comparison diagrams, making new readers be easier to grasp fundamental and wide knowledge; Contains the most recent research results in the field of communications, signal processing and computing sciences for facilitating smart homes, buildings, and cities; Includes future research directions in IoT, smart homes, smart buildings, smart grid, and smart cities; and Presents real examples of applying these enabling technologies to smart homes, transportation systems and cities With the increasing interest in Smart Cities around the world, this book has a potential to be a reference volume to the professionals.



Neoskilling for Digital Transformation and the Artificial Intelligence Revolution

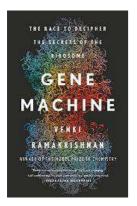
By Prof. L Prasad, S. Ramachandran

2018 / 180 Pages / Paperback / Rs. 729 (Rs. 700 on Amazon India)

ISBN: 9788126577156 / Wiley India

Managers reskill their teams, to meet today's needs. Leaders think ahead, for the futuristic long-term needs of their organization and the overall ecosystem to excel and reap the benefits of Digital Transformation we are undergoing - "neoskilling" in short. Neoskilling is holistic and beyond formal class-room training, requiring a mental metamorphosis. It includes soft skills, cultural aspects and instills higher-order thinking in individuals and groups in preparation for the Workplace of the Future. Leaders must avoid a strategically Myopic, INtellectually IMpoverished, Ethically

Challenged, obtuse management approach, ensuring that they do not fall into the MINIMEC trap as they undertake this journey. For influencers and policymakers, neoskilling helps in socially inclusive growth, taking digitization and its benefits beyond corporates to every section of the society and for employability.



Gene Machine: The Race to Decipher the Secrets of the Ribosome

By Venki Ramakrishnan

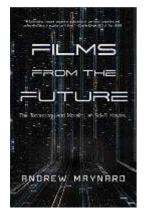
2018 / 288 pages / Hardcover / Rs. 699 (On Amazon India Rs. 436)

ISBN: 978-9353023232 / HarperCollins India

Everyone has heard of DNA. But by itself, DNA is just an inert blueprint for life. It is the ribosome--an enormous molecular machine made up of a million atoms--that makes DNA come to life, turning our genetic code into proteins and therefore into us. Gene Machine is an insider account of the race for the structure of the ribosome, a fundamental discovery that both advances our knowledge of all life and could lead to the development of better antibiotics against life-threatening diseases. But this is also a human story of Ramakrishnan's unlikely journey, from his first fumbling experiments in a biology lab to being the dark horse in a fierce competition with some of the world's best scientists. In the end, Gene Machine is a frank insider's account of the

pursuit of high-stakes science. This book is a must reading for life sciences professionals, academicians and students.

About the Author: Sir Venki (Venkataraman) Ramakrishnan is an Indian-born British structural biologist. He won the 2009 Nobel Prize in Chemistry for his work on ribosomal structure, and was knighted in 2012. In 2015, he was elected President of the Royal Society. He lives in Cambridge, England.



Films from the Future: The Technology and Morality of Sci-Fi Movies

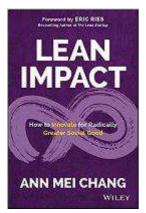
By Andrew Maynard

2018 / 256 pages / Hardcover / Rs. 2037 (at Amazon India)

ASIN: B07FTSXZN9 / Mango Media Inc

Physicist Andrew Maynard threads together his love of science fiction movies with his expertise on emerging technologies to engage, entertain, and make you think about the relationship between technology and society as humanity continues to push the boundaries on advances in science. Through the imagination and creativity of science fiction movies, Maynard introduces readers to the profound capabilities presented by new and emerging technologies, and the complex personal and societal challenges they present. Each movie in Films from the Future provides the starting point for exploring potentially life-changing technologies and trends, from genetic engineering (Jurassic Park) and brain-enhancing drugs (Limitless), to human augmentation (Ghost in the Shell), and artificial intelligence (Ex Machina). These are woven

together with emerging ideas on technological convergence and responsible and ethical innovation to provide a sweeping perspective on where our technologies are taking us, and how we ensure this is where we want to go. With each examination, you will take a progressive journey through the fascinating worlds of biological and genetic manipulation, human enhancement and cyber technologies, and nanotechnology. Maynard shows that the fantastical worlds of the movies might not be as impossible as we think. With a focus on hard science, economics, the social implications of technological feats, and the movies that could very well become our real-life future, Films from the Future will be sure to educate and entertain



Lean Impact: How to Innovate for Radically Greater Social Good

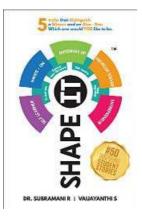
By Ann Mei Chang

2018 / 304 pages / Hardcover / Rs. 1830 (on Amazon India)

ISBN: 978-1119506607 / John Wiley & Sons

Lean Impact is a hands-on guide designed to exponentially increase the impact of our time and money. Building on the modern innovation practices that have fueled the technological breakthroughs that have touched every aspect of our lives, Lean Impact puts the focus on a new purpose -- radically great social good. Of course, making the world a better place is far more complicated than building an app. It involves more listening, more care, and more stakeholders to ensure solutions are fully embraced, address root causes, and include an engine that will drive growth. Lean Impact offers practical tools and strategies that are inspired by the customercentered, fast iteration, and data-driven approaches popularized by The New York Times bestseller, The Lean Startup. Lean Impact is designed to maximize social benefit in the face of

the complex challenges in today's world. At the heart of the model is the scientific method that relies on hypothesis-driven experiments to reduce risk and increase the pace of learning. It accepts the reality that no solution is likely to be designed perfectly at the outset, thus the ability to rapidly adapt is essential. Lean Impact draws on best practices from The Lean Startup and beyond and introduces new techniques that are tailored to the unique nature and needs of mission-driven organizations. This combination of scientific rigor and entrepreneurial agility can dramatically increase both the depth and breadth of an organization's impact. Ann Mei Chang brings a rare perspective from across sectors, with her executive roles at top Silicon Valley companies, nonprofits, and government. She vividly illustrates the book with the inspiring, real-life stories and lessons from nonprofits, social enterprises, companies, foundations, government agencies, philanthropists, and impact investors across the United States and around the world. Lean Impact is the essential guidebook for social change that will help you think big, start small, and relentlessly seek impact.



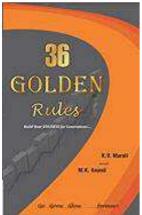
SHAPE IT: A Perfect Gift for Budding Engineers to Become Industry Ready

By Subramani R &, Vaijayanthi S 2017 240 pages / Softcover / Rs. 250 ISBN: 978-1946869166 / Notion Press

The job market is shifting from qualification-based to skill-based setup. To stay relevant you have to SHAPE IT or ship-out. One needs to be a life-long learner to survive and succeed at workplace. SHAPE IT takes a

commonsensical approach to skill enhancement, to make budding engineers industry ready. The 50+ student stories provide prescription for success, and motivate young graduates to explore new opportunities. The SHAPE IT traits are vital ingredients to enrich your career, have to be practiced in actual settings and perfected over time. The book covers the life skills in detail with anecdotes and real life examples. The book aims to expand the horizons of learning beyond the curriculum an also to expand the industry academia partnership and develop new initiatives

to make students industry ready. While SHAPE IT is a framework designed for students, even the experienced professionals would benefit going through this book and refreshing their insights.



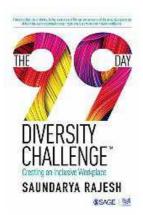
36 Golden Rules - Build Your Business for Generations...

By K V Murali (& M K Anand 2015 / 160 Pages / Softcover / Rs. 180

ISBN: 978-8193248713 / See Change Consulting

This book is an attempt to deal with what we could state as "Excellence in Execution is through an effective hand holding techniques with the tool knowledge". It enables everyone to look at the basics of business in the manner they wish to, and create and lay solid foundations to "stick to the bill" as they say, in order to build a lasting impact, which the business owners or entrepreneurs wish to make according to the DREAM or PASSION in which the whole enterprise is launched by him/her. The rules have been grouped under four broad categories: Market & Consumer, Supplier Governance, Business Management, and Employee Relationship. Success is a journey and not a destination. Keep Going, Growing and growing every day until the last minute of your lives. According to the authors, this book is an attempt

to share their 40 years of collective business experience with MSME / SME relationship pan India and is a small step to contribute for an entrepreneur to build his dream with fervor and a guided approach.



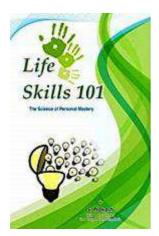
The 99 Day Diversity Challenge: Creating an Inclusive Workplace

By Saundarya Rajesh

2018 / 328 Pages / Paperback / Rs 495 (Rs. 392 on Amazon India) ISBN: 978-9352808311 / Sage Publications India Private Limited

Is it really possible for an individual or an organization to develop an inclusion and diversity mindset within the proverbial 99 days? Award-winning social entrepreneur Dr Saundarya Rajesh, one of India's most prominent diversity strategists who is credited with having ushered in the 'second-career' revolution for women professionals, believes it is. In an engaging, gentle, often light-hearted way, Dr Rajesh demystifies this vast subject of Diversity and Inclusion (D and I) for the business leader, the diversity enthusiast and even the young professional who is curious about this topic. Over a set of 99 stories, anecdotes and thought blogs, this book sequentially uncovers what inclusion and diversity means and how this can be absorbed by just about everyone. At the core of The 99 Day Diversity Challenge is the belief that the

organizational practice of inclusion actually results in us becoming better human beings. For when we break down differences and create greater connectedness between people, we are building a better world. What is The 99 Day Diversity Challenge? A never-before account of the nascent experiences of implementing the culture of D and I at the Indian workplace; A precise explanation on the different strands of diversity, how to leverage each strand and the future of the D and I thought; A handy guide to set organizational inclusion goals, design a methodology to accomplish them and track your progress. This book is a collection of stories, fables, caselets and first-person accounts of the amazing experiences of individuals and organizations aspiring to create a diverse and inclusive workplace. It is aimed to be an user manual to unlock the diverse human potential at your workplace and presents the content in 10 sections namely: The basics of diversity; The dimensions of diversity; Gender and Generation: Important imperatives; Initiating the discussion around Diversity; Demystifying Diversity in your workplace; The role of leadership and strategy in Diversity and Inclusion; Actioning your D&I vision; Biases and how to find them; Creating Equity in the workplace; and Infusing the spirit of inclusion in your workplace.



Life Skills 101 - The Science of Personal Mastery

By S Prakash

2016 / 154 Pages / Paperback / Rs. 195

ISBN: 978-8193248720 / See Change Consulting

Life is a dynamic process providing a series of challenges from which one can learn. Time immemorial, human beings have been trying various means and methods to deal with klife effectively. This book introduces a large spectrum of life skills (101 in total) through simple and easy to understand ideas and tools and presents them in 12 distinct chapters namely: Attitude Building; Building self-=belief and Self-confidence; Time Management; Communication Skills; Effective Interpersonal Skills; Team Effectiveness; Emotional Intelligence; Creative Thinking Skills; Goal Setting & Planning; Leadership Perspectives; Work Life Balance; and Striving for Excellence. The author believes in Success is all about continuous learning and putting the learning into practice by consistent, repetitive action and wishes everyone to start the success voyage by learning these skills.

Cyber Physical Systems – Overview and Evolution A tool for continuous evolution of systems

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Abstract Developing and maintaining great products and services comes with the challenges including trade-offs, dynamics, details, time pressure and economics. The revolution in the context of machines, often termed as Industry 4.0 symbolizes smart factories. Industry 4.0 is being characterized by ubiquitous and mobile internet, smaller and more powerful sensors and computing getting cheaper, artificial intelligence and machine learning. All these leverage the pervasive power of digitalization and information technology. The merger of Information Technology with Operational Technologies. Cyber Physical Systems merges computing, communication and control into an integrated form. The purpose of this paper is to discuss the reference models and architectures discussed in 5C architecture and C2PS reference architectures and develop insights on the skills, competencies and projects worth watching.

Index Terms Simulation, Cyber Physical System, Cloud, Internet of Things, Control Systems, Industrial Internet.

I. INTRODUCTION

Developing and maintaining great products and services comes with the challenges including trade-offs, dynamics, details, time pressure and economics [1]. Innovation has turned into more dynamic forms including collaborative or co-creation through a combination of standards, open architectures and open source. [2]. The revolution in the context of machines, often termed as Industry 4.0 symbolizes smart factories.

Industry 4.0 is being characterized by ubiquitous and mobile internet, smaller and more powerful sensors and computing getting cheaper, artificial intelligence and machine learning. It is this fusion of these technologies and their interaction across physical, digital and biological domains that makes the fourth industrial revolution different from previous revolutions. All these leverage the pervasive power of digitalization and information technology [3].

Many a barrier has been broken. For instance Software Architecture now considers Intelligent, Connected Systems as the paradigm [4]. A recent NASSCOM conference discussed the trend as Connected, Autonomous, Shared and Electric (CASE) [5]. The merger of Information Technology with Operational Technologies have led to several knee jerk reactions like - 'A bunch of IT guys invading the factory floor'. From a Control Systems practitioner standpoint, control systems getting closer to mainstream standards and technologies including web and information modeling. From an Information and Communication Technology(ICT) specialist, the view is about modernizing the Control Systems or Automation Systems space with latest technologies. While many consider data as the new oil, very few seem to be focused on extracting potential value from captured data. In case of manufacturing it is as low as 20 to 30 percent. A Smart City or Smart Grid or a Smart Factory requires the best of the converging worlds and need a shared vision. The architectural concerns and their differences are shown in Fig. 1 to facilitate an appreciation across the two practices. As Gaynor states, an appreciation of systems is necessary [6].

Characteristic	Systems	IT Applications
Time to market	1 Year and reducing	Much less, even in the range of months
Target Market	Specific market segments driven by reliability and cost factors	Targeted at applications more to improve productivity.
Expected Lifetime	10-30 years	1-5 years
Relevant owners	Phase wise owners from operator, engineer, end customer, decommissioning engineer	Owners could vary across projects.
Legacy support/Backward Compatibility Reguirements	Strong requirements due to huge investments required	Weak requirements due to the fact that an IT implementation could reduce current operating cost.
Shutdown permitted	Shutdown only permitted as part of planned maintenance. Else could lead to losses	Shutdown is permitted within tolerance benchmarks.
Safety Critical	Yes, considering human lives and huge investments to be protected	Few implementations are safety critical, but not necessarily

Fig. 1. Comparison of Concerns in Systems and IT Applications.

Cyber Physical Systems becomes significant in this context. Brend Kramer explains origins of Cyber from Greek word Kubernetis meaning control skills. This evolved to English word govern [7]. Stipanovic characterizes Cyber Physical Systems as a new research direction at the intersection of physical, biological, engineering and information sciences. In short they integrate the dynamics of physical processes with those of software and communication providing abstractions and modeling design and analysis techniques for the integrated whole. The interactions lead to need for new techniques in design due to the concepts taking physical and virtual forms leading to new emerging scenarios otherwise called emergence. The disciplines involve embedded systems, computers and communication [8].

As in Fig. 2, the CPS merges the 3Cs computation, communication and control into an intelligent closed loop system between the physical world and the information world [9]. Though the initial use cases had more to do with Virtual Reality, Computer Vision and Immersed experiences, the field is fast evolving to support Systems across their Lifecycle.

One of the milestone works in the area is discussed by Michael Strage in the concept of Serious Play way back in 1999 [10]. The two publications discussing CPS in detail are the one discussing 5C Architecture which defines Cyber Physical Systems in detail and presents how Cyber Physical System and its layers act as transformative technologies for managing interconnected systems [11]. These bring together the Information Technology (IT) aspects and the Operational Technologies (OT) prevalent in manufacturing and power plants using control systems.

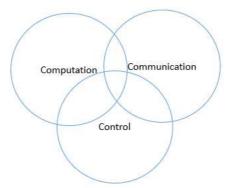


Fig. 2. Convergence of 3C's.

These systems have the following characteristics:

- Closely Integrated.
- 2. Cyber Capability in every physical component and resource constrained.
- 3. Networked at multiple extreme scales.
- 4. Complex at multiple temporal and spatial scales.
- 5. Dynamically reorganizing/reconfiguring
- 6. High degrees of automation, control loops must close.
- 7. Operation must be dependable certified in some cases.

The purpose of the paper is to briefly navigate through the finer details of convergence as seen from two publications of 5C Architecture and C2PS, discuss the competencies and skills, ideas to kickstart action and future.

II. OVERVIEW

The 5C Architecture defines two main functional components:

- 1. Advanced Connectivity which ensures real-time data acquisition from physical and information from physical space.
- 2. Intelligent Data Management Analytics and Computational capability that constructs the cyber space.

As in Fig. 3, below, the Cyber Physical System is considered at various levels;

- 1. Smart Connection Level.
- 2. Data to Information Conversion Level.
- 3. Cyber Level.
- 4. Cognition Level.
- 5. Configuration Level.

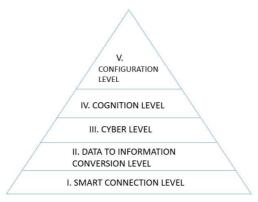


Fig. 3. 5C Architecture Model.

Each of these levels is described in detail in next steps:

I. Smart Connection Level

This level is about acquiring accurate and reliable data from machines and their components. The data measured by sensors are obtained from controllers and from enterprise manufacturing systems. The various types of data and selection of sensors play an important role here.

II. Data to Information Conversion Level

This level is about inference from data leading to meaningful information. This is used for prognosis and health management by calculating health value, estimating remaining life etc.

III. Cyber Level

This level acts as a central information hub with data being pushed from multiple sources or machines. This level uses special analytics to show the capability and comparison across multiple devices and systems.

IV. Cognition Level

This level is about generating thorough knowledge of the monitored system and proper presentation for good decision making.

V. Configuration Level

This is feedback from cyber space to physical space and acts as supervisory control to make machine self-configurable and self-adaptive.

III. DETAILED CONSIDERATIONS

One of the architectural patterns of applying Cyber-Physical Systems is the digital twin. Dr. Michael Greaves in his book Virtually Perfect book, introduced the term digital twin.[12]. As per Greaves, the Digital Twin concept model consists of three main parts: a) physical products in Real Space, b) virtual products in Virtual Space, and c) the connections of data and information that ties the virtual and real products together. We can collect operational data, and continuously improve the intelligence of the digital part by learning from operational data analysis. These can later be included back into factory simulation. In a recent publication on Cyber Physical Systems the authors introduce a Reference Architecture for building a Cyber Physical System based on Cloud using digital twin architecture termed C2PS [13].

As in Fig. 4, the architecture model approaches it by considering Cloud or Distributed Consideration as the primary consideration. The key elements of physical element include Network Interfaces, Power Supply, Sensors, Functional Unit/Functions, Data Store, Observation and Actuators. In the Cyber thing, these elements turn out to be virtual. There can be three types of interactions physical-physical, cyber-cyber and cyber-physical.

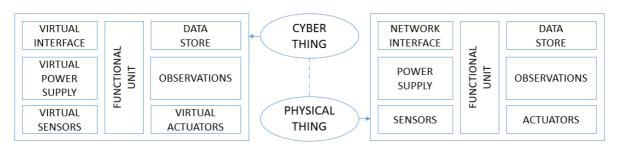


Fig. 4. C2PS Architecture.

Software defined elements play a significant role considering the Cloud or Distributed Systems as the primary approach [14]. The author and team once identified an architectural approach to start with using the capabilities of open hardware like Raspberry Pi and Open Network Emulators using Software Defined Networks like Mininet [15].

IV. EMERGENCE OF STANDARDS AND FRAMEWORKS

Standards include CPS Framework Release from NIST [16]. The Framework sees CPS going beyond a conventional product, system and application design traditionally conducted in the absence of significant or pervasive interconnectedness. CPS could include System of Systems and due to complexity and multiple systems emergent behaviours can be many. CPS could go far beyond current applications including cross-domain ones. Connectedness could have impact on being trustworthy. There is a need to be able to accommodate a variety of computational models and support variety of communication. Heterogeneity can lead to complexity. Timing is a major concern and the operating environment has a major role to play.

As in Fig. 5, the CPS Conceptual Model includes major concerns over Reliability, Security, Resilience, Safety, Confidentiality, Privacy. The Reference Model considers the industrial Internet of Things (IIoT) Reference Model, IEEE P2413 working group, OneM2M as inter-operability enabler, Cyber Security Research Alliance (CSRA), NIST Privacy Engineering, IEEE 802.1 TSN-Time Sensitive Networking, OPC-Unified Architecture, Time synchronization using IEEE 1588, Industrial Internet Consortium and Open Platform. 4DIAC a Project using IEC 61499 is also one of the aspects getting developed as part of the CPS work. At an abstract level, CPS can be deployed to enable and control- the flow of energies, the flow of material, the transportation of objects or goods, the movement of objects, the flow of signals, the conversion of energies, material and signals. The aspects of CPS considerations spans across Functional, Business, Human and Trustworthiness. The Prominent concerns include Performance and Safety properties as to avoid hazards.

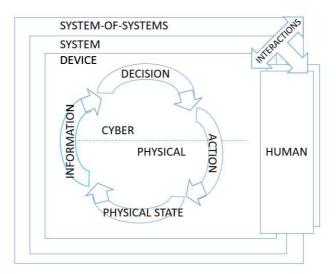


Fig. 5. CPS Conceptual Model.

V. OPPORTUNITIES, COMPETENCIES AND SKILLS

While machines can enable us to be more human, an agile transformation is essential [17]. 'What we need is an entrepreneurial society in which innovation and entrepreneurship is normal, steady and continuous'-Peter Drucker. Continuous experimentation as an approach to Products and Systems is discussed by Jan Bosch in his Three layer product model [18]. The endless possibilities of experimentation empowering the world is the focus of Chris Anderson's book Maker Revolution [19]. This leads us to a three - axis view as in Fig. 6 with Digital and machine driven Transformation in x-axis, the experimentation system on y-axis and agile transformation on z-axis. Cyber Physical Systems would play a significant role as Experimentation System, thereby enabling faster evolution, also ability to gain confidence of users over time.

The research challenges include Design considering reliability, A Systems Perspective, and Human considerations including safety and trustworthiness $[\underline{20}]$. There is much research required to better understand the relationship between cognitive cycle of the human operator and that of CPS built and operated by humans.

The type of skills and the tools required to operate in this ecosystem include a good understanding of web technologies, communication technologies and embedded systems. Cross-pollination is essential to necessitate knowledge building. These teams need to have a good grasp of algorithms, data science from an application perspective.

Two projects worth watching are 4DIAC and the one from Blair. 4DIAC is part of Cyber Physical System platform projects and Built on the IEC 61499 standard. This project provides an engineering approach based on eclipse and a runtime which runs on Raspberry Pi called FORTE [21]. Blair et al builds on the Power System Standards of IEC 61850 and maps the same to Web protocols like HTTP [22]. The open source nature of these projects facilitate further collaboration. An approach using Design Thinking to facilitate faster incremental feature additions could be applied [23].

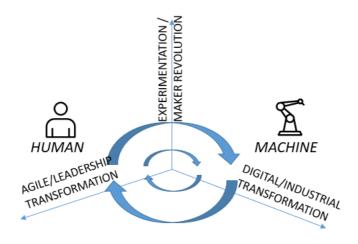


Fig. 6. Three Axis View.

VI. SUMMARY

Cyber Physical Systems have the ability to play a major role in continuous experimentation in systems. They empower organizations to perform data exploration faster. These systems expand themselves from Smart Factories to Smart Cities, Smart Grids and Healthcare thus delivering innovative experiences to customers. When augmented with intelligence they enable learning from real world, thus having increasing their impact. An iterative approach applying Design Thinking can be considered to unravel benefits.

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Ten Rules for the Good Life

Never put off till tomorrow what you can do today.

Never trouble another for what you can do yourself.

Never spend your money before you have it.

Never buy what you do not want because it is cheap; it will never be dear to you.

Pride costs us more than hunger, thirst, and cold.

Never repent of having eaten too little.

Nothing is troublesome that we do willingly.

Don't let the evils which have never happened cost you pain.

Always take things by their smooth handle.

When angry, count to ten before you speak; if very angry, count to one hundred.

Thomas Jefferson

Eight Things You Can Learn in 10 Minutes That Will 10x Your Productivity

How to prioritize

How to get everything out of your head

How to separate urgent from important tasks

How to focus on one thing at a time

How to live the 80/20 life

How to own and defend your time

How to stop being a perfectionist

How to measure your inputs and results!

Source: https://medium.com/kaizen-habits/habits-you-can-learn-in-10-minutes-that-will-make-you-more-productive-for-the-rest-of-your-life-b428015becfb

Hardware Trojan Horses: The New Face of Cyber Terrorism

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University of Calcutta

Introduction:

The present era is witnessing a merge of the physical and the cyber world. Previously, malicious operations of the cyber domain were confined to hacking and phishing operations. These were mainly associated with information stealing for monetary benefits but did not threaten innocent lives. Thus, there existed only cybercrimes but not cyber terrorism. However, with the involvement of technology in the day-to-day activities of common individuals, the nature of cyber crimes has changed. Technology malfunction can not only cause distress to common individuals but also can create mass terror and even lead to consequences, which may be catastrophic in nature. Thus, threats to physical entities is not only confined to the physical realm, but is also affected by malicious operations of the virtual domain. These led to the coining of the term "Cyber-Terrorism" in the late 1990s by Barry C. Colin [1].

As per FBI, cyber terrorism is defined as "premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against non-combatant targets by subnational groups or clandestine agents" [2]. Common cyber terror activities involve spreading of disputed propaganda via social media or by hacking common websites [3,4]. Such activities even create mass panic like the "millennium bug" incident. Though many are hoax, yet these are successful in creating fear and terror among common individuals. The scenario becomes quite serious when innocent lives are affected as side effects to such activities. Instances like the Saudi petrochemical sabotage attempt in 2018 and damage to Iran's nuclear program by the malicious cyber worm, Stuxnet are quite alarming [5].

The breach of security was mainly confined to software and hardware was considered trusted. Researchers found direct execution of tasks in hardware was a convenient and safe solution for a secured system. Hence, the embedded era emerged. In the embedded regime, design of dedicated system on chips (SoCs) gained prominence. Design of an SoC involves several phases as evident from Figure 1. These design phases are not only complex, but also time consuming. Even many design sites lack the expertise to carry out all the phases of chip design. However, consumer demand increased with time. To meet stringent marketing deadlines and reduce cost, the semiconductor design industry adopted the globalization strategy for SoC designing [6].

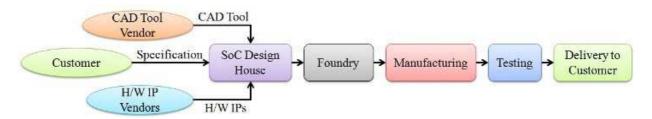


Figure 1: Stages in SoC Design

In the globalization technique, design modules or intellectual properties (IPs) are procured from various third party IP (3PIP) vendors, which are integrated to form the entire SoC. Even the various phases of chip design are outsourced to different parts of the world. Though such a technique reduced SoC design cost and facilitated meeting of stringent marketing deadlines, but the element of hardware trust had been evicted [6]. It is difficult to trust the 3PIP vendors who supply the IPs. Scenarios are common where malicious codes are introduced during the hardware description language (HDL) phase of IP design [7]. Adversaries in the outsourced foundries can even introduce malware during chip fabrication [8]. Such malicious elements are commonly known as Hardware Trojan Horses (HTH).

Hardware Trojan Horses:

HTHs possess the ability of remaining dormant during testing and the initial phases of operation, but get suddenly activated at runtime to jeopardize real time mission critical operations [6]. A trigger and a payload module are the essential elements of an HTH architecture as depicted in Figure 2. The trigger module can be either a combinational or a sequential circuit, which is basically an activation function. The trigger can either be internal like a rare combination of node values or external like activation with the aid of radio signals, which are received via an antenna. Only when the trigger criterion is

satisfied, the malicious functionality encapsulated in the payload is activated. Effects of the payload may vary and generally depend on the nature and extent of the harm intended to be caused by the adversary.

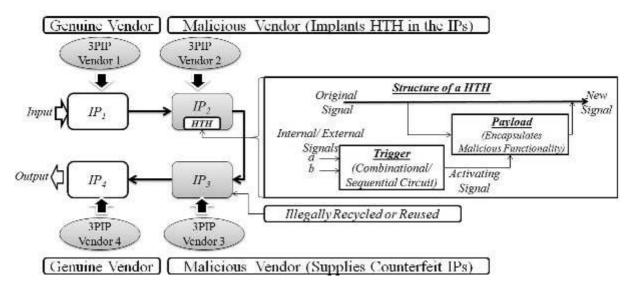


Figure 2: Vulnerability in SoC Design and Structure of an HTH [16]

The US Government of Defense had even recognized HTHs as a significant threat to mission critical applications in 2005 [15]. HTHs may cause both active and passive attacks and possess the ability to jeopardize the basic security primitives of a system. Erroneous result generation may affect the integrity [9], while leakage of secret information may affect the confidentiality of the system [10,16]. Degrading system performance via sudden induced delays at runtime will affect system availability [11]. Even real time tasks of mixed critical systems may be affected by HTHs [12].

Difference from Traditional Faults:

Though effects of HTHs are quite similar to traditional faults occurring at runtime, yet their nature differs. Faults occurring in a system at runtime are unintentional and not preplanned, but attacks of a HTH are pre-planned and intentional. Faults may occur during testing and in such a scenario, the faulty IPs are replaced, but HTHs are designed in such a way that they will never exhibit their malicious characteristic during testing and will only get triggered at runtime. Moreover, it is possible to detect faults during post-mortem analysis, but HTHs may exhibit their malicious behavior and then regain their dormant nature during post-mortem analysis. Hence, detection of HTHs is quite difficult than faults.

Point of Concern:

With the entry into the embedded era, dependence on embedded devices has increased. Such embedded devices constantly monitor the operations of their host users. Many of these embedded devices like the embedded healthcare appliances are even attached to human bodies and directly affect human functionality. Implanted HTHs in such embedded devices may leak secret information related to their host users. This in turn affects the privacy of the users, without their knowledge. Moreover, if such embedded devices are associated with critical infrastructure, then their malfunction during critical stages of operation will lead to fatal consequences and loss of innocent lives.

Rate of import of embedded devices, which ranges from simple electronic devices to critical healthcare appliances and defense weaponry, is high for nations across the globe. Conventional tests which are performed, are unlikely to detect such malicious hardware implantations as these remain dormant unless the trigger is activated, whose control remains with the manufacturing countries. Thus, concern remains in the outbreak of emergency which may affect innocent lives, via the embedded devices utilized.

Defense against HTHs:

Existing strategies to counteract the threats of HTHs are mainly classified into three categories, i.e. (i) Test Time Detection Techniques, (ii) Protection based on Authentication and (iii) Runtime Mitigation Strategies. We briefly discuss each of these in this section.

(i) Test Time Detection Techniques: Test time detection techniques are basically of two types, namely logic testing and side channel analysis, as shown in Figure 3 [6]. As, HTHs remain dormant during test phases, hence, conventional testing strategies are unable to detect HTHs. In logic testing, special test vectors are generated to trigger the malicious effects of the HTHs before their activation. Though this is useful for simple IPs, but the methodology loses its effectiveness when the

IP is complex. This is because, with increase in complexity, it is difficult to generate test vectors for all the nodes of the IPs. Moreover, modern IPs are delivered in an unreadable format so that the users are unable to replicate them and without knowing the structure of the IPs, it's difficult to generate the test vectors.

In side channel analysis, refuge is sought to side channel parameters like delay, power, leakage current, etc to detect the presence of HTHs in the procured IPs. In this technique, the values of the side channel parameters of the experimental IP are compared with a reference or golden IP. However, when the HTH size is small and the IP size is large, the merits of side channel analysis are limited. This is due to the fact that the difference in side channel parameters will be negligible and will be hard to detect.

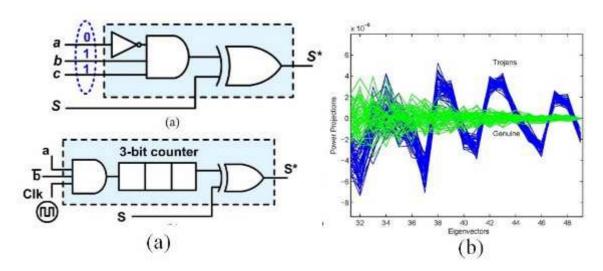


Figure 3: Diagrammatic Representation of Test Time Detection Strategies (a) Logic Testing (b) Side Channel Analysis [6]

(ii) Protection based on Authentication: Identification is necessary to confirm genuineness of the procured IPs. Moreover, tracking the vendors who supplied the malicious components in case of a system malfunction and taking appropriate action can ensure trust. To facilitate this, proof of authentication needs to be appended with the supplied IPs. Such proof of authentication must be unique and non-replicable. For this, physical unclonable functions (PUFs) are used, which utilizes the non-replicable properties of the semiconductor devices to generate an unique identity [13]. Other than PUFs, watermarking is also a convenient option [14]. In watermarking, the producer implants a watermark in the IP, which is duly verified by the user. Diagrammatic representations of these are shown in Figure 4.

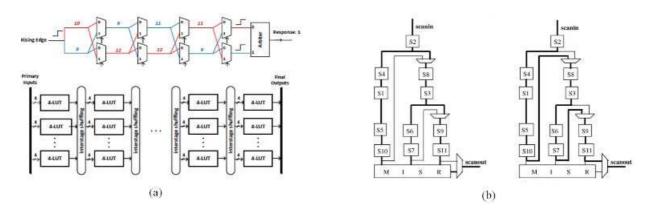


Figure 4: Diagrammatic Representation of Authentication Mechanisms (a) a 4 BIT Delay PUF implemented in FPGA architecture[13] (b) A Watermarking Technique which facilitates authentication by reordering Scan Cells S={S1, S2,...,S11}[14]

(iii) Runtime Mitigation Strategies: Such techniques are termed as the last line of defense by eminent researchers of this arena [6]. This can either be a redundant approach or a self-aware approach. In the former, multiple IPs are procured from different vendors for a particular functional operation. The same task is redundantly carried out in all the IPs and the correct result is generated after majority polling of all the results [9]. As the IPs are procured from different sources, hence, the same HTH cannot be implanted in all. Even if they cause the same malfunction, their activation times must be different. And as majority polling is carried out, the result generated is correct. More is the number of IPs procured for a particular task, more is its effectiveness. However, associated cost increases with increase in redundancy.

In the self-aware approach, no redundant operations are performed. Instead, a self-aware module is associated with the IPs, which works based on the Observe-Decide-Act (ODA) paradigm [10,11]. Operations of the IPs are constantly monitored in the Observe phase. Whenever an anomaly of operations is monitored, the Decide phase is triggered. In the Decide phase, it is deciphered whether the change in state of operations is associated with the objective of causing malfunction or not. Operations in the Act phase is carried out based on the inference of the Decide phase. If a malfunction is deciphered, then operations of the IPs are temporarily stopped or bypassed to prevent system damage, else the new state is learned and operations continue. Figure 5 demonstrates a redundancy approach and a self aware approach to ensure security.

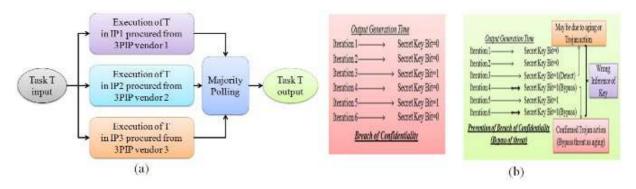


Figure 5: Diagrammatic Representation of Runtime Mitigation Strategies (a) Redundancy Approach (b) Self Aware Approach

Conclusion:

The nature of threat changes with time. With the entry into the embedded era, hardware threats gained prominence. Malware such as HTHs remain dormant during testing and gets activated at runtime. HTHs possess the capability to jeopardize basic security primitives of a system and its effects can be life threatening and fatal. With such consequences, HTHs can be considered as a new face of cyber terrorism in the recent embedded era. Though test time detection techniques are available, yet they are not full proof. Authentication techniques induce trust to a certain extent. But to ensure full proof trust, runtime mitigation strategies must be deployed, which are termed as the last line of defense.

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IEEE Computer Society predicts top ten tech trends for 2019

Deep learning accelerators

Assisted transportation

The Internet of Bodies (IoB)

Social credit algorithms

Advanced (smart) materials and devices

Active security protection

Virtual reality (VR) and augmented reality (AR)

Chatbots

Automated voice spam (robocall) prevention

Technology for humanity (specifically machine learning)

Source: https://hub.packtpub.com/ieee-computer-society-predicts-top-ten-tech-trends-for-2019-assisted-transportation-chatbots-and-deep-learning-accelerators-among-others/

Artificial Intelligence: Impact on Labour and Employment

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Among the four factors of production, namely, land, labour, capital and enterprise (Ref.1), there is a significant difference between labour and the rest. There is an intrinsic productivity component in labour whereas all other resources depend on an external stimuli or action to show productivity gains. (Enterprise is the method or glue that stitches together all other productive resources.) Labour productivity can be enhanced by either investing in superior machinery and methods or by motivational factors.

Money as a resource is considered to be secondary as it is an enabler to procure land, building, machinery or materials. It is not taken as a primary factor of production. Hence "Capital" in this context is used to refer to the Machinery with long productive usage.

Motivation of the individual or the team plays a big role in what can be achieved. Innovation can emerge from initiatives-from-within to create major breakthroughs. Neither motivation nor innovation is an attribute of rest of the resources. Hence human-power (or call it labour) stands distinct from other resources since its accomplishment potential is unlimited.

Business history, over the past five centuries, reveals many seminal stories. Adam Smith in 1776, in his Wealth of Nations (Ref.2), highlighted the role of free enterprise in building a nation. The industrializing nations embraced his concepts with fervor; they focused on building intellectual capital and rallied all other resources around it to build the ladder of growth and prosperity.

It took a few more years before David Ricardo expounded the principle of comparative advantage of nations (Ref.3) in 1817. He further stressed the need for a borderless society where everyone cooperates to improve the fortunes of all.

The fast paced shift from agrarian to industrial society pitted Capital against Labour. The substitutability of one for the other became an endless debate both in academia and society at large. The production-oriented society was obsessed with productivity as well. It drove relentlessly in finding opportunities to substitute labour with capital (equipment) as the former required to be motivated, supervised and protected. Thus the seeds for rapid mechanization and automation were sown in the 19th century. Discovery of power sources such as steam, coal and electricity added fuel to this fire.

Mechanization was taken to the next level with Frederick Taylor's concepts of Division of Labour (Ref.4) as applied to manufacturing. He showed how the system productivity could be enhanced many-fold by his assembly line concepts. The concepts emphasized task specialization, focus and repeated execution aspects of manufacturing processes to enhance productivity. Yet it also led incidentally to humans being confined to tasks that are repetitive and limited in range of skills required to perform. That such tasks are a motivation killer was not recognized in that era of productivity euphoria.

It was Karl Marx and Engel (Das Capital in 1867) who wrote to remind the world of the distinction between emphasizing machine power versus manpower. Their writings have helped to restore balance and fairness in our approach to allocation and utilization of resources.



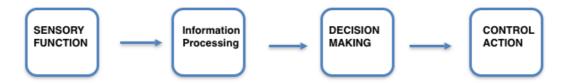
The resulting unrest of workforce from the large-scale adoption of factory mechanization opened the eyes of academia. Abraham Maslow conceived the theory of human motivation in 1943 (Ref.5) . The two-factor theory of Frederick Herzberg in 1959 coupled with Maslow's need hierarchy helped to refocus on the human resource and place it at the top of the management ladder.

Mechanization and Automation turned out to be a seamless continuum when the focus remained on quality and productivity. (Humans are still needed to operate and control machinery in mechanization. Automation on the other hand, eliminates the human presence altogether.)

Further, when we add the concerns of safety, speed and consistency we move into the territory of automation. We add a significantly different goal to the system, viz, elimination of tasks with human involvement in the entire production process. The journey of automation may have started with minimization of human role in factory settings but it has gone far beyond in the past five decades. Automation includes handing over human cognitive skill based tasks as well as muscle power related tasks.

Sensory inputs as obtained from humans often played a key role in the manufacturing activity; seeing (or observing), hearing, smelling and even touching an object enabled us to gather vital data on status of the process or the condition of the

product. When this information is processed within a bio system it would result in a control action that intervenes in the process. Hence the elements involved here are sensory, information processing, decision-making and control action.



Automation of systems called for replacing each of these functional elements with a corresponding device, physical or logical. The principal difference is that such a device is inanimate. It can replace a specific human activity with equal or better effectiveness. It won't exhibit fatigue, won't have the need for biological breaks nor would it experience emotions.



Robotic systems with machine vision capability, audio signal absorption and processing ability and capable of initiating control actions with the help of mechanical arms, legs, gears or other parts, penetrated the factory floor in a progressive manner. They became ideal partners in an assembly line as well as in manufacturing individual parts, as this revolution spread.

Completely automated factory became a reality before the dawn of this century. It assumed an indispensable role wherever precision engineering, miniaturization and micro scale manufacturing became necessity; such as in computer chip manufacturing.



From the Industrial Revolution era, the role of mechanization and automation to enhance productivity and throughput has not been disputed; that they often resulted in improved quality of products and services was perceivable: And most of the time, they would lead to higher level of human safety was also accepted.

However, they have also led to tremendous consternation (Ref.6) about loss of jobs in affected sectors such as agriculture, mining and textiles. Thousands of jobs were made redundant and hence eliminated from the factory floor. Labour unions in developed and developing countries alike started raising alarms and followed them up with widespread agitations.

E. F. Schumacher, a German economist reflected this collective concern in his 1973 book "Small is beautiful" (Ref.7). He argued in favour of adopting an appropriate technology from the spectrum of automation; the appropriateness being determined by broader concerns for use of local materials and local talent pool. His thoughts and writings found favour with a majority of developmental economists and developing country policy makers.

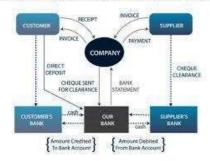
A concern that is over shadowed in this scenario is the societal need to spur demand and consumption as much as improving supply quantity and quality. Economic prosperity of a nation depends equally on production efficiency and consumption capability. If a significant section of populace does not have a productive occupation, there won't be any purchasing power in their hands; or any demand for many goods however efficiently they may have been produced with the help of automation. The supply side of any equation has to be balanced with the demand side at all times.

Jean-Baptiste Say, even two centuries ago (1803) had articulated this concept with his "Treatise on Political Economy" (Ref.8). According to Say's Law our aggregate purchasing power is determined by the aggregate value of what we produce. Total supply has to match the total purchases.

Hence boundaries of automation in a society will be defined not by the aggregate production (it can create with economic efficiency) alone but also based on its ability to create employment and to spread wealth amongst the populace. Without adequate employment and purchasing power in the hands of the people, there won't be any demand for many goods and services.

In other words, with more and more farm mechanization, labour needed at the field comes down. But the surplus labour has to find adequate job opportunities in farm machinery production. With automation of mining activities, more and more miners would seek employment elsewhere and the mining machinery manufacturers must be able to provide enough jobs for them. There can be a cross sector effect in this process. In an aggregate sense, jobs displaced or eliminated due to mechanization and automation in all sectors put together, should lead to equivalent number of jobs in producing the additional machinery, equipment and devices needed. It is further possible that a category shift can occur from products to services as well. Hence retraining on skills and cross movement of labour from one industry to another must be facilitated.

The advent of computers from the early 1950s marks a major shift in this mechanization/automation journey. Comptometers and calculators, during the preceding decades, introduced the feasibility of human brainpower being aided by machines but computers magnified this possibility by hundreds of times. Till then we were satisfied with muscle power substituted with machines; and then the era of mind power substitution with machines began.



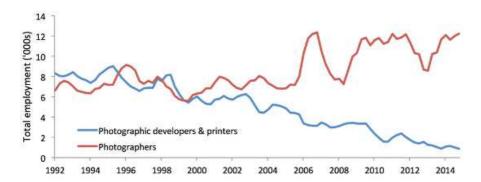
Reconciliation Process - An Overview The early stage computers were capable of performing mathematical calculations and posting entries in a ledger accurately. Given their speed, they turned out to be a boon, as many laborious tasks that took many person hours or days to complete could be relegated to computers. Hence the revolution caught on and the information age dawned on us.

> Next three decades saw impressive and exponential growth of computing power and as a consequence computer applications moving from the accountant or scientist's office to cover many other functional roles. The introduction of personal computers in mid-seventies and of the Internet in mid-nineties transformation with further acceleration. Functions such as Production Planning and Scheduling, Transportation and Logistics Management or interbank

reconciliation (Ref.9) and credit appraisals came within the ambit of the Information Technology Groups.

Alarmed by the rapid pace with which traditional office jobs were disappearing, the white-collar workers joined the fray to fight the onslaught of computerization. It was a common sight of agitating employees in many countries expressing their concern through many avenues. Labour Union negotiations encompassed this issue to define the terms and reference for activities and functions that can be automated or not. For example, the Bank Employees Unions in India insisted that every computer is a stand-alone computer with no networking and ledger posting of entries not to be permitted.

The response from the tech world was almost unanimous. It re-embraced the arguments of prior decades when factory automation was spreading; that more jobs were being created in newer categories by the diffusion of technology in society than the number of jobs eliminated by it in traditional categories. Macro-economic studies seemed to back up such assertions with aggregate data on net employment generation from year to year. For example, the graph (Ref.10) shows the data from Australia that as laboratory based photographic development and printing jobs were lost they were made up with higher level of employment among field photographers.

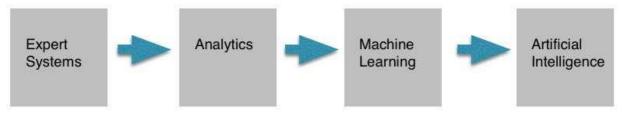




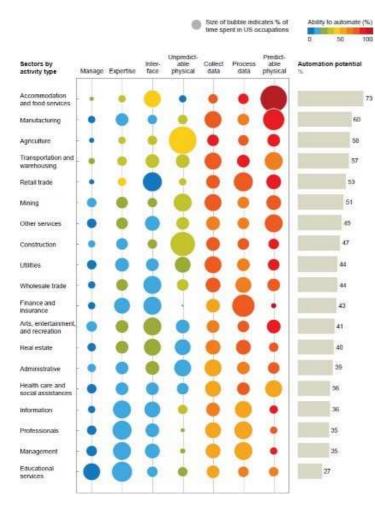
The capability of the computers, meanwhile, was not standing still. Computer scientists began to extend text processing to natural language processing. Audio and video extensions enabled the computers to listen, speak, see and map the external world thereby acquiring some of the human sensory functions (yet at a rudimentary level). Geographical Positioning Systems (GPS) when integrated with mobile computing such as in cell phones opened a new world of exciting possibilities. It is appropriate to say that such developments extended the interaction capabilities of the machines with the human beings. They can take multiple level inputs and provide multi-level outputs. The interface was no longer limited to a keyboard.

A silent revolution was taking place underneath these layers however. It took more than five decades to garner major attention and concern. It is the field of artificial intelligence (AI).

The chronological evolution of AI can be traced as



Even in early 1950s scientists could develop programs that can perform complex and higher order functions that facilitate Decision Making. Computers could perform regression studies to check out beliefs about cause versus effect, could predict or forecast economic trends or allocate limited resources to competing projects or solutions more effectively than human beings. They could perform these calculations in minutes or hours as opposed to the days it took earlier with an army of trained people. They came under a broad category called Expert Systems since they were able to capture (within the program logic) complex rules.



The decades since the beginning of the twenty-first century have seen remarkable growth in these Expert Systems. When the expanded input and output capabilities of the peripheral devices are merged with expanding reasoning power of the computer the emerging developments stretch human comprehension. The diagram in this para (Ref.11) represents the automation potential of various industry segments.

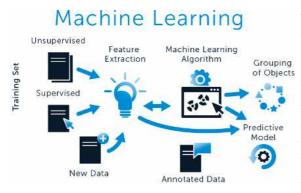
Further, rapid and parallel developments in the fields of Computer Science, Management Science and Behavioural Science have led to the hybrid discipline of Analytics. More and more of the analytical functions performed by humans with the assistance of computers over the decades are being transferred to automated systems in present era. For example, if Claim Processors would use checklists to accept or reject certain insurance claims earlier, these tasks are now assigned to a program thereby reducing costs and improving accuracy.

Computers are more effective in descriptive analytics than humans. They can use a plethora of artifacts such as graphs, charts, network diagrams, drawings and icons based models effortlessly to represent the current status of a system better than most of us. They are very good at projecting trends and predicting the near future with stable systems. This is called predictive analytics. Most of the real world systems are, however, non-deterministic and are subject to wide variations. Past is not an accurate predictor of future in many cases. Hence the acceptance and use of such predictive analytics

solutions are limited as of date.

The final aspect called prescriptive analytics (PA) deals with imposing newer controls on existing systems and selecting an appropriate course of action. When systems environment is well controlled, such as in scientific and engineering arena, PA has achieved considerable success. Most societal systems, on the other hand, present unpredictable environments and hence pose a severe challenge to their successful application.

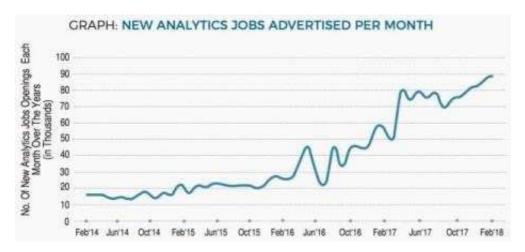
The term artificial intelligence (AI) was coined in 1956 by John McCarthy and others at the Dartmouth Workshop in USA. It came to mean machine intelligence as opposed to human intelligence which has been considered as natural. Cognitive functions that humans can perform, such as learning and problem solving, if mimicked successfully by machines, then it is considered as AI. Given the limited success achieved by such systems in early decades, scientists preferred to call them as Expert Systems. They were of the distinct opinion that human Intelligence, with multi sensor inputs and multi dimensional information processing capabilities was vastly superior and hence cannot be compared.



The fundamental question is which cognitive functions can computers and devices perform as effectively as humans can. The answer is still work in progress in most fields. As a corollary we can also ask if it is desirable to let machines perform these tasks instead of human beings.

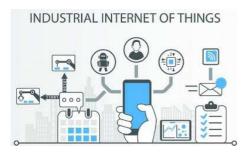
With large volumes of data available from operations, the endeavour of the scientists is to use the same to train the computer to learn directly from data. This is called Machine Learning (Ref.12). ML expertise is being acquired and refined with the help of many statistical tools. When audio and video data along with images get to be processed in conjunction with conventional data the domain

expands to Big Data Analytics. This is a nascent field but likely to expand rapidly in two decades.



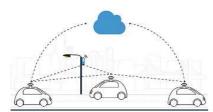
Nevertheless, even as of date, the field of analytics, as applied in the functional areas of manufacturing, logistics, resource planning and performance control has gained strength and has given rise to thousands of new jobs in the economy. As Analytics penetrates into the marketing and human resource management tasks it would be a growing field with tremendous potential to create more jobs in coming decades (Ref.13).

There is further seamless bonding happening between the fields of analytics and sensory functions (capability to accept multiple types of inputs and to provide appropriate outputs) performed by the machines. There are two major applications penetrating in the global markets due to this fusion; namely Industrial Internet of things (IIoT) and Autonomous Vehicles(AV)



IIoT refers to devices interacting with devices directly without human intervention. The ubiquitous Internet has made this possible. Smart devices can accept data coming from sensors and share them with other devices, machines or computers directly. If the data needs to be understood and interpreted to initiate a particular action, a computer interface can be provided in-between to perform this role. There are numerous IIoT projects being implemented now at a unit level in a factory while the long-term goal is to cover the entire factory or workplace with such systems.

IIoT is currently perceived as a boon for industrial productivity, safety and product quality. It is also considered as yet another short-term threat for employment, particularly in the industrial sector. There is considerable optimism however, that the next wave of boom in jobs in the information technology sector in India, as many as 15 million of them, would come from IIoT (Ref.14).

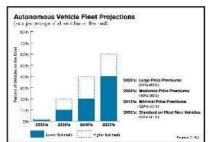


Autonomous Vehicles (AV) is in everyday news with pilot projects being undertaken in many countries at present. These are self-driving vehicles being put to road tests. Their peripheral vision capability is far superior to human beings, their location awareness capability (with assistance from GPS devices) is impressive and their reaction time is a fraction of any human being. Cars, taxis, buses, trucks and military vehicles can all be turned into AVs in our life times.

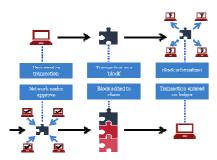
The projected societal benefits of AVs are immense and impressive. They would cut down road accidents and fatalities and make journeys much safer than today. They can result in better fleet utilization as no

vehicle needs to be idle for an extended period of time. They can cut down the number of vehicles on road at any given moment. They can optimize journey route, time and cost much better than us.

The common perception and fear is that AVs would be the stealth job killers whenever the market becomes ready. Personal car drivers, taxi drivers, truck drivers, school bus drivers and utility vehicle drivers are amongst the categories of jobs that could suffer severe erosion. Traffic marshals, accident claim experts, motor vehicle insurers and lawyers dealing with accident victims and cases are next in line for reduction in job opportunities. One study estimates that nearly 300,000 jobs will be lost per year in USA alone.



The AV technology is far from being fully developed and tested. Its major impact on the job market is perceived to be at least two decades away. But the analysts project significant employment growth due to AV technology development and market capture (Ref.15) in the intervening period. Need for Electrical and Robotics Engineers, Industrial Engineers, Field Service Technicians, Functional Safety Engineers and Navigation Software Engineers are projected to grow at a faster pace.



Beyond IIoT and AV, another technology opening up slowly is Blockchain(Ref.16). When successfully developed and implemented, it would eliminate the need for each firm maintaining a ledger to keep track of its commercial transactions. Instead, transactions of hundreds of collaborating firms can be kept in a central ledger and the system will provide access to relevant and appropriate transactions alone to every firm.

The current method of double entry book keeping has been in vogue for three centuries. It has lead to the creation of an army of jobs as accounts clerks, accountants and loan recovery agents within a firm. It has also created the need for

many intermediaries who would help to reconcile the transactions across firms. With Blockchain technology the need for these jobs and intermediary firms will dwindle.



AI is the over arching theme of most of the technologies being developed at present. Analytics, Big Data, Machine Learning, IioT and AV are covered in its ambit while Blockchain can be an allied technology. Is AI like an octopus spreading its tentacles in multiple directions to catch its prey? Or is it more like a banyan tree spreading its branches far and wide with deep roots to the soil and providing shade to one and all? Will it eliminate too many white-collar middle range jobs with repetitive and predictable logic but will create insufficient high-end jobs? Should it be regulated right now to control where it may take us?

There are many unanswered questions. Yet we can rely on fundamental economic laws such as Say's Law or sociologist Herbert Blumer's theory of social interaction. We can deduce that for automation, AI or for any technology to succeed it has to create enough jobs to engage most of the populace. To recall the message of Say's Law, the increase in supply of goods and services has to match with the increase in purchasing power of the entire populace. Hence the need for widespread creation of new employment as old category of jobs gets eliminated. It is likely that many factory and office based jobs will be lost forever and certain categories completed wiped out. But there would be newer and adequate number of jobs created in new categories, in different sectors is the lesson learnt from economic history.

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Image 3: Source: US Bureau of Labor Statistics, Mckinsey Global Institute Analysis

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Ref.16: https://www.europeanpaymentscouncil.eu/news-insights/insight/blockchain-applications-payments Image Credit:

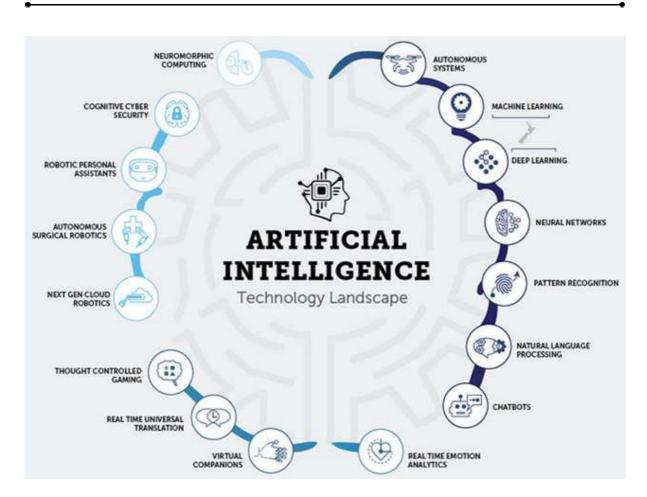
Blockchaintechnology flow. Source: PwC Digital Services

About the author



Dr. Parasuram Balasubramanian has been a Consultant, Group Leader, CIO, CEO and Profit Centre Head in Information Technology industry in his career spanning four decades. He has played a noteworthy role in establishing analytics practice in India and India as a premier offshore service destination. He was instrumental in introducing high quality standards for software delivery services and in building up the skill sets of thousands of employees. He has worked in India, Jamaica and USA. Over the years, he has sustained considerable interest in academics and executive training. He has been a guest faculty and invited speaker in numerous colleges, executive training programs and industry fora. He has written chapters in Handbook of Operations Research [CRC press], Handbook of Automation [Elsevier Publishers] and in Cultural Factors in Systems Design: Decision Making and

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Source & Courtesy: http://linksoftvn.com/should-we-worry-about-artificial-intelligence-ai-2/

Incubation Centres – A Need for Successful Innovations via. Entrepreneurs!

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Abstract

Innovations could tremendously increase through the venture of setting up startups. However, the downside of setting up startups is that the success rate of meeting up the slated expectations of startups is poor and the creation of higher revenues at the initial stage is an arduous task. In fact, the success rate of startups is hardly five to ten percentage in many countries, including India. Nourishing startups and nurturing them at the initial stage of their establishments are considered as the essential ingredients of several upcoming incubation centres. India, along with the Atal Incubation Mission (AIM) team, has taken a rewarding initiative to setup specialized world class incubation centers in various domains such as IoT Cloud, Healthcare, and so forth. This article discussed on the essentials of incubation centres for the efficient functioning of startups and for increasing innovations at varying levels of implementing startups.

Incubation Centres - A Need

In general, innovation is the key factor that determines the economy of a country or an organization. Innovations do create a long wealthy living without the help of any third parties, if guided properly. As per the data available by Forbes.com (1), Indian startups have contributed heavily upon filing patents in recent years. This points out the improvement of innovations happening in India.

However, the growth curve of startups leading to a successful market-ready product or attaining hefty revenues (or exits) in the long run are the challenges in reality. There exists several reasons that lead to an immature growth pattern, such as,

- i) Improper guidance or mentoring
- ii) Unable to reach out to apt customers
- iii) Poor market analysis and judgements
- iv) Undermined team or leadership
- v) Poor planning and so forth.

Understanding the challenges of entrepreneurs and the growing number of entrepreneurial interests among young minds of engineering aspirants (including academic organizations), setting up incubation centres has become a crucial task for policy makers in recent years. In fact, an incubation centre endeavors to fulfil the gaps that an entrepreneur would face on the process of setting up his/her businesses for developing innovative products or solutions.

Generally speaking, an entrepreneur should have the following important qualities to become a successful entrepreneur: a) ability to understand the problem of larger customers, b) capability of quickly solving the needs of scalable customers, c) proactively handling the evolving tasks, d) efficiency in dealing with the adhoc and permanent teams with patience, e) a wide knowledge and skill sets on market planning, budgeting, and taking actions, and f) ability to proactively formulate innovative ideas which should be iteratively practiced at all levels, including tough handling or tough talking with the underlying customers.

Objectives of Incubation Centres

The incubation centres aim at the following four major objectives on the process of promoting entrepreneurs:



Figure 1 Major Objectives of Incubation Centres

The centres have to create awareness on startups. To do so, they may need to organize bootcamps, one-day awareness sessions, and several programs to connect with the large volume of entrepreneurial personal. The centres may need to scale down the risks of startups based on their know-how practices; it has to ensure the smooth functioning of businesses; and, boost up the economy of countries at large.

Essential Components of Incubation Centres

The essential components of an incubation centre for enriching the capability of incoming startups are described in the following heads:

a) Precise Goals and Vision:

Each incubation centers should have a clear vision and set of goals that sustain for a long run. They should have a proper scalable roadmap that should incline towards their capacities and goals. For instance, AIC IIITKottayam (shortlisted), an upcoming incubation centre of IIIT Kottayam, focuses on the application of high end technologies such as IoT Cloud for Societal Applications. A clear vision and visible objectives could create an impression for startup enthusiasts to select an appropriate incubation centre to build up their product with utmost satisfaction.

b) Investment Suggestions:

Providing suggestions on investment plans to startups should enhance the revenue stability of their businesses. Each incubation centre could critically comment/suggest on the investment ideas, especially the time plan for their investments on the products, in order to have constructive developments or to raise larger seed money with their investors. Generally, there should be a good relationship with the investor and the entrepreneurs in order to attract money for their startups.

Investments for startups generally happen in three levels:

- i) Investments via. Friends or Family: This level of funding crop up at the initial stage of the business establishments often between 1 to 6 months of establishing companies.
- ii) Investments via. Angel Investors: This level of funding happens when the revenue overcomes the death valley curve of business cycle. The Angel Investors are generally people who have money to invest on a specific idea aiming at there will be a hope of revenue growth. In India and various parts of the countries, we could find a network of Angel investors that has tens of thousands of such Angel Investors.
- iii) Investments via. Venture Capitalists: Once when the business grows at the large level, there is a dire need of scaling the business to large volume of customers. Venture capitalists are a network of investors who are capable of funding tens of hundreds of crores to businesses. The need of a venture capitalist, in general, starts only after two to three years of establishing businesses.

c) Mentoring Support:

Most of the entrepreneurs of incubation centres, often named as incubates or startups, may not be capable to look into the pros and cons of different domain sectors including marketing, diversified technical concepts (basic science, IoT, Cloud, blockchain, biotechnology, quantum computing, and so forth), effects of team leadership and so forth.

Obviously, an incubation centre may need to have a pool of mentors who are experts in unique fields, including technologies. Such mentors need to be highly accessible to the incubates in a committed fashion. It is also possible that an incubation centre will not have sufficient experts as required by incubates – for instance, an incubation centre specializing in blockchain technology might not have sufficient experts to guide incubates in healthcare technology. In such scenarios, the centre should take the responsibility to assist the incubates by networking with the other centres. To do so, it has to maintain a list of mentors with classifications in varying domains. In fact, AIM team of India has formulated procedures to frame a large pool of such mentors who could be rightly accessible to startups irrespective of geographic separations.

The most important characteristics of a good mentor are



Figure 2 Characteristics of a Good Mentor

Are Mentors paid in Incubation Centres? In general, mentors are not directly paid by the incubate (hand in hand). But, they are paid through the incubation centres either through the startup equity percentage or through monthly basis.

d) Infrastructural Assistance:

The incubation centres shall assist incubates by offering incubation space and the high-end technical infrastructural facilities available at their premise – if incubates require high-end processing equipments or servers to demonstrate the machine learning program for his/her product development, the facilities of the incubation centres may be extended to the incubates. At AIC IIITKottayam (an upcoming centre - shortlisted), we could offer the incubation space and facilities to incubates that relates to IoT Cloud. In addition, as IIITKottayam has established an MoU with various Universities and Organizations, including Technical University Munich-Germany and Bose Information Technologies-Germany, we are able to provide the high-end infrastructural support to incubates that are more specific to IoT Cloud domains.

e) Provisioning Ecosystem:

Framing a strong ecosystem is a step to success of startups. The ecosystem shall be organized in three varying levels: i) governmental/non-governmental ii) corporate ecosystem and iii) research level ecosystem. A startup holder, as an individual, requires a long period of duration to create the ecosystem for the sustainability of the company. The role of incubation centres would be to reduce the duration by providing sufficient inputs for the incubates so that the ecosystem becomes viable in no time. In fact, framing such ecosystems require a hefty investment on networking and establishments.

f) Budgeting Assistance:

Creating optimal budgets for the slated tasks to meet the short term and long term goals of an organization might be a difficult task for a few startup companies. Although several paid software exists such as tally, it is mandatory for the startups to opt for newer techniques and special assistance at some point in their growth curve. For instance, the assistance might become crucial during the period when they need to raise funds to several Angel Investors or Venture Capitalists. The incubation centres shall provide them guidance to a few available tools such as SaaS-Tally and the available budgeting team for succeeding in their endeavors.

g) Legal Assistance:

In fact, technocrats and startup holders might struggle while establishing a company – they might not know the procedures of establishing a company. For instances, do they need to frame a Section 8 company or a Private Ltd Company, or a Trust? – these queries could be addressed by the incubation centres. Even if an incubate has already established it, they may not be aware of several other legal aspects as discussed below:

- i. An appointment of Auditor should happen within the 30 days of establishing a company
- ii. Organizing a regular *Board of Governing* meeting in a company. Especially, a Section 8 company should have atleast 4 meetings in a year.
- iii. An annual general meeting should be organized within 6 months of a financial year.

iv. Reporting to the income tax officers, donors, or the other statutory bodies should be done within any stipulated/slated time intervals.

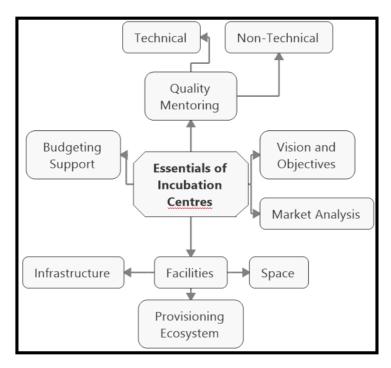


Figure 3 Essentials of Incubation Centres

h) Team Formation:

A guidance may be provided to the startups to create a successful team. In fact, energetic and quality team leaders are the key players for the success of startups. Consequently, a few startups have practiced several innovative models in the recent past in order to frame efficient team members in an organization.

For instance, a few successful startups had allotted 30 percentage of their manpower to undertake urgent matters and the other 70 percentage of the manpower for dedicated assigned works. To note: while framing the team, we have to avoid emotions and family constraints, if any.

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About the author



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Contextual Knowledge Digitisation and its Application in Software Development

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Background

After experimenting with digitisation of contextual knowledge for nearly ten years, I have conceptualised a new proposition around knowledge management named as 'Generic Knowledge Management Framework (GKMF)' and its application in software development named as 'Knowledge Driven Development (KDD)'. Both GKMF and KDD are detailed in my book 'Knowledge Driven Development – Bridging Waterfall and Agile Methodologies' published in June 2018 jointly by IISc Press and Cambridge University Press. I have summarised these concepts again via this article.

Generic Knowledge Management Framework (GKMF)

Generic Knowledge Management Framework (GKMF) is a new framework aimed to capture fit-for-purpose knowledge for a defined scope, generally termed as contextual knowledge. From a structural perspective, contextual knowledge has four layers and eight building blocks as shown in Figure 1 and explained below.

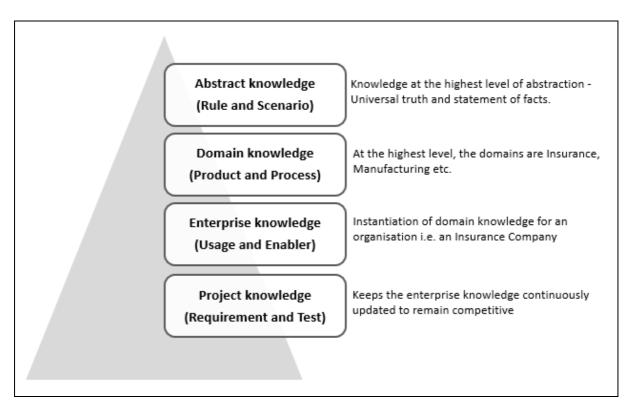


Figure 1: Four layers of contextual knowledge

- Abstract knowledge: Rules and scenarios are enough to capture knowledge at the highest level, i.e., abstract knowledge. They are mostly universal truths and statements of fact. An example can be Modes of payment via cash, cheque and electronic channel are payment scenario and online shopping accepting only electronic payment is a payment rule.
- Domain knowledge: The addition of products and processes contextualises the rules and scenarios which capture knowledge at a lower level, known as domain knowledge. Knowledge about insurance, banking and manufacturing are examples of domain knowledge. Payment scenario and rule can be contextualised to premium payment process of a life insurance product for insurance domain.
- Enterprise knowledge: Enterprise knowledge is instantiation of domain knowledge for an organisation. The 'Usage' building block provides a mechanism to customise domain knowledge for the organisation via user interface, reports

and communications and 'Enabler' building block automates 'Usage' primarily via IT applications. Knowledge of an insurance company primarily used for its business operations, for example, represents its enterprise knowledge. An example of enterprise knowledge can be – if the insurance premium is more than a certain amount, it must be paid through electronic channel.

• Project knowledge: At the last level comes the project knowledge. The objective of project knowledge is to keep the enterprise knowledge updated to maintain the competitive advantage of the organisation. Project knowledge is driven by specific requirements and a way to prove that the requirements are met is by the 'project test case' building block. An initiative to increase the self-servicing capability of the customer through a customer portal is an example of project knowledge as it reduces the operating cost, assisting in maintaining the competitive advantage of the organisation. Another example of project knowledge can be to create a mobile app for premium payment.

Knowledge levels depend on situation. The project knowledge in one situation can be viewed as abstract knowledge in another. Forcing users to change the password at regular interval – may be project knowledge in the context of an enterprise initiative to enhance security for online users. The same sentence may represent abstract knowledge for a specific project to force password change for the users of a specific IT application. For the same project, an example of project knowledge can be – Users must change password every six months and warning message for the same must start appearing in the last 15 days of reaching six months.

The number of building blocks required to capture a knowledge level will be cumulative blocks of that level and the preceding levels. For example, to capture project knowledge completely, it requires a total of eight building blocks, two from the project knowledge building blocks and the remaining six from the previous knowledge levels. As the project knowledge represents the superset of the building blocks, it is also used to denote the contextual knowledge at some points in this article. As we go down in the level, the granularity of information in the building blocks increases. For example, business rules and scenarios in project knowledge will be more detailed than that of an abstract knowledge.

Execution activities aimed at implementing the contextual knowledge, produce the desired outcome either tangible such as building and factory or intangible such as software and launch of a new brand for an organisation.

Sample applications of GKMF

GKMF has universal applicability. For a defined scope, GKMF aims to capture the contextual knowledge. Some of the examples are detailed below:

A. Let's start with the widest scope and understand GKMF in human lifecycle as shown in Figure 2.

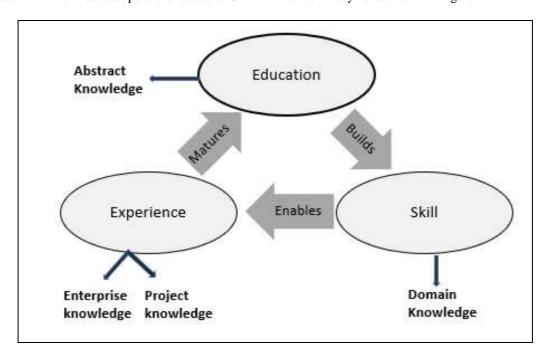


Figure 2: Levels of knowledge in human lifecycle

Knowledge remains relevant to us in various forms - right from our childhood till the end of our active life. In the early stages we gain knowledge via primary and secondary education (abstract knowledge). When we reach adulthood, we learn necessary skills (domain knowledge) to prepare ourselves for the profession of our choice. When we join an organisation, we accomplish tasks and start gaining experience in the skill acquired. There are primarily two types of tasks – repeatable or specialised tasks (enterprise knowledge) and tasks to optimise repeatable or specialised tasks (project knowledge).

- B. Limiting the scope to managing details of the customers of an enterprise, the four layers of knowledge are:
 - Abstract knowledge: Customer details can be of two types personal details such as date of birth and contact details such as mobile number.
 - Domain knowledge: For customers of an insurance company, personal habits such as smoking and having dangerous hobbies influence the premium calculation.
 - Enterprise knowledge: Usage of channels in a specific organisation for change in personal details may be Call centre 50%, Sending letter 25%, Doing it online via self-servicing portal 25%.
 - Project knowledge: The company may initiate a project tasked with increasing the online channel usage for change in personal details from 25% to at least 75% to cut expenditure and remain competitive.

C. Narrowing the scope little further to password management, the four layers of knowledge are:

- Abstract knowledge: The password should be strong enough so that it cannot be easily deciphered.
- Domain knowledge: For specialised high cost insurance products a second level password is required.
- Enterprise knowledge: A company has decided that all its Passwords must have 8 characters consisting of a combination of alphabets, numeric and special characters, and should lock after 3 unsuccessful attempts.
- Project knowledge: There is a requirement to send an email to the user immediately after he/she changes their password.

It is clear from the above examples that GKMF helps in scientific evolution (detailing) of the contextual knowledge.

Application of GKMF in software development – Knowledge Driven Development (KDD)

Software is built through a set of execution activities such as build and test based on its contextual knowledge. In Figure 3, the contextual knowledge of GKMF is customised for software development by expanding the building blocks from 8 to 18

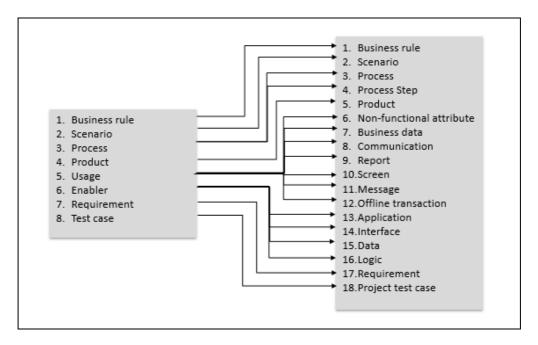


Figure 3: Expanding 8 to 18 building blocks for software development

Usage and Enabler building blocks are expanded into 11 building blocks as listed above to customise it to the software development from enterprise knowledge perspective. This is a typical split and depending on the situation, the total number of building blocks may vary.

For example, for a calculation intensive work, calculation can be a separate building block but in general it is implied in the Rule building block.

These 18 building blocks are reorganised into four constituents of the contextual knowledge relevant to the software development as shown in Figure 4.

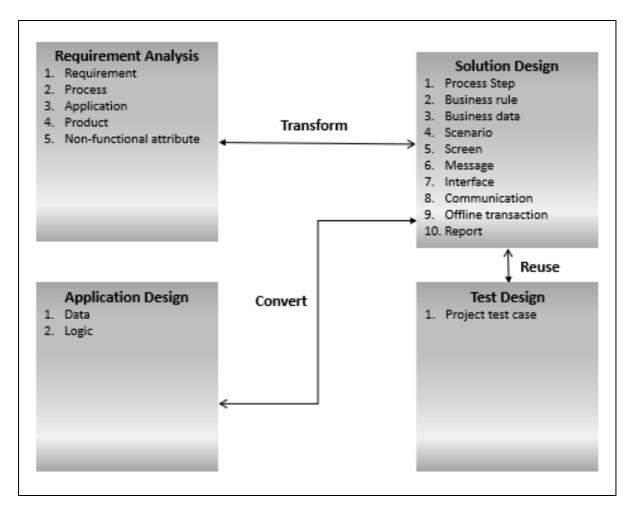


Figure 4: Four constituents of contextual knowledge and its relationship

These four constituents of the contextual knowledge of the software represent complete knowledge from their perspective. If one knows all the 'project test cases', there will be no new knowledge in solution design. These contextual knowledge constituents are also related to each other. Requirements are transformed or expanded into solution design detailing more about the software to be built in business language. Solution design is converted from business language to technical language in application design. Solution design details are reused in test design.

Contextual knowledge specification also assists in execution activities. Execution activities consist of implementing application design (build) and test design (test) knowledge to create a working software. It assists in managing the project knowledge and execution related activities giving rise to a new software development methodology - KDD (Knowledge Driven Development). KDD has a view on important constituents of the software development as listed below:

- Project knowledge Requirement analysis
- Project knowledge Solution design
- Project knowledge Application design
- Project knowledge Test design
- Project execution Build
- Project execution Test execution and defect management
- Project management Risk management
- Project management Quality management
- Project management Task management
- Project management Configuration management

KDD complies with the current frameworks and standards in software development as listed below:

- Quality assurance framework
- Service management framework
- Testing standards
- Business analysis standards
- Enterprise architecture framework
- Project management framework

Unique selling proposition of KDD

The main proposition of KDD is in digitisation of the project knowledge. Let's understand what I mean by digitisation of the project knowledge. Today, the project knowledge is contained in various sources such as specification documents, presentations, sheets, diagrams, models, wiki. Waterfall methodology places emphasis on exhaustive knowledge capture via specification documents (such as Business Requirement Specification), which is difficult to update regularly. Agile relies mostly on wiki pattern and User Story – Acceptance criteria combination where knowledge remains at high level. I call it analogue project knowledge. KDD aims to digitise this knowledge where the entire knowledge about the software is contained in the inventory and relationship format (detailed later) of 18 building blocks of the project knowledge. IT helps to digitise enterprises and KDD is an attempt to digitise the software development itself.

While Agile and DevOps have brought in much needed speed of delivery in the software development and maintenance, IT industry is still in look out for a better way of managing the contextual knowledge needed for the software development. KDD with its contextual knowledge management proposition fills this much needed gap.

Three important benefits of KDD based on digitisation of the project knowledge are explained below.

1. Digital format resulting in desired quantification in project delivery:

Knowledge of 18 building blocks is specified in the inventory and relationship format as shown in Figure 5.

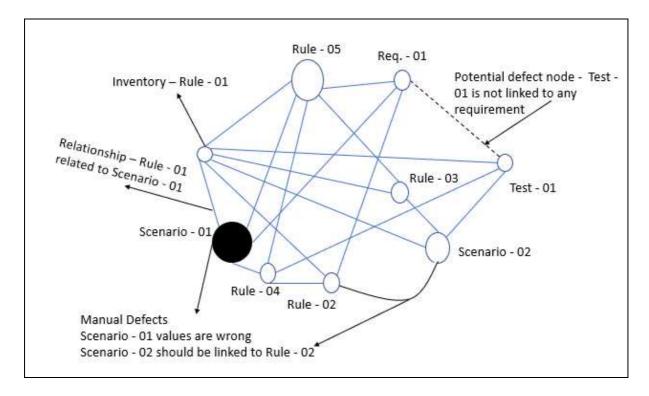


Figure 5: Inventory and relationship format of capturing contextual knowledge

Knowledge is catalogued via inventories of each of the 18 building blocks. For example, requirement-01 and requirement-02 are inventories of requirement building block being specified via attributes such as requirement id, requirement name, requirement description. Linkage between two inventories is known as relationship. An example can be: requirement-01 is related to test-05 (inventory of project test case building block). 18 building blocks give rise to 171 (n*(n + 1)/2) types of

relationship (such as relationship between requirement and project test case, business rule and business data, product and process). Taken together, there are 189 (18 + 171) data points specifying the project knowledge.

This format assists in quality assurance of the project knowledge. Each relationship has two potential nodes of failure. For example, relationship between requirement and project test case building blocks has failure nodes as 'A requirement not linked to any test case' and 'A project test case not linked to any requirement' and this can be derived from the existing relationship. This is a useful information and assists in improving the project knowledge quality. 'A project test case not linked to any requirement' can have either of the two actions – link the project test case to a suitable requirement or delete the test case. Manual review of inventory and relationship assists finding remaining defects in the project knowledge.

Inventory (18), relationship (171) and its quality assurance (171*2=342 potential nodes of failure + 2 (manual review of inventory and relationship) = 344) bring digitisation to the project knowledge. The project knowledge can now be easily measured by a set of activities covering all its digitised constituents making KDD a better choice to manage the project knowledge.

Management thinker Peter Drucker says, 'you cannot manage what you cannot measure'. KDD by providing a mechanism to measure the project knowledge better, aims to solve a well-known problem in the industry on bringing transparency to the project knowledge.

Additionally, the project knowledge management concept of KDD can assist both Waterfall and Agile methodologies.

2. Enabling continuous improvement in project delivery:

Enterprise knowledge is at a higher level of abstraction than the project knowledge. Building blocks such as Product is part of both enterprise knowledge and project knowledge whereas Requirement building block is part of project knowledge only and not the enterprise knowledge.

In KDD, with every project, a portion of project knowledge moves to the enterprise knowledge and this results in the continued growth of the enterprise knowledge. Enterprise knowledge, as it is in the same format (digitised) as project knowledge, can be directly reused in the project delivery environment. The reusability increases with subsequent projects and provides a continuous improvement environment in the project delivery.

3. Supplementing DevOps to cover end to end software development and maintenance:

It is now evident that treatment of knowledge management in KDD is more scientific than Waterfall and Agile methodologies. DevOps is a partnership between software development and IT Operation teams that emphasises communication, collaboration and integration. DevOps takes Agile to the next stage primarily via optimal automation of the execution activities, but it has not given any better treatment to knowledge management than what Agile advocates.

If DevOps uses the knowledge management framework of KDD, end to end software delivery optimisation can truly be achieved as in this case both execution and contextual knowledge activities can be optimised for automation. The digital project knowledge of KDD may also act as an integrator of development and operations team where the project knowledge is created by the development team and maintained by the operations team for the software maintenance. Easier impact analysis for the software maintenance with the help of digital project knowledge will greatly assist the operations team.

Next Steps

GKMF as a new knowledge management framework and KDD as a new software development methodology are explained via 17 chapters of my book at a conceptual level. With more than six months of its publication followed by keen interest generated in academia and in industry, there is a need to take GKMF and KDD to the next stage. The long-term objective of GKMF is to assist in skill development with its digital knowledge management proposition. The long-term objective of KDD is to include it in the relevant courses in the colleges and being used by a portion of the IT workforce. To achieve it, short term next steps can be:

- Do further study to see how GKMF and KDD may assist in Machine Learning, Artificial Intelligence and Data Analytics as I think it may benefit from this new proposition on knowledge management.
- Increase the awareness of GKMF and KDD by publishing articles and white papers in related journals and magazines
- Participating in the leading conferences and seminars on knowledge management, software engineering, digital and Agile and presenting GKMF and KDD
- Create visualisation of GKMF and snippets of its usage in various domains
- Create visualisation of KDD and related case studies
- Organising seminars and workshops on GKMF and KDD

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About the author



Coming from Darbhanga, Bihar, Manoj Kumar Lal graduated in Mechanical Engineering from BIT Sindri and did his ME in Aerospace from IISc Bangalore in 1997. He joined TCS immediately after IISc and has been there for more than 21 years. A specialist in UK Insurance domain, he has performed almost all the roles in software development. His area of interest is knowledge management and quality assurance.

He is a member of 'International Association for Knowledge Management (IAKM)' and presented in European Conference in Knowledge Management (ECKM), Barcelona in 2017 about a new knowledge management framework. His professional qualifications acquired over the last 20 years include: Certified Scrum Master (CSM) from Scrum Alliance, SAFe 4.0 (Scaled Agile) from Scaled Agile Inc, Foundation Certificate in Software Testing from ISTQB, Foundation Certificate in Business Analysis from British Computer Society (BCS), UK, PRINCE2 foundation certificate from APMG, UK, Certificate in Financial Planning (CFP) and Certificate in Financial Administration (CFA) from Chartered Insurance Institute (CII), UK. He is also an author from IISc Press and Cambridge University Press.

10 Habits of Highly Successful Software Developers

You write clean, reusable code that's easier to read and test
You understand how your code helps drive the overall business
You listen more than you speak—or you at least listen before you speak
You are disciplined
You're able to deeply focus on the right thing
You are a persistent problem-solver
You get help from strangers on the internet
You go beyond skill to achieve expertise, but not necessarily mastery
You are open to new things
You're comfortable with being uncomfortable

Source: https://blog.newrelic.com/culture/successful-software-developers-habits/

12 Most Influential Books Every Software Engineer Needs to Read

Working Effectively with Legacy Code
The Mythical Man-Month
Design Patterns
Programming Pearls (2nd Edition)

CODE: The Hidden Language of Computer Hardware and Software

The Art of Computer Programming

Refactoring

<u>Clean Code</u> <u>Introduction to Algorithms</u>

Structure and Interpretation of Computer Programs

Pragmatic Programmer

Code Complete

Source: https://jasonroell.com/2015/03/16/12-most-infuential-books-every-software-engineer-needs-to-read/

System on chip methods for Autonomous Cars

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Design Methodologies for the Automotive sector is changing. The average number of IP cores integrated into automotive SoCs is growing from nearly 20 about five years ago to more than 100 within the next few years. Modern trends are making an impact on the semiconductor IP providers who offer the functional ingredients that make up a chip. Some of the new application areas for automotive SoCs include ADAS, sensor fusion for autonomous driving, vision processing (front camera, object detection, and recognition, surround view, etc.), advanced sensor control and processing (LIDAR, RADAR, etc.) and machine learning for decision making functions in all these domains. Lidar units that Google uses in its self driving cars cost up to US\$ 70,000 per unit, though there are now units that cost as little as US\$ 250. GPS sub-systems are now available as sophisticated system-on-chip (SoC) ICs or multi-chip chipsets that require only power and antenna, and include an embedded, application specific compute engine to perform intensive calculations. Automotive Enhanced, meaning the chip has attributes targeting specific automotive use cases. Arm plans to extend its Automotive Enhanced IP solutions to a wider range of its products in the future.

Deep sub-micron processing technologies have enabled the implementation of new application-specific embedded architectures that integrate multiple software programmable processors and dedicated hardware components together onto a single cost-efficient IC. Application-specific architectures are emerging as a key design solution to today's microelectronics design problems, which are being driven by emerging applications in the areas of wireless communication, broadband networking, and multimedia computing.

SoC interconnect plays a vital role in facilitating functional safety because it interacts with all the data on chip. Consequently, on-chip communications are a critical building block in meeting the overall functional safety requirements. Selecting interconnect IP that is developed in accordance with the ISO 26262 functional safety specification can save OEMs and Tier-1s several man-months spent qualifying an automotive chip that must meet functional safety specifications.

Advances in hardware and networking will enable an entirely new kind of operating system, which will raise the level of abstraction significantly for users and developers. Such systems will enforce extreme location transparency. Any code fragment runs anywhere, any data object might live anywhere and the system manages locality, replication, and migration of computation and data and Self-configuring, self-monitoring, self-tuning, scaleable and secure.

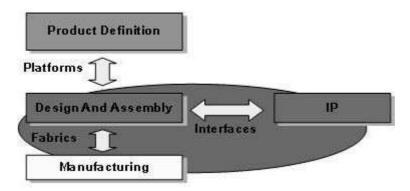


Figure 1. Electronic System Design

New automotive SoCs utilize multiple specialized processing units on a single chip to perform multiple simultaneous tasks like camera vision, body control, and information display. The on-chip communications infrastructure is key to ensuring efficient data flow on the chip. And as the types and numbers of processing elements increase, the role of interconnects and memory architecture connecting these processing elements becomes crucial.

Issues in SoC limits:

- Economics
- Productivity
- Process
- IP Delivery & Reuse
- Tools & Methodology
- Manufacturing

Memories that are closely coupled to a single processing element are often implemented as internal SRAMs and are usually transparent to the running software. This approach works well for smaller systems, but an increase in the number of processing elements necessitates a corresponding increase in closely coupled memories. Another approach is to have RAM buffers that can be shared with multiple processing elements. However, in this case, access must be managed at the software level, which, in turn, can lead to software complexity as the system scales up. This software complexity can lead to systematic errors that can lead to errors and faults that affect ISO 26262 safety goals. Finally, as the systems become larger, it's often useful to implement hardware cache-coherence technology. It allows processing elements to share data without the overhead of direct software management. And there is a new technology for cache coherence, now widely implemented in automotive SoCs, that allows processing elements to efficiently share data with each other and as peers in the coherent system using a specialized configurable cache called a proxy cache.

Beyond memory architecture, whether it achieves data locality with buffers or is cache-coherent, what also matters is the on-chip interconnect. It optimizes the overall data flow to guarantee the quality of service (QoS) and thus ensures that automotive SoCs meet the bandwidth and latency requirements. Bandwidth allocation and latency requirements are a critical factor in mission-critical automotive designs, especially when some of the processing may be non-deterministic, such as for neural-network and deep-learning processing. Automotive designs are also providing the impetus for implementing new technologies like artificial intelligence (AI) because it is impossible to manually create "if-then-else" rules to deal with complex, real-world scenarios.

AI algorithms that can handle highly complex tasks are being incorporated into automated driving systems and other life-critical systems that must make decisions in near-real-time domains. That's why machine learning, a subset of AI, is the most publicly visible new application in self-driving cars.

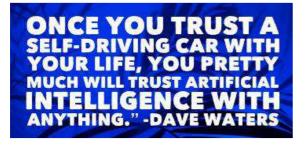
Machine learning enables complex tasks in ADAS and automated driving through experiential learning that are otherwise nearly impossible using rule-based programming. But machine learning requires hardware customization for algorithm acceleration as well as for data-flow optimization. Therefore, in machine-learning-based SoC designs, the ADAS and autonomous car architects are slicing the algorithms more finely by adding more types of hardware accelerators. These custom hardware accelerators act as heterogeneous processing elements and cater to specialized algorithms that enable functions such as real-time 3D mapping, LiDAR point cloud mapping, etc. These highly specialized IP accelerators can send and receive data within the near-real-time latency bounds and deliver the huge bandwidth required to identify and classify objects, meeting stringent and oftentimes conflicting QoS demands.

Designers can compete and differentiate by choosing what to accelerate, how to accelerate it, and how to interconnect that functionality with the rest of the SoC design. Regarding new technologies, it's also worth mentioning that neural net networks have become the most common way to implement machine learning. What neural networks do here is implement deep learning in autonomous driving systems using specialized hardware accelerators to classify objects like pedestrians and road signs.

About the author



Mr. V. P. Sampath works as a consultant that develops hardware/software co-design tools. Among his publications are technical articles and papers on FPGA and Embedded systems and methods as well as textbooks. He is an active Senior Member of IEEE and Member of Institution of Engineers. He is a mentor for the semiconductor industries.



"self-driving cars are the natural extension of active safety and obviously something we should do." -elon musk

Teaching Learning Centre for Design and Manufacturing Education at IIITDM Kancheepuram - Toward Extremely Affordable DIY Laboratory Education

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Introduction

India's population growth trends project a large youthful segment which could lead to a "demographic dividend", since most developed countries and large developing countries like China face an ageing population trend. However, there are warnings that in the absence of effective initiatives to equip the youth with workplace skills and provide them dignifying jobs, the dividend could well turn out to be a *population bomb* [1]. An additional challenge in this context is posed by automation and robotics, which threaten to eliminate jobs in large scale across many fields.

The Indian government has in recent years rightly come up with major initiatives such as *Skills India*, *Digital India*, *Startup India*, and *Make in India*. The goal is that numerous well-paying jobs could be generated by promoting indigenous economic development and entrepreneurship, through skill development among the youth and enabling growth through promotion of innovative technologies. The results so far, however, are not encouraging due to many factors [2].

Importance of Manufacturing

The performance of the overall Indian economy is even more disappointing, if one compares it to China's: the two countries had nearly the same GDP in 1990 but in just over a quarter century, China's economy has grown to about five times the size of India's (\$14.092 trillion vs \$2.848 trillion). There is another interesting dichotomy in the evolution of the economies of India and China, that point to differences in educational innovation in the long run. Over the last two decades – starting with the Y2K scare and related surge in demand for IT jobs – Indian higher education has emphasized training toward jobs in the IT sector, and this has largely been to the benefit of an urban, college-educated and English-speaking segment of the youth population. By contrast, China has placed emphasis on the manufacturing industry and eventually became the *Factory of the World*, as evidenced by the comparison of Indian and Chinese manufacturing sectors in Table 1. This has meant that the Chinese could generate mass employment opportunities on the factory floor, for even rural, non-English-speaking, and high school graduates and dropouts.

Table 1. Comparison of Manufacturing Sectors in India and China (2015)

	India	China
Population (% of global)	17.5%	20%
Manufacturing GDP & rank	\$240 billion & 10 th	\$2.9 trillion & 1 st
Global Manufacturing Competitiveness Index	2 nd	1 st
Manufacturing as % of GDP	12.9%	31.8%
Manufacturing Employment & as % of Total	11 million &5.8%	100 million & 34%
% of Global Manufacturing Exports	1.6%	17.5%
% of Global Engineering Exports	1.2%	12.3%
Hourly Wages	\$1	\$3
Foreign investment profitability index (2015 & 2014)	1 (6)	65 (60)
Global Innovation Index (out of 143 countries, 2014)	76	29

From the above comparison, the tremendous potential of manufacturing for Indian economy is obvious: even a mere doubling or tripling of our manufacturing industry output can lead to tremendous growth in economic output and millions of new, high-paying jobs. Accordingly, India's 2011 *National Manufacturing Policy* has set an ambitious target of 25% share for manufacturing in GDP and manufacturing employment of 100 million by the year 2022. This is an achievable target, as the share of manufacturing in comparable economies in Asia is much higher at 25-34%. According to the 2012 *National Policy on Electronics*, semiconductor electronic manufacturing alone is expected to create 28 million new jobs by 2020. This achievement will be remarkable, if we compare the fact that the entire IT industry in India has created 3.1 million jobs.

However, the *National Manufacturing Policy* identifies constraints to the growth of Indian manufacturing sector as "<u>inadequate physical infrastructure</u>, complex regulatory environment, and <u>inadequate availability of skilled manpower</u>" (emphasis added). Therefore, the success of the *Make in India* campaign depends very much on the availability of innovative, affordable, high quality manufacturing technology education infrastructure and effective manpower training on a national scale.

The decade of the 2010s has been designated as the decade of *Innovative India*. Yet, Indian engineering and technology professionals, teachers, and students lack in the area of creativity and innovative thinking. While Indian education, starting at the school level, is often blamed for this lack of innovation, in a focused domain-specific higher educational initiative like ours, fruitful efforts to inculcate innovative teaching and learning can nevertheless be undertaken with careful planning and implementation. A 2013 study by the McKinsey Global Institute lists 3D printing, advanced robotics, cloud technology, mobile Internet, Internet of Things, semi-autonomous and autonomous vehicles, and renewable energy as among 12 major *disruptive technologies* of our times [3]. Many of these technologies are based on the use of actuators, sensors, controllers, and software which are also the basic tools and components of modern manufacturing for value addition, innovation, and competitiveness. These disruptive technologies provide a \$20 trillion economic opportunity for India [4]. Therefore, innovative design and manufacturing education can also help India catch up with the developed world in the pursuit of these disruptive and value-adding technologies.

As economic competition becomes global, India has a major advantage in terms of *skilled manpower*, that can produce innovative and advanced yet *frugal* (*jugaadh*) technologies, products, and solutions for domestic consumption, import substitution, and the export market. The need of the hour is *to foster innovative teaching learning methods in higher education on a large scale, in a short period of time, for maximum impact on the national endeavors to leap frog India into a global manufacturing hub. Therefore, hands-on education in design and manufacturing can provide Indian students and graduates with creative, innovative, problem solving, and R&D skills. The entry of these well-educated graduates into the workforce of the future Indian manufacturing industry will provide a boost to the competitiveness and growth of high-tech engineering industries in India.*

Teaching Learning Centre for Design and Manufacturing

The Teaching Learning Center (TLC) for Design and Manufacturing Education at Indian Institute of Information Technology, Design, and Manufacturing (IIITDM)-Kancheepuram, was established in October 2015 with funding from the Ministry of Human Resource Development (MHRD) under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT). Its objective is to provide at the national level to innovative, hands-on, state-of-art education, affordable and creative teaching and learning materials, and training to faculty and students of universities and colleges, as well as polytechnics, it is and even high schools, in the areas of innovative product design, subtractive (computer numerical control-based) and additive manufacturing (3D printing), prototyping, and product development and commercialization.

This article provides an overview of the TLC, its activities on manufacturing education technologies design, development and dissemination, and schools and community outreach. Further information on the centre can be found at tlc.iiitdm.ac.in [5], [6].

Extremely Affordable DIY Technologies using Open Source Hardware and Software

The word *engineering* has its roots in the Latin term for 'to create'. Engineering education is fundamentally practice-oriented, but in resource-poor academic institutions in India the access to hands-on laboratory instruction is constrained by the high cost of equipment and instruments. Many teachers also have limited training with state-of-art equipment, and so resort to purchase and use of commercial black-box type kits which provide students only limited learning outcomes.

The TLC works to design and develop e-learning materials and common Do-It-Yourself (DIY) and Build-Your-Own (BYO) low-cost laboratory instruction modules for adoption and use in engineering universities, colleges and polytechnics. The modules are mainly built using inexpensive commercial off-the-shelf (COTS) materials and components, open source hardware, and free open source software, making them *extremely affordable*.

The activities of the TLC include:

- Development and dissemination of e-learning materials online (video recordings of course lectures, special topics and talks, workshop proceedings, demos of lab modules, etc.)
- Design and development of low-cost and innovative practical instruction modules
- Hands-on short-term workshops for teachers from universities, colleges, polytechnics and high schools
- Development of how-to manuals, induction training programs, and Web-based Virtual Labs
- Collaboration with academic and research institutes in India and abroad
- Internships by college faculty and students

- Serve as model Maker Space facilitating innovations by students, faculty and startups, and
- Community service and outreach programs and workshops for school teachers and children

DIY/BYO technologies for fabrication of the following basic manufacturing engineering education equipment have been developed, using open source hardware and software.

- Desktop 3-axis CNC mill (with PVC/aluminum frame)
- Desktop 2-axis CNC lathe
- Desktop 3D printer
- Double-sided PCB machine
- 3-axis robot arm and mobile robot
- CNC router
- CNC vinyl cutter
- CNC laser cutter/engraver, and
- CNC plasma cutter.



3-axis CNC mill

2-axis CNC lathe



PCB machine

Low-cost 3D printer

Low-cost 3D printer







3-axis robot arm







CNC laser engraver

Low-cost mobile robot





CNC laser cutter

CNC plasma cutter

The following are the infrastructure facilities of the TLC:

- Design and Prototyping Studio for CAD/CAM/CIM, 3D printing, 3D scanning, robotics, AR/VR
- Manufacturing Lab for design and development of CNC manufacturing equipment
- Advanced Manufacturing Lab for digital fabrication, and design and development of advanced
- Manufacturing equipment: laser cutting, plasma metal cutting, electric discharge machining, etc.
- Electronics Lab Electronic prototyping and printed circuit board (PCB) machining
- Mechanical Workshop for basic wood and metal working, mechanical fabrication, machining, and welding
- Conference Hall for conducting workshops, meetings, and presentations

Schools Outreach for STE(A)M Education

TLC is providing the technical and pedagogical mentoring to SRF Foundation's InnoSTE(A)M Labs initiative in nearly 30 government high schools in Chennai, Bengaluru, Trichy, Salem, Mumbai, Pune, Kolkata, Noida, and Hyderabad. The labs are funded by Cappemini Corporation as part its Corporate Social Responsibility (CSR) School Adoption Program. Under this scheme, Maker Spaces have been established in the schools, for selected children in Grades 5-9 and their teachermentors, with provision of hand and power tools, supplies and materials, electromechanical components, test & measuring equipment, open source hardware and software, and desktop computer numerical control (CNC) milling machines. TLC project staff are working to develop, test, and disseminate curricular materials in the fields of computer aided design and manufacturing (CAD/CAM), CNC, electronics, robotics, programming, development of web technologies and mobile phone apps for students of high schools. Full-time SRFF technical staff mentored by TLC engineers then take care of regular training and support for the school teachers and students. Based on the tools learned, students will be encouraged to pursue innovations through periodic design competitions for the participating schools at local and national levels, involving unstructured or open-ended themes, as well as on theme-specific topics related to community problem solving. Extreme affordability of teaching learning materials is a key objective of the program, so as to maximize the impact and reach of the project.

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About the author



Dr. S. R. Pandian is presently Dean (Planning) and teaches in the Department of Electronics and Communication Engineering at Indian Institute of Information Technology, Design and Manufacturing-Kancheepuram. He did his BE in ECE from Thiagarajar College of Engineering, Madurai, and then completed MTech from IIT Kanpur and PhD from IIT Delhi, both in Electrical Engineering. His areas of specialization include robotics, control, mechatronics and autonomous systems, with applications in energy, environment and education. He has more than 130 publications in international and national journals and conferences. From 1992 till 2000, he was involved in teaching and research in robotics at Ritsumeikan University, in Japan. During 2001-12, he did teaching and research in USA at University of Michigan, Flint, Tulane University, New Orleans, and

Southeastern Louisiana University. He invented a pneumatics-based system for power generation based on children's play, which was selected by the New York Times as one of the best ideas of the year 2003. His inventions have been featured in Discovery Channel, Canada, many national and international media, and a school text book in Texas State. He was also a finalist in 2005 for the Louisiana Innovator of the Year award. In 2007, Dr. Pandian was one of nine inventors from around the world featured in a special program on human power conversion on SBS TV, Korea. Dr. Pandian returned to India in 2012, and worked in Velammal College of Engineering and Technology, Madurai first as a Professor and Head of the Department of Information Technology, and then as Director-Research, before moving to IIITDM. He is active in education, research and outreach in robotics and intelligent systems. At IIITDM, he is now Coordinator of MHRD-funded Teaching Learning Center for Design and Manufacturing Education, which aims to design, develop and disseminate innovative and low-cost, build-your-own laboratory modules for design and manufacturing education in universities, colleges, polytechnics, ITIs, as well as schools.

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The Times of India

Opp edit page

Active Learning in Computer Science @ UT Dallas

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Most technical jobs in the old days (decades ago) look like assembly line - well defined inputs & goals, strict processes, well-defined hierarchy in the companies & complete expertise to handle the assigned jobs. Now, it looks more like a hitech playground - get in there without knowing everything, learn about the new blocks as needed, ask for help and collaborate with others, try new novel approaches hoping to succeed or fail fast, refuse to leave work due to exciting work, etc.

How do colleges adapt and make the students ready for the modern workplace? The University of Texas at Dallas has incorporated several mechanisms in the past decade to prepare the students. We will cover these items below.

ECS 1200

It is well understood that the early school years should focus on building the fundamentals and teaching principles. Another key focus for computer science is problem-solving ability. As a result, many universities have created a "First Year Engineering Experience" course. The purpose is not to teach any specific skill, but to foster an attitude of experimentation, teach soft skills, and promote teamwork. At UT Dallas this resulted in the ECS1200 course.

The course involves several activities as well as traditional lecture. One of the first activities is a "scavenger hunt," in which students are required to take photos of themselves at various locations around campus, including the computer lab, the advising office, their professor's office, and others. The purpose is to get them to familiarize themselves with the campus while working as a team.

Another issue is that we see many students who did well in high school but do not have the time management skills and study habits that will let them do well in college. One way ECS1200 addresses the first problem is with a homework assignment to keep track of how much time the student is spending on studying for each course during a week. Thus a student might mark that he spent 1.25 hours studying for CS1337 on Monday, none on Tuesday, 2.5 hours on Wednesday, and so on. Many students are surprised at how little time they actually spend on schoolwork. We also talk about the effectiveness of their studying. If they are only reading the material but not working problems, that is not enough. A related issue is procrastination, a very common problem. We address this by not accepting late work for certain assignments.

It is difficult to teach problem-solving skills, and one of the issues is that although they are all freshmen, there is a wide range of programming ability, from those who have never programmed to students who have placed out of a year of courses. To address this, we teach techniques such as flowcharting and pseudocode, which allow them to think about the problem without worrying about the details of a particular programming language.

Another soft skill the marketplace demands is communication ability, both written and oral. While other courses, such as Rhetoric, require writing, ECS1200 requires both writing and a presentation. The presentation is usually done as part of a project, in which students design a program, create high-level pseudocode for it, and present their work.

It is hard to measure the efficacy of ECS1200, given that there is no control group and the student body is not comparable from one year to the next. However, anecdotal evidence is that it helps retain students at UT Dallas and in Computer Science as a major.

CS Outreach

You might have heard — "Best way to learn is to teach." We use UTD students to teach the coding skills to the school students. We also believe that all public universities should do public good - Since UTD is a public university funded by state, teaching coding to school students is a great way to give back to the community. While more & more schools are introducing Computer Science into the curriculum slowly, serious gaps continue to remain – specifically schools in low income neighborhoods are likely not to offer any coding at all, due to various reasons. We have seen the high school students graduate without knowing the meaning of "computer programming!"

With the plenty of free resources available through the web (code.org, MIT Scratch, CMU Alice, BBC micro:bit, KhanAcademy JavaScript, GameMaker, MIT App Inventor & Finch/Scribbler/WeDo robots, just to name a few!), it is easy

to find an appropriate learning tool for school students at any grade level. In addition to getting paid for their teaching hours, UTD students, especially international graduate students, improve their communication skills and build confidence before they face the interviews. Additionally, "CS Outreach instructor position" makes their resumes to stand out among their peers'.

We have been running two major programs, starting from 2013:

- AfterSchool Coding Clubs during the school year we work with the interested local schools individually to identify specific weekday and conduct a coding club in the school's computer lab for an hour after school is over, for 8 to 10 weeks. This is very popular & efficient option for most elementary schools since they finish early in the afternoon & most parents prefer to come one hour later to pick-up their children. Depending on the status of each school's neighborhood, we decide whether to charge a fee for each student or do it for free. You can access more details @ utdallas.edu/k12/access
- Summer Coding Camps most school students get 11 weeks of summer break. Typically, families may travel for a few summer weeks and stay at home for the remaining weeks since the parents have to work. US has a long tradition of sending school-age children to attend summer camps to explore various areas to get an idea about which field they like & to select the college major. We offer 10-15 camps every week of summer covering all grade levels. With 200-300 school students every week, our building looks like a Summer school!
- Goal of each camp is to introduce coding skills in an enjoyable hands-on manner at the age-appropriate level. Students can climb on their own pace and move up the levels. We always have a few students every summer who spend almost 10 weeks with us. We also have residential facility out-of-town high school students can come and stay like UTD student and attend the camps. When a student completes all our camps, (s)he will have the coding skills of 2nd/3rd year BS CS student! It will enable such students to excel when they go to college. More details and the summer camp schedule can be found @ utdallas.edu/k12/summer

These programs employ 50-100 UTD students at a time. With local corporate sponsorships, we provide low-fee & no-fee programs to low income families. All our course materials are available online @ github.com/UTDallasCSO for other colleges to download and use. We can also provide our instructors to kick-start your camps and bring your staff upto speed.

Hackathons

The great thing about hackathons is that they provide a time-limited cycle to design, write, and test a program. This is far more realistic than writing a program for a class assignment, where you have a week or more and access to information from search engines and the textbook. Hackathons are also highly creative, since most people don't go into them with a project in mind, and the rules discourage (or outright forbid) coming with a pre-written program. The top teams win prizes ranging from electronic gadgets worth under \$50 to hundreds of dollars.

Another benefit of hackathons is that they let corporate sponsors meet and talk with top students. That gives them a far better idea of who they might want to hire than just reading a resume.

UTD holds several hackathons every year. The big one is HackUTD, which in recent years had had about 500 students competing and has drawn hackers from as far away as Canada and England.

Other hackathons are more specialized. We held our first Hacks for Humanity, working with Arizona State University, in September. HackAI, organized around artificial intelligence programming, was held this Fall. Occasionally, companies will sponsor a hackathon around using one of their products, although they sometimes sponsor a category within HackUTD.

The UTD Computer Science Department actively supports hackathons, with faculty sponsors working with the student groups, assistance getting corporate sponsors, and providing the building and some of the infrastructure.

UTDesign

The capstone course is a requirement for any engineering and computer science department, seeking ABET accreditation. Initially, a senior student would work with a professor (an expert in the field of interest) to define a project, set the goals and the milestones for a semester. The student would then meet the professor throughout the semester, aiming to achieve the original milestones. At the end of the semester, the results are evaluated and stored.

Lately, colleges define a capstone course for all the senior students to register and the whole group meets early in the semester with the professor to take care of common items like project management. The project and its goals are still defined by the student and the professor continues to meet with each student individually to ensure progress.

The School of Engineering and Computer Science at UTD, took steps to enhance the capstone experience further, adding the following:

- i. All projects are developed by student teams (no individual projects are allowed)
- ii. There is an advisor for each team. The advisor is part of the faculty, research or staff that serves as a silent project manager.
- iii. Projects are defined and managed by companies (local or national), or projects can also be faculty sponsored or student defined. Faculty sponsored projects are either a well-defined and challenging component of an ongoing research project, or an initial work for a new one, Student defined projects are an incentive for entrepreneurs; creative students who are looking to challenge themselves.

First requirement is to cultivate teamwork and leadership, offering students the opportunity to interact with other students & help each other to progress towards the common goals. Regular meetings outside the class time, are required and everyone is required to report their progress on a weekly basis.

The faculty advisor is a project monitor following the team's progress and a resource to set realistic expectation from both, the students and the sponsor, as well as the first point of contact to resolve conflicts among the team members.

Each company project is called as UTDesign project - it comes with a project mentor from the company. This role is fulfilled by an expert in the field, with deep technical knowledge, needed to advise and train (if needed) the team of students in order to achieve the project goals. Company mentor takes very active role in the project running the weekly meetings & is crucial person that ensures the success of the project. This engagement also ensures that there are no last-minute negative surprises! Each project typically falls into these 3 broad areas: proof of concept for a new product, enhancements of an existing product or exploration of new technology and frameworks.

Projects can also be defined and sponsored by a faculty member. These projects are appealing for students planning to continue with graduate studies or focus bit more on research. The faculty serves as the client, and the role of mentor is fulfilled by the faculty or a member of the faculty's research group.

Student sponsored projects, on the other hand, are ideal for those students who are ready to jump into the industry but would like to explore some interesting ideas on their own, potentially leading to a Start-up. All ideas are evaluated by experts in the field and also by UTD Entrepreneurship Institute. We provide suggestions/improvements that could increase the chances of success.

Industry sponsored projects offer many benefits to both students and sponsoring companies. From the student perspective, these projects are different to academic projects that may focus on a single technology aspect or framework. It may be the first industry-size project that many students work on – it is complex enough that it cannot be completed by one person either. Regular status meetings with the industry mentor brings time-discipline to the students. Typically these meetings are held at company premises and the students get to work with other employees as needed. It can become an immersive experience to learn about the company culture and the work atmosphere there.

For companies, UTDesign project is a great way to get a back-burner project done since regular employees may be busy with high priority tasks. Several companies also use "project mentor" role to groom their employees' project management skills. Finally, companies also use it as long-term assessment of students' skills & behavior and make full-time job offers at the end.

Since the inception of UTDesign projects in 2009, the computer science alone, has completed more than 350 projects, with near-perfect success rate. Such phenomenal success is attributed to upfront right-sizing the projects & active involvement from the industry mentor throughout the project. We do charge a project fee to the companies to ensure that the projects are of some value inside the company & get "enough" visibility within the company to take it seriously and assign a capable mentor.

Has any UTDesign project failed, i.e. did not meet the expectations? Yes, few projects have failed. Primary reasons range from company mentor is not committed, to unexpected roadblocks with new technology. In such cases, we take them as real-world learning experiences and provide a plan to the students to bring the project to meaningful close. What if the students are not committed, or the team is not working well together? In addition to weekly status meetings, we collect mid-term peer-review for students and mid-term assessment from the industry mentor and the faculty mentor. After analyzing the performance of each team, we assign a mid-term grade – we have had a few teams that got wake-up calls with low mid-term grade and managed to complete the projects successfully!

Visit <u>utdallas.edu/utdesign</u> for more details about this program.

About the authors



Dr. Jey Veerasamy works as Director of Center for Computer Science Education & Outreach and also as Teaching Faculty in the Department of Computer Science at the University of Texas at Dallas, USA. Prior to joining UT Dallas in August 2010, he worked in US wireless telecom software industry (Nortel & Samsung) for 16 years & taught online courses in several colleges for 11 years in parallel. Center for CS Education & Outreach offers 100s of coding camps & clubs to school students in Dallas area - it is one of the nation's largest CS Outreach programs run by any university. 1000s of school students benefit from these programs every year. Center also conducts technical workshops for UT Dallas students and professionals.



Mr. John Cole is a senior lecturer at the University of Texas at Dallas. Earlier, he had taught at Collin County Community College for three years, and prior to that, at Illinois Institute of Technology in the mid-1970s, which is also where he had earned his degrees. Before joining the full-time faculty at UTD in Fall 2012, he had taught part-time for 13 semesters. He has been a software developer for many years, working on projects as diverse as a SNOBOL4 compiler, a DATABUS compiler, a word processor, the operating system for an early computer, statistical analysis of insurance claims, telecommunications, and embedded programming. He has been using a variety of languages, including Java, C++, C#, Visual Basic, Databus, Intel assembly language, and many others.



Dr. Miguel RAZO obtained his M.S. in Telecommunications Engineering in 2006 and a Ph.D. in Computer Science in 2009 from The University of Texas at Dallas. He worked as Research Assistant from 2007 to 2009, and is currently a Research Associate, at the OpNeAR (Open Networking Advance Research) Laboratory and Senior Lecturer within the Computer Science Department at the Erik Jonsson School of Engineering and Computer Science. He has collaborated in design and implementation of software prototypes for telecom industry. His research interests include network planning, fault protection, telecommunication software design, protocol design and network modeling, emulation and simulation.

iToons

Sunil Agarwal & Ajit Ninan



Research Trends and Opportunities in Machine Learning in Biotech & Health Sciences

Dr. Kolla Bhanu Prakash & Dr. B. Mahendran

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Implementation of Machine Learning in every sector of Biotechnology is little scary, however efforts in implementing will openup new evenues in BIO-IT world. Major thrust areas in Biotechnology is Agricultural and Health sector. Agriculture mainly depends upon environmental conditions. Applying deep learning algorithms to predict early seasonal calamities in a form of pest attack, natural calamities can increase economic GDP in agricultural sector.

Agricultural income largely depends on agro-climatic conditions such as seed quality, soil quality, water availability and finally food preservation strategies. There are sevaral public and private agencies who documented seasonal database, which are being implied to AI algorithms to educate farmers to choose a suitable crop. Machine learning algorithms in conjunction with Internet of Things (IoT) are being deployed not only to identify the pest attack, fungal infections but also insecticides and pesticides in a targeted manner using helping to deliver (https://www.mindtree.com/sites/default/files/2018-04/Artificial%20Intelligence%20in%20Agriculture.pdf). Along the lines AI based algorithm are being used for the identification and removal of weeds (Ahmed M. Tobal and Sahar A. Mokhtar, Journal of Computer Science 10 (8): 1355-1361, 2014). Inspite of the modern technologies many of the farmers are committing suicide, due to the fact that the seeds and pesticides sold in the market are low yield and low efficient fertilizers and pesticides. Hence it is atmost important to design and develop a powerful artificial algorithm to avoid adulteration of seeds and other agro-economic products. Apart from seed quality, Machine learning algorithms need to be developed to identify the ripening time from the field to end consumer in natural conditions. Most of the time fruits are ripened using artificial gases or chemical to attract consumer. However, consumption of these food may damage neuronal growth of our children. Hence it is utmost import to develop an AI based algorithm to identify organic vs nonorganic ripening for the detection of qualitative and quantitative measurement of nutrient value, agricultural products for the health and well-being of humankind.

Biotechnological applications are generating large amount of data towards DNA analysis and Drug Discovery, by investing money in billion dollors. Both the methadologies are paving a way to clinical findings to treat human disorders. Drug discovery and disease associated mutation discovery is time and cost effective towards personalized medicine. Advancement in computational methadologies such as artifical inteligence and deep learning algorithms can be used in conjungtion with bigdata analytical tools. The machine learning algoritms can be employed not only to identify genotypes vs wildtype, normal vs hybrid variety, sick vs healthy cell, grading diabetes, cancer but also to predict biological activities and toxicity predictions aganist drugs. These advancements in AI and ML are going to shift clinical geenticds to Desktop diagnostics.

Some startups started their research based on Desktop Diagnostics based on ML algorithms. For example a startup named Benevolent Bio developed a ML algorithm to identify a drug candidate against motor neuron disease, which is verified by another startup named SITraN (Sheffiled Transitional Institute of Neuroscience). Similarly, Switzerland based another startup Sophia Genetics is using AI basesd platform to diagnose many diseases based \$50-200 per test.

The following list of companies are using AI based platform for Biotech Applications

S.No	Name of the startup	Year of Establishment	Type of Disease
1	BenevolentAI	2018	Motor Neuron Disease
2	Sophia Geentics	2011	Oncology, heriditary Cancer, Metabolic Disorder
3	DNAlytics	2011	Rhematoid disease
4	Artery`s	2018	Medical Imaging to treat Heart DIsease
5	Adynxl	2018	Post-surgery treatment aganist pain
6	Atomwise	2012	Ebola infection and Multiple sclerosis

Deep learning techniques can be empolyed to identify the organic vs non organic farming. Artificial ripening using chemical gasses can damage the public health by damaging the nervous system, which can be avoided by differentiating natural ripening and artificial ripening. Along the lines, msny of the fruits are being coated with wax, which is difficult to

detect by natural eye. This can be acomplished by development of computr vision based on neural network algorithms can enhace threshold detection. Usage of natural and artificial colors in the food sector can be traced uisng AI models.

Deep learning can be used for design imaging and reading protocols specific to different organs, lesion types, and patient characteristics. With the growing demand of neuroimaging scanners in hospitals and institutes, radiologists roles and challenges are increasing. The manual interpretation suffers from inter- and intra-radiologist variance. In addition, emotion, fatigue, and other factors will influence the manual interpretation result.

After indepth literature review it has been observed that, Computer-Aided Medical Diagnosis are procedures in medicine to assist radiologists and doctors in the interpretation of medical images, which may come from CT, X-ray, ultrasound, thermography, MRI, PET, SPECT, etc. In practical situations, CAMD can help radiologists interpret a medical image within seconds. Conventional CAMD tools are built on top of handcrafted features. Recent progress on deep learning opens a new era that can automatically build features from the large amount of data. On the other hand, many important medical projects were launched during the last decade (Human brain project, Blue brain project, Brain Initiative, etc.) that provides massive data. Those emerging big medical data can support the use of deep learning.

It is especially important to develop deep networks to capture normal-appearing lesions, which may be neglected by human interpretation.

Some of the topics observed from latest literature are given below

- Robotic soft tissue surgery and Google Car
- Deep network architecture for CAMD and big medical data
- Deep learning for cancer location, cancer image segmentation, cancer tissue classification, cancer image retrieval
- CAMD for neurodegenerative diseases, neoplastic disease, cerebrovascular disease, and inflammatory disease

As mentioned in Nature Biotechnology [Sept 2018], Deep Variant uses convolutional neural networks to improve the accuracy of variant calling.

In an another article from Nature Medicine, authors mentioned that Intracortical activity data recorded over 2 years in a tetraplegic patient is used to develop an artificial intelligence algorithm that achieves fast, accurate, and stable movement decoding to reenable real-time control of the paralyzed forearm. Nature Medicine, 1–8 [Sept 2018]

Another Research team observed that DeepSequence is an unsupervised deep latent-variable model that predicts the effects of mutations on the basis of evolutionary sequence information. Results published in Nature Methods 15, 816–822. [Sept 2018]

Atlast to conclude I am very much excited to see how deep imaging will accelerate to a level that it will re-invent the future of healthcare and modern engineering applications.

Few latest openings for Machine Learning Researchers in Biotech & Health Sciences

https://www.indeed.com/viewjob?jk=da418c559db641c7&tk=1cugcisf0busm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=3781024a968cae02&tk=1cugcisf0busm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=a153e30a5c737ee0&tk=1cugcisf0busm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=f1f7e33c9cac8cd8&tk=1cugcisf0busm802&from=serp&vjs=3 https://www.indeed.com/viewjob?jk=8800fe28344a8c91&tk=1cugcisf0busm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=dc9b34515128ec6e&tk=1cugcov1ibusm803& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=f0966ecf3e2427c5&tk=1cugcr6ejbusm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=8f497dc64896aec1&tk=1cugcr6ejbusm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=122cfa78fa813328&tk=1cugcr6ejbusm802& from=serp&vjs=3 https://www.indeed.com/viewjob?jk=12fcce400a9a9507&tk=1cugcr6ejbusm802& from=serp&vjs=3

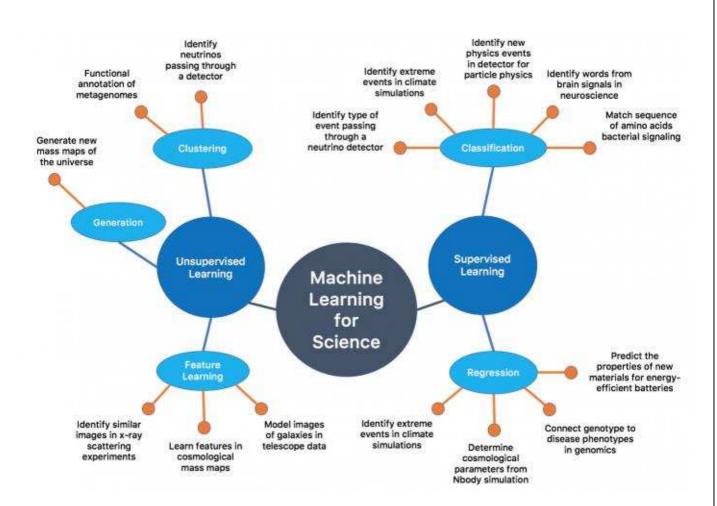
About the authors



Dr. Kolla Bhanu Prakash is working as Professor and Research Group Head for A.I and Data Sciences Research group in CSE Department, Koneru Lakshmaiah Education Foundation. Dr. Kolla Bhanu Prakash has 12+ years of experience working in the academia, research, teaching, academic administration. His current research interests include Machine learning, Deep Learning, Media Mining, Image Processing and Natural Language Processing. He was the recipient of Best Speaker award during M.Sc. He has authored over 4 books and 32 research papers in various national and international journals and conferences. His publications are indexed in Web of Science, Scopus, DBLP and Google scholar.



Dr. Mahendran Botlagunta,is an UGC-Research awardee from Koneru Lakshmaiah Education Foundation. His research focuses on interdisciplinary areas covering Cancer, Nanomedicine and Bioinformatics. His works were published in many peer reviewed international journals. His laboratory is currently engaged in detection of diseases using Machine Learning algorithms.



Source: http://www.nersc.gov/users/data-analytics/data-analytics-2/deep-learning/

Setting up Super Silicon Valley Smart City in India – A High-tech Innovation through Secured Governance

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&

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Cities are the engines of economic growth. Every city must ensure a better quality of life for citizens by smartly adopting modern technology on all fronts: from its services and governance mechanisms to its interactions with citizens. Technology has certainly allowed us to increase the quality of our lives in terms of survival in the practical sense of the term (subsistence). The objective of this article is to promote and support High Technology Smart Cities starting from smaller Hubs on a Self sustained basis. "SILICON VALLEY INNOVATION COMMITTEE" is a networking platform for India Technology Professionals for their professional and self development and they contributing back to the community and India with their leadership, innovation, skills and resources. The committee will identify the value of smart city and advanced technologies and products and promote the diffusion of High-tech technologies and products through the implementation of a smart city development project in India. The new Innovative Mini HUB in India that brings together innovation capabilities in one location.

The committee aims to heighten or intensify the Indian Tech professional to contribute back to community in terms of skills, knowledge and leadership to make a difference. It would be an active resource that serves local and Indian origin communities with its skills and abilities. Moreover the committee will interact with educators and policy makers to continuously improve IT related education. It enables to provide mutual understanding and cooperation between this association and other associations in the United States and India. Even it work with and contribute to qualifying not-for-profit organizations in US and India. Besides, there are a number of private foundations and nonprofit organizations investors that offer gifts or grants to help communities build more livable and sustainable smart cities.

Many cities around the globe have successfully transformed into smart cities through the adoption of technology traversing areas such as transportation, energy, water management, environment, governance, public safety, housing, education, healthcare amongst others. Nearly 33.5% of India's current population lives in urban areas and contributes 63% of India's GDP. India is third largest country in the world in terms of Purchasing Power Parity (PPP) with value of *INR*. 614.43 lakh crore ($\approx US\$9.49$ trillion).

A smart sustainable city is an innovative city that uses modern technologies and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social environmental aspects.

Innovation HUBs: An Engine of Economic Growth



Innovation HUBs possess huge economic potential because of the wealth of innovative ideas they carry and their propensity to create jobs when these ideas develop into businesses. These Innovation HUBs provide co-shared work spaces where young people share ideas and develop homegrown solutions to problems with sustainable business models. Entrepreneurship and innovation are the drivers of value creation in the twenty-first century. In the geography of the global economy there are 'hot spots' where new technologies germinate at an astounding rate

and pools of capital, expertise, and talent foster the development of new industries, and new ways of doing business.

The presence of universities/research institutes with highly efficient technology transfer structures, the involvement and perseverance of extremely bright, energetic and curious

individuals driven to change the world with innovative ideas, a climate that tolerates risk-taking and failure, collaborative efforts that exist between Government, Business organizations and Non-profit organizations, presence of Infrastructure, diversity of people, idea sharing/openness and solid business structures have all been named as factors

Technological Ecosystem in Smart cities

The creation of the smart city is not a technology issue. It has always been about livability: about enabling a greater number of people to live together in comfort and with efficient use of limited resources. Cities that achieve this goal can expect to attract a greater number of businesses and individuals that can boost the local economy and continue the virtuous circle of creating an appealing place to live and work.

Collaborative innovation in a smart city context requires an effective strategy for bringing together diverse stakeholders to develop solutions to the city's problems. From the ideal-typical perspective with the focus on governance, smart cities are defined as cities with smart collaboration. Governments around the world are facing complex problems, and solving them requires government agencies, non-profit and private organizations to work together. Creating an environment of collaboration can be considered one of the main differences between electronic government and smart governance concepts. Governance can be defined as interaction and collaboration between different stakeholders in decision-making processes.

Medical Tourism

Smart healthcare uses the latest mobile and digital technologies to make advances in e-Health and m-Health systems while also driving the growth of medical tourist from other countries and connected medical devices. There is a philosophical change to smart healthcare too, with initiatives designed to encourage a broader view of health and wellbeing in domestic and foreign citizens using technology for health monitoring and diagnostics to pre-empt treatment.

Value through Technology Efficiency:

Smart technologies can help cities address challenges like pollution, crime, transportation, congestion and many other issues. They can change the way cities interact with citizens, drive opportunities for deeper engagement and fuel the creation of innovative services that improve the lives of citizens. The key change is from focusing on technology to focusing on business, and creating technology strategies that increase revenue, decrease company operating expense or improve asset utilization. In essence, to create sustainable positive cash flow. That means using technology to change the customer experience – creating a seamless multichannel route to market, completely reengineering the business model, adding technology to products and services.

Developing and Implementing Smart Cities:

As cities continue booming tirelessly, their challenges need to be carefully thought through so that population growth, economic development and social progress walk on the same path.

1. Channeling Finance to the Smart Cities:

Smart city stakeholders are evolving with different levels of focus and involvement at the central, state, and local levels. The foundations and non-governmental organizations are involved as financiers, and industry collaborators, and are also defining standards.

2. Quick Approval and Clearance:

Right now, stable government is in a unique position to propel smart city development. It has the power to align technology with policy, support research and innovation, and enable mass adoption of new tools and practices. The project is time bound and all clearances and approvals must be granted with minimum time so that the project sticks to the schedule.

3. Co-Ordination among Multiple Stakeholders:

Many areas of government agency activities are characterized by fragmented and overlapping delegations of power to administrative agencies. Such delegations may produce redundancy, inefficiency, and gaps, but they also create underappreciated coordination challenges. The single window system will streamline these tedious and time-consuming processes and help developers will be able to increase supply, which will not only address the country's massive housing shortage, but also increase the government's revenue collections through increased stamp duty and registrations.

4. Retrofitting Existing Cities:

Retrofitting essentially means adding features to the existing set up to make it more efficient. Many upcoming Smart Cities in India are in this category and Silicon Valley companies would have lots to offer by having good presence in India and take up Make in India incentives to ensure their growth.

5. Human Resource

Smart knowledge sharing system is a novel approach aimed at developing effective and practical intelligent systems used in decision making and problem solving. Knowledge management refers to a set of processes used by organizations to discover, develop, explain and dispense knowledge that can be reused, recognized, and learned within the organizations. These processes are often associated with human resource means like workers, staff required to implement the project. There is a huge need of skilled workers and professionals.

6. Availability of Utility Services:

Smart cities need uninterrupted access to electricity and water. Considering the power generation and distribution systems in the existing states and union territories, this seems to be a challenge in meeting the growing energy demands. States must resort to non-conventional energy resources to meet the energy shortage.

Satellite Cities

A satellite town or satellite city is a concept of small cities and towns appeared spontaneously near or around Metropolis city. Satellite towns are smaller municipalities that are adjacent to a metropolitan area and enroute of major transportation links of regions. It can be defined as: 'A city designed to house the overspill population of any major city, but located well beyond the limits of that city, and operating as a discrete, self-contained entity'. Conceptually, satellite cities would be self-sufficient communities outside their larger metropolitan areas.

Secured Governance (SG)

"Secured Governance is a novel concept offers strategy to get all the basic infrastructure development with a negligible investment by the entrepreneurs. It is a concept of developing Techno Economic Corridors connecting HUBs which will act as growth centre for individual sectors. Public capital investment enhances private land value that public – private partnerships in developing toll roads positively impacts adjacent property values. A value capture strategy will be used for finance infrastructure development and allow local governments to share in the land value gains The local governments will effectively recover infrastructure investment costs through this value capture mechanism. SG compliments the present PPP (Public Private Partnership) developmental model, by ensuring balanced participation of the private and public sector taking advantage of value and valuation of infrastructure thereby yielding higher returns.

- Harnessing the Untapped Potential of the Nation.
- Defining Growth through Convergence of Multiple Sectors.
- Infrastructure Development with Minimal Govt. Investment.
- Setting up Hubs, Mini Hubs and Nano Hubs Nationally.



Innovation Committee in India.

A huge capital investment will be required at the initial stages as the cost of this capital expenditure would cost the exchequer a huge amount. Significant funding would be required as development has to be done from scratch for all the utilities such as water, waste, power etc. Many foreign firms including US investors are welcome and invest here or are planning to make an entry through Silicon Valley

The potential of island for smart city development depends on the effectiveness of blue economic governance both at the national and the global level. It refers to the provisions, regulations and mechanisms surrounding access, management and control of islands and the smart city related activities. Even, smart city development could create a positive impact and ensure to bring Social and economic benefits to local communities of Islands.



It was notable to experience and understand Contributions of **Dr. P. Sekhar** towards Creation of a unique Development mechanism for national Development "**Secured Governance**". Secured Governance with Techno – Economic corridor will help in boosting the economic growth not only developing nations but also will help extensively in Developed countries.

Goodwill Ambassador & Former Mayer of Beverly Hills, California

Smart Tech HUBs or Super Silicon Valley smart city not only host people from different areas of the IT landscape and other skilled population, they encourage them to gather and stay in that city. From various skilled employees, web designers and digital marketers to developers and angel investors, a growing company needs to have access to the best talent in all aspects of the sector. It also needs to be able to establish itself in a culture where people are connected and where networking is of paramount importance and intrinsic to work life.

The SILICON VALLEY INNOVATION COMMITTEE enhances even high-tech, entrepreneurial firms may be small in size, and they often play a large role in developing innovative products and thus spurring economic growth. The committee is widely believed as providing a nurturing environment for new business start-ups and growth of technology related existing industries. The Committee will encourage entrepreneurship promotion and education schemes designed to find, assist and train new technology entrepreneurs. However a strong connection between committee and industry creates an environment that promotes business-sense in academia and greater technological understanding in the business world.

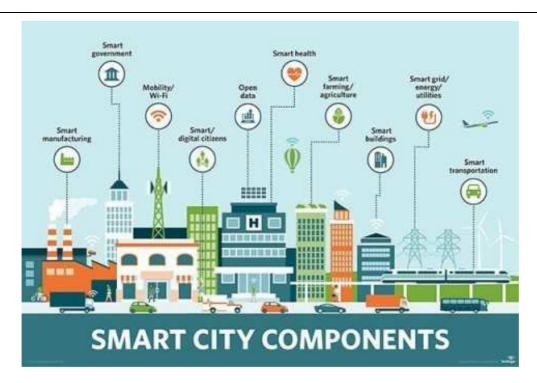
About the authors



Dr. P. Sekhar is a respected development thinker and an author of well-documented series of 65 plus books on Secured Techno-Economic National Growth. He has spent over four decades in R&D based technologies and related human and national development initiatives. He has done Research leading to Ph.D. from MU having done work in Nuclear Physics in BARC and Solid State Electronics in TIFR with International publications.



Dr. Venkata Rayapati is the President of Silicon Valley Innovation Committee a premier organisation of Silicon Valley companies. He has over twenty years of experience in Cyber Security, Wireless Video, and Artificial Intelligence. He holds Ph.D. in Electrical and Computer engineering from the University of Montreal. Dr. Rayapati has published more than 30 plus papers in various reputable International Journals and Conferences.



Source: https://internetofthingsagenda.techtarget.com/definition/smart-city

Digital Forensics – As we know it today...

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'Digital Forensics' is better understood by the common connotation of the words rather than through a formally approved definition. It may not be far from reality to state that 'Digital Forensics' begs an academically rigorous definition though there are quite a few good working definitions. A briefing note (1) on Digital Forensics prepared for the British Parliament states that "There is no standard definition, but the UK Forensic Science Regulator (2) defines digital forensics as the process by which information is extracted from data storage media (e.g. devices, systems associated with computing, ...), rendered into a useable form, processed and interpreted for the purpose of obtaining intelligence for use in investigations, or evidence for use in criminal proceedings." Ken Zatyko (3) former Director of the US Defense Computer Forensics Laboratory prefers a more process oriented definition when he suggests that digital forensics can be defined as "the application of computer science and investigative procedures for a legal purpose involving the analysis of digital evidence after proper search authority, chain of custody, validation with mathematics, use of validated tools, repeatability, reporting, and possible expert presentation." As we wade through these approaches to defining digital evidence, a very different view point is found in SWGDE (Scientific Working Group on Digital Evidence) glossary (4) where computer forensics is defined as a "sub-discipline of Digital & Multimedia Evidence, which involves the scientific examination, analysis, and/or evaluation of digital evidence in legal matters." Interestingly this definition found in SWGDE glossary positions forensics as a subset of evidence while the common understanding is that evidence is sub-set of the forensic process. This paper is no place for an elaborate debate on whether forensics is a subset of evidence or vice-versa.

Digital Forensics and Traditional Forensics

As opined by Donn Parker, in a paper-based environment, the legal system assumes a set of processes that is fully understood and observed by all parties. However, when we apply these processes to digital evidence, we encounter a set of problems that requires a legally defensible solution for digital forensics to have served its purpose (5). While most of the work on the development of digital forensics can be credited to law enforcement and criminal justice systems of different countries, there is a sprinkling of contribution by private enterprises as well; mostly by vendors of products used in the digital forensics process. The largest users of digital forensics services are the prosecution and judiciary while private enterprises are slowly but surely understanding the importance of this discipline as significant value adders for their internal investigations on cyber infractions.

Digital forensics started getting some attention when the specialized laws that were enacted to curb cyber-crimes had to be dovetailed into the country's generic legal system and stakeholders asked a poignant question – "how will evidence look like in a digital environment?" Crime management and jurisprudence depended on evidence of probative value to determine whether a crime had in fact been committed and if so, to identify the perpetrators beyond reasonable doubt. A key question that is still being asked is if such identification of perpetrators is possible at all, given that anonymity is the hallmark of the Internet. This process of ensuring dependence on reliable evidence of probative value can be seen supporting some of the well-known principles of jurisprudence including the one propounded by Sir William Blackstone way back in 1765 when he said that "Better that ten guilty persons escape than that one innocent suffer." (6) Can digital evidence ever be so water tight or will application of these principles to poorly structured digital forensic processes result in poor rates of prosecution and sentencing.

Given the importance of evidence in criminal justice dispensation, it is important to understand the ways in which evidence is identified, gathered, analyzed and interpreted and finally presented in a court of law in line with the procedural requirements laid down locally. Matters relating to evidence in conventional forms of crimes (eg., murder, armed robbery, etc.) have been well established for a long time and all the parties handling such evidence viz., the law enforcement, prosecuting and defense attorneys and the judges know quite clearly the ways in which evidence will be handled, analyzed and interpreted. It is widely believed that the legal interpretation of autopsy was recorded in a Chinese work (7) dating back to the 13th century while 16th century saw the European interest in forensics with the French, Italian and German surgeons propounding the concept of police medicine and took forward the Chinese work on autopsy to more logical conclusions. (8) We later had ballistics, toxicology, anthropometry and finally the now famous finger prints. Digital forensics is struggling to reach the same level of maturity in less than forty years, what took traditional forensics close to four hundred years to reach.

Ubiquity of Digital Forensics

The Association of Chief Police Officers (ACPO) bring out the ubiquity of digital evidence quite clearly when they state that "it must be present in almost every crime." (9) This ubiquity can be understood when we realize that we have gone past the era when digital forensics mostly looked at PCs and laptops. Now, material to support digital forensic investigation can be found a wide variety of devices including PDAs, smart phones, GPS devices, asset access controllers, CCTV, game

consoles, fitness wrist-wraps and in third party devices like those operated and controlled by ISPs. There is also a growing tendency to capture data or evidence in transit as data moves between network devices and voice call intercepts, with lawful authority to do so. As we keep pace with the proliferation of devices that are potential repositories of evidence for digital forensic analysis, an interesting trend is the skewed distribution of devices used to collect digital evidence. Smart phones continue to remain the most analyzed device for collection of digital evidence while investigating cyber-crimes. The UK Metropolitan Police reports that mobile phones constitute three-quarters of the plethora of evidence holding devices that they examine annually (10).

Digital Forensics process – is it a scientific method?

Even as we decide on the relevance, applicability and uniformity of what has come to be called a scientific process of forensic analysis involving evidence collection and interpretation, there are questions being raised about digital forensics being a scientific discipline. Simon A Cole (11) points to the efforts by forensic communities to fit themselves into a template called "scientific method" constructed around hypothesis testing. However, he also points to the fact that "scientific method" is more of an honorific rather than a description of what society generally calls "science." This reflects the contemporary American thought that digital forensics cannot be any more scientific than the general forensic science can be. The British thought on this subject is more focused on processes, unlike the Americans who have considered the perspectives. The Forensic Science Regulator in the UK admits that risk of errors occurring in digital forensics is significant (12) and strongly recommends that digital forensic processes must be carried out in institutions accredited to ISO17025 standards. So, we are now facing the prospect of collecting, analyzing and interpreting digital evidence in frameworks that does not seem to fit a conventional "scientific method" template and can remain error-prone. It is important to understand this caveat since users of digital forensic processes should not be carried away by the belief that the results are conclusive and beyond an iota of doubt, though in many cases the results can pass the legal test of being beyond 'reasonable' doubt.

Digital Forensic Processes - Evolution

The digital forensic process is often seen to adopt a life-cycle approach since it has a clear start, end and a defined flow. Most of what we have as digital forensics process framework today can be traced back to the pioneering work that nurtured at the various Digital Forensics Research Workshops (DFRWS). As an example, Palmer's Roadmap for Digital Forensics Research (13) presented in the first DFRWS paved way for two adaptations. Firstly, it formed the basis for development of 'Systematic Digital Forensic Investigation Model' by Agarwal *et al* (14) in 2011. Palmer can also be credited with laying the foundation for developing a framework for comparative study of digital forensic models, spearheaded by Reith *et al* (15) Carrier and Spafford (16) pioneered the concept of event centric digital forensic investigation, which appears to have influenced the Enhanced Digital Investigation Process by Baryamureeba and Tushabe. (17) I have personally heard some information security professionals claim that digital forensics is another *avatar* of incident response process and have embedded evidence collection as a component of the the incident response process.

Most models discussed above and a few more that are actively used (including that proposed by Perumal,(18) Perumal et al (19) and Kohn (20)) substantially adopt the waterfall model and expect that all steps are followed in the right sequence and covers all evidence that can be collected at a crime scene and related locations. However, in the case of emergencies involving digital forensic analysis, investigators have done well to learn from the medical emergency processes and apply the concept of triage. In the medical world, triage is the assignment of degrees of urgency to wounds or illnesses to decide the order of treatment of a large number of patients or casualties. In a digital crime scene, the concept of triage has been built in the decision process to determine acquisition, quick assessment of the relevance of what has been acquired and decide on the course of action, particularly when threatened with device overload or data deluges. This becomes important in situations where speed of decision to act on evidence collected becomes important; as could be in cases where digital forensic process points to clues related to kidnapping; ransom demands, etc. While not many have questioned the relevance of triage in the digital forensics context, a key concern appears to be that investigating officers using triage could be in conflict with the requirement of independence expected at every stage of digital forensic process. This arises because in a triage, by definition, the investigating officer will pass instant judgement on the relevance, accuracy and admissibility of evidence on hand. Among the mitigating measures to address this risk of lack of independence, one that is gaining ground is that the prosecuting officers do not interpret the triage results but stop with using them as factual evidence and take a call. It is not hard to understand the difficulty in adopting such a dichotomous attitude when confronted with large volumes of evidence and principles of triage is to be adopted.

With a view to addressing some of the limitations of using forensic investigation tools and methods in criminal justice dispensation, Crown prosecutors in the UK often follow a process leading to the creation of Streamlined Forensic Reporting (SFR). This has helped in reducing court time and efforts by facilitating an early mutual acceptance of the forensic issues by the prosecution and defense and also agreeing on what will be contested. SFR or its equivalent is slowly gaining ground in different jurisdictions with the Crown Prosecution in the UK formally endorsing its relevance to digital forensics investigation. (21)

Challenges to Digital Forensics processes

In addition to the conceptual challenges and issues that plague the evolution of a robust and globally applicable digital forensic process framework as discussed above, there are other challenges that often confront a digital forensic investigator. The most common problem relates to the way in which data is stored securely. Encryption is recognized as the cornerstone on which many data security solutions have been built. When a digital forensic investigator encounters encrypted data, nothing much can be done unless the forensically relevant data is decrypted. Laws in many countries, including India, have provisions that enable a law enforcement officer of a certain rank to warrant the disclosure of the decryption key enabling access to the data in plain text format. The United States tried what is commonly known as the LEAF - Law Enforcement Access Field as a means of being able to decrypt messages in encrypted format when the Government wanted access, in national interest and in counter-terrorism activities. Though this is no longer in use, there is suspicion that some legacy systems may still carry this. The process centered around the 'Clipper Chip' developed by the US National Security Agency and was meant to encrypt voice and data messages. The Clipper Chip used a crypto algorithm called 'Skipjack' that was also developed by US National Security Agency and at the core of this development was the concept of keyescrow which enabled US Government agencies, after demonstrating their authority to do so, to decrypt and access plain text data or voice communication. Amid strong protests from Electronic Privacy Information Center and the Electronic Frontier Foundation as well as other privacy protagonists, LEAF was discontinued but the law enforcement still holds the right to compel decryption under certain conditions. Notwithstanding all that has been said about the power available with law enforcement to compel decryption or sharing of crypto-keys, such process is time consuming and situations requiring quick access to OoFI (Objects of Forensic Importance) will still throw up challenges.

Increased reliance on the Cloud for storage of information poses a second set of challenge for the digital forensic investigator. In a cloud environment that permit multiple access paths to data storage with collaborative computing, there can be challenges arising from even minor issues like one user over-writing on a location where logically deleted data was originally stored. This will result in permanently losing the deleted data which could contain OoFI. Most cloud access is subject to strong access control protocols that is bound to delay forensic analysis of information held in the cloud. Further, cloud service provider and the servers on which data is stored may be in jurisdictions other than where the investigation is happening. Though investigators may seek support under Mutual Legal Assistance Treaties to access information in different jurisdictions, such processes will be painfully slow.

A third and perhaps technologically the most exciting challenge is anti-forensics. Cyber-crime perpetrators often have full knowledge of the various methods and processes adopted by digital forensic investigators. To derail the digital forensic investigation process and to mislead investigators, anti-forensic processes are adopted. Some of the more common anti-forensic practices include changes to calendar and time stamps; overwrite file content so that it is permanently unavailable to the investigators; using multiple passwords to access different parts of the storage where different parts of the data is stored, etc. The last process ensures that even when one password is disclosed under duress or using due process of law, it will point to only one part of the information which does not to contain anything incriminating. It is highly unlikely that the digital forensic investigator will always suspect that what is available is incomplete unless the anti-forensic process has been flawed.

Digital Forensics as a Service (DFaaS)

Though we have identified the proliferation of cloud computing as an impediment to quick digital forensic analysis, a section of digital forensic professionals are looking at the option of harnessing the power, architecture and ubiquitous reach of the cloud to develop a Digital Forensics as a Service (DFaaS) model. Building on the findings of Lee and Un (22) that efficiency of cloud systems significantly improves during indexed searches, Wen *et al* (23) proposed a cloud-based service harnessing the potential of parallel computing to overcome the problem of data magnitude that threatened digital forensic processes with unacceptable levels of delay. This service, in the words of Wen *et al* (cited supra) "deals with a large volume of forensic data, sharing interoperable forensic software, and providing tools for forensic investigators to create and customize forensic data processing workflows." They further report that based on testing a number of scenarios, the workflow solution proposed can save upto 87% of analysis time in the tested scenarios. When will DFaaS come of age is too early to guess though one successful use case was reported by van Baar *et a* (24) when they tried implementing DFaaS in the Netherlands Forensic Institute with success.

What direction will the actual implementation of digital forensics services take in the future is unclear but what remains clear is that digital forensics is here to stay. The more mature, repeatable, reliable and objective digital forensic processes become, the more will its acceptability be in the pursuit of evidence of probative value.

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criminology. He has CISSP, CISA, CISM credentials and FCA, FCFIP and FISC fellowships. He was recipient of the ISC-Prof S S Srivastava prize for excellence in social sciences research.

Robert Baptiste, a French security expert and ethical hacker, today tweeted that "an anonymous source" has full access to database of PM Narendra Modi's website. Baptiste added that he would start a security audit after PM Modi contacts him in private. He later claimed that 'narendramodi.in' team got in touch with him and they will take appropriate measures.

Shaping India's Future in Enterprise AV-IT Convergence

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Over the past decades, the IT sector has been through several transformations that are evident in the ways technology is applied and the supporting infrastructure. A prominent example of these advancements is the convergence of audiovisual (AV) and information technology (IT).

Whether it is in business, government, healthcare, or schools, more IT departments now find themselves building infrastructures that cater to an expanding number of AV devices on the network. Many teams are also inheriting new responsibilities that concern AV experiences.

Zooming in on the enterprise sector, what forces are driving the convergence of AV and IT? How do these integrations fit into India's future growth? How can its IT community better prepare for its increasing responsibility with AV solutions?

Let us start by looking at the factors that bring AV and IT together in enterprise applications.

It is all About the User Experience

Today's enterprises have high expectations for their communications systems. For a video conference involving offsite colleagues, they expect the system to connect correctly upon a button's touch. Callers' faces are projected onscreen with great fidelity and every spoken word amplified in the room with crisp intelligibility. Control presets linked to the room booking system trigger the preferred sound and brightness levels. Most important of all, they expect the system to work like magic with no glitch, every time.

This very system simplicity, performance, and reliability are the fundamental drivers pushing the demand for enterprise AV–IT integration. Enterprises have no appetite for the AV mishaps and inflexibility common with legacy systems. AV–IT integration streamlines users' interactions and in addition, enables a user-centric approach to system improvement and expansion.

By putting AV devices on the network, systems managers can build feedback data generation into the configuration, such as usage pattern and failure reports. Equipped with these invaluable insights, managers can continuously assess how the organisational needs are being met and approach future project design with confidence.

India's Opportunity to Leapfrog Network AV Adoption

India is shaping up to be one of the fastest growing markets for enterprise network AV.

The Indian economy grew by 7 percent in 2016 and has an estimated yearly growth of over 7 percent through 2019. The government's USD 15 billion Smart Cities mission aims to create 100 smart cities over the next decade. This means brand new buildings are breaking ground every week across the country, from government buildings and convention centres to hotels. Many of these projects are designed from the onset to feature integrated enterprise communications.

If these trends continue, the number of new integrated AV environments in India may outpace those in the United States of America and Europe, where the driver is mostly equipment retrofits. Taking heed of how India has skipped fixed broadband to jump directly to mobile, it will be exciting to see if India's digital leapfrogging will carry over to network AV.

Fuelling India's Digital Transformation Journey

India's market demand for integrated AV communications is indisputable. However, whether these drivers will translate into a vibrant and sustainable new sector depends on several critical factors: a knowledgeable workforce, adoption of standards, and cross-sector collaboration between AV and IT experts.

The Audiovisual and Integrated Experience Association (AVIXA), is the Global Trade Association established in 1939 representing the professional AV and information communications technology (ICT) Industries worldwide and a trusted resource for the larger AV community creating integrated experiences.

In anticipation of the rapid growth in India's pro-AV market, which is expected to reach USD8.4 billion by 2022, AVIXA has made India a key region of focus, regularly bringing its education programme to major cities to train professionals on AV topics. AVIXA has also published numerous standards as guides to ensure AV–IT solutions are designed to be scalable and easily replicated across different venues.

Also, through industry roundtables and conferences like InfoComm India, AVIXA welcomes the IT community to network and exchange knowledge with AV professionals. Closer collaboration with AV experts will be essential in delivering consistently high video and sound quality with designs optimised for each room.

As tens of thousands of integrated enterprise spaces come online in India in the next decades, a key step is to equip the industry with the right tools to create solutions that deliver the desired business outcomes. We look forward to working with the IT community to shape this future.

A detailed report providing information on the economic outlook and implications for the AV industry on the Indian subcontinent can be found in the <u>Industry Outlook and Trends Analysis</u> (IOTA), which is updated annually. For enquiries about membership and other benefits, contact <u>Gaurab Majumdar</u>.

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About AVIXA

AVIXATM is the Audiovisual and Integrated Experience Association, producer of InfoComm trade shows around the world, co-owner of Integrated Systems Europe, and the international trade association representing the audiovisual industry. Established in 1939, AVIXA has more than 5,400 members, including manufacturers, systems integrators, dealers and distributors, consultants, programmers, live events companies, technology managers, content producers, and multimedia professionals from more than 80 countries. AVIXA members create integrated AV experiences that deliver outcomes for end users. AVIXA is a hub for professional collaboration, information, and community, and the leading resource for AV standards, certification, training, market intelligence and thought leadership. Additional information is available at www.avixa.org

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Mr. Gaurab Majumdar is working with The Audiovisual & Integrated Experience Association (AVIXA) as Regional Director (India & Middle East) since 2014. He is instrumental in developing AV market in India & ME through the Association activities like membership, certification, awareness sessions & trade shows. His linkages with Government agencies, Institutions & Associations have helped to strengthen partnership.

Mr. Majumdar has a long span of 20 years of professional career in the field of trade & economic development. He had earlier worked with Government of India; South Korean Government Agency & Embassy of United States of America.

He has Indian Master Degree qualifications in Management (MBA) and Commerce (MCOM) and received Financial Management Certificate from USA.

Images are not only visual. They're also auditory, they involve sensuous impressions, bundles of information that come to us through our senses, and mainly through seeing and hearing: the audio-visual field.

-- W. J. T. Mitchell

There is a lot of money to be made from miseducation, from the easy to read easy to learn textbooks, workbooks, teacher manuals, educational games and visual aids. The textbook business is more than a billion-dollar-a-year industry and some of its biggest profits come from 'audio-visual aids' - flash cards, tape cassettes, and filmstrips. No wonder the education industry encourages schools to focus on surface education.

-- Marva Collins

If a chemical drug like Viagra is accepted by society and by the world to ignite desire, then what is the problem with my audio-visual drug called cinema which ignites desire?

Both are basically doing the same thing!

-- Mallika Sherawat

The importance of HiST(ory) for S&T

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It is ironical that a country like India with a hoary tradition of science and technology does not yet have departments dedicated to studying and teaching of the history of science and technology. But fortunately there has been considerable research and teaching - especially in the last four decades - by individuals or groups working in the history/sociology departments of universities or in research centres (like the National Institute of Science, Technology and Development Studies - NISTADS - for instance). Considering the breadth and depth of the Indian heritage, and engagements with scientific and technological traditions emanating from different parts of the globe over vast centuries, there is much room and scope available for scholarly research yet in the years ahead. While such unearthing and deeper understanding progresses on the one hand, it is also important to make the fruits of such work available constantly to the wider world. This ought to be not only in terms of publications and the discussions and teaching of the same in the departments of history but also through the spread and appreciation of it among practitioners and students of sciences and technology too.

The importance of History of Science and Technology [HiST] to the world of S&T and to the public at large is manifold. One of the important attributes and concerns about the course of modern S&T - especially science - in the past few decades is that it is becoming increasingly esoteric - making sense only to those within the circumscribed world of specialists. With increasing specialization, specific fields of science become esoteric not only to the lay public but even to members of the broader S&T community who do not belong to the particular specialty. While this is inevitable to some extent (with the consoling fact that its constricting effects are mitigated and counterbalanced internally, to some extent by the simultaneous trend of the increasingly interdisciplinary nature of research pursuits), it is important externally to nourish and cherish the bridges between S&T and wider society. There is no gainsaying the fact that S&T and its practitioners are very much products of social and cultural forces and factors. One of the ways of constantly reinforcing this connectedness is through a serious sociological and historical analysis of the processes in various domains of S&T over the centuries. More importantly, students of S&T ought to be exposed to this kind of literature so that they are connected by heart and mind simultaneously to the social aspects of S&T and to the past heritage.

Such exposure will reinforce in them the social dimensions and functions of science rather than keeping them sunk merely in their world of equations, calculations, related examinations and career advancements. This connectedness has the advantage of making them also more socially conscientious which in turn can spur them to make a substantial part of their professional life socially relevant - reasonably alert to the changing needs of society and the aspirations of fellow countrymen - especially the many who are still struggling under the avoidable burdens of economic, knowledge, and digital divides in society. An added advantage of such connectedness for students of S&T (even as they try effectively to address socio-economic concerns through the power of S&T) is to help them come out of the trap of technological determinism - that fanciful but deep belief in technology not only as the THE driving force of history/society, but also that it (technology) can solve ALL problems - including those created by itself. The connectedness and practical engagement with society (coinciding with the understanding and appreciation of similar connections in the past) will help them realise that technology has to contend with many social, cultural and attitudinal issues that are beyond the scope of technology itself to address fully.

Such realization in turn will help in building healthy relationship with, and regard for, professionals from other fields especially beyond S&T - like social workers, historians, economists and sociologists. Not only will this bring an element of modesty and openness but extend the scope of interdisciplinary research beyond S&T - leading to fruitful policy/action-oriented ventures which will make S&T more socially relevant and effective, while also being sensitive to some of the challenging ecological and other problems caused by non-judicious and less-contextual use of S&T. HiST will be of particular use with regard to this. One of the advantages of an objective and sensitive study of history of technology with the benefit of (non-hasty) hindsight is the ability to have a new look at forgotten alternatives, aborted discoveries, and 'paths not taken'. There would be several of them either overlooked or deliberately marginalized due to mistaken priorities or political expediencies or imbalances - especially under colonial domination. The study of history of technology particularly with sensitivity to this aspect will not only lead to an appreciation of missed opportunities but also (in a practical way), to seek balanced approaches to solving contemporary problems without excessive obsession with what is seen as 'modern', accompanied by a stiff resistance or indifference to what is perceived as 'traditional'. It will also lead to creative and context-based hybrid technology thus embodying a living dialogue between the past and the present (for a better and more ecologically secure future).

One of the other important merits of the study of HiST generally and particularly by students and practitioners of S&T is to attain a more informed understanding of the enterprise of S&T beyond the stereotyped image of its being a fully 'objective' and 'rational' endeavour. It is important to realize and to be aware of the many (human) factors beyond the rational, that shape(d) the motives and careers of outstanding men and women of S&T throughout history. This can contribute to a sense

of modesty and sensitivity to the potential wrong trajectories that S&T can take due to inherent frailties and fallibilities of mankind even as we intend to make the world an ever better place through our S&T innovations. Above all, it will keep them firmly rooted in the human (context), even as their fields of research and practical S&T activities may lead them through esoteric avenues.

This in turn has implications for another important domain - which very rightly, is being talked much about in recent decades - the 'public understanding of science'. Public understanding of S&T has become an important concern with increasing democratic activities of different kinds especially with the spread of modern ICTs (Information and Communication Technologies) which are valuable tools for empowerment but which can be used to spread misinformation as much as information, by ALL sides. With rising contestations about the proper use of S&T especially in developmental activities (with diverging visions of what 'development' is), and increasingly public expressions of the same - including violent ones, some leading even to tragic deaths - it is important to promote healthy dialogue between S&T (practitioners) and its various stake holders - especially the broader public. Maintaining the human dimension and rootedness is very crucial for practitioners of S&T so that their credibility is at a high when they reach out to the public rather than giving the impression of coming out (or worse coming 'down') with a conscious sense of 'difference' - with the associated baggage of attitudes towards and about the 'ignorant public'.

Finally at a very personal level, the study of HiST can have fruitful influences on students and practitioners of S&T in terms of inspiration and finding greater meaning to their lives and vocations. A study of the little known dimension of the life of Jagadis Chandra Bose (1858-1937) as an 'instrumentation' expert in his own right - building his own (highly sensitive) instruments for his various experiments using minimum available materials, under the extremely constraining conditions of colonialism, is bound to inspire sensitive young minds and equip them better to face challenges of different kinds in today's scenario - especially in situations where is there is perceived 'fund-crunch'. An awareness of the struggles of Michael Faraday (1791-1867) - whose early interest in electrical science and engineering was nurtured while he laboured as a poor youngster in a book-binding shop where the papers of Humphrey Davy (1778 - 1829) came for binding - can not fail to make at least a small spark in some corner of an impressionable heart. An examination of the life of a Ludwig Prandtl (1875—1953) who on the one hand is hailed as the father of modern aerodynamics but was also one who was happy to serve the Nazi war agenda and found justifications for it, would spur one to relate it to the moral dilemmas that practitioners of S&T might face in the call to deploy their expertise in the 'service of the nation' in questionable ways today. An informed (and even a technological) study of some of the architectural, metallurgical and textiles-related accomplishments of those who did them centuries and millennia ago with corresponding limited resources, is bound to instill a sense of pride and also a more proper attitude to those 'non-modern' (wo)men and their works, and therefore again a sense of modesty, while contributing to the 'enormous power' of S&T to shape human ends today.

To conclude, one should be conscious of the fact that even as the world of S&T cherishes and expects 'scientific temper' from broader society (which is right and is needed ever more today), it is also worthwhile to nurture among students and practitioners of S&T, the equally important 'human[ities] temper'.

About the author



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Dr. Lourdusamy has authored the books: Science and National Consciousness in Bengal, 1870-1930, (2004); Religion and Modern Science in Colonial Bengal, 1870-1940, (2007). He was a member (2014-16) of the Research Council, Indian National Commission for the History of Science - an organ of the Indian National Science Academy. He is currently part of a multi-author book writing project on "Moving Crops" under the

Indian National Science Academy. He is currently part of a multi-author book writing project on "Moving Crops" under the auspices of the Max Planck Institute for History of Science, Berlin.

Politicians, real-estate agents, used-car salesmen, and advertising copy-writers are expected to stretch facts in self-serving directions, but scientists who falsify their results are regarded by their peers as committing an inexcusable crime. Yet the sad fact is that the history of science swarms with cases of outright fakery and instances of scientists who unconsciously distorted their work by seeing it through lenses of passionately held beliefs.

— Martin Gardner

Next What? PPR (Possibility, Potential and Reality) Quotient

Mr. M. K. Anand

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If you are NOT following your professional and business dreams whatever the reason may be, then this article is meant (a must read) for you.

To put yourself back on track, you still have time! No matter what your age is and whatever circumstances you are at present.

The search for "Next What" is always a puzzle to be solved by each one of us in this world. Right from the age of just one or a little more than that, curiosity develops to know things more and more, to explore the environment around us and it goes on till our last day of our lives on this planet Earth.

Now the question is to check whether the search has created any significant impact in our lives or is it just another infatuated spike generated out of a momentary impulse. There are many people who generally accept mediocrity and justify the same with reasons which are obnoxious.

Unfortunately, most human beings never pursue their aspirations deeply and their search <u>Terminates</u> before it <u>Germinates</u> into something profound to impact their own life and the society in general.

The reasons are obvious and to share few,

- Being short of Goals and Priorities
- Being short of Direction
- Being short of Speed
- Being short of Self-Motivation
- Being short of Guidance
- Being short of Consistency

Once we cross a certain biological age, we tend to think that it's all over and our focus shifts towards routine – upbringing and supporting our offspring.

Time and again it has been proved that One Man, One Idea and One Action has brought in a paradigm shift in what we do. We witness this irrespective of the field, be it Sports, Politics, Education, Music and any other domain. There is someone who has always made the difference by innovating and a whole bunch of people who follow them have also been benefited significantly.

How do we rationalise this extraordinary action? How do we frame this in order to be able to establish ourselves and get into the act?

There is a simple format to analyse our life and possibly find the solution to move forward.

It is called **PPR Quotient**:

What is PPR Quotient?

PPR is a format which magnifies the larger context of one's dream, wish list and rationalises it with capabilities and skills first and then analyses it with ground reality. It creates a pathway to bridge the gap and accomplish the set goals- priorities.

Let's dive deep into this model:

- **P** Possibility List out your Dreams
- **P** Potential Map your potentials/capabilities with Possibility
- R- Reality Validate your Current state of affairs with Possibility + Potentials that are required to achieve

Eg: Cricket Game

Possibility Quotient:

The Cricket Game with 20 overs has 120 Deliveries. The possibility is to hit sixer in every ball which will count to 720 Runs. This is a paper possibility which is technically correct. Drawing parallel from this example, explore the possibility of your domain, vertical and field of choice in which you can rise to your highest possible potential. The key is to know where you are heading and why you are heading in that direction. This clarity is lacking in a lot of people. It is called the "Theory of Possibility" (ToP). We find most people work on what is called the "Theory of Constraints" (ToC) instead of ToP. Hence, they tend to get satisfied with what they have in life currently and never venture to what they should be and finally to what they ought to be.

Potential Quotient:

Possibility to Potential is the one which determines the player to look at his/her own capabilities to hit as high as possible to reach the pinnacle of success in securing the highest ever possible scores in the history of cricket.

Highest innings totals as of now...

263/5 in 20 overs by Royal Challengers Bangalore against Pune Warriors India at Bangalore on 23rd April 2013

Source: Wikipedia / ESPNcricinfo

The above example proves that there is always a scope to hit the possibility inch by inch and all it requires is a modified belief system and putting in consistent efforts towards the goals and priorities by adopting different techniques and skills.

Why do people stop pursuing their possibilities? Is it Age? However, Life takes U turns and Curves and there is one feeling which pops up to many "Oh No...It's enough!". One who is persistent, will not give up on his/her priorities and it may seem that while we need to balance our livelihood and dreams however our passion, goal-oriented efforts, inner fervour to achieve the dream must never stop at any age or life situation. Those who do not follow this path fail and never keep the FIRE ON all the time until it is achieved. **Swami Vivekananda said, Arise, Awake and Stop not till the Goal is reached.**

A known interesting personality from the Movie Industry (Tamil) is **Chiyaan Vikram**. His passion and focus with 10 years of **persistent waiting** (working towards the possibility with his potential, after the initial 3 movies as hero failed in row one after the other) has made him what he is today. This actor proved all-time great in proving his mettle by demonstrating his endurance and strength of character, or the necessary skills, abilities, or traits to succeed in something which he believed so firmly.

Reality Quotient:

Here comes the Ground Check, Validation and Introspection of What am I today? Where am I today? Where exactly is the Gap?

This needs continuous introspection, counselling, mentoring and brainstorming. It requires openness; willingness and courage to accept the reality of where are you today with relevance to your dream or potential.

Unless the receptivity is established within yourself, it is almost impossible to realise the truth about yourself. Once someone can accept the stark truth, then the rebuilding can happen with lesser time. For some people it needs few years to realise, for some it could just be the very next minute to accept and start working on the gaps identified with a support system. For many it is a distant dream. The reason is they neither know that they are not what they think they are, nor do they approach an expert to analyse the truth about themselves. Majority of people fall under this category hence theoretically they know that a possibility exists, and the potential can be developed but in reality, they are not inclined to know or accept or take action to come out of the quick sand in which they are almost buried. These are ones who build negative vibes and spread negativity and it impacts the positive ones and some fragile people who get attracted and lose their focus and priorities.

Hence, we see that the bottom of the Pyramid is always crowded but at the top it is always a few who accomplish their Possibilities by consistently building their potentials and often validating with reality check.

To sum up,

- 1. Write your field of Possibilities
- 2. Write your short comings, technical skills, functional knowledge and behavioural traits to meet the possibilities
- 3. Write your Reality Check list, what stops and blocks you

If you can figure out the above, you are 50% way towards your Dreams and Aspirations.

Next What?

Work on it and Fix it. It's that Simple.

Best Wishes for all your endeavours in 2019 and the Future Years.

About the author



M. K. Anand is a Co-Founder and Chief Relationship Officer, See Change Consulting. He is a first generation entrepreneur and ventured into business domain at the age of 26.

His 25+ years of career includes 5 years in Employment which includes Wipro Channel Business. Since 1998, over the last 20 years he has been in the entrepreneurial journey handling verticals like IT, HR and Business Consulting.

His Professional accomplishments are in the areas of Sales, Marketing, Information Technology, System Integration, Training, Coaching and Turnaround Consulting.

His present priorities are Coaching Entrepreneurs, Fund Raising, Establishing L&D for organisations, Employee Development Program, Entertainment and Sports Consulting. His organisation has Empanelled 100+ Subject Matter Experts in their panel of network across India and abroad.

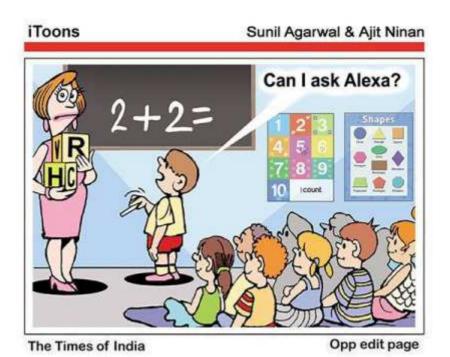
On the Academic front, he is a Graduate in Chemistry, Post Graduate in Public Administration and Management Graduate (MBA), DSM in software application and certified on various areas of L&D.

He is an Executive Committee Member, Chairman, IT & Telecom Subcommittee, Co Chairman, Skill Development Sub Committee, Andhra Chamber of Commerce, Chartered Member at CILT, UK. He is an Advisor of the E-Bulletin-Editorial Board of Andhra Chamber of Commerce.

He has Co Authored a book for SME Entrepreneurs titled "36 Golden Rules" – Build Your business for generations. He writes Blog and Contribute in several magazines and shares his experience at various social and public forums.

He is an Active Student of Spirituality with Heartfulness Institute of Shri Ram Chandra Mission since 1999. He is a Certified Heartfulness Coach from the Global Heartfulness Institute Inc, USA.

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Atal New India Challenges – A first step towards becoming an Innovation Nation

Mr. R. Ramanan

Additional Secretary and Mission Director Atal Innovation Mission, Niti Aayog r.ramanan@gov.in

India is a country with 1.3 Billion+ people enjoying a demographic dividend that is the envy of many a country. It also has one of the fastest growing GDPs among the major economies of the world which is poised to grow faster. India has over 1.4 million schools, over 10,500 engineering and technical institutions, thousands of business schools creating an impressive energetic youth force that can be of tremendous advantage.

However India is also a country with thousands of challenges which demand immediate attention be it related to poverty elimination, quality healthcare, affordable housing, clean drinking water, mass transportation, urban housing and development, agri productivity, education, clean energy, waste management to name a few.

Viewed another way these challenges are also tremendous startup opportunities for the young budding innovators of India to address. We are also living in a world where technology and communications are advancing at a scorching pace, enabling advanced, affordable technology driven solutions which seemed like only a distant possibility a couple of decades ago. The Internet, cloud services, 3D printing, Robotics, Augmented and Virtual reality, Internet of Things, Artifical Intelligence, Blockchain are revolutionizing the way we are experiencing the world and the world can interact with us. Distance, bandwidths or computing power are no longer a limitation thereby giving rise to new business models and unique innovative solutions to address humankind needs.

With its strong focus on education, its demographic dividend, growing GDP, and the opportunities to be addressed both at the bottom of the pyramid (frugal innovation) as well as to a fast growing higher economic class of the population, India verily has the potential of becoming the Innovation Nation of the world.

Towards this end the National Institution for Transforming India (NITI AAYOG) has launched a flagship initiative the Atal Innovation Mission (AIM) with the highest levels of support and encouragement from the Government. The Atal Innovation Mission's (AIM) vision is to create a national ecosystem that promotes innovation and entrepreneurship across the country in a holistic manner - spanning higher secondary schools, universities and colleges, corporates, small and medium enterprises, research institutions, NGOs, states, smart cities, remote / hilly districts of the nation. AIM's implementation started in late 2016. Since the start of the implementation, AIM has delivered exceptionally fast results and continues to grow its momentum.

At a school level, AIM has launched over five thousand (5000+) Atal Tinkering Labs that enable school students from Grade VI-Grade XII to tinker and innovate with emerging technologies like 3D printers, Robotics, IOT, Augmented/Virtual reality and micro electronics to solve problems / challenges they see in and around their communities. This is a real game-changer in the school educational system to move away from a pure rote-learning based mindset to creating a more problem solving innovative mindset in the school students of our country. Tinkering Challenges and Tinkering Marathons provoking the young students to identify problems / challenges around them and leverage technology to innovatively resolve them will create the next generation of young budding innovators in the growing number of universities of the country. AIM is giving a grant of Rs 20 lakhs (twenty lakhs) to each school over a period of 5 years to ensure the above.

At a university and institutional level, AIM is launching hundreds of world class Atal Incubators that would foster and nurture the growth of startups across the country. 101 such Atal incubators are being established by end 2019, of which 32 are already functional with over 500 startups operational in diverse sectors of the country be it biotech, agri, transportation, smart cities etc. AIM is providing a grant of Rs Ten Crores (Rs 10 crores) to each successful applicant of an Atal Incubator over a period of 5 years to enable providing the needed support in terms of research / technology labs, seed funding, business planning, strategy, mentoring and training support relevant to the incubator.

To give sharper focus to creating innovative technology driven solutions to the growing number of startups of the country, AIM has also launched Atal New India Challenges (ANICs) in collaboration with ministries and the industry. These challenges are to stimulate creation of commercially deployable innovations having national impact at an economic or societal level. To date 35 Atal New India Challenges with the Ministries of Agriculture, Urban Housing and Development, Drinking Water and Sanitation, Rail, Transportation and Defence have been launched garnering over 1000+ applications across the country with a proof of concept, patented innovation or a beta prototype. Successful applicants will be given a grant of Rs one crore (Rs 1 crore) for commercializing the product. Successful product completions will be connected to Atal Incubators, investor communities so as to enable the innovators develop into a successful startup /company. A highly qualified selection committee drawn from the industry, academia, investors and government will identify winners. The fact that these challenges have been drawn in consultations with the ministries and the industry ensures that there would be ready market for the successful product that meets the needs of the Atal New India challenge.

Table-1 (AIM Website) gives a list of the initial 24 Atal New India challenges floated to date.. The next round of challenges will include Healthcare, Education, Clean Energy etc.. with other ministries.

Atal New India Challenges (ANIC) has several unique characteristics that make them a compelling proposition for the innovation community in India and even globally. These include

- ANICs are arrived at based on actual market and national needs requiring an innovative commercially deployable solution and enables startups to focus on the same. ANICs also enables research to be applied constructively to create solutions for actual problems, and will therefore strengthen the research ecosystem in the country
- ANICs trigger competitive innovations at a national level which would provoke greater participation and recognition of innovation across the length and breadth of the country
- ANICs would enable continuous intelligent leverage of emerging state of the art technologies to create advanced, affordable, frugal innovative solutions that is very much the need for emerging economies like India whose needs are very different from those of the western world
- ANICs enable national dialogues and interactions between government, academia and industry by their very collaborative methodology both in challenge identification as well as solution assessment and market deployments
- ANICs enable small innovators to collaborate with larger entities in a complementing manner thereby enhancing the startups road to success and also sharper focus on core competencies of each partnering entity
- ANICs would enable leveraging of cross innovations across the industry. For example a solution for affordable housing may leverage an innovation from a chemical or biotech industry startup too. This enables identification and utilization of innovation components from multiple industries in stitching together an innovative end solution
- ANICs solutions can be deployed in other parts of the world. Any solution created in India that is acceptable to a billion people has the potential to be leveraged by the several other billions on our planet. It is indeed an opportunity for indigenous innovation to have global impact. Viewed from this perspective it would be also be advantageous for global innovators to partner with Indian startups to create customizable, affordable yet high quality innovations that the Indian market needs

A challenge driven route is vital to ensure accelerated application of innovations to address the myriad challenges of India. It excites the imaginations of budding innovators with actual problems to solve, and would surely trigger a wave of innovation across the country. The ANIC methodology could be adopted at corporate, state, regional levels too to stimulate innovations and make India the Innovation Nation of the world.

Table-1

CATEGORY	OBJECTIVE
Climate-smart agriculture	Deploy products, technologies, and processes (supply chains) to promote and commercialize climate-resilient agricultural practices, species, and processes.
Fog vision system for road and rail	Increase deployment of technologies to reduce accidents in low visibility conditions - vehicle-attached, or improvements in street lighting infrastructure, or improved reflectors for higher pedestrian visibility, etc.
Systems to predict identify and recognize rail failure using technologies	Advanced technology solutions to predict and prevent rail failures viz. automated track monitoring systems, rail track health, signaling and switching technologies etc.
Predictive Maintenance of Rolling Stock	Solutions to monitor the health and safety of key components of the coaches, freight cars, locomotives which includes bearing and wheels to reduce catastrophic failures leading to improved safety and operating cost.
Alternate fuel based transportation	Deployment of technologies/products in transportation, using an alternate source of power to reduce carbon emissions - including systems to integrate with existing transportation infrastructure.
Smart Mobility	Use of alternate transportation mechanisms for newly urbanizing regions / smart cities.

Electric Mobility	Technologies / innovations to increase the share of electric vehicles in all modes of transportation.
Safe transport	Technologies / innovations to reduce accidents and fatalities, with a special focus on two-wheelers / pedestrians.
Instant Portable Water Quality Testing	Develop systems, products, technologies, or protocols to identify nature and/or concentration of biological/chemical contaminants in any given water sample.
Sustaining drinking water sources	Ensuring drinking water sustainability is of paramount importance. Sustaining the sources depends the following major aspects: (i) source strengthening/sustainability (ii) regular operation and maintenance and (iii) replacing the aged infrastructure. Suggestions are invited to (i) Achieve source strengthening through innovative, measures and/or traditional water harvesting wisdom. (ii) Reduce the operation and maintenance cost of water supply schemes with special focus on decreasing power consumption (iii) Replace/repair the aging infrastructure through unique, cost effective, new/innovative technologies/methods.
Digital Water Management	IT and Mobile phones have enabled easier access to various services. How to use these technologies to solve day-to-day managerial issues to (i) assist to make district water budgets and District/Block level water managers to know on day-to-day basis, the habitation-wise quantity and quality water supplied and (ii) make every household a water smart household by informing them about the quantity and quality of water available from their nearest source to plan their daily family water budget. Ideas can be mix of technologies, management solutions, awareness games etc.
Providing potable water to water quality affected areas	A large number of habitations face ground water quality issues. The most common contaminants are arsenic, fluoride, nitrates, iron, salinity etc. In some cases, traces of heavy metals have also been reported in groundwater. Treatment processes are generally complex, involves higher cost and requires power. Please suggest technologies those have (i) cost effective & efficient (ii) lower power consumption (iii) low cost - long life membrane (iv) Affordable & scalable and (v) in-built reject management to provide potable drinking water to habitations affected with (a) Arsenic (b) Fluoride (c) Nitrates (d) Iron (e) Salinity (f) Heavy metals

Data analytics for water governance	Various Stake-holder Ministries of Government of India have huge individual data bases on water supply; water availability; groundwater; measures taken up for recharge; rain water harvesting; household-wise drinking water source access data; enrollment in schools etc. However, they are in individual silos. At district level, these data can be aggregated and analyzed to understand how each one of them affect/interact with one- another. The question is "Using big data analytics techniques, how to generate quality information at District/State levels, using above databases, that would aid in policy formulation for effective water education & governance and management?"
Mini Desalination plants in coastal areas	Low cost, environmental friendly, low power technologies available for setting up and operating mini desalination plants for coastal habitations.
Grey water management	Many States are providing higher per-capita water supply service levels in rural areas. This is leading to generation of significant grey water in rural areas and needs to be managed usefully. Suggestions are invited for innovative, low cost and simple technologies to manage the grey water in rural areas.
Affordable Desalination/Recycling Technology	Affordable Recycling technology - Deploy technologies or products to recycle water at household and community levels.
Waste management recycling and reuse	Deployment of technologies for waste management, e.g. solid, e-waste etc.
Garbage composition devices	Portable/handheld scanner/device that can distinguish the composition of garbage collected from households as wet or dry.
Quality of compost	Portable/handheld device that can quickly determine the quality of compost (also whether the compost heap meets FCO standards).
Decentralized composting	Economical, efficient, modular, aesthetic, environment-friendly and occupying minimum space arrangements/ equipment/plants for decentralized composting which may be aerobic/anaerobic / vermi.
Mixing blades for composting	Efficient mixing blades for small-scale / household composting material.
Waste in public spaces	Efficient, simple and economical methods of sweeping and sucking the littered waste in public places including narrow streets.
Dissuading public littering	Efficient, simple and economical methods of identifying persons littering, raising alarm so as to dissuade the public from littering.
Cleaning of Sewers and Septic Tanks	Smart and efficient cleaning techniques, with the objective of eliminating need for human entry.

About the author: Mr. R Ramanan is the Mission Director of the Atal Innovation Mission Additional Secy NITI Aayog - the Atal Innovation mission is a strategic national Innovation initiative NITI spanning schools, universities, NGOs and the industry

R Ramanan was previously Managing Director & Chief Executive Officer and member of the Board of Directors of CMC Ltd., a subsidiary of the globally acclaimed Tata Consultancy Services (TCS).

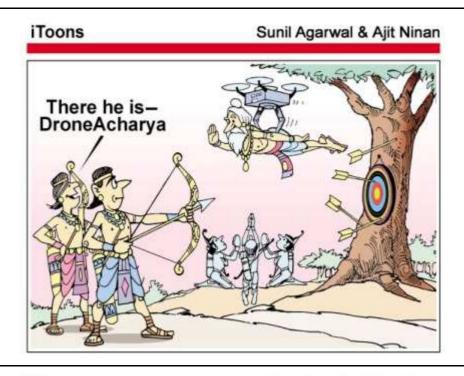
Ramanan's illustrious career in the IT industry spans more than three decades when he joined TCS in 1981 after graduating from IIT Mumbai in Electrical Engineering. Ramanan played an instrumental role in the growth of

TCS with a variety of responsibilities ranging from software product development, technical marketing, global business development, and general management of large delivery centers of TCS.

Ramanan led CMC's rapid transformation from a domestic government organization to a global IT systems engineering and integration organization. Under his leadership CMC share price grew over 2100% between October 2001 to 2014, its operating profits over 1338%, with over 72% of its business coming from the overseas markets and leading to its successful amalgamation into TCS in 2015

Ramanan graduated from IIT Mumbai in electrical Engineering in 1981. He is also a Harvard Business School Advanced Management Program Alumni and accredited by Cambridge University in Sustainability Leadership. He was also elected Lifetime Chair of HBS AMP187 Alumni by HBS.

Ramanan received the CEO of the Year award in 2015 from CMO Asia, India's top 3 most "Value" able CEO recognition by Business World in 2011 and 2013, Indira Gandhi Sadbhavana and Rajiv Gandhi Shiromani awards in 2005-2006 and many other recognitions for outstanding contributions in Innovation and Business Leadership. He has recently been recently honored with Mint SAP Digitalist Award-19th April 2018 in Mumbai.





The Chapter-end Takeaways



Excerpts from the end of each chapter of the book

Neoskilling for Digital Transformation and the Artificial Intelligence Revolution By Prof. L Prasad, S. Ramachandran 2018 / 180 Pages / Paperback / Rs. 729 (rs. 700 on Amzaon India) ISBN: 9788126577156 / Wiley India

CHAPTER 1 The Need for Neoskilling – Beyond Reskilling

The rapid adoption of digital technologies across the society is a given. All other factors remaining the same (awareness, access to technology, funding, resources), the availability and effective deployment of capable employees will be the differentiating factor between organizations that

successfully adopt emerging technologies for significant business impact, and those that do not and hence lag behind.

In the continuum of skill development, neoskilling or preparing individuals and teams for futuristic skills is at the top of the pyramid, followed by reskilling for present-day needs. Neoskilling is not just about offering training in upcoming technologies. It needs a revamp of the purpose of a business starting from the top, leading to higher-order thinking and eventually skill development as an outcome of the exercise.

To avoid the MINIMEC trap for strategic long-term, sustainable, intellectually strong growth with ethics and integrity, it is important to have the Gardener, Farmer, and Forester mindset for short, medium, and long-term perspectives.

Organizations should consider the entire cycle of creation, capture, and delivery of value in mind, backed by skilled resources, to ensure that innovative ideas reach the market and retain a steady, sustainable, and profitable revenue stream.

CHAPTER 2 Ownership – The Buck Stops Here

At a macro level, our study findings show that the two owners for reskilling of the society are the industry and industry—government collaboration. Awareness of ongoing global initiatives beyond one's industry and geography will be important to leverage them, avoid duplication of effort and for benefits to be derived.

At the corporate level, with the alphabet soup of designations available today, it is vital to have clear ownership and accountability on who in an organization will own neoskilling with policies put in place. Reskilling for today and neoskilling for tomorrow need inputs from business units and functions for specific skill development. Skill needs today are not generic that can be managed as a horizontal function.

Change management is the biggest challenge in reskilling. A people-centric approach will be important for the reskilling owners to ensure that any concerns among employees such as loss of jobs during technology adoption are addressed.

CHAPTER 3 The Hierarchy of Reskilling

Neoskilling is not limited to the traditional classroom training offered for emerging technologies, out of the "fear of missing out." It is strategic, should start with the board room and be implemented as a well thought-out and planned ongoing program. The logical chain starting from awareness to accessibility, funding, appetite, and "ambition to implement" should be kept in mind.

Limiting the sources of input and information for skill identification to direct stakeholders alone - clients, senior management, and employees (or the first-order environment), is fraught with risk and inadequate. It is important to reach out to the external environment (second order) by building a network of partners, analysts, subject matter experts, consultants, and policymakers. With "awareness" for reskilling being the biggest challenge from our study findings, reaching out to the second-order environment becomes even more important.

For professionals and policymakers who worry about "employability," Perrow's Technology classification along the Novelty and Programmability dimensions is crucial to identify the "craft" and "non-routine" type of work, which will need humans. The other two types of jobs, "routine" and "professional" will be targets for digitization, automation, and AI-driven systems to perform. Such a generic, technology-agnostic approach will be required to look at the big picture, before going to the deep dive at specific jobs, roles, and task levels.

It will be inevitable for repeatable jobs to be replaced by automation or AI systems. A gradual shift to craft and non-routine category jobs, along with a neoskilling strategy to match, will help the employability aspects and for the organization to

maintain its competitive edge. This shift cannot happen overnight but be planned and implemented gradually over a 5- to 10-year time frame.

CHAPTER 4 Socially Inclusive Reskilling – Digital for All

Digital Transformation today is ubiquitous and not limited only to the corporates. There is an opportunity for policymakers, to make it inclusive in nature for those at the bottom of the pyramid. As socially responsible organizations, corporates can play an active role in this inclusive growth. It will also open up a market that needs to be tapped.

Technology by itself is becoming affordable and scalable to ensure that all layers of the society receive the benefits of the digital revolution and are skilled enough to tap it, irrespective of the levels of formal education, with intuitive user interface design for devices such as the smartphone or tablets.

The rural segment should not be considered only as consumers of technology. They have several best practices and vital information that, if shared in a timely manner across a wide network, can be beneficial for the overall society.

Technology if implemented in the correct way ensures transparency for flow of public funds from the corridors of power until the last mile, with a vast potential to avoid corruption. These technologies should be leveraged for avoiding leakage of funds in government-sponsored projects and initiatives.

Technology offers a level playing field for everyone irrespective of their formal education, age, gender, social background, or economic status. Those willing to pick up these emerging skill sets can define a sustainable and rewarding professional career. Government initiatives for skill development should be made use of effectively.

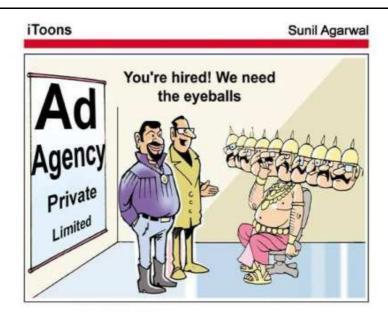
CHAPTER 5 Industry Analysis

Both reskilling and neoskilling will be specific to each industry, and within an industry, specific to each enterprise, business unit, and function. It will offer a competitive advantage for organizations that identify the appropriate skills and train their teams in them. At the same time, best practices beyond one's industry should also be utilized where possible.

Industry-specific initiatives such as Industry 4.0 in manufacturing need not be limited to their points of origin. Other industries can adopt the applicable practices, for example, a connected world borrowing from Industry 4.0 in a hospital.

Technology itself is offering ways and means for reskilling and adoption of emerging areas by democratizing them – for example, cloud-based deployment of tools such as advanced analytics, Machine Learning and MOOCs for online education. SMEs should not shy away from digitization initiatives but be aware of and make use of these avenues.

Technology providers are taking up initiatives to create a network effect for fully leveraging the benefits offered by their solutions. In cases where the technology is readily available in the market, the gap in the skill set is a road block that needs to be filled and everyone should play their role for reskilling and neoskilling.



Announcements

Late Shri Pralhad P Chhabria Award 2019: Nominations are invited for the two awards (cash award of Rs. 1, 25,000 with a medal & citation) for (1) Best Outgoing Female Student (from faculty of Science / Engineering / Technology) & (2) Best Female Engineer / Scientist / Technocrat (working professional -Early Career Stage) from IEEE student & IEEE WIE members by 20th Jan 2019. More details at http://www.hfrc-ieeeawards.org/

IEEE Membership: The IEEE membership for the year 2019 is due by 31st Dec 2018. To get uninterrupted service from IEEE, please renew your membership immediately. While renewing, you can also join as a member in technical societies. To renew your membership, pl. visit https://www.ieee.org/membership/renew.html

IEEE Society Membership: IEEE Society members stay technically current, network with colleagues locally and abroad, and collaborate on research and projects with leading experts -- all while taking advantage of specialized opportunities. Discover which Society, or Societies, best match your technical interests by joining today to take advantage of membership benefits ranging from access to cutting-edge technical periodicals and conference discounts to educational resources and worldwide networking opportunities. In addition, IEEE members enjoy deep discounts on Society memberships. Please visit https://www.ieee.org/communities/societies/index.html for more details of individual societies. We are providing details of few societies below.

IEEE Aerospace and Electronic Systems Society (AESS): AESS pioneers large-scale integrated interoperable systems and is the only professional Society dealing with total integrated electronic systems and the enabling technologies. AESS members have access to educational initiatives, professional development, and networking opportunities, as well as top technical information covering the organization, systems engineering, design, development, integration, and operation of complex systems for space, air, ocean, or ground environments. Therefore, they personally profit in many ways from their AESS membership in their daily professional life. <u>Visit the AESS website to learn more about:</u>

IEEE Antennas and Propagation Society (APS): APS provides members affordable access to cutting-edge technical information covering antenna systems and electromagnetic wave propagation and scattering in complex media for wireless communication, sensing, medical, and other applications. Membership includes access to multiple periodicals, including magazines, reduced conference registration rates, and members-only content on the AP-S website. <u>Visit the APS website to learn more about:</u>

IEEE Broadcast Technology Society (BTS): BTS technologies deliver information and entertainment to audiences worldwide, at home and on the go. Members access breakthrough research in the fields of broadcasting, including antennas, electronics, power, communications, signal processing, information theory, computers, and audio as well as access to multiple periodicals and reduced rates for BTS symposia. Visit the BTS website to learn more about:

IEEE Circuits and Systems Society (CAS): CAS's unique and profound expertise in circuits, systems, signals, modeling, analysis, and design have a decisive impact on sustainable energy, bio-health, green information technology, nanotechnology, and scalable information technology systems. Membership includes access to multiple periodicals, networking opportunities, and reduced conference registration rates. <u>Visit the CAS website to learn more about:</u>

IEEE Communications Society: ComSoc provides a premier international forum for global industry professionals with a common interest in advancing all communications technologies including terminals, computers, systems, and operations; transmission media networks; new content/delivery methods; layout; protocol; and architecture. Membership includes access to multiple periodicals, conference discounts, and more. <u>Visit the Communications Society website to learn more about:</u>

Some useful IEEE web links

- Global Benefits Finder: http://www.ieee.org/membership_services/membership/benefits/index.html
- 2019 IEEE Membership and Society Membership Dues: http://www.ieee.org/membership services/membership/join/join dues.html
- IEEE Society Memberships: http://www.ieee.org/membership_services/membership/societies/index.html
- Payment Options: http://www.ieee.org/membership/services/membership/join/referral_payment.html
- IEEE Student Activities: http://www.ieee.org/membership_services/membership/students/index.html
- IEEE Xplore Digital Library: http://ieeexplore.ieee.org/Xplore/home.jsp
- IEEE Websites / Sitemap: http://www.ieee.org/sitemap.html

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Guidelines for submitting reports and articles to get published in the IEEE INDIA INFO, the India Council Newsletter (ICNL)

- Please submit the event reports within TWO months of its happening. Older events reported may be ignored.
- The matter may be in doc / rtf / txt format. Please avoid other formats such as pdf, jpg as they will not be considered.
- Please use SINGLE column format (while the report is prepared).
- Please avoid embedding the photos in the document relating to event reports. However, images referred in articles alone may be embedded at appropriate places in the article document in addition to sending them separately.
- Please send the event photos (typically one/two best) separately (even in they are included in the report).
- Preferred format for photos is "jpg". Please avoid sending the photos in "bmp", "png" formats.
- Photographs in digital form should not to exceed 1024 pixels in width. You may use any photo editing software
 (MS Office Picture Manager is quite useful) to re-size the image. This will reduce the file size of the images
 considerably. Pl. avoid sending large size photos (Sometimes we get files even up to 6 MB size). We generally
 recommend file sizes less than 500K.
- Provide your name, full affiliation, membership no. and email id at the end of the document.
- Send the matter by email with the subject: From <Section / College Name in short form> -- Report on <Event Name (short name is OK) & Date> eg: "From Madras Section / SSNCE -- Report on Conf on Wireless Networking dt. 10-11, Feb 2017"
- Please send the matter by email to ieee.icnl@gmail.com
- Please note that the matter sent to other email ids may get ignored and may not be considered.
- Please submit the matter for publication latest by 8th of the publication month (currently Mar, Jun, Sep, Dec as ICNL is a quarterly) to facilitate inclusion in that quarter's issue of IC Newsletter.
- Pleae note that while all efforts will be made for publishing, due to certain practical constraints, the actual publishing may be delayed.
- We will be constrained to ignore the submitted materials, if they do not follow the above guidelines.
- Please co-operate with us by adhering to the guidelines specified.

IEEE India Council Website

The website of the IEEE India Council (IC) has been redesigned using the Wordpress content management system and is hosted on the IEEE webserver at http://sites.ieee.org/indiacouncil/ with the efforts of the web master Dr. Suryanarayana Doolla of IIT Bombay. The readers may find the following links of the IC useful.

Home: http://sites.ieee.org/indiacouncil/

Executive Committee: http://sites.ieee.org/indiacouncil/about-ieee/executive-committee/

Sections: http://sites.ieee.org/indiacouncil/about-ieee/sections/ Chapters: http://sites.ieee.org/indiacouncil/about-ieee/sections/

Announcements: http://sites.ieee.org/indiacouncil/category/announcements/

Events: http://sites.ieee.org/indiacouncil/events/

Newsletter Archives: http://sites.ieee.org/indiacouncil/newsletter/newsletter-archives/

Conference Norms: http://sites.ieee.org/indiacouncil/conference-norms/

INDICON: http://sites.ieee.org/indiacouncil/indicon/

Student Activities – Awards: http://sites.ieee.org/indiacouncil/student-activities/awards/
M V Chauhan Student Paper Contest: http://sites.ieee.org/indiacouncil/student-activities/mvc/

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