

### Message from the Chairman



Dear IEEE Members,

At the very outset, I would like to express my sincere thanks to IEEE fraternity of India, at the time important juncture when I start another year to serve IEEE India Council as its Chair in 2018. I had a wonderful year 2017, in which I have worked with a great team with excellent team spirit, work ethos and mutual understanding. I intend to go forward in the same manner in 2018. In the long run of 2018, I solicit active support and cooperation from all of you, as you have extended during 2017.

With this issue of ICNL, the revamped IC Newsletter is completing its one year, in which the ICNL has been brought out at the timely intervals of three months with excellent contents. Kudos to ICNL Editor and all others who have made it possible. I look forward to regular and informative ICNL issues in 2018, too.

In December 2017, INDICON 2017 was organized successfully by IEEE Uttar Pradesh Section in collaboration with IIT Roorkee in IIT Roorkee campus. It was a memorable experience for all of us who attended the conference. The Annual General Meeting of IEEE India Council was held in the sidelines of INDICON 2017. AISYWC-2017 was held with the theme 'Imagine, Engineer, Enlighten, Empower' at the Indian Institute of Information Technology Allahabad (IIITA) during 27<sup>th</sup> - 29<sup>th</sup> Sept 2017. It was a grand event with large participation from all over India. MV Chauhan Student Paper Contest 2017 was conducted on 25<sup>th</sup> November 2017 and two prizes have been given, one each for UG and PG categories.

On behalf of IEEE India Council, I extend hearty congratulations to the winners of two IC Awards, viz. IEEE India Council Outstanding Student Branch award and IEEE India Council Outstanding Volunteer award, which were given at the IC AGM 2017.

During INDICON 2017, IEEE IC announced a prestigious award program named "Late Shri Pralhad P Chhabria Award" presented by Hope Foundation and Research Centre in association with IEEE India Council and Women in Engineering Affinity Group, IEEE Pune Section. In this award program, there will be two awards, viz. i) Best Outgoing Female Student (from faculty of Science / Engineering / Technology) and ii) Best Women Engineer / Scientist / Technocrat (working Professional-Early Career Stage). The newly instituted awards will be in place in the year 2018. I request all concerned to keep track of the IC as well as Award websites for relevant announcements and updates.

This is the time to start another year of exciting membership of IEEE. I congratulate those, who have already renewed their membership. I request all those, who have not yet renewed, to renew their IEEE membership at the earliest.

I beg to apologize if I have missed anything significant in my messages that I have given for ICNL in 2017. I conclude by conveying heartfelt thanks to all the Section Chairs, IC Office-bearers and Execom Members, IC Chapter Chairs and all IC active volunteers, who have made our journey in 2017 a memorable one.

With warm fraternal greetings,

Sivaji Chakravorti  
IEEE IC Chair 2017-2018  
[s\\_chakrav@yahoo.com](mailto:s_chakrav@yahoo.com)



## Message from Editor

H.R. Mohan, [hrmohan.ieee@gmail.com](mailto:hrmohan.ieee@gmail.com)

Dear readers,

We are presenting the fourth and the last quarter issue of India Council Newsletter (ICNL) for the year 2017. This current issue of ICNL in 68 pages features various events, such as international conferences, symposiums, workshops, hub & student congresses, distinguished lectures, activities of Society Chapters, YP, WIE held in the Bangalore, Kerala, Kolkata, Madras and UP Sections. We thank the chairs of these Sections and the conveners of the events for sending the reports as per guidelines and IC Chair Dr. Sivaji and IC Secretary Dr Preeti for their coordination. For the forthcoming issues, we expect the activity reports from all the Sections to be sent to the newsletter email id directly at [ieee.icnl@gmail.com](mailto:ieee.icnl@gmail.com) as per the guidelines published in the newsletter and also available at <https://goo.gl/DcVPmx>

Dr. Sivaji Chakravorti, Chair, IC in his message has outlined and thanked the organisers for the successful conduct of AISWYC-2017 at IIT Allahabad, IC Awards, INDICON-2017 and MV Chauhan Student Paper Contest 2017. He was also happy in announcing the prestigious award program named “Late Shri Pralhad P Chhabria Award” presented by Hope Foundation and Research Centre in association with IEEE India Council and Women in Engineering Affinity Group, IEEE Pune Section – for which the call for nomination has been published elsewhere in this issue.

ICNL congratulates the winners of the Annual IC Awards, the MV Chauhan Student Paper Contest 2017, prestigious MGA Awards -- Mr. Ramakrishna Kappagantu for 2107 MGA Larry K. Wilson Transnational Award, Mr. Puneet Kumar Mishra for 2017 MGA Achievement Award and Mr. H.R. Mohan for 2017 MGA Leadership Award.

ICNL thanks the authors of the following informative and interesting articles published in this issue.

The article “A Perspective on Artificial Intelligence and Machine Learning” by Mr. Rajeev Mullakara is a trendy one and tries to provide an overview of AI, ML & DL

The case study on “Software Defined Radio” by Dr. S. Jayakumar highlights the emerging market for SDR in India through Navy and Airforce, traces the history of SDR in India and presents the successful implementation of the SDR project in India

The article on “Telecommunication Technology Vs E-Waste Generation Reports Globally” by Mr. T. Udhayakumar, Dr. R. Krishnaraj and Dr. P. Parthasarty deals with how the growth in telecommunications is connected with the increase in e-waste generations globally and highlights the negativities and measures to control them.

Access to information is becoming expensive and in particular the increased subscription costs of scholarly journals have become a major concern to the researchers and professionals. The article “Access for Engineers and Engineering” by Mr. Francis Jayakanth and Mr. Muthu Madhan elaborates on how access barrier to scholarly literature is being reduced by open access to research publications, either through institutional repositories or by publishing in open access journals and provides various resources..

The article by Mr. V. P. Sampath on “C-RAN - Nextgen Access Network” promises a low cost, high reliability, low latency and high bandwidth interconnect network.

Waste is Wealth. To realize this, ICNL plans to publish a series of articles on “Waste Management” by Mr. Alok Kumar, a seasoned expert in this field. The 1<sup>st</sup> part of the series appears in this issue.

It is disheartening to read that nearly 80% of the engineers are unemployable. The article “Why are Indian Engineering Graduates Unemployable?” by Mr. G. Senthil Kumar tries to analyze this issue and provide some solutions.

IT in Oct-Dec 2017 by Prof. S. Sadagopan, Director, IIT Bangalore is a part of our regular column in ICNL and provides a broad overview on various important happenings in the IT and Telecom sectors in India. We are sure that readers will find the information and the related links provided in the column “Information Resources” compiled by the editor Mr. H.R. Mohan will be of interest to ICNL readers. Our wish to make ICNL a quality source of information can be realized only with the active support from one and all. We look forward to inputs from IEEE OUs, articles on current interest topics from academic and professional community. Happy reading of ICNL-17q4.

## IEEE Bangalore Section Events

### iAIM-2017: International Conference on Antenna Innovations and Modern Technologies for Ground, Aircraft and Satellite Applications



The International Conference on Antenna Innovations and Modern Technologies for Ground, Aircraft and Satellite Applications (iAIM 2017) was held in Hotel Sterlings Mac, Bangalore during 24-26 Nov 2017.

([www.ieeeiain2017.org](http://www.ieeeiain2017.org))

It was one of the largest conferences of IEEE Antenna Community in India, organized by IEEE Bangalore Section and supported by IEEE AP/MTT Joint Bangalore Chapter and IEEE APS. There were nine eminent speakers for two Keynote and seven Invited Talks. They were: Dr. Sudhakar Rao, IEEE Life Fellow, Northrop Grumman, Dr. Paul A Rosen, NASA/JPL, Prof. Ahmed Kishk, 2017 IEEE APS President, Dr. Clency Lee Yow, CMi, Mr. Rajeev Jyoti, SAC/ISRO, Dr. A K Singh, DLRL/DRDO, Dr.

V V Srinivasan, ISTRAC/ISRO, Dr. NNSSRK Prasad, ADA/DRDO and Prof. Debatosh Guha, CU.

This year focus of the conference was on Antenna Innovations and Modern Technologies for Ground, Aircraft and Satellite Applications. A workshop on the same theme was also organised with Prof. Prabhakar H Pathak, OSU, Dr. C J Reddy, Altair and Dr. Giancarlo Guida, IDS as resource persons. An industry exhibit was also organized in which more than 15 industries participated to showcase their product and recent developments in antenna technology. More than 400 participants were able to congregate and share their work and participated in iAIM.



Out of 176 research papers received, 123 papers/posters were selected after peer review by more than 40 scientists/engineers. The selected papers were presented in 16 Technical Oral Presentation sessions and posters were presented during 6 technical poster presentation sessions. The above selected and presented papers and posters have been sent to IEEE Xplore for publication. To encourage the researchers, the conference committee instituted 27 different categories (iAIM Best Paper Award-1<sup>st</sup>, 2<sup>nd</sup> & 3<sup>rd</sup>, Mr. Franco Bernalli Best Student Paper Award, Dr. NNSSRK Prasad Best Female Student Paper Award, 16-Best Paper Award in a Technical Session and 6- Best Poster Award in a Poster Session) of awards with prize money of more than US\$ 1500. Dr. Sudhakar Rao Travel Grant (INR 5000) was provided to one female and one male researcher and 50 Students were provided iAIM Student Travel Grant (sleeper class train fare-to & fro).



This year three additional workshops on 5G Technology, Humanitarian Technology, and Next generation Antenna Measurements were introduced with an aim to provide the latest information on future technologies and encourage participants to develop technologies for the benefit of humanity. Dr. Tim Lee, IEEE 5G Initiative Co-Chair, Prof. C Y Desmondsim, Fengchia University and Mr. Andy Chung, ETS-Lindren were speakers in workshop on 5G. Dr. Tim Lee, IEEE SIGHT Chair, Prof. Steve Reising, Corolado University, Dr. Ravinder Dahiya, University of Glasgow, Dr. Neha Satak, Astrom Technologies and Dr. Ashok Das, Sunmoksha were speakers for Workshop on Humanitarian Technology. Mr. Puneet K Mishra had conducted the workshop on Next Generation Antenna and Payload Measurements.



Two panel discussions were held. One on 5G India 2020: Vision and Perspective with Mr. Rajesh Pathak, Director, DoT, Govt of India, Ms. Pamela Kuamr, Director General, TSDSI, Prof. A R Harish, IITK, Mr. Ratnakar VR, SAMSUNG and Mr. Ravikiran A, IEEE 5G Initiative as panellists. As an outcome a working group on Antennas was formed. The second panel discussion was on Next Generation Industry and Academia collaboration in Antenna Technology with Dr. Tim Lee, Boeing, Dr. Sudhakar Rao, Northrop Grumann, Dr. Surendra Pal, DIAT, Dr. Hema Singh, NAL, Dr. S B Sharma, Indus University, Dr. DC Pande, DRDO, Prof. Ahmed Kishk, Concordia University as panellists. Both the panel discussions were moderated by Mr. Puneet Kumar Mishra, General Chair, iAIM.

The conference was generously supported by ANSYS, IDS, IEEE-APS-IIC, CST, Airbus, Aniritsu, C-DoT, ETS-Lindgren, IEEE HAC, IEEE 5G, JV Micronics, Mathworks, NI, Altair, CMi, DMC and IEEE Young Professionals.

*Report by: Puneet Kumar Mishra, General Chair, IEEE iAIM 2017 & Vice Chair, IEEE Bangalore Section*

### IEEE ICNL Congratulates the prestigious award winners



**Mr. Ramakrishna Kappagantu**

**2017 MGA Larry K. Wilson Transnational Award**

For dynamic leadership in building a vibrant IEEE Asia Pacific community



**Mr. Puneet Kumar Mishra**

**2017 MGA Achievement Award**

For exemplary contributions to increase member engagement and operational effectiveness within several Geographic Units.

## IEEE Kerala Section Events

### PES SB Chapter, Vimaljyothi Engineering College, Kannur: Energy Conservation Programme for Panchyaths in Kerala



The Power and Energy Society Student Branch Chapter of Vimal Jyothi Engineering College (VJEC) conducted a PES, Kerala Section supported program related to energy conservation in Eruvessy Panchayath on 2nd Sep 2017.

The program was inaugurated by the President of Eruvessy Panchayat Adv. Joseph Isaac and Mrs Pauline, Vice President Eruvessy Panchayath by lighting the lamp. Other dignitaries who graced the occasion were Fr.Jinu,Administrator VJEC, Fr.Dr.Thomas Melvetom, Chairman of VJEC, Fr. George Asarikkunnel Bursar of VJEC, Dr.Benny Joseph, Principal of VJEC Mrs Laly James, HOD EEE Dept. and Mr Prabin James,IEEE PES Staff Advisor.

The IEEE PES student volunteers visited the houses, shops etc. situated in the 9,10,11 wards of Eruvessy Panchayath and enlightened the people on the need to save energy and also briefed them about the contest conducted by VJEC in which the most energy efficient house/shop will be awarded.

The students received a positive response from the local people and all of them promised to try their level best in bringing down their energy consumption.

### AIPESSC'17: All India PES Students Congress



15<sup>th</sup> Sep 2017 was a special day for the IEEE Power and Energy Society (PES) Kerala Chapter as well as Govt. Engineering College (GEC), Thrissur due to many reasons such as: It was Engineers' Day for all Indian Engineers celebrated in the fond remembrance of Sri. M Visweswarayya; It was IEEE Day for all IEEE members; and the day marked the beginning of the first ever All India PES Students' Congress organized by an Indian PES chapter.

The AIPESSC'17 was organized as a three day event during 15-17 Sep 2017 with a view to provide sparkles of information on current technical issues and concerns on power and energy which specifically follows the mission of IEEE PES Society. Being a national level IEEE event, talks were arranged on Motivation, Leadership, Entrepreneurship Development, Benefits of IEEE and Mentoring. The presence of Young Professionals (YPs) made the event memorable with effective networking.

The congress was inaugurated by Padmashri. M. Chandra Dathan, former Director of VSSC. The inaugural was presided over by Er. A. Suhair, Vice Chair, PES Kerala Chapter. Prof. Mini V., the Faculty Advisor of PES Students' Chapter GEC, Thrissur extended a warm welcome to the gathering. In his presidential address Er. A. Suhair talked about the significance of such programmes in today's world and the role of PES and IEEE in an engineer's professional life. Padmashri M.C. Dathan, in his inaugural address highlighted about the current scarcity of power and importance of power engineers. Prof.

Biju K., Secretary, PES Kerala Chapter informed about the motivation behind conducting such an event. Dr. Suresh Nair, Chair, IEEE Kerala Section, felicitated the event and expressed his willingness to provide a campus recruitment drive during the three day programme at the venue. Dr. B. Jayanand, Principal, GEC, Thrissur and Prof. K. D. Joseph, Student Branch Counselor, GEC, Thrissur, felicitated the event. Mr. Fasil K.V (Chair, IEEE SB GECT) and Mr. Shyam Pradeep, (Chair, PES SBC, GECT) respectively gave an overview of the programme and extended the Vote of Thanks. The inaugural function was followed by a Key-Note address by the Chief Guest of Honour, Sri. M. C. Dathan who elucidated upon the importance of power, energy and the crisis faced throughout the world. He also presented the award for successful engineer, instituted by the PES Kerala Chapter, in the category of over 35 years of age, which was bagged by Er. Dhareesan Unnithan, Director, EMC, Kerala.

**The first session** of the technical extravaganza, started with an enjoying and informative talk on **“Energy Efficiency to attain INDC”** by Er. Dhareesan Unnithan, the Director of Energy Management Centre, Kerala. He enlightened the audience upon the alarming increase in energy demand over the whole world. The after effects of increase in demand bring about serious environmental issues. He educated the students on the importance of energy conservation for making our blue planet a better place to live upon.

**The second session** was handled by Er. C. Jayaraman, Founder and General Secretary, SEEM. His session was on **“Energy, Environment, Sustainable Development and Policies”**. He threw light upon the disastrous effects of climatic changes and the anticipated natural calamities which may destruct the environmental stability in the near future. Studies reveal that the sea level may rise above one metre within thirty years thus producing serious damages to society, environment and mankind as a whole. He also explained the need for global scientific cooperation, a global information system and an international forum within which specific agreements can be worked out and international cooperation in enforcing those agreements.

**The Second day**, began with the session on **“Dream to Destination”** by Ms. Deepika, Product Manager, CISCO, Bangalore. She inspired the participants with her beautiful presentation making them feel that Dreaming is the starting point towards acquiring great achievements. The audience was energized by the dynamic and motivating style of presentation.

Young Professional (YP), Mr. John Benedict of IEEE Hyderabad section, took a half-an-hour session on PES student membership, PES scholarship and career advice.

Mr. Jayakrishnan (YP) was present throughout the three day event. He introduced the theme of **IEEE Day “Leveraging Technology for a better tomorrow”** to all gathered at the programme.

**Dr. Nagaraja Ramappa, IEEE PES R-10**, West Chapter Representative, is a professional by himself being the Founder and Managing Director of PRDC, Bangalore and a successful career maker. His talk on **“Power Engineering Professional Accomplishment through IEEE PES”**, added flying colours to the „dreams“ of the spectators created by the previous speaker, Ms. Deepika. He paid tributes to the Sri. Viswevarayya, reminding young engineers the qualities that they should develop and practice throughout their life like punctuality, perfectionism in all respects, fitness, dedication to work and courage. He revealed his life achievements as a member of the IEEE community and thus posed a role model for the young members of various SBCs from different parts of India. It was a confidence boosting exercise for the participants to attend his assurance “All the power is within You and You can do anything and everything”.

Mr. Ranjith R. Nair, (YP) proposed a live session on **“Effective Utilization of IEEE products and services”**. He pointed out the importance of picking and choosing the resources carefully for developing a better and suitable career.

The afternoon session on the second day was handled by Er. Ajith Gopi, from ANERT, TVM on **“Wind Power Development and Use”**. Er. Ajith Gopi is a learned practitioner who has hands on experience with installation of solar and wind power plants and also electrification of remote rural villages. Students were very much happy to receive such a session. The organizers had to cut short the questionnaire from the participants” side in order to conclude the session in the stipulated time.

The sessions were followed by an awesome **field trip to Peechi Dam site**. The heavy rain added to the beauty of the evening. Participants were all filled with joy to have come to such a calm and cool place to have networking with students of many other colleges.

After the trip, a gala dinner was arranged in the Western Amphy Hall of the college. Students of the college band played mind-blowing music. Everybody enjoyed the candle light dinner.



**Third and final day** started with the talk on **“Mentoring to advance your career”** handled by Er. A. Suhair, Vice-Chair, PES Kerala Chapter. He gave a brief overview about the role of Engineers in today’s changing world. An engineer is one who effectively adapts the findings of science to the use of man”.

The session was closely followed by another interesting one on **“Energy Crisis and Renewable Energy”** by Er. Rajan Babu. He detailed upon the two disasters – Fuel insecurity and Global warming and called upon the attention of the audience to the possible solutions – aggressive promotion of renewable energy and energy management and energy efficient technologies. The students got opportunity to interact with eminent personalities in the subject field. It gives them immense strength to try to acquire knowledge on emerging areas of Engineering and Technology.

The last session was from Dr. K. C. Chandrasekharan Nair on **“Student Entrepreneurship”**. The session was quite enthusiastic for young Engineers. A photography contest was conducted as a part of the IEEE day celebration. The prize for poster presentation entry was distributed at the end of the session.

The three day mega event AIPESSC’17 came to an end after a grand feast. The happiness on the young faces demonstrates the satisfaction of the participants for becoming a part of this glorious All India PES Students Congress 2017.

### **Workshop on “Execution of Successful Projects for B. Tech”**



**“How to do a major project?”** is a frequently asked question by B.Tech students when it’s time to submit their projects. A workshop on this theme was held on 23<sup>rd</sup> Sep 2017 at College of Engineering Chengannur, to help students understand what is expected from them and to plan their project well to produce an outstanding project.

The workshop was officially inaugurated by Dr. Sunil T T, Principal of College of Engineering, Attingal. A few words of wisdom were shared by Dr. Jacob Thomas V, Principal of CEC. This was followed by a few words from Mr. Manoj Kumar, the branch councilor. The keynote was given by Prof .Biju K, Secretary & Treasurer of IEEE PES Kerala Chapter.

Workshop sessions were conducted separately, for four different branches of Engineering viz. Civil (by Prof. Adarsh S, Assistant Professor, TKMCE Kollam), Computer Science (by Prof. Binu A, HOD of IT Department, Rajagiri School of Engineering & Technology Kochi), Electronics & Communication (by Dr. Sunil T T, Principal, College of Engineering, Attingal) and Electrical & Electronics (by Dr. Dinesh Gopinath, AssociateProfessor, GEC Idukki).

The instructors mainly spoke about the wide range of resources that could be used by students to prove their depth of knowledge and application levels. They were introduced to many new software and applications that would help them give their projects a more professional and sophisticated makeover. They also enlightened students on how to plan their projects properly in order to produce expected results in the given time limit. The instructors also covered the areas students have to stress on to get their projects to stand out from the crowd and be worth presenting at any competitions. Students were briefed on the points to be kept in mind while choosing their projects.

The event also helped students to mingle with other participants. Certificates of participation were presented to all at the end of the workshop. The workshop received myriad positive responses. Participants were really satisfied with the workshop and it turned out to be a sensation among them.

### IEEE PES Energy Efficient Dream Home Contest



IEEE PES Kerala Chapter in association with Energy Management Centre (EMC) Kerala & PES SBC TKMCE Kollam, organized “Energy Efficient Dream Home” contest for engineering students. These hub level contests were conducted on 7th Oct 2017. The venues for different hubs were: Travancore Hub -- Bishop Jerome Institute Kollam; Kochi Hub -- Saintgits College of Engineering, Pathamuttom, Kottayam; Malabar Hub -- MES College of Engineering Kuttippuram. 39 teams from different engineering colleges registered for the contest in Kochi hub, 22 teams in Travancore hub and 12 teams in Malabar hub. The teams had to prepare and present their ideas and model of energy efficient dream home. The evaluation was based on design, improved use of terrain, materials used, energy

efficient equipment, renewable energy, waste to energy, water harvesting, innovative/new concepts introduced. The judging panel was consisted of experts from the field of Power & Energy. The contest started at 9:30 a.m. The rules and regulations for contest were explained to the teams and the judging panel were introduced to the audience. Each team was allotted 20 minutes for presentation and interaction. The presentations were over by 3:30p.m. in various hubs and the results were announced. The judges conveyed their comments and views on the presentations and announced the winners. All the members of the participated teams were given participation certificates.

The winners are:

Kochi hub:

1. Ajay Balan, Albin S Vayattattil, Marshal Tommy, Sharon Philip of Dept. of Civil engineering Viswajyothi College Of Engineering And Technology, Vazhakulam won the first prize.
2. Naeema Abdul Gafoor, Sreeshma K.S, Varna Vishwan. T, Surya Gayathry Ratnan. K of Dept. of Civil engineering, Vidya Academy Of Science And Technology, Thalakkottukara were the runners up.
3. Gisha Joseph, Jobin John Mathew, Arya T.R of Dept. of ECE, Mar Baselios Christian College of Engineering And Technology, Kuttikanam were in third place.
4. Jobin Jacob Peter & team from MACE Kothamangalam won the fourth place.

The prize money and certificates for winners were presented by Dr. Jaimol Thomas, Head, Dept. of EEE, Saintgits College of Engineering, Kottayam. Mr. Emil Ninan Skariah, IEEE PES Saintgits SB advisor presented the mementos to judging panel members.

Travancore hub:

1. Asif Noushad & team - TKMCE Kollam
2. Jithin & team - TKMCE Kollam
3. Athira & team - Heera college of engineering Trivandrum
4. Devi vijayakumar & team - Trinity college of Engineering Trivandrum

The cash prizes and certificates were given by Prof.V K Damodaran.

Malabar hub:

1. Dibu & team- MES College of Engineering Kuttippuram
2. Shahabaz & team- MES College of Engineering Kuttippuram

The cash prizes and certificates were given by Prof.K P Mohandas.



## IEEE PES Kerala Chapter: Paper Presentation Contest



Paper presentation contest for engineering students was jointly organized by IEEE PES Kerala chapter and PES SBC TKMCE Kollam. The programme was conducted using the funds of member driven initiative scheme by PES. The theme for the contest was 'Smart grid for power distribution in smart cities'.

The hub level competitions were held on 21<sup>st</sup> October 2017. The venue for Travancore hub was College of Engineering, Adoor; venue for Kochi hub was Rajagiri School of Engineering & Technology Kochi; and venue for Malabar hub was Vimaljyothi Engineering College Kannur. The hub level winners are

Travancore hub:

1. Abhirami prakash & team, College of engineering Adoor
2. Anjana S & team, College of engineering Adoor
3. Jithin T & team, TKM College of engineering Kollam
4. Aswathy A M & team, GEC Bartonhill

Kochi hub:

1. Roselyn Ann Chacko & team, College of Engineering Munnar
2. Malavika Sudheer & team, Sahridaya engineering college Thrisuur
3. Alan anna Mathew & team, Rajagiri school of engineering & technology Kochi
4. Cerine kallukaran & team, Rajagiri school of engineering & technology Kochi

Malabar hub:

1. Raja pandiammal & team, GEC Kannur
2. Rohan sajeev & team, Vimaljyothi engineering college Kannur
3. Megna sudeep & team, Vimaljyothi engineering college Kannur
4. Murshid musthafa & team, Vimaljyothi engineering college Kannur

The state level of paper presentation contest for engineering students was conducted on 18<sup>th</sup> Nov 2017 at TKMCE Kollam. The presentations by the finalists teams were judged by a panel of three experts from the field of Power & Energy.. The winners of the finals were

1. Raja pandiammal & team, GEC Kannur
2. Abhirami prakash & team, College of engineering Adoor
3. Jithin T & team, TKM College of engineering Kollam

The winners were given cash prizes and merit certificates while all the participants were given participation certificates. Certificates were distributed by Prof. Biju K, Secretary, IEEE PES Kerala chapter.

## PES SB Chapter, College of Engineering Trivandrum: Solar Training Programme



A two-day workshop on Solar PV Installation was organized by PES SB Chapter, College of Engineering Trivandrum during 21-22 Oct 2017. At the inaugural session, Mr. Sabari Vijay, Vice chairman of IEEE SB CET welcomed the dignitaries and the participants from various colleges of Kerala. Mr. Mehul Patel, faculty from Kwatt Solution briefly introduced about Kwatt Solution and the other faculties. Inaugural ceremony was concluded by the

felicitation of Ms. Sreejaya staff advisor of IEEE PES SBC CET.

The first day workshop covered the basics of Photovoltaic system and its types and how to design a Photovoltaic system from scratch based on your requirements. The participants were familiarized with the PVsyst 6.3.9, an app developed by the Kwatt Solutions. The sessions were handled by faculty who were trained by IIT Bombay in the designing of photovoltaic systems.

On the second day, there was a hands-on session to build a solar mobile charger from scratch. It kept the participants interested and working in non-renewable energy experiments. Two solar panel of 3 volt were given along with a kit for hands-on. This was followed by another hands-on session for building a light seeking robot that follows a moving light source.

The workshop came to a conclusion with the vote of thanks by Mr. Praveen T A, Chairman IEEE PES SBC CET. The workshop was attended by over 250 participants from all over Kerala and the event turned out to be a great networking opportunity.

### **PES Quiz 2017**



*College level Quiz contest Participation (3<sup>rd</sup> Oct 2017)*

- Travancore Hub - 23 Colleges participated
- Kochi Hub – 20 Colleges Participated
- Malabar Hub – 14 Colleges participated

*Hub & State level Finals (4<sup>th</sup> Nov 2017)*

- Travancore Hub – 39 students from 19 Colleges participated
- Kochi Hub – 33 students from 19 Colleges participated
- Malabar Hub – 16 students from 8 Colleges participated.
- A total of 88 students from 46 Colleges participated for the Hub level finals.

Er A G Hareendralal, Chair PES Kerala chapter, inaugurated the Quiz contest on 4<sup>th</sup> Nov 2017. Asif Nausad, Section SR felicitated in the function. Prof Biju K, Secretary PES Kerala chapter, offered vote of Thanks.

Sandra J of TKMCE Kollam & Rohit R of Amal Jyothi Engg College Kanjirappally stood first, Jairam R Prabhu of Model Engg College Ernakulam & Daniel Mohan of Jyothi Engg College Thrissur bagged the second place and Jinan K V of GEC Sreekrishnapuram & Ajith V Krishna of College of Engg, Adoor won the third place. The certificates and cash Prize were distributed and the function ended around 5.00 PM.

### **PES Annual General Meeting 2017**



The Annual General Meeting 2017 of IEEE PES Kerala chapter was held on 16<sup>th</sup> Dec 2017 at Classic Sarovar Portico hotel, Trivandrum. About 30 PES members attended the AGM. Er.. A. G. Hareendralal, Chair, PES Kerala chapter welcomed the gathering. Prof. K. Biju, Secretary, PES Kerala Chapter presented the activity report for the year 2017. It was followed by a session on 'How the chapter can excel' by Er..A. Suhair, Vice Chair, PES Kerala Chapter. Next session was on the topic

'Challenges in power sector in Kerala and the role of PES' by Prof. .V..K. Damodaran, Life Senior Member IEEE, and Chair, Educational Activities, PES Kerala Chapter.

After lunch, the various PES student branch chapter chairs presented activity report of their chapters. After that, there was a session on 'Interaction with affinity groups' such as YP, WIE, SIGHT and SSIT. Next session on 'Renewable energy progress in Kerala' by Er..Ajith Gopi, Project Engineer ANERT. Prof. P.S. Chandramohan, Chair, Conferences, PES

Kerala Chapter briefed about the projects that could be taken by PES for the benefit of the society. The last session was an interactive session where, discussions were held on the future activities of PES Kerala Chapter and about the feedback of the activities in the year 2017. Many ideas came up during the discussions. The meeting ended with a brief concluding remarks by Er. A Suhair and a formal vote of thanks by Prof. K. Biju.

*Reports by: K. Biju, Secretary, PES Kerala Chapter, [bijuk@ieee.org](mailto:bijuk@ieee.org)*

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## Techbits

China and US-based researchers have developed "atomristors", the thinnest data storage device with dense memory capacity. The team developed a 1.5-nanometre-thick memory cell using graphene (2D form of carbon) and semiconducting atomic sheets. Memory storage and transistors have been separate components on a microchip, but atomristors combine both functions on a single system, said researchers.

India overtook the US to take the second spot for the number of app downloads in 2017, as per the App Annie 2017 Retrospective report. The report also said a user in India has nearly 80 apps and accesses over 40 of them per month. Globally, the app downloads exceeded 175 billion, while consumer spending exceeded \$86 billion.

A new feature in Google Arts & Culture app lets users take selfies and finds art that resembles them using image recognition technology. The app places the image of an artwork next to a user's selfie and also generates a match percentage.

Scientists in the US are reportedly working to develop artificial intelligence (AI) that can translate animals' vocalisations and facial expressions into English. A Professor Emeritus at Northern Arizona University is collecting videos of dogs showing various barks to train the AI algorithm. The professor reportedly claimed that a pet translator could be available in less than a decade.

An app named WeCroak sends notifications at random intervals to its users five times a day to remind them that they will die. The app is based on a Bhutanese folk saying, which suggests that humans should contemplate death five times daily in order to be happy. The app displays quotes about death from philosophers when a notification is opened.

Microsoft is developing an artificial intelligence technology (AI) that can generate images based on text descriptions, the company has said. Called a 'drawing bot', it produces a nearly three-fold boost in image quality compared to previous state-of-the-art technique for text-to-image generation. It also adds details to images that weren't in the text, indicating it has an artificial imagination.

IBM and Denmark's Maersk have announced a joint venture that uses blockchain technology to track international cargo movement. The company will use distributed ledger technology behind blockchain to create an unchangeable record of transactions that can be shared real-time.

Swedish camera manufacturer Hasselblad has introduced a 400-megapixel multi-shot camera H6D-400C MS. A single picture clicked by the camera is sized nearly 2.4 GB. The camera, which is priced at \$47,995 (₹30 lakh), features a 3.0-inch rear touch display and USB 3.0 Type C connection for tethering to a computer while capturing such large images.

French startup Pragma Industries has become world's first company to start factory production of hydrogen-powered bicycles for use in corporate or municipal fleets. Priced at \$9,100, the firm's Alpha bike runs for about 100 km on a two-litre tank of hydrogen. It also takes only 2 minutes to refill the bike with hydrogen using the filling station.

Switzerland-based 22-year-old Jann Horn, who found the Spectre and Meltdown flaws that hit PCs globally, is a security researcher associated with Google's Project Zero team. Horn read Intel manuals and investigated how processors handle speculative execution. Horn realised that the code pattern on which the chips were working might potentially leak secret data, discovering the bugs in the process.

A device called 'Breath' has been developed which mines cryptocurrency via human respiration. It measures how much air is inhaled and exhaled by your lungs and then the data is sent to a small computer mining on the Monero blockchain. The user's breath determines the computer's hash rate, which then determines how much Monero the computer can mine.

*Source & Courtesy: <https://www.inshorts.com/en/read/technology>*



## IEEE Kolkata Section Events

### ABHIVYAKTI '17



The IEEE Student Branch BIT Mesra Patna Campus successfully organized its 3-day annual technical fest “ABHIVYAKTI'17” from 3<sup>rd</sup> to 5<sup>th</sup> November 2017. The students actively participated with great zeal and grit in twelve different competitions.

**Day 1: 3<sup>rd</sup> Nov 2017:** Prof.(Dr.) Anant Kumar, Joint Director (Science), Science and

Technology Department, Government of Bihar inaugurated the event and shared his thoughts upon the prospects and importance of innovation for a developed nation and the role of youth in the scientific advancements. Fr .(Dr.) Robert Athical, Director of Tarumitra Organization Patna, the Guest of Honor, in his speech he emphasized the significance of maintaining balance between technology and environmental bio-diversity. The inaugural session was Presided by Prof.(Dr.) B.K. Singh the Director of BIT Patna. The other guests explained the role of IEEE and encouraged everyone for spreading awareness about innovation in Technology.

At the inaugural session, the souvenir of Abhivyakti 17 was also released. The IEEE Student Branch Counsellor Dr. Prashant Kumar, introduced the newly elected Office Bearers and explained about the ongoing activities in BIT Patna and appreciated the efforts of the members of the Branch in fulfilling the objectives of IEEE and successfully organizing various activiteis in Patna.

The other events held include: Robotic Event (Death Race) - Prelims; Poster Presentation - Finals; App Presentation - Finals; and Coding Competition - Prelims

**Day 2: 4<sup>th</sup> Nov 2017:** The 2<sup>nd</sup> day of the event witnessed a huge participation from students of all the branches. On this day prelims of technical events such as circuit designing, MATLAB and Technical Quiz were conducted. The finals of non-technical events like Group Discussion on topics which were given on-the-spot and Case Study on were also conducted.

**Day 3: 5<sup>th</sup> Nov 2017: The Finals of the events such as Death Race, Multisim, MATLAB, Quiz, Coding and Paper Presentation took place.** The prize distribution session witnessed the gracious presence of the Chief Guest Mr. Atul Sinha (ITS), Director, Science and Technology Department, Government of Bihar and Guest of Honour Prof. (Dr.) Anil Kumar Sinha, Joint Director, Science and Technology Department, Government of Bihar. The Guest addressed the students about the importance of technical fests. Speaking on the event the Director and Branch Counsellor inspired students to actively participate in similar events and become members of IEEE. The Guests distributed prizes to the winners of all the 12 competitions.



The program saw a satisfactory conclusion with the felicitation of the Guests, Organizers and all the active members of IEEE Students Branch BIT Patna. The program was sponsored by National Insurance Company Limited, IBS and ACE Academy. The events were widely covered by Print and electronic media.

NASA has successfully applied a new technology that allows aircraft to fold their wings between zero and 70 degrees while inflight.

## IEEE Madras Section Events

### Jansons Institute of Technology, Coimbatore: Symposium



IEEE SB and EEE Dept. organized a national level technical symposium IGNIZ'2K17 on 26<sup>th</sup> Sep 2017. 48 papers and 23 projects were presented by participants from various colleges. The symposium was inaugurated by Mr. Sundar Muruganandhan, MD Versa Drives and Manufacturers of Superfan. Judges for various events included Dr. G. Vetrichelvi and Prof. C. Shanmugan of ECE; Dr. T. Meenakshi, EEE and Dr. S. Sathish Kumar. Prizes were distributed by Dr. S. Elangovan, HOD/EEE.

### Jansons Institute of Technology, Coimbatore: ICAETGT-17



IEEE SB organized the international conference on Advances in Electrical Technology for Green Energy on 23<sup>rd</sup> Sep 2017. IEEE MAS YP, PELS, CIS, PES, CSS and TEMS sponsored the conference. 79 papers were received and 40 were selected for presentation in 3 tracks namely Emerging Energy Technologies, Energy System Integration and Optimization and Energy System Applications. The conference was inaugurated by Dr. Sanjeevikumar Padmanaban, Assoc Prof., /EEE, University of Johannesburg, South Africa. Session chairs were Dr. K. Baskaran,

Assoc Prof./, EEE, GCT Coimbatore and Prof. J. Gnanavadeivel, Prof, Mepco Schlenk Engineering College, Sivakasi.

### Karunya University, Coimbatore: RPWPEA17



IEEE PELS SBC organized a national level workshop on Raspberry-Pi with Python in Engineering Applications on 20<sup>th</sup> Sep 2017.

Workshop speakers included Mr. E. Pradhap & Mr. S. Naveen, Embedded Project Engineers and Mr. P. Sudalai, Marketing Manager of Pantech ProEd, Coimbatore. 57 participants attended the workshop.

Dr. J. Jayakumar, Programme Coordinator/EEE and Dr. K. Vinoth Kumar, PELS SBC also spoke.

### Panimalar Institute of Technology: Students Technology Awareness Program (STAP)



Students Technology Awareness Program (STAP) was organized by IEEE SB in association with IEEE SBCs & WIE at Dasar Higher Secondary School, Thiruninravur on 6<sup>th</sup> Sep 2017.

Daphne Jenson, V Jayashree, C Angel Teresa, VM Nandhini and Jenifer Mercy Carolina of Third Year conducted the programme to embolden and inspire school students.

Google has awarded nearly ₹72 lakh to researcher Guang Gong for finding bugs in its Pixel devices. The exploit chain consisted of two bugs which together could inject arbitrary code into system\_server by accessing a malicious URL in Chrome

### **Panimalar Institute of Technology: National level Seminar on Agriculture using IoT**



IEEE SB, ISTE, IETE organized a national level seminar on Agriculture using IoT Catalysed and Supported by Tamil Nadu State Council for Science And Technology, Govt. of Tamil Nadu, Chennai and NCSTC, DST, Govt. of India, New Delhi on 21<sup>st</sup> Sep 2017. The event was inaugurated by Mr. H. R. Mohan, Vice Chairman, IEEE Madras Section. Other speakers were Dr. N.R. Shanker, Managing Director, Chase Technologies, Chennai and Dr. Swarna Ravindra Naidu, CEO, COOVUM Smart Services, Chennai. The event was coordinated by Dr. M. P. Chitra, HOD/ECE & Dr. M. PremKumar, Prof/ECE.

### **VIT Vellore: International Conference**



IEEE SB and the Dept. of Micro and Nanoelectronics organized an International Conference on Microelectronics Devices, Circuits and Systems from 10<sup>th</sup> to 12<sup>th</sup> Aug 2017.

The conf. was sponsored by IEEE Electronic Devices Society and co-sponsored by Global Foundries. The conference received 300 papers of which 140 were accepted. The faculty coordinator of the conference was Mr. V. Arunachalam.

### **Kalasalingam University, , KrinshnanKoil: IEEE – Tirunelveli Hub Congress 2017**



IEEE SB of Kalasalingam University organized the IEEE Madras Section sponsored IEEE Tirunelveli Hub Congress 2017 during 22<sup>nd</sup> & 23<sup>rd</sup> Sep 2017.

Dr. S. Saravanasankar, Vice- Chancellor presided over the congress, which was inaugurated by Mr. H. R. Mohan, Vice Chairman, IEEE Madras Section. Around 300 students attended from various colleges in the Tirunelveli vicinity. Various speakers included:

- Mr. Govindasamy, AMD, Bangalore
- Mr. V. Udaya Sankar, Regional Head, NASSCOM
- Mr. K.S. Ravindranath, Director, Indowind Energy, Chennai
- Dr. S. Radha, Executive Member, IEEE Madras Section
- Dr. R. Chandrasekhar, Dean/Management
- Prof. A. Darwin Jose Raju, St.Xavier's Catholic College of Engg., Nagercoil
- Mr. Aravindhnan Anbazhagan, Fellow in Teach for India
- Mr. Jim Isaac, Ms. Angelin Indira and Mr. B. Ashvanth, IEEE volunteers
- Mr. Praveen Kumar, Software Engineer, CTS

Various events in the hub congress included talks, workshops, contests, industry sessions and entrepreneurship awareness sessions. Dr. P. Aruna Jeyanthi, HOD/EEE; Dr. D. Devaraj, SBC; Ms. S. J. Swathi, SB Secretary; Mr. Pranav and Mr. Eugene Kingsley also spoke. The best SB award went to Cape Institute of Technology. .

### **Kalasalingam University, KrinshnanKoil: International Workshop on CPS**

A two days' international; workshop on CPS was organized by the ICE Department of Kalsalingam University, Srivilliputhur between Sept 22-23, 2017.



The workshop, supported by IEEE Madras Section and the Control Systems Society provided a platform to delve on the important aspects of CPS and future research directions. It also gave a platform for the students to understand, appreciate the recent developments in CPS. The workshop, attended by over 90 participants from across India, had the following lectures by experts from academia and industry



- Synthesis of Control Programs for Railway Networks using Game Based Approach by Prof. Michael Hansen, Denmark Technical University, Denmark
- Design, Verification and Control of CPS by Prof. Seshadhri Srinivasan, Kalasalingam University
- Internet of Things by Prof. Renu Kumawat, Manipal University, Jaipur
- Control Theoretic Perspective to CPS by Prof. Sidharth Mukhophadyay, IIT Kharagpur
- Applications of CPS by Mr. H.R. Mohan, Vice Chairman, IEEE Madras Section
- Multi-Fragment Markov Model Guided Online Test Generation for MPSoC by Prof. Juri Vain, Tallinn University of Technology
- Towards a reliable Interpretation of a Logic for Traffic Analysis by Prof. Michael Hansen, Denmark Technical University, Denmark
- Cyber Infrastructure for Smart Applications- Fundamentals and Applications by Mr. Jithendrian Sundaravaradhan, CISCO, Bangalore
- Connected Vehicles by Mr. Vishnu Narayanan, Robert Bosch, Coimbatore

#### **AISYWC-2017 Participation:**



IEEE Madras Section sponsored the All India Students YP & WIE Congress sponsored by UP Section and hosted by IIIT Allahabad. The sponsorship entitled us to sponsor six participants. A group of four students/WIE members consisting of Mr. S. Kirubakaran, Panimalar Inst. of Tech, Chennai, Mr. K. Kuttiraj, Sri Ramakrishna Engg College, Coimbatore, Ms. Pragya Tiwariand, Mr. E. Mathirajan, SSN College of Engg along with H.R. Mohan, VC, IEEE MAS and Dr. Sakthivel, Treasurer participated in the congress. Mr. H.R. Mohan delivered a talk on Networking at the congress. Also, pl. see SSNCE activities for group photo.

#### **Knowledge Institute of Technology, Salem: Section Technical Meeting**



A technical meeting on “Computational Intelligence Techniques for Image Analysis” by Dr. M. Madheswaran, Principal, Mahendra Engineering College, Namakkal was organised on 20th Oct 2017. This was organised as section technical meeting at an outside location jointly by the IEEE SB of KIOT along with IEEE Computer Society, Madras Chapter and IEEE Information Theory Society Madras Chapter.

### Kongu Engineering College: State level PES Congress



SPESC'17, the State Level PES Congress was hosted by the IEEE SB of Kongu Engineering College during 21-22 Sep 2017.

The congress was inaugurated by Mr. S. Rajasekhar, Founder, Man of Drones. The highlights of the congress include: workshops on Drones and Stunt Quad, talks on Microgrids and Smart Grids by Dr. S. Umashankar, IEEE –MAS YP Vice-Chair.

### PPG Institute of Technology, Coimbatore: International Conference



19-20 Oct 2017: The 2<sup>nd</sup> International Conference on Communication and Electronics Systems (ICCES 2017). with 202 papers presentation was held during 19-20 Oct 2017. The conf. keynote speakers included: Dr. N. Mohan Kumar, Prof/ECE, SKP Institute of Technology, Tiruvannamalai, Dr. R. Harikumar, Prof/ECE, Bannari Amman Institute of Technology, Sathyamangalam, Dr. D. Nirmal, Assoc Prof/ECE, Karunya University.

### RVS Technical Campus, Coimbatore: International Conference



The 2<sup>nd</sup> International Conference on Inventive Computation Technologies (ICICT 2017) was organised during 24-25 Aug 2017.

The keynote speakers included: Dr. A. Nagappan, Chair, IEEE Aerospace and Electronic Systems Society and Dr. R. Harikumar, Prof/ECE, Bannari Amman Institute of Technology, Sathyamangalam. 249 papers were presented.

### SSN College of Engineering, Kalavakkam: IEEE Xtreme Programming Competition



The IEEE Xtreme 11.0 24-hour Programming Competition was organized during 14-15 Oct 2017 by IEEE Madras Section and hosted by the SB and IT Dept of SSNCE. 66 teams from various colleges and universities in and around Chennai region participated in this competition which had a global participation of 3348 teams. Dr. R. Srin, Software Technology Manager, ABB, USA delivered a talk on “Making the invisible visible“. The participants were motivated by interactions with Mr. H. R. Mohan, Vice Chair; Dr. Sakthivel, Treasurer and Dr. Koteeswaran, Executive Member of IEEE Madras Section. The team Heuristics with members J

Chandramowli, S. Murugappan and Rahul Ramji from the Dept. of Information Technology, SSNCE secured the first place in the Madras Section, third place at the national level and, 43<sup>rd</sup> place in the IEEE Region 10 and 109<sup>th</sup> place in the international level.

University of Michigan researchers have patented a system that could use glasses or a headset to prevent motion sickness while in a moving car. The glasses provide light stimuli in the rider's visual periphery to mimic the outside movement to prevent getting sick. It has been designed for users to read a book or check their phone in self-driving cars.



## IEEE Product safety Engineering Society, Madras Chapter: Fire Safety Awareness Program



An awareness programme on Fire Safety Awareness Program for school students of Koona Presidency Matric School, Vellore was organized on 17<sup>th</sup> Oct 2017 by the IEEE PSES Madras Chapter along with IEEE SB of Ganadipathy Tulsi's Jain Engineering College and Fire & Rescue Department of Tamil Nadu Government, Vellore. The session was led by Mr. P. Vinayagam, Superintendent of Police, Fire & Rescue Department and his team.

## IEEE Day 2017 and IEEE R10 Large Section Award Celebrations



The IEEE Day 2017 and IEEE R10 Large Section Award Celebrations was organised on 28<sup>th</sup> Oct 2017 at TAG Auditorium, Anna University. About 120 members participated in the event.

The event started with the welcome address and briefing on the event highlights by Mr. H.R. Mohan, Vice Chair, IEEE Madras Section. Dr. Atmanand, Chair, IEEE Madras Section in his presidential address thanked all the members, SBs and others who made it possible for the Section to get the R10 Large Section Award for the year 2017 based on the activities of 2016. He stressed the need to organise quality and branded events and take the chapter to a newer height.

Dr. Krishna M Sivalingam, Prof. and Head, Dept. of Computer Science and Engineering, IIT Madras and IEEE Fellow was the chief guest at the celebrations. Dr. P. Sakthivel, Treasurer, IEEE Madras Section introduced Dr Krishna M Sivalingam who had shared how the membership in IEEE had helped in both academically and in his career progression. He also presented the member achievement certificates to 48 of our Section Members who have been recognised for their achievements in 2017. The list is at <https://goo.gl/tF5moY> After the formal vote of thanks by Dr. Michael Kumar, Secretary, IEEE madras Section, the formal IEEE Day Cake cutting and a group photo session took place.

Following this a brief quiz session on Know Your IEEE was conducted by Mr. H. R. Mohan, Chair, Student Activities, IEEE MAS in which members enthusiastically participated and answered various questions relating to IEEE and its activities and received cash prizes. Ms. K. Visalini, a young achiever and 17 year old, 3<sup>rd</sup> CSE student at Kalasalingam University and a young IEEE & IEEE CS Student Member (presented by IEEE MAS & IEEE CS for her 5 World Records and completing 13 International Certifications in the last 10 years as a token of appreciation) delivered a motivational talk. Her presentation is available at <https://goo.gl/Ht1iJd>

A brief presentation on IEEE MAS entrepreneurship initiatives was made by Mr. Vijay Srinivas and shared at <https://goo.gl/jW9Gsr> Following this, a stand-up comedy show on the theme, Humour as a medicine in day to day life was performed by Mr. Sridhar Krishnan & P. Venkatesan. Eight Student Branches presented their activities and shared the best practices followed at their SB. Their presentations are available at <https://goo.gl/MbVjr5> A session on Fun Activities & Networking by IEEE MAS volunteers was enjoyed by all and provided a good networking opportunity. The Photos taken at the event are shared at <https://goo.gl/1xPJkV>





The IEEE Madras Section organized a mini POCO (Panel of Conference Organizers) event for the benefit of conference organizing community on 29<sup>th</sup> Oct 2017 at the Conference Hall, Alumni Centre, Anna University. The idea behind this Mini-POCO event was to help participants in gaining in-depth knowledge to hold International conferences of high level, commensurate with IEEE standards. The event aimed to provide exposure to Timeline Planning, Procedures, Research Papers Preparation, Plagiarism Check, Publication, and IEEE Best Practices etc. This event also attempted to clarify and guide in all factors related to organizing a conference following global standards.

The 2017 edition of IEEE MAS mini POCO which attracted about 50 participants was a one day event with the following sessions and covered almost all topics relating to organizing a quality IEEE conference.

- Conference Organizer Best Practices by Dr R. Hariprakash, Sr. Member, IEEE Madras and Chair, IEEE Constol Systems Society
- How to Write Good Journal Papers by Dr. V. Jagadeesh Kumar, Dept of Electrical Engineering, IIT Madras
- Timeline and Factors for Consideration to Organize an Quality Conference – IEEE Conf. Sponsorship Overview &
- Conf. Application Process by Dr. M.A. Atmanand, Chair, IEEE Madras Section & Former Director, NIOT, Chennai
- Supporting IEEE Authors by Mr. Dhanu Pattanashetti, IEEE Client Services/University Partnership Program Manager, IEEE India Office (through video conference from Bangalore)
- Tools for Plagiarism Check and Quality Conf. Publications by Mr. H.R. Mohan, Vice Chair, IEEE Madras Section & Chairman, IEEE Professional Communication Society
- Guidelines for Madras Section Technical Sponsorship for Conferences by Mr. H.R. Mohan, Vice Chair, IEEE Madras Section
- Event & Membership Management Platform offering Pre-event, event-day, post- event SaaS application for Events by Nithin Samuel, Sales Manager, Explara

The participants interacted with the presenters and clarified various aspects relating to the conference organising since the IEEE HQ has of late become very strict in approving conferences under its banner in the context of growing plagiarism. It was decided that similar events are to be organised at different centres to educate the conference organisers who could not participate in this event.

The presentations made and select photos of the event are shared at <https://goo.gl/pC534F>

### **Panimalar Institute of Technology: Inauguration of IEEE PCS & TEMS SB Chapters**



On 21<sup>st</sup> Nov 2017, the student branch chapter (SBC) of IEEE Professional Communication Society was inaugurated by Mr. H.R. Mohan, Vice Chairman, IEEE MAS & Chairman, IEEE PCS Madras Chapter.

On the same day, the SBC of IEEE Technology and Engineering Management Society was inaugurated by Mr. S. Sundaresh, Chairman, IEEE TEMS Madras Chapter & DRDO Distinguished Fellow.

### **SCAD Institute of Technology, Palladam: International Conference**



The International Conference on "Intelligent Sustainable Systems 2017" was held during 7-8 Dec 2017.

Dr. N. Mohan Kumar, Prof/ECE, SKP Engineering College, Tiruvannamalai was the chief guest. 231 papers were presented at the conference.

### **VIT University, Vellore: Participation in the World Bank Youth Summit Competition 2017**



Mr. Krishit Arora, an IEEE student member and final year B.Tech. (EEE) student of VIT, Vellore was selected among the global top six at the World Bank Youth Summit Competition 2017 from the 500+ submitted proposal by students from 100+ countries. The Competition with the theme – 'Technology and Innovation for Impact' took place in Washington DC on 4th-5th December 2017 at the World Bank Headquarters. Krishit represented India along with his teammate, Eshwar Agarwal, a recent graduate of Delhi

Technological University. Their project, called 'Anant Ujwala' (Infinite Light), is based on "Decentralised Smart Grids using Blockchain". They made to final round at the World Bank Competition and had the great opportunity of presenting the proposal to a distinguished gathering of world leaders. Their live interview from the World Bank HQ in Washington DC is published on the official World Bank Facebook Page at <https://goo.gl/mJ6nX2> More details about the competition and their project are presented in the following blog post: <http://wrlld.bg/v8WN30hbHxF>

### **Veltech Dr. RR & Dr. SR University: PDC on "The Internet of Things and its Applications"**



7-8 Nov 2017: Two-day, professional development certificate course on "The Internet of Things and its Applications" jointly organised during 7-8 Nov 2017 by the Dept. of Computer Science and Engineering, School of Computing, Veltech Dr. RR & Dr. SR University, IEEE Computer Society and IEEE Madras Section. The key topics covered in this certification course included: Introduction to IoT, Cyber Physical Systems; Importance of IoT; Architecture of IoT; Supporting Technologies (Hardware, software, communications); Applications in several important domains, and use cases; IoT, Cloud, Fog and Edge

Computing; Gaining value from IoT data; Issues and concerns, and how they can be addressed (Security, Privacy, Risks); Interoperability and standards; Key development and deployment considerations and platforms; Research opportunities; Career opportunities and Prospects; and hands-on lab session. The resource persons included: Dr. San Murugesan, Director of BRITE Professional Services, Editor in Chief of IEEE IT Professional Magazine, Adjunct Professor at Western Sydney University, Australia; Dr. S. Radha, Professor & Head, Dept. of ECE, SSN College of Engineering; and Dr. Aasha Nandhini, Post Doctoral Fellow, SSN College of Engineering.



### **Veltech Dr. RR & Dr. SR University: Workshop on “Succeeding in Research”**



A two-day workshop on “Succeeding in Research” was jointly organized during 9-10 Nov 2017 by the Dept. of Computer Science and Engineering, School of Computing, IEEE Madras Section, IEEE Computer Society Madras Chapter and IEEE Professional Communication Society Madras Chapter. The workshop sessions covered: Choosing a good, relevant research problem; Research methods in engineering and science: an overview; Doing research successfully; Research Resources: Research Planning & Writing; Research Communication (Do’s and Don’ts); Writing papers for publication; Quality Consideration in Research; Writing a good thesis; Research supervision; Avoiding the plagiarism evil; and Gaining competitive research grants. The resource persons included: Dr. San Murugesan, Director, BRITE Professional Services, Editor in Chief, IEEE IT Professional Magazine, Adjunct Professor, Western Sydney University, Australia; Dr. C.R. Muthukrishnan, Former Dy. Director & Prof. of CSE, Indian Institute of Technology, Madras; Dr. P. Venkatesan, Former Scientist-F, Indian Council of Medical Research (ICMR), Chennai & Professor - Research, Sri Ramachandra University, Chennai; Dr. Natarajan Gajendran, President, Indian Society for Education and Environment (iSee), Chennai; Dr. E. Kannan, Professor & Registrar, Veltech Dr.RR & Dr.SR University, Chennai; and Dr. M. M. Naidu, Professor & Dean, School of Computing, Veltech Dr.RR & Dr.SR University, Chennai.

### **Library Week Celebrations: “Delivering Research Better Than Ever”**



The Library Week Celebrations on the theme “Delivering Research Better Than Ever” was organised on 16<sup>th</sup> Nov 2017 by Anna University, IEEE India Office, IEEE Computer Society and IEEE Professional Communication Society. At the inaugural, Dr. G. Krishnamoorthy, Director, University Library, Anna University welcomed the gathering. Mr. H. R. Mohan, Vice Chair, IEEE Madras & Chair, IEEE PCS spoke on IEEE & Societies and their role in research publications and digital libraries. Dr. S. Ganesan, Registrar, Anna University offered felicitations and Prof. Dr. T. V. Geetha, Dean, CEG, Anna University delivered the inaugural address and requested IEEE to support in organising events & competitions in promoting research publications among academia and research community. Dr. P. Sakthivel, Chair, IEEE Computer Society delivered the vote of thanks. The sessions included: Resources in Anna University Library by Dr. G. Krishnamoorthy, Director, University Library, Anna University; Tools for Librarians and Researchers by Dr. M. Jadhav, Librarian, Central Library, IIT Madras; and IEEE Xplore: Delivering Research Better Than Ever by Mr Dhanu Pattanashetti, Client Services Manager, IEEE India.



## IEEE Madras Section SAC & YP: Volunteer training (VOLT) workshop



IEEE Madras Section SAC & YP organised a one-day volunteer training (VOLT) workshop on 11<sup>th</sup> Dec 2017 focusing on graduating student members and young professionals. The workshop was aimed to bring together a team of active student volunteers from 10+ student branches along with YP members and provide a platform to brain storm and device solutions to the different challenges that we face together as a Section thereby will empower students & YP volunteers on various aspects of IEEE and skill building. The programme started with a session on “IEEE Madras Section - Opportunities & Challenges” by Mr. H.R. Mohan, Vice-Chair, IEEE Madras Section followed by a presentation on “IEEE Big Picture - Why does it matter?” by Mr Nivas Ravichandran, Chair, IEEE MAS sub-committee on . Entrepreneurship & Innovation. The participants then had brain storming under five head lead by a senior volunteer: Student Activities - Aravindhan Anbazhagan; Entrepreneurship Activities - Vijay Srinivas; Humanitarian Activities - Aneesh & Eugene; Technical Activities - Prasanth Mohan; and Professional Activities - Nivas Ravichandran. Lightning talk on “SB Best Practices” was given by Mr. Aravindhan Anbazhagan and Mr Prasanth Mohan spoke on “IEEE Volunteering”. The outcome of the brainstorming held under different heads was presented and a action plan for the year 2018 was worked out. The programme ended with a session on “Professional Etiquettes” by Mr Felix Fedalies and some fun activities.

## ADSF SIGHT Consultation Meeting on Nano Satellites for Deep-Sea Fishers



A meeting on “Consultations on Nano Satellites for Deep-Sea Fishers: Design, Fabrication and Launch” was convened at the Russian Centre for Culture and Science on 11<sup>th</sup> Dec 2017. It was organized by jointly by, ADSGAF, IEEE ADSF SIGHT, IEEE Madras Section, IEEE Kerala Section, SpaceKidz India and Internet Society Trivandrum. The purpose of this meeting of fishermen organizations, professional societies, students and others was for the urgent life-saving technology interventions in the aftermath of Cyclone Ockhi, with over 600 fishers still missing in Kanyakumari district of Tamil Nadu and Kerala.

Representatives of fishermen organizations expressed their intense distress and dismay at the fact that over 120 fishers were confirmed dead and over 600 still reported missing in the recent Cyclone Okhi. The meeting was unanimous that fishers and their boats should have access to communications technology, including voice and data, through satellite or any other way, so as to be able to communicate with land-based stations. It was pointed out that communications based on mobile phones and FM Radio had better chances given the range and limitations of the fishing craft. Newer technologies, such as commercial Satellite telephony and mobile trunking (PMRTS) were also discussed.

Fishermen were unanimous in calling for immediate government action to enhance communications while at sea. "The present situation displays the utter apathy and negligence on the part of the Government. Fishers contribute Rs. 14,000

crores annual to the government through our fish. Yet, there was no action whatsoever from the Central and State governments to prevent loss of lives of fishers. Our lives are still seen as dispensable. This must change immediately", said Mr. Anthony Adimai, Chairman, SIFFS.

"Our country is at the forefront of space and satellite technology. Yet there is no technology available to protect the fishermen, who represent a most vulnerable section of society. It is high time that technology was deployed for their use", said Mr. Vincent Jain, from IEEE ADSF SIGHT, and organizer of the meeting. "It is important to harness the possibilities of new technology to protect the lives, property and livelihoods of small-scale fishers", said Mr. H.R.Mohan, Vice Chair, IEEE Madras Section, "We can support such technology development, jointly with the student community and the industry". Dr.Srimathy Kesan, Director of Space Kidz India, stressed for the need for effective communication system which can be provided by a constellation of Nano Satellites planted in the sub-orbital region as this is the most economically viable method for trial missions. Mr.Micheal J Gorbato, Vice-Consul and Director, RCSC, made a voluntary announcement to get the help of the Ministry of Contingencies in Russian to support the needs of the fishermen.

About 50 participants including fishers, engineers & technologists, researchers, industry representatives and students took part in the meeting. The meeting decided to follow up by launching a nano satellite as a proof-of-concept towards a more robust system that will meet the challenges of the large footprint of fishing operations that covers the whole of the Western Indian Ocean, the limited capacities of small-scale fishing fleet, budget constraints and licensing regimes. It was decided to convene a second meeting will be convened in Trivandrum to discuss the next steps.

The technical session and other discussions of the consultation were chaired and directed by Mr. Satish Babu of ISOC – Trivandrum. He is the former Chair of IEEE Kerala Section, former Director of ICFOSS, Government of Kerala and former Chief Executive of SIFFS

## OPEN APPEAL

The cyclone which lashed the south Indian coasts has largely affected the fishermen and other communities of the region. The ADSF SIGHT has estimated the total loss (in rupees) of Deep Sea Fishing Boats as given below/

THOOTHOR ZONE, Kanyakumari District, Tamil Nadu, India													
Total lose of Deep Sea Fishing Boats by Cyclone Okhi													
Sl.No	Village	No of Boat Unit cost	Boat 4000000	Net 1000000	Lines 300000	GPS 18000	Wireless 25000	Fishfinder 45000	Mobile (5000x10)	Battery 35000	Generator 28000	Other 75000	Total
1	Neerodi	1	4000000	1000000	300000	18000	25000	45000	50000	35000	28000	75000	5576000
2	Marthandanthurai	0	0	0	0	0	0	0	0	0	0	0	0
3	Valavilai	9	36000000	9000000	2700000	162000	225000	405000	450000	315000	252000	675000	50184000
4	Eraviputhenthurai	1	4000000	1000000	300000	18000	25000	45000	50000	35000	28000	75000	5576000
5	Chinnathurai	5	20000000	5000000	1500000	90000	125000	225000	250000	175000	140000	375000	27880000
6	Thoothoor	5	20000000	5000000	1500000	90000	125000	225000	250000	175000	140000	375000	27880000
7	Poothurai	3	12000000	3000000	900000	54000	75000	135000	150000	105000	84000	225000	16728000
8	Eraimanthurai	0	0	0	0	0	0	0	0	0	0	0	0
	Total	24	96000000	24000000	7200000	432000	600000	1080000	1200000	840000	672000	1800000	133824000

We request the all our IEEE members to team up and come out with project proposals, which could be taken up for funding with the headquarters. We at the IEEE Madras Section execom will go through the proposals and help you to take up rehabilitation projects. We are sure IEEE HQ true to its motto will support good proposals.

Further, any immediate contribution / funding / donation in support of attending the repair / reconstruction for boats from the IEEE members are welcome. Those interested may pl. get in touch with Mr. I. Tamil Selvan, Secretary, IEEE ADSF SIGHT at [tamilselvan898@gmail.com](mailto:tamilselvan898@gmail.com)

## IEEE ICNL Congratulates Mr. H.R. Mohan for prestigious MGA Award



**Mr. H. R. Mohan**

**2017 IEEE MGA Leadership Award.**

For dedicated and sustained commitment to member engagement through various programs, student activities and information sharing.

## IEEE UP Section Events

GLA University, Mathura: 4<sup>th</sup> IEEE International Conferences UPCON 2017



The 4<sup>th</sup> IEEE International Conference on Electrical, Computer and Electronics – UPCON 2017 was organized by the Dept. of Computer Engineering & Applications at GLA University, Mathura during 26-28 Oct 2017 in technical collaboration with IEEE Uttar Pradesh Section. The conference was inaugurated on 27<sup>th</sup> October by the Chief Guest Prof. Yogesh Singh, Vice Chancellor, Delhi Technological University, New Delhi; Guest of Honor Prof. P. K. Kalra, Director, Dayalbagh Educational Institute, Agra. The Convener of the Conference, Prof. Dilip Kumar Sharma provided the conference highlights.

The Vice Chancellor, Prof. D. S. Chauhan, welcomed the gathering and stated that International Conferences of these types would benefit not only the members present here, but also the Industry, Academia and Researchers as a whole. The Technical Program Committee Chair, Prof. Charul Bhatnagar introduced the theme of the Conference. In his address, she emphasized the importance of Computer, Electronic and Electrical Engineering. The General Chair, Prof. Anand Singh Jalal welcomed and introduced the guests and keynote speakers of the conference

- Prof. Yogesh Singh, Vice Chancellor, Delhi Technological University,
- Prof. P. K. Kalra, Director, Dayalbagh Educational Institute, Agra
- Prof. Vincenzo Piuri from University degli Studi di Milano
- Prof. Ishak Bin Aris from Universiti Putra Malaysia.
- Dr. Belkacem Kada from King Abdulaziz University
- Prof. J. Ramkumar, IIT Kanpur
- Dr. Monojit Choudhury, Microsoft Research Lab India
- Dr. Sameep Mehta, IBM Research Lab India
- Prof. Ekram Khan AMU Aligarh
- Prof. S. N. Singh R10 CTS Coordinator and Vice Chancellor MMMUT Gorakhpur
- Dr. Kumar Vaibhav Srivastava IIT Kanpur
- Dr. Asheesh Kumar Singh MNNIT Allahabad
- Dr. Satish Kumar Singh IIIT Allahabad
- Dr. Brijesh Kaushik IIT Roorkee
- Dr. Rajat Kumar Singh IIIT Allahabad

Prof. Vincenzo Piuri, University of Milan, Italy delivered the keynote address on “Computational Intelligence Technologies for Ambient Intelligence”. Prof. Belkacem Kada, King Abdulaziz University, Saudi Arabia, delivered a talk on “New Advances and Progress in Tactical Missiles Guidance, Navigation, and Control”. Prof. Ishak Bin Aris, University of Putra, Malaysia addressed the participants on “Impacts of IoT and ICT to current and Future Intelligent Energy Efficient Vehicle”.



Prof. S. N. Singh, R10 – CTS Coordinator & Vice Chancellor, MMMUT Gorakhpur, delivered a keynote address on “Effective Writing and Publishing Research Papers.” Prof. J. Ramkumar, IIT Kanpur spoke on “World is Moving to Industry 4.0”. Dr. Monojit Chaudhary, Microsoft Research Lab India, Bangalore, was one of the keynote speakers from Industry. His talk was on “Language and Society through the lenses of Social Media: Understanding Extreme Multilingualism”. Another keynote speaker from industry, Mr. Sameep Mehta, IBM Research Lab, India spoke on “Is it a Puppy or a Muffin? Resilient Analytics – A study on various attacks on Analytics Offerings”.

Along with these keynote speakers, some more eminent speakers and technical session chairs included: Prof. Ekram Khan, AMU Aligarh, Dr. Kumar Vaibhav Shrivastava, IIT Kanpur, Dr. Brijesh Kaushik, IIT Roorkee, Dr. Satish Kumar Singh, IIIT Allahabad, Dr. Asheesh Singh, MNNIT Allahabad; They addressed the participants on various current and emerging issues in the engineering domain.

IEEE U.P. Section Late Prof G K Dubey Memorial Award for Life Time Achievement was awarded to Prof P. K. Kalra DEI Agra by Chairman IEEE U.P. Section during UPCON 2017 inaugural ceremony. During the cultural evening Prof Dilip Kumar Sharma was awarded with the Outstanding Contribution Award for his contribution as Convener of UPCON 2017 by Chairman IEEE Uttar Pradesh Section.

The Conference also witnessed two research workshops, two tutorials on 26<sup>th</sup> Oct and one PhD Symposium on 28<sup>th</sup> Oct. The PhD Symposium Chair was Prof. J. Ramkumar, IIT Kanpur. During UPCON 2017, 142 papers selected out of 400 received. Out of 127 papers registered, 123 were presented in 23 technical sessions.



In the conference valedictory session held on 28<sup>th</sup> Oct Prof Vincenzo Piuri, University of Milan, Italy was the Chief Guest. Prof. Ashish Sharma presented a summary of the conference which was followed by the Vote of Thanks.

*Report by: Prof Dilip Kumar Sharma, Secretary IEEE UP Section*

#### **Quantum School of Technology, Roorkee: Technology Enhancement Programme on Robotics**



The IEEE Student Branch of Quantum School of Technology, Roorkee had organized a two-day Technology Enhancement Programme on Robotics (TEP – R) during 13<sup>th</sup> and 14<sup>th</sup> Nov 2017. The event was inaugurated by Dr. Gulshan Chauhan, Director, Quantum School of Technology, Roorkee. Er. M. S. Gupta, Dean Academics, Quantum School of

Technology, Roorkee; Mr. Raunak Gupta, Branch Counselor, IEEE Student Branch; Mr. Mohd. Furqan Khan, Manager, KVCH, Noida; and Mr. Uma Shanker Yadav, Sr. Research Engineer, KVCH, Noida participated in the inaugural session. .

Mr. Raunak Gupta while welcoming the dignitaries and participants said that being the interdisciplinary field, robotics is having large number of applications in every walk of life like manufacturing, medical, aerospace and automotive industries etc. He added that during the TEP – R, the participants will learn the design, function and controlling of a basic robot.

Mr. Uma Shankar Yadav, Sr. Research Engineer from KVCH Noida told the participants about the components being used in making the robot. Students learned the robotics through the hands on practical session. They worked on various algorithms like Line Follower Robot, Edge Follower Robot etc. During the last session, a quiz was held to assess the knowledge of the participants and top six participants were given the Certificate of Merit.

Dr. Gulshan Chauhan, Director, Quantum School of Technology while presenting the vote of thanks, assured that the IEEE SB will provide the best of opportunities to all the budding engineers, researchers and professors who are keen to garner information and explore in the field of R&D in the near future. There were a total of 31 registered participants..

*Report by: Mr. Raunak Gupta, [raunakgupta.me@quantumeducation.in](mailto:raunakgupta.me@quantumeducation.in)*

### **GLA University, Mathura : National Workshop on Emerging Trends in Information Retrieval**



The Dept. of Computer Engineering & Applications, GLA University, Mathura, India had successfully conducted a one-day national workshop on “Emerging Trends in Information Retrieval” on 26 Nov 2017 with the technical sponsorship of IEEE UP Section.

Prof. A. M. Agrawal, Pro Vice Chancellor, GLA University, Mathura inaugurated the workshop. The guests at the inaugural session included: Dr. Ashish Saini, Associate Professor, Department of Electrical Engineering, Dayalbagh Educational Institute, Agra; Dr. Upendra Kumar, Assistant Professor, IET, Lucknow; Dr. Pawan Kumar Tiwari,

Assistant Professor, IET, Lucknow; Prof. Anand Singh Jalal; Dr. Manoj Kumar; Prof. Dilip Kumar Sharma, Convener of the workshop. Prof. Dilip Kumar Sharma welcomed the guest and briefly introduces them. Dr. Manoj Kumar introduced the theme of this workshop & focused on the need and necessity of information retrieval in front of all delegates & participants.

During this workshop, Dr. Ashish Saini explained the use of soft computing techniques in Information Retrieval. He classified IR in three categories: Document Representation, Ranking Function and Query Expansion and briefed on how evolutionary algorithms and fuzzy systems are helpful to enhance the performance of IR. He further elaborated on hybrid ranking function and IR evidences based ranking function and concluded his presentation with explaining about query expansion using term weighting methods.

Dr. Aditi Sharan delivered a talk on fundamentals of opinion mining and its application areas. These two expert talks were followed by hands-on sentiment analysis and word cloud. By Mr. Rahul Pradhan and Mr. Yogesh Gupta who explained how sentiment analysis can be done on tweets and how to create word cloud. The workshop, attracted over 50 participants and they were benefited by getting an awareness on the latest trends and new advancements in the field of information retrieval.

*Report by: Prof Dilip Kumar Sharma, Secretary IEEE UP Section*

Facebook claims to have invented a new unit of time called 'flick' to measure the speed of digital audio and video. A flick, or frame-tick, is roughly 1.41723356 nanoseconds long and defined as 1/705,600,000 of a second.



## AISYWC-2017: All India Student Young Professionals WIE Congress 2017



All India Student – Young Professionals – Women in Engineering Congress is the annual hallmark event of the IEEE India Council, which was founded in 2000 with the aim to bring together inventors, professionals, entrepreneurs and visionaries from across the country under one roof.

This year, AISYWC-2017 was hosted by IEEE UP Section at the Indian Institute of Information Technology, Allahabad, Uttar Pradesh from 27<sup>th</sup> to 29<sup>th</sup> September, 2017. The congress revolved around the theme “Imagine, Engineer, Enlighten, and Empower” and envisioned to enlighten delegates to become engineers that are technically, socially and economically responsible for the betterment of the society.

The congress witnessed the presence of around 370 delegates and 15 speakers from all-over the country. The congress was inaugurated by Prof. Nagabhushan, Director, Indian Institute of Information Technology, Allahabad, Prof. Shekhar Verma, Chair, IEEE CS Chapter, UP Section, Dr. J. Ramkumar, Chairman, IEEE UP Section, Prof H.P. Khincha, IISC Bangalore, Dr. Rajat Kumar Singh, Faculty Counselor, IEEE-SB-IITA, Prof S. N. Singh, Chair-Elect, IEEE India Council and Mr. Gitansh Anand, Vice Chair, Young Professionals and Chair, Student Coordination Team.

The event was planned to assist delegates in all career-oriented domains and thus, three parallel tracks were organized namely, Student Track, Women in Engineering Track and Young Professionals Track to cater the needs of all the delegates attending the congress.

The student track was slated to provide budding engineers an insight into trending technologies and thus multiple sessions were conducted based on Artificial Intelligence, Robotics, and Rainwater Harvesting etc. The Young Professionals track focused on Innovation in Entrepreneurship and sessions for which were presented by Mr. Abhishek Appaji (Young Professionals Coordinator, IEEE Bangalore Section) and Mr. Gitansh Anand (Young Professionals Vice Chair, IEEE India Council). The WIE track consisted of motivating sessions like “Change starts with thinking” and had innovative talks on “Neuro Linguistic Programming” by Ridhima Dua.

The congress was not only a conglomeration of visionaries but also a unification of diverse cultures of the country. To promote and celebrate the rich cultural diversity, a cultural night was organized where delegates from different sections performed and displayed the special art forms of their place through dance, drama and music.

The three days event concluded on a successful note where each session was a new learning, every collaboration inculcated a sense of belonging and it was all together an illuminating experience for all.

For a detailed report, pl. visit <https://goo.gl/ynjFuW>





**Prof. S. Sadagopan**  
Director, IIIT-Bangalore  
[ss@iiitb.ac.in](mailto:ss@iiitb.ac.in)

### General

- Government announces major economic reforms - bank recapitalisation, support to MSME and massive road projects on October 24, 2017
- India's ranking on "ease of doing business" goes up and India joins the "top 100" as per World Bank Report of October 31, 2017; Moody's upgrade India rank on November 16, 2017 (the first in 14 years)
- Multiple train accidents and NTPC plant blast in this quarter in India, US LS Vegas shoot out on October 1, 2017, terror strike in NYC on October 31, 2017 lead to loss of many precious lives
- BJP Gujarat Himachal elections in December 2017

### Products

- Google launches **Pixel 2** phones, **Pixel Book** and **Google Home** on October 4, 2017
- **Apple iPhone X** went on sale on November 3, 2017

### Markets

- India's stock indices **Sensex** (BSE) and **Nifty** (NSE) reach lifetime high values of 33,836 and 10,463 respectively on December 19, 2017; market capitalization of BSE listed companies touch ₹ 150 L Crores on December 25, 2017
- Chip maker **Marvell Tech** to acquire **Cavium** for \$ 6 Billion on November 20, 2017
- Chinese social media major **Tencent** has higher market capitalisation (\$ 500 Billion) than **Facebook** (\$ 474 Billion) on November 21, 2017!
- Co-working space pioneer **WeWork** buys start-up **MeetUp** on November 27, 2017
- Iowa-based Meredith Corporation acquires **Time** Magazine on November 26, 2017 for \$ 2.8 Billion
- **Walt Disney** acquires 21st Century Fox for \$ 52 Billion in December 14, 2017

### Science & Technology and Education & Research

- **Nobel Prize winners for 2017** announced; **Medicine** Nobel announced on October 2, 2017 goes to Jeffrey Hall (University of Maine, USA), Michael Rosbash (Brandeis University, USA) and Michael Young (Rockefeller University, USA); **Physics** Nobel announced on October 3, 2017 goes to Rainer Weiss (MIT, USA), Barry Barish and Kip Thorne (both of Caltech, USA); it had some interesting Indian connections too); **Chemistry** Nobel announced on October 4, 2017 goes to Jacques Dubochet (University of Lausanne, Switzerland), Joachim Frank (Columbia University, USA) and Richard Henderson (Cambridge, UK); **Literature** Nobel announced on October 5, 2017 goes to Japanese-born English author Kazuo Ishiguro; Nobel **Peace** Prize announced on October 6, 2017 goes to International Campaign to Abolish Nuclear weapons (ICAN); **Economics** Nobel announced on October 9, 2017 goes to Richard Thaler (University of Chicago, USA)
- **Infosys Science Prize** announced on November 14, 2017; **Engineering and Computer Science** Prize goes to **Sanghamitra Bandyopadhyay** of Indian Statistical Institute, **Humanities** Prize goes to Ananya Jahanara Kabir of King's College, London, Life Sciences Prize goes to Upinder Bhalla of NCBS, Mathematical Sciences goes to Ritabrata Munshi of TIFR/ISI, Physical Sciences Prize goes to Yamuna Krishnan of University of Chicago and Social Sciences Prize goes to Lawrence Liang of Ambedkar University, Delhi

- India-born steel major **Lakshmi Mittal** donates \$ 25 Million to Harvard University to set up LM South Asia Institute on October 11, 2017
- **IIT Bombay** and **Indian Institute of Science, Bangalore** top **QS World University Rankings 2018** released in October 2017
- Parliament passes **IIM (Indian Institutes of Management) Bill** giving greater autonomy and degree granting authority to the Institutes on December 20, 2017; Presidential signs it into a Law on December 31, 2017
- Government announces the setting up of **National Testing Agency** on Nov 12, 2017

### Indian IT Companies

- **Wipro** acquires NY-based leader in UX design **Cooper** in October 2017
- **TCS** starts Olympus Centre that can accommodate 30,000 people in Mumbai on November 8, 2017
- **Mahindra** start Detroit plant on November 20, 2017
- **24[7].ai** announces its decision to hire 3,000 Internet-based customer experience professionals in November 2017
- **TCS** wins \$ 2.5 Billion Nielsen deal in December 2017

### MNC in India

- Co-working spaces pioneer **WeWork** starts India operations in Bangalore in October 2017
- **Goldman Sachs** increases hiring in India in October 2017
- **Standard Chartered** global centre in Bangalore commissioned in October 11, 2017
- **ThoughtWorks** starts 300-seat second Office in Bangalore in October 2017
- **Amazon** leases 450,000 sq. ft. space in Chennai in October 2017; invests ₹2,900 Cr more in India in November 2017; **AWS** chosen to offer public cloud services for government customers in December 2017
- **Google** launches cloud services out of India with local currency payments on November 1, 2017; starts **Google Go** - 2-wheeler option to Google Maps in India;
- **WalMart** opens its first India “dark stores” in Bhiwandi near Mumbai to serve Kirana Stores on November 1, 2017
- **Uber** starts 2nd Engineering Center at Hyderabad in November 2017
- **IBM India** revenue crosses \$ 5 Billion in 2017
- **Delta Electronics** of Taiwan announces its decision to invest \$ 200 Million in Bangalore in December 2017

### Telecom

- **Airtel** launches low cost 4G phone on Oct 11, 2017 at ₹ 1,500 price point; Airtel to merge Tata Tele-services in a cash-free, debt-free deal signed on October 12, 2017
- **RCom** to exit 2G business
- **BharatNet** phase 2 with ₹ 34,000 Crores funding goes on stream on November 13, 2017
- CBI Court acquits all accused in the 2G scam involving illegal telecom license allotment on December 20, 2017 and causes a flutter

### People

- **Soumya Swaminathan** appointed **Director General of WHO** (World Health Organization) on October 4, 2017
- Microsoft CEO **Satya Nadella** visits India in November 2017 and launches his book **Hit Refresh**
- Infosys co-founder **Nandan Nilekani** and his wife **Rohini** join “**I give pledge**” by donating 50% of their worth to charity in the presence of Bill Gates in Bangalore in November 2017
- **Global Start-up Summit** saw US President’s daughter **Ivanka Trump** visit Hyderabad in November 2017
- **Infosys** appoints Capgemini veteran **Salil Parekh as CEO** on December 2, 2017; Salil takes over on January 2, 2018

### Start-up scene

- Chinese social media giant **Tencent** puts \$ 1 Billion in Ola in October 2017
- **Flipkart** to invest \$ 500 Million in mobile wallet **PhonePe** in Oct 2017
- **HealthifyMe** starts rolling out it’s AI nutritionist **Ria** in October 2017
- Bangalore-based niche embedded systems company **Mistral** acquired by **Axiscades** for Rs 175 Crores on November 5, 2017

- **PayTM** Payment Bank formally launched by PM on November 28, 2017
- **PayTM** and **ICICI Bank** launch “buy now pay later” instant credit for 45 days for up to ₹ 3,000 in November 2017
- **Cisco** CEO John Chambers invests in IIT Madras incubated Uniphore Software systems (specializing in Indian language based speech processing solutions) on December 1, 2017
- **Ola** acquires **FoodPanda** on December 19, 2017

### Interesting Mobile Apps

- State Bank of India (SBI) launches **yono** (You Only Need One) mobile App on November 24, 2017

### Interesting numbers

- **FlipKart** touches 100 million downloads of its App in October 2017
- **FlipKart** and Amazon India cross 100 million downloads on November 1, 2017
- **Apple** market capitalisation touches \$ 900 Billion on November 2, 2017
- **Alibaba** sales cross \$ 25 Billion in a single day on November 11, 2017
- Indian airline passengers crossed 100 Million in January - November 2017; making India the third largest globally after USA (719 Million) and China (436 Million)

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Professor Sowmyanarayanan SADAGOPAN is the Director of IIIT-Bangalore. These are his personal views. He has been writing about IT in India for two decades, with monthly columns in Times of India (1999 – 2003), Financial Express (2004 - 2007), IT Magazine (2008 - 2011) and IEEE India Newsletter (2012 onwards). He can be reached at [ss@iiitb.ac.in](mailto:ss@iiitb.ac.in)

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Amazon has launched a checkout-free hi-tech grocery store called 'Amazon Go' in Seattle, US. It uses ceiling-mounted cameras to identify each customer and track what items they select, eliminating the need for billing. The sensors detect when products are taken from shelves and maintain a virtual cart. The purchases are billed to customers' credit cards when they leave the store.

Facebook employee Matt King, who lost his sight, is working to verbalise online content and enable the visually impaired to 'see' and determine appropriate content on the platform. King also worked on 'screen reader' which uses audio cues or braille to 'see' content on the screen. He previously worked on 'automated alt-text' which describes audibly what is in Facebook images.

Technology giant Apple has partnered with Malala Fund to support girls' education, thereby becoming its first Laureate partner. The Fund plans to extend the funding programs to India and Latin America with Apple's help in terms of technology, curriculum and education policy research. Founded in 2013, the Malala Fund aims to empower girls by helping them access quality education.

NSA whistleblower Edward Snowden on Sunday took to Twitter to express his concerns over demands to link Aadhaar to services, saying, "Such demands must be criminalised." He further called Aadhaar "an improper gate to service". His tweet came in response to an article by former RAW head KC Verma, who slammed the need to link Aadhaar number to various services.

Scientists in Spain have developed an artificial intelligence (AI) system that can predict the likelihood of corruption in a government as well as the conditions that favour their appearance. The computer model based on neural networks claims that the probabilities of corruption increase when the same political party stays in power for more number of years.

Researchers at a German research laboratory have developed a sensor-driven electronic 'skin' that can enable users to control objects or appliances with gestures. The thin foil, which sticks to the palm of the hand, allows users to control both virtual and physical objects using magnetic fields. Its sensors can also withstand bending, folding and stretching without losing their functionality.

Belgium-based app developers have designed a chat app called Die With Me which can only be used when a user's smartphone has less than 5% battery left. The app allows users to connect to other users with low battery which it displays next to the sent texts. The app is available both on the App Store and Google Play Store.



## 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](mailto:hrmohan.ieee@gmail.com)

**How scientists and supercomputers could make oceans drinkable:** Removing salt from seawater is an enormous challenge. Researchers may have the answer – but it will require a whole lot of processing power. Aleksandr Noy, a senior researcher at Lawrence Livermore National Laboratory, has devoted a significant part of his career to perfecting the liquid alchemy known as desalination – removing salt from seawater. His stock-in-trade is the carbon nanotube. In 2006, Noy had the audacity to embrace a radical theory: maybe nanotubes – cylinders so tiny, that they can be seen only with an electron microscope – could act as desalination filters. It depended on just how wide the tubes were. The opening needed to be big enough to let water molecules flow through but small enough to block the larger salt particles that make seawater undrinkable. Put enough carbon nanotubes together and you potentially have the world's most efficient machine for making clean water. [Article](#)

**A User Guide to Neural Networks for the Business:** In numerous fields, from medicine to exploring space, neural networks will have an indispensable role. Overall, machine learning powered by ANNs is being put to good use. Today, the concept of neural networks doesn't raise a lot of eyebrows. When someone mentions working with neural networks, people rarely imagine scientists conducting neurological or psychological research. Instead, we think of a clever system powered by artificial intelligence. It feels like we're already in the future, where machines can learn and provide a fantastic output of new opportunities. With the current massive increase in available data and computational power, artificial intelligence, and artificial neural networks, in particular, can be applied to the vast areas of everyday life. What does that really mean, though, for business owners? Let's have a closer look at neural networks in business. [Full Post](#)

**2018 mobile industry predictions:** In the 11th edition of mobile industry predictions, 2018 is already starting off with technological bombshells, thanks to the U.S. FCC repealing network neutrality regulations in 2017. However, this debate is far from over. Blockchain is gold: Any company mentioning blockchain suddenly rises to the top, and public companies discussing blockchain see stock valuations sometimes rise dramatically. Those results are primarily based on the hype that bitcoin and other cryptocurrencies experienced in December. Mobile networks continue to flourish, and 5G will likely become reality this year. [Full Post](#)

**Future of Work 2018: 10 Predictions You Can't Ignore:** The start of winter is often referred to as the "holiday season." But it might also be called the "prediction season." When it comes to human capital management (HCM), most predictions tend to be variations of the same things. A colleague and I even created a scale to rate HCM predictions based on whether they are new or just "old wine in new bottles." The reason HCM predictions do not change much over time is because the "H" in HCM is about people. People do not evolve as fast as technology. Consequently, the basic challenges of HCM are constant: getting the right people in the right roles and providing them with the right work environments while complying with employment laws. The following are my "top ten" predictions about how these will change in 2018. [Full Story](#)

**8 Internet Of Things Predictions For 2018:** 1. The IoT hype is over – but the trough of disillusionment typically precedes mainstream adoption; 2. The IoT cloud platform market will consolidate quickly; 3. IoT vendors will refocus and lead with IoT solutions delivering value to their installed base. [To read the rest](#)

**Technologies That Will Propel India In 2018:** Convenience, affordability, and inclusivity will become the mainstay of innovations that take center stage in India in 2018, according to experts. 2017 saw the Indian economy make significant headway in technology deployment. Cloud-based transactions, artificial intelligence (AI), the Internet of Things (IoT), Big Data analytics, augmented and virtual reality (AR and VR), and blockchain became buzzwords across the country, thanks

to the digital push by the Indian government, a flourishing startup ecosystem, and automation in the commercial space. India's thrust in building a robust broadband infrastructure, coupled with its high mobile penetration, will boost technology adoption further. Sector-wise, game changers vary, and 2018 promises further disruptions. Which technologies are likely to take the spotlight in 2018? We reached out to 10 prominent leaders from across key sectors to assess contemporary technologies and predict the likely digital disruptions that await India in the coming year. Below is Digitalist Magazine's projection for emerging technologies in 2018 and the key determinants of their adoption, based on these conversations. [Full Story](#)

**Computer Architecture - A Study Guide:** Computer architecture provides an introduction to system design basics for most computer science students. Webopedia Study Guide This computer architecture study guide describes the different parts of a computer system and their relations. Students are typically expected to know the architecture of the CPU and the primary CPU components, the role of primary memory and differences between RAM and ROM. Other topics of study include the purpose of cache memory, the machine instruction cycle, and the role secondary memory plays in computer architecture. [Guide](#)

**Huge List of 65 Computer and IT Certifications:** Have you heard about a computer certification program but can't figure out if it's right for you? Use this handy list to help you decide. Becoming IT certified in a specific skill or product is a way to prove that you have the necessary knowledge to perform a job in a given field or a job that uses specific technologies. Earning certification is a good way for computer science graduates and entry-level IT professionals to improve their resume. Employers often look at a candidate's computer and technology certifications in order to assess whether or not the individual is a viable candidate for a position. Webopedia compiled this alphabetical list of different certifications related to computer technologies with a brief explanation of each certification and links to help interested learners find additional information. [See the list](#)

**200 universities just launched 560 free online courses:** If you haven't heard, universities around the world offering their courses online for free (or at-least partially free). These courses are collectively called as MOOCS or Massive Open Online Courses. In the past six years or so, close to 800 universities have created more than 8,000 of these MOOCs. Here's the full list. [See the list](#)

**65 Password Security Tips: How to Create and Secure Accounts:** From a favorite online bookstore to Facebook and webmail services, we create a lot of online accounts. According to a 2016 poll by Intel Security, the average person has 27 discrete online logins. Add to this number, offline codes and we're virtually swimming in usernames, passwords and PINs. From generating strong passwords to using a password manager many security experts, business owners, and vendors contributed their very best ideas and practical advice for our giant list of password security tips. [Learn the tips](#)

**Robotics in business: Everything humans need to know:** Today, robots are cropping up in offices, hospitals, and schools -- decidedly non-industrial environments -- as well as in warehouses, fulfillment centers, and small manufacturing centers. More and more, they are on our roads and flying overhead. And that's just to name a few spheres in which robots are rapidly gaining traction by doing work more efficiently, reliably, and for less money than previously possible. That's got a lot of people excited -- and a lot of others worried. The stunning pace of development in the industry has raised lots of questions. This guide, written with the enterprise in mind, will address the big questions. And it'll give you the context to make up your mind about others. It'll also give you a handle on an industry that's poised to drive \$135.4 billion in spending by 2019, one whose relevance to commerce and day-to-day life in the coming decades cannot be overstated. [Guide](#)

**Net neutrality: The smart person's guide:** Do internet service providers have a right to throttle certain traffic? That's the question at the heart of net neutrality, and here's everything you need to know about it. [Guide](#)

**More Than Noise: Digital Trends That Are Bigger Than You Think:** In the tech world in 2017, several trends emerged as signals amid the noise, signifying much larger changes to come. As we noted in last year's More Than Noise list, things are changing—and the changes are occurring in ways that don't necessarily fit into the prevailing narrative. While many of 2017's signals have a dark tint to them, perhaps reflecting the times we live in, we have sought out some rays of light to illuminate the way forward. The following signals differ considerably, but understanding them can help guide businesses in the right direction for 2018 and beyond. [Full Post](#)

**Workforce of the future - The competing forces shaping 2030:** We are living through a fundamental transformation in the way we work. Automation and 'thinking machines' are replacing human tasks, changing the skills that organisations are looking for in their people. But what will the future look like? This isn't a time to sit back and wait for events to unfold. To be prepared for the future, you have to understand it. Our 'Workforce of the future' study looks at four possible Worlds of Work for 2030 to help you kick-start your thinking. You can also take a closer look at the views of 10,000 people in our survey findings summary. [Report](#)

### **These 42 Tools Will Take Your Content To The Next Level...No Matter Your Strategy, Industry or Skill Level:**

Whether you're an artist, entrepreneur, marketer, freelancer or something else, we all can agree on one thing: creating solid, online content consistently can be hard as hell! Despite this, content has only a handful of components. By mastering these components, one by one, you will better position yourself to be a top content creator in your field. These components are preparation, execution, and promotion. Preparation and promotion consists of what you'd expect: Strategically preparing your piece of content to provide value to others, promote it to rise above the noise, and get the engagement you deserve. The execution—however complex we would like to think it is—almost always consists of a combination of writing, photography/graphic design, and video. In this post, the author has taken all these components, and boiled down hundreds of contenders to bring you the top 3 of each category. These tools include pieces of content, apps, Chrome extensions, websites, and more. [Full Post](#)

**Be Prepared To Lose Your Job In The Future... If You Don't Learn This One Skill Now:** One question Jeff Bezos is often asked is one we all need to ask ourselves, "What's going to change in the next 10 years?" It's a profound question because the world is changing so rapidly, and because the decisions we make now will determine our destiny. Decide wrong, and you might find yourself on a sinking ship, watching as your whole industry goes bankrupt and the skills you spent years honing become obsolete. Millions of people from journalists to financial analysts now find themselves in this position. Decide right, and you could be set for life. The top artificial intelligence programmers, for example, make as much as NFL superstars. These programmers have suddenly found that the skill set they spent years honing has become incredibly valuable. These two groups, top AI programmers and people whose skills have become devalued, might have spent the same amount of time learning and be equally smart. But selecting different fields took them down completely different paths. Over the last few years, The author has come across a group of people who have spent their whole careers expertly predicting the future, investing based off of their predictions, and then massively profiting decade after decade. What the author had noticed is that they share a common and completely counterintuitive approach toward investing their money and time that bucks conventional wisdom. In this article, the author shares how you can copy the approaches of self-made billionaire entrepreneurs and investors like Jeff Bezos, Ray Dalio, Howard Marks, and Warren Buffett so that you too can 'win' your future. [Article](#)

**30 Behaviors That Will Make You Unstoppable:** A lot of people are good at what they do. Some are even elite. A select few are completely unstoppable. Those who are unstoppable are in their own world. They don't compete with anyone but themselves. You never know what they will do—only that you will be forced to respond. Even though they don't compete with you, they make you compete with them. Are you unstoppable? By the end of this blog post you will be. [Blog Post](#)

**Twisted questions to expect in IIM-Ahmedabad interviews:** First Hand Account: Given the reputation of IIMs in India, and how it's no cake walk to get into one of them, it's a huge mystery as to what an IIM interview is like. What really goes on between a student and the interview panel within closed doors? How tough are the questions asked by interviewers? Here are two candidates Deeptam Tudu Saha and Nishant Shah, now proud students of IIM Ahmedabad, narrating their nerve-racking moments of the interview in pure honesty, and it's a treat to read their encounters: [Story](#)

**These 50 Guy Kawasaki Quotes Will Make You a Better Entrepreneur:** "Guy Kawasaki is the chief evangelist of Canva, an online graphic design tool. Formerly, he was an advisor to the Motorola business unit of Google and chief evangelist of Apple. He is also the author of APE, What the Plus!, Enchantment, and nine other books." (Amazon). "He is a marketing specialist, author, and Silicon Valley venture capitalist. He was one of the Apple employees originally responsible for marketing their Macintosh computer line in 1984." Guy Kawasaki via Wikipedia. The 50 Guy Kawasaki Quotes that Will Make You a Better Human, Entrepreneur, Founder (and Make your Startup actually Start Up) [Post](#)

**Top Facts to Know About Computer Crime:** Computer crime (also called cybercrime), is used to generally describe any criminal act dealing with computers and networks. Usually we would use the phrase to describe malicious hacking, identity theft, e-commerce fraud or phishing – but may also be used to describe illegal acts committed with the use of a computer or device and internet connection, such as stalking or cyber bullying. The following facts and statistics capture the changing landscape of cyber security and how business owners and security professionals are keeping up with these top security challenges. [Full Post](#)

**The Five Generations of Computers:** Each one of the five generations of computers is characterized by a major technological development that fundamentally changed the way computers operate. Most major developments from the 1940's to present day have resulted in increasingly smaller, cheaper, more powerful and more efficient computing devices. In this Webopedia Study Guide, you'll learn about each of the five generations of computers and the advances in technology that have led to the development of the many computing devices that we use today. [Full Guide](#)



## A Perspective on Artificial Intelligence and Machine Learning



**Mr. Rajeev Mullakara**

Enterprise Architect

Tata Consultancy Services, Kochi

[ma\\_rajeev@yahoo.com](mailto:ma_rajeev@yahoo.com)

There has been tremendous interest in Artificial Intelligence (AI) and Machine Learning (ML) in recent times. The AI resurgence can be attributed to many factors like easy availability of electronic data, cheaper and faster computing, open source nature of software and hardware in this space, investment by large players in anticipation of break thru, & advances in algorithms mimicking nature (Biomimicry) like Deep Neural Networks (DNN). With all these advancements, it is clear that we are in the early stage of cognitive computing. To many of the practitioners in the field it is clear that we are more artificial and less intelligent at present and wants to be less artificial and more intelligent. The main reason for it lies in quality of processing versus quantity of processing. Machines and humans are different. At present computers are extremely powerful in quantity of processing where as they are weak in quality of processing. For example, humans are extremely good at separating noise and signal whereas computers find it very difficult. Today they outperform humans in narrow tasks to great extent by the sheer power of computing force as opposed to the clever nature of solving problems.

There are three stages in AI. Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), & Artificial Super Intelligence (ASI). We are in a stage of transition from artificial narrow intelligence to artificial general intelligence. It is estimated that humanity will achieve AGI by next decade. The era of ANI is characterized by machines which can tackle narrow tasks with basic motor skills. The era of AGI will be characterized by intelligent machines which can tackle any tasks that a human can tackle, be it cognitive or motor skills.

The DARPA perspective on AI categorize the three waves of AI as DESCRIBE, CATEGORIZE, & EXPLAIN. The describe phase is characterized by handcrafted knowledge; the categorize phase characterized by statistical learning; & the explain phase characterized by contextual knowledge. The four dimensions of perceiving, learning, abstracting, & reasoning helps us to evaluate the waves of AI. A high level maturity on all the four dimensions corresponds to advanced AI.

Are heading to a state where silicon life forms reverse engineering carbon life form to be the dominant force going forward?

Terminologies like AI, ML, & DL are interchangeably used today. What is AI and in what way is it different than ML or DL? There are many definitions for AI, but in simple terms it is "*the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings*". AI is about machines augmenting humans and full automation is not in our vicinity. Machine Learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. In other words Machine Learning is a sub field within Artificial Intelligence. In recent times the term deep learning is interchangeably used with machine learning more often. It should be noted that deep learning is a sub filed within machine learning focusing on learning thru neural networks. In classical programming we obtained answers from rules and data where as in machine learning we obtain the rules given data and answers. New thinking is required to unlock the massive potential of machine learning.

Machine learning requires computational power of order  $N^2$  or more as the problem size increases. Some algorithms are computationally more intensive than others. The number of features and number of records decide the computational complexity. Today's HPC clusters and distributed clusters help us to solve very large problems. There are real world problems which still cannot be solved in today's hardware infrastructure. The next generation hardware can be either evolutionary or revolutionary in nature. The evolutionary changes include advances in CPU, GPU, TPU, FPGA, ASIC, etc. With Moore's law coming to an end, other forms of computing are emerging. The revolutionary changes include

neuromorphic computing and quantum computing which can reduce the amount of time required to solve larger problems which are beyond the realm of today's computational power. It should be noted that neuromorphic computing and quantum computing are not general purpose. They add value in solving specific problems and will be used in conjunction with traditional computers going forward.

There are different classification schemes by which we can look at machine learning algorithms. The most widely seen classification is Supervised learning vs Unsupervised learning vs Reinforcement learning. Majority of today's learning is in the space of supervised learning. Machine learning is all about learning from data. Based on the amount data available for training, we can utilize shallow learning and deep learning algorithms. Normally shallow learning algorithms require less data to learn compared to deep learning algorithms which normally requires more data. There is research happening to make deep learning algorithms learn from less data. A more detailed classification scheme is defined in the article "[Machine Learning Journey](#)".

Shallow learning is characterized by manual feature engineering. Deep learning tries to avoid manual feature engineering using a technique called representation learning. Hierarchical learning is another characteristic of deep learning. Learning in layers is what makes it transferable from one task to another task.

As noted by Robin Bordoli the CEO of CrowdFlower; Training data, machine learning, and human in the loop form the corner stone of today's AI. It should be highlighted that the training data is as important as the algorithm. The paper "The unreasonable effectiveness of data" can be summarized as "*If you had a choice making better algorithms or getting more data, get more data*". Data pre-processing can take up to 70% of the time in building a machine learning pipeline. The feedback loop after deployment allows the algorithm to adjust to the changing environment and improve itself. Feedbacks from humans are important for the long term sustenance of the machine learning pipeline. This is why term augmentation goes better with AI than automation. Some even prefer to call AI as Augmented Intelligence as opposed to Artificial Intelligence.

Data and algorithm forms the core of machine learning excluding human. The data used for training can be either structured or unstructured (voice, image, & text). Algorithms can be of many types. From an outcome perspective they can be seen as classification or regression in supervised learning, clustering and dimensionality reduction in unsupervised learning. Anomaly detection and reinforcement learning are two additional types of algorithms which purely do not fall into either supervised or unsupervised. Algorithms can be either generative or discriminative depending on the probability distribution. A generative model learns the joint probability distribution  $p(x,y)$  and a discriminative model learns the conditional probability distribution  $p(y|x)$ .

When you try to answer the question "Is this A or B?", you in turn are trying to classify it. For example given an image, answering a question like is this cat or dog falls in classification task. Trying to answer the question "How much or How many?", you are trying to perform regression. For example given the specification of a house in a locality, answering a question like what will be the value of the house falls in regression. Trying to understand how the data is organized is called clustering. An example could be organizing the population into low income, middle income, & high income assuming there are three groups in the population. Some classification tasks can be changed to clustering tasks by just rephrasing the question that we are trying to answer. Given a set of image of animals, we could ask how many different types of animals are in the given set of images? At times data might have weird values. When you try answer the question "Is this Weird?", we in turn are performing anomaly or outlier detection. There are many practical situations in which we need to understand what should i do next? Reinforcement learning is used when you need to answer such a question. Dimensionality reduction is similar in concept to lossy compression. How can we reduce the dimension of the problem without losing much on the final outcome?

Machine learning is applied in many applications today without our knowledge. Recommendation is one of the best examples of its usage. The recommendation becomes more specific as the system starts understanding the preferences of the user and changes with the change in preference. It is not prefect, but it works and companies have gained revenue gains because of the learning. Identifying the churn of customers or employees is another example where machine learning is applied today. Anomaly detection, fraud identification, computer vision (object classification, object detection, & object segmentation), language translation are other areas where machine learning is applied today. It is becoming more difficult to find applications that don't use learning as a fundamental tool.

There are many algorithms for solving classification, regression, clustering, anomaly, dimensionality reduction, & reinforcement learning tasks. General guidance is available for choosing the right algorithm for the task at hand. It is still not sure if it is a science or an art in choosing the algorithm / algorithms for a given task. A good understanding of linear regression, logistic regression, tree methods and tree ensembles, support vector machines, principal component analysis, K-

means clustering, hierarchical clustering, & multi-layer perceptron should be sufficient to start your career and apply them in real life.

Basic to advanced knowledge in math, stats, probability, linear algebra, & visualization helps one to apply machine learning well. The choices of programming languages are many, but Python & R are more popular with engineers and data scientists. Java / Scala is preferred in some enterprises because they tend to use distributed machine learning as opposed to machine learning using high performance computing.

There are many courses freely available for learning ML. MOOCs are the most favorite forms of learning. ML courses from Coursera, edX, & Udacity provide the jump start. It is an experimental science and requires extensive practice before one can become master at it. A right balance between theory and practice is required to become an expert in the field. Continuous learning should be part of the day to day activities to keep pace with the changes happening in this space.

#### References:

- Machine Learning Journey - <https://www.linkedin.com/pulse/machine-learning-journey-rajeev-m-a/>
- A Brief History of AI - <https://www.salesforce.com/video/1713120/>
- DARPA Perspective on AI - <https://www.darpa.mil/about-us/darpa-perspective-on-ai>
- The Unreasonable effectiveness of data - <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/35179.pdf>

### Beautiful Lines

- No lock is manufactured without a key. Similarly, god won't give problems without solutions.
- Changing the face can change nothing. But facing the change can change everything. Don't complain about others, change yourself if you want peace.
- Every successful person has a painful story. Every painful story has a successful ending.
- If a problem can be solved no need to worry about it. If a problem cannot be solved what is the use of worrying.
- No one can go back and change a bad beginning. But anyone can start now and create a successful ending.
- Easy to judge the mistakes of others. Difficult is to recognise our own mistakes. It is easier to protect your feet with slippers than to cover the earth with carpet.
- Mistakes are painful when they happen. But years later, collection of mistakes is called experience, which leads to success.
- Life laughs at you when you are unhappy. Life smiles at you when you are happy. Life salutes you when you make others happy.

### Strange But True

- In spite of so many colors - Black & White is considered Class.
- In spite of so many voices words & sounds - Silence is considered ultimate.
- In spite of so much to eat - Fasting is considered healthy.
- In spite of so much to travel & explore - Meditating under trees & mountains is considered superior.
- In spite of so much to see - Closing your eyes & looking within is Apex.
- In spite of listening to all the outside world - Voice from inside You is eternal.
- In spite of a Sweet charming Life - A Peaceful life Soul is Solace & Divine.

There is a report by a NASA scientist that America is creating 6th and 7th generation super computers based on Sanskrit language. Project deadline is 2025 for 6th generation and 2034 for 7th generation computer. After this there will be a revolution all over the world to learn Sanskrit. However, trend has picked up in the Western world. Indians are waiting for the moment when Sanskrit Scholars from overseas countries will come to teach them.

Sanskrit is a highly regularized language. In fact, NASA declared it to be the “only unambiguous spoken language on the planet” – and very suitable for computer comprehension.

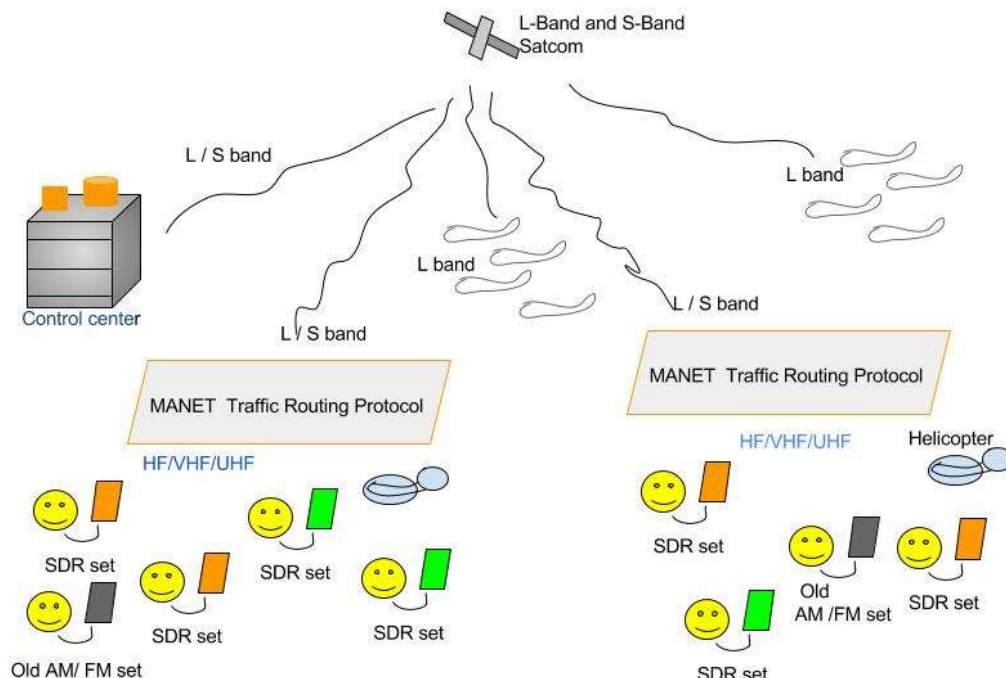


## Case Study on SDR: Software Defined Radio



**Dr. S. Jayakumar,** [jk@rinanu.in](mailto:jk@rinanu.in)  
Founding Member, Rinanu Semiconductor, Bangalore

SDR market in India is emerging from Navy, Army and Airforce. Worldwide market for SDR is growing fast and it is expected to be 27.3 B USD by 2020. India is having one sixth of global market share. One of my earlier venture ( Epigon Media Technologies Pvt Ltd) had invested along with National instruments and BEL in SDR enabled wireless Radio Link and same was demonstrated to Indian Navy during 2009/09/16. Looking forward to use **Make in India** and address local market need.



### Press release

Present central government on SDR with German government

‘Indian and German companies signed five agreements on smart mobile urban solutions, Software Defined Radios, development of solar projects, skills development in electrical semiconductors and collaboration in machine tools on Tuesday.’ <http://www.mediaeye.in/more-details.php?id=1238>

BEL developing software-defined communication radios.

[http://www.business-standard.com/article/companies/bel-developing-software-defined-communication-radios-110111800015\\_1.html](http://www.business-standard.com/article/companies/bel-developing-software-defined-communication-radios-110111800015_1.html)

Software Defined Radios Penetration will Increase in Defense, Commercial, and Homeland Security Segments

<http://www.marketsandmarkets.com/ResearchInsight/software-defined-radios-market.asp>

## Market Leaders (Worldwide)

Some of the key vendors in software defined radio market are BAE Systems PLC, Elbit Systems Ltd., L3 Communications Corporation, Raytheon Co., Thales Group, Viasat Incorporated, SAAB AB, Rockwell Collins, Northrop Grumman Corp., ITT Corporation, Harris Corporation and Datasoft Corporation, among others. <http://www.futuremarketinsights.com/reports/software-defined-radio-market>

## SDR Manufacturing For India Market

- **Market Segment:** Indian Navy, Army and Airforce, Metro Rail Transport service companies and upcoming ever green Smart cities of India
- **Objective:** Use Make in India and create SDR for India requirements
- **Total Market in India:** 4.8 B USD ( in another 2 to 3 year time)
- **Addressable market:** 800 M USD market (Indian Navy and Army)

## Need to create SDR in India

Attack (26/11) in Mumbai via sea route had created big jerk in Navy and WESEE (part of Navy) had called for immediate and urgent meeting in 29/11 and requested us to invest and innovate in development of Wireless link for Indian Navy such that “boat and ship can have communication by using 128 kbps wireless data link”.

## Early Efforts in SDR in India

Epigon Media Technologies had proven itself during that point of time frame ( 2008) in Digital Signal processor (DSP) enabled Satellite radio Receiver product for WorldSpace Inc. Epigon had innovated along with National Instruments and created 760 kbps wireless link and the same is demonstrated to Indian Navy in Mumbai. BEL had worked as front end company deploy SDR in India for Navy. Following picture is from Pilot demo of our Wireless link in Indian Navy Mumbai.

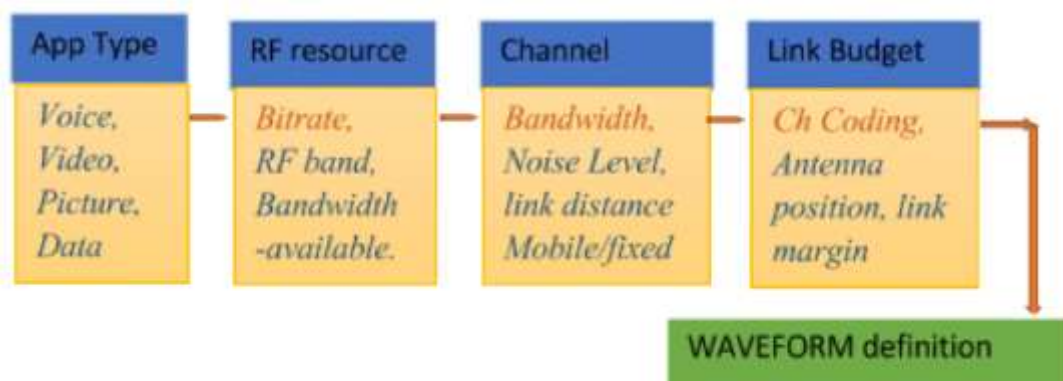


## 1) Standards and Protocols Software

### 1.1 Communication waveforms: Development Tools

Modern software tools in communication software industry provides infrastructure to build communication link for pre-defined waveform. In fact, waveform is defined by expert committee and given specification for waveform such that implementation team can pick up tools for the same. Most of the time, tools companies also works along with standards committee (GSM, 3G, 4G etc) and bring out tool that can fit exactly for given specification in terms of bandwidth, RF band, bitrate etc. Thus, design engineers not have many option in selecting software tools and associated library for design and testing. However, in tactical communication is not same as given in the above and it demands new set of environment for design and development. For example tools like ADS, MATLAB, SCILAB, LABVIEW etc provides easy interface with user to design and development of “waveform of their choice”. But

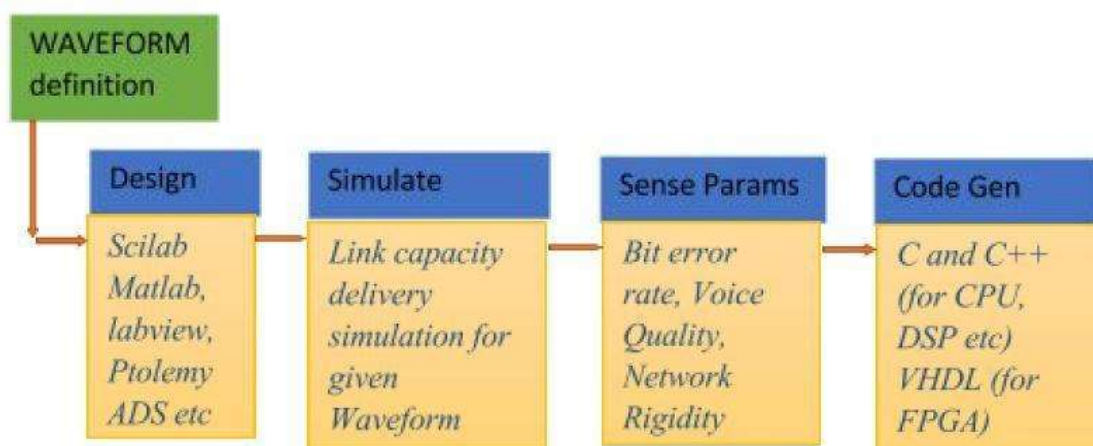
realization of such a waveform on given (or specified) h/w target will be an issue. User need to go for target specific tools such that realization of waveform is easy. For example, if modem link is Narrow bandwidth 64 kbps in 90 KHz bandwidth, then Blackfin DSP (BF5xx) and TI55xx ( from TI) are target hardware. Mentioned DSP's requires software environments such as VisualSP, Code Composer Studio etc. Suppose communication link is broadband then Xilinx Virtex-7 FPGA or any other FPGA will be h/w platform. These h/w requires tools like modelsim etc. Thus use of tools for implementation and realization become h/w platform centric. These tools mostly stand alone and they are not web-enabled as of now and thus, it will be tough to put in use via remote to get the waveform implementation. On testing side of waveform requires tools from software and also from hardware. For example, to test modem implementation on Blackfin DSP requires JTAG ICE (or USB ICE) to debug and test run time condition of modem. Same case is with other DSPs and FPGAs. Plan is to provide integrated environment for Waveform developer by using very innovative process capture user requirements.



Above figure provides information on functional flow of parameters that are critical to generate Waveform configuration (on definition). Integrated environment provided to user to arrive Waveform definition from user dashboard. Mentioned tool will work on lightweight devices such as Tablet PC and also in Laptop or higher versions of machine. Voice interface is provided to user to give input to the above functional flow in any sequence. There will be default parameter will be used, if user did not provide all above mentioned parameters. Another parameter will be given by user or tool to calculate optimal link margin. But parameter like Antenna plays major role by placing antenna in good place by user. Thus, Antenna position parameter will be critical and also Antenna size (along with polarity). Noise level parameter is something user need to define such that waveform can be generated for given noise condition. Noise condition might require lot more time to arrive by domain specific and knowledge on physical condition of planned communication link. RF band and bandwidth are two important parameters, that need to be owned by user. Application definition provides real important parameter for a waveform generation. .

## 1.2 Design and Development of waveforms

Waveform configuration will be used to design a waveform. In the following design flow is given.

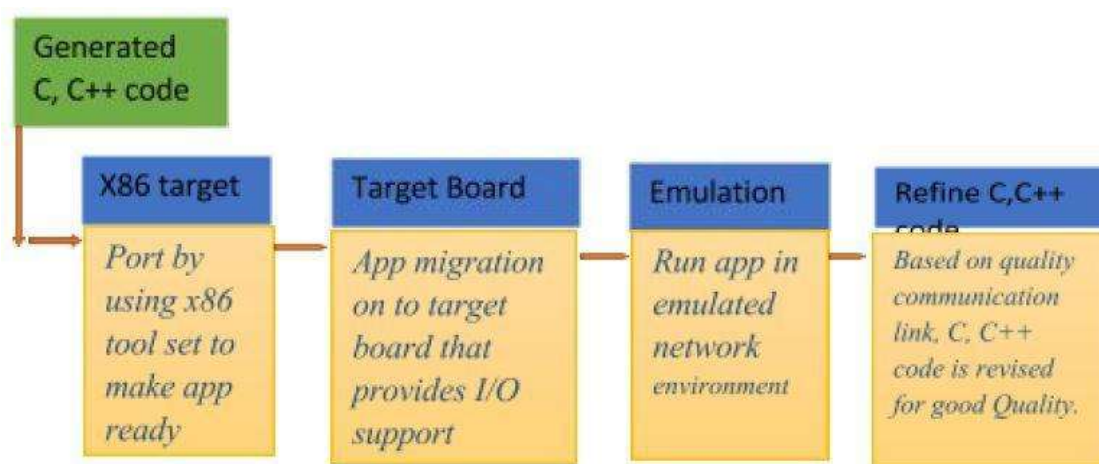




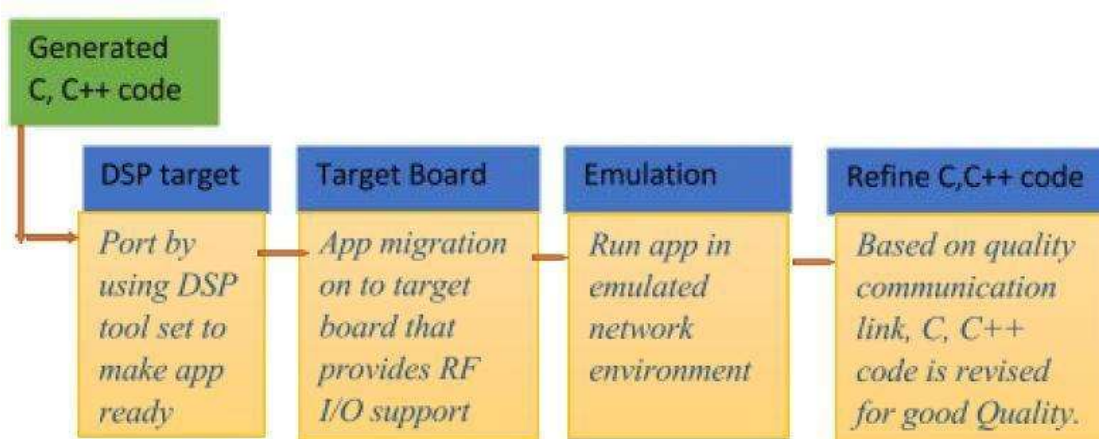
Design of Waveform is using configuration given by user and generates code in any one of platforms such as Scilab, Matlab, Labview and Ptolemy etc. During design, automated software will take care of constraints in terms of Noise in channel and Antenna position etc. Thus, there is need to involve human resource in design stage of waveform. Complete simulation of link capacity delivery in a given network configuration is very important. This mentioned simulation is done extensively by using exhaustive input test vector for simulation. This interface to existing instruments will enable us to be cost effective in testing infrastructure else cost of testing will be very high by going with closed door policy on simulation environment. Thus, simulation environment will have interface with “Matlab, Scilab, Labview, Ptolemy, ADS etc and also interface with 3rd party signal generation unit and other vendors unit as well. Parameter sensing is very important. Apart from routine engineering parameters measuring, there is a need to measure Network Rigidity (this provides service level confidence). After satisfactory level on Quality of given design then C code generation will be done. In Code generation, C and C++ code generated to support CPU and DSP processors. VHDL code is generated to support Xilinx and Altera FPGA target devices.

### 1.3 Customization of waveforms

Generated code for given design is ported on to particular platform. Most of the time, porting of given code will invites good amount of work because nature of custom built boards and associated target devices.

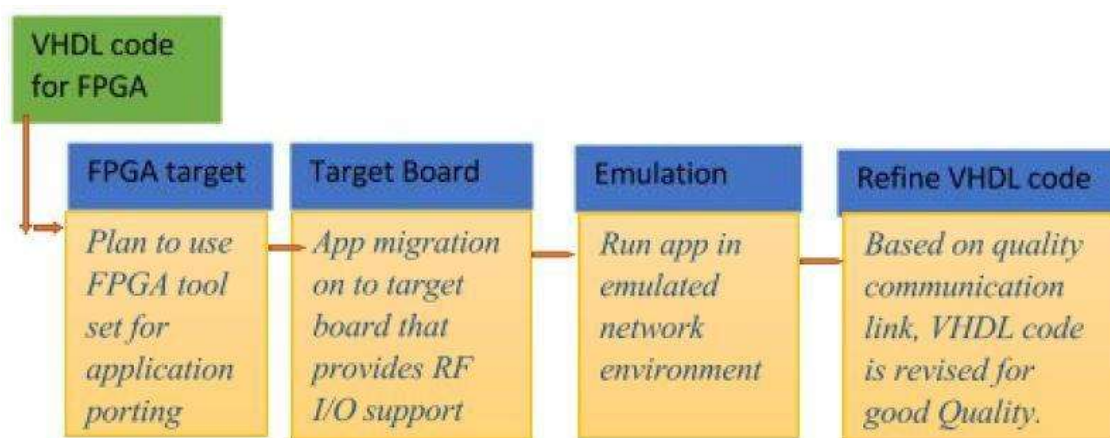


In the above customization of C and C++ code for X86 platform is given. There is need to bring DSP based devices to complement strength of X86 platform such that full app can provide expected quality performance.



In the above customization of C and C++ code for DSP platform is given. DSP is having vendor specific tools to work with associated DSP's. Porting C, C++ code on DSP processor is done by using respective tool set (VisualDSP for Blackfin DSP, Code composer studio for TI DSP, Codewarrior for Starcore DSP.). After that, by giving defined inputs (RF or IF) to DSP board emulation will be carried out. Output of emulation will provide opportunity to refine C, C++ code to give better communication link. It has been observed that, present state of art of DSP's are expected (apart from B4860 from Freescale) to work well for Narrow Band communication link.

For high bandwidth, it appears that there is need to go for FPGA based target device. In the following (next page) customization of VHDL code for FPGA platform is given. As mentioned in earlier part of document, every FPGA is having vendor specific tools to work with associated FPGA's. Porting VHDL code on FPGA device is done by using respective tool set (ISE for Xilinx Virtex 7 (Zynq tm 7000), Quartus II Modelsim for Altera Stratix V) and migrate application onto given target board. After that, by giving defined inputs (RF or IF) to FPGA board emulation will be carried out. Output of emulation will provide opportunity to refine VHDL code to give better communication link.



It has been observed that, present generation FPGA's supporting 128 mbps link by using OFDM. Thus, most of the requirement emerged out of user application can be met with by using FPGA based target board.

#### 1.4 Ownership of waveforms

Ownership is with Designers or respective user involved in design of waveform.

#### 1.5 Collaboration in Waveform Design

Tactical communication demands communication link and associated parameters to be secretive in all sense. Thus there is no option of Collaboration during waveform design and development. However, collaboration can be thought for consumer communication devices.

#### 1.6 Collaboration in Waveform Design

##### 1.6.1 SDR Standards

Whether the existing standards are being used/ modified and the interoperability with Indian/ International/ open standards. ?

**Discussion:** Server centric communication will be using TCP/IP for command and control applications. In the case of media streaming (video call or voice call), RTCP /UDP will be used such that real time requirement. These standards are used in internet based applications. Tactical communication also need to be part of internet but it should be in secured from end to end. These above mentioned standards are international and there is nothing user Specific. May be security and definition of encryption and decryption need to be taken care by User side. This part will be discussed with user and will be followed as by instruction of User.

##### 1.6.2 IPs in SDR

IPR issues.

**Discussion:** TCP/IP related IPR need to handle as other international IPR procedure. In the case of encryption and decryption, user can protect their version if they disclose it else it can be secretive and not known to others.

##### 1.6.3 SDR Solution

How the solution offered would enable efficient utilization and facilitate interoperability.

**Discussion:** Tactical communication includes server side and also in client side. But during communication, client side devices need to be part of network such that it can communicate with other user who is in part of network. IP centric network ( at all instant) provides interoperability to interact with each other or use with it. For example, handset join part of network and start communicate others who are already part of network. In this case, handset and its make and versions will be an real issue for basic part of communication and data exchange. Suppose call is based on video call if other set do

not have rendering capacity then there will be an issue. Thus, planed solution will resolve all these operational issues by going with properly planned transcoder in server side and this will be aware of “how to serve a given client at given point of time”. Mostly, intelligence is incorporated in server about each client by using client registration with server.

#### 1.6.4 SDR Compatibility

Compatibility issues.

**Discussion:** IP centric central backend does transcoding to solve compatibility issues because of old equipment. This means there is a need to have server backend which can interact with old equipment’s and then integrate old equipment also part of network. This looks very simple but this will be most complex item because it has to carry all kind of modulation and demodulation techniques that are used in old equipment’s. In this will be real use of software defined radio by having all possible models in software in server side and interact with given client at a time.

#### 1.6.5 SDR Upgrade

Future upgrades.

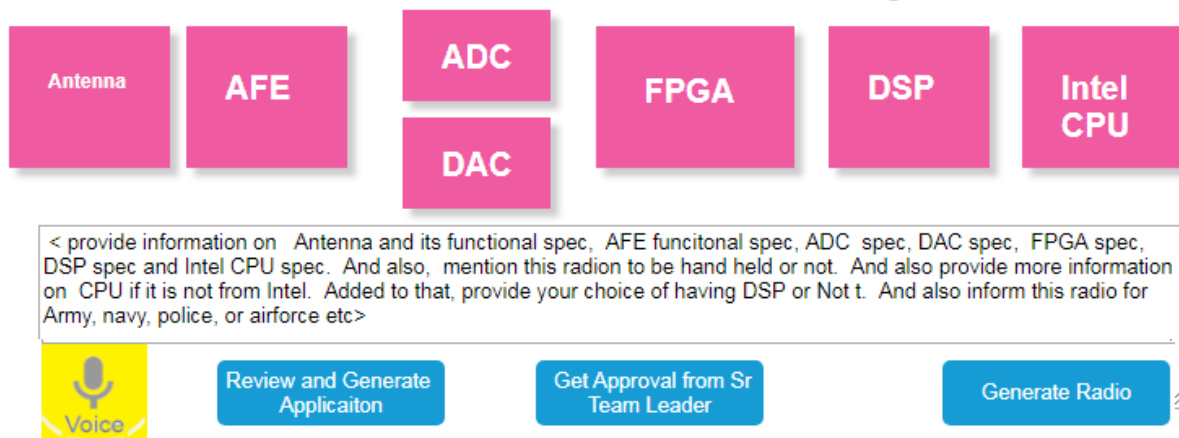
**Discussion:** Upgrade will from Tools side by respective vendors (DSP software tools, FPGA software tools, CPU software tools) with their own versions. But this might be real issue and thus for 5 years or more there will be single window upgrade for device centric tools such as VisualDSP, codewarrior, CCS etc. And on host side, tools like Scilab, Matlab, and LabVIEW are coming up with their own upgrade and thus there is a need to have single window for host tool upgrade as well. Apart from 3rd party vendor tools, local design environment upgrade will be communicated with User and business team will coordinate the same with User.

#### 1.6.6 SDR Unique features

Unique features (in any).

**Discussion:** Data handling in terms of packets is central to software defined radio. In fact, this will be in line with packet switched communication instead of circuit switched communication.

### Generate Radio Software For Target Hardware



#### 1.7 Military Symbolology

##### 1.7.1 SDR and Old Radio Standards

Whether the existing standards are being used/ modified.

**Discussion:** Representation of events or objects with Symbol code is linked with domain of knowledge. But issue is, how to map with existing symbols in communication segment of military. SCA 2.2.2 provides framework on communication but not providing particular symbol or any other associated item to represent it. Thus there is a need to discuss with User on this and create table that can be guideline for User interface designers

##### 1.7.2 Tactical Graphics

Methodology to address point symbols and tactical graphics.

**Discussion:** This part again in the same line as discussed in SDR and Old Radio Standards. There is a need to work or collaborate with User and create User Interface such that tactical communication representation is taken care and also user can feel home with same old representation of symbols and associated decisions.



### 1.7.3 SDR Methodology

Methodology to assign attributes.

Discussion: This part also in the similar lines as discussed in SDR and Old Radio Standards

### 1.7.4 SDR Symbol

Symbol encoding

**Discussion:** This part also in the similar lines as discussed in SDR and Old Radio Standards

### 1.7.5 SDR Unique features

Unique features (if any).

**Discussion:** Will be discussed on server centric User Interface and also Client centric user interface are two main items that need to be taken care.

## 2) LabVIEW vs SCA 2.2.2 in SDR

### 2.1 Software Communication Architecture (SCA)

In SCA, member variables of modem is not exposed to the outside world. Thus, there is a need for Broker component. (Broker is LabVIEW platform)

#### 2.1.1 Uses Attributes

Where attributes have implicit set and query operations. (Possible in LabVIEW)

#### 2.1.2 Uses Operations

To serve request from application (LabVIEW VI provides operation)

#### 2.1.3 Hardware Configuration

SCA does not specify a hardware configuration (LabVIEW provides front end for all h/w.)

### 2.2 Resource Interface

- TestableObject (VI is testable object in LabVIEW)
- PortSupplier (LabVIEW takes care of Port supply)
- LifeCycle (VI version control is in place)
- PropertySet (VI is having clear definition of VI property)

### 2.3 Radio's transmitter

- Alter frequency range (possible in LabVIEW)
- Modulation type (possible in LabVIEW)
- Maximum radiated or conducted output power

### 2.4 Component Placement

CORBA middleware allows software components to be distributed anywhere within the radio. The Core Framework provides distributed object launchers for each processor board within the set. // LabVIEW allows VI to be there on multiple target. For example, FPGA, HOST etc //

Radio application factory launches a waveform or application by providing the object files and execution parameters to the various processors within the radio. //User can load Waveform in form of VI that can work with in Radio//

### 2.5 Dynamic Software Configuration

CORBA middleware allows the two objects to pass data or send control information. CORBA provides distributed processing the two software components in the diagram can actually reside in different processors within the radio. // LabVIEW allows VI to be there on multiple target. For example, FPGA, HOST etc//

### 3) Pilot in Mumbai Navy

Software defined radio (SDR) is one of the modern tool that can be very useful to interact with old equipment based communication and also emerging future communication equipment's.



In this line, SCA 2.2.2 provides guideline for communication network but is not giving guideline for particular device or communication waveform. Thus, it is part of implantation strategy that need to work out good things in version of SDR which is good for customer who will be using this system in tactical communication side.

Essentially, SCA 2.2.2 provide scope to

- "Load waveform of user",
- "test user waveform",
- "manage user waveform",
- "use waveform for communication",
- "unload user waveform"

but these mentioned items form a core of SDR. To implement the above functions, implementation team on choice of tool such that it need not be constrained by particular tool set vendor. For example, it is not must that one has to use CRC (from Canada). In the past, above functionalities have been implemented by ( Epigon media Technologies Pvt Ltd) using Labview and in FPGA platform (Xilinx virtex V) along with Intel Host processor. In fact cost advantage is very huge by going with modern and consumer centric tools for SDR platform design and development. For example, CORBA centric object communication is one of the old technique and in fact much better option available in Labview in-terms making Virtual Instruments (VIs ). Thus team in Epigon had very interesting experience in this field by using modern tool chain to design and develop SDR in a given short period of time. Mentioned experience was part of providing demonstration to WESEE and BEL Bangalore. Mentioned demonstration was in real time that achieved 760 kbps for 18 nautical miles (2 way communication). This was in 2009 Sep.



However, it is important to take some of the proven modules from USA or from Europe and customize it for tfor local need. For example, ICs and associated tools need to come from USA or from Europe. Implementation and waveform design tools will be from India and this is critical for high rigidity communication.

#### ***About the author Dr. S. Jayakumar:***

Algorithm design and development for Digital Signal Processing have been a core strength of Jayakumar for 20 plus years. More in particular Digital audio and Digital Radio are tjose two major segment. Jayakumar is part of founding team in Rinanu Semiconductor,. Epigon Media Technologies, PiiTech Systems, GPTL etc. He had worked in HAL ( Helicopter Design Bureau), Cranes Infotech, Mistral Solutions and Essel Utilities etc, His dream project was design and development of Karaoke Machine ( which was project from Analog Devices and MIT Media lab) for TAITO Corp. He also worked on Satellite Radio Receiver for WorldSpace broadcast Satellites ( and DAB Radio Receivers), which was fully software driven solution at that time using low cost Digital Signal Processors. He had lead team to design and develop 768 kbps Wireless data link for Indian Navy. His PhD thesis was in “simultaneous stabilization of Feedback systems and Masters Project in “Robust Pole placement for Flight Control system”. Both M.Tech and PhD are from IIT Mumbai systems and control engineering department. His under graduation from Madras Institue for Technology Aeronautical Engineering department and Mathematics in Madras University. Jayakumar is invited Member of “IEEE India Standards SIG ( Special Interest group)”

Canada-based researchers have developed an Augmented Reality system that projects patients' internal anatomy directly on the body, doing away with the need to make incisions. Called ProjectDR, the technology uses infrared cameras and body markers that project images while tracking body movement. Further, doctors can choose to see only the lungs or blood vessels, depending on the case.

Air New Zealand has developed a program that analyses users' facial reactions to different sites and attractions in Queensland, Australia. After analysing facial cues, the service creates an itinerary of recommended locations in New Zealand. Once the video ends, users can see which activities made their face change the most and receive recommendations on how to book a trip.

Billionaire investor George Soros has said governments would soon start regulating Facebook and Google as they control over half of all internet advertising revenue. Speaking at the World Economic Forum, the 87-year-old said, "Davos is a good place to announce that their days are numbered". He also predicted the tech giants would "compromise themselves" to access markets like China.

Global spending on robotics and drones is expected to grow 22.1% year-on-year to reach \$103 billion in 2018, according to a report by International Data Corporation (IDC). The report also said the spending will more than double to \$218.4 billion by 2021. Robotics spending will account for over 90% of all spending between 2017 and 2021, report added.

American automaker Ford has filed for a patent for a self-driving police car. The patent describes the artificial intelligence-driven vehicle would be able to detect traffic violations by another vehicle, either on its own or with the help of surveillance cameras. It also describes a method by which officers within the car could manually take control or use it wirelessly.

According to a report by The New York Times, actors, politicians, and television presenters were among those who bought millions of fake social media followers. The report said the accounts were bought from a company called Devumi which claims to increase a user's "social media presence". In a statement, Twitter said it is working to stop Devumi and similar companies.

Google is testing a tool called Bulletin that would allow anyone to publish information about local interests like bookstore readings, sporting events, or street closures. The company described Bulletin as a lightweight app for capturing photos and videoclips from the phone and publishing them without having to create a blog. The service is currently being piloted in select US cities.

Talking about artificial intelligence (AI) at a recent event, Alibaba's Founder Jack Ma said, "The AI, Big Data is a threat to human beings." He also said that AI will kill a lot of jobs as they will be done by machines in the future. He added that technology should always do something that enables, not disables people.

According to Accenture, investments by companies in artificial intelligence (AI) and human-machine collaboration can raise global employment by 10% by 2022.



# Telecommunication Technology Vs E-Waste Generation Reports Globally

**Mr. T. Udhayakumar .**

SRM University Scholar - Faculty of Management

[udhayakumart@gmail.com](mailto:udhayakumart@gmail.com)

*Co-Authors*

**Dr. R. Krishnaraj**

Assistant Professor SRM University Scholar- Faculty of Management

**Dr. P. Parthasarty**

MD–E-Parisaraa Pvt Ltd. - E-waste Recycling Pvt Limited,

## **How does mobile communications works from base station to subscribers**

A mobile phone is an electronic device used for mobile telecommunications over a cellular network of specialized base stations known as cell sites. A cell phone offers full Duplex Communication and transfer the link when the user moves from one cell to another. As the phone user moves from one cell area to another, the system automatically commands the mobile phone and a cell site with a stronger signal, to switch on to a new frequency in order to keep the link.

Mobile phone is primarily designed for Voice communication. In addition to the standard voice function, new generation mobile phones support many additional services, and accessories, such as SMS for text messaging, email, packet switching for access to the Internet, gaming, Bluetooth, camera with video recorder and MMS for sending and receiving photos and video, MP3 player, radio and GPS.

## **Signal Frequency in Cell Phone**

The cellular system is the division of an area into small cells. This allows extensive frequency reuse across that area, so that many people can use cell phones simultaneously. Cellular networks has a number of advantages like increased capacity, reduced power usage, larger coverage area, reduced interference from other signals etc.

## **FDMA and CDMA Systems**

Frequency Division Multiple Access (FDMA) and Code Division Multiple Access (CDMA) were developed to distinguish signals from several different transmitters. In FDMA, the transmitting and receiving frequencies used in each cell are different from the frequencies used in the neighboring cells. The principle of CDMA is more complex and the distributed transceivers can select one cell and listen to it. Other methods include Polarization Division Multiple Access (PDMA) and Time Division Multiple Access (TDMA). Time division multiple access is used in combination with either FDMA or CDMA to give multiple channels within the coverage area of a single cell.

## **Codes in the Mobile Phone**

Mobile phones have special codes associated with them. These include:

**Electronic Serial Number (ESN)** - unique 32-bit number programmed in the phone

**Mobile Identification Number (MIN)** – 10 digit number derived from the phone's number.

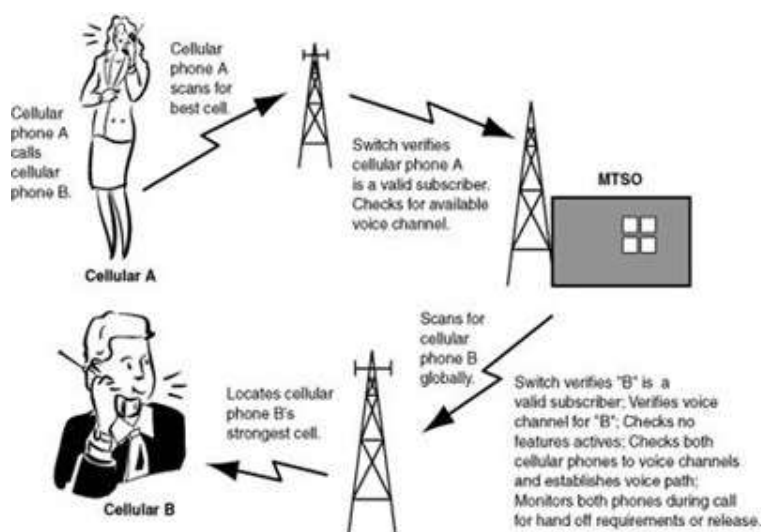
**System Identification Code (SID)** – unique 5 digit number that is assigned to each carrier by the FCC.

ESN is a permanent part of the phone while MIN and SID codes are programmed in the phone when a service plan is selected and activated.

Mobile phone is a Duplex device. When we use one frequency for talking, a second separate frequency is used for listening. So that both the people on the call can talk at once. The Mobile phone can communicate on 1,664 channels or more. The Mobile phones operate within the cells, so that it is easy to switch on to different cells as they move around. A person using a cell phone can drive hundreds of kilometers and can maintain a conversation during the entire time because of the cellular approach.

## What happens when we make a call?

1. When we switch on the mobile phone, it tries for an SID on the Control channel. The Control channel is a special frequency that the phone and base station use to talk to one another. If the Mobile phone finds difficulty to get link with the control channel, it displays a "no service" message.
2. If the Mobile phone gets the SID, it compares the SID with the SID programmed in the phone. If both SID match, the phone identifies that the cell it is communicating is the part of its home system.
3. The phone also transmits a registration request along with the SID and the MTSO keeps track of your phone's location in a database. MTSO knows in which cell you are when it wants to ring the phone.
4. The MTSO then gets the signal, it tries to find the phone. The MTSO looks in its database to find the cell in which the phone is present. The MTSO then picks a frequency pair to take the call.
5. The MTSO communicates with the Mobile phone over the control channel to tell it what frequencies to use. Once the Mobile phone and the tower switch on those frequencies, the call is connected.
6. When the Mobile phone move toward the edge of the cell, the cell's base station will note that the signal strength is diminishing. At the same time, the base station in the cell in which the phone is moving will be able to see the phone's signal strength increasing.
7. The two base stations coordinate themselves through the MTSO. At some point, the Mobile phone gets a signal on a control channel and directs it to change frequencies. This will switch the phone to the new cell. [1][2]



**Mobile 1G**  
AMPS, NMT, TACS



**Mobile 2G**  
D-AMPS, GSM/GPRS, cdmaOne



**Mobile 3G**  
CDMA2000/EV-DO, WCDMA/HSPA+, TD-SCDMA



**Mobile 4G LTE**  
LTE, LTE Advanced



1



1G established seamless mobile connectivity introducing mobile voice services

3



3G optimized mobile for data enabling mobile broadband services, and is evolving for faster and better connectivity

2



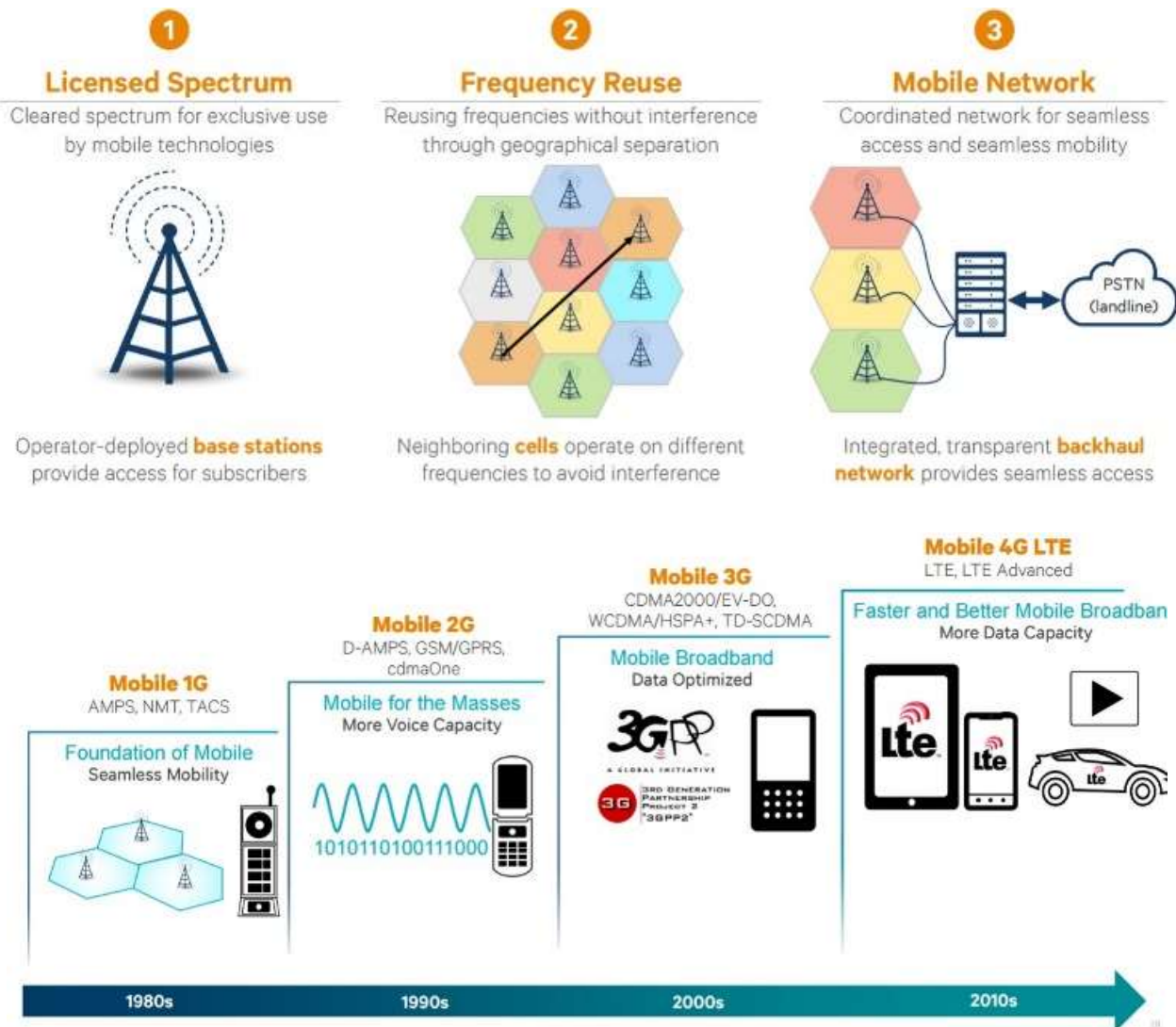
2G digital wireless technologies increased voice capacity delivering mobile to the masses

4



4G LTE delivers more capacity for faster and better mobile broadband experiences, and is also expanding in to new frontiers

## Mobile 1G established the foundation of mobile



## Who are all service providers world-wide?

The world's top ten telecommunications companies each have a market value of more than \$50 billion. Servicing the world's ever-growing telephone and wireless connection needs, the telecommunications industry is forecast to continue to expand operations on a global level. More individuals in emerging markets are signing up for telephone and Internet contracts, while new telecommunications technologies in developed nations are expanding pre-existing customer bases of providers. While several company attributes can distinguish the top telecommunications companies in the world, market value serves as the determining factor that arranges this list of the top ten telecommunications companies.

- 1) China Mobile Ltd.
- 2) Verizon Communications Inc.
- 3) AT&T Inc.
- 4) Vodafone Group plc
- 5) Nippon Telegraph & Telephone Corporation
- 6) Softbank Group Corp.
- 7) Deutsche Telekom AG
- 8) Telefonica S.A.
- 9) America Movil
- 10) China Telecom

<http://www.investopedia.com/articles/markets/030216/worlds-top-10-telecommunications-companies.asp>



### **What is their share contribution?**

With daily increasing subscriber base, there have been a lot of investments and developments in the sector. The industry has attracted FDI worth US\$ 23.92 billion during the period April 2000 to December 2016, according to the data released by Department of Industrial Policy and Promotion (DIPP). Some of the major developments in the recent past are:

- Bharti Airtel will buy Telenor's India operations in seven circles to receive 43.5 megahertz (MHz) spectrum in the 1800 MHz band.
- Apple plans to produce iPhone SE at an upcoming facility in Bengaluru, owned by its partner Wistron.
- Ortel Communications, Odisha's largest multi-system operator, plans to invest around Rs 300 crore (US\$ 45 million) over the next two years, for upgrading its infrastructure, along with strengthening its reach, efficiency and competitiveness in the market.
- Reliance Communications Limited (RCom) has signed a binding agreement with Brookfield Infrastructure Partners to sell a 51 per cent stake in Reliance Infratel, RCom's tower unit, for Rs 11,000 crore (US\$ 1.65 billion).
- Private equity giant KKR & Co LP and pension giant Canada Pension Plan Investment Board (CPPIB) are in talks to acquire a significant stake in Bharti Infratel, which is expected at around US\$ 4 billion.
- Chinese smartphone manufacturers, Oppo and Vivo, have both planned to invest in setting up large scale manufacturing capacity in the state of Uttar Pradesh in India, with an aggregate investment size of Rs 4,000 crore (US\$ 600 million).
- Samsung India has expanded its service network to over 6,000 talukas across 29 states and seven union territories in India, by introducing over 535 service vans equipped with engineers, key components, diesel generator (DG) sets and key equipment, for providing quick response and on-spot resolution.
- LeEco, a Chinese technology company, has entered into a partnership with Compal Technologies and invested US\$ 7 million to set up manufacturing facility at Greater Noida in order to start manufacturing Le2 smartphones in India.
- Chinese telecom gear maker Huawei has set up its largest global service centre (GSC) at Bengaluru in India, with an initial investment of Rs 136 crore (US\$ 20.4 million), which will extend its support to Huawei's domestic and international telecom carrier customers in about 30 markets across Asia, Middle East and Africa.
- Chinese smartphone maker Gionee, which currently assembles smartphones in partnerships with contract manufacturers Foxconn and Dixon, plans to invest Rs 500 crore (US\$ 75 million) to set up a manufacturing facility in India.
- Singapore Telecommunications Limited (Singtel), the major shareholder in Bharti Airtel, announced that it has signed an agreement with its majority owner Temasek Holdings Private Limited to purchase a 7.39 per cent stake in Bharti Telecom Limited, the parent company of Bharti Airtel Limited, in a deal worth US\$ 659.51 million.
- Axiata Digital, a subsidiary of Malaysia's largest telecom firm Axiata Group Berhad, has made its entry into Indian e-commerce market by investing Rs 100 crores (US\$ 15 million) in Bengaluru-based StoreKing.
- Chinese smartphone manufacturer OnePlus has partnered with Foxconn to start manufacturing its products in India as part of its plan to have 90 per cent of the devices sold in India to be locally manufactured by the end of 2017.
- Government of India to make a windfall gain from sale of spectrum in 2016-17 and achieve its fiscal deficit target of 3.5 per cent of GDP for the year. [3]

### **What are the mobile phone policies?**

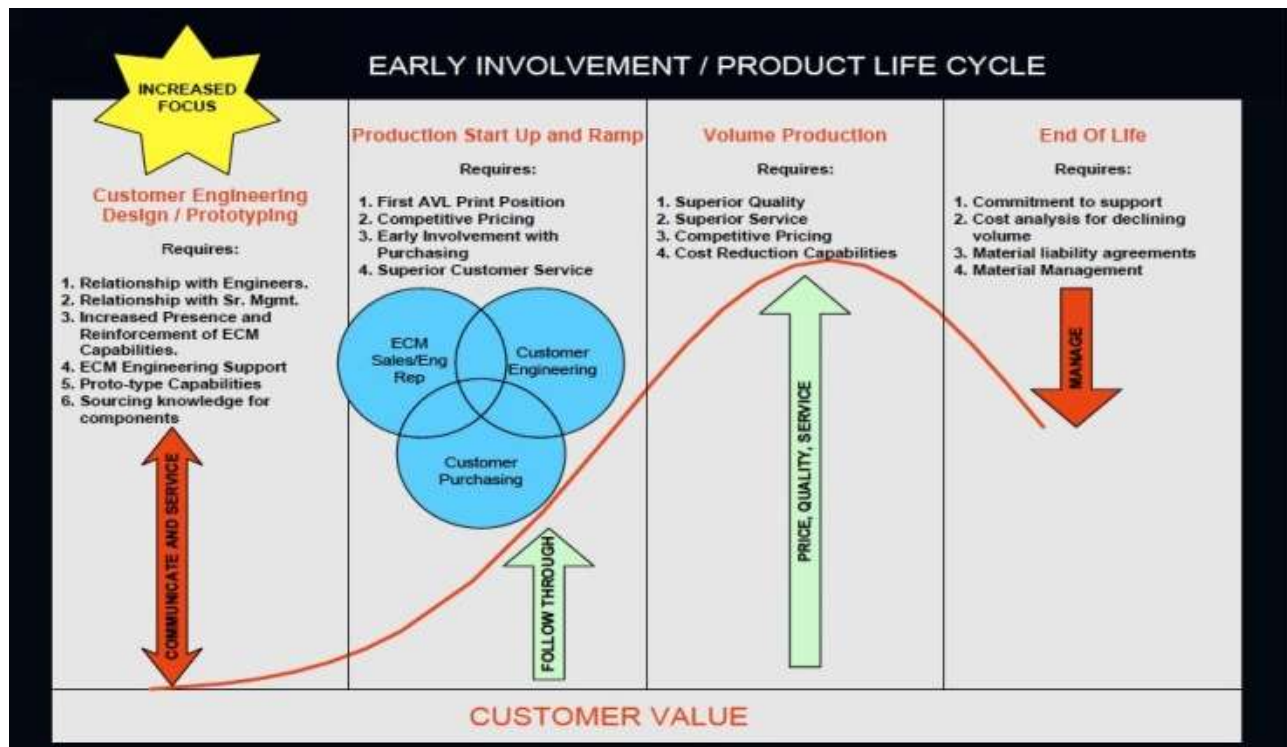
Mobile phones can be both disruptive (in terms of productivity and concentration levels) and dangerous (from a health and safety point of view). Mobile phone use in the workplace can also risk breaches of confidentiality. Policy is linked with the Company's Health and Safety Policy. Employer, have a duty to ensure that the working environment is safe and that safe policies and practices are adopted. Policy will apply differently to individual members of staff and what is acceptable will depend on the type of work being undertaken and the working environment. We expect all employees to adopt a common-sense approach in this regard.

It is against the law to use a hand-held mobile phone when driving. Employees are strictly prohibited from using a hand-held mobile phone at any time when driving. If an employee is caught by the police using a hand-held mobile phone or similar device whilst driving the individual can expect to get an automatic fixed penalty notice.

### **Life cycle of electronics products**

The UPC code, now nearly universal on retail products, has provided a foundation for efficient product supply chains. The extension of a universal product code to the product lifecycle is could make reuse and recycling more efficient, economical,

and could open up new technological possibilities for product lifecycle management. The key questions concern the costs and environmental and economic benefits of extending the UPC throughout the product lifecycle.



**Introduction Stage** The introduction stage in the part life cycle is usually characterized by high production costs driven by recently incurred design costs and low yield, frequent modifications, low or unpredictable production volumes, and lack of specialized production equipment. Marketing costs, at this stage, may also be high. Early adopter customers who buy a part in its introductory stage tend to value performance over price.

**Growth Stage** The growth stage is characterized by the part's market acceptance. Increased sales during this stage may justify the development and use of specialized equipment for production, which in turn improves economies of scale of production. Mass production, mass distribution, and mass marketing often bring about price reductions. This stage often consists of the largest number of competitors, as opportunity seeking firms are attracted by the part's profit potential and, strategic acquisitions and mergers have not yet taken place

**Maturity Stage** The maturity stage of the part life cycle is characterized by high-volume sales. Competitors with lower cost of production may enter the market, or domestic competitors may shift production facilities to less expensive locations to enable them to lower manufacturing costs. The 16M DRAM is an example of a mature part.

**Decline Stage** The decline stage is characterized by decreasing demand and generally decreasing profit margin. Towards the end of the decline stage, only a few specialized manufacturers remain in the market. TTL logic ICs are examples of parts that have been available very late in this stage due to continued sales in the black and white television market.

**Phase-out Stage** Phase-out occurs when the manufacturer sets a date when production of the part will stop. Generally, the manufacturer issues a discontinuance notice to customers, provides a last-time buy date, and suggests alternative parts or aftermarket manufacturers. As an example, on September 2, 1999 Texas Instruments (TI), Standard Linear and Logic Group announced the discontinuance of ULN2803A, a Darlington Transistor Array. TI stated that the product would be discontinued on September 2, 2000 with the last (and non-cancelable) order date being March 2, 2000.

**Discontinuance and Obsolescence** Discontinuance occurs when the manufacturer stops production of the part. The part may still be available in the market if the production line or part stocks were bought by an aftermarket source. [4]

## **End life cycle of electronics products**

"End-of-life" (EOL) is a term used with respect to a product supplied to customers, indicating that the product is in the end of its useful life (from the vendor's point of view), and a vendor stops marketing, selling, or rework sustaining it. (The vendor may simply intend to limit or end support for the product.) In the specific case of product sales, a vendor may employ the more specific term "end-of-sale" (EOS). The time-frame after the last production date depends on the product and relates to the expected product lifetime from a customer's point of view. Different lifetime examples include toys from fast food chains (weeks or months), mobile phones (3 years) and cars (10 years).

## **Foreign countries best practices of E waste practices**

**In Switzerland, the first electronic waste recycling system was implemented in 1991, beginning with collection of old refrigerators.**

Over the years, all other electric and electronic devices were gradually been included in the system. Legislation followed in 1998, and since January 2005 it has been possible to return all electronic waste to the sales points and other collection points free of charge. There are two established producer responsibility organizations:

**SWICO, mainly handling information, communication, and organization technology, and SENS, responsible for electrical appliances. The total amount of recycled electronic waste exceeds 10 kg per capita per year.**

**Europe** In 1998, the amount of electrical and electronic equipment arising (EEE) as waste was estimated for the EU15 at 6 million tons. The new estimate of the current WEEE arising across the EU27 is between 8.3 and 9.1 million tons per year for 2005. This increase is due to the expansion of the EU, growth in the number of households and inclusion of items that may have been excluded previously (B2B). A number of forecasting assumptions were applied which predict that by 2020, total WEEE arising will grow annually between 2.5% and 2.7% reaching about 12.3 million tons. At present each EU citizen produces 17-20 kg of e-waste every year. Of this some 90% is still land filled, incinerated, or recovered without any pre-treatment (Savage, 2006). The current amounts of WEEE in the EU are roughly between 25% for medium sized appliances to 40% for larger appliances.

**According to a study conducted by the UNU in 2007, the returns of appliances lighter than 1kg are very low for all systems. In addition, the composition of EEE put on the market currently is different from that of WEEE arising due to changing product composition over time.**

This is especially the case for flat panel displays instead of CRT screens as well as the phase out of CFC's from refrigerators, Nickel Cadmium from battery packs and Polychlorinated biphenyls in capacitors

**Japan** The amount of e-waste generation has seen a continuous rise in Japan since the 1990s. The domestic production of the electrical and electronic industries (including electrical equipment, electronic equipment, communications equipment, controls equipment, electrical measuring instruments, light fixtures, storage/ dry batteries, wiring equipment, electric bulbs, etc.) as of the year 2006 showed an increase of 105.8% as against 2005 (JEMA, 2007) . For computers specifically, the total number of disused computers in 1995 was estimated at 30,000 tons.

**This number is predicted to increase to 100,000 tons by 2010 (METI, 2006). According to Japanese government sources, as much as 450 million tons (t) of waste is generated every year in Japan, of which 50 million t is municipal solid waste (MSW). At the same time, the number of final disposal sites is rapidly dwindling in the country. It is estimated that general waste landfill sites will be full within 10 years and that industrial landfill will be full by 2007/8 (DTI, 2005).**

## **World e waste generation of Telecommunication equipment and India**

As Indians become richer and spend more electronic items and appliances, Computer equipment accounts for almost 70% of e-waste material followed by telecommunication equipment (12%), electrical equipment (8%) and medical equipment (7%). Other equipment, including household e-crap account for the remaining 4%, it said.

The sad part is that a mere 1.5% of India's total e-waste gets recycled due to poor infrastructure, legislation and framework which lead to a waste of diminishing natural resources, irreparable damage of environment and health of the people working in industry. Over 95% of e-waste generated is managed by the unorganised sector and scrap dealers in this market, dismantle the disposed products instead of recycling it



In India, about 4-5 lakhs child labours between the age group of 10-15 are observed to be engaged in various e-waste (electronic waste) activities, without adequate protection and safeguards in various yards and recycling workshops, said Mr. D S Rawat, Secretary General ASSOCHAM while releasing the paper. The chamber has also strongly advocated the need to bring out effective legislation to prevent entry of child labour into its collection, segregation and distribution, reveals the study.

“E-waste typically includes discarded computer monitors, motherboards, Cathode Ray Tubes (CRT), Printed Circuit Board (PCB), mobile phones and chargers, compact discs, headphones, white goods such as Liquid Crystal Displays (LCD)/ Plasma televisions, air conditioners, refrigerators and so on.

As per the study, E-waste workers in India suffer from breathing problems, such as asthma and bronchitis. Many workers are children, who are unaware of the hazards and by the time they reach 35 to 40 years of age, they're incapable of working, points out the study.

About 2/3 of e-waste workers in India suffering from respiratory ailments like breathing difficulties, irritation, coughing, choking, tremors problems who all are engaged in various e-waste (electronic waste) activities due to improper safeguards and dismantling workshops.

The recovery of metals like gold, platinum, copper and lead uses caustic soda and concentrated acids. The workers dip their hands in poisonous chemicals for long hours. They are also exposed to fumes of highly concentrated acid. Safety gear such as gloves, face masks and ventilation fans are virtually unheard of, noted study.

According to the study, computers, televisions and mobile phones are most dangerous because they have high levels of lead, mercury and cadmium -- and they have short life-spans so are discarded more, adds the study.

The main sources of electronic waste in India are the government, public and private (industrial) sectors, which account for almost 75% of total waste generation. The contribution of individual households is relatively small at about 16 per cent; the rest being contributed by manufacturers. Though individual households are not large contributors to waste generated by computers, they consume large quantities of consumer durables and are, therefore, potential creators of waste, reveals the ASSOCHAM study.

E-waste accounts for approximately 40 percent of the lead and 70 percent of heavy metals found in landfills. These pollutants lead to ground water and air pollution and soil acidification. High and prolonged exposure to these chemicals/pollutants emitted during unsafe e-waste recycling leads to damage of nervous systems, blood systems, kidneys and brain development, respiratory disorders, skin disorders, bronchitis, lung cancer, heart, liver, and spleen damage.

Despite the Indian government stringent law to regulate e-waste trade, destitute children still face hazards picking apart old computers, TV etc. The chamber has also strongly advocated the need to bring out effective legislation to prevent entry of child labour into its collection, segregation and distribution. [5]

### **Gaps between forging countries Vs India**

For two decades the global narrative around electronic waste has typically been that rich, industrialized countries were dumping used devices onto impoverished ones, where the desperately poor often recycled printed circuit boards under unsafe conditions. But experts say nascent e-waste trends are beginning to challenge that paradigm. Developing countries are now shipping more e-waste by weight to developed countries than vice versa, according to a recent analysis of United Nations trade data by Josh Lepawsky, a geographer at Canada's Memorial University of Newfoundland and an expert on the electronic waste trade. “

For example, the German government's development aid agency, the German Society for International Cooperation, has supported an Indian company named e-WaRDD that has piloted a project to incentivize circuit-board collection in Bangalore, India. And a Belgium-based non-profit, World Loop, receives corporate funding to support a range of electronics recycling programs in Africa that link informal recyclers with state-of-the-art facilities overseas that recycle printed circuit boards, transformers, and leaded glass.

Researchers say printed circuit boards, which often contain gold and other valuable metals, are a good first step for such projects because they typically represent the most valuable — as well as the most environmentally hazardous — aspect of the e-waste recycling process. The goal is to allow collectors to continue their practice of re-using or manually dismantling electronic equipment, but then sell those parts to professional facilities instead of melting them or using cyanide to extract

valuable metals in backyard workshops. Advanced recycling facilities employ commodity separation, shredding, resource recovery, and pollution-control technologies that greatly reduce the health and environmental hazards associated with backyard recycling operations.

As e-waste flows shift, manufacturers in China, India, and many other low- and middle-income countries increasingly view e-scrap as a valuable commodity — both for extracting metals and for manufacturing new devices from a product's component parts. That is partly because the value of e-waste has broadly increased in recent years in tandem with rising demand for the so-called “rare earth” elements used in laptops, cellular phones, and other electronic devices.

India is planning to burn more of its trash to generate badly needed electricity. But critics are worried about lax air pollution controls and the impact of incineration on people who eke out a living picking through trash. [6]

## References

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6. [http://e360.yale.edu/features/in\\_developing\\_world\\_a\\_push\\_to\\_bring\\_e-waste\\_out\\_of\\_shadows](http://e360.yale.edu/features/in_developing_world_a_push_to_bring_e-waste_out_of_shadows)

## Twelve Golden Sentences

1. Heavy rains remind us of challenges in life. Never ask for a lighter rain, just pray for a better umbrella. That is Attitude.
2. When flood comes, fish eats ants and when flood recedes, ants eat fish. Only time matters. Just hold on. God gives opportunity to every one.
3. In a theatre when drama plays, you opt for front seats. When film is screened, you opt for rear seats. Your position in life is only relative. Not absolute.
4. For making soap, oil is required. But to clean oil, soap is required. This is the irony of life.
5. Life is not about finding the right person. But creating the right relationship.
6. It's not how we care in the beginning. But how much we care till the end.
7. Every problem has (N+1) solutions: where N is the number of solutions that you have tried and 1 is that you have not tried.
8. When you are in problem, don't think it's the End. It is only a Bend in life.
9. Difference between Man and God is God gives, gives and forgives. Man gets, gets and forgets.
10. Only two category of people are happy in life-The Mad and the Child. Be Mad to achieve a goal. Be a Child to enjoy what you achieved.
11. Never play with the feelings of others. You may win. But loose the person for lifetime.
12. There is NO Escalator to success. ONLY STEPS!!!

## Open Access for Engineers and Engineering

**Mr. Francis Jayakanth**

J.R.D. Tata Memorial Library,  
Indian Institute of Science, Bengaluru – 560 012  
[francis@iisc.ac.in](mailto:francis@iisc.ac.in)

**Mr. Muthu Madhan**

DST-Centre for Policy Research (DST-CPR),  
Indian Institute of Science, Bengaluru – 560 012  
[mu.madhan@gmail.com](mailto:mu.madhan@gmail.com)

Scholarly communication, which encompasses the creation of scholarly content, evaluated for quality, and disseminated amongst the scholarly community, is the key for the advancement of knowledge in any discipline. It has a history of more than 350 years. The *Journal des sçavans* (later renamed *Journal des savants*), established by Denis de Sallo, was the earliest academic journal published in Europe. Its content included obituaries of famous men, church history, and legal reports. The first issue appeared as a twelve-page quarto pamphlet on Monday, 5 January 1665. This was shortly before the first appearance of the *Philosophical Transactions of the Royal Society*, on 6 March 1665.<sup>1</sup>

For over three centuries, scholarly communication has been happening through the medium of printed journals. Over the period of time, the subscription cost of scholarly journals has been rising steadily. During the last couple of decades, it has reached a stage wherein even the richest of libraries in the world are not in a position to subscribe to all the journals and other scholarly resources that their users would like to have access to. This situation is amply exemplified by a memo issued in 2012 from Harvard Library to the university's 2,100 teaching and research staff. It calls for action after warning it could no longer afford the price hikes imposed by many large journal publishers, which bill the library around \$3.5m a year.<sup>2</sup> If Harvard university is unable to sustain its subscriptions to scholarly journals, one can imagine the plight of the libraries in the developing and the underdeveloped countries.

The access barrier to scholarly literature created due to high subscription costs can hamper scientific progress because fundamental characteristics of scholarly research is that it is created for public good to facilitate further enquiry and extending the existing body of knowledge. Substantial portion of such research is funded by the government agencies.

During the last three decades, the rapid advancements that are taking place in the fields of Internet, web and related technologies have transformed the way research is carried out and disseminated. Paul Ginsparg brought about a revolution when in August 1991 he started hep-th@xxx.lanl.gov using automated email systems and public FTP servers to help researchers in high-energy particle physics to exchange preprints. In 1998 this server was renamed as arXiv, and currently it serves as an electronic preprint server for Physics, Mathematics, Computer Science, Nonlinear Sciences, and Quantitative Biology. ArXiv had an immediate impact on physicists in less developed countries. They received research ideas almost instantly and their own contributions could be read by others, immediately.<sup>3</sup>

The effective demonstration of exploitation of knowledge and sharing information by the physics community indeed formed the basis of the worldwide call for web-wide open access (OA) to scientific information. In 1994, Stevan Harnad proposed all scientific authors to use public FTP servers to share preprints with their peers.<sup>4</sup> Today, researchers have got technically better systems and legitimate ways to make their postprints - 'peer-reviewed' research papers - (not just preprints) openly accessible to all potential users.

The concept of facilitating Open Access to peer-reviewed scholarly literature has its roots in the development of e-print archives. The landmark meeting initiated by the Soros Open Society Institute (OSI) in Budapest in 2001 resulted in the establishment of the Budapest Open Access Initiative (BOAI) and a definition of two primary ways ahead to close the knowledge gaps in science.<sup>5</sup> The first OA strategy is called Self Archiving, and subsequently also referred to as Institutional Archives (or Repositories) / Open Access Archives (OAA). In this strategy, accepted versions of already published research articles are archived in the author's institutional OA archive and / or in a subject-based archive. The institutional repository of the Indian Institute of Science, ePrints@IISc, <<http://eprints.iisc.ernet.in>> established in the year 2002, was Indian's first interoperable institutional repository.<sup>6</sup>

The second strategy is publication of Open Access Journals (OAJ). All the journals published by the Indian Academy of Sciences are OAJ. <<http://www.ias.ac.in/Journals/Overview>>



Around 2000, researchers at the University of Southampton developed EPrints, a free and open-source software package for building open access institutional repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH, <https://www.openarchives.org/pmh/>). It was followed in 2002 by DSpace, developed at MIT in partnership with Hewlett Packard. Both EPrints and DSpace have undergone many developments in the past 15 years and currently are being used by many institutions around the world.<sup>7</sup>

Facilitating open access to research publications, either through institutional repositories or by publishing in open access journals, enhances the visibility and citation impact of such publications.<sup>8</sup> Also, research generated in the emerging countries will be missing to the international knowledge base because many of the journals published from the emerging countries are not indexed in the leading abstracting databases nor they are being subscribed by the libraries in the developed countries. Thus, there are both North to South and South to North knowledge gaps, leading to incomplete pictures of global health, environmental and other developmental issues.<sup>9</sup> The knowledge gap can be easily overcome if the researchers facilitate open access to their peer-reviewed scholarly literature.

Facilitating OA to the final accepted versions of the research papers by the researchers across the world will substantially reduce the access barrier to published scholarly literature that exists today. Despite significant inherent advantages associated with OA, researchers are not keen in embracing OA publishing voluntarily. This has prompted research institutions and research funding agencies to mandate OA publishing for the research they support through their OA policies. OA policy mandates researchers to submit their peer-reviewed, final accepted manuscript either in an institutional repository, or in a centralized repository.

Several publishers have also responded favourably to the growing demand for OA and permit authors to self-archive their papers. For example, IEEE grants authors and their employers the “right to post the accepted version of IEEE-copyrighted articles on their own personal servers or the servers of their institutions or employers without permission from IEEE”.<sup>10</sup> ACM and ASCE also give similar privileges to their authors. Sherpa-Romeo <<http://www.sherpa.ac.uk/romeo/search.php>>, a service of JISC, UK, provides a guide to publishers’ policies on OA.

Biomedical funding agencies in the USA, UK, Europe and India have realized the potential of open access to research outputs and encourage the researchers they support to share preprints and postprints through interoperable repositories.

### **Current status of OA**

Many services are available for scientists and scholars to make their research output OA. Individual scientists and scholars can effectively make their paper OA just by typing a few additional keystrokes. It costs nothing for scientists to archive their preprints in central preprint servers such as arXiv and bioRxiv, and to upload post-prints on their personal websites or in institutional repositories (e.g. <http://dst.sciencecentral.in/>). Metadata interoperability among these repositories enables service providers create index of records available in the distributed repository system and build search interfaces (e.g. BASE: <https://www.base-search.net/?l=en>).

There are full OA journals where every article is OA and there is no charge both for the author and the reader, and there are full OA journals that charge authors an article processing charge (APC). The Directory of Open Access Journals (DOAJ) <<https://doaj.org/>> has listed more than 10,400 OA journals published from more than 120 countries and, of these, 236 are engineering and technology journals. And, there are traditional commercial journals that offer authors a choice to make their papers OA provided the authors pay the requisite author processing charges (APC). Such journals are called hybrid OA journals. The APC varies across the journal publishers.

Funding agencies in the USA, UK, and Europe underwrite the cost of APC for the papers that come out of the projects they fund. In India funding agencies require researchers to upload papers resulting from the research they fund in interoperable OA repositories, which are also supported by them.<sup>11</sup>

An estimate made late last year showed that India was potentially spending about USD 2.4 million annually on APCs paid to OA journals and the amount would be much more if APCs paid to make papers published in hybrid journals open access were added. Needless to say that it would be prudent for Indian authors to make their work freely available through interoperable repositories. That is the trend in Latin America and China. Scientists are ready to pay APC as long as institutions pay for it and funding agencies are not ready to insist that grants provided for research should not be used for paying APC.<sup>12</sup> Recently Ministry of Human Resources Development (MHRD) has notified that publications in ‘paid journals’ (meaning paying APC) would not be considered hereafter for faculty selection and promotion in NITs and a senior official of MHRD has told a correspondent that this practice is being followed by IITs already.<sup>13</sup> In 2016, *Science Citation Index Expanded (SCIE)* has indexed more than 1.5 million papers (article, letter and review), and of these 200,422 (13.3%) are published in full-OA journals. Of all the papers indexed in SCIE, 329,630 (22%) have been

published in journals that can be classified as Engineering and of these 16,904 (5%) papers have been published in full OA journals.

Materials science, and Metallurgy and metallurgical engineering account for 126,083 (38%) of all engineering papers, and 8,011 or 7% of all papers in this field have been published in full-OA journals; Electrical and electronics engineering and Automation and control systems account for 63,525 (19 %) and 2,793 or 4.4% in OA journals; Computer sciences account for 52,663 (16%) and 2,024 or 3.8% in OA journals; Chemical engineering account for 34,427 (10.4% and 1.1% in OA journals; Mechanical, Manufacturing, and Production engineering, and Robotics together account for 31,848 (9.7%) and 1,698 or 5.3% in OA journals; Civil engineering and Construction building technology account 20,181 (6.1%) and 442 or 2% in OA journal.(Data as seen in *WoS*). It may be noted that some journals are classified under more than one field and therefore the total will add up to more than 100%. *AIP Advances*, *Materials*, *Mathematical Problems in Engineering* and *IEEE Access* are the journals where researchers have published at least 800 papers.

SCIE does not show counts of OA papers in hybrid OA journals and therefore the count one gets from SCIE is less than the actual number. Researchers might publish their papers in non-OA journals and upload the post-prints on personal websites, and/or in institutional repositories.

Engineers depend on technical reports and recent conference literature for their highly focused information needs.<sup>14</sup> So, they tend to often present papers in research conferences rather than publishing in journals. However, a search in *Conference Proceedings Citation Index (CPCI)* reveals researchers in the fields of Electrical and electronics and Computer science more often use conference venues to present their research than researchers in other engineering fields. About 79% of the 366,381 proceedings papers published in 2016, and indexed by *CPCI* fall under Engineering category, and of these Electrical and electronics, and Computer science together account for 221,117 which is 76.5% of all Engineering proceedings papers (or 60% of all proceedings papers). According to *CPCI*, only 2% of all the Engineering papers are OA. MATEC web conferences (3,654 papers) and E3S web conferences (577 papers) are among the conferences with the largest number of OA papers. Distribution of OA papers in conferences and journals by country is plotted in a bar graph as shown in figure 1.

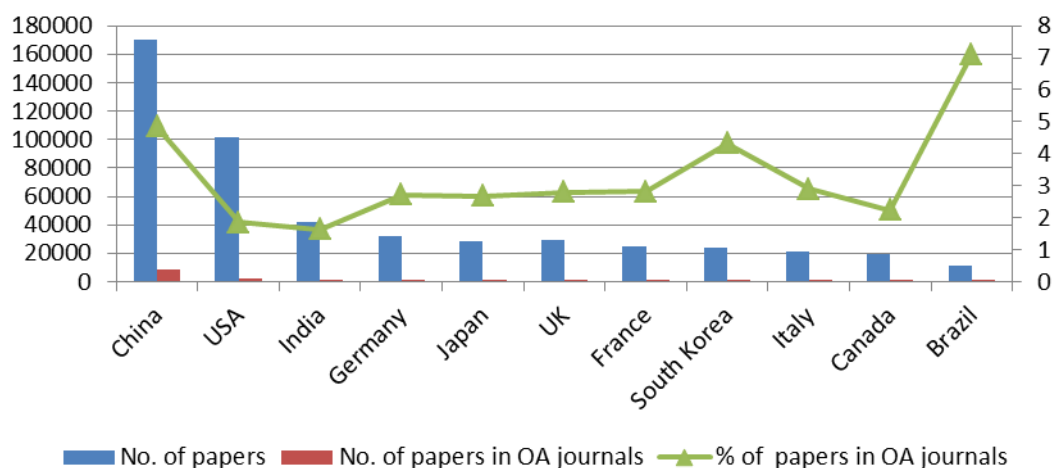


Fig 1. Distribution of Engineering papers and papers published in OA journals/conferences by country.  
Source – SCIE & CPCI

Conference papers are typically formal publications in Computer science and are “often more prestigious than journal articles, with acceptance rates at some conferences below 10%” says Steve Lawrence.<sup>15</sup> One should be cautious while estimating the quantity of Engineering literature using tools like Web of Science (*WoS*) and *Scopus*. By matching publication profiles of faculty working in the departments of Physics, Mathematics, Electrical and electronics, and Computer science in leading US universities with author profiles of popular citation databases, Wainer et al found that *WoS* had not indexed on average 66% of the published work of a computer scientist and the rate of invisibility in Computer science and Electrical and electronics is much higher than that of Mathematics and physics. “On average, 47% of conference proceedings are not indexed in *CPCI* and 32% not indexed in *Scopus*.”<sup>16</sup> Also, research papers in fields of Electrical and electronics, and Computer science are highly scattered in different kinds of sources and disorganized on the web. Hence, the citations to these papers are scattered as well.

Lawrence and colleagues developed CiteSeerX <<http://citeseerx.ist.psu.edu/>>, a search engine based on an autonomous citation indexing algorithm, to index the scientific information on the web.<sup>17</sup> CiteSeerX gathers its content mostly by crawling the literature in computer and information science in public websites and partly through submissions by authors. Recently, the software's architecture and data model have been modified to enhance its user experience.

It is clear that engineering researchers have no particular interest in publishing in OA journals. They will do well to change their attitude to OA. A very large portion of the conference literature goes unindexed in citation databases such as *WoS* and *Scopus*, but the computer science database CiteSeerX crawls all repositories (including personal web pages) and automatically indexes every paper down to individual citations and disambiguates author names. The advantages are obvious. We suggest that CiteSeer-like crawlers be developed for all fields and researchers in all branches of engineering deposit their papers in a repository, or at least in their own web page. When publishers are ready to grant authors permission to upload postprints of accepted papers in their own or their institution's website, we should capitalize on the opportunity.

Considerable amount of engineering research is carried out in India and it will be to our advantage if all of them are made accessible through open access channels. MHRD could set up its own harvester, similar to Science Central and CSIR Central, and request CSIR-URDIP to develop and manage the same as they are doing the other two already.

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## Don't mess with intelligent people

When Swami Vivekanand was studying law at the University College, London, a white professor, whose last name was Peters, disliked him intensely.

One day, Mr. Peters was having lunch at the dining room when vivekananda came along with his tray and sat next to the professor.

The professor said, "Mr Vivekanand , you do not understand, \*a pig and a bird do not sit together to eat.\*"

Vivekanandji looked at him as a parent would a rude child and calmly replied, \*"You do not worry professor. I'll fly away,"\* and he went and sat at another table.

Mr. Peters, reddened with rage, decided to take revenge.

The next day in Class he posed the following question: "Mr.Vivekanand , if you were walking down the street and found a package, and within was a bag of wisdom and another bag with money, which one would you take ?"

Without hesitating, Vivekanandji responded, "The one with the money, of course."

Mr. Peters , smiling sarcastically said, "I, in your place, would have taken the wisdom."

Swami Vivekanand shrugged and responded, \*"Each one takes what he doesn't have."\*

Mr. Peters, by this time was fit to be tied. So great was his anger that he wrote on Swami Vivekanand's exam sheet the word "idiot" and gave it to Swami Vivekanand.

Vivekanandji took the exam sheet and sat down at his desk trying very hard to remain calm while he contemplated his next move.

A few minutes later, Swami Vivekanand got up, went to the professor and told him in a dignified polite tone, "Mr. Peters, \*you signed the sheet\*, but you did not give me the grade."

## C-RAN, a Nextgen Access Network



**Mr. V. P. Sampath**

Technical Architect

Adeptchips Private Limited, Bangalore

C-RAN is a centralized, cloud computing based new radio access network architecture which supports 2G, 3G, 4G system and future wireless communication standards. The name C-RAN is coined from the four 'C's in the main characters of C-RAN system, which are "Clean, Centralized processing, Collaborative radio, and real-time Cloud Radio Access Network" i.e. Cloud-RAN, sometimes also referred as Centralized-RAN. It is a new cellular network architecture for the future mobile network infrastructure which was first introduced by China Mobile Research Institute in April 2010 in Beijing, China. It is based on many existing technology advances of wireless communication and optical technology as well as IT technology. In the era of mobile Internet, mobile operators are facing pressure on ever-increasing capital expenditures and operating expenses with much less growth of income. Cloud Radio Access Network (C-RAN) is expected to be a candidate of next generation access network techniques that can solve operators' puzzle.

CRAN applies recent Data Centre Network technology to allow a low cost, high reliability, low latency and high bandwidth interconnect network in the BBU pool. It utilizes open platform and real-time virtualization technology rooted in cloud computing to achieve dynamic shared resource allocation in BBU pool and support of multi-vendor, multi-technology environment. A baseband unit (BBU) is a unit that processes baseband in telecomm systems. A typical wireless telecom station consists of the baseband processing unit and the RF processing unit (remote radio unit - RRU). CRAN allows hundreds of thousands of remote RRH (remote radio head) connect to a centralized BBU pool.

Remote radio head is a remote radio transceiver that connects to an operator radio control panel via electrical or wireless interface. Any BBU can talk with other BBU within the BBU pool with very high bandwidth (10Gbit/s and above) and low latency (10us level). This is enabled by the interconnect of BBU in the pool. This is one major difference from BBU Hoteling, or base station hoteling. In the later case, the BBU of different base stations are simply stacked together and has no direct link among them to allow physical layer co-ordination. This is different from the traditional base station built on proprietary hardware, where the software and hardware are closed-sources and provided by one single vendor. C-RAN BBU pool is built on open hardware, like x86/ARM CPU based servers, plus interface cards to handle fiber link to RRH and inter-connection in the pool. C-RAN can be viewed as an architectural evolution based on the above distributed base station architecture.

### C-RAN Architecture

C-RAN architecture has the following characteristics that are different from other cellular network architectures:

- i. Large scale centralized deployment
- ii. Native support to Collaborative Radio technologies
- iii. Real-time virtualization capability based on open platform
- iv. Centralization is back into consideration, driven not only by the need to improve performance, but also by pragmatic and strategic motives that are embodied in Cloud RAN.

C-RAN small cells can be most broadly defined as having a centralized baseband that is pooled across a large number of distributed access points. This provides significant management and self-organizing network benefits compared to a cluster of standalone small cells. Some C-RAN small cells go support the key attributes such as Coordination between radios, Baseband pooling, Ethernet front haul and Single cell operation. Cloud RAN is based on two tenets: centralization and virtualization of base station baseband processing. Centralization is a mean to improving performance. Driver for centralization is very pragmatic: operational cost reduction. Virtualization, aims at reducing capital expenditures by applying network function virtualization (NFV) to the radio access network. But virtualization has another attractive feature such that it can switch between base station vendors at the click of a button! In fact, there are two issues to resolve. The first

issue is front haul which is an impediment towards centralization. Virtualization could spread at the 'micro' level, while the technology and economic challenges are resolved for the 'macro'

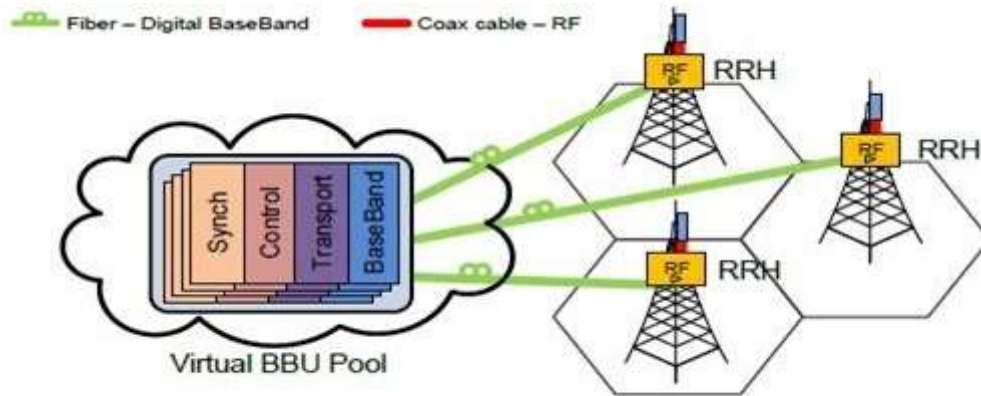


Figure1.C-RAN Architecture

Front haul is the link between the baseband units and the remote radios. Fronthaul capacity, delay and synchronization requirements are stringent. A single 20 MHz 2x2 MIMO LTE channel requires about 2.5 Gbps. This capacity adds up quickly when tens even hundreds of baseband modules are collocated in a data center. A fiber network is required to connect the sites to the data centers which not all operators possess. The cost of fiber breaks the business case for operators without their own fiber assets. But operators recognize the need for fiber and there has been a strong drive by many operators to acquire and build up their fiber assets. The second challenge centers on virtualization of the physical layer (PHY) which involves real-time processes and high computational load functions.

General purpose processors are less efficient in running these functions for commercially scalable networks than dedicated processors resulting in high power consumption. Dedicated processors can have as much as 10x the performance per Watt of general purpose processors for PHY functions. A possible solution is to offload real-time and computationally expensive functions to accelerators. But there are other solutions. The fronthaul and virtualization challenges are coupled in a manner that a solution to both can be arrived at by judiciously choosing the functional split between centralized and distributed functions. For example, it is possible to place the physical layer at the remote radio while placing higher layers in the data center. This significantly reduces fronthaul capacity and timing requirements, and consequently the cost of fronthaul, but also reduces the performance gain over traditional distributed architecture. Since it is possible to draw the line between distributed and centralized functions along different points in the protocol stack, we are set to witness a proliferation of Cloud RAN implementations. While the industry works at resolving the above challenges in Cloud RAN, small Cloud RAN systems are set to emerge. Such systems would be targeted at venues, for example, a stadium or a convention center, and deployed in a similar way to distributed antenna systems (DAS). More than eight different solutions are in development with various vendors, so the hype cycle is beginning.

Small Cloud RAN systems could eventually disrupt the wireless industry with virtualization moving up into ever larger deployments – a familiar path taken by disruptive technologies in other fields ranging from steel to excavation equipment. Another indicator of the promise of Cloud RAN is manifested in the current thinking around 5G networks. While capacity was a major requirement for 4G, 5G complements this with emphasis on scalability and energy efficiency (as much as 90% of power consumption of mobile operators is due to the radio access network). HetNets are a central feature of 5G networks which imposes requirements for simplification of all aspects of network operation and management. These facts combined point to the importance of virtualizing the radio access network and formulating a Cloud RAN architecture and deployment scenarios that leverage the benefits of Cloud RAN. The trends in wireless network evolution indicate that we are currently at the cusp of bifurcation in network architecture and technologies, and even commercial practices. Operational processes remain rigidly entrenched. Operators will have to look for new means to meet the demands placed upon them by customers and investors more efficiently and effectively.

About two thirds of a network's cost of ownership is in operational costs including site rental, energy, and support and maintenance expenses. Also, operators realize further cost reduction from pooling and virtualizing baseband processing because we no longer need to provision for peak capacity on a per-site basis: it is possible to reduce processing requirements by as much as 75%. Cloud RAN has the elements to provide flexibility necessary in future wireless networks, and in the indoor market, emerging solutions may break new ground toward low-cost, high density mobile infrastructure.



# Understanding Waste Management – Part 1

**Mr. Alok Kumar**  
Narmada Clean Tech Ltd  
Ankleshwar (Gujarat)  
[alok1958@yahoo.co.in](mailto:alok1958@yahoo.co.in)

## Introduction

Waste Management is a widely and frequently discussed subject in all social and public forums today. We keep hearing about ever increasing levels of pollution in the air, water and land everyday and its negative impact on life on the planet. We also keep hearing about the depleting resources of the earth as we make technological progress.

We shall try to simplify these aspects and explain in logical manner to understand what the fundamental issues in waste management today are.

As the life grew on the planet, so did the requirements to support the various life forms. Therefore Oxygen (from the air), water (from rivers, lakes ) and food consumption grew accordingly. Progressively life evolved through the ages, and secondary consumptions of other resources also started growing. As the civilisation progressed and living standards improved, these secondary consumptions grew exponentially.

As we know today, in order to provide consumption of any item, it has to be produced, processed, manufactured, developed, packaged, transported, stored etc etc. All these activities apart from producing the intended item, also produce significant quantity of un-intended items, which we term as waste. These could be agricultural waste, metal waste plastic waste, fuel waste, combustion waste etc etc. The basic life form, ie our bodies also become a waste after the life ends.

Traditionally over the ages, when the population on the planet was not much, these wastes were disposed in various forms on the planet surface in the water bodies, on land, buried under the land etc , without much issue.

Also as the standard of life improved, we started developing and using many items which need high quantity of natural resources to produce. This exploitation of natural resources started impacting the ecological balance of many of nature's wealth, and also started producing high quantity of waste materials.

## Modern Era Issues

As science and technology made rapid progress during the past 150 years or so, the quantity of waste generation also grew exponentially. This necessitated the need for controlling and treating these wastes. We learnt from many bad experiences over the past century of the negative impact of the various wastes on life forms on the planet.

As a result attempts were made to characterise different wastes and find methods to deal with these wastes. As a first step wastes were categories into three broad categories:

- a) Liquid wastes, comprising waste water and other waste liquids
- b) Solid wastes
- c) Gaseous wastes which are emitted into the ambient air

Regulations were developed to monitor these waste streams with respect to the constituents and overall quality of the stream.

Simultaneously techniques were also developed to make these streams fit for discharge into atmosphere by suitable treatment methods.

Different nations on the planet developed their respective regulations and limits of pollutants over time, based on the need as understood at that time.

Therefore in our country today we have legal provisions or acts pertaining to control of Water pollution, Air pollution, and Hazardous waste control. These acts specify how the waste generators need to abide by the relevant rules during their economic activities and control pollution as per specified limits. However in spite of having these legal and administrative

mechanisms in place, we find that the waste generation and accumulation keeps on increasing, and impact on the environment keeps on becoming serious by the day.

In our country there are certain areas where the legal provisions have not been applied or are unable to regulate the requirements under the acts. Municipal waste piles in all our cities and towns are a stark example of this inability to regulate and control pollution and waste generation. Another area of serious concern is the state of all our rivers in the country. The water quality in these rivers is way below the recommended acceptable quality fit for use by living beings.

Owing to our innate inability to regulate, each new technological development is bringing a new crisis to our already burgeoning waste management problem. Computer and Information Technology developments have brought their own challenge of e-waste handling and management.

Thus the waste management area requires a very open and future looking approach at all levels, ie generators, regulators and public at large to have adequate and effective regulation and control to minimise the adverse impacts to acceptable levels.

The current status clearly proves that the present approach or lack of it, is ineffective in securing the acceptable and expected results in the area of waste management.

In the coming issues of the newsletter, we shall discuss and describe in more detail how these problems and issues are being strategically addressed or planned to be addressed in some key economic areas around the world.

*Bye till the next issue.*

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## How can I improve myself within a month?

### 21 ideas

1. Detoxify your speech. Reduce the use of cuss words. Be polite.
2. Read everyday. Doesn't matter what. Choose whatever interests you.
3. Promise yourself that you will never talk rudely to your parents. They never deserve it.
4. Observe people around you. Imbibe their virtues.
5. Spend some time with nature every day.
6. Feed the stray animals. Yes, it feels good to feed the hungry.
7. No ego. No ego. No ego. Just learn, learn and learn.
8. Do not hesitate to clarify a doubt. "He who asks a question remains fool for 5 minutes. He who does not ask remains a fool forever".
9. Whatever you do, do it with full involvement. That's meditation.
10. Keep distance from people who give you negative vibes but never hold grudges.
11. Stop comparing yourself with others. If you won't stop, you will never know your own potential.
12. "The biggest failure in life is the failure to try". Always remember this.
13. "I cried as I had no shoes until I saw a man who had no feet". Never complain.
14. Plan your day. It will take a few minutes but will save your days.
15. Every day, for a few minutes, sit in silence. I mean sit with yourself. Just yourself. Magic will flow.
16. In a healthy body resides a healthy mind. Do not litter it with junk.
17. For one month, eat home cooked meals.
18. Keep your body hydrated at all times. Practice drinking 8–10 glasses of water.
19. Make a habit to eat at least one serving of raw vegetable salad on a daily basis.
20. Take care of your health. "He who has health has hope and he who has hope has everything".
21. Life is short. Life is simple. Do not complicate it. Don't forget to smile. 😊

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**One in five existing jobs in Great Britain, amounting to 3.6 million, may be displaced by 2030 due to the rise of robots, according to Centre for Cities' report. It suggested retail, customer service roles, and warehouse jobs were among the most at risk.**

## Why are Indian Engineering Graduates Unemployable?



**Mr. G. Senthil Kumar**  
Founder & Director, MADIEE  
[senthil@madiee.com](mailto:senthil@madiee.com)

In the article, “National Employability Report - Engineers 2016”, by Aspiring Minds<sup>1</sup>, it was said that nearly 80% of the engineers are unemployable even for a profile in software services sector or sales engineering and only a meagre 6.5% and 3.67 % are employable in core design engineering and software products.

Sadly in a country that sends rocket to mars at a price of an auto fare<sup>2</sup> per km and in which 30% of the engineering graduates are first time<sup>3</sup> college goers, more than 80% of the engineers are unemployable.

India’s higher education system is in crisis, very particularly, the status of Engineering education. It is broken on all fronts that matter and is disconnected with the needs and aspirations of the students, parents, industry, society and nation. There are three critical dimensions to the problem that needs to be addressed right NOW.

### **Narrow down approach towards Higher Education**

Unlike 20th century, in 21st century, it is expected that a person will change jobs, industries, or even their career path multiple times. But most of the indian higher education institutions are narrowly specialised, and infact, they are getting even more narrowly specialized. While the graduating students of these colleges may have obtained an engineering degree, they become clueless about life and are inept in handling “real life” issues.

*What is the purpose of specialised ‘job seeking’ education if most of the jobs of 2020 are not yet defined?*

Higher education system appears to be short sighted and inadequate in developing individuals with inner strength to deal with multiple situations in life. They must have good inputs in some of the modern disciplines that may enable students to fetch jobs. In equal measure they must develop individual interests and provide avenues for testing them while graduating.

This is the need of the hour and it is high time that we focus on holistic education.

### **Faculty Crunch**

Nearly 30 to 50% of the faculty positions<sup>4</sup> are vacant in most institutions. Currently this shortage is not being plugged by people who either have passion or significant experience in the industry even if they are willing due to the antiquated requirements of entry thresholds of our institutions.

In such a situation, though there have been efforts like choice based credit systems<sup>5</sup> (CBCS) and open electives, they turn out to be mostly forced/restricted electives, due to a faculty crunch, providing no chance for the students to find their passion or to change their paths.

### **Deteriorating student’s Self - Esteem**

In most colleges, the atmosphere is neither conducive enough to learn nor it is supportive enough for students to build their self-esteem. It is this aspect of students that plays a major role in their placements and career and it is highly neglected by college authority. This is based on the following two critical observations that is seen happening in almost every other colleges out there, which is leading to lack of self-esteem among the students.



One is the lack of student's official email ID. In this digital age, a mere college photo IDENTITY (ID) card of a student is not his/her digital identity. The power of an official college email ID for students is significant. There is a huge push for internships from the government these days, but hardly a very few get the ones they deserve. Many times it was because of the communication channel. As an employer, I would prefer looking at an email application for internship, that has come from [senthil@xcollege.edu.in](mailto:senthil@xcollege.edu.in), rather than [senthil3456@gmail.com](mailto:senthil3456@gmail.com) or [senthil4578@yahoo.com](mailto:senthil4578@yahoo.com). This becomes even more critical when students apply for studies abroad. Many research proposals might have left unnoticed by professors just because it was not from an official email ID and the same happens even for job applications.

These official email IDs comes at a price, but it is very much worth investing and it is high time that colleges start realising it. Because the success and reach of colleges solely depends on the success and reach of its students. They are the ambassadors of their college. Universities like Ashoka are a standing proof for the same, and they even provide visiting cards for its students, treating them with such a high dignity. Yes, official email IDs are not just IDs. It is the respect and dignity which a college lays on its students and it has multiple positive mirror effects.

The other one is lack of respect of student's time. Recently I have been to many colleges to meet the Principals and HoDs. One scene which is very much common in most colleges is where a teaching or a non-teaching staff enters the Principals/HoDs cabin with ease, whereas the students are made to wait, and wait for long. Why aren't student's time respected and why is a teacher or a staff's time so special when compared to that of student? It is these double standard practises which are killing student's self-esteem. The same goes with guest lectures, where a class of students with free hour is forced to sit in a special guest lecture, citing lack of audience. However special and important the chief guest may be, the free hour belongs to the students and they might have had their own plans and colleges should start respecting student's time and space.

### **The SOLUTION**

It is these above 3 critical dimensions that has killed student's aptitude and attitude, and only these things matter, not just to an prospective employer but even for growth of one's own prospective career. What is the key to overcome the above problem? A meagre workshop on personality development and spoken English could never solve the issue of unemployment, in a time where most of the jobs are undefined and not yet thought of.

### **Time for Holistic Education**

Throughout the major U.S. tech hubs, whether Silicon Valley or Seattle, Boston or Austin, Tex., software companies are discovering that liberal arts thinking makes them stronger<sup>6</sup>. Narrowly defined tech jobs, by themselves, aren't going to be the answer for long-term employment growth.

Thus, in addition to mastering a field or profession, obtaining critical skills, and developing the whole person, it is important to learn about additional subjects that expand our knowledge and the appreciation of the world around us.

Just as in the Universities in US, nurturing a holistic self by offering a holistic education is a way out. Historically, Indian universities such as Nalanda and Shantiniketan also encouraged a broad-ranging education aimed at holistic development. However, over time our education system has evolved in a manner leading to single field institutions for engineering, management, which took away the opportunity for students to discover their interests and passion.

In today's time, many students end up in Engineering without any choice and are forced to complete their degree without any sort of interest. Their passion may lie outside Engineering, in fields like law, painting, cinematography or others. Isn't it the responsibility of our Higher Educations institutions to provide avenues for him/her to explore their passion? These avenues can be created through offering open electives in the field of liberal and creative arts during their course of Engineering.

Introduction of Liberal and creative arts in Engineering, develops in students a spirit of inquiry, critical thinking and analysis as well as verbal and written communication skills. In-class discussions, field trips, presentations, movies and hands-on assignments are some of the ways in which students are exposed to multiple facets of an issue and encouraged to explore.

[MADIEE](#) - Making A Difference In Educational Experience<sup>7</sup>, makes the dream of holistic education in higher education institutes in India a reality. MADIEE curates experiential learning solutions in the form of open electives and short term courses in the humanities and liberal arts, and acts as the platform for passionate professionals to teach the next generation.

In every other college, the value added courses / open electives are still highly relevant to one's branch of study and not OPEN. In today's time, inter disciplinary approach is the need of the hour and we can foster this only when students from different streams interact with each other in an intellectual way and this is highly lacking in our colleges. In 99% of the colleges in India, students have a common subject only in their first semester of study and that's the only learning space where interdisciplinary thoughts (though everything is Engineering) are nurtured. But to face this 21st century, we need more social engineers with multiple facets of thoughts, rather than narrowed down engineering approach. Facebook is not just a result of brilliant coding, it is marrying of coding with human psychology that created FB. Introduction of liberal arts as open electives creates a situation where students from inter disciplinary streams can attend the course together and this will open up several other opportunities. Some of the courses offered at MADIEE are fundamentals of law, the art of doing research, economics and public policy, crucial communications and negotiations, perspectives of art using cinematography, and positive psychology.

Success of MADIEE would create an ecosystem where cost effective medical devices are developed by engineering faculty collaborating with practising medical doctors, where economists, environmentalists, architects, designers and engineers are working towards city planning, with innovative solutions for energy and water challenges. We should remember that Facebook is not just a product of computer programming, but rather it is a culmination of programming and human psychology.

Hence, developing these interdisciplinary approach towards design will improve the quality of innovation and research in higher education spaces across the country.

### **Gateway to Teaching**

However, introduction of liberal arts in Engineering colleges which is already facing the issue of faculty crunch, will bring in further challenges but we have a solution for it too.

MADIEE is also a platform for today's Young working professionals to give back to society in the most noblest of ways, that is, through the act of 'Teaching'. It acts as a direct bridge between the passionate professionals and the aspiring students. Lots and lots of people give back to the society in the form of money, through charity, which is welcoming. But so as to tackle the root cause of the problem, it is not just enough to gift the fish to the hungry person, we need to teach him how to fish, and this is facilitated at MADIEE.

An expert in his/her field of work need not be a great teacher, but at MADIEE, we are more focused on showcasing their passion towards their work. We firmly believe that it is their passion that will inspire the next generation to explore more. It is like, we don't have to showcase the whole movie; all we need is a glimpse of the movie, a trailer or a teaser, to instigate them, and in our case, it will be a workshop or a series of workshops. One of my favourite quotes of Winston Churchill is befitting here. He said, "Personally, I'm always ready to learn, although I don't always like being taught". With huge pile of data and information available online and the growing numbers of MOOC (Massive Open Online Courses), and the

recent introduction of SWAYAM<sup>8</sup> (Study Webs of Active learning by Young Aspiring Minds) by Government of India, all we need to give the next generation is HOPE and a little tap behind their shoulder, and we can facilitate this by providing platform for passionate working professionals to teach the next generation.

### **Respecting Students' time and space**

Finally, improving the student's self-esteem can only be facilitated by creating a supportive atmosphere at colleges and it is very much a need of the hour. Professors need not be good administrators but they are burdened with additional administrative task and that is affecting the time which the professor should ideally dedicate towards the students. College authorities should bring in more administrators to tackle this issue in the long run and in the short run, I request the principals and HoD of various colleges to allot a special hour or so everyday to meet the students, and I salute the ones who are already doing this. But kindly make sure that the special hour is convenient for the students to come and not when you are available. Students may not come everyday and may not even come at all, but still there needs to be a time for students and it has to be respected. If their time is respected, soon one day, we will see students engaging in positive conversations with teachers.

Also in this digital age, college development funds focussed on mere physical infrastructure is not enough, and a significant amount should be spent on digital infrastructure too. For a student, his/her digital identity as a student is their official college email ID. Digital India mainly lies on digitally empowered student community and it starts with a official student email ID.

If you are an alumna/alumnus of a college, please do push for the official email ID for the current students. India's and almost every country's strength solely lies on empowering its students and let's strive for it.

## Conclusion

India is a young nation. We have 605 million people below the age of 25, while in the age group 10-19, poised for higher education, we have 225 million. A significant number of these are likely to go into engineering. The only way we can reap the advantages of our young demographic dividend is by developing holistic citizens who can take advantage of the opportunities that the 21st century world offers them.

MADIEE envisions to create a world class higher education system in India where every student has the freedom to make his choice of study, and are taught by teachers whom they look upto and get inspired. The mission to help higher education institutions, primarily Engineering colleges, nurture holistic and well rounded graduates who can engineer a better tomorrow.

*"If there is one place on the face of the earth where all the dreams of living men have found a home from the very earliest days when man began the dream of existence, it is India"*

Romain Rolland, Nobel Laureate, French Scholar

Come on, We had Nalanda University here, the centre of higher learning in the country and the world. Join us to relive our glorious past.

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As [Shail Kumar](#) in his book 'Building Golden India', called for, together let's create the Gray revolution in India

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IT ministry has tested LiFi, an LED-based wireless communication technology, jointly conducted with IIT-Madras and lighting company Philips India. LiFi, or light fidelity, aims to replace WiFi by using light to transmit internet signals with speeds up to 10 Gbps. The technology was reportedly being tested to cover areas that cannot be reached by the existing network.

Worldwide shipments of devices including computers, tablets, and mobile phones will reach 2.32 billion units in 2018, an increase of 2.1% from last year, according to a report by Gartner.

## Announcements

### IEEE India Council Awards

IEEE India Council is happy to announce winners of following IEEE India Council Awards.

**IEEE India Council Outstanding Student Branch Award – 2017** is awarded to  
G. H. Raison College of Engineering, Nagpur (Bombay Section) (Branch Code: STB 62361)

The IEEE India Council Outstanding Student Branch Award is to recognize a student branch that has maintained membership, provided student members with opportunities to volunteer, and helped in promotion of IEEE and its mission

**IEEE India Council Outstanding Volunteer Award – 2017** is jointly won by

- Dr. Vijay Bhaskar Semwal (UP Section) (Membership Number : 93398659)
- Subhransu Ranjan Samantaray (Kolkata Section) (Membership Number : 90483659)

IEEE India Council Outstanding Volunteer Award is to recognize those members who, through their work as a volunteer, exemplify the Institute's commitment to technical development of Engineers, Scientists and students at large

### Late Shri Pralhad P Chhabria Award

#### *PRESENTED BY*

**Hope Foundation and Research Centre (Hope Foundation) – A Project by Finolex**

#### *IN ASSOCIATION WITH*

**The Institute of Electrical and Electronics Engineers (IEEE), India Council,  
Women in Engineering (WIE) Affinity Group and IEEE Pune Section**

#### **ABOUT AWARDS**

The **Late Shri Pralhad P. Chhabria Awards** presented by Hope Foundation and Research Centre in association with IEEE India Council and WIE Affinity Group, IEEE Pune Section is instituted to honour academic and professional achievements of young women engineers. The award is intended to encourage, support and help the 'women-in-engineering community' to grow and achieve success.

It has been Late Shri Pralhad P Chhabria's dream to empower women and instil in them the confidence to believe in their abilities to make the society better. He believed that women have the ability to take what they have and bring about a change in their families, their work place and their society. He always encouraged female students to be courageous to pursue their professional and personal aspirations and not allow gender biases hinder their path to success.

In his honour, **Hope Foundation and Research Centre, IEEE India Council and Women in Engineering (WIE) Affinity Group, IEEE Pune Section** has announced two awards that are designed to recognize and applaud outstanding female student/s 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.

**DESCRIPTION OF THE AWARDS:** These two awards are designed to recognize and applaud outstanding female student/s specifically from the faculties of science, engineering or technology as well as young women engineers who are in their early career stage.

#### **The Awards**

- Award I - Best Outgoing Female Student (from faculty of Science / Engineering / Technology)
- Award II - Best Women Engineer / Scientist / Technocrat (working Professional - Early Career Stage)

**ELIGIBILITY:** Award Nominee must be an

- IEEE Student Member for Award No 1 and IEEE Member for Award No 2.
- IEEE woman in engineering membership is desirable though not necessary.
- Indian National



**Award No I:** The award is open to Woman Student pursuing science, engineering or technology education in India, is in the final year of studies and has been an outstanding achiever throughout her education. Demonstration of originality and innovation in the respective field/s of work is mandatory.

**Award No II:** The award is open to Woman in science, technology or engineering actively working for at least 3-7 years in India in the field of her related knowledge and skills for economic development of the community and /or country. Demonstration of originality and innovation in the respective field/s of work is mandatory

## **PRIZE**

**Award I:** Cash prize of 1,25,000/- (Rupees One Lakh Twenty Five Thousand only) Taxes as applicable shall be deducted from this prize money; Medal and citation

**Award II:** Cash prize of 1,25,000/- (Rupees One Lakh Twenty Five Thousand only) Taxes as applicable shall be deducted from this prize money; Medal and citation

## **APPLICATION PROCESS**

1. Application Opens 16 December, 2017
2. Application Closes 10 February, 2018
3. Winner Announcement 12 March, 2018

**Contact Details:** Convener, HFRC-IEEE Awards, P-14, Rajiv Gandhi Infotech Park, MIDC Phase I, Hinjawadi, Pune - 411 057 Phone - +91 20 22933441 | Email - [info@hfrc-ieeeawards.org](mailto:info@hfrc-ieeeawards.org) | Website - <http://hfrc-ieeeawards.org/>

PDF Brochure at [http://hfrc-ieeeawards.org/wp-content/uploads/2018/01/3\\_PPC-award-booklet-4.pdf](http://hfrc-ieeeawards.org/wp-content/uploads/2018/01/3_PPC-award-booklet-4.pdf)

## **Useful IEEE Links**

2018 IEEE Membership and Society Membership Dues:

[http://www.ieee.org/membership\\_services/membership/join/join\\_dues.html](http://www.ieee.org/membership_services/membership/join/join_dues.html)

IEEE Society Memberships: [http://www.ieee.org/membership\\_services/membership/societies/index.html](http://www.ieee.org/membership_services/membership/societies/index.html)

Referral and Payment Options: [http://www.ieee.org/membership\\_services/membership/join/referral\\_payment.html](http://www.ieee.org/membership_services/membership/join/referral_payment.html)

Rupee Group Payment Option: [https://www.ieee.org/membership\\_services/membership/rupee\\_join\\_option.html](https://www.ieee.org/membership_services/membership/rupee_join_option.html)

Step-by-step process of Rupee Group Payment explained at

[https://www.ieee.org/documents/indian\\_rupee\\_payment\\_group\\_challan\\_payment\\_option.pdf](https://www.ieee.org/documents/indian_rupee_payment_group_challan_payment_option.pdf)

IEEE Student Activities: [http://www.ieee.org/membership\\_services/membership/students/index.html](http://www.ieee.org/membership_services/membership/students/index.html)

IEEE Geographic Unit Formation Policies and Petitions

[http://www.ieee.org/societies\\_communities/geo\\_activities/forms\\_petitions/forms\\_petitions\\_index.html](http://www.ieee.org/societies_communities/geo_activities/forms_petitions/forms_petitions_index.html)

Education & Careers: [http://www.ieee.org/education\\_careers/index.html](http://www.ieee.org/education_careers/index.html)

IEEE Xplore Digital Library: <http://ieeexplore.ieee.org/Xplore/home.jsp>

IEEE Websites / Sitemap: <http://www.ieee.org/sitemap.html>

IEEE-Sponsored Insurance Services:

[http://www.ieee.org/membership\\_services/membership/discounts/group\\_insurance.html](http://www.ieee.org/membership_services/membership/discounts/group_insurance.html)

## **Acknowledgements**

ICNL wishes to acknowledge various internet sources for the information presented in this issue of the newsletter. Our exclusive thanks to inshorts – a content discovery and distribution application, which aggregates the news across the world and presents them in a concise manner for easy consumption. We have picked up the titbits appearing in this issue from inshorts (<https://www.inshorts.com>)

## 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](mailto: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.
- Please 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/chapters/>

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/>

#### *For Private Circulation*

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### IEEE INDIA COUNCIL

Email: [ieee.icnl@gmail.com](mailto:ieee.icnl@gmail.com)

Website: <http://sites.ieee.org/indiacouncil/>