



Vol. 13 :: No. 1 :: Jan – Mar 2018

Message from the Chairman



Dear IEEE Members,

I am very happy to write to you once again on the occasion of bringing out one more issue of IEEE India Council Newsletter (IEEE ICNL). In the first quarter of 2018, IEEE IC continued its works with great vigour. We had a wonderful face-to-face executive committee meeting at Rajkot on 17th February 2018 hosted by IEEE Gujarat Section. I will fail in my duties if I do not acknowledge with appreciation the amazing hospitality of Gujarat Section and the comforting care of all the IC execom members taken by the untiring volunteers of Gujarat Section.

IEEE Gujarat Section has also come forward to shoulder one more major responsibility by agreeing to organize IEEE INDICON 2019. Let us all extend our cooperative hands to Gujarat Section in their enterprising endeavour.

IEEE R10 Meeting was held in Langkawi, Malaysia, on 3-4 March 2018, where the section leaders from India were present along with couple of IC execom members. IC had another enjoyable face-to-face execom meeting on 3rd March 2018 on the sidelines of R10 meeting. During this R10 meeting, the R10 nomination committee announced the name of the candidates for R10 Director-Elect. IEEE IC is happy to note that Sri Deepak Mathur, immediate past IC Chair, has been nominated as one of the three candidates. Sri Mathur is the only nominated candidate from India this time for this prestigious IEEE position.

It has been unanimously decided by IEEE IC that MV Chouhan Student Paper Contest (MVCSPC) shall be organized by INDICON Organizing Committee, i.e. by Madras Section in 2018 and by Gujarat Section in 2019. In another major development, Bangalore Section has volunteered to organize AISYWC in 2018 and Hyderabad Section in 2019. We all express our sincere thanks to these two sections for volunteering to take up this major event in the coming two years.

I am also happy to state here that MiniPOCO 2018 will be held on 20th May 2018 at Visakhapatnam, Andhra Pradesh. The theme this time is “Conferences in the Changing World”. Please visit the conference website (<https://e36.hubilo.com/>) regularly for the updates.

“Late Shri Pralhad P Chhabria Award” instituted by Hope Foundation and Research Centre in association with IEEE India Council and Women in Engineering Affinity Group, IEEE Pune Section, was announced on 12th March 2018. On this day, winners of two awards were announced, viz. i) Best Outgoing Female Student (from faculty of Science / Engineering / Technology) - Ms. Jayati Vijaywargiya, a student of Mody University of Science and Technology, and ii) Best Women Engineer / Scientist / Technocrat (working Professional-Early Career Stage) – Ms. Soma Biswas, a faculty of IISc Bangalore. On behalf of IEEE IC, I extend hearty congratulations to both the award winners.

IEEE IC is striving hard to raise the bar of the standard of its activities. In this pursuit of higher standard, we want everybody at our sides. With the help and support from all of you, we are confident of achieving our goals.

With warm fraternal greetings,

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



Message from Editor

H.R. Mohan, hrmohan.ieee@gmail.com

Dear readers,

At the outset, let me wish all our readers a Happy New Year 2018. We are presenting the first quarter issue of India Council Newsletter (ICNL) for the year 2018. This current issue of ICNL in 82 pages features a record number of ten articles, few items unique to the 1st issue of the year such as Execom-2018 details of India Council, Secretary's Report for the year 2017, Reference to the Section Reports for the year 2017 that are submitted to R10 and a Report on annual flagship event INDICON-2017 and AG of IC along with various events, such as international conferences, symposiums, workshops, hub & student congresses, distinguished lectures, activities of Societies and Affinity Groups held in the Bangalore, Kerala, Kolkata, Madras and Pune Sections and IEEE CSS & IEE PES chapters. 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. While all the Sections must have sent their Annual Reports for 2017 to R10, only five Sections – Bombay, Delhi, Kerala, Madras and Pune seem to have shared it with ICNL. These reports are quite comprehensive, elaborate and run to several pages and have been archived and the link is shared for reader's ref. As and when we receive the reports from other Sections, they will get included in the archive. 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 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 given the highlights of the face-to-face IC execom meetings held at Rajkot and during the R10 meeting at Langkawi, Malaysia. Malaysia including the nomination of Sri Deepak Mathur, immediate past IC Chair as one of the three candidates for the R10 Director Elect elections. It is nice to note that IEEE IC that MV Chouhan Student Paper Contest (MVCSPC) will become a part of INDICON from 2018. Great to note about the venues of INDICON-2019 (Gujarat), AISYWC- 2018 (Bangalore), AISYWC-2019 (Hyderabad), miniPOCO-2018 (Visakhapatnam).

ICNL congratulates Ms. Jayati Vijaywargiya & Ms. Soma Biswas -- the winners of "Late Shri Pralhad P Chhabria Award" instituted by Hope Foundation and Research Centre in association with IEEE IC and WiE, IEEE Pune Section and Prof Anurag Kumar for the prestigious IEI IEEE Award for Engineering Excellence 2017.

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

- Enabling Blind and Visually Impaired through Users-Developed Dactylology by Mr. Gourav Modanwal and Mr. Kishor Sarawadekar
- A Unique Pedagogical Experiment: The 5-Week Induction Programme (5WIP) at IIT Mandi by Prof. Timothy A. Gonsalves & Dr. Devika Sethi
- Collaborative Contract Research / R&D Outsourcing in India The Gap and the Solution by Dr. K. Subramanian
- Corporate Responsibility and the Challenges of Sustainability by Dr Mukund Rajan
- IoT Demystified - Its role in precision agriculture to meet food security by Mr. Amit Saha
- IoT-Cloud Applications for Societal Benefits – An Entrepreneurial Solution by Dr. Shajulin Benedict
- Future of Testing in the Digital World by Ms. Renu Rajani
- Future of Jobs – 2018 by Aspiring Minds
- ASIC Cloud Trends by Mr. V. P. Sampath
- Understanding Waste Management – Part 2 by Mr. Alok Kumar

IT in Jan-Mar 2018 by Prof. S. Sadagopan, Director, IIIT 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. We have also included brief reviews of three books -- The Business Plan Write-up Simplified; The Manual for Indian Start-ups; and IoT Technical Challenges and Solutions

We wish to reiterate that our wish to make ICNL a quality source of information can be realized only with the active support from one and all. In this context, we look forward to inputs from IEEE OUs, articles on current interest topics from academic and professional community. Happy reading of ICNL-18q1.

IEEE India Council Execom – 2018

Sl. No	Name	Role	IEEE Mem No.	Section
1	Dr. Sivaji Chakravorti	Chair	SM 00244426	Kolkata
2	Dr. Preeti Bajaj	Secretary	SM 40286317	Bombay
3	Dr. Sameer S. M.	Treasurer	SM 80401549	Kerala
4	Mr. Deepak Mathur	Immediate Past Chair, Chapter Coordinator	SM 40324184	Gujarat
5	Dr. S. N. Singh	Chair Elect	F 41398439	UP
6	Dr. Satyanarayana Bhesette	Vice Chair - Technical Activities	SM 90728815	Bombay
7	Dr. Suryanarayana Doolla	Webmaster	SM 41627283	Bombay
8	Mr. Gitansh Anand	Vice Chair Young Professional, Chair Student Coordination Team	GSM 92093245	Delhi
9	Dr. J. Ramkumar	Vice Chair - Student Activities	SM 93075118	UP
10	Prof. Keshab Bhattacharya	Representative of Kolkota Section		Kolkata
11	Mr. H R Mohan	Vice Chair - Professional Activities & Newsletter Editor	SM 04142691	Madras
12	Dr. Rajesh Ingle	Vice Chair – Awards	SM 40261758	Pune
13	Dr. Rajashree Jain	Vice Chair - WIE	SM 90384280	Pune
14	Dr. Atul Negi	Vice Chair - Educational Activities	SM 03803707	Hyderabad
15	Mr. Harish Mysore	India Office	M 92523596	Bangalore
16	Puneet Mishra	Vice Chair - Industry Relations		Bangalore
17	Dr. Ponnaivaikko M	Ombudsman	SM 04472254	Madras
18	Dr. Suresh Nair	Vice Chair – Conferences	SM 03757648	Kerala
19	Dr. Yogesh Kosta			Gujarat
20	Dr. T. Michael N. Kumar	Representative of Madras Section	SM 41452564	Madras
21	Dr. Amit Kumar	Coordinator- Branding	SM	Hyderabad
22	Dr. Amitabha Bhattacharya	Section Chair	SM 41367115	Kharagpur
Section Chairs				
1	Sudeendra kaushik	Section Chair		Bangalore
2	Dr. K Subramanian	Section Chair	SM 40276159	Delhi
3	Dr. R.B. Jadeja	Section Chair	SM 90525637	Gujarat
4	PVS Maruthi Rao	Section Chair	SM 41249040	Hyderabad
5		Section Chair	SM 41367115	Kharagpur
6	Dr. Sujit K. Biswas	Section Chair	SM 08264129	Kolkatta

7	Dr. P A Manoharan	Section Chair		Madras
8	Mr. Dinanath Kholkar	Section Chair	SM 41238762	Pune
9	Dr. Kumar Vaibhav Srivastava	Section Chair	SM 90648252	UP
10	Dr. Sameer S. M.	Section Chair	SM 80401549	Kerala
11	Mr. Abhay Phansikar	Section Chair	SM 91160918	Bombay

IEEE Section Reports for the year 2017

The Section Reports for the year 2017 of the following Sections are archived and available for reading at <https://drive.google.com/drive/folders/1sqDqaQoT7E8AlWPSvla5O2t5rJ11OuWx?usp=sharing>

Bombay
Delhi
Kerala
Madras
Pune

The other Section reports as and when sent to ICNL will archived at this URL.

Principles for Digital Development

The following none “living” guidelines designed to help digital development practitioners integrate established best practices into technology-enabled programs.

- **Design With the User:** User-centered design starts with getting to know the people you are designing for through conversation, observation and co-creation.
- **Understand the Existing Ecosystem:** Well-designed initiatives and digital tools consider the particular structures and needs that exist in each country, region and community.
- **Design for Scale:** Achieving scale requires adoption beyond an initiatives pilot population and often necessitates securing funding or partners that take the initiative to new communities or regions.
- **Build for Sustainability:** Building sustainable programs, platforms and digital tools is essential to maintain user and stakeholder support, as well as to maximize long-term impact.
- **Be Data Driven:** When an initiative is data driven, quality information is available to the right people when they need it, and they are using those data to take action.
- **Use Open Standards, Open Data, Open Source, and Open Innovation:** An open approach to digital development can help to increase collaboration in the digital development community and avoid duplicating work that has already been done.
- **Reuse and Improve:** Reusing and improving is about taking the work of the global development community further than any organization or program can do alone.
- **Address Privacy & Security:** Addressing privacy and security in digital development involves careful consideration of which data are collected and how data are acquired, used, stored and shared.
- **Be Collaborative:** Being collaborative means sharing information, insights, strategies and resources across projects, organizations and sectors, leading to increased efficiency and impact.

Secretary's Report – 2017

The India Council Executive Committee – 2017 comprised the following members along with all Section Chairs as its ex-officio members of Execom

Name	Office	Section
Prof. Sivaji Chakravorti	Chair	Kolkata
Prof. S.N.Singh	Chair Elect	UP
Mr. Deepak Mathur	Immediate Past Chair & In charge Chapter Activities	Gujarat
Dr. Preeti Bajaj	Secretary	Bombay
Mr. Anthony Lobo	Vice Chair, Membership Development	Bombay
Dr. S.M. Sameer	Treasurer	Kerala
Prof Debashish Guha	VC Conferences	Kolkata
Dr. Rajesh Ingle	Vice Chair, Awards	Pune
Dr. Atul Negi	Vice Chair, Educational Activities	Hyderabad
Mr. Puneet Mishra	Vice Chair, Industrial Relations	Banglore
Prof. Ramkumar	Vice Chair, Student Activities	UP
Dr. Satya	Vice Chair, Technical Activities	Bombay
Dr. Rajashree Jain	Vice Chair, WIE	Pune
Mr. Gitansh Anand	Vice Chair, Young Professionals Program	Delhi
Dr. M. Ponnaivaikko	Ombudsman	Madras
Mr. H.R. Mohan	Vice Chair, Professional Activities & Newsletter Editor	Madras
Dr. Suryanarayana Doolla	Webmaster	Bombay
Mr. Abhay Phanshikar	Conference Coordinator	Bombay
Dr. Jayakumari	Chair- IEEE Circuits and Systems Society Chapter (CAS04)	India Council
A. Shaligram	Chair- IEEE Chapter of Electronic Devices Society (ED15)	India Council
Dr. Deepak Bhatnagar	Chair- IEEE Microwave Theory & Techniques Society (MTT17)	India Council
Dr. Madheswaran	Chair- IEEE Oceanic Engineering Society Chapter (OE022)	India Council
Mr. Hitesh Mehta	Chair- IEEE Photonics Society Chapter. (PHO36)	India Council
Dr. Madheswaran	Chair- IEEE Solid Circuits Society Chapter (SSC 037)	India Council
Dr. Madheswaran	Chair- IEEE Education Society Chapter (ED25)	India Council
Mr. Q. bakir	Chair- Joint IEEE Chapter of Aerospace & Electronic Systems Society, and Communications Society (AES10/COM19)	India Council
Prof. Annappa Basava	Chair- IEEE Computer Society (C16)	India Council
Prof. A.K.Tripathy	Chair- PES chapter	India Council
Ex - officio	All IEEE Section Chairs of India	

Meetings

First time online meetings were introduced by India Council in addition to face to face (F2F) meetings which had helped everyone to share presentations, updates, video chat and gave equal results as good as F2F meetings. Five online meetings were conducted. Courtesy Mr. Abhay Phanshikar. The minutes of all eight meetings held (five online and three F2F) were circulated to the EC members and duly approved. Online meetings helped all members to contribute equally as good as F2F meetings. Presentations, updates were shared and contribution and active participation, and high attendance kept IC active and many important decisions were taken to strengthen the policies of IC.

The following Execom meetings were held in 2017

Online through Gomeeting		F2F meetings		
1	1st January 2017	1	Chiba, Japan	5 th March 2017 (On the side-lines of R-10 meeting)
2.	5th February 2017	2	Kolkata	16 th April 2017
3.	4th June 2017	3	Kochi	16 th July 2017 (on the side-lines of the Tensymp 2017)
4.	17th September 2017	4	IIT Roorkee	Scheduled on the side-lines of INDICON 2017 at IIT Roorkee on 17 th December 2017
5	12th November 2015			

Highlights of IC Students Activities

- A. **Students volunteers committee formation:** 30 volunteers after screening 200 nominations have been selected who are working under different committees under YP Gitansh Anand and Prof. Ramkumar VC SAC.
- B. **SB WhatsApp group:** A WhatsApp group was formed for all student branch chairs across India with constant support and guidance regarding functioning of SB and helpful for networking and peer learning.
- C. **Branding at social media IC group :** Branding of India Council through Social Media channels like Facebook, twitter etc. had been enhanced by 35% growth in the outreach through the engagement.
- D. **IEEE Google Program at Nagpur:** Google offered an Applied CS with Android - weeklong pilot program at G H Raisoni College of Engineering. As requested by IEEE. 120 Computer Science pre-final year students of CS and IT department were trained in technical plus soft skills aspects and training.
- E. **IEEE Google training program at Google, Bangalore:** 20 students (Bombay Section - 03, Kerala Section - 02, Pune Section - 03, Gujarat Section - 02, Hyderabad Section - 02, Kharagpur Section - 01, Delhi Section - 03, UP Section - 02, Madras Section - 02) as nominated by the respective Sections have participated at GoogleDdevelopers Meet on 2nd and 3rd Sept at Bengaluru Google Office.
- F. **AISYWC 2017 AT IIIT Allahabad during 27-29 September 2017:** All India Students Young Professionals and Women in Engineering Congress (AISYWC) is the annual hallmark event of the IEEE India Council. This year, AISYWC was hosted by IEEE UP Section at the Indian Institute of Information Technology Allahabad, from 27th to 29th September 2017. Theme of this year AISYWC was Imagine, Engineer, Enlighten, and Empower, which focused on developing efficiently engineered scalable solutions for the welfare of the society. The three days event witnessed distinguished speakers from industry, start-ups and R&D Organizations with 370 participants from all 11 Sections networked and learned leadership, engaged in research and group activities.
- G. **MV Chavhan Contest:** 16 papers from various Sections and very reputed institutions were submitted which went through blind review and final presentations were scheduled through skype. Prizes were announced and presented at the Execom at IIT Roorkee during INDICON-2017.

H. **Students participation at ‘India Electronics Week 2017’ at Bangalore:** IEEE India Council collaborated with EFY group to extend IEEE volunteers support for registrations, speaker’s lounge, in the multi-disciplinary mega tech convention for 3 days with 100+ speaker, 65+ talks and 25+ workshops.

IC Women In Engineering: Women in Engineering Affinity group, IEEE India Council, initiated and successfully organized various activities for the benefit women in residing in the geography in line with the motto of WIE AG- Inspire, Encourage, Empower and Engage,

A. **IEEE WIE ILS Goa 2017 :** IEEE WIE International Leadership Summit 2017 which was conducted in Goa by Goa Engineering College with technical support by IEEE India Council along with Bombay section at Bogmallo Beach Resort, Goa, India from July 13th-15th, 2017 with the theme ‘ Disrupt - Breaking the barriers of thought’. The summit had four tracks, namely, ‘Advance Entrepreneurship’, ‘Leadership’, ‘Community Design & Art’ and ‘Innovation and Technology’. IEEE WIE ILS Goa 2017 was the confluence with over 300 participants from 7 countries, and 69 speakers representing 29 corporates or organizations.

B. **IEEE WIE Workshop, TENSYP 2017:** An IEEE WIE WORKSHOP was conducted during TENSYSMP 2017 at Kochi India on 15th July 2017. Dr Celia Shehanaz, WIE Coordinator, R10, 2016, Dr Rjashree Jain Vice Chair, WIE AG, IEEE IC, Dr Surekha Deshmukh, IEEE Pune and Ms. Deepika , from CISCO India shared their expertise with the gathered audience of the symposium. A panel discussion on Women Empowerment was also arranged during the workshop in association with WIE Kerala and WIE Workshops subcommittee.

C. **WIE Track at AISWYC 2017:** WIE Track during AISYWC 2017, on 28th -29th September 2017 at IIT Allahabad was conducted successfully. Key notes, panel discussions, competitions were organized as part of WIE track. Some of the mention-able Speaker names are; Dr. Sharmila Mande, Chief Scientist and Head of the Bio-Sciences R&D Division at Innovation Labs of TCS Ltd, Prof. Jharna Majumdar, Dean R & D, Prof. Comp Sc. & Engg. at Nitte Meenakshi Institute of Technology, Ms. Riddhima Dua, Founder Director IFlame consulting and Ms Garima Vishal. Dejawoo Schools.

D. **WIE awards with HOPE Foundation:** Hope Foundation and Research Centre (Hope Foundation) has instituted two awards for IEEE WIE members of India two awards - Best WIE Student (final year) and Best WIE Engineer (early career) which is approved by IEEE IC in association with IEEE Pune Section. The award money is Rs 1,25,000/- with a medal and a citation.

IC Young professional Activities: Young Professionals Track in AISYWC 2017 has been conducted wherein 80+ participants from PAN India participated and networked and discussed on disrupt ideas. The track received 900 USD funding from R-10 and STEP.

Technical Activities: The proposal from IC for USD8000 being submitted with the title as ‘Furthering Indian Perception of IEEE’ under 2017 IEEE foundation Grants Program which has theme as ‘Raise awareness and understanding of Science & Technology and their potential to address a global challenge’.

Industry Activities

A. **Electronics Makers 2017:** A Two-day Conference entitled ‘Electronics Makers 2017’ was jointly organized by Industry Relations-IEEE India Council, Centre for Embedded Product Design, Centre for Electronics Design & Technolgy, NSIT, in Association with IEEE-CAS, Bangalore Chapter on July 1-2, 2017 at NSIT, New Delhi. Few talks covered Keynote by Director IIT Delhi Dr. Ramgopal Rao on ‘Bridging Academic R&D with Product Innovation - a few case studies and a way forward’ on nanotechnology, Dr. Prabhat Ranjan, executive director of TIFAC-CORE (DST). Two panel discussions were also arranged on "From DIY to Make In India - A Leap of Faith" and on Project based Engineering Education for “Make in India”. A hands-on workshop was conducted by Texas Instruments, India entitled Microcontroller Learning Platform on a Shoestring Budget using MSP430 LunchBox, Beaglebone and Linux - Open-Source Hardware and Software for DIY and a workshop on VXWorks were the highlights of the conference. More than 100 delegates attended the program and Demos and presentations of 15 selected projects were made.

B. **Webinar:** India Council-industry Relations Vice Chair Mr. Puneet Mishra has organized one of its own kind a webinar on Business opportunities from Subsystem design to satellite building on October 29 from 5PM to 7PM which got huge success with more than 1500 registrations. More than 1000 people attended the webinar and actively participated during the Q&A. Nearly 50% attendees were from Industry. It was noted that such activity can be a major source of revenue generation for IC in future.

Conferences

The following conferences were organised during 2017.

- A. Second IEEE conference on Emerging Devices and Smart Systems (ICEDSS 2017) was conducted during March 3-4, 2017 at Mahendra Engineering College, Tamilnadu, India under IEEE India EDS chapter.
- B. 2017 8th International Conference on Computing, Communication and Networking Technologies (ICCCNT) (40222) held at IITD under India Council SSC Chapter
- C. IEEE Photonics Society, India Council PHO Chapter, Office of Naval Research Global- ONRG and Mahindra Ecole Centrale organizing '2017 IEEE Workshop on Recent Advances in Photonics (WRAP)' to be held on or about 18-Dec-2017, in Hyderabad, India.
- D. INDICON 2017: With rising popularity of INDICON, IEEE India Council's signature event, the 14th edition of the conference, INDICON-2017, is organized by IEEE Uttar Pradesh Section at IIT Roorkee, Roorkee, Uttarakhand during 15 - 17 December 2017. The 2017 edition of the conference has included Green Technology in continuation of regular tracks of the conference. The general Chairs of the INDICON 2017 are Professor S.N. Singh, VC, MMMUT, Gorakhpur and Prof. Sibam K. Koul, IIT Delhi and Steering committee members are Prof. J. Ramkumar- Chair IEEE UP Section, and Chair IEEE Roorkee Sub-Section – Prof. A. Patnaik.

The following conferences were approved for 2018

- A. India Council SSC Chapter and Kongu Engineering College, Bannari Amman Institute of Technology 2018 9th International Conference on Computing, Communication and Networking Technologies (ICCCNT) to be held on or about 10-Jul-2018, in Bengaluru, India
- B. Uttar Pradesh Section, India Council Computer society Chapter, Uttar Pradesh Section PE/IA Joint Chapter and Galgotias University, 2018 International Conference on Computing, Power and Communication Technologies (GUCON) to be held on or about 28-Sep-2018, in Greater Noida, Uttar Pradesh, India
- C. India Council CAS Chapter and Saintgits College of Engineering are organizing 2018 International Conference on Circuits and Systems in Digital Enterprise Technology (ICCSDET) to be held on or about 21-Dec-2018, in Kottayam, India
- D. India Council ED Chapter, Mahendra Engineering College, 2018 Conference on Emerging Devices and Smart Systems (ICEDSS) to be held on or about 02-Mar-2018, in Tiruchengode, India

Chapter Activities: In addition to continuing streamlining chapter activities, this year chapter chairs were added into IC group email id so as to keep them updated about IC activities and also invited for meetings.

Major Decisions:

- A. Nomination in Engineering Council of India: It was resolved that henceforth in Engineering Council, current Chair and Chair Elect shall be deputed without any financial implications on IC.
- B. "Resolved that the approval of the council executive committee members be and is hereby accorded to transfer the bank account of IEEE India Council having account at HDFC bank, Chennai 600061, Tamilnadu to HDFC bank ("bank"), WTC Branch, Bengaluru, Karnataka 560055 with no change in the authorized account signatories or the way

in which the account was being operated.” **“Resolved further that** the bank to use the address of IEEE Bangalore office:

- C. **INDICON logo:** The signature event of IEEE India Council INDICON the flagship conferernce whose popularity is increasing day by day was due for its logo since long. IC has finalised its logo and given an identity to its signature event.
- D. **New Website of India Council:** The website of India Council was upgraded to Wordpress from the conventional EWH server. The new website is attractive and user-friendly. This migration gives the flexibility to maintain and host a series of plug-ins, which IEEE has built for the benefit of members. Dr Suryanarayana Doolla volunteered himself for Webmaster.
- E. **e-Notices:** For the benefit of members (IEEE India) and avoid spamming for conference notices, IEEE IC has taken a policy decision pertaining to sending e-notices regarding conference/symposia. This policy allows the conference organizers to reach out IEEE India members with limited information (digest mode). Such broadcasting would be done three times for each conference in the first week of each month.
- F. **Newsletter of India Council:** It was decided to bring out the IEEE India Info, the newsletter of the India Council newsletter once again on quarterly basis. Mr. H.R.Mohan Vice Chair Professional Activities has volunteered himself for retriveing newsletter of IC and accepted as and NL Editor of IC. Accordingly, in this year(2017) three issues for the quaters Jan-Mar, Apr-Jun, Jul-Sep have been published featuring the major events held in various Sections, Affinity Groups, Society Chapters along with articles of current interest topics from experts in respective areas. The fourth issue for the period Oct-Dec 2017 is under preparations and Oct-Dec issue is in pipeline. All the published issues have been posted to the members of the India Council through eNotice. Further, the issues are also hosted at the India Council website at <http://sites.ieee.org/indiacouncil/newsletter/>

IEEE Events of significance to members all India

- A. R10 Directors address to IC Execom : R-10 Director has attended and addressed India Council 6th meeting at Kochi during side-lines of the Tensymp-17 on 16th July 2017.
- B. 40 years of Bombay section: Bombay Section has celebrated 40 years of its formation
- C. 40 years of Bangalore section: Bangalore Section has celebrated 40 years of its formation
- D. Tensymp 2017 in India: R10 Conference was brought to India and conducted successfully by Kerala Section at Kochi.
- E. India Adhoc committee on India Strategy : On 16th January 2017, an adhoc committee was established by IEEE 2017 President Karen Bartleson. IC Chair and Secretary are part of it. Few objectives are enhancing coordination between IEEE OU’s in India and improvements and reconfiguration of existing capabilities in India, meeting needs of India etc
- F. The India Strategy of MGA SDEA by R10 and MGA : This is under implementation for 2017-2018. Three committees are formed to cater the needs of India – Internship portal development, entrepreneurship and retention.

Membership Snapshot: IEEE india Council Membership Development Highlights 2017 (up to 31st Oct 2017)

The ratio of high grade members to total for IEEE is 83% wherein the same for R-10 is 68% and is of India is 40%. The ratio of Student members to total numbers for IEEE is 17% wherein the same for R-10 is 32% and for India its 60%. The ratio of senior members to Lifemembers and members together for Global IEEE is 21% wherein the same for R-10 is 18% and that of India is 20%.

India Council sections continue to occupy the top five positions in R10 along with Beijing and Tokyo Sections as of the October MDC report for R10. Among the 55 Sections across the world which met both Recruitment and Retention goals 10 sections were from R10 while Bombay, Gujarat and Kerala achieved this distinction from India Council.

Member ship	H	LF	F	LS	SM	L M	M	AM	GSM	Higher Grade Total	StM	Grand Total
Oct 2016	2	65			2096		11906	419	4882	19370	25828	45198
Active Oct 2017	1	24	47	131	2183	30	12093	450	4667	19626	28918	48544

IEEE India Council Awards Program

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

In 2017, For Outstanding volunteers, total 45 nominations were received, in which 12 were invalid and out of 32 valid entries, two have been declared as Outstanding volunteers- Dr. Vijay Bhaskar Semwal (IEEE Membership Number: 93398659) of UP Section and Subhransu Ranjan Samantaray (IEEE Membership Number: 90483659) of Kolkata section.

Similarly for the IEEE India Council Outstanding Student Branch Award, out of 35 student branches, which have been nominated by sections, 02 entries were invalid. Out of 33 valid nominations, Student Branch of G. H. Raisoni College of Engineering, Nagpur (STB 62361) under Bombay Section declared as Winner of Outstanding Branch.

The Winners of the both the Awards shall be presented during Execom at the sidelines of INDICON 2017 at IIT Roorkee.

Individual volunteers and Sections from India had a significant presence in the R10 and Global awards for 2017.

- A. Following sections could get 2017 R10 MD incentive grants of US\$ 250 for first position, US\$ 200 for second position and US\$ 150 for third position.
- i. **For Recruitment** Kerala Section was at second position and did exceptionally well and exceeded the goals set by HQ.
 - ii. **For Senior Member Elevations** Uttar Pradesh Section stood Second followed by Bombay Section at Third position
 - iii. **Under Student Member promoted to Young Professionals** Bombay Section got First position followed by Uttar Pradesh Section at third position
- B. Outstanding Large Section Award: **IEEE Madras Section** received the award in recognition and appreciation of valued services and contributions.
- C. IEEE Women in Engineering Committee (WIEC), the recipient of an Honorable Mention for the 2017 WIE Inspiring Member Award is Mrs. Vijaylatha from Hyderabad section.
- D. Outstanding Volunteer Award: **Dr. Koduri Srinivas** in recognition of outstanding contribution and services to IEEE Hyderabad Section and IEEE Region 10.
- E. YP Outstanding Volunteer in Industry Award: **Bibin Parukoor Thomas** in recognition of leadership and contributions to YP industry program in IEEE Kerala Section
- F. SAC Volunteer Award: **Prof. Rachana Garg** in recognition of leadership and contributions to R10 SAC programs.
- G. WIE Outstanding Professional Volunteer Award: **Prof Sunitha Beevi K.** in recognition of leadership for Professional WIE.
- H. WIE Outstanding Student Volunteer Award: **Ms. Shaik Suraiah Thaseen** in recognition of leadership for Student WIE.

Slate for 2018

The Nomination Committee for the year 2018 was formed by IEEE IC Chair as per by-laws of IC. The Committee, after deliberations has recommended that the existing slate of India Council Executive Committee 2017 would continue for one more year. We are grateful to the members of the Nomination Committee for their support and confidence.

Liaison with IEEE India Office

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

Acknowledgements

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

Preeti Bajaj
Secretary, IEEE India Council

IEEE INDICON

INDICON-2017:: 15 – 17 December 2017 at IIT Roorkee, Roorkee, India



The 14th IEEE India Council International Conference (INDICON 2017) was organized by IEEE Uttar Pradesh Section at IIT Roorkee, Uttarakhand during 15-17 Dec 2017. The 2017 edition of the conference had included Green Technology and Humanitarian Technology as a new addition in the theme along with the areas included in the earlier conferences. Prof. Ajit K. Chaturvedi, Director, IIT Roorkee, who was the Patron of the conference, graced the inaugural ceremony along with Prof. Sivaji Chakravorti, IEEE India Council Chairman; Prof. R. P. Jindal, Fellow IEEE, Vanderziel Institute of Science and Technology, Princeton, USA; and Mr. Roger U. Fujii, Fellow IEEE, 2016 IEEE Computer Society President. Prof. Jindal delivered the keynote address on “Mesoscopic Devices: A Bio-Inspired Approach” and Mr. Fujii’s keynote address

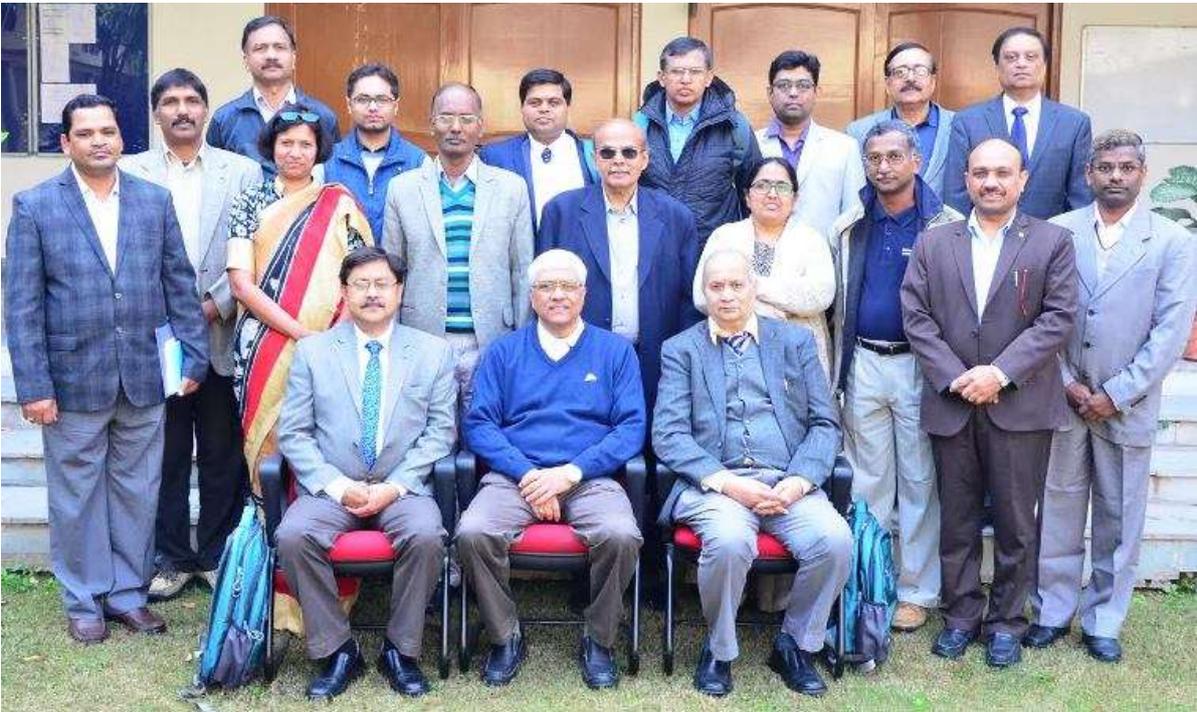
was on “Developing Safe, Secure and Reliable Software Systems.” Four workshops on themes covering Electrical Engineering, Electronics Engineering and Computer Engineering were arranged on the first day of the conference.

In the rest two days of the conference, the paper presentations were made comprising of 24 oral sessions, and three poster sessions. A total of 185 papers were presented in oral mode and rest 161 papers were presented through poster mode. Besides that nine plenary sessions were arranged on emerging topics of research. Registered authors, who could not attend the conference in person presented their papers over *skype*.

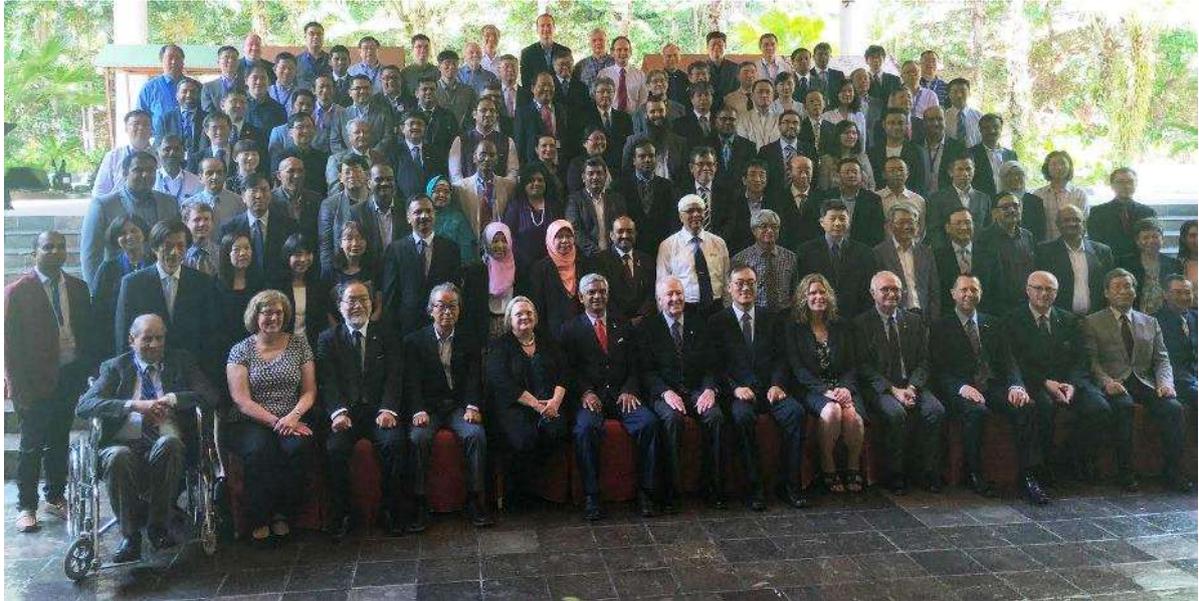
The guests in the valedictory function were Prof. S. N. Singh, Professor IIT Kanpur, Conference General Chair; and Prof. J. Ramkumar, Professor, IIT Kanpur, IEEE UP Section Chair, Conference Steering Committee Chair. In the valedictory function the INDICON trophy was handed over to the organizers of 2018 INDICON.

On the second day of the conference, that is, on 16th Dec, the meeting of the IEEE India Council Executive Members was held followed by IEEE general-body meeting. In the general-body meeting, members of 2018 INDICON organizing committee made a presentation on the preparedness of the INDICON-2018.





2018 R10 Meeting held during 3-4 March 2018 at Langkawi, Malaysia



R10 Director Elect Election

IEEE Region 10 has nominated the following three candidates for the election of Region 10 Director Elect 2019-2020.

1. Deepak Mathur from India
2. Zia Ahmed from Australia
3. Norliza Mohd noor from Malaysia

IEEE IC requests the IEEE Members from India to vote in large numbers in the forthcoming election.

IEEE Bangalore Section Events

Branch Counsellors Meet



The Branch Counsellors meet was held on 25th February 2018 in Jnana Jyothi Auditorium, KR Circle, Bangalore. Sudeendra Koushik in his opening remarks introduced the present Execom members of the IEEE Bangalore Section. Dr.P.Deepa Shenoy gave a brief agenda regarding SAC activities and its initiatives.

The role of the Branch Counsellors was discussed in detail and delegates were briefed about all the available benefits of being an IEEE member by Munir Mohammad. The IEEE Students Ethics Competition was introduced this year and awards for the events that would be held next year was summarised by R.Siva Reddy. Shrikant Tangade stated all the steps necessary to start a Student Branch.

Enlightening facts about IEEE was conveyed to all in the form of quiz which was conducted by TEAM IEEE UVCE. An introduction regarding Young Professionals Chapter was given by Andan Patil followed by introduction of SAC team members along with their HUB leads by Suraj S. Detailed explanation on how to report the activities of Student Branch on vTools was given by Suraj S from the SAC team. Student activities by respective colleges were presented after which P Deepa Shenoy expressed gratitude to everyone in her closing remarks. The meet ended with lunch being served to all.

Chapter Chairs meeting



This meeting was held at Board Room, UVCE, Bengaluru on February 25th, 2018. Mr. Rajashekhar S, Secretary, Bengaluru Sction opened meeting with the need for an effective section and chapters coordination. The facilities available with Section and an overview on responsibilities of chapter chairs and office bearers were explained. About 15 chapters were represented in this meeting.

Each of the chapters presented their proposed events and programs for 2018 and explained their suggestions and grievances. These were discussed and the Section indicated that it would try to address some of them. The possible joint events between similar chapters have been discussed.



Mr Sudeendra, Chair Bengaluru section, explained his priorities and chapters role in improving membership and industry involvement in IEEE activities. Dilip and Prasant, execom members, explained the industrial activities roadmap for 2018 and sought chapters active participation. Prof Sivareddy and Prof. Srinivas shared their experiences in effectively running chapter activities.

IEEE CONECCT 2018



Prof Anurag Kumar - the recipient of IEI IEEE Award for Engineering Excellence 2017. The award was conferred on Prof Anurag Kumar in the recently concluded IEEE Bangalore Section's International flagship conference CONECCT.

CONECCT was held on March 16-17, 2018 at Bangalore and was held successfully with excellent paper presentations and key note talks.

Significant Achievements

1. IEEE Bangalore Section felicitated Dr. S Christopher and Prof. Anurag Kumar for their R&D contributions and a section IEEE member reaching the highest position in institutions of repute
2. 2017 MGA Achievement Award

International events

1. IEEE International Conference on Smart Grids, Power and Advanced Control Engineering (ICSPACE2017)
2. C-CUBE 2017: IEEE Second International conference on Circuits, controls and communications, RNSIT, Bangalore, India during December 15-16, 2017
3. ICAECC 2018 - Second International Conference on Advances in Electronics, Computers and Communications
4. International Conference on Consumer Electronics - Asia 2017 (ICCE)
5. International Conference on Computational Systems and Information Technology for Sustainable Solution [CSITSS]-RVCE_21 Dec, 2017

National events

1. BEC-IEEE “Robust event in NOVUS 17-a national level technical symposium
2. BEC-IEEE “Overhaul
3. On account of fIEEEsta IEEE Annual Fest VVIET IEEE Student Branch had conducted National Level Seminar on "Innovation & Entrepreneurship" on 10th May 2017 at Vidya Vikas Institute of Engineering & Technology
4. HIT QUEST-2017
5. KAGADA-2017- IEEE UVCE
6. IMPETUS - national level annual technical fest of IEEE UVCE
7. The National Level ROBODIUM @ ASE - RASE'17 is an Annual National Level Robotic Competition



IEEE ICNL Congratulates Prof Anurag Kumar

for the prestigious IEI IEEE Award for Engineering Excellence 2017.

The award was conferred on Prof Anurag Kumar in the recently concluded IEEE Bangalore section's International flagship conference CONECCT during 16-17 Mar 20182.

Cognitive Robotics

Cognitive robotics is a field of technology involving robots that can learn from experience, from human teachers, and even on their own, thereby developing the ability to effectively deal with their environment.

Most robotics researchers use animal reasoning as the basis for the development and evolution of robotic behavior and intelligence. The primary goal is to make the robot act and react appropriately in real-world situations. Common elements and functions of a so-called smart robot include:

- Machine vision
- Voice recognition
- Speech synthesis
- Proximity sensing
- Pressure sensing
- Texture sensing
- Anticipation and planning
- Programmable motion
- Imitation of motion
- Teachability
- Ability to learn from mistakes
- Long-term knowledge acquisition
- Ability to explore on its own

Source: <https://whatis.techtarget.com/definition/cognitive-robotics>

IEEE Kerala Section Events

IEEE – NIELIT Workshop on Linux Device Driver Development



development of common Device Drivers. There were 43 participants representing academia, young entrepreneurs and industry professionals

Event URL : <http://nielit.gov.in/content/ieee-workshop-linux-device-drivers>

IEEE – NIELIT Workshop ‘IoT Primer’



Programming fundamentals, Interfacing Sensors & Actuators, IoT Protocols (MQTT, CoAP etc), Dashboards & Connectivity etc . The workshop concluded by a capstone project by the participants. There were 46 participants representing academia, young entrepreneurs and industry professionals . There were participants from companies like Robert Bosch, VM Ware , Sigtech Wireless Technologies , to name a few

Event URL : <http://nielit.gov.in/calicut/content/workshop-ieee-internet-things-primer>

Raspberry Pi Workshop



College of Engineering Attingal. The workshop was attended and benefited by 24 IEEE members and seven non IEEE members.

Robot teacher which can also dance being tested in Finland: A language-teaching humanoid robot named Elias is being tested at a primary school in Finland. The one-foot-tall robot, which can also do the 'Gangnam Style' dance, can speak 23 languages and is equipped with a software to understand students' requirements and encourage learning. It also recognises the pupil's skill levels and adjusts its questions accordingly

Workshop on IoT



workshop. An IEEE Awareness was also given to all participants of the workshop.

IAS/IES/PELS Joint Chapter of Kerala Section together with IEDC Unit of Musaliar College of Engineering, Chirayinkeezhu conducted a workshop on IoT during Mar 9 – 11 at Musaliar College of Engineering. Prof Muhammed Kasim, Chair IAS/IES/PELS Joint Chapter inaugurated the workshop. Prof Arif M K, HOD CSE & Ms Aswini, IEDC Coordinator of CE Dept. attended the function. Mr Achus & Mr Nandan from Neo Green Labs, Kochi handled the workshop sessions. The workshop was planned with 80% hands-on training. Training was given with 3/4 students per team. 41 students from Civil, Mechanical, Electrical & Electronics attended this useful

Event SAATHI



SAATHI is about being a companion, co-traveller and a facilitator encouraging girls to use their abilities to get involved in technical industry and make them aware of the vast pool of opportunities available to them. This event held on 10th Mar 2018 at Aanandanilayam Orphanage, Manacaud Trivandrum started with few activities for the kids which gave them an opportunity to identify their talents and also their courage to present to an audience was put to test. After the ice breaker session, K B Senthilkumar, Chair IEEE Computer Society Kerala Chapter gave the kids an introduction regarding IEEE, Computer Society and Women In Engineering & Computig. This was followed by the keynote address from the Chief Guest Mrs. Jyothi Ramaswamy Treasurer, IEEE Kerala Section. She gave a brief talk regarding the present scenario in the tech industry. She explained the opportunities that lie ahead of them and the ways in which they can latch on to them. In the following Q&A session, questions put forward by the kids were answered by the guests. The key point in this session was how girls can achieve their dreams. Then there was a cake cutting ceremony. The cake was distributed amongst all the students and the staff of Aanandanilayam. Meanwhile, the kids were allowed to interact with the guests. Later on, the kids were let into a few fun activities which made their day more memorable.

Look out for more details on the following WIE event scheduled on 7-8 Sep 2018.



Police use dead man's finger to try to unlock phone in US
Researchers from the Massachusetts Institute of Technology have developed a device which allows users to control their sleep.

IEEE Kolkata Section Events

39th Annual General Meeting



The 39th Annual General Meeting of the IEEE Kolkata Section was held on Monday, January 15, 2018 at 19-30 hrs. at 'The Lalit Great Eastern' 1,2,3 Old Court House Street, Dalhousie Square, Kolkata 700069. The AGM was attended by more than 200 IEEE members. The total 14 active chapters, three affinity groups, one India Council Chapter and one Sub-section participated in the AGM.

IEEE Heritage Institute of Technology Student Branch



The IEEE Electron Devices Heritage Institute of Technology Student Branch Chapter organized a 3-day hands-on Autonomous Robotics Workshop 'Lord of the Tracks 1.0' during 20-22 February 2018. Ten teams comprising of 40 students from second year B.Tech. ECE participated in the workshop. The teams were mentored and guided by 10 student member volunteers, Student Branch Counselor Dr. Mousiki Kar and ED HIT SBC Advisor Dr. Atanu Kundu.



The IEEE Electron Devices Heritage Institute of Technology Student Branch Chapter organized a 3-day hands-on Autonomous Robotics Workshop 'Lord of the Tracks 2.0' during 13-15 March 2018. The workshop was proactively executed by 10 student member volunteers, Student Branch Counselor Dr. Mousiki Kar and ED HIT SBC Advisor Dr. Atanu Kundu. A total of 45 students from 2nd year B.Tech. ECE participated in the workshop.

IEEE IAS Kolkata Section

The first technical lecture meeting of the IAS Kolkata for 2018 is planned to be conducted on 26th March 2018 at Indian Institute of Engineering Science and Technology, Shibpur, Howrah in which . Dr. Karun Malhotra, Managing Director, Murata Business Engineering (India) Pvt. Ltd., will speak on "Opportunities in Power Electronics". The seminar will focus on two main topics. -- energy eco-system and the technologies, products and strengths (and limitations) of Murata.

IEM-IEEE Communications Society Student Chapter

The chapter, since its formal approval from IEEE on 16th Feb 2018; has been working for the preparations and successful completion of three major events, viz. The Cryptanalysis Workshop (13-14 Mar 2018), De Cipher (31st Mar and 1st Apr 2018) and eHaCON (6th and 7th Apr).

Cryptanalysis Workshop



This was a two day workshop held during 13-14 Mar 2018 with an inaugural address by Dr. Mohuya Chakraborty, HoD/IT. The workshop attended by students of various branches was conducted by Prof. Tapan Kumar Hazra, Dept of IT and Prof. Arup Kumar Chattopadhyay, Dept. of IT. The topics discussed included: Steganography and its types, viz. image, text and audio; Implementation of steganography of image and extraction of hidden message; Cryptography and various encryption techniques with the different types of Ciphers; and frequency analysis with examples. This workshop was aimed to provide a guiding platform to preparation for the upcoming coding event De Cipher.

National Seminar “Renewable Energy Converters And Storage Towards Efficient Power Utilization” .



A national seminar on Renewable Energy Converters and Storage towards Efficient Power Utilisation was organized by Electrical Engineering Section, Department of Applied Physics, University of Calcutta under the auspices of UGC SAP DRS II program on 17th Feb 2018 at Meghnad Saha Auditorium, University of Calcutta. The program was technically co-sponsored by IEEE Kolkata Section, IEEE-PES, IEE-CSS-IMS, IEEE-IAS, Kolkata chapters, Center for Excellence in Green Energy and Sensor Systems (CEGESS), IEST, Shibpur, Howrah and financially supported by IET, Kolkata Network.

Prof. Jitendranath Bera, Coordinator of DSR II program of Applied Physics welcomed the gathering.. Dr. Kaushik Das Sharma briefly spoke on the present activities related to development of smart grid prototype initiatives of the Department. Professor Amlan Chakrabarti, Dean, Faculty of Engineering and Technology, University of Calcutta delivered the inaugural address. Professor Subhsis Neogi, ex-Director, School of Energy Studies, Jadavpur University delivered the address as a Guest of Honour. Dr. Amitava Biswas delivered vote of thanks to all. the other speakers were: Prof Sujit K. Biswas, Ex. Professor, Jadavpur University and Chair IEEE Kolkata Section; Professor Partha Sarathi Sen Sharma, IIT, Kanpur; Er. Abhishek Ghosh, Exide R & D India Ltd; and Er. Alekhya Datta, TERI, New Delhi. The sessions were chaired by Er. Sanjoy Kar Chowdhury, CESC Ltd., Kolkata and Er. Satyaban Roy, Ex-Chief Engineer, WBSEDCL, Kolkata. The event was attended by a total 288 participants, including 19 faculty members, 21 industry professionals, 15 research scholars and the rest students of UG & PG in engineering.

IEEE Bhubaneswar Sub Section Activities

IEEE: Orientation, Membership Benefits and Volunteering Opportunities



The first activity of the year 2018-19 was a talk on "IEEE: Orientation, Membership Benefits and Volunteering Opportunities" by Ankit Dave, an IEEE Young Professional on 16th Feb 2018 at IIT Bhubaneswar. Dr. Subhransu Ranjan Samantaray, Secretary, IEEE Bhubaneswar Sub Section and Dr. Debi Prosad Dogra, Treasurer, IEEE Bhubaneswar Sub Section, Councilor, IEEE Student Branch addressed the students on this occasion. 45 students including B.Tech, M.Tech and Research Scholars attended this talk.

China bank opens 1st unmanned branch with robots, holograms: A state-owned Chinese bank has opened the country's first unmanned bank equipped with robots and machine holograms to talk to customers. The bank uses facial recognition technology for identification while a robot greets customers at entrance to answer questions. Machines inside the bank allow visitors to buy gold, change currency, or scout real estate investments using virtual reality goggles.

Wikipedia lets users preview pages before opening hyperlinks

CONNECTERE 1.0: Workshop on Networking Fundamentals



The workshop on basic networking fundamentals was conducted on 24th Mar 2018 in the School of Electrical Sciences, IIT Bhubaneswar for the students of the institute at free of cost. The workshop started with a Welcome address by Dr. Debi Prosad Dogra, Treasurer, IEEE Bhubaneswar Sub Section, Councilor, IEEE Student Branch. The lecture on “Transformation from Computer Network to SDN” given by Dr. P. L. Bera from SES, included FTP Applications, Client Server Applications, Network

Topology, SDN Flow Setup and Control etc. Hands-on session on networking simulators such as mininet, OpenDayLight, OpenFlow 2.0 was also provided to the participants. Out of 80 plus students applied for the workshop, 40 students were shortlisted and 36 from various disciplines attended and completed the workshop successfully and received the certificate.

IEEE Techno India College of Technology Student Branch Activities



Techno India College of Technology jointly organized a two-day workshop with CDAC-Kolkata on “Emerging Technologies and Applications in Electronics and Information Technology” during 21-22 Feb 2018.

Dr. Amit Chaudhuri, Group Head ICT & Services, CDAC-Kolkata inaugurated the workshop in presence of Dr. R.T. Goswami, Director, TICT; Shri Alokesh Ghosh, Joint Director, CDAC and other dignitaries.

The speakers, in this two day’s workshop, attended by over 100 students from different Techno India Group colleges, discussed the current scenarios to implement latest technologies in Electronics and Information Technology. Sessions were conducted by eminent speakers from CDAC-Kolkata and Jadavpur University which include: Dr. Amit Chaudhuri Group Head ICT & Services, CDAC-Kolkata; Dr. Nabarun Bhattacharyya, Director, CDAC-Kolkata; Prof Rajib Bandyopadhyaya, Jadavpur University; Shri Ritesh Mukherjee, Joint Director, CDAC; Shri Biswajit Saha, Joint Director, CDAC; Dr. Arun Jana, Senior Engineer, CDAC; Shri Amitava Akuli, Principal Engineer, CDAC; and Shri Sanjay Chowdhury, Joint Director, CDAC.

Device streams videos using 10,000 times less power: University of Washington researchers have developed a device which consumes up to 10,000 times less power to stream videos. They claimed to offload most of the energy-consuming work to another device using wireless transmissions. The device, which can be attached to glasses, was able to broadcast a 720P signal at 10 frames per second from a customised camera, researchers added.

Amazon working on building household robots: The robot prototypes have advanced cameras and computer vision software and can navigate through homes like a self-driving car. The company is expecting to seed the robots in employees' homes by the end of this year, and potentially with consumers as early as 2019.

IEEE EMBS Student Chapter Activities

Special Lecture on "EXPLORING THE POTENTIAL OF MEMBRANES FOR HELIUM SEPARATION FROM NATURAL GAS"



School of Bioscience and Engineering and IEEE EMBS student chapter (Jadavpur University) organized a Special Lecture on "EXPLORING THE POTENTIAL OF MEMBRANES FOR HELIUM SEPARATION FROM NATURAL GAS" By Dr. Ujjal Kumar Ghosh, Ph.D. Assistant Professor, College Of Engineering Qatar University on 29th Jan 2018. The talk imparted knowledge on basics of Helium separation from Natural Gases and the use of different kinds of membranes in that process. The lecture also imparted an overview of the application of helium gas in different sectors. Students from Jadavpur University, Heritage Institute of Technology, Netaji Subhash Engineering College and University of Engineering and management attended the lecture and benefited. Prof Chiranjib Bhattacharjee, Professor, Department of Chemical Engineering and Dean, Faculty of Engineering Jadavpur University delivered the closing remarks and also shared few of his experiences. Dr. Sukumar Roy, HOD, Netaji Subhash Engineering College also shared his valuable comments on IEEE student chapter and importance of special lectures.

IEEE Young Professional Affinity Group, Kolkata section Activities

IEEE YP technically sponsored 5th International Conference on Emerging Applications of Information Technology (EAIT 2018), at Indian Institute of Engineering Science and Technology (IEST), Shibpur, West Bengal, during 11-13 Jan 2018.

IEEE YP organized a lecture on "Chaos based Security and Authentication in Public Domain Communications" by Prof. J. K. Mandal, Department of Computer Science & Engineering, University of Kalyani, West Bengal, at Computer Science and Engineering Dept., Jadavpur University, on 8 Feb 2018.

IEEE YP technically sponsored Technological Fest at Bengal Institute of Technology, Kolkata, West Bengal, during 22-23 Feb, 2018.

IEEE Photonics Society Kolkata Section Activities

The IEEE Photonics Society Kolkata Section organized an outreach program on 10th Mar 2018 in Badaldih High School, Purulia to celebrate the National Science Day jointly with the IEEE Calcutta University student branch. The program was to increase awareness and interest in science among the students of schools. The participants numbering around 100 were students of Class IX – XI from Badaldih high school and seven other nearby schools. Sri P. C. Mahato, Headmaster of school presided over the inaugural session following which there were two lectures by Prof. P. K. Basu and Prof. N. R. Das on "Application of photonic devices in daily life" and "Light around us" respectively. The main emphasis of the program was the demonstration of Hands-on models on different aspects of basic and applied sciences prepared by students of IEEE student branch of Calcutta University and members of IEEE Photonics Society Calcutta Chapter.

The models were on Electricity, Magnetism/ Electromagnetism, Properties of Light, Heat and few daily life usages of science and technology demonstrated by Paulami Rakshit, Shampa Guin, Sonali Basak, Santu Sarkar, Soumyadip Das, Shreerupa Biswas, Piyali Mukherjee, Anamika Das, Moubani Bandyopadhyay and Madhusudan Mishra. The program was very successful which was reflected from the feedback of students and teachers. They also requested us to organize similar program in future.

ED MSIT Student Branch Chapter Activities

The ED MSIT Student Branch Chapter and MSIT Student Branch, in association with the Department of ECE, MSIT organized a one day IEEE EDS DL by Prof. Muhammad Mustafa Hussain, Professor, Electrical Engineering Computer

Electrical Mathematical Science and Engineering Division King Abdullah University of Science and Technology (KAUST) on 11th Jan 2018. The DL on "Electronics for all" was attended by around sixty students including 25 IEEE student members. All the students were immensely benefitted by the DL and the interactive sessions after the lecture.

One week summer training on "Advance VLSI Design and IoT" was organized by the ED MSIT Student Branch Chapter in association with the Department of ECE during 5-12 Jan 2018 in the Advance VLSI Design Lab. The program was organized to guide the Pre-Final year students towards the Advanced VLSI design and embedded systems. Mainly Transistor level modelling and simulation of the arithmetic and logical building blocks using Non-planar MOSFET, Internet on Things (IoT) based projects etc were dealt in depth. A total 20 students attended this program out of which 13 were the IEEE student members. Students were immensely benefitted from the training as it has enriched them for the final year major projects.

A membership awareness program was organized by the IEEE ED MSIT Student Branch Chapter on 13th Feb, 2018 to share the importance of IEEE membership and the activities of the ED SBC with the 2nd year students of the Dept. of ECE.

On 24th Mar, the event, "Electroclash" was organized by ED MSIT SBC in association with the "Megatronix" club in "PARIDHI 2018. The event was based on "spot simulation" and certain problem statement was provided to individual one. The student who could provide an optimal solution using minimal components for the program was given the prize. A total of 38 members registered for the event including 20 IEEE members.

The event "Electro-survivor" was organized by the ED MSIT SBC on 25th Mar in association with the "PARIDHI 2018". This event was organized to encourage the students towards circuit design in the field of electronics. 22 teams of two members each participated in the event including 30 IEEE student members. The first round was circuit rectification and the next round was to design a circuit on the basis of problem statement given.

Student Branch, JIS College of Engineering Activities

On 21st Feb 2018, JIS College of Engineering organized an International Conference on impact of digital co creation in business.

On 13th Mar 2018 the student chapter had organized a Special Lecture (SL) on "Application of Power Electronics for Control of Electrical Apparatus" by Prof. Debasish Chatterjee, Professor, Jadavpur University.

On 29th Mar 2018, a guest lecture (GL) by Dr. Partha Sarathi Bera on "Power System Stability & Protection" has been organized.

Reports compiled and presented by: Dr. Atanu Kundu, Secretary, IEEE Kolkata Section, kundu.atanu@gmail.com

Unhappy People	Happy People
Wait for something to make them happy	Feel happy now, enjoy every moment of their life
Envy successful people	Admire great achievers, learn from them
Envy what others have	Enjoy what they have
Brooding, vengeful	Understanding, forgiving
Self-focused, antagonistic	Compassionate, loving, sociable
Frustrated	Self-confident, kind, and friendly
Negative thinkers	Positive thinkers
Fear change	Create positive change
Hate their job	Love what they do
Stressed	Creative, innovative

IEEE Madras Section Events

SSN COLLEGE OF ENGINEERING: All India IEEE Computer Society Students Young Professionals Congress 2017



enhance their technical knowledge on Artificial Intelligence & Machine Learning.

The 7th edition of **All India IEEE Computer Society Students Young Professionals Congress (AICSSYC)** was held at *SSN College of Engineering, Chennai* during 17-19 December 2017. The event was organized by IEEE Computer Society and co-sponsored by IEEE MGA Young Professionals, IEEE Region 10 Young Professionals, IEEE MGA Women in Engineering, IEEE MGA Student Activities Committee, IEEE Region 10 Student Activities Committee. The program served as a platform for 200+ students and Young Professional participants all around India to collaborate, network and

Day 1: Ice Breaking & Inauguration

On the first day of the Congress, an inter-section badminton match was organized as an ice-breaking activity for the participants. The participants had an exciting networking experience with the participants from other Sections and had a lot of fun.

The Congress was formally inaugurated by the following dignitaries.

- Mr. Roger Fujji, *Past President of IEEE Computer Society*
- Mr. Eric Berkowitz, *Membership Director, IEEE Computer Society*
- Dr. M. A. Atmanand, *Chair, IEEE Madras Section*
- Mr. H. R. Mohan, *Vice-Chair, IEEE Madras Section*
- Dr. S. Salivahanan, *Principal, SSN College of Engineering, Chennai*
- Dr. T. Sree Sharmila, *Student Branch Counselor, SSN College of Engineering, Chennai*
- Mr. Prasanth Mohan, *Program Chair, AICSSYC 2017*

As part of the inauguration ceremony, the winners of Richard E Merwin student leadership scholarship were facilitated. The inauguration was followed by a cultural performance of the host.

Key note talks from 3 of the eminent speakers Mr. Shri Ram Viswanathan (IBM Distinguished Engineer), Mr. Girish Mathrubootham (CEO, Freshworks) & Ms. Visalini (World record holder for highest IQ) inspired the attendees of the program. The first day concluded with a banquet dinner and an informal fun activity hosted by YP volunteers.

Day 2: Technical Talks on AI & ML

The second day of the Congress kick started with a early morning local tour to shore temple and beach at Mahabalipuram, Chennai (UNESCO heritage site). The tour served as an opportunity for the delegates to network with each other, enjoying the sun rise at the beach.

Engaging sessions by the following speakers focused on the theme of the Congress 'Artificial Intelligence & Machine Learning' excited the participants throughout the day.

- Mr. Pradeep Gullipali (*Co-founder, Tiger Analytics*)
- Mr. Venkatesh Sarangan, (*Principal Scientist, TCS*)
- Mr. Ram Tilak, (*Data Scientist, HP Singapore*)
- Mr. Narayanan (*Product Engineer, Invention labs*)
- Mr. Mohan Shivam, (*Founder & CEO, GAMASOME*)
- Ms. Prathyusha Karamjugudda (*Co-founder, Muse wearables*)
- Mr. Ramprakash Ramamoorthy (*Member, Leadership staff, Zoho labs*)

The traditional lunch with local cuisines was a surprise delight for all the participants. Post the sessions, a gala cultural night and DJ was organized by the hosts. Attendees exhibited their talents through dance, songs and various art forms. The evening was one amazing experience for the participants, encompassing memories to cherish forever.

Day 3: Professional development & volunteering with IEEE

On final day, the much awaited talks related to professional development and volunteering with IEEE, the largest technical professional organization were delivered by the following speakers:

- Mr. Nivas Ravichandran (*IEEE Region 10 Young Professionals Coordinator*)
- Mr. Anand Balu (*Former co-program leader, Startup Leadership Program*)
- Mr. Madhan Karky (*Indian Lyricist & Researcher*)
- Mr. Rajendra Dhandapani (*Director of Engineering, Zoho*)
- Ms. Pavithra Balakrishnan (*Founder & Product Director, Galvanize*)
- Mr. Shyaam Subramanian (*Chief People Officer, Teach For India*)
- Mr. Senthil (*CEO, GeeksUp*)
- Mr. Eric Berkowitz (*Membership Director, IEEE Computer Society*)
- Mr. Roger Fujii (*Past President, IEEE Computer Society*)

Parallel Tracks: Merwin Ambassadors Meet & IEEE CS Student Chapter Exhibition

A formal meeting for Merwin ambassadors was organized as a parallel session. 17 student/YP ambassadors across India attended the meeting to brainstorm on the various projects that they execute to engage the IEEE CS members in the region. IEEE CS Student Chapter exhibition was hosted to amplify the best practices / events to engage the student members. Several student chapters across India participated on the exhibition. IEEE CS Chapter of VIT Vellore was announced as the winners and received a cash prize of \$150.



Valedictory ceremony

Before the closing ceremony, the launch of the CSIS website took place. Mr. Roger Fujii & Mr. Eric Berkowitz appreciated and facilitated all the volunteers who were responsible for the success of the AICSSYC with certificates of appreciation. IEEE CS Compute newsletter team volunteers were also applauded during the closing ceremony. The program received wonderful feedback from the participants. It was an incredible experience for the Young Professionals, to improve their networking experience and professional skills. AICSSYC ignited the spark on the Young Professionals to contribute more to the community.

Report by: Dr. T. Sree Sharmila, sreesharmilat@ssn.edu.in

Google rolls out Search feature for jobs in India: It will allow users to look for employment opportunities in Search. The company has also partnered with job search platforms including LinkedIn and QuikrJobs for the same. The feature offers filters like location, type, and field, and is available on the Search app for both Android and iOS users.

VIT Vellore: Awareness programme on ICT Standards, Benchmarks and Guidelines



Vellore Institute of Technology, Vellore hosted a One-week awareness programme on ICT Standards, Benchmarks and Guidelines (12-16 March 2018) focusing on the following 5 core subjects: Computer Hardware, Operating System, Computer Networks, Database Management Systems and Programming Languages.

The event was organised by School of Information Technology & Engineering in association with IEEE CS, ACM and CSI student branches of VIT Vellore.

The student members had set up info booths for creating awareness to these professional societies and their roles in formulating ICT standards, benchmarks and guidelines.

The programme was attended by about 570 participants in different activities of the programme such as (a) Invited talks from working professionals from ICT industry on the role of standards, benchmarks and guidelines in enhancing organizational productivity and quality of products and services (b) Presentation by faculty members on leading organizations engaged in formulation of standards, benchmarks and guidelines (c) Presentations by final semester project students - sharing their experience how they used/incorporated standards/benchmarks/guidelines in their project (d) Oral and poster presentations by students on standards, benchmarks and guidelines (e) Quizzes.

Mr. Christopher G Hudson, Principal Consultant, TCS inaugurated and delivered keynote speech on 12th March 2018. In his speech, he deliberated upon the significance of standards, benchmarks and guidelines in distributed product development scenarios. He shared his experiences of leveraging distributed software development teams to deliver exceptional results. Mr. H.R. Mohan Fellow & Past President, CSI and Vice Chair, Professional Activities & Editor, ICNL, IEEE India Council graced the valedictory as the chief guest on 16th March 2018.

On 13th March 2018, Prof. H.R. Vishwakarma shared a few opportunities for faculty and students to work with leading organizations that are engaged in formulation of ICT standards, benchmarks and guidelines.

On 14th March 2018 Mr. Devarajan Mohan, Head, Offshore Service Delivery, TCS Chennai delivered an invited talk on role of standards, benchmarks and guidelines in ICT infrastructure management. On 14th March 2018, Mr. Chandrasekharan K, former Associate Vice President - HCL Technologies Ltd, Bangalore presented an overview on how software engineering standards evolved overtime and deliberated on software coding standards.

On 15th March 2018, Prof. K. Ganesan delivered a talk on Motor Industry Software Reliability Association (MISRA) C Software Development Standard. On 16th March 2018, Dr. Anand Subrmanian, Senior Delivery Manager, IBM India Pvt Ltd, Bangalore the role of standards in software project management.



On 16th March 2018, Mr. H.R. Mohan Fellow & Past President, CSI and Vice Chair, Professional Activities, IEEE India Council and Dr. S. Koteeswaran, Dean-Research, Dept. of CSE, VelTech and Treasurer of IEEE CS Chapter, IEEE Madras Section conducted a quiz on the latest developments in ICT.

Dr. Aswani Kumar, Dean, School of Information Technology & Engineering and Dr. B. Valarmathi, Head of Department of Software and Systems

Engineering, Prof. H.R. Vishwakarma and Dr. G. Jagadeesh coordinated the programme.

Report by: Prof. H.R. Vishwakarma, hrvishwakarma@vit.ac.in

Autonomous robot assembles Ikea chair in under 9 mins: Nanyang Technological University (NTU) has developed an autonomous robot assembling furniture giant Ikea's chair in 8 minutes 55 seconds. The robot, powered by NTU-coded algorithms, comprises a 3D camera and two robotic arms featuring grippers to pick up objects.

IEEE Pune Section Events

Workshop on Design and implementation of Industry Relevant Computer Science Curriculum



A workshop on Design and implementation of Industry Relevant Computer Science Curriculum for B.E/B. Tech was organized on 4th Jan 2018 by TCS with the co-sponsorship of IEEE Pune Section.

TCS, the largest IT company in India had come up with an Integrated Degree Program on Computer Science and Business Management and presented it to Principals, Deans, HOD (CS) and senior faculty of reputed Engineering Colleges in Pune to gather their feedback on the proposed curriculum along with finding the interest of the institutions in implementing this program.

The presentations were made by Dinanath Kholkar, Vice President and Global Head of Analytics & Insights, TCS; Ranjan Bandopadhyay, Vice President HR, TCS; and Asoke Dassarma, Transformation and Change Management, Cognitive Business Operations, TCS.

About 30 academicians attended the event and brainstormed the suggested program.

Workshop on Agriculture



A workshop on Agriculture was held on Monday, 8th Jan 2018 at TCS Sahyadri Park, Pune with the key stakeholders including IEEE; TCS A&I and mKrishi teams; Maharashtra Grape Growers Association; Rural Relations; and Individual contributors and experts

The purpose of this workshop was to develop a road map for the Agriculture Initiatives in collaboration with key stakeholders and experts. The following are the discussion points and action items from the workshop.

Discussion Points

1. Make agriculture a viable profession Form IEEE Chapter on Agriculture can be the key focus area.
2. Need to encourage women participation at various levels in the field of agriculture.

3. Need to focus on skill building.
4. Empower farmer via technology and partnerships
5. Partnering with ICAR (Indian Council of Agriculture Research, New Delhi)
6. Transforming rural livelihoods through platform solutions. It has potential to eliminate the middle man.
7. Application of IT in Precision Agriculture was shared by Dr Khilari through various examples
 - a. Water, Nutrition Management and yield monitoring. Water management has a major gap in India.
 - b. Application of Sensors in various Crop Monitoring Phases eg soil moisture level and leaf moisture level
 - c. Certification and Traceability
 - d. Pest and Disease Forecasting Models
 - e. Crop Density Identification
 - f. Export Market Compliance and Real Time Tracking of Commodity Container at Global level
 - g. Use of LIDAR for precise chemical/pesticide application
 - h. Crop harvest criteria and dissemination/adoption of information
 - i. Use of Infrared imagery for water status estimation
 - j. Local issues such as incident of bats
 - k. Opportunities in Precision Viticulture
8. Scope to leverage ITIL for incident management in agriculture
9. Development of Low Cost Instruments and Equipment's for Agriculture Operations
10. Gyan Key can act as a conduit to the last mile. Need to work with Sarpanch, Principal and Post Master who are three key opinion leaders in the village.
11. Create "Success Stories" across region, crops and disseminate by using mKRISHI® Platform. Rural India is progressing rapidly due to girls taking education and youth being inspired. Branding of farming and farmers to ensure social stature.
12. Nano Videos: High impact stories to be captured in Nano video's and share via mKRISHI® Platform. Can also publish a book.
13. IEEE can help define Standard's in Agriculture Field
14. Formation of IEEE Chapter in Agriculture Colleges. For this purpose. IEEE can collaborate with ICAR
15. Digitization of Dr. J.M. Khilari's work in Viticulture
16. Strong relationship and trust building with Farmer is crucial for bringing change in Agriculture. Need to focus on villages with 2000 plus population and having weekly bazaar.
17. Android phone and education are great enablers
18. Research on low cost IOT solutions
19. Create a institute for entrepreneurship development in Agriculture colleges

The following Action Items were identified with the key persons involved to carryout them.

- Establishing IEEE & ICAR Collaboration
- Formation of Agriculture Chapter in IEEE Pune Section. Focus on IEEE Standardization Process
- Deployment of platform for Grape Farmers with the help of Dr. J.M. Khilari
- Digitization of Dr. J.M. Khilari's work in Viticulture
- Collaboration with Rural Relations
- Organize an IEEE event on Agriculture

Workshop on Review of Integrated CSE Course Structure

A workshop to review of the Integrated Computer Science and Business Management program for B.E./B.Tech students was held on 29th Jan 2018. The event was organized by TCS Pune with IEEE Pune Section as the co-sponsor.

The TCS designed, course structure for the Integrated Degree Program on Computer Science and Business Management was reviewed by a group of 14 well-known experts from academia and Industry and changes were suggested. Mr. Asoke Dassarma, Head, Transformation and Change Management, Cognitive Business Operations, TCS, was the resource person from TCS.

Seminar on Membership Drive



A seminar on membership drive was held on 20th Jan 2018 at G. H. Raisoni College of Engineering by the Dept. of CSE. Dr. Neha Sharma, Professor, Institute of Industrial and Computer Management and Research (IICMR), Nigdi, Pune provided an overview and highlighted the benefits of IEEE Student Membership to around 200 students participated in the drive including 24 existing IEEE members, 170 UG/PG/PhD students and 6 faculty. :

SB Counsellors and Office Bearers Meet



A meeting of Student Branch Counsellors was held on Saturday, 3rd Feb 2018 at TCS Nyati, Pune with the following agenda

1. Talk on “Industry 4.0” by Dinanath Kholkar, Chair, IEEE Pune Section
2. Updates from IEEE R10 by Dr Rajesh Ingle
3. Status updates by Student Branch Counsellors/Office bearers

The discussion points of the meeting included the following:

1. Creating a tab on IEEE Pune website for students with some areas of interest on which they can use technology as a means to impact social lives of a larger group of people. Identifying problems and then using technology to create solutions. “Work where there are problems”
2. Detailed FAQs clarifying points mostly regarding the petition for student branch formation, filling forms with correct address.
3. Creating a mechanism for event submission on website from all section stake holders
4. Frequent membership drives in all the colleges and industries
5. Making a digital flyer which provides a mind map about how can they justify paying the membership fee and visibility on benefits.
6. Efforts towards retention of graduating students to professional members and engaging them for section activities.
7. Frequent professional and competency building programs
8. Revamping of Section website to make it more user friendly and attractive.
9. Encourage entrepreneurship activities amongst students.

Preparatory workshop on Affordable Agriculture



A preparatory workshop was held on 28th Feb 2018 in AISSMS College towards preparation for a larger event to be hosted by the Special Interest Group (SIG) on Agriculture which is a part of IEEE Pune Section with the following agenda.

- Context setting for the formation of the Special Interest Group (SIG) on Agriculture by Jagdish Chaudhari
- Discussion on potential opportunities and challenges in the field of agriculture.
- Brainstorming on the vision for the initiative
- Listing down the immediate next steps

The discussion points of the workshop include:

- There was a consensus within the group regarding huge opportunities in the field of agriculture and potential for IEEE to contribute in terms of technology leverage for farming.
- The group felt that the government's program for doubling the farmer's income could be a good starting point for our work.
- There was a brief discussion around the Research & Innovation model being used at Pabal Vidnyan Ashram and the need to replicate it in other Engineering colleges.
- Emphasis on encouraging inter disciplinary work in engineering colleges to find solutions.
- The group agreed on the need for exposing engineering students to domain knowledge on agriculture. For this purpose it was agreed to collaborate with the Agriculture College.
- It was agreed that we should make an attempt to form an IEEE student branch in the College of Agriculture Engineering.
- It was agreed to start small and do quality work with around 5 engineering colleges for creating affordable agriculture labs or Center of Excellence to drive innovation. Following colleges were listed as potential members for the phase 1 implementation.
 - PICT
 - College of Agriculture Engineering
 - MIT
 - AISSMS
- The group agreed that few more informal meetings will be required for ensuring foundational work on this initiative.

Facebook wearable lets users 'feel' incoming messages: Facebook has developed a wearable device that allows users to receive messages without looking at their smart devices, and feel them through their skin. The system transmits a vibration pattern representing words in the message to the users' arm for the purpose. Reports said people were able to learn 100 words with 90% accuracy after 100 minutes of training.

Apple unveils robot that recycles iPhones: Apple has unveiled a new robot 'Daisy' which can disassemble iPhones to recover components that contain high-quality materials. Daisy has been made from Apple's Liam robot which was launched in 2016 and is capable of disassembling nine versions of iPhones. The new robot, which can also sort high-quality components for recycling, can take apart up to 200 devices per hour.

IEEE Circuits and Systems Society Events

IEEE International Conference on Circuits and Systems



IEEE International Conference on Circuits and Systems (ICCS 2017) organized by IEEE Circuits and Systems Society (CASS) India chapter in association with IEEE India Council was conducted successfully at Mar Baselios College of Engineering and Technology, Thiruvananthapuram during 20-21 Dec 2017

The inaugural function was held on 20th Dec. Dr. Jayakumari. J, Chair, IEEE CASS India chapter welcomed the gathering. The conference was inaugurated by Dr. K. Giridhar, Professor, Dept. of EE, IIT Madras. Dr. Rominus Valsalam, Former Director, Electronics Research and Development Centre of IIT, Thiruvananthapuram delivered the Chief Guest address. Dr. T. M. George, Principal, Mar Baselios College of Engineering and Technology, Thiruvananthapuram released the ICCS 2017 conference proceedings. Dr. K. Giridhar, delivered a keynote address on “How will 5G be useful to India” and Er.T.cAnanthavelavan, Principal Engineer, Microchip, Chennai delivered a keynote address on “Array Signal Processing - Adaptive Beamforming using array of MEMS microphones”. These keynote sessions were followed by technical paper presentations in 5 parallel sessions.

All the technical sessions were chaired by experts in the field. This conference received a good response from wide spectrum of scholars and there were four tracks - Communication & Networking, Signal Processing, VLSI & Embedded Systems and Power & Energy Systems.

On 21st Dec, Dr.Saman Halgamuge, Professor and Director of Research School of Engineering, ANU College of Engineering and Computer Science, Australian National University delivered a keynote address on “Smart Mini Grids: Exploring Near Off-Grid Solutions” and Er. Sudalaimani. C, Scientist D, Health and Software Technology Group, CDAC, Trivandrum delivered a keynote address on “Brain Signal Processing and it’s applications”. These keynote sessions were followed by technical paper presentations in five parallel sessions. Best Paper Awards were constituted to recognize in various tracks of this event. The awards were decided based on general quality, originality, contributions, subject matter and timeliness. Totally four best papers were selected and awarded. The conference concluded with a valedictory function on 21st Dec in which Dr.Saman Halgamuge, delivered the valedictory address and distributed the Best Paper Awards and certificates.

Report by: Dr. Jayakumari. J, Chair, IEEE CASS India chapter, hellojayakumari@rediffmail.com

Microsoft launches its first product based on Linux: Microsoft is launching a product based on former rival technology Linux kernel for the first time, announcing a new operating system Azure Sphere. The product will help improve the security of internet-connected devices. Notably, former Microsoft CEO Steve Ballmer had called Linux a "cancer" in 2001 but said he "loved" a Microsoft release in 2016 which was compatible with Linux.

Amazon launches web browser in India which uses less data

India Council IEEE PES Chapter, Bhubaneswar: Events

National Workshop on Emerging Technologies in Electrical Power Engineering (NWET-2018)



India Council PES IEEE and IEEE Bhubaneswar subsection extended technical sponsorship to the National workshop on emerging technologies (NWET 2018) hosted by the Electrical and Electronics Dept. of Silicon Institute of Technology Bhubaneswar from 8th Feb 2018 to 10th Feb 2018. This workshop addressed “Advances in Power Transmission” covering:

- An overview of the recent advances in the area of voltage-source converter (VSC)
 - HVDC Technology
 - Wide area stability controllers
 - State estimation of transmission system
- Automation of transmission system
 - Role of Smart grid with large scale penetration of renewable sources
 - Smart System in Power Transmission
 - Latest trends in asset management in Power Grid
 - Condition monitoring of Transformers
 - Operation of distribution network in floating mode

Inaugural Session

Mr. Bibhu Prasad Mohapatra, Director, OPTCL was the chief guest at the workshop. He spoke on the power scenario in the state and how OPTCL was alert to modernization. The others who followed were Prof A K Tripathy, Chair, IEEE India Council PES Chapter, Mr. K. Ramakrishna, Chair, IEEE R10 Nominations & Advisory (2017-18), Prof J. Talukdar, Principal, SIT

Expert Speakers

The expert speakers who spoke at the workshop sessions include: K. Ramakrishna, Former GM, PGCIL; Dr. Subhransu Samantaray, IIT, Bhubaneswar; Er. A. K. Tripathy, Former DG, CPRI; Er. Guru Prasad Mishra OPTCL; Mr. P. K. Pattnaik, GM, OPTCL; Prof. R. Sarathi, IIT Madras; Dr. Balaraman, DG, National Institute of Wind Energy, Chennai; Prof. Anil Kulkarni, IIT Mumbai; Prof. Debapriya Das, IIT, Kharagpur; Er. Eswara Rao, PGCIL, Bhubaneswar; Dr. John Benedict, IEEE, Hyderabad; Dr. Shekhar M Kelapure, GM, PRDC; and Ms. Irabati Chakraborty, Schneider-Electric, Kolkata.

There were 113 registered delegates from Academia, Industry and Utility and a number of IEEE student volunteers from Silicon IEEE student branch.

Facebook building a team to make its own chips: Social media company Facebook is building a team to design its own semiconductors, according to reports. The company is looking to hire engineers to build an "end-to-end SoC/ASIC, firmware and driver development organization," according to a job listing. Facebook might use such chips to power hardware devices, artificial intelligence software, and servers in its data centers, reports said.

Xiaomi planning biggest ever IPO at \$100 billion: Chinese electronics company Xiaomi is planning biggest-ever initial public offering (IPO) next month and is targeting a valuation of about \$100 billion, according to reports. Xiaomi has reportedly chosen Morgan Stanley, Goldman Sachs Group, Credit Suisse Group AG and Deutsche Bank AG for its IPO. The last biggest IPO was Chinese conglomerate Alibaba Group's \$25-billion debut in 2014.

France building its own WhatsApp rival over spying risk

IT in Jan-Mar 2018



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General

- January 3, 2018 announcement of **security bugs** (“Meltdown” and “Spectre”) in processor chips causes havoc in tech industry
- Cape Town in South Africa runs **out of water** in February 2018; many cities including Bangalore likely to follow suit in the next decade
- Punjab National Bank **scam** hogs the limelight much of February 2018 in Indian media
- Facebook loses \$ 35 Billion of market value in a day on March 18, 2018; its founder Mark Zuckerberg issues full page apology in leading newspapers in USA; India’s Supreme Court continues hearing on AADHAAR; UK-based consulting company “Cambridge Analytica” in the news for all the wrong reasons – all leading to lots of attention on **data protection**
- With USA and China getting into competitive protectionist measures, the world starts to have a sort of **trade war** starting March 2018

Technology

- **ISRO** successfully launches 31 **satellites** on January 12, 2018 and hits a century of ISRO’s own satellites; unfortunately, its communication satellite launched on March 31, 2018 is still “out of reach”
- India hosts **global solar technology alliance** for the first time in Delhi on March 11, 2018 with over 150+ countries represented in the event
- **P&W engine trouble** leads to hundreds of flight cancellations in India by IndiGo and other Airlines in March 2018

Products

- **Xiaomi Redmi 5** and **OnePlus 5T** mobile phones launched in the first quarter of 2018 in India
- The world saw multiple product launches including **NOKIA 8** and **Samsung Galaxy 9** during **Mobile World Congress** (February 26 to March 1, 2018); Samsung launches **Galaxy 9 in India** on March 6, 2018
- **Western Digital** announces 14 TB disk drive availability by July 2018 on March 13, 2018
- **Apple** launches new products focused on schools including \$ **299 iPad** in March 2018

Markets

- **Indian stock markets** in a roller coaster; NSE’s **NIFTY** crossed 10,700 for the first time on January 15, 2018; BSE’s **Sensex** crosses 35,000 for the first time on January 17, 2018, but there was a crash soon after; **Sensex** tanks 840 points on February 2, 2018 a day after the Union Budget; the up and down journey continued for the full quarter; global stock markets were no different; **Dow Jones index** recorded the biggest single day fall since August 2011 on February 5, 2018 and again on February 8, 2018 wiping out \$ 4 Trillion globally; USA China trade war continues to spook the markets in March 2018 leading to another crash on March 23, 2018
- **HDFC Bank** market value crosses ₹ 5 Trillion in January 2018
- 70-year old iconic store chain “**Toys R Us**” becomes history in March 2018 with 800+ outlets shutting down
- In mergers & acquisitions in the quarter saw the iconic **Xerox** getting acquired by **Fuji** on January 31, 2018 after 115 years of existence; in January 2018 **BirlaSoft** and **KPIT** merge; **Quess Corporation** acquires online recruitment company **Monster**; **InMobi** acquires Los Angeles based **AerServ** for \$ 90 Million; in March 2018,

QuestGlobal acquires **Exilant** (founded by ex-Infosys employees in 2004) and **Wipro** acquires 30% stake in US-based Cybersecurity firm **Denim group**

- **IPO scene** in the quarter saw successful IPO by **NewGen Software** (subscribed more than 8 times) in January 2018, **Bandhan Bank** (subscribed more than 14 times) in March 18,2018 and weak show by **ICICI Securities** and **Hindustan Aeronautics** in March 2018

Indian IT Companies

- **Salil Parekh** takes over as **Infosys CEO** on January 2, 2018
- **TCS** and **Infosys** announce good quarterly results on January 11 & 12 respectively
- **TCS** bags multi-year \$ 2 Billion **TransAmerica** order - the largest ever for TCS; TCS market cap crosses ₹ 6 Trillion on January 25, 2018
- **Ola goes to Australia** in January 2018
- **Wipro** acquires 30% stake in US-based Cybersecurity firm **Denim** group and sells Data center business to **Ensano** for \$ 405 Million; invests in US-based AI start-up **Avamo**; starts **operations** in Plano, Texas in **USA** all in the first quarter 2018
- **Infosys** starts 4th Development Center in USA in Indianapolis in March 2018
- Indian mid-size IT services firm **Zensar** acquires US-based AI Startup **Cynosure** for \$ 33 Million on March 23, 2018
- **Tejas Networks** gets ₹ 336 Cr **BharatNet** order from BSNL on March 28, 2018
- **Cognizant** gets into tax difficulty with its accounts frozen for a week in March 2018

MNC Companies in India

- **Google** fined by Competition Commission of India in February 2018 for unfair advertisement placement in search queries
- **Amazon** pumps more money into **Amazon Pay** in India in March 2018
- **Wistron** to invest ₹ 680 Cr in Bangalore Factory
- **Informatica** announces its plans to hire 350 in Bangalore

People

- Dr. Sivan takes over as ISRO Chairman on January 10, 2018
- High-profile visitors to India in the quarter include **Israel Prime Minister** in January 2018, **IBM global CEO**, **Uber CEO**, **Iranian President** and **Canadian President** in February 2018 and **French President** in March 2018
- **IIT Bombay Alumnus Parag Agarwal** becomes Twitter CTO in March 2018
- **Chinese Premier Xi** set to rule China for life as per Parliament decision of March 10, 2018
- Renowned Scientist **Stephen Hawking** passed away on March 14, 2018

Interesting start-up activities

- **InMobi** buys **AerServ** for ₹ 58 Cr on January 10, 2018
- Pune-based Travel Assistant App **Mezi** acquired by **American Express** on January 30, 2018
- EduTech start-up **Byju's** started by Byju Raveendran turn Unicorn in March 2018
- Hackathons are a craze! 2-Day **National hackathon** at Nagpur in March 2018 saw 40 winners out of 10,000+ students representing 1,296 teams from 28 nodal centers across India; even **Vatican** had a hackathon **vHacks** in March 2018

Education & Research

- Computer Architecture pioneers Professors John L Hennessy and David A Patterson get **Turing Award** for 2018
- **UGC** announces **graded autonomy**; 60 Universities get autonomy in the first place (25 Universities under Category 1, 27 Universities under Category 2 and 8 Autonomous Colleges)
- With President giving assent to the **IIM Bill**, the Institutes get powers to award degrees on January 1, 2018; **IIMB** takes the lead in conferring MBA on March 28, 2018
- **Krea University** in Sri City - a new generation Liberal Arts university - with Mr. R. Seshasayee (ex CII President and Ashok Leyland Chairman) as Chairman to start functioning from 2019

Interesting Applications

- **WhatsApp payment** beta starts in February 2018 with one million customers in India

Interesting mobile apps

- With Congress accusing **Narendra Modi App** of stealing data and BJP accusing **Congress App** of doing the same and Congress deciding to withdraw the App later, **mobile Apps** hog limelight

Interesting numbers

- Indians sent 20 Billion WhatsApp messages (globally 75 Billion) on New Year day 2018
- Apple sold more watches (8 Million in October to December 2017) than the entire Swiss watch industry!
- **India's mobile phone subscribers** and **wireline subscribers** as of January 31, 2018 stood at 1152 Million and 24 Million as per TRAI Press Release 35/2018 release of March 23, 2018
- **India's foreign exchange reserves** March 31, 2018 stood at \$ 424 Billion (a record) (RBI)
- **Indian Rupee Vs USD** was at 65.07 on March 31, 2018 (RBI)

Professor Sowmyanarayanan Sadagopan is the Director of IIIT-Bangalore. These are his personal views. He can be reached at ss@iiitb.ac.in

Six Cs of Clean Tech

The Clean Tech Revolution: The Next Big Growth and Investment Opportunity is a 2007 book by Ron Pernick and Clint Wilder,

Pernick and Wilder identify six major forces, which they call the six C's, that are pushing clean technology into the mainstream and driving rapid growth and expansion: costs, capital, competition, China, consumers, and climate.

- **Costs.** "Perhaps the most powerful force driving today's clean-tech growth is simple economics. As a general trend, clean-energy costs are falling as the costs of fossil fuel energy are going up. The future of clean tech is going to be, in many ways, about scaling up manufacturing and driving down costs."
- **Capital.** "An unprecedented influx of capital is changing the clean tech landscape, with billions of dollars, euros, yen, and yuan pouring in from a myriad of public and private sector sources."
- **Competition.** "Governments are competing aggressively in the high stakes race to dominate in the clean-tech sector and build the jobs of the future."
- **China.** "Clean tech is being driven by the inexorable demands being placed on the earth not only by mature economies but also by the explosive demand for resources in China, India, and other developing nations. Their expanding energy needs are driving major growth in clean-energy, transportation, building, and water-delivery technologies."
- **Consumers.** "Savvy consumers are demanding cleaner products and services that use resources efficiently, reduce costs, and embrace quality over quantity."
- **Climate.** "The debate around climate_change has gone from question mark to peer-reviewed certainty, and smart businesses are taking heed."

The six C's are a simple list of factors, not necessarily a useful framework for understanding, or profiting from, the clean technology industry.

Information Resources



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How Embedded Systems Impact Your Everyday Life: Every day the world is becoming more and more digital, connected, and automated, but what makes this transformation possible? In many cases, it is a technology that is often overlooked: embedded systems. Embedded systems play a part in nearly every aspect of modern life. They impact the way we spend our leisure time, the way we commute, and the way we do business. In this article, we will give you a primer on what makes a something an “embedded system” and dive into some common use cases for embedded systems that should help drive the concept home. [Story](#)

12 futuristic technologies that could become reality in 2018: In the last year, the business and consumer markets alike have seen the release of advanced technologies that were once considered the stuff of science fiction. Smart gadgets that control every facet of your home, self-driving vehicles, facial and biometric identification systems and more have begun to emerge, giving us a glimpse of the high-tech reality we’re moving towards. To find out which futuristic technologies are on the horizon, we asked a panel of Young Entrepreneurs Council members the following question: In 2017, we saw futuristic tech ideas become reality, from facial recognition applications to Elon Musk’s SpaceX reusable rockets. What futuristic technology might we see released in 2018? Their best answers are included in the [article](#)

Constellation Research: 9 Starting Points for Digital Transformation in Manufacturing: The rise of automation and data exchange in manufacturing technologies means you have new opportunities to undergo digital transformation. Read “9 Starting Points for Digital Transformation in Manufacturing” from Constellation Research for actionable next steps you can take, including: 9 entry points for digital transformation in manufacturing; 6 features of organizations that succeed in digital transformation; and 5 recommendations to ensure digital transformation success. Get the guidance you need to begin your digital transformation journey. [Download](#)

Life in the Most Polluted Capital in the World: In 2016, Ulan Bator overtook both New Delhi and Beijing as the capital with the highest air pollution levels in the world. The city’s topography is one factor: like Beijing, Ulan Bator was built in a river valley and surrounding mountains trap smog like soup in a pan. The extreme climate is another cause. In the world’s coldest capital, the average January low is 27.4 below (-33C) but temperatures can dip beneath -40, the point at which Fahrenheit and Celsius intersect. Locals say winter air pollution was barely noticeable until the mid-2000s. Now, the city has among the world’s highest peaks of PM2.5—the ultrafine particles that can carry carcinogens such as arsenic and mercury and are small enough to permeate most of the body’s defensive filters. In late January, a government-installed sensor reported a PM2.5 per cubic meter rate of 3,320 in parts of Ulan Bator. That’s 133 times the level the World Health Organization (WHO) deems safe. [Read](#)

Job Hunting? 15 Ways to Make Your LinkedIn Profile Work for You: If you’re like a lot of people, you might be wondering what you’re supposed to get out of your LinkedIn profile. A LinkedIn profile can be a powerful tool for career advancement, but you have to know how to use it — just like any other tool. Here’s some solid, actionable advice about how you can make your LinkedIn profile look better to recruiters and hiring managers. [Slide Show](#)

Book: Engineers & Electrons: A Century of Electrical Progress: An informal, popularly-written history of electrical engineering. Spanning two centuries, it is as much a revelation of the human side of engineering as it is the description of the technical accomplishments of the profession. Written by John D. Ryder and Donald G. Fink. [Download](#)

Book: The Making of a Profession: A Century of Electrical Engineering in America: A. Michal McMahon’s history of the formation and growth of AIEE., IRE, and IEEE. [Download](#)

Hate to Network? 14 Tricks That Will Help You Succeed at Any Event: Have you ever had those moments where you think of every excuse under the sun not to go to an event for work to network? The thought of gloating about yourself to strangers or engaging in small talk makes your skin crawl, and every time you talk to someone, you overthink the words that come out of your mouth. If this all sounds familiar, it might be a social anxiety — or you might just be human. According to Anxiety and Depression Association of America, about 40 million Americans suffer from some sort of anxiety disorder. So combine that with networking or some work event and that could equal a mess of a situation that one would want to avoid. However, don't hide under the rug just yet, there are ways for people to network without overthinking it and second-guessing themselves. Check out the following 14 tricks you can use to ease your way into feeling comfortable with networking. [Slide Show](#)

15 innovation tips: how large corporations can successfully engage with start-ups: In an increasingly competitive and globalised economy, it is only 'unrelenting innovation' that can help companies sustain a long term advantage, says Gerald Tellis, Director of the Centre for Global Innovation, University of Southern California. Engaging with startups can be one way for corporate giants to get fresh ideas and break out of 'incumbent's curse,' as these 15 tips and examples below show. [Full Post](#)

Mapping the blockchain project ecosystem: Blockchain technology, cryptocurrencies, and token sales are all the rage right now. According to the author of the post who has been working the VC industry, this is by and large the fastest he has seen any area of technology take off in terms of new company (or project) formation. The post provides an overview of each broader category of Blockchain touching on some of the subcategories that comprise them. [Read the post](#)

What researchers want: A wishlist to support openness of research dissemination: Researchers want dissemination of their findings to be simple and increasingly open. They want to use dissemination tools as they choose. They do not want to be bogged down with overly-complex publication guidelines. Sally suggests how libraries, publishers and funders can provide tools and services that assist researchers to adopt open access to their outputs for the benefit of researchers and research, and society. [Presentation](#)

2018 Developer Skills Report: The future of work will be very different. Irrespective of your job, it will become important for everyone to learn how to code. Coding helps enrich your computational thinking, which is powerful in making decisions. The traditional resume will go away and hiring will happen based on your skills first. We launched HackerRank in late 2012 with the goal of matching every developer to the right job. And the growth has been amazing — we reached 3.2M developers in the community and powered 2% of all developer hires last year. For the first time, we surveyed the HackerRank community to get a pulse on developer skills (when did they push code for the first time, how do they learn coding, what are the favorite languages and frameworks, what do they want in a job, what hiring managers want in a candidate, and more). There are some great insights, from 39,441 responses, that we are happy to share with you today. Did you know that 1 in 4 developers learned to code before they could drive? We hope you find the 2018 Developer Skills Report insightful and would love to discuss the findings with you at /r/programming. [Report](#)

Global AI Talent Report 2018: The demand for AI experts has grown exponentially over the last few years. As companies increasingly adopt AI solutions for their businesses, the need for highly experienced, PhD-educated, and technically-adept talent shows no signs of stopping anytime soon. This report summarizes our research into the scope and breadth of the worldwide AI talent pool. Although these data visualizations map the distribution of worldwide talent at the start of 2018, we want to acknowledge that this is a predominantly Western-centric model of AI expertise. [Report](#)

Whose data is it anyway? India's data protection committee starts its consultation tour to find out: As India inches closer towards enacting a law for data protection, an expert committee appointed by the government of India begins today its public consultation process for feedback before it drafts the law. India's data protection framework is based on seven principles, which includes informed consent, data minimisation, and deterrent penalties. The [summary for the white paper](#) explores the scope and exceptions under the framework, raising questions on the definition of personal data, sensitive personal data, data controller, processor, and other aspects like cross border flow of data and data localisation. [Whitepaper](#)

A Look At India's Unique Initiative On Artificial Intelligence Task Force: Now, India has taken a cue from global developments and set up a Task Force on Artificial Intelligence (AI) to drive economic agenda in August. According to PIB, the Commerce and Industry Ministry led by Nirmala Sitharaman set up an AI Task Force last year to accelerate rapid development in the fields of information technology and hardware. While the world is on a cusp on a fourth Industrial Revolution, India is now gearing up to deepen its capabilities in big data, AI, robotics and embed it in its social, economic agenda. The 18-member task force that comprises researchers, academics, experts and industry leaders is headed by IIT Madras's Dr V Kamakoti. [Report of the Task Force](#)

How lines of code kill humans: It was a moonless night of April 12, 2014, in Washington State. A terrified Seattle woman dialed 911 for 37 times and the number was dead. There was a stranger lurking outside her home, and he was trying to break into the house. After a while she was trying for the emergency services in vain, the man managed to crawl through a window. She picked up a knife and the stranger fled. It was later found out that all the emergency services for the state of Washington were in radio silence for an entire 6 hours. [Full Post](#)

The ITIL 2018 update better catch up to modern IT: ITIL, once known as the Information Technology Infrastructure Library, was last updated in 2011. A lot has happened since then, and for an ITIL 2018 release to regain the relevance that the IT service management framework has lost, it must accommodate the drive toward DevOps. [Full Post](#)

How plants could be spying on all of us soon: Humans have been changing nature since agriculture has been feeding them. We select the best seeds, splice and edit them. Even changing the very structure of plants genes, humans have found a way to maximize yield. Plants have been hacked for millennia, but now it's different. The technology currently being developed will catapult any past achievements out of the water by a long shot. The idea of re-engineering plants for military use is as intelligent as it is brave. This time scientists are moving beyond just yield. Scientists at the US Advanced Research Agency are reengineering plants. Turning them into early detection systems for various attacks including: chemical, biological, radiological, nuclear, and explosive (CBRNE) threats. [Full Post](#)

So you want to be a computational biologist?: The term 'computational biologist' can encompass several roles, including data analyst, data curator, database developer, statistician, mathematical modeler, bioinformatician, software developer, ontologist—and many more. What's clear is that computers are now essential components of modern biological research, and scientists are being asked to adopt new skills in computational biology and master new terminology. Whether you're a student, a professor or somewhere in between, if you increasingly find that computational analysis is important to your research, follow the advice below and start along the road towards becoming a computational biologist! [Read](#)

Top 10 Reasons Why You're Not Getting A Job: As a business and career coach, I run into so many different people every day. I attend conferences and events, I run workshops and webinars, and I host team masterminds for all types of professionals. And guess what? When I talk to the unemployed, I've heard all the excuses why you don't have a job. Here are the top ten realities of your job search today: [Read the post](#)

The 80/20 Rule: How the Pareto Principle Can Transform Your Life: Interested in getting maximum results with minimal effort? Then the best thing you can do is implement the 80/20 rule throughout your life. [Read the post](#)

A Primer for 5G: 5G communication is just around the corner. Let's examine the specs of this new standard and how it will impact mobile users, driverless cars, and the Industrial Internet. [Read](#)

A Timeline for When Everything in Your Pocket Will Go Digital: From your driver's license to your house keys to your insurance cards—and everything in between. [Read](#)

Diving Into Data Visualization: In this article, we're going to look at some of the top data visualization articles on DZone, explore data visualization elsewhere on the web, and look at some data visualization publications. [Post](#)

Here's how you can become invisible online: If you are tired of the internet's onslaught on your personal life, so much so that you want to permanently and completely get off it, you absolutely can. With more and more people wanting to go off the grid, corresponding services have cropped up that aid users in doing just that. Let's look at the various measures you can take towards internet invisibility. [Read](#)

Learning Path: Your mentor to become a machine learning expert: Machine learning is a complex topic to master! Not only there is a plethora of resources available, they also age very fast. Couple this with a lot of technical jargon and you can see why people get lost while pursuing machine learning. However, this is only part of the story. You can not master machine learning without undergoing the grind yourself. You have to spend hours understanding the nuances of feature engineering, its importance and the impact it can have on your models. Through this learning path, we hope to provide you an answer to this problem. We have deliberately loaded this learning path with a lot of practical projects. You can not master machine learning with the hard work! But once you do, you are one of the highly sought after people around. Since this is a complex topic, we recommend you to strictly follow the steps in sequential order. Consider this as your mentor for machine learning. Only skip a step, if you know the subject matter mentioned in that step already. [Follow](#)

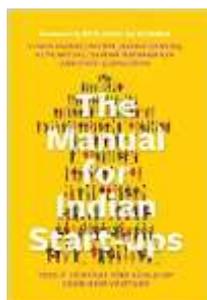
Diving Into Data Visualization: In this article, we're going to look at some of the top data visualization articles on DZone, explore data visualization elsewhere on the web, and look at some data visualization publications. [Post](#)

Book Reviews



The Business Plan Write-up Simplified: A practitioner's guide to writing the Business Plan.

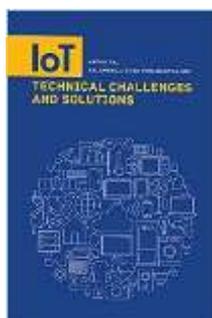
Author: Sarada Ramani. Publisher: Notion Press. Pages: 86. Price INR 249/-. Written by a self-made entrepreneur, the book on Business Plan, an important document which gives a shape and intends to translate an idea into a profitable business deals with most of the essential aspects of the blue print of a business such as problem statement; intended solution; market and product positioning; competitor analysis; team; marketing strategy; sales plan; operations plan; financial plan; milestones; risk and mitigation plan and exit plan. The jargon free presentation in a simple language makes this a good primer on the subject and will be useful to start-ups and beginners venturing into business. Though the business plan to be made may vary depending on the intended purpose, we hope few specimen business plans may be included in the next edition of this book to make it a mandatory reading.



The Manual for Indian Start-ups: Tools to Start and Scale-up Your New Venture.

Authors: Vijaya Kumar Ivaturi is the co-founder and CTO of Crayon Data; Meena Ganesh founded and led, or co-promoted, some of India's most disruptive start-ups; Alok Mittal is co-founder and CEO of Indifi; Sriram Subramanya founded Integra Software Services; and Professor Sadagopan is the director of IIT-Bangalore. Publisher: Penguin Random House India. Paperback. Pages: 176. Price INR 250/- The recommendations of the task force of the CII 's Start-Up Council focussing on innovation and entrepreneurship, which provided advice, typical practices in Indian start-ups and guidelines for key contracts needed in the early stage of a start-up has been brought out as a reference manual. As the models for India start-ups relating to team composition, funding and customer engagements are different from that of western start-ups, this book is intended to serve as a handy guide to Indian entrepreneurs. The emphasis of this book is more on functional aspects of a business and written in a

sector agnostic way focusing on common elements of work streams in a typical start-up in its early stages independent of the domain it belongs to. Few important templates such as founder's agreement, employee agreement, advisor agreement and sees investor agreement are included in this manual. These agreements built in consultation with the legal experts and already used by start-ups makes them relevant and provide conceptual and operational value to the promotors. The promotor Speak column included in the manual is quite interesting. The authors have plan to come out with a sequel to this with several other templates and topic. A recommended read for entrepreneurs.



IoT Technical Challenges and Solutions.

Authors: Arpan Pal and Balamuralidhar Purushothaman. Publisher: Artech House Publishers. Hardcover. Pages: 200. Price: INR 6170/-. This book is written by authors with significant working experience at TCS in building horizontal IoT platform for multiple applications. It has come out at a right time when the adoption of IoT is growing and driven with decreasing cost of sensors, matured cloud and better Internet facilities. Authors strongly feel that IoT deployments should not be just technology play but must consider business goals and return on investment (ROI) aspects early in the design of solutions and IoT systems focusing on value preposition to business and social applications need to follow an integrated approach with abstraction of technology components such as communications, computing, storage, mobility, security and privacy, business value add via analytics, economy of mobile sensing and automation. The subject matter has been presented in a lucid and encyclopaedic manner with concise technical fundamentals

and relevant business examples in seven chapters namely Internet of Things Today, Scalability of Networks an Computing, Security and Privacy, Sensor Informatics and Business Insights, Democratizing Analytics: Analytics as a Service, and The Real Internet of Things and Beyond. An introduction on drivers to new wave of IoT – Resilient IoT Systems and Cognitive IoT is very interesting. The References and Selected Bibliography included at the end of each chapter are extremely useful for further reading. This book is a practical resource and highlights relevant technology, challenges related to large scale adoption of IoT. As a person tracking the development in IoT since its start, I found this book a joy to read for the sheer presentation and focus. Every sentence in the book is loaded with meaningful and valuable information. This volume beyond a technology cookbook discussing practical considerations towards building real IoT systems will be useful to a wide section of readers including practicing professionals, consultants, academic community and entrepreneurs interested in IoT related start-ups. The authors may consider for an Indian reprint at a lower price for a larger readership.

Enabling Blind and Visually Impaired through Users-Developed Dactylogy



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1 Introduction

With the massive use of computers in every dimension of society human-computer interaction (HCI) has become an essential part of human life. Their widespread use suggests that the ability to handle computers is perhaps equally essential for visually impaired as well as sighted persons. The National Policy on Electronic Accessibility also suggests that differently abled persons should be facilitated with equal and unhindered access to Electronics and ICTs products and services. Over 285 million people in the world are visually impaired, of whom 39 million are blind, and 246 million have moderate to severe visual impairment (WHO, 2011). These facts are shown in Fig. 1. According to Blind Foundation for India, nearly 30 % of the global blind population belongs to India. It is predicted that without extra interventions, these numbers are expected to double by the year 2020.

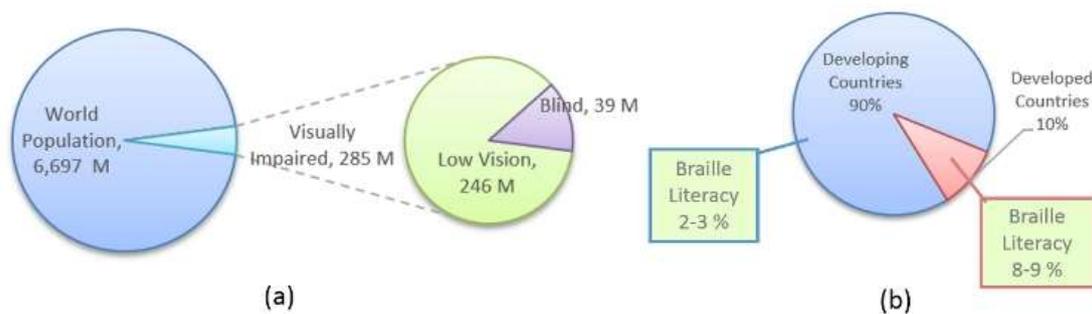


Fig. 1 Some interesting facts (a) Blind population (b) Braille literacy rate.

Mouse and keyboard are the basic input devices to interact with a computer. However, most of the blinds use screen reader software along with the keyboard. This software reads aloud the contents displayed on the screen. After listening to it carefully, blinds provide appropriate input to the system through the keyboard. This action requires hand-eye coordination which makes it difficult for them to use the computer fluently.

Braille-based devices are also available for such users. However, according to the annual report by American Printing House for the Blind [1] only 8.64% blind students in the United States use Braille and merely 10% of the blind children are learning it. This situation is the worst in the developing countries wherein 90% of the global blind population reside, and their literacy rate is almost 3%. A six-dot Braille supports only 63 unique symbols, whereas a keyboard has 104 keys. Due to these reasons, Braille-based devices are not popular for interacting with computers. Another option to interact with computer is speech processing. However, it is ineffective in the crowded environment. Further, it depends on accents, dialects and mannerisms. Its recognition accuracy is also low [2]. Hence, speech processing is unsuitable for this application. This entails, there is a need to develop an assistive technology based on non-verbal communication viz. hand gesture, electroencephalogram (EEG). Building robust and practical system using EEG is a challenging problem because the recorded signals are feeble and noisy [3]. The gesture is considered to have a great potential to create more intuitive, creative and productive experience [4]. Research has already confirmed that vision is not responsible for the production of gesture [5]. Every human being [even those blind from birth produces hand gesture during the interaction [6]. They produce gestures almost similar to the gesture produced by sighted users. However, their gestures are limited, and their emotions and facial expression are less detailed.

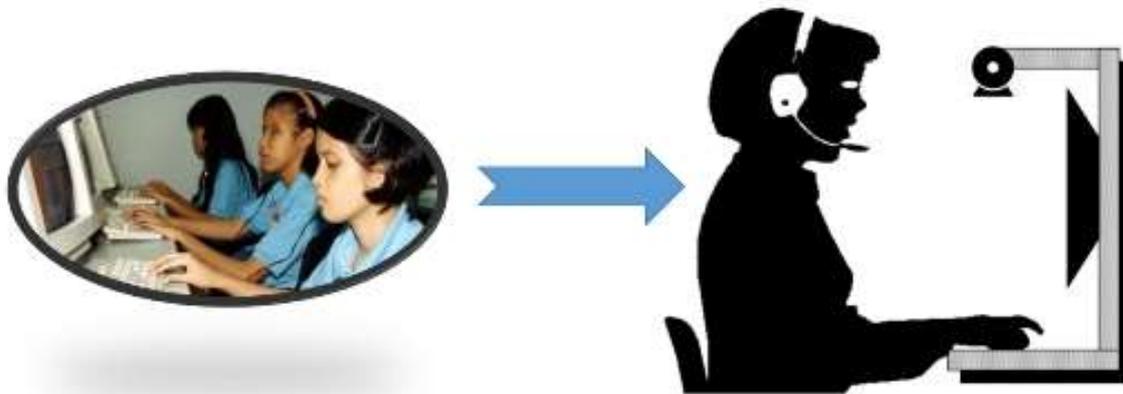


Fig. 2 Illustration of interactive system

Looking specifically towards the use of hand gesture for human-computer interaction. We found that majority of work [7] have used fingerspelling in American Sign Language (ASL) or its subset. Blind and visually impaired people feel difficulty with fingerspelling. Previous studies have suggested to perform user evaluation with target users instead of just using gestures devised for others. Since no study has included blinds in their study. Hence there is a requirement of a user evaluation study with blind and visually impaired which should investigate whether a gesture-based interaction is possible with them. Can it be used to interact with computers? If yes what type of gestures are suitable for them? How should these gestures be matched to the keys of the keyboard? What algorithm should be used to recognise these gesture?

2 Research Approach

The primary objective of the presented research work is to enable blind and visually impaired users through a gestural-based interaction. To address aforementioned questions, further research work is required. The proposal of the interactive system involves following three inter-connected research: design of interaction space, development of dactylogy and recognition unit.

2.1 Design of Interaction Space

The proposed system uses hand gestures to interact with the computer. In a conventional gesture-based interaction, blinds feel two significant issues. They find it difficult to precisely locate/hold their pose in space due to no support. Additionally, they find difficulty in maintaining pose perpendicular to camera axis causing perspective errors which result in projective distortion. Brain plasticity theory states that sensitivity relevant to touch is very prominent in blind people [8]. They perceive touch faster than those with normal vision [9]. To take advantage of this, we have changed the conventional gesture-based interaction by providing a table top arrangement as shown in Fig. 2.

This set-up facilitates haptic feedback and support to the arms. The setup consists of the camera to capture the gestures posed in its field of view. To enable feedback to the user, audio output is produced. Through this audio, the user ensures whether the provided input is correct or not. If it is wrong, the user can re-enter by deleting the previously submitted command. Different ergonomic aspects like the form factor, the height of the table, bending of the wrist, etc. are also considered while designing this interactive interface.

2.2 Proposal of Dactylogy

In [10], we proposed a novel dactylogy based on a concept similar to Braille. The 6-dot Braille codes consist of two columns, and each column has three dots. A maximum of 63 Braille codes is formed by combining these dot. There are six mechanical keys corresponding to each dot, and one column of dots is controlled by one hand. A desired combination of dots is formed by pressing these keys simultaneously which require the involvement of both hands. The proposed dactylogy also uses both hands, but the user only needs to pose finger/s instead of pressing the keys. Further, compared to Braille more numbers of symbols can be produced. Using 31 gestures of each hand almost 1023 symbols can be produced. However, due to physiological constraints, all these gestures may not be comfortable to the user. Hence, a set of optimal gestures are needed to be devised through a user evaluation study.

More than 12,000 questions were asked in the user evaluation study. All possible gestures were evaluated using performance and preference measure metrics. Performance measure includes rating of gestures on the basis of easiness (C1), naturalness (C2), ease of learning (C3), and reproducibility (C4). A Likert scale (1 = strongly disagree to 5 = strongly

agree) is used to rate gestures on questions related to four criteria. In preference measure, a preference index is calculated to consider the popularity and preference of a gesture among blind users. Based on the two metrics, optimal gesture set is devised. Finally, a dactylogy is proposed using the optimal gesture set obtained through the proposed study. For further details about dactylogy, readers are referred to [10].

2.3 Recognition Module

The proposed dactylogy is paired with a gesture recognition module [11] to allow writing support system for blinds. Gesture recognition module has three major steps namely image acquisition, processing unit, and gesture interpretation. Image acquisition is the first stage where the optical flow method is used to obtain displacement vector between two consecutive frames. Based on this, frames which seem to be static are captured and processed further. The processing unit extracts distinctive features and performs classification using a rule-based classifier. Finally, the gesture interpretation step recognises the symbol. The processing unit is comprised of three stages (1) Pre-processing, (2) Feature extraction, and (3) Classification. In this work, a new feature extraction technique Reduced Shape Signature (RSS) is proposed which is rotation, translation and scale invariant. Unlike other shape signatures, RSS is compact as on an average 35% reduction in feature sets is achieved. Upon classifying and recognising a symbol, the system sends a command to the computer to perform a specific task as per the dactylogy. The symbol recognition rate of the proposed algorithm is 97.53 %. Another work [12] showed an improvement in recognition accuracy to 98.57 %.

3 Discussion & Conclusion

In this research work, we discussed the problem of computer interaction faced by blind and visually impaired users. Braille and other conventional technology are unable to help them. The gesture is considered to be found even in individual who is blind from birth. Despite this none of the work have considered blind and visually impaired users to understand their performance and preference. To bridge this gap, we performed a user evaluation study which is discussed in [10]. In this study, optimal gestures were devised using performance and preference measure. Further, a novel dactylogy was proposed. In [11], we have presented a recognition module to recognise the dactylogy symbols.

The proposed system will enable the blind community to interact with the computer. This will help them to connect with the cyber world. Blinds can use the proposed system to edit text in e-document, listen to music, play games etc. More than 15 million blinds reside in India, among which less than 5 % receive any education. This innovation will help them to improve their expertise in handling computers or computerised systems which are the most common today and they will become a part of this digital age. This will improve their living standard too. Efforts are going on to increase support for the number of symbols, add dynamic gestures, and provide support for several other applications, etc.

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Seven Leadership Principles To Learn From An Eagle

1. Eagles fly Alone and at High Altitudes. They don't fly with sparrows, ravens and other small birds.

Meaning: Stay away from narrow-minded people, those that bring you down. Eagle flies with Eagles. Keep good company.

2. Eagles have an Accurate Vision. They have the ability to focus on something as far as 5 km away. No matter the obstacles, the eagle will not move his focus from the prey until he grabs it.

Meaning: Have a vision and remain focused no matter what the obstacles and you will succeed.

3. Eagles do not Eat Dead things. They Feed only on Fresh Prey.

Meaning: Do not rely on your past success, keep looking for new frontiers to conquer.

4. Eagles Love the Storm. When clouds gather, the eagle gets excited; the eagle uses the storms wind to lift itself higher. Once it finds the wind of the storm, the eagle uses the raging storm to lift itself above the clouds. This gives the eagle an opportunity to glide and rest its wings. In the meantime, all the other birds hide in the branches and leaves of the tree.

Meaning: Face your challenges head on knowing that these will make you emerge stronger and better than you were. We can use the storms of life to rise to greater heights. Achievers are not afraid of challenges, rather they relish them and use them profitably.

5. When a female eagle meets male eagle, she tests him for commitments. When a Female Eagle Meets a Male Eagle and they want to mate, she flies down to earth, picks a twig and flies back into the air with the male eagle in hot pursuit. Once she has reached a height high enough for her, she drops the twig, and let it fall to the ground while she watches. The male eagle chases after the twig and catches it before it reached the ground, then bring it back to the female eagle. The female eagle grabs the twig and flies to a much higher altitude and drops the twig again for the male eagle to chase. This goes on for hours with the height increasing each time until the female eagle is assured that the male eagle has mastered the art of picking the twig which shows commitment. Then and only then will she allow him to mate with her.

Meaning: Whether in private life or business, one should test the commitment of the people intended for partnership.

6. Eagles Prepare for Training. They remove the feathers and soft grass in the nest so that the young ones get uncomfortable in preparation for flying and eventually flies when it becomes unbearable to stay in the nest.

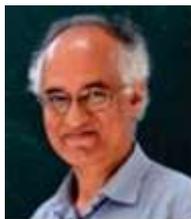
Meaning: Leave your Comfort Zone, there is No Growth there.

7. When the eagle grows old, they hurt themselves for new feathers. When the Eagle Grows old, his feathers becomes weak and cannot take him as fast and as high as it should. This makes him weak and could make him die. So he goes to a place far away in the mountains. While there, he plucks out the weak feathers on his body and breaks its beaks and claws against the rocks until he is completely bare, a very bloody and painful process. Then he stays in this hiding place until he has grown new feathers, new beaks and claws and then he comes out flying higher than before.

Meaning: We occasionally need to shed off old habit no matter how difficult; things that burden us or add no value to our lives should be let go of.

Yes, Never Give up, Be an Eagle, Never Ever Give up.

A Unique Pedagogical Experiment: The 5-Week Induction Programme (5WIP) at IIT Mandi



**Prof. Timothy A.
Gonsalves**
Director, IIT Mandi



Dr. Devika Sethi
Assistant Professor
IIT Mandi

A potter, when shaping a vessel, pays a great deal of attention to the shape, symmetry, texture, surface and the material of the object. She is perhaps aware of—but not overly preoccupied with—the future contents of the vessel. On the other hand, teachers in the higher education system in India, are trained to focus almost exclusively on the information that they are charged with imparting to their students. In India—with its stark variations in the population’s economic background, exposure to technology and to the English language — there are pronounced differences in abilities and skills among college-entering students.

Yet, today all these students are lumped together and given a brief introduction to the new environment of the IITs (academic, and also social) in which they are to find themselves for the next four years. It is assumed that from the next day all will be able to absorb, with equal ease, the lecture material, and rise to their teacher’s expectations. Additionally, it is assumed that they will be able to make friends across linguistic and regional barriers, participate in extra-curricular activities, and generally, emerge from their IIT after four years as polished, well-trained individuals and good citizens. Given the rigorous entrance exam to get into IITs, when students drop out from the IITs, or are unable to cope, the general public is unable to understand the paradox. Why does this happen?

Questioning the assumption that all students are equally well-equipped, intellectually and even emotionally, to handle the major transition from school to an IIT is the first step to-wards understanding this paradox. The next step is to identify ways in which all students can be treated as unique individuals, with their specific strengths and weaknesses. It is difficult for a teacher to handle students with diverse backgrounds in the classroom. So, an alternative is to give all students a chance—before their rigorous, grade-oriented classes begin—to acquire the critical skills that will enable them to follow lectures with ease, gain the confidence to ask questions of their teachers, and to feel at ease in their new home: the IIT residential campus.

These steps were carefully conceptualized in the 1st edition of IIT Mandi’s *5-Week Induction Programme (5WIP)*, which began with the new B.Tech batch (150 students) of 2016. As many as 60 of the 100 faculty members of the Institute were involved in organizing and implementing the programme in a voluntary capacity. Not only does this speak volumes for their commitment to the Institute’s ethos, but it also distinguishes this programme from that of other institutes where such training may be outsourced to other agencies and consultants.

In *5WIP 2016* at IIT Mandi, students spent their first 5 weeks in an intense 6 am to 10 pm daily programme before regular classes began. The components of the 5WIP may be classified into four categories: Exploring Engineering, Academic Skills, Life Skills, and Inspirational Activities.

In **Exploring Engineering** (duration: 24 hours), through interactive group-work, students were exposed to the excitement of real-world engineering. Faculty members from different engineering disciplines guided students to discover what exactly a career in engineering entails. Students were given carefully chosen projects to create, including a boomerang and a circuit board, and were encouraged to experiment with conceptual and material tools. This module opened up for the students exciting vistas of the 4 years ahead. It demystified engineering and students learnt that branch is not important in real-world engineering.

The **Academic Skills** component is intended to bring all students up to a minimum level in skills essential for the rigorous IIT classes. This includes English and Computer Proficiency modules (13 hours each). Each student, irrespective of his/her initial proficiency level, spent these hours acquiring or honing his/her English and computer skills. As students were in randomly chosen groups, students who were better at a skill/subject were encouraged to help their

group members. At the same time, the more skilled students were also given optional, more challenging assignments. Other skills were acquired in the Communication and Soft Skills (9 hours) and Visual Thinking (9 hours) modules. Visual Thinking, a critical skill for engineers, was an activity based module in which students learned the power of pencil sketches for engineering design. For example, they had to conceptualize and sketch all components of a metro station.

In the **Life Skills** component, students were encouraged to explore the inter-connected worlds of self, family and society, i.e. human values (16 hours). The idea was to equip students with the capacity to reflect on their decisions and actions, to develop their values and ethics, and to conduct themselves in society with maturity and finesse. By participating in a variety of sports, including yoga (56 hours, in early morning and evening) and creative activities (a theatre workshop, visual arts and music for 30 hours), students tasted a range of extra-curricular activities, some of which may turn into hobbies for life.

These components were complemented by the **Inspirational Activities**. Here, eminent speakers from all walks of life were invited to address students. Club Introductions, Film Screenings and other Evening Activities (45 hours) kept students happily occupied in the evening hours. On Saturdays, students were taken on visits to old age homes and orphan-ages, and participated in tree-plantation and cleanliness drives (23 hours).

Assessments of the programme have been very positive. According to the Dean Students, Dr. Suman Kalyan Pal, the programme *“improved the communication skills of freshers and made them open up; it helped them absorb IIT Mandi traditions (academic, cultural and social) quickly. Areas of improvement in the programme are being identified.”* The Head Counsellor, Ms. Lishma Anand, who has interacted closely with several batches, observed: *“The 5WIP has had a positive impact on student life. They are confident, communicative, have made friends and are well-settled in the hostels. Usually this happens at the end of the first year. Compared to previous years only a few first year students have approached me with homesickness, academic or communication issues.”* In the anonymous feedback solicited from students, one student spoke for many when s/he said that: *“5WIP made our transition from school life to college life easy. The activities in 5WIP allowed us to make new friends and initiated a healthy interaction with the seniors and faculty members.”*

In my Director's welcome to the new batch, I highlighted that whereas in the past teachers would drill knowledge and skills into students, in a rapidly changing world this is no longer enough. Knowledge and skills have a much shorter shelf-life now. With the IIT Mandi philosophy of learning to learn, students could no longer expect teachers to spoon-feed information to them. The 5WIP was, therefore, intended to help students become more self-sufficient and self-confident. Assessments at the end of the programme indicate that these aims have been met much beyond our initial expectations. IIT Mandi faculty are now gear-ing up for 5WIP 2017 with renewed enthusiasm.

Our 5WIP is characterized by several unique features, of which we would like to list four:

- (1) Students are mentored in small groups of 20 by faculty, and not by external experts. This facilitates bonding between students and faculty which enriches the rest of the 4 years.
- (2) There is great emphasis on the excitement of engineering, leading into the regular curriculum.
- (3) There is considerable emphasis on the creative arts and sports as well for holistic development of the students.
- (4) The unique Himalayan location of IIT Mandi facilitates outreach activities directed towards the Himachali community.



Team Activity



Lunch at Mess



Campus Cleaning



Morning Exercise

We began with the metaphor of the potter, a creative soul, and we end with the metaphor of the swimming coach. The 5WIP at IIT Mandi is the equivalent of a rigorous but compassionate swimming coach, who knows that throwing learners in the deep end is rarely beneficial. For every learner who learns to swim after such a drastic introduction, there are many others who struggle, suffer and fail to learn, and develop a life-long fear of water. The coach understands the importance of teaching her charges how to appreciate the beauty (and danger) of the water, gauge its temperature, help other swimmers, and gradually progress from the shallow to the deep end of the pool in gentle, but enjoyable, steps and strokes. The 5WIP represents a brief but intense period of handholding as we watch our students—not just the brightest or the most articulate, but all, without exception—plumb the enchanting depths of the oceans of life and of learning.

Inspired by the experiences of IIT Mandi, IIT Gandhinagar, IIT BHU and IIT Patna, the IIT Council has recommended that all IITs run an induction programme of at least 3 weeks duration. MHRD has likewise requested all engineering colleges to follow suit.

Understanding Life through Physics

- Concept of Gravity Says...One can be always Attractive....
- Concept of Bulb Says Shining is an outcome of Resistance.....
- Concept of Battery Says your Potential is because of both your Negatives & Positives....
- Concept of Elasticity Says. There is a Limit to bear a Strain....
- Concept of Diode Says ...Rectify your Negatives....
- Concept of Quantum Says...whatever Hill, Well or Barrier comes...u have Definite Probability to come out....
- Concept of Relativity Says...if U don't understand anybody don't worry...put yourself in DIFFERENT frame of reference....
- Concept of e raise to x Says be cool don't get DIFFERENTIATED whatever worst happens...
- Concept of Current Says...whatever direction the electron flowsCurrent should always Origin from Positive....
- Concept of Interference Says...it can be Constructive / Destructive depends on Phase Relation.....

Collaborative Contract Research / R&D Outsourcing in India The Gap and the Solution



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Introduction

There is a common belief in India and some parts of the world that most research is performed at universities or educational institutions and that industry is merely a receiver of the output of the research performed at these institutions in order to commercialize the outcome. While this notion may be true in part, it accounts for only a small fraction of the research performed. A very significant amount of Research & Development actually happens entirely within industrial entities for their own specific requirements. Why is this so? If educational institutions have the skill, infrastructure, low-cost labour and Government support to deliver R&D, then why is all R&D not outsourced to them and why does significant captive R&D happen within industry? Given that there exists such a gap between industry and academic entities, what can and is being done to effectively close this gap? We will dwell on these issues in the paragraphs below and potentially shed some light on the R&D outsourcing scenario in India and the world.

The problem

The way most Government R&D grants work, the funds are either provided entirely to academic institutions or provided under the condition that industry will cost-share about 20%-50% of the total funding requirement. In other words, the Government provides a portion (typically equal or a majority) of the R&D funding to the academic institution while industry needs to support the balance. The rationale behind this scheme, presumably, is that industry gets to do subsidized research at the academic institution towards their own R&D problems and academia gets to work on applied problems that are relevant to the industry. While the intention is noble, the assumption behind this process is fundamentally flawed. It is quite obvious that the thought process behind these schemes springs from the root assumption that academia need to feed R&D to industry and the assumption that R&D can be effectively realized in this mode. The major flaw arises from the fact that in these schemes, R&D performed within industry is not specifically encouraged. **There is an entire ecosystem where R&D is performed “by industry” “for industry”, which is ignored in these schemes, especially where such R&D can immensely benefit from Government participation.**

My own personal experience as a scientist has naturally started in the academic world, that I have immense respect for. Where else would a student learn the fundamentals which are the precursors of all scientific knowledge, when industry has neither the time, resource nor motivation to impart such knowledge? Having reaped the benefits on rigorous academic training via a PhD, I however quickly realized that industry is an entirely different entity to deal with. Academic knowledge barely scratches the surface of what industry expects and in many cases, does not train one sufficiently for the real world. Timelines and deliverables take on a new dimension in industrial research. Though this may sound trivial, it should be appreciated that the phrases “R&D” and “timelines” do not often occur in the same sentence as research is viewed as an exploratory activity that should be accommodated within flexible schedules. Industry insists that path-breaking research be performed within a short to medium time frame, beyond which it is potentially useless to the market.

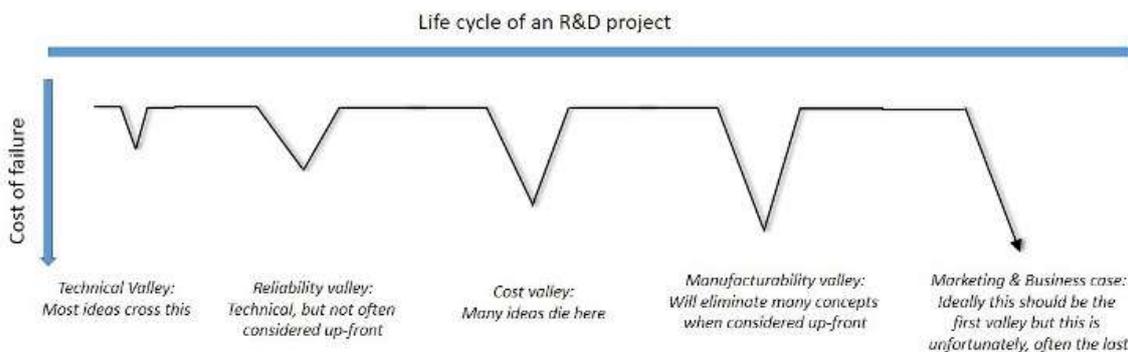
Likewise, industrial research takes on new dimensions such as cost, reliability, supply chain and manufacturing. Though these terms do not sound like research criteria, imagine a situation where someone invents a new material and later realizes that it is prohibitively expensive for the application. The effort involved in going back and re-engineering the material is equivalent to working on an entirely new project starting from scratch. Industry forces its scientists to consider the entire business case as a criterion from the beginning of the effort – in fact, in many cases the commercial case needs to be

presented well before any technical development even starts. Reliability, or lifing, is a similar trap. It is very possible for scientist to go down a technically valid path that ultimately results in a wonderful lab-scale demonstration but not robust to failures in actual usage. Reliability can make or break the entire R&D exercise unless it is analyzed up-front and again throughout the course of the project.

For all these reasons and more, it has proven more difficult for academia to provide R&D that can seamlessly transition into industrial product. Many companies have hence withdrawn into a shell of sorts where every company has setup its own R&D lab if it can afford one. The benefit is clear. In spite of the enormous investments required in creating these R&D facilities, the benefit is worthwhile in the fact that the team of scientists is closely tied in to the product teams. Hence product requirements are paramount in the research performed while the associated technological innovations directly serve product purpose. Thus a captive, focused team of applied scientists can work wonders for the future of the company, assuming they are well-funded. The word “captive” brings us to another key difference between academic and industrial perspectives on research. Academia has the non-selfish intent of propagating its research throughout the world via publications. Industry, on the other hand, largely refrains from such knowledge sharing. While sharing certainly helps accelerate the overall rate of research, it creates conflicts with Intellectual Property. Industry typically believes that it should own the research funded by itself, which incentivizes itself in the long run to innovate more. Both viewpoints, in this case, have their advantages.

An industrial entity attempting to outsource R&D to an academic institution, therefore faces the following key issues: There is often a lack of seriousness on timelines, compounded by the fact that the work-force is a floating population with commitments outside of their projects as well (such as classes for students). There is resistance to sharing Intellectual Property rights as IP prerogatives are widely different on either side. The combination of these factors results in a serious gap in academic R&D output as many of the above mentioned factors have not been thoughtfully considered – as a result the R&D is not ultimately useful for product. Often, there is ignorance among researchers in factors such as supply chain and manufacturability. The invention may be so interesting (read “exotic”) that a supply chain may not even exist for volume production. Manufacturability considerations including usage of standard processes, production yield and quality issues often take a back-seat in favour of technical achievements, which is very hard to correct at an advanced R&D stage. Consider Figure 1 showing the various “valleys of death” that a technology goes through before it can mature. It is interesting to note that the technical hurdles present only a fraction of the risks involved. Most research projects, in fact, cross the technical hurdles but fail at one or all of the other valleys.

Fig.1 Valleys of Death from Concept to Manufacturing



Another critical function provided by academic institutions is the training and providing of skilled talent to the industrial work force. Here again, there are deep shortfalls due largely to the gaps mentioned above as the same reflect in the way students are trained. Industry often has to impart significant training to its fresh graduates to make them useful in the real-world.

The Solution

The gap between academic output and industry requirement is plainly obvious and is killing the R&D eco-system, which begs the question as to what can be done to bridge this gap. **The answer lies simply in placing the words “R&D” and “industry” in the same phrase and therefore facilitating the creation and funding of industrial R&D labs.** These are R&D entities that are owned entirely under an industrial umbrella but not necessarily performing captive research for their

own products. Why does this solve the problem and quite efficiently at that? Such an industrial R&D entity would have both the necessary research skills and also a complete understanding of the rigour required to take research all the way to product. They would gain trust from an industrial user quite promptly. Thus the existing gap between academic research and industry requirements would be aptly filled. Not only that, such an industrial R&D lab would serve the purpose of providing R&D solutions for many small and medium enterprises as well, who simply don't have an internal R&D setup but need an industrial partner to make innovations happen.

An industrial R&D lab would have the following aspects working in its favour:

- A full time dedicated staff of scientists who do not have work commitments beyond their assigned research projects
- Well-paid staff, who do not need to conform to Government pay scales
- Multi-disciplinary skills under one department. As the saying goes, innovation happens at the intersection of disciplines, hence ensuring that different disciplines integrate seamlessly is of vital importance.
- Very flexible IP sharing terms, or in many cases, complete transfer of IP to the client
- Tightly integrated with on-site supply-chain staff, marketing staff, quality personnel and manufacturing facilities thereby resulting in much higher probability that the R&D is successful and manufacturable

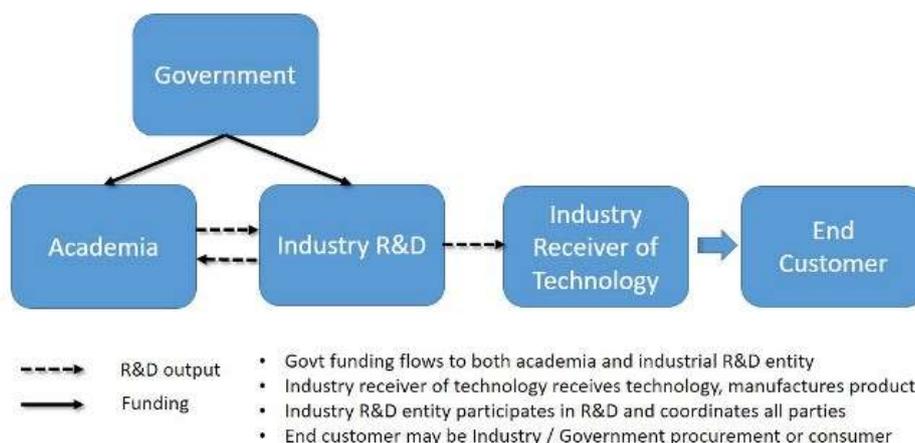
On the other hand, the following disadvantages present themselves:

- Higher R&D costs as salaries and overheads are higher than academia
- Limited capital budget for expensive R&D equipment

Precisely to cater to the disadvantages above is why the Government needs to step in. The higher costs may be subsidized by Government grants provided the Government has the willingness and the mechanism in place to fund private industry directly. Such grants may help in building a good asset base of research equipment too, in the long run. Having said this, it has proven difficult to impossible at the grassroots to channel Government funding to private industry.

Another solution presents itself at this juncture. Given that academia does not have the specific disadvantages listed above, a 3-way collaboration between Government, academia and an industrial R&D house may solve all of the problems in entirety. This is shown schematically in Figure 2 where the industrial R&D house is central to the process. Both industry and academia perform the research together while the industry R&D entity ensures that the research is steered to product goals. Coordination of all parties is done by this central entity, which makes it easier for the receiving industry to ultimately accept the technology and manufacture it. Such an arrangement would dramatically increase the probability of success of an R&D project, where "success" includes all steps from innovation to commercialization. This entire model is hinged on the "hope" that Government can find a simple way to fund an industrial R&D organization as easily as it funds academic entities today.

Fig.2 Proposed R&D model centered around Industrial R&D



In line with this proposed scheme, Powergear has created an R&D services division with full-time scientists who are tightly integrated with manufacturing units that are co-located with R&D. Powergear also makes IP discussion very simple by transferring all IP to the customer. While this model has been successful in attracting industrial clients, the Government needs to realize the potential that this model offers. Government would stand to benefit by achieving a significantly higher ROI (Return on Investment) on its R&D grants due to the fact that many more R&D projects would see the light of day.

Powergear performs both fundamental research and product development in multi-disciplinary areas and strongly believes that even fundamental research should be applied. Powergear's capability is highlighted here not to market the company's activities but to stand behind our words and show that we practice what we preach. The strength of this model will be fully realized when many such industrial R&D houses come up in India with strong Government and academic support. Another natural outcome of this approach will be a pool of better trained talent available to the industry in the long run. **When students at educational institutions are closely engaged with industrial R&D houses during their education, their skills will naturally be honed towards real-world productivity.**

Today, a Google search for the term "contract search" will result in almost entirely biology and medical organizations. While this is encouraging, there is a huge gap in contract research services in all other facets of technology. We sincerely hope that the Government will incentivize companies attempting to fill this gap and make India a power house in R&D.

Summary

There is a wide gap today between industry's R&D expectations and what academia can deliver working alone. This gap needs to be bridged by bringing research output much more in line with industry expectations. The foreseeable way to make this happen is for industrial R&D labs to participate in research on equal terms with academia from day one of the project. This way, the wealth of knowledge and infrastructure that exists in academia can be tapped and made to engage with the best scientists who are already delivering break-through innovation in industrial environments. **All of this should be facilitated by the Government through the funding of private industrial organizations who are serious about their R&D.** Many companies in the R&D outsourcing space will be MSMEs who cannot invest their own funds or provide a cost share, which makes Government funding all the more relevant. These MSMEs will hugely benefit from a combined R&D service offering that includes both academia and an industrial R&D lab. All parties will thus work together in a collaborative mode coordinated by the industrial R&D entity that understands both R&D and industrial needs and constraints. Ultimately, enabling MSMEs to innovate will revolutionize the technological future of the country. If the Government does not fill this gap then it is only a matter of time before industrial contract R&D matures on its own and fills the market, but unfortunately, academia will be left out in the process and the Government will end up with minimum ROI on its research endeavours. The contract R&D market is quite mature in many parts of the world and India needs to take bold decisions and giant leaps to win in this space. An incentive in doing so will be that India will eventually show the world that the world's innovation needs can be outsourced to and fulfilled in India and that our best brains can match their output at significantly lower cost. **India will become a hub for innovation and R&D, which is the holy grail at the highest end of the product development chain.**

About the Author:

Dr. K. Subramanian obtained his PhD from Cornell University in Electrical Engineering with specialization in Micro ElectroMechanical Systems or MEMS. He obtained his Bachelor's degree in Mechanical Engineering from IIT Madras. He is currently Head of R&D at Powergear Ltd., MEPZ, Chennai where he works on implementing several novel technologies in Energy and other sectors. He previously worked at GE's Global Research Center in New York. Subramanian has filed more than 50 patent applications in his field. He managed a large program on MEMS at GE and received two prestigious awards for his research. One of them, the Hull Award, is presented to early-career researchers at GE Global Research. The other award, the Whitney technical achievement award is for a project that is viewed as a potential market game changer. Subramanian is a Six Sigma Black Belt. He has made significant contributions to multiple unique projects and has authored numerous publications and technical reports. The current R&D initiative at Powergear aims to showcase India's innovative talents to the world.

Same Hyd school has produced Microsoft, Adobe, Mastercard CEOs: Microsoft CEO Satya Nadella had attended the Hyderabad Public School in Begumpet, Hyderabad, which also produced Adobe CEO Shantanu Narayen and Mastercard CEO Ajaypal Singh Banga. The high school was established in 1923 for the sons of aristocrats.

Microsoft once offered to buy Facebook for \$24 billion: Microsoft's former CEO Steve Ballmer in an interview in 2016 revealed he once offered Mark Zuckerberg \$24 billion to buy Facebook. While Zuckerberg refused the offer, Ballmer said, "I respect that. You have to have a willing seller". Zuckerberg is currently world's seventh richest person with a net worth of \$62.6 billion, while Facebook is valued at around \$450 billion.

Corporate Responsibility and the Challenges of Sustainability



Dr Mukund Rajan
Former Chairman
Tata Global Sustainability Council

Chief Guest Address at the CSR Conference & Round Table Discussion
on “Synergy for Maximizing Social Impact”
organized by The Madras Chamber of Commerce & Industry on 2nd Mar 2018

Good evening ladies and gentlemen. It is a pleasure to be here today, and to share with you some perspectives on the challenges of sustainability that corporates face, and the role that corporates might be expected to play in directing the changes we can expect to see in the next three decades.

As a lifer in the Tata group, I will draw upon examples from the Tata organization, amongst others, and demonstrate that corporates can and must play a leading role, alongside Governments and other stakeholders, in driving much needed changes in society. Some of these changes, inevitably, will need to be directed internally, within corporates themselves.

I will start with the critical environmental sustainability challenges the world faces today, and then reflect on the social challenges that we will need to address in the coming decades.

The first environmental sustainability challenge is the pressure that a growing global population places on the natural environment. We are now reaching the so-called Earth Overshoot Day, the date when humanity’s demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year, in August, which is simply frightening. A very specific outcome of our consumption of fossil fuel based energy sources is the looming threat of global warming, which will lead to melting glaciers, sea level rise, inundation of low lying geographies, changes in cropping patterns, and increase in natural disasters. We are already witnessing the phenomenon of the increasing frequency of man-made environmental disasters in India, like the Uttarakhand floods four years back, or the Chennai floods of 2015, or the Assam floods last year.

The second critical environmental sustainability challenge is the pressure of urbanization on infrastructure and housing, inevitable in the context of accommodating over 1 billion migrants we expect to see across the globe over the next decade.

The environmental degradation this will create can be gauged from the fact that a majority of the world’s urban population already lives in cities with air pollution levels at least 5 times higher than the World Health Organization’s (WHO) recommended standards. India is no stranger to this problem; it is worth noting that as per the WHO’s ambient air pollution database released in 2017, 13 of the top 20 most polluted cities in the world are in India. We know that in our capital city, Delhi, the air pollution continues to be severe, aggravated by the crop burning by farmers in the neighbouring states. The images of children in Delhi going to school wearing masks last year is a forewarning of our future if we don’t take urgent action.

The good news is that corporates are recognizing the critical urgency of responding to these challenges. They are beginning to integrate sustainability thinking into their strategies, and are making real investments and business choices that reflect their commitment to addressing issues like climate change. At Tata, for instance, our energy utility company, Tata Power, has emerged as India’s largest renewable energy player, and has announced that by 2025, 40% of its generation capacity will come from renewables. Our automobile company, Tata Motors, has joined RE100, the global collaborative initiative of companies committed to using 100% renewable power. And we are piloting innovative projects around the theme of the circular economy, a good example of which is the work being done in Jaguar Land Rover’s REALCAR (REcycled ALuminium CAR) project.

Corporates are also taking cognizance of the calls for greater transparency and accountability in their sustainability practices. The recent recommendations of the Task Force on Climate-related Financial Disclosure (TCFD), around reporting of material climate-related risks by businesses in their financial filings, are but the latest in a series of disclosure guidelines that more and more corporates are heeding.

The challenges that face us are also stimulating significant innovation and collaboration in the corporate world. The continuing success of the Montreal Protocol on Substances that Deplete the Ozone Layer which has seen corporate collaboration and innovation to phase out ozone depleting substances is a good example.

The challenges of sustainability are also catalyzing new business opportunities and business models. In India, we are seeing this in areas like rooftop solar, green buildings, the internet of things, and the emergence of the sharing economy in sectors like transportation and hospitality.

Let's turn next to the social challenges that we will need to address - the question of growing economic inequality in society. At Tata, we have learnt over a century and a half that if we do not address inequality in society, it prevents us from becoming a valued member of the community, and a neighbor of choice.

Our Founder, Jamsetji Tata, was clear about the role of business in the community, when he famously said that "In a free enterprise, the community is not just another stakeholder in business but is in fact the very purpose of its existence". He felt corporates have a responsibility to concern themselves with the quality of life of the communities they serve. If the community is not successful, if the customers, suppliers, lenders and investors in that community are not successful, it is hardly likely that the corporate that serves that community will survive.

It is this differentiated purpose that informs the work we do for addressing inequalities in society through, for instance, our Affirmative Action programme, or our work in addressing gender diversity.

The Tata Affirmative Action Program (TAAP) uses the 4 Es – Education, Employability, Employment, and Entrepreneurship – to address the inequities and social exclusion faced by the SC/ST communities.

Turning to gender inequality, a great example of the role corporates can play in shining a light on this issue is the campaign designed by Tata Global Beverages under their Jaago Re platform, 'The Power of 49'. This campaign was designed to encourage women in India to recognize their power to change the country with the use of informed votes. The campaign was launched ahead of the 2014 General Elections; a multi-media campaign solicited women's inputs on the issues that really mattered to them, as a result of which views were gathered from over 1.2 million women, perhaps the largest survey of its kind.

These views found their place in the 'Voice of 49' manifesto, and eventually were integrated into the political manifestos of India's three largest political parties. The campaign won the Grand Emvie award for the best campaign of the year in 2014-15; more importantly, as a result of initiatives like this and other efforts to mobilize women to register for and cast their votes, the General Elections witnessed the highest ever female voter turnout in Indian history, at 66% compared to 56% in the previous General Elections.

The bottomline with societal inequality is this – you need to carry the community with you, and demonstrate your commitment to inclusive growth.

Of course, inequality also exists within corporates, and questions can be raised about the compensation structure of corporates. In recent years, questions have been raised about the level of executive pay, and the acceptability of very high pay differentials between the highest paid executives and the lowest paid workers in an enterprise. This should, of course, not tempt us to revisit the bad old days of socialism when salaries even in the private sector were capped. Nor should we envy the wealth creation by entrepreneurs, such as the new billionaires leading the so-called Indian unicorns. But we need to be sensitive to this issue of income disparity.

So, I want to make the case that corporate responsibility, in the wake of the many new challenges of sustainability, requires a new face to be presented by corporates and corporate leaders. A face that is genuinely caring and concerned, that is willing to invest for long-term solutions to current problems, that recognizes the social tensions that arise from gross inequalities in society, and that is willing to undertake the changes necessary to make a meaningful difference.

In making change possible, I believe there are three spaces where corporates will be increasingly tasked and challenged. The first is the role of those millions of men and women who make up part of every corporate's organization. I believe volunteering, and active demonstration of individual responsibility, will be something increasingly expected from every

corporate. At Tatas, we have accordingly undertaken a corporate volunteering programme, Tata Engage, which we believe is the largest in India - last year, it delivered over a million hours of volunteering support for non-profits. What we have found from this exercise is that our employees emerge from the experience of volunteering more enthused and passionate about the work they do and the difference they can make in society. And very gratifying is the fact that this is especially true of the millennials in our organization.

The second space where corporates will be challenged is the need for collaboration to address complex problems. Fortunately, legislations such as the CSR amendments to the Indian Companies Act are helping to address this by permitting corporates to pool their CSR funds, to achieve greater impact; the space is seen as one where corporates can collaborate, without worrying about losing their competitive edge, and where the contribution they can make offers a win-win for all stakeholders. As a result, corporates are now aggregating their funds to deliver results on scale; this also has the benefit of reducing the system overheads on issues like staff salaries, commissioning of experts, and the like. At Tata, we are seeing this play out in initiatives like our skills development activity, where corporates like Schneider, Siemens and Bosch have willingly joined hands with us to deliver high quality skills development programmes.

The Companies Act also mandates strict standards of reporting and hence gives external stakeholders a chance to assess the impact companies are creating in CSR. This scrutiny is elevating the discourse on CSR at the level of the Board – where earlier CSR spending by Indian companies used to be something undertaken “beyond business”, if and when a corporate had the money and inclination, it is now a firm mandate, and a matter of considerable debate and discussion amongst the Board Directors, with a focus on the efficiency of spending and the outcomes delivered.

As a result, corporates are significantly revamping and refreshing their CSR programmes, and bringing in the discipline and rigours of measurement that they would hitherto reserve for their business activities. The efficiencies being introduced in ensuring that every rupee spent on CSR delivers appropriate value is definitely helping the sector.

The third space where corporates will be challenged relates to the structure of corporate ownership, and this is linked to the economic inequality in society which I mentioned earlier. At Tata, we have been fortunate to be owned at the level of our parent investment holding company, Tata Sons, principally by charities. These charities, created from the wealth bequeathed by Jamsetji Tata’s sons, are India’s largest private charities today, undertaking various philanthropic causes across the country, giving away in the region of over \$ 100 Mn, a number that has been steadily rising, every year. As a result, we are a most unusual corporate in the world of capitalism, owned as we are principally by charities that are dedicated to doing good. As JRD Tata famously said “The wealth gathered by Jamsetji Tata and his sons ... is held in trust for the people and used exclusively for their benefit. The cycle is thus complete. What came from the people has gone back to the people many times over.”

The Trusteeship model of ownership does a lot to instill pride in employees, and to engender trust within other stakeholder groups. As the challenges of sustainability present dramatic possibilities to each society, I am certain there will be more debate on the role of corporates and the structure of corporate ownership.

Ladies and gentlemen, thank you so much for listening to me. I hope what I have said will provoke more thoughts around the role of corporates in addressing the challenges of sustainability in society.

Thank you very much.

Dr Mukund Rajan
Former Chairman – Tata Global Sustainability Council

Microsoft lab is the quietest place in the world: A lab built by Microsoft at its headquarters in Washington, US, is the 'Quietest place on Earth', as recognised by the Guinness World Records. The company built the anechoic chamber for audio and device testing, and reported -20.35 dBA average background noise. An anechoic room is insulated from exterior noise sources and designed to completely absorb reflections of sounds inside.

Google installing 9,656 km undersea cable between Japan, Australia: Technology giant Google on Tuesday said it has started installing a 9,656-kilometre-long undersea cable between Japan and Australia to expand its cloud business. The cable system will have two fibre pairs connecting Japan to Guam, and two fiber pairs connecting Guam to Sydney. The project is expected to be completed by the end of 2019, Google said.

IoT Demystified

Its role in precision agriculture to meet food security

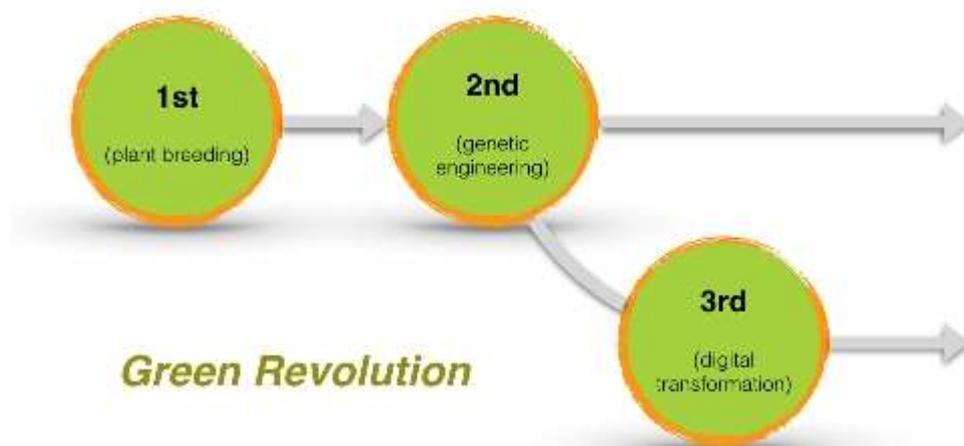


Mr Amit Saha
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The feature in the form of Q&A published below is based on the interaction of Mr. H.R. Mohan, editor of IEEE ICNL with Mr. Amit Saha, after his presentation on "IOT in Agriculture" at the FICCI Digital Disruption and Transformation Summit. Thanks to Mr Amit Saha for trying to demystify IOT and sharing his views on how IOT in Precision Agriculture will be helpful in meeting the challenges of food security for the country's growing population.

Can you update us on the transformation that is currently undergoing in the agriculture sector?

The Agriculture sector is undergoing a dramatic change - what we call the third green revolution. And as I have depicted below, the digital transformation (3rd revolution) has already kicked off and is warming up parallel to the 2nd one.



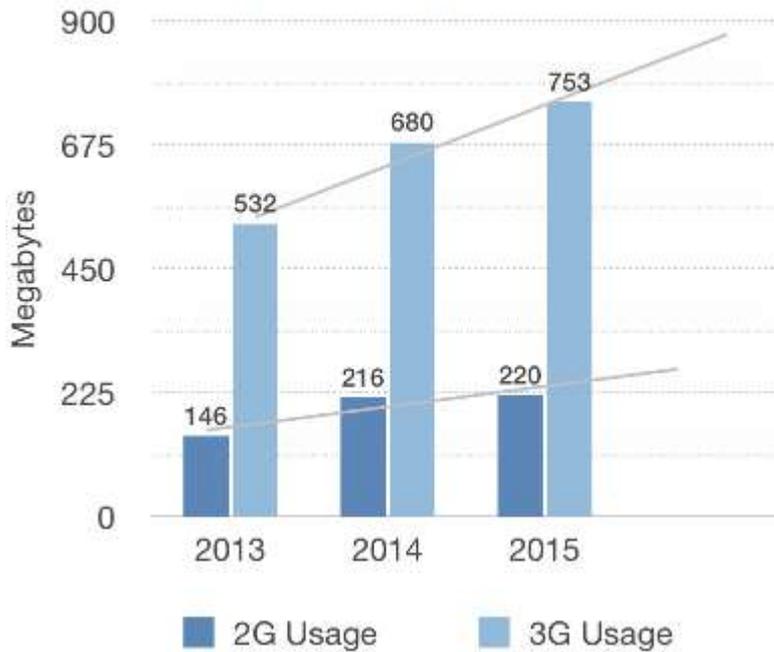
Do you think IoTs can fundamentally change our life and living?

IoT's will integrate the online world with the physical world and redefine our life on earth. Let me bring up few scenarios.

Let us consider that you are on a long drive and your car needs a refill within next 12 miles. Typically you will refill at the next gas station. Now imagine that your car suggests you to skip next two gas stations and stop at the third one which is coming up in another 9 miles as that is the station offering the cheapest rate among all the gas stations within the distance that your car can go before it runs out of gas.

Or imagine that a drone flies over a plantation, captures photo and sends to the base station. The photos are then analysed and the system finds few plants having fungus infection. The system identifies the kind of infection and suggests an appropriate fungicide. This information is then sent to the nearest service provider who launches an UAV fitted with spraying equipment and the fungicide and it will spray only those plants that are infected and with appropriate dosage. This will avoid excessive spraying of crops thus helping in attaining zero residue quality as well as reduction of input cost. Payment will be collected digitally from the farmland owner.

Average Data Usage per User per Month



As IoTs are evolving and getting smarter and infiltrating into almost all products and structures, they will generate an unimaginable volume of data. This data can be used to understand the behaviour, identify pattern and suggest best action. This involves processing of volumes of data and analytics will play a key role in this game.

The future machines will be intelligent enough to reconfigure itself to optimise its output. The machines will have sensors built inside to capture key information about their own health and performance and that data will be analysed and used to further enhance output.

And you will see such machines everywhere - home appliances, scanners in hospitals, aircrafts, satellites, construction vehicles, self driven cars, manufacturing plants and assembly

lines, sports arena, airport security systems, defence, inside humans and cattle et al.

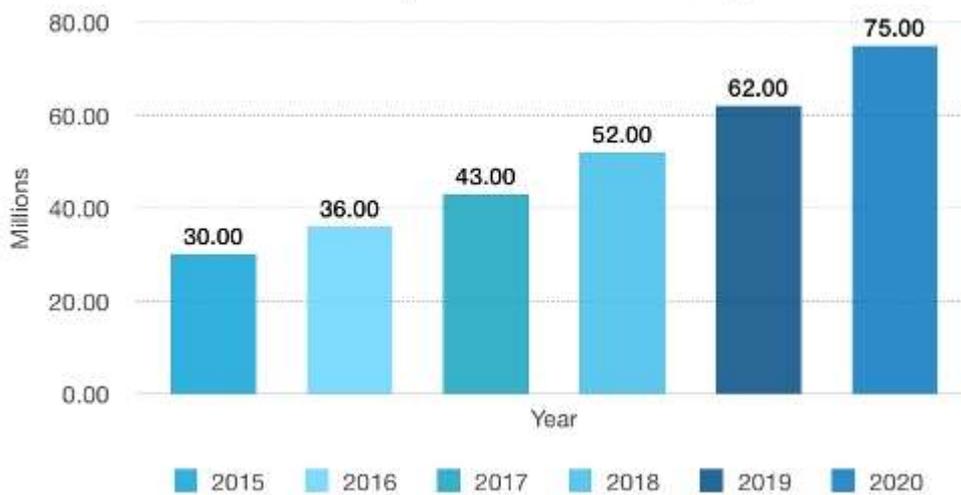
So, you see that IoT will affect every walk of life and hence completely transform our life on earth.

How big can this industry grow into?

The IoT industry will explode into a 15 trillion dollar empire by 2030 - that was the estimate from Accenture some 3 years back as well as quoted by Angela Murkell in Davos in 2015.

Typically new technology adoption is slow at the onset. But let us understand that IoT is usually not a complete solution all by itself. IoT is rather an extremely strong enablement for the existing technology. Thus adoption of relatively new technology (and surely upcoming ones) will be accelerated due to integration of IoTs into the solution. The graph below will show you how the shipment volume is on the rise.

Global Agricultural IoT Device Shipment

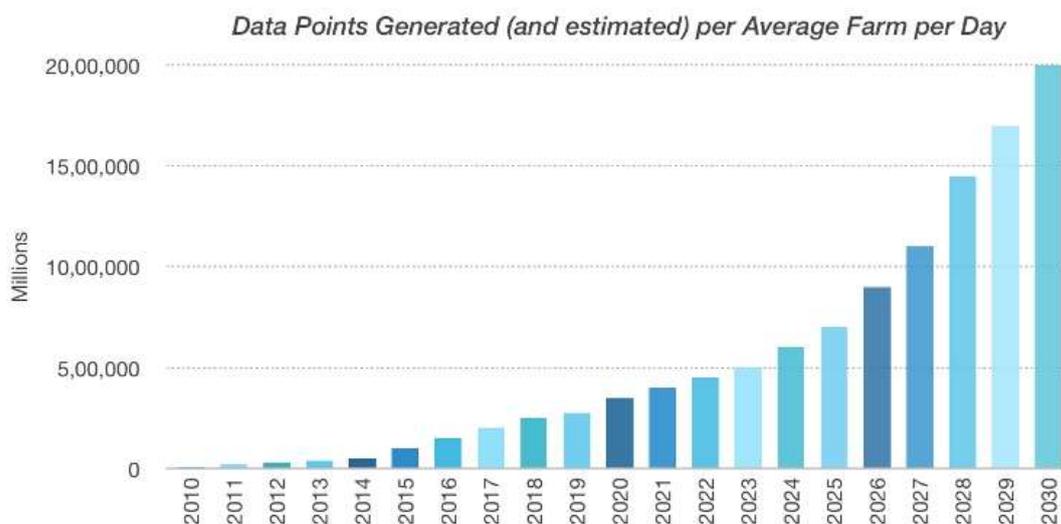


The advent and evolution of IoTs will be like a tide raising all boats impacting sectors including education, medical, tourism, hospitality, agriculture, food processing, banking, retail, aerospace, construction, mining, computer, high-tech and the list goes on.

What are the challenges in adoption of IoT?

Like any upcoming technology, IoT has already posed several challenges in technology as well as technology management space. Let me list a few of these challenges:

1. There are several types of IoT devices and each player has its own way of connecting and communicating with these devices. This is and will lead to evolution of several different approaches each probably optimised to do a certain piece of work by its designer/ manufacturer. This will lead to interoperability issues, vendor lock in, expensive solution, lack of healthy competition and ultimately the customers will miss out on benefit. Clearly we have to arrive at standard(s) that can be embraced by the industry. Surely we will need several standards for different categories of activities, but enforcement of these standards will mature the market and the industry and the customers will enjoy long term commercial benefits.
2. A problem that lurks over the developing economies is that of availability and reliability of telecom network throughout the country. If this basic infrastructure is missing then the proliferation of IoT technology in developing countries will be severely hurt. There are technology that offer connectivity without utilising the telecom network but we have to wait until such technology really picks up momentum. The industrial network technology like ethernet and wireless technology will double in economic value.
3. IoTs will generate humongous volume of data. Constant transmission of this data over the telecom (and any other) network, will require massive bandwidth and it is doubtful if existing Telco companies have all the means and financial strength to provide such backbone.



4. The large data volume generated by the billions of IoTs need to be stored, analysed and acted upon. This calls for hyper capacity computation power and elastic storage that is really unheard of. Petabytes of data needs to be transported, analysed in motion, intelligence extracted and action lined up - all in real time (or in near real time).
5. Basics of risk management tells us that more the exposure, higher the risk. With billions of IoTs gathering information from external world and transmitting that over a network (mostly public) will surely pose a massive security challenge. Data privacy and security will always be on the mind of the customers when their data flows over public network and all their systems are hosted on public cloud. We need to convince our customers that their data on the public cloud today is probably far more secured than in their own data centres. The industry needs to evolve new security approaches, measures and threat management policies and practices.

What are some of the areas that you see developing as a part of the big tide that you mentioned?

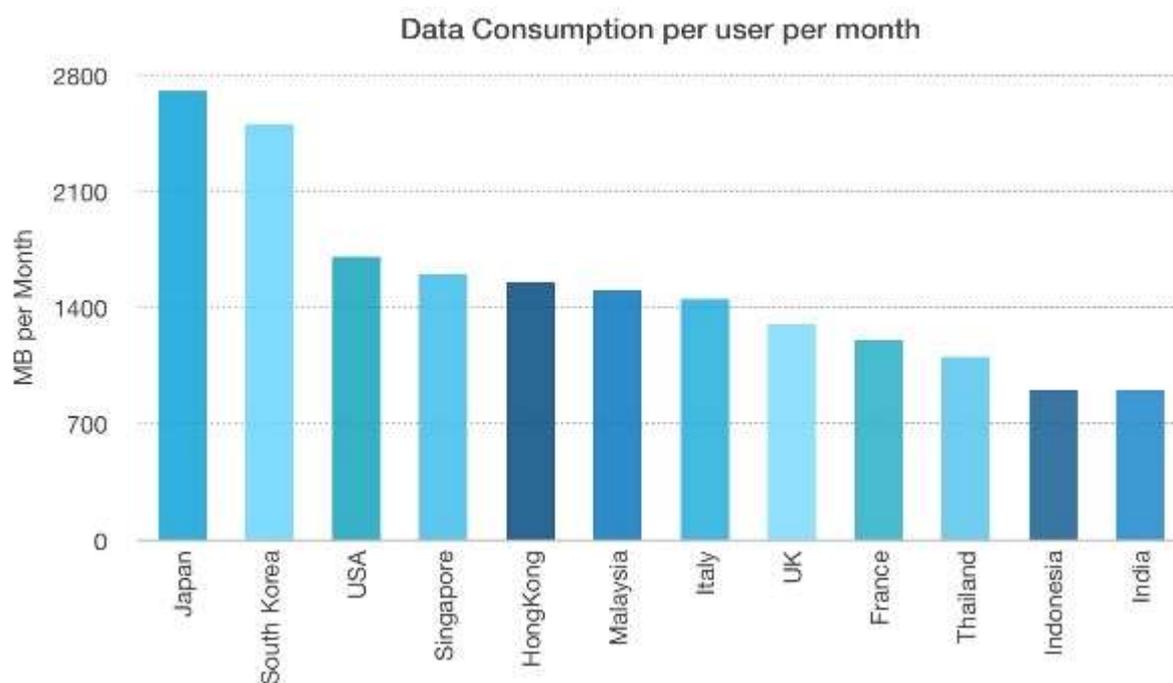
We can broadly classify IoT space into four areas/ scope - Connection, Manage, Analyse and Actuate. There is massive development happening within each of these areas.

We will have sensors that will not just be low powered but ones who will never need to be powered externally. These devices will operate on low powered network, will be capable of many to many messaging between large numbers of similar or diverse devices. All these messages will be encrypted which itself poses another challenge. Imagine billions of messages being encrypted, transmitted between thousands of devices and then decrypted at the receiving end for analytical processing - the security processing itself will demand massive computational resource.

The management of this super large volume of data, provisioning of resources, network, storage, security, business continuity will all evolve dramatically and this is already happening. The need for transmitting all data to the central repository will no longer be there thus reducing the cost of data transportation and reducing delay in processing and action.

The analytical software will see radical change in its design and functioning to keep up with the demand to process exabytes of data and drive actions through man and machine on the ground. Traditional Analytics had all the data gathered from the source and then stored on a central storage and then processed through aggregation, slicing and dicing etc. But with millions of IoTs deployed on the field this architecture will change dramatically. The advent of distributed analytics is already changing the game. Data will be stored and processed at the edge without being transmitted to the central repository unless absolutely necessary. IBM Watson platform already offers this feature and is being leveraged in many solutions.

As you already see in previous graph how the demand and need for data is shooting up in India while the graph below will show you how far behind we are compared to data driven society like Japan.



If you see how each one of the large vendors like IBM, Amazon, Google and Microsoft are evolving - they are in a race to provide solution in each of these areas and grab as much market share as possible. There are many smaller vendors who are doing great job in driving this evolution and maturity of technology in the market.

India being an agricultural country, will IoT help us in meeting the challenges of food security in the years to come?

I see IoT as an enabler of our food security. Agriculture is one of the toughest sector to adopt IoTs. I see great enthusiasm amongst people to adopt and industry to participate, but the difficulties lie in the complexity of technological implementation as a solution.

Agriculture has so many variables and parameters that are so dynamic that optimising an outcome amongst all these uncertainties is a tough challenge. The change in weather condition every day and hours within a day, rainfall and moisture content of the soil, genetic orientation of the seeds, nutritional composition of the soil, labor availability (non-availability), infestation of disease and pests, regulatory pressure, access to financial and the market for poor farmers - are all challenges that create a complex condition that our farmers have to fight everyday.

We also need to keep the bigger challenge in perspective - to attain food security, we have to double our food production by 2030 on arable land that will reduce to about 70% of what we have today.

So, it is very clear that we can't attain food security if we submit ourselves to mediocre yield - we need the best yield of the most nutritious variety of crops from every inch of land and using minimum of all resources natural or human supplied.

Although these challenges will impede adoption of IoTs, it is probably IoTs that can come to our saving. The practice of precision agriculture is on the rise. As we understand the combinatorial working of the plants, environment and technological systems better and we put them to best possible use in the entire value chain both for the farmers and the ones who handle food thereafter. Such adoption will explode the data generated from these IoTs as shown in the graph below.

Some of the areas of current focus are image processing and recognition, drones, unmanned farm vehicle, robotics, artificial intelligence, predictive analytics, machine learning, gene editing, irrigation, automation and natural language processing.

About the author

Amit Saha is an Information Technology expert and a global leader in establishing and managing IT for large international MNCs in North America, Europe and Asia. He is an expert in Envisioning, Strategy, Innovation, Digital Transformation and Organisational Changes. He is a Mechanical Engineer and holds an MBA from National University of Singapore.

He has worked with some of the largest organisations in the world including GE Capital, Dupont, NCR, PwC, Novartis, Pfizer and Syngenta, Amit has established global consulting practices and executed programs in cross cultural environment across Asia, Europe and the US.

He is a distinguished panelist and visiting lecturer to several business and technical schools and delivers on topics including Leadership, Digital Transformation, Change Management, Innovation & Technology Management. Amit is the designer and implementor of several CSR programs for the cause of Multiple Sclerosis, Schools for the underprivileged, Marginal Farmers and recently setup Hunger's End - a social enterprise to feed the hungry kids.

Dilbert's One Liners

Born free, taxed to death
I say "NO" to alcohol, it just doesn't listen.
A friend in need is a pest indeed.
Marriage is one of the chief causes of divorce.
Work is fine if it doesn't take too much of your time.
When everything comes your way, you're probably in the wrong lane.
The light at the end of the tunnel may be an incoming train.
Everyone has a photographic memory, some just don't have film.
Life is unsure; always eat your dessert first.
Smile, it makes people wonder what you are thinking.
If you keep your feet firmly on the ground, you'll have trouble putting on your pants.
It's not hard to meet expenses, they are everywhere.
I love being a writer.. What I can't stand is the paperwork.
A printer consists of 3 main parts: the case, the jammed paper tray and the blinking red light.
The guy who invented the first wheel was an idiot. The guy who invented the other three, he was the genius
The trouble with being punctual is that no one is there to appreciate it.
In a country of free speech, why are there phone bills?

IoT-Cloud Applications for Societal Benefits – An Entrepreneurial Solution



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Abstract

High end technologies such as Cloud, Edge, Fog computing, and so forth have profound implications on addressing the emerging issues of societies. Several leading societal problems such as air pollution, water pollution, corruption, and poverty could be timely notified or addressed with the application of these high end technologies. This article discussed a few societal applications and the importance of an IoT Cloud enabled technologies. In addition, the current research works and the innovative product developments at the IoT Cloud research lab of the Indian Institute of Information Technology Kottayam were discussed.

IoT Cloud Technologies – An Introduction:

Internet of Things is a system where hundreds or thousands of devices/sensors could communicate each other over internet in an automated fashion for attaining certain tasks. Several researchers, business enthusiasts, and entrepreneurs have attempted to develop applications relating to societal innovations using IoT technology. In fact, Cisco has estimated that the technology would generate a revenue of \$14 trillion by 2020; DST-India has formulated an initiative for developing IoT based solutions or products; Atal Nidhi Aayog's AIM scheme has encouraged business models with innovative technologies such as IoT, Cloud, and so forth.

In fact, most of the researchers', including industrialists, have engaged cloud based databases and cloud-enabled solutions for their applications. This is due to the fact that the sensors need not require large volume of memory or processing power. Obviously, hosting such a large amount of data in cloud constantly lead to the networking and memory issues for most of the societal applications. For instances, weather prediction or automation industries could transport sensory data in the range of over terra bytes to the cloud.

Recently, technologies such as Edge computing has provided a feasible solution to IoT Cloud application developers. By this, limited data are forwarded rather than dumping all sensory data to the cloud database. This means that the data are screened in with some pre-defined criteria before they would be uploaded to the cloud.

As cloud technology provide pay-as-you-go computing model, startups and incubates could venture upon their innovations at the minimal costs. The technology could also offer tens of thousands of innovations when married with societal products. This article discussed the societal applications and the need for high end technologies, most importantly, the IoTCloud.

Societal Applications – Domains:

Societal applications exist in various disciplines – agricultural, forestry, pollution, chemical engineering, forensic, ICT domains, and so forth.

The emerging societal applications could be classified in the following categories:

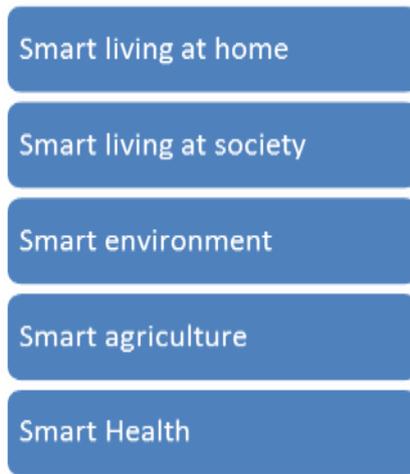


Figure 1 Societal Applications - Category

i) Smart living at home

People, mostly living in urban cities, anticipates a smart living. This means that their wearable devices should be remotely connected and synchronized in a way such that the solutions should seamlessly assist them to pursue their daily routines with ease. For instances, the evolving solutions have predominantly attracted people to enhance their home with security gadgets and fire/flood/tsunami alarm machines; refrigerators do communicate with the personal mobile devices to remind them about shopping milk tonight.

ii) Smart living at society

Society should be automated so that the future may remain socially and economically competitive. The current issues of finding a shopping mall, identifying the concerned officer to report a problem, solving apartment complexities, and so forth could be easily addressed with the help of these applications.

iii) Smart environment

Environment should be clean. What steps do we technocrats adopt for ensuring cleanliness? The Indian government, through its Swatch Bharath mission, has taken various strides to develop a Clean India. Despite several initiations, Frontline (Feb.16 2018 issue) has reported a scenario where industries dump chemical wastes to Noyyal river of Tamilnadu. Why precautionary measures are not being adopted? Can't technologies assist the concerned governmental agencies? These questions should be seriously dealt with for the future Clean India. In addition, air pollution is also remaining as a serious concern in various parts of India, which results in health hazards to the society.

iv) Smart Agriculture

Optimizing watering at agricultural lands could increase the economy of the society – i.e., the farmers at large. Weather assisted farming with computing solutions do a tremendous role in boosting up the economy of the society. In addition, a few agriculture-suggestive ICT or alarming systems while ruining agricultural fields could be developed using these technologies.

v) Smart Health

Above 40, most of the south Indian citizens are prone to several health issues – most predominantly, the diabetes mellitus. A healthy society is a productive society. Patient monitoring and health monitoring machines should be produced in a cost effective manner for the utilization of any common man.

Benefits/Challenges of IoT-Cloud for Societal Applications

The benefits of including IoT cloud based technologies for societal applications are manifold:

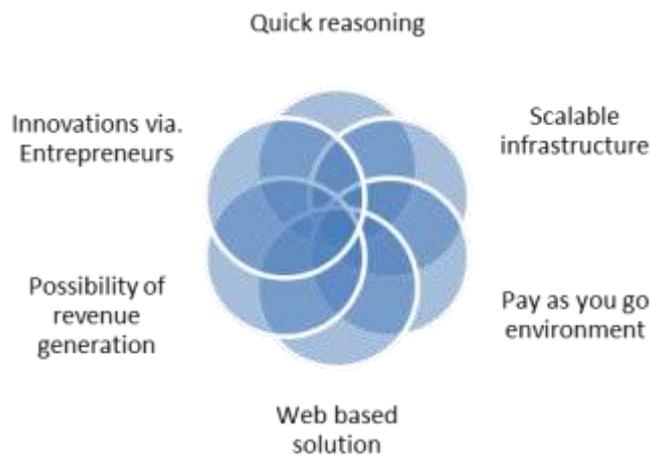


Figure 2 Benefits of IoT Cloud Technologies for Societal Applications

Known Challenges.

The emerging challenges while adopting IoT Cloud technologies for solving societal problems include:

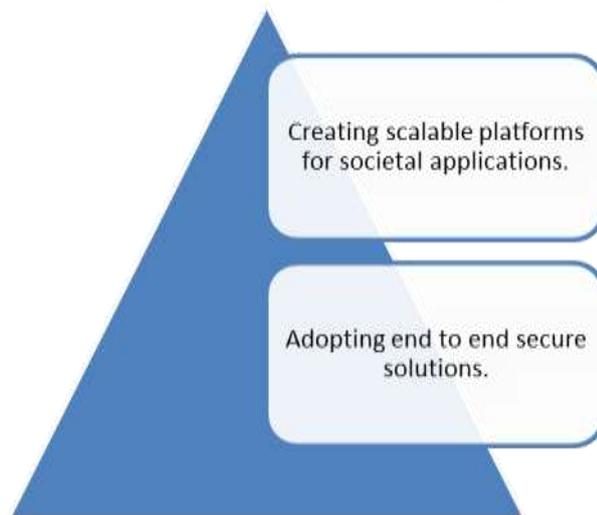


Figure 3 Challenges of Adopting IoT Cloud to Societal Problems

Air Pollution Analysis and Ongoing Research/Innovations

A Case Study: Are you planning for a comfortable living? an air-pollution free city? Is your environment safe for the family members? Is your environment safe to launch an industry or a startup company? Air quality sensors could be housed in various locations and the air quality parameters such as SO₂, NO₂, RSPM, and so forth could be monitored. In addition, the other weather related sensors such as temperature, moisture, air pressure, and so forth could be utilized to assist in analyzing the air quality of a particular city.

In fact, air pollution forecasting is an approach for predicting the air quality parameters in order to study the impact of air quality at a particular location or city. The forecasting could easily provide us the concentration of these air quality parameters which could guide the entrepreneurs or societal enthusiasts. A few machine learning approaches could be adopted to forecast these air quality parameters.

Ongoing Research/Entrepreneurship at IITK: At IITK, we are developing and motivating students (the future entrepreneurs) to develop societal applications with the help of high end technologies such as Cloud, Edge and Fog computing. For instances, Dr. Shajulin Benedict of IITK has developed a cloud microservice application to predict the air quality of cities using Random Forest algorithm. The developed solution could also create revenue to city authorities if implemented. A few of his students are developing societal applications such as revenue assisted manhole detection

(Manikayla Rao), revenue oriented water quality analysis and air quality analysis (Harsh Kumar Singh and Anuj Bhatla), and electricity consumption management system (Ravi Verma) and Water management system for smart cities (Srija M.) as part of their academic projects / internships. In fact, IIITK organizes a collaborative cloud computing course along with the Technical University Munich Germany for its students to enrich the technology orienting towards the societal benefits.

Reference:

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About the author

SHAJULIN BENEDICT graduated in 2001 from Manonmaniam Sunderanar University, India, with Distinction. In 2004, he received M.E Degree in Digital Communication and Computer Networking from A.K.C.E, Anna University-Chennai. He is the University second rank holder for his masters. He did his Ph.D degree in the area of Grid scheduling under Anna University, Chennai (Supervisor - Dr. V. Vasudevan, Director, Software Technologies Group of TIFAC Core in Network Engineering). He was affiliated towards the same group and published more papers in Int. Journals. After his Ph.D award, he joined a research team in Germany to pursue PostDoctorate under the guidance of Prof. Gerndt. He has completed two funded projects from DST and two grants from CIM-GIZ Germany while working as Professor at SXCCE Research Centre of Anna University-Chennai. He visited TUM Germany for teaching Cloud Computing as Guest Professor of TUM-Germany. Now, he works at the Indian Institute of Information Technology Kottayam, Kerala, India, an institute of national importance of India, under MHRD (PPP). His research interests include Grid scheduling, Performance Analysis of parallel applications (including exa-scale), IoT-Cloud Computing, and so forth - www.iiitkottayam.ac.in/shajulin.php

How English and Englishmen make fun of each other

Q: Can February March?

A: No. But April May!

Q: Did you hear about the painter who was hospitalised?

A: Reports say it was due to too many strokes!

Q: Have you heard the joke about the butter?

A: I better not tell you, it might spread!

Q: How do you know that carrots are good for your eyesight?

A: Have you ever seen a rabbit wearing glasses?

Q: Music Teacher: What's your favourite musical instrument?

A: Kid: The lunch bell!

Q: What did the triangle say to the circle?

A: You're pointless!

Q: What do you call a ghosts mom and dad?

A: Transparents!

Q: What do you call a group of men waiting for a haircut?

A: A Barbercuel!

Q: What do you call a person that chops up cereal

A: A cereal killer!

Future of Testing in the Digital World



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Software Testing has been evolving since the dawn of computing as a science, an art, and a profession. Testing discipline too has evolved fast. Regardless of the changes in technologies and Information Technology (IT) landscape, testing has continued to remain focus areas for organizations, more so in today's digital world, where the cost of failure is high.

Before one makes an attempt to chart out future of testing in next decade, it would be good to summarize the technologies of tomorrow that the testing discipline needs to cater to.

Key technology trends that would shape future of Information Technology

In this section, we would present 5 key technology trends, viz.

- Pervasive technologies and predictive analytics for customer experience
- Cognitive Intelligence in connected autonomous vehicles
- Multi-channel customer connect and wearable technologies
- Dis-intermediation eliminating middlemen
- changing workplace of future with arrival of robots

Pervasive technologies and predictive analytics for customer experience

Pervasive technologies deal with the flow of information between the built-in environment and its occupants. The environment is rich with information that can be utilized to enhance the quality of our work and life. Some basic examples such as customized deals in shopping malls based on geo-localization and buying pattern, traffic alert based on the route taken to the office every day, etc.

Even Connected Autonomous Vehicles (CAV) are good examples of pervasive technologies and predictive analytics as they interact with their environment and based on some specific triggers, predict the outcome of the events and perform appropriately.



Cognitive Intelligence in Connected Autonomous Vehicle (CAV)

Connected vehicles use different communication technologies to communicate with the driver, other cars on the road (Vehicle-to-Vehicle--V2V), roadside infrastructure (Vehicle-to-Infrastructure--V2I), and the “Cloud.”

Autonomous vehicles are those in which operation of the vehicle occurs without direct driver input to control the steering, acceleration, and braking, and are designed so that the driver is not expected to constantly monitor the roadway while operating in self-driving mode.

CAV comes with in-built cognitive intelligence and predictive analysis as it has to distinguish between various types of objects on the road, for example, pedestrians, cyclists, other cars, etc., and take a decision on steering past, acceleration, deceleration, or braking accordingly. The CAV features will improve road safety, enhance the driving experience, reduce the potential for traffic jams, and improve the traffic flow.



Multi-channel Customer Connect – Wearable Technology

Wearable technology or fashion electronics are clothing and accessories -comprising a computer and advanced electronic technologies. The designs often incorporate practical functions and features.

Wearable devices are part of the network of physical objects or "things" embedded with electronics, software, sensors, and connectivity to enable objects to exchange data with a manufacturer, operator and/or other connected devices, without requiring human intervention.

There is a huge application of wearable technology in the personal computing, entertainment and gaming, and e-health sectors.



Disintermediation – Business Platform to connect new partners

Disintermediation platforms are removing intermediaries from a supply chain in connection with a transaction or a series of transactions. In order to decrease the cost of servicing customers, traditional distribution channels, which had some type of intermediate companies such as distributors, wholesalers, brokers or agents, are now dealing with every customer directly or via the internet.

Some basic examples are eCommerce platforms such as FlipKart and Amazon, which source products directly from the manufacturer. Other examples are reselling platforms such as OLX, which connects the buyer and seller directly enabling the successful transaction.

ITC's e-Choupal has completely removed the middlemen and benefitted a huge number of Indian farmers, who can sell their produce at a much better price.



Changing workplaces of future – Robotic Process Automation (RPA)

In Robotic Process Automation (RPA), software "robot" replicates the low-skilled actions of humans such as entering data into an enterprise resource planning (ERP) platform or follow a set of repetitive processes. RPA software can be configured to capture and interpret the actions of their existing applications used in a variety of business processes. Once the software has been trained to grasp certain processes, it can automatically manipulate data, communicate with other system, and process transactions as needed.



Testing considerations for new technologies

How are we going to test these new technologies? Is it going to be tricky or just a cakewalk? Let's try to find out the testing considerations for each of these new technologies.

Pervasive technologies and predictive analytics

Testing for pervasive technologies and predictive analytics will have three basic components: (i) Business analytics testing on the huge amount of information gathered from the environment; (ii) Thorough testing of the prediction model for extensive coverage of test scenarios; and (iii) Testing of the adopted Near Field Communication (NFC) technology

Cognitive intelligence–Connected Autonomous Vehicle (CAV)

During testing of CAV, two most critical factors are cognitive intelligence of the prediction model and response time. While the software onboard will be responsible for predicting the next move of the other objects on the road, the hardware will be responsible for performing the required action within a fraction of a second.

Along with basic connectivity testing, thorough testing of the prediction logic and performance testing of the hardware response time will be of prime importance.

Multi-channel customer connect–wearable technology

Wearable technology primarily consists of sensors and IoT. The testing of wearable technology will primarily focus on testing the sensors and the information captured by them.

Testing the connectivity and internet protocols should also be part of the testing consideration.

Disintermediation–business platform

During testing of a business platform for disintermediation, knowledge of the end-to-end business scenario and process flow is very important. Therefore, the testers have to be savvy with domain understanding as well as the technology used to realize the platform.

Also, from end user testing perspective, crowd testing can be a viable choice for all these business platforms.

Changing workplaces of future–robotic process automation

Robotic process automation is going to change the way we do testing and test automation today. The software components of RPA should be tested the way we test any software component. However, instead of a traditional waterfall, it will be more inclined towards agile, Extreme Programming (XP), Test Driven Development (TDD), or Behavior Driven Development (BDD). Having System Development Engineers in Test (SDET)s in the testing team rather than pure career testers should also help test the RPA.

Concluding Thoughts

With the advent of new technologies, basic testing process and methodology will not change significantly; but at the same time, as these new technologies are evolving and the test basis is ever changing, traditional waterfall model will give way to more flexible methodologies such as agile, TDD, BDD, micro-services architecture, etc.

Looking ahead in the future, testing will be more tools-oriented; even the automation scripts will be created by robotic software. Testers also need to upgrade their skills from pure, independent career testers to a more holistic skillset from technology and business perspective. Eventually, they will have to wear multiple hats as apart from their testing job they have to perform troubleshooting and if needed, coding as well.

About the Author

Renu Rajani is a seasoned IT Services/Consulting leader with 28 years of experience. She is Vice President and Delivery head with Infosys in Financial Services. Prior to Infosys, she has worked with reputed tier-1 IT services companies including Capgemini, Citi, IBM, and KPMG Consulting in key leadership roles. Renu's experience spans across complex delivery, Transformation, Technical Solutioning, Outsourcing Governance, and Consulting.

Renu has been recipient of Testing Thought Leadership award in 2008 by PureTesting and Testing Leader of the year award by Unicom in 2015.

Renu holds an MS from Krannert Graduate School of Management, Purdue Univ USA, an MBA in Finance from DAVV Indore, a B Tech in Computer Science from IET, Lucknow University. She is an IBM Sr PM Certified with DPE/SM discipline, and holds ITIL V3, CAIIB and PMP Certifications.

Renu is author of two books on software testing

“Testing Practitioner Handbook”, Renu Rajani, Packt Publisher, 2017, ISBN 978-1-78829-954-1

“Software Testing – Effective Methods, Tools and Techniques, 2nd Edition”; Renu Rajani, Pradeep Oak; Mcgrawhill Education, 2018; ISBN-13: 978-93-87432-67-3

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Courtesy:

This article is a reprint of chapter-44 in Renu Rajani’s book “Testing Practitioner Handbook” (ISBN 978-1-78829-954-1) published with Packt Publishers in 2017. The article is printed with permission from the author.

Techbits

India becomes world's second largest mobile phone producer: India has become the world's second largest mobile phone producer after China, as per information shared by Indian Cellular Association (ICA). According to the data, annual production of mobile phones in India increased from 3 million units in 2014 to 11 million units in 2017. India replaced Vietnam to become the second largest producer of mobile phones.

Robot designed for hiring humans made in Russia: Russian startup Stafory has developed an AI-powered robot named Vera designed for hiring humans. Robot Vera, which has been trained with 13 billion examples of syntax and speech, can shortlist or delete duplicate resumes and conduct interviews. The startup claims Vera has taken over 2,000 interviews so far and has 300 clients including PepsiCo, L'Oréal, and Ikea.

Smugglers used drones to send \$80 mn worth iPhones to China: Chinese customs officers have busted a group of smugglers who used drones to transport iPhones worth \$79.8 million from Hong Kong to Shenzhen city in China. The smugglers used drones to fly two 200-metre cables between Hong Kong and the mainland to transport refurbished iPhones. They reportedly transported as many as 15,000 phones in a single night.

Social network Arbtr lets users share one post at one time: Canada-based developer Daniel Grigsby is developing a social media network called Arbtr which limits users to sharing one post at one time. The platform claims to function on 100% human curation and deletes the old posts after users share a new one. However, users can turn this feature off to keep a log of everything they've shared for a fee.

Google to shut down its URL shortening service 'goo.gl': Google has announced that it will be shutting down its URL shortening service 'goo.gl'. The company said new and anonymous users won't be able to create links through the service from April 13 but it'll be available for existing users for another year. The URL shortener was launched in 2009 for users to share links and measure traffic online.

Mobile internet users in India may hit 478mn by June 2018: Report: The number of mobile Internet users in India is likely to reach 478 million by June 2018, according to a report by Internet and Mobile Association of India and Kantar-IMRB. The number increased by 17.2% from December 2016 to hit 456 million by December 2017. The popularity of the mobile Internet in the country was attributed to its affordability.

US approves SpaceX's plan to provide internet via satellites: The US Federal Communications Commission (FCC) has authorised Elon Musk-led space exploration startup SpaceX to deploy its proposed system to provide internet services using satellites. This will allow SpaceX to provide reliable and high-speed broadband service to consumers around the world, the FCC said. SpaceX filed an application seeking permission to launch 4,425 satellites in 2016.

Amazon India testing search feature using pictures, barcodes: Amazon India is testing a feature on the Android operating system which allows users to scan pictures and barcodes to find products on its platform and buy them. The feature is already available on its iOS app in India. The feature currently has a limited customer visibility, a spokesperson for the e-commerce giant said.

Future of Jobs – 2018

This article is an extract from the report on FUTURE OF JOBS | 2018 by Aspiring Minds. We thank Mr. Varun Aggarwal, Co-founder, Aspiring Minds for granting the permission to publish in ICNL

INTRODUCTION

With the advances in science and technology, especially in the areas of artificial intelligence, machine learning and robotics, a new era of automation is around the corner. This automation of jobs has had people worried, wondering if it shall put them out of jobs. With machines being created to out-perform humans in various tasks, be it those needing excellent manual dexterity or cognitive abilities, the worry among the masses is fair. In this report, we analyze the potential of automation of various job roles in India, and how automation of tasks will impact the demand of graduates in the job market.

Automation of tasks results in increase in process efficiency by improving quality and speeding up processes simultaneously, causing reduction in prices. This availability of improved, cheaper products and services causes increase in demand, which further leads to more production, hence creating employment. However, we will see a shift in skills that are high in demand. For example, as the production of a product is automated, we will see a reduction in price and a consequent surge in demand. Here, while the automation of production may have left some people out of jobs, it would have added jobs in functions like sales, marketing and operations. Thus, in this manner, instead of completely taking away a certain number of jobs off the market, we are able to replace older jobs with newer positions, requiring a different skill set.

We find that activities that require creative and strategic thinking, and emotional intelligence are less likely to be automated and are here to stay. Hence, it is imperative that we introduce changes in teaching curriculums and pedagogy so as to work upon cognitive abilities and soft skills from an early age. Training and development programs for working professionals are equally important as they help people skill up, whether to move higher up the ladder or take a tangential route and make a career switch altogether.

METHODOLOGY

This report analyses the automation potential of labor market in India. We analyze over 30 job roles and more than 100 skills that are required to perform activities on these job roles. In view of the technological advancements in the area of science and technology, a large number of activities on a job can be conducted using automated tools or bots, thus leaving a significant number of skills needed on certain jobs obsolete.

The 30 odd job roles considered in this analysis are a subset of job roles that graduates in India can be employed in. These job roles are based on O*net's taxonomy of job roles, as well as others inspired by popular professions in the labor market. The job roles are in-turn mapped to skills that are needed on the job and the importance of these skills – that is the importance of being proficient in the skill in consideration. Based on the potential for automation of various skills and their importance on a job, the automation potential of a job role was computed. These jobs are further categorized into various job functions, such as sales, marketing, operations management, and we discuss automation potential in these functions collectively.

In this analysis, we also cover the change in demand in open job positions across roles due to the high potential of automation of various activities on a job. In order to obtain demand for a job role, we collected open job positions in India through an automated survey of various job sites, examining over 10,00,000 jobs in total.

To conclude, we also try to understand if automation of various activities on a job will lead to a significant reduction in demand and thus could give rise to unemployment in the country.

I. DEMAND OF VARIOUS SKILLS AND JOB FUNCTIONS IN INDIA

Before discussing the potential of automation in various skills and job functions, it is crucial to understand the demand, or the number of open job positions in these areas.

Table 1. and 2. below give the number of open job positions in various skills and job functions as a percentage of total jobs in the country.

Skills	Skill Description	Demand %
English Comprehension	The ability to understand the written text and communicate effectively through written documents	100.00%
Deductive Reasoning	The ability to make inferences and decide actions based on data containing multiple textual instructions and simple symbolic rules	62.31%
Inductive Reasoning	The ability to learn and to derive objective rules based on specific instances of a rule's application	45.75%
Agreeableness	This refers to social conformity, cooperativeness, friendliness, and helpfulness. It is a "big five" personality trait	34.30%
Information Gathering and Synthesis	The ability to collate, comprehend, and evaluate information from multiple sources to make inferences and draw objective conclusions, and determine the appropriate course of action	33.74%
Extraversion	This is defined as disposition toward the outer world sociability, talkativeness, and assertiveness	28.21%
Emotional Stability	This is defined as the ability to stay even tempered and face stressful situations without getting upset	22.88%
Quantitative Ability	It is defined as the ability to understand basic number system, i.e., fractions, decimals, negative, positive, odd, even numbers, etc.	15.14%

Function	Description	Demand
Software and Information Technology	Software and IT comprises of job roles such as Support Technician, Software Developer, Networking Engineer, Systems Analyst. In addition to having requisite domain knowledge, they are also required to possess a certain level of reasoning and quantitative ability.	31%
Sales	Sales is a crucial job function for any business as it results in generation of revenue for the organization. The key skills needed for someone to be a successful salesperson are logical ability, soft skills such as agreeableness and ability to influence others by rational discussions.	12%
Customer Service	Customer service is the support and advice provided by an organization to its customers in order to assist them and ease their buying experience and post sales queries.	9%
Marketing	Marketing is a function that designs and implements the promotion strategies for a business, including activities like market research and advertising. This requires skills that are less likely to be matched in competence by automation techniques. Some of these skills are creativity and a highly rational thought process.	7%
Core Engineering	Core engineering comprises of various engineering domains apart from software and IT. These include but may not be limited to electrical engineering, civil engineering and mechanical engineering.	7%
General Management	General management comprises of roles that require leadership and management of an enterprise as a whole, such as Business Managers, General Managers.	7%
Analytics and Consulting	Analytics and consulting is the practice of assisting organizations in improving their operations and processes through the analysis of existing issues and developing improvement plans.	4%
Accounting	Accounting comprises of recording, summarizing, analyzing and reporting financial data. An accountant is required to be highly logical and innovative, as the job requires them to constantly learn the new developments in policies and processes.	3%
Operations Management	Operations management comprises of tasks conducted in order to design and control business processes efficiently so as to ensure smooth production and/or delivery of services or products of an organization.	1%
Others		19%

Table 2. Open job positions in various job functions in India

A little less than one third jobs are in software and IT, and over 20% are sales and customer services jobs. Interestingly, core engineering jobs, in the various engineering domains like civil, mechanical, electrical, form only 7% of the total open positions. While, analytics and consulting, despite being a niche function, comprise 4% of the total open positions.

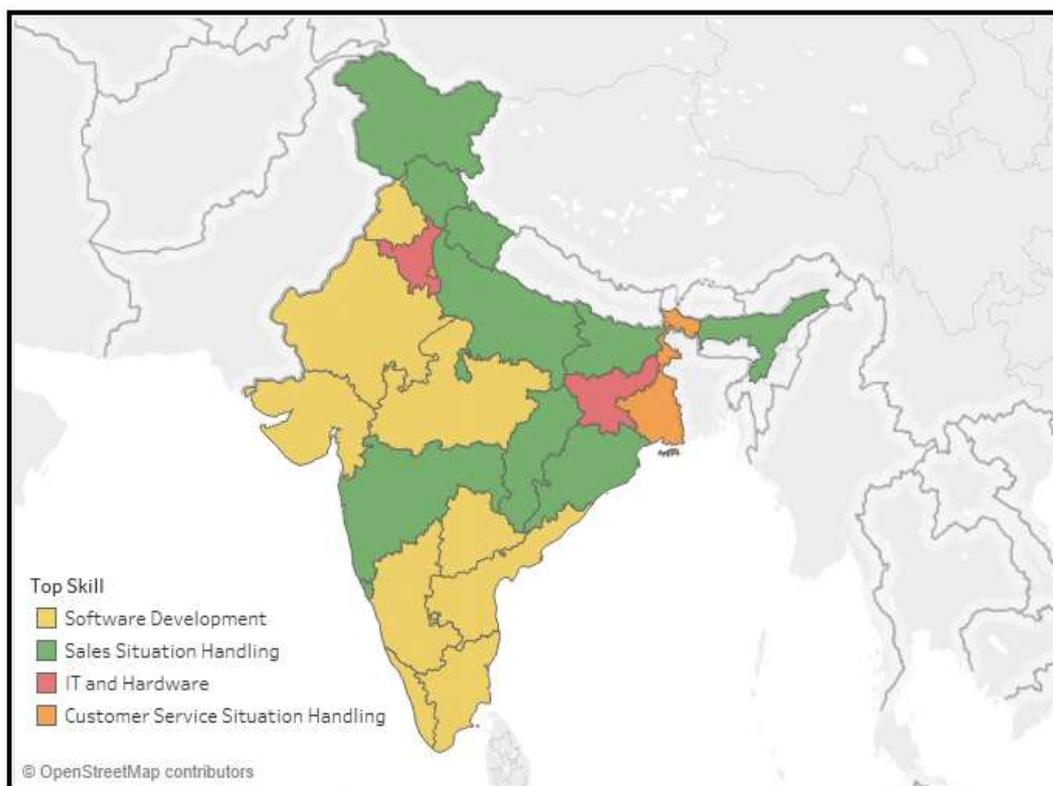


Image 1. Domain skills highest in demand

Image 1. shows the domain skills that are highest in demand in various states* in the country. While both software development and sales situation handling are the top skills in 10 states each, IT and hardware and customer service situation handling are the top domain skills in 2 states each.

In the following chapters, automation potential of skills and popular job functions are covered, along with the impact of automation of jobs on demand in the market.

*States with insufficient number of job openings are not included.

II. POTENTIAL OF AUTOMATION AND ITS IMPACT ON THE LABOR MARKET

Automation of activities requiring various skills can be attributed to developments in artificial intelligence. Activities tagged to different skills are in the process of being mechanized due to the implementation of different technologies.

Information Gathering and Synthesis

It is the ability to collate, comprehend, and evaluate information from multiple sources to make inferences and draw objective conclusions, and determine the appropriate course of action.

Collating and comprehending information may need reading handwritten notes, viewing and understanding images, among other tasks.

Technologies that are enabling automation of information gathering and synthesis:

Handwriting Recognition

- Used to read amount figures from bank cheques
- Used to read mailing addresses from mails and couriers

Nearly 100% accuracy has been achieved in recognizing quality machine print, and 95% read rate in reading addresses from envelopes with 2% error rate.¹

Image Recognition

- Used to organize image galleries and in image captioning
- Used in image and face recognition for the purpose of authentication
- Used in image search engines

Google has achieved 93.9% accuracy in image captioning.²

English Comprehension

English Comprehension is the ability to understand written text and spoken English language, and communicate effectively through written documents or speaking.

Reading, writing and speaking English correctly is needed in order to effectively communicate in the language.

Technologies that are enabling automation of English comprehension:

Speech Recognition

- Used in voice biometrics in authentication and crime investigations
- Used in hands-free assistants, like iOS's Siri

Microsoft³ has achieved a new milestone of 5.1% word error rate in speech recognition.

Spelling and Grammar check

- Used in grading assessments, used at various levels – schools, employment, migration, etc.

The spelling and grammar checking systems⁴ have achieved an accuracy of 50-60% in identifying errors.

Response Generation

- Used to automate customer service assistance.
- Used in automated response suggestion in emails and messages.

Factual response accuracy is very high and the AI systems are able to handle most of the query based responses. 85% of all customer interactions are expected to be handled without a human agent by 2020.⁵

Agreeableness

This refers to social conformity, cooperativeness, friendliness, and helpfulness. It is a "big five" personality trait.

Synthesizing emotions into robots

- Used to recognize human emotions based on facial clues and psychological responses – for instance, criminal investigation.

Synthesizing emotions has two parts – one understanding the emotions and second taking responsive action based on the emotions. Researchers are making staggering progress in building systems powered by AI to synthesize emotion.⁶

The potential of automation of various job functions is computed by taking into consideration the automat-ability of skills needed in order to successfully perform these functions, and the importance of these skills.

1 <https://www.parascript.com/blog/how-accurate-is-handwriting-recognition/>

2 <https://research.googleblog.com/2016/09/show-and-tell-image-captioning-open.html>

3 <https://www.microsoft.com/en-us/research/blog/microsoft-researchers-achieve-new-conversational->

4 http://www.danielnaber.de/language-tool/download/style_and_grammar_checker.pdf

5 <https://www.ibm.com/blogs/watson/2017/10/10-reasons-ai-powered-automated-customer-service-future/>

6 <https://theconversation.com/amp/will-ai-ever-understand-human-emotions-70960>

Function	Automation Potential
Accounting	61%
Analytics and Consulting	35%
Core Engineering	27%
Customer Service	64%
General Management	14%
Marketing	21%
Operations Management	53%
Sales	39%
Software and Information Technology	42%

Table 3. Automation potential of various job functions

- Among others, functions involving activities that require creativity and logical reasoning largely, are here to stay and have lesser automation potential. For example, Marketing is a function that shows very less ability to be automated at 21%. This is because marketing requires implementation of a fair amount of creative solutions along with critical and logical reasoning to make rational decisions in the process.
- In addition to this, functions that need people management and inter-personal skills also remain low on automation, as these skills are still far from getting replaced by automated methods. Hence, functions like general management and sales are low on the automation scale, at 14% and 39% respectively.
- While customer service is another domain that requires interaction with people, the processes in this function can be highly repetitive and do not need higher order skills like reasoning to perform most of the activities. Thus, over one-third of the activities in a customer service role can be automated.
- Core engineering functions, including domains like mechanical, electrical, electronic and civil engineering, also have low automation potential. While there is large share of activities in the engineering domains that can be automated, including repetitive tasks needing manual and finger dexterity, there is and will always be a much larger share of activities that need critical reasoning and logical ability. For instance, in order to introduce more efficient and accurate methods in the functioning of a production line, it is required that an individual understands the process entirely and is able to draft and implement innovative solutions.
- Functions involving activities such as collecting and processing of data have high potential of automation with the introduction of various software that mechanize the process. This leads to the high automat-ability in functions like accounting and analytics where a large part of the job is collection, cleaning and processing of data. However, activities like analyzing the data and drawing inferences that make an impact on business processes require high level of inductive and deductive reasoning, and thus are still far from being automated.
- In the software programming domain, even with the easy availability of thousands of tools, components and libraries that can handle a large portion of the development work, human intervention is needed to support, extend and integrate these solutions with others. In addition to this, project management and domain expertise need absolute human involvement as the activities involved need people management, planning and strategizing.

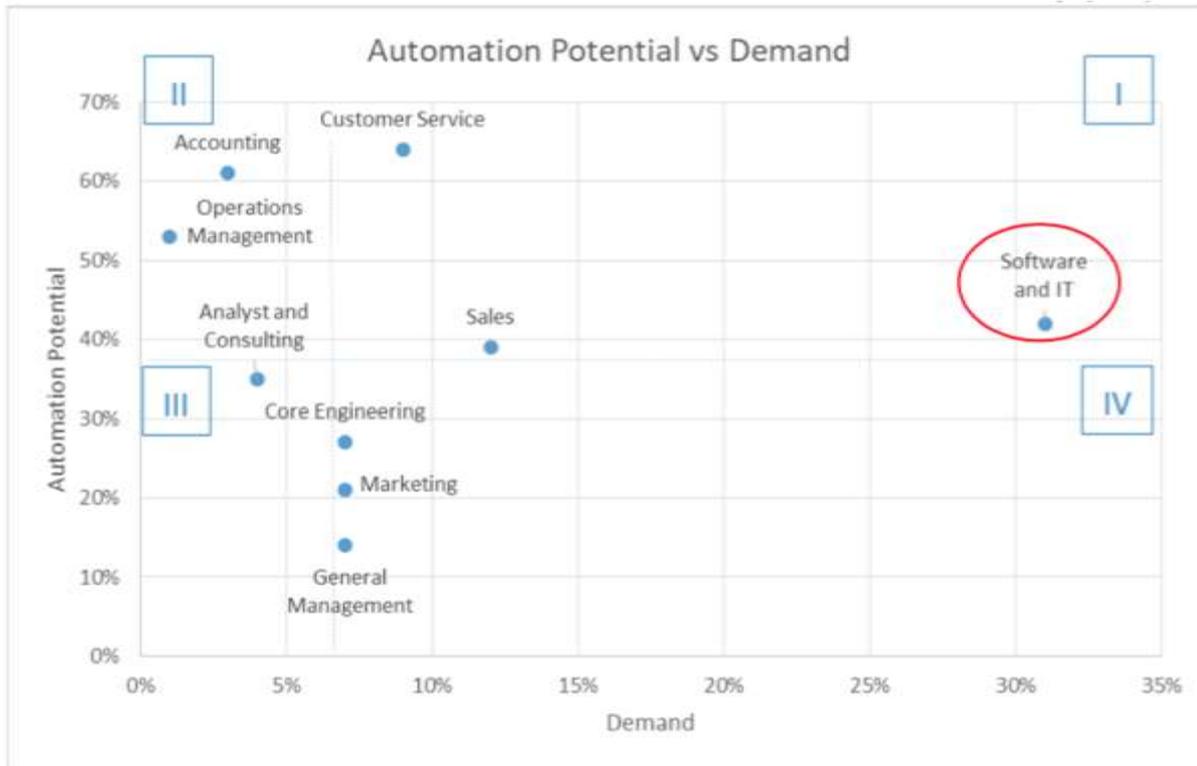


Image 2. Domain skills in demand and their automation potential

In image 2., the graph plots job functions based on their demand in the job market against their automation potential.

Out of the four quadrants on the graph, quadrant I is of the utmost criticality, where jobs with higher demand and higher automation potential lie. These jobs are likely to disrupt the job market by a large extent.

Software and Information Technology comes out to be the domain highest at risk, with demand as high as 31% in the function, the potential of automation of these jobs is 42%. Customer service lies at the edge with high automation potential of 64% and a 9% demand, along with Sales, at 39% automat-ability and 12% demand.

III. IMPACT ON EMPLOYMENT

The introduction of computers saw a wide protest in India from neo-luddite groups, with people being worried that “computers were capitalists who would steal their jobs”. Over 60 years since the first computer was brought to the country, we have grown to be one of the largest information technology hubs in the world, employing over 31% of the population in the information technology industry alone. The concept of automation has existed since over centuries. Even with inventions in the primitive times, man has introduced automation in processes in some or the other way. These automations have resulted in improvement in efficiency, speed and quality, and reduction in errors. And so, while there has been reluctance from some groups like the neo-luddites, who constantly oppose forms of modern technology, claiming we may lose our jobs or become slaves at the hands of machines, the world has observed almost a consistent increase in employment.

With every passing year as we bring in new technology to automate processes and make them more efficient, it would be incorrect to say that we lose as many jobs in the process. Instead, we replace some number of jobs and create employment in newer areas. Back in the 1400s, when Gutenberg invented the printing press, luddites were worried that the laborious manuscript writers would be put out of work. Similar reactions were received as a result of other inventions like the automated knitting machine, the tractor, the computer, and many more. However, in each of these cases, automation resulted in improved, cheaper products and services. As a result, the demand for these products and services grew in the market, and consequently led to creation of more jobs than were lost to begin with. Thus, while there may be a short-term threat to jobs in certain areas, automation leads to increase in employment in newer areas.

In order to keep up with automation of tasks, it has become necessary to develop soft skills that enable a person to adapt in new roles and responsibilities. Soft skills are attributes such as communication skills, teamwork, problem solving, emotional intelligence. These attributes are independent of the functional skills a person possesses and are defined by their inherent personality developed over time. Soft skills not only help in efficiently conducting tasks on a person's current job, but also make a person more trainable to be able to take up newer challenges. Additionally, soft skills are the reason why certain tasks cannot be automated, for instance, creative and strategic thinking, people management, inter-personal skills are some of the traits that are hard to be performed by machines, and will continue to be conducted by humans for a long time now.

Thus, while automation may cause a short-term disruption in the labor market, transition to newer roles shall become easier if people improve soft skills and cognitive ability.

Here are the top 5 job functions that have lower potential to be automated in the near future, and are also high on demand:

- Data Analysis
- Marketing
- Human Resource Management and Training & Development
- Project Management in various domains, for instance, engineering, IT
- General Management

States in India where highest decrease in number of jobs is observed due to automation are given in table 4. below.

State	% Decrease
Delhi NCR	45.1
West Bengal	42.2
Haryana	39.3
Uttar Pradesh	39.0
Rajasthan	37.8
Madhya Pradesh	37.8
Karnataka	37.8
Tamil Nadu	37.6
Telangana	37.5
Andhra Pradesh	37.2

Table 4. Estimated decrease in number of jobs due to potential automation

A high reduction in jobs is observed in some of the highly critical areas that have higher employment rate in the country. Delhi NCR, Karnataka, Tamil Nadu, Telangana and Andhra Pradesh have over 40% of the country's jobs, and are severely hit by the mechanization of work activities.

Maharashtra remains less affected by automation – with over 18% jobs of the country in the state, the region loses a little over 18% jobs due to mechanization.

The alarming figures in table 4. call for a change in curriculums and pedagogy in schools and colleges that is dynamic and adapts to the fast changes in the job economy, especially with the new skills in demand. More emphasis on training and development for working professionals is equally imperative.



Aspiring Minds is a global leader in job skills assessments and credentialing. We envision a merit-driven talent ecosystem enabled by efficient job skills matching and reliable and intelligent assessments. Powered by machine learning, AI, psychometry and statistics, these state-of-the-art assessment tools are used by companies across a wide variety of industries to help recruit the right people, develop requisite skills benchmarks, and to assess workforce health.

Pioneering large scale credentialing analogous to a GRE-for-employment concept, the flagship product AMCAT is the most popular employability test in the world today. AMCAT helps to place over two million candidates in the 'right' jobs every year. Backed by our proprietary adaptive assessment technology and machine learning algorithms – AMCAT provides adaptive, standardized and reliable measurements of generic employability skills (language, cognitive, behavioral) while also assessing a wide range of functional skills.

Aspiring Minds helps companies dramatically improve their recruitment efficiency. We are presently associated with more than 3500 corporations in sectors ranging from BFSI, IT, ITeS, hospitality, and retail. We also work with job seekers to help them evaluate their professional skills, earn industry recognized credentials and find appropriate career opportunities.

Aspiring Minds is a 300+ people strong organization with offices in the US, China, India, Middle East, Tanzania, Bangladesh, the Philippines and Sub-Saharan Africa. Our client list includes Amazon, Baidu, ZTE, Sapient, GE, Genpact, Bank of America, Wipro, CITI, Axis Bank, Wipro, Suzuki, Tata Motors, Daimler, HDFC Bank, Microsoft, Mphasis, DUPONT, Hyundai, Deloitte, and many more.

10 Principles of Strategic Leadership

Source & Courtesy: <https://www.strategy-business.com/article/10-Principles-of-Strategic-Leadership>

- 1** Distribute responsibility.
- 2** Be honest and open about information.
- 3** Create multiple paths for raising and testing ideas.
- 4** Make it safe to fail.
- 5** Provide access to other strategists.
- 6** Develop opportunities for experience-based learning.
- 7** Hire for transformation.
- 8** Bring your whole self to work.
- 9** Find time to reflect.
- 10** Recognize leadership development as an ongoing practice.

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ASIC Cloud Trends



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The bifurcation of computation industry into two modes such as the client and cloud. The client is the mobile SoC. Cloud is implemented by the accelerator. As transistors shrank, the necessary voltage and current; power is proportional to the area of the transistor. So, as the size of the transistors shrank, and the voltage was reduced, circuits could operate at higher frequencies at the same power. As transistors get smaller, power density increases because these don't scale with size. These created a "Power Wall" that has limited practical processor frequency to around 4 GHz since 2006.

Need for ASIC Cloud

TCO improvement; vs TCO /NRE
TCO improvement determined by accelerator
TCO determined by scale of computation
NRE determined by ASIC design

Two for two rule

Moderate speed up with low NRE
Beats high speedup at high NRE

Build a model for NRE

Mask cost, ip license cost, labour cost, total cost, package NRE cost, Labour cost

Process node

Asic Process technology node from 250 mn to 16 nm gives us a range of:

256x in max accelerator size
15.5x in max tran freq
152 x in energy per op
28x in cost per ops
89x in mask cost

Verilog to TCO-optimized data rate

A joint specialized server and ASIC to optimize tco. Thermal option based on RCA properties, asic placement (DUCT layout), heat sink optimization (fins, width, mask, depth), die size. voltage scaling is a first class optimization for TCO.

Core voltage increases from left to right. asic servers generally outputs best non asic in forms of tco

Wafer cost rise exponentially after 65nm jump on transistor to bigger wafers
Wafer diameter is 200mm until 180mm and 300 mm afterwards

Accelerator metric:

Energy efficiency (W per op/s)
Performance (\$ per op/s)
Conventional trivial weighing
Energy delay product or energy product delay spread
Datacenter total cost of ownership as new mask

Cloud services are becoming increasingly globalized and data-center workloads are expanding exponentially. ASIC Clouds are not ASIC supercomputers that scale up problem sizes for a single tightly coupled computation. ASIC Cloud is an energy efficient, high-performance, specialized RCA (replicated compute accelerators) that is multiplied up by having multiple copies per ASIC, multiple ASICs per server, multiple servers per rack, and multiple racks per datacenter.

One of the primary goals of efficient data center infrastructure is to extract the maximum amount of compute capacity while expending the least power. At Face book, web servers must process an increasingly large number of requests simultaneously while responding to each individual request as quickly as possible. To keep up with this growing performance demand, they use processors with progressively more power over the past 10 years and redesigned web servers to pack more than twice the compute capacity in each rack while maintaining our rack power budget. This design provides a significant improvement in performance per watt over the previous generation-over-generation trajectory. With this system implemented, they achieve the same performance per watt today that would have otherwise required multiple new server generations.

Scaling Facebook's computing infrastructure to be as efficient and cost-effective as possible has been a consistent focus of our engineering efforts. The result was a one-processor server with lower-power CPUs, which worked better than the two-processor server for our web workload and is better suited overall to data center workloads. With this new system, not only were we able to avoid the flattening performance trajectory, but we could leapfrog the performance cadence we had been on for the past five server generations, as well. The system also operates within the same rack power budget, making our data centers more efficient than ever before. In Face book's cluster architecture, each cluster consists of more than 10,000 servers. Most of our user traffic comes through the front-end clusters, and web servers represent a major portion of the front-end cluster. These web servers run HHVM, an open-source virtual machine designed for executing programs written in Hack and PHP. HHVM uses a just-in-time compilation approach to achieve superior performance while maintaining the development flexibility that PHP provides. At a high level, this workload is simultaneously latency-sensitive and throughput-bound. Each web server needs to respond to a given user request quickly as well as serve requests from multiple users in parallel.

In CPU terms, we require good single-thread performance and excellent throughput with a large number of concurrent threads and architected this workload so that we can parallelize the requests using PHP's stateless execution model. There isn't much interaction between requests on a given web server, allowing us to efficiently scale out across a large number of machines. However, because we have a large code base and because each request accesses a large amount of data, the workload tends to be memory-bandwidth-bound and not memory-capacity-bound. The code footprint is large enough that we see pressure on the front end of the CPU (fetching and decoding instructions). This necessitates careful attention to the design of the caches in the processor.

Frequent instruction misses in the l-cache result in front-end stalls, which affect latency and instructions executed per second. web servers are heavily compute-bound and don't require much memory capacity, the two-socket servers we had in production had several limitations. The server has a QPI link that connects the processors, which created a NUMA problem. It also requires an accompanying chipset that required more power. We kept pushing the performance (and hence power) envelope. Intel provided us with 95W, then 115W, and now 120W-130W CPUs to hit our performance targets. Given an 11kW rack level power budget, pushing the limits of CPU power was not scalable, and we were not seeing performance keep up with increased power. Making a server-class CPU is difficult and something that we take for granted. Process transitions are also challenging, especially at such minuscule dimensions. We knew that Intel was solving a hard problem, but since our software was evolving at a rapid pace in parallel, we wanted to take this problem on as well and look at our system design through a new lens. There is a strong need for ASIC Clouds. Facebook runs face recognition on 2b pic/day. SIRI recognition speech has billion users. Youtube transcode to google for 500 hrs uploads per minutes. These incur high total cost of ownership for the provider. There is a need to reduce TCO.

Work requests from outside the datacenter will be distributed across these RCAs in a scale-out fashion. They target workloads comprising many independent but similar jobs. GPU and FPGA-based clouds have illustrated improvements in power and performance by accelerating compute-intensive workloads. ASIC-based clouds are a promising way to optimize the Total Cost of Ownership (TCO) of a given datacenter computation (e.g. YouTube transcoding) by reducing both energy

consumption and marginal computation cost. All system components can be customized for the application to minimize total cost of Ownership (TCO). Each ASIC interconnects its RCAs using a customized on-chip network. The ASIC's control plane unit also connects to this network and schedules incoming work from the ASIC's off-chip router onto the RCAs. Next, the packaged ASICs are arranged in lanes on a customized PCB and connected to a controller that bridges to the off-PCB interface. Specialized replicated compute accelerators (RCAs) are multiplied up by having multiple copies per application-specific integrated circuit (ASIC), multiple ASICs per server, multiple servers per rack, and multiple racks per datacenter.

Server controller can be a field-programmable gate array (FPGA), microcontroller, or a Xeon processor. The power delivery and cooling system are customized based on ASIC needs. If required, there would be DRAMs on the printed circuit board (PCB) as well. (PSU: power supply unit.) In some cases, DRAMs can connect directly to the ASICs. The controller can be implemented by an FPGA, a microcontroller, or a Xeon processor. It schedules remote procedure calls (RPCs) that come from the off-PCB interface on to the ASICs. Depending on the application, it can implement the non-acceleratable part of the workload or perform UDP/TCP-IP offload.

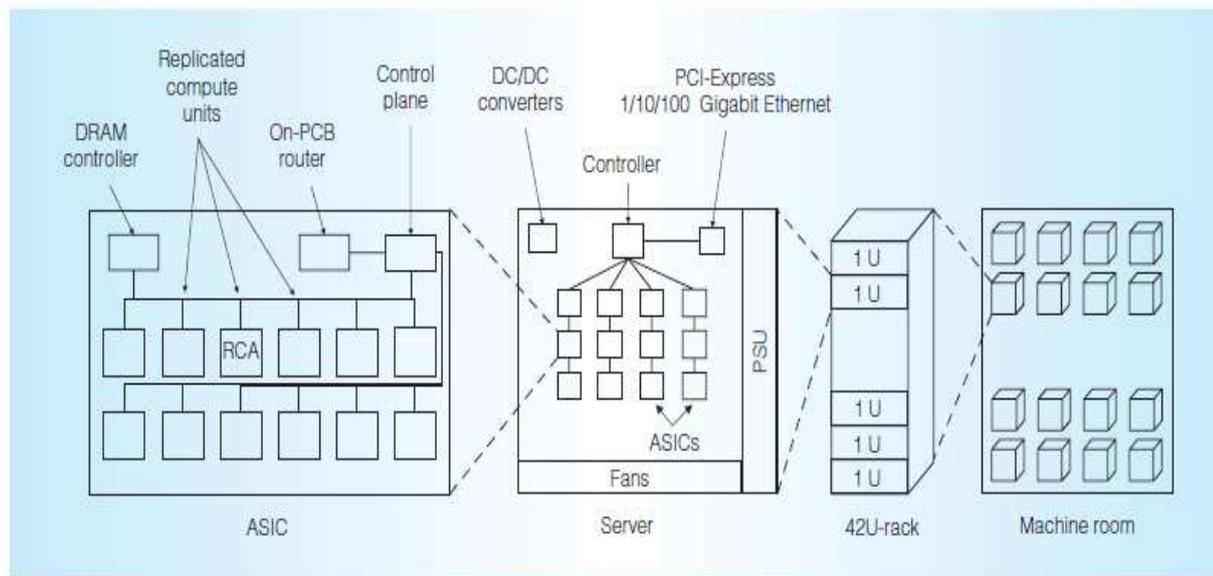


Figure 1. Architecture of an ASIC Cloud

The machine room at the datacenter has multiple 42U or 48U racks. Each rack is connected through high speed Ethernet to the external network. The racks have a central Ethernet switch (Top-of-Rack switch) which connects each of the server blades in the rack.

The server has a power supply unit (PSU) and cooling system. The off-PCB interface (10G Ethernet, PCI-e or other point-to-point links) delivers data to the server controller (FPGA or a micro-controller) which has access to an array of specialized ASICs.

Each of the ASIC consists of multiple accelerators called as the Replicated Compute Accelerators (RCA for brevity). The off-chip interface connects to the ASIC router and the controller which distributes the workload among the available RCAs through the internal network. Each ASIC may have on-chip clock generator or PLL, thermal sensor and power grid. In case of memory intensive applications, the DRAMs could be shared among RCAs with a memory controller on each ASIC.

Mahindra invites Indian startups to make a social network: Amid the Facebook data scandal, Billionaire businessman Anand Mahindra has invited "relevant" Indian startups that can make the country's own social networking company which is "widely owned&professionally managed&willingly regulated." "I'd like to see if I can assist with seed capital," the 62-year-old Mahindra Group Chairman added.

Google loses legal battle over Java, faces \$9 billion fine: A US court has ruled that Google violated copyright law when it used computer software company Oracle's Java APIs to create the Android mobile operating system.

Understanding Waste Management – Part 2

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Waste Water Management

Introduction to Waste Water

In this second part of our series we shall try to understand the issues and problems associated with the generation and pollution caused by waste water streams.

We know that water is essential in sustaining life on the planet. However water is equally essential to sustain all economic activities which also require use of water in significant quantity.

All the water which is used for any activity generates a used stream which we generally term as waste water stream. Some simple examples shall illustrate this aspect.

Personal use of water for bathing, washing, cooking, cleaning etc generates a used stream which is no longer clean water !! Therefore it is a waste water stream, and contains contaminants arising out of the particular activity, like dirt, soap, chemicals etc etc.

When metals are to be produced, water is first used in mining process, after wards in the ore processing, then in metal furnace cooling, metal process cooling etc etc. All these used streams shall be containing contaminants from the respective processes and are therefore waste water streams.

Similarly all other economic activities in all industrial sectors, eg Coal, Petroleum, Power generation, nuclear power generation, textile production and processing, food processing, Chemical Industry, Hotel and Restaurants, etc etc generate numerous types of waste water streams.

Impact on Environment

These used waste water streams contain contaminants which are present either in **dissolved** form like salts, or other soluble substances, or in **suspended** form like dirt, food particles, or other insoluble matter, or in **colloidal** form like micro particles or microorganisms, or as **emulsions** formed by mixing of oily substances, etc etc....When these streams reach the natural water bodies the contaminants present interact with the surrounding water body by physical, chemical and biological processes. These interactions consume the **Dissolved Oxygen (DO)** present in the water bodies, thereby reducing the DO content. This reduction in DO has an adverse impact on the aquatic life as Oxygen availability for sustaining life is reduced.

These waste streams also have numerous substances which are **Toxic** to the aquatic life, and also to the consumers of the water. The world has had many unpleasant experiences during the last century in all parts of the world due to the Toxic substances causing serious health issues to the consumers of water, and also serious damage to the aquatic life. Recent surveys have indicated huge quantities of plastic which has travelled into the oceans and is impacting the food chain of the marine eco system.

Early Efforts to Reduce Impact

As the mankind made progress, the waste water generation increased and so too its adverse impact. This also initiated efforts to control the adverse impact or pollution caused by various waste water streams. The initial efforts were aimed at characterising these waste water streams as per certain standard parameters like pH, TDS, TSS, BOD, COD, Color etc...explained as below :-

pH indicates if the water is acidic or basic or neutral, **TDS** = Total Dissolved Solids, **TSS** = Total Suspended Solids, **BOD** = Biological Oxygen Demand, **COD** = Chemical Oxygen Demand

The earliest waste water to be characterised and treated was sewage from human settlements. Efforts to treat sewage led to use of microorganisms like bacteria and algae in the treatment process. As the sewage contains mainly organic contaminants the microorganism develop and feed on the organic content and help in cleaning or treating the waste water stream. This led to the development of parameters like BOD, COD, TDS and TSS for measuring the quality of these waste water streams. The most popular and widely used process for treating sewage is called the **activated sludge process**, and

involves use of bio mass containing the required bacteria along with a dose of air (**oxygen**). After the aeration treatment step, the activated sludge is separated and reused, and the treated water is discharge to its destination.

Present Day Scenario

When Industrial development progressed, the principles of activated sludge process were also applied in treating the waste water streams generated from the industries. With years of efforts and optimization by various groups in various parts of the globe, a standard method for treating the industrial waste water is prevalent today. This method has three broad stages, viz **Primary treatment** steps comprising physical and chemical methods to make the waste water suitable for the next step ie. **Secondary treatment** step comprising biological method based on the principle of activated sludge process or its variants. Another step generally called **Tertiary treatment** follows based on specific requirements of treating the stream for certain contaminants, and could be combination of physical, chemical or electrochemical processes.

This somewhat standard philosophy is popular and prevalent as it is most economical and easy to operate. For specific industries or applications, specialised treatment for certain streams to make them fit for this three step process, are undertaken. For example if a stream has Chromium as contaminant, treatment scheme to remove this Chromium content will be used, prior to sending this stream for the standard treatment process.

Alternative Methods

There are still many waste water streams or waste liquid streams which cannot be treated by the methodology described above. For such streams specific treatment processes need to be developed. Some of this methods are listed in the next paragraph.

Incineration & Thermal methods : There are certain processes which are based on destruction / conversion of these waste streams into harmless products This involves burning of the waste stream in presence of fuel at elevated temperatures to destroy the stream into harmless compounds like CO₂, H₂O, N₂ etc, and absorbing the other combustion products in a scrubbing system using normally an alkaline aqueous solution. These are costly methods and are used only if no other economic scheme is feasible. Incineration is also used for gaseous and solid wastes. It also contributes to addition in carbon footprint by releasing CO₂ into the atmosphere. Nowadays all the medical wastes from hospitals is incinerated. Many variants of the Incineration technologies have been developed based on the type of waste to be destructed, and are commercially available with branded technical names world wide.

Membrane based methods like Ultra- Filtration & Reverse Osmosis : When the waste water streams have mainly dissolved solids content as contaminants and with a medium concentration, membrane processes are used to get purified water. These methods contribute to generation of high TDS reject streams which need to be handled by costly methods like evaporation or Incineration etc. These processes are at many times used as the Tertiary stages in the standard three step process described earlier.

Future Focus & Emphasis on Resource Recovery & Reuse

Lot of research is ongoing and has taken place during the last couple of decades in developing new techniques based on developments in science and technology and their application into waste water treatment methods. These techniques are aiming at reduction in cost of treatment, improving the efficiencies of treatment, and reducing quantities of treatment rejects. Techniques based on **combination of chemical, physical and electrical and magnetic** methods are regularly being developed to address these challenges.

During the last decade the focus has shifted from mere treatment to **recovery of resources** from the waste water streams. With improvements in technology and IT methods it is now possible to recover certain resources from these streams , which were earlier not possible to achieve. This focus has substantially altered the economics of waste water treatment now as valuable resources like metals, minerals, etc are possible to recover. It is now feasible and economical to treat and recycle the sewage waste water entirely. This helps to conserve fresh water for the future generations. Mini sewage treatment units are now installed in housing complex or offices and totally recycle the treated water for gardening and toilet use.

With this approach in focus, now the waste water treatment can easily be considered as a **resource recovery and reuse strategy**.

In today's time the country should aim for total treatment of all sewage and recycle of recovered clean water for use. This alone will help to avoid the impending water crisis in the country.

Bye till the next issue.

Announcements

PANEL OF CONFERENCE ORGANIZERS (mini POCO)-2018: An IEEE conference has high quality technical lectures, tutorials, speakers and eager participants. The organiser of such events needs to understand the IEEE Conferences Policy and know all the helping channels within IEEE to meet expectations of IEEE Conference attendees and produce desired output from a conference. If you want to organise an IEEE Conference and want to get trained on important know-hows of taking up a quality event, this workshop is the right place for you. mini Panel of Conference Organisers Workshop is being organised by IEEE Hyderabad Section in collaboration with IEEE India Council which is scheduled at Vizag on 20th May 2018. This event is comprised of seminars & focused sessions with plenty of opportunity for participants to exchange ideas, success stories and challenges with other IEEE Conference organisers community. This one Day workshop will offer Networking opportunity with the experienced Conference Organisers. This workshop is meant for the IEEE Members & Non Members, IEEE Volunteers, Academicians and Industry Professionals interested in organising IEEE Conferences. It is an ideal Platform to get trained and gain key skills you need to have for initiating and managing an IEEE conference. You can exchange ideas, listen to success stories, and learn how to meet IEEE Conference challenges with experienced conference organisers and Trainers. When and Where: 20th May 2018, Sunday, Hotel Palm Beach Vishakapatnam, India. Website: <https://e36.hubilo.com/>

IEEE Bangalore Section - Industry Award 2018 : Call for Nomination (new initiative from IEEE Bangalore Section): The Institute of Electrical and Electronics Engineers – Bangalore Section, as part of industry relations, has instituted a prestigious award for industry professionals in India; for excellence in electrical engineering technology, and allied fields of engineering and technology. The title of the award will be "IEEE Bangalore – Technologist of the Year 2018"; and will comprise of an exclusive plaque, medal, and a certificate. The objective of this award will be to recognize technical excellence with benefit to society in the field of electrical engineering, and related technical areas. The nominee should have been residing and working in India – at least – for the last 5 years. This award will recognize the outstanding individual contributions in industry. The awardee will be shortlisted by an eminent jury comprising of experts from the IEEE Bangalore Section. The award will be presented at SmartTech 2018. Please check the Call for Nominations link (given below); for further details on award guidelines, eligibility, nomination process, and nomination deadlines. <http://ieeebangalore.org/2018/04/05/ieee-bangalore-section-industry-award-2018-call-for-nomination/>

INDICON-2018: At Amrita University, Coimbatore in Dec 2018. Look forward to the details soon

TENCON-2018: 28-31 Oct 2018 at Jeju, Island, Korea. Website: <http://tencon2018.org/>

TENSYMP 2018: 4-6 Jul 2018 at Sydney, NSW, Australia, <http://sites.ieee.org/tensymp2018/>

2018 Region 10 Award and Recognitions: <http://www.ieeer10.org/awards-recognition-committee/>

IEEE R10 SAC Volunteer Awards: <http://sac.ieeer10.org/r10-sac-awards/>

IEEE R10 WIE Awards: <http://wie.ieeer10.org/awards/>

IEEE-Sponsored Insurance Services:
http://www.ieee.org/membership_services/membership/discounts/group_insurance.html

IEEE Student Activities: http://www.ieee.org/membership_services/membership/students/index.html

Education & Careers: 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>

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
- 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/>

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