



IETE Bengaluru Magazine

VOLUME9 NOVEMBER 2020 - JANUARY 2021

From the President's Desk

I am extremely pleased to know that IETE Bengaluru Centre has launched and successfully published the 9th edition of its quarterly magazine. The magazine not only

gives an overview of the technical programmes organised by the centre but also highlights its vision and future endeavors in the service of IETE members. Bengaluru

is one of the most dynamic centres of IETE, devoted to enhance the stature of the Institution by contributing significantly towards the technological advancement of its members in South Zone.

Recognised as a Centre of Excellence, IETE Bengaluru has been conducting many courses that benefit students, faculty and professionals. This year the centre has also organised webinar to educate teaching faculties from various institutions of Karnataka, by disseminating knowledge about the Digital / Online Learning concepts, technologies and Tools

available in practice. In addition the centre has also taken up many internship programmes for engineering students and for Empowerment of Women.

IETE HQ has always treasured and encouraged all initiatives of its centres in the pursuit of sharing and knowledge.

I compliment the Chairman and Executive Committee Members of IETE Bengaluru Centre all the very best and hope that we with our collective efforts can help our institution prosper and progress and augment its standing in the nation.

Prof (Dr) JW Bakal
President



From the Chairman

Dear IETEians,
We are glad to present this 9th edition of your Magazine on Science Day 2021.

For almost a year we have been constrained to conduct our activities in the virtual mode, but, hopefully, we will resume our work in the physical way soon. We hoisted the Flag on Republic Day and, in a long while, met each other in person. We will still use videoconferencing for its many advantages, though.

We have been working as a close knit team and an example of this is the IETE garden that we are fondly nurturing. More important, however, is to nurture ideas, start new activities and make IETE Bangalore a true Centre of Excellence. We wish to strengthen our training activities by expanding our IoT Lab, and we invite Students, Faculty and Working Professionals to take advantage of them. Above all, we need your feedback and constructive criticism of our work so that your Centre becomes better each passing day.

The Magazine is a platform for all of us to exchange ideas and information. Please do contribute to it and widely share it online. Advertisements are welcome too. Visit our website www.ietebangalore.org to find the editions.

C Satyanandan
Chairman, IETE Bangalore

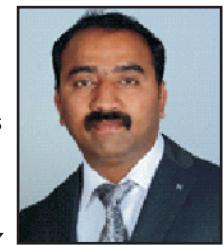


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IETE BENGALURU



From Hon. Secretary

It is my immense pleasure that we are back with the Ninth issue of the IETE Bangalore magazine. This edition will be released on a special day – “National Science Day Celebrations” on 28th February 2021.

As quoted by John F. Kennedy, **“Things do not happen. Things are made to happen”**
Many new initiatives have been taken to organize various quality technical activities for all the stakeholders to make the center more vibrant in its execution.

The Magazine has been very instrumental in showcasing all the good work that we have been doing and exhibiting innovative technical articles which can pave the way to new research trends. I would appreciate your sincere feedback and suggestions in all our activities been conducted and making the Bengaluru Centre more proactive and accomplish the vision of the Centre.

Dr. S G Shivaprasad Yadav

Honorary Secretary
IETE Bangalore



Welcome to Ninth Issue of *iете Bengaluru Magazine!*



I am glad we are releasing this issue of IETEBM on National Science Day. National Science Day is celebrated in India on 28 February each year to mark the discovery of the Raman effect by Indian physicist Sir C. V. Raman on 28 February 1928. As all of us are aware, for his discovery, Sir C.V. Raman was awarded the Nobel Prize in Physics in 1930. Incidentally Sir C V Raman was First Indian Director of Indian Institute of Science, one of the best Institutes in India and based in India.

In this issue we are starting a series of articles on best Technical Institutes in Bengaluru & Karnataka. The first article, appearing in this issue, is on Indian Institute of Science. We plan to cover all other prestigious Technical Institutes in subsequent issues. Hope this will be useful and interesting.

This issue also covers all the major activities organized by IETEB which includes training rograms, workshops, Student’s day, Foundation Day etc under able stewardship of Chairman Sri Satyanandan and his team, technical articles, Tech Trends etc.

We would like to thank Mr Satyanandan for his immese support in bringing out this issue of the magazine. Our thanks are always due to Prof (Dr) J W Bakal, President IETE for his message, constant support & blessings. Thanks to all members of IETEB Magazine Editorial Board for contributions in bringing out this issue.

Please send your views, suggestions and also be part of the magazine by contributing articles, news clips etc. Thanks for your continued support and encouragement.

Dr M H Kori

On behalf of *iete Bengaluru Magazine* Editorial Board

IETE Bengaluru Magazine Editorial Board: Dr. M H Kori, Editor-in- Chief
 Mr. C Satyanandan, Chairman Dr. S G Shivaprasad Yadav, Convener
 Dr. C V Ravishankar, Member Dr. E Kavitha Ramesh, Member
 Dr. S Mohan Kumar, Member



AN EVENTFUL QUARTER

Webinars:

1. 27th Nov 2020: IETE Bengaluru in association with Department of Computer Science & Engineering, Sambhram Institute of Technology, Bengaluru organised a one day webinar on "IoT, Its Applications and Smart Cities".
2. 05 Dec 2020: Sri Venkateshwara College of Engineering (SVCE), Bengaluru in association with IETE, Bengaluru organized a webinar on "Impact of Wireless Sensor Networks towards Agriculture Yield Productivity (Coffee Plantations)" at SVCE, Bengaluru.
3. 19 Dec 2020: webinars were conducted at Dr. T Thimaiyah Institute of Technology, Kolar on "Idea Pitching for Final Year Students" & "CNC Machine and Control Systems".
4. 8th-12th February 2021: An online FDP was organized by Dept. of ECE, Atria Institute of Technology, Bengaluru in association with IETE Bangalore on "Advances in Signal and Image Processing".
5. 12th February 2021: A webinar was organized by Broadcast Engineers Society (India) Bangalore Chapter on "Social Media" at which the key speaker was Dr. E Kavitha Ramesh, Hon. Joint Secretary, IETE Bangalore.

Short Term Courses/ Workshops

1. 26-10-2020: A TABLEU course was started by Dr. Suresh Kumar.
2. IETE Bangalore conducted training courses for executives of BEL on the following dates:
 - 19-21 Nov 2020: EMI/EMC course by Dr. D C Pande
 - 25-28 Nov 2020: Micro strip Antenna course by Dr. Shivaprasad Yadav
 - 12-14 Dec 2020: Advanced Jamming Techniques by Dr. AK Singh
 - 3. 01-11-2020: course on MATLAB/SIMULINK-10 Sundays Course by Dr. S G Shivaprasad Yadav
 - 4. 17th Jan 2021: a training program on 'Advanced FPGA Design' started. It is held every Sunday from 10 AM to 1 PM in 10 sessions on Sundays, online.

5. 17-01-2021: Adv. FPGA Design Course started by Sri. Anil Kumar, TS

6. 24-01-2021: Python with Data Science started by Dr. S Suresh Kumar

Celebrations and other programs

1. 2- 11- 2020: The 67th Foundation Day of IETE was celebrated in the Videoconferencing mode. (Report in this issue)
2. 26-1-2021: Republic Day was celebrated at IETE Bangalore. Shri. VV Bhat IAS (Retd.), former Secretary to Govt. of India, the Guest of Honour, hoisted the National Flag. Members of the Executive Committee and guests interacted with the Guest of Honour over breakfast. Shri. Bhat and other invitees planted saplings in the Garden.





3. 1-2- 2021: IETE Student Day was celebrated in online mode. (Report in this issue)

4. 'Reaching out to the unreached'. IETE Bangalore authorities visited Anekal on Saturday, 19 Dec. to explore ways to serve the student community on the outskirts of the city. They interacted with local government officials on starting training courses in Electronics and Computer Technology for High School students. This was followed up with a meeting of High School Teachers and BEO, Anekal Taluk at Hebbagodlu Government School- facilitated by Erin Foundation- on 6th February 2021. It was decided to conduct first a familiarization course for the teachers.



Revenue Generation Activities: Chartered Accountant Examinations was conducted at IETE from November 21st to December 14th, 2020.

A Report on IETE Foundation Day

The 67th Foundation Day of IETE was celebrated on Monday, 2nd November 2020 at 5 pm by IETE Bengaluru Centre in the Videoconferencing mode. Mr. P Radhakrishna, Director LRDE was the Chief Guest and Mr. MV Rajasekhar, Director, R&D BEL the Guest of Honour.

After Invocation, the program commenced with a welcome address by Dr. Shivaprasad Yadav, Hon. Secretary. Dr. E Kavitha, Member EC then read out a Message on the Foundation Day from Dr. JW Bakal, President IETE.

Dr. MH Kori, Vice President IETE then delivered the Foundation Day Theme Lecture on "Emerging Technologies for Effective Management of the Pandemic". :

Dr. Ravishankar, Vice Chairman, IETE Bangalore introduced the Chief Guest Mr. P Radhakrishna who complimented IETE Bangalore and spoke on the activities of LRDE which he heads. Mr. Radhakrishna conferred the IETE IRSI Awards 2020 on the winners. Two Scientists of LRDE who were among the winners were personally honoured by him on camera.

Dr. Balaji Rajendran, Member EC introduced the Guest of Honour Mr. MV Rajasekhar, Director, R&D BEL. Mr. Rajasekhar spoke on the research activities at Bharat Electronics Ltd. and complimented IETE Bangalore. He then conferred the NV Gadadhar Memorial Award jointly to the winners.

Mr. Satyanandan, Chairman IETE Bangalore in his presidential remarks thanked the Chief Guest and Guest of Honour for accepting Bangalore Centre's

invitation and conferring the prestigious awards. He also welcomed the Governing Council Members, Executive Committee Members and invitees. He conveyed the greetings of the Immediate Past Chairman Prof HS Bhatia who was unable to participate on health grounds.

The Chairman briefly mentioned the activities taken up by the Bangalore Centre and the proposed enhancement of our Lab facilities. He appealed for the support and involvement of organisations like BEL and LRDE. He then honoured three senior members of IETE viz. Mr. D Rajagopal, Mr. R Laksminarayana Rao and Mr.

RA Bhagawan and highlighted their contributions to IETE Bangalore. Mr. Lakshminarayana Rao and Mr. Bhagawan thanked the Centre for the honour conferred.

'IETE Bengaluru Magazine' was then unwrapped and released by the Chief Guest and the Guest of Honour on camera.

Mr. Ranjeet Kumar, Hon. Secretary proposed the Vote of Thanks and the function concluded with the National Anthem.

Activities Planned

1. Short Term Training course on "Hands-on Machine Learning with SCI-Kit Learn, Keras and Tensor flow"
2. Internship Program on AI and Machine learning
3. Short term Training course on "Matlab and Simulink"

A Report on IETE Student Day 2021

IETE Student Day was celebrated on 1st February 2021. The program began with an invocation of Lord Ganesha by Dr. Ramya of MSRIT, Bangalore. The Hon. Secretary Dr. Shivaprasad Yadav welcomed the Guest of Honour, students and Faculty, ISF Coordinators, IETE Members and other invitees.

Dr. Kavitha, Hon. Jt. Secretary, read out the Student Day Message of President IETE, Dr. JW Bakal. This was followed by Chairman's Remarks. Mr. Satyanandan, Chairman IETE Bangalore introduced the Guest of Honour, Mr. MK Krishna, an expert in Banking, social worker, broadcaster and motivational speaker. Chairman emphasized the need for students not only to excel in their studies but also pay attention to personality development. He talked about the importance of 'Soft Skills' such as communication ability and interview skills in their effort to find employment in a competitive world. While many colleges are offering such courses, IETE can also contribute and fill the gap, he said.

Mr. MK Krishna, the Guest of Honour talked about the various engineering disciplines that have good potential to offer jobs and contribute to economic development of the nation and benefit individuals. He exhorted the students to cultivate social responsibility and contribute to the Nation, the Institution they serve, and the Society.

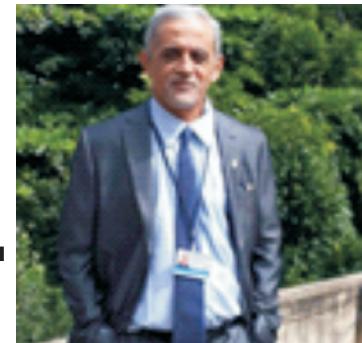
Mr. Krishna who has been associated for the past 25

years with donation of BESCOM, or, Blood, Eyes, Stem Cells, Cadaver, Organ and Marrow, said students have been the most active group in blood donation. He offered to help in promoting such activities in the ISF colleges and thus develop among students the sense of Individual Social Responsibility. He concluded by quoting the famous words, "think what you can do for your country".

Chairman briefly introduced the senior members of the Executive Committee and gave an idea of the composition of the EC. Prof. HS Bhatia, Immediate Past Chairman thanked the Guest of Honour for his inspiring talk.

Recordings of various activities and competitions held in ISF colleges were then projected. Dr. Shivaprasad Yadav announced the names of the winners in the competitions.

Mr. Ranjeet Kumar,
Hon. Treasurer proposed
the Vote of Thanks and
the program concluded
with National Anthem.



MK Krishna

ISF College activities conducted on Student Day:

1. Sir M. Visvesvaraya Institute of Technology, Department of Electronics and Telecommunication Engineering Conducted Quiz competition on Emerging trends in Technology. Three students emerged winners of the quiz namely, Manmohan Singh, Abhinav Kumar and Anubhuti Sinha. Co-ordinators were Ms Anju K. Peter & Ms. Varshitha and the convener was Dr. E. Kavitha Professor and HOD, Electronics and Telecommunication Engineering, Sir MVIT.
2. Department of Computer Science and Engineering of Sri Venkateshwara College of Engineering, Bengaluru organised an online "Technical Quiz" for the Students and Staff. More than 30 students actively participated in the Competition. Top three winners are Mr.Chidroop, Mr. Hitesh R Guhaa and Dr. Renuka R Patil. Dr. SURESHA, Principal of SVCE, Bengaluru addressed the participants. It was organised by Dr. Sanjeev C Lingareddy, HoD, CSE and Faculty members of Department of CSE.
- The Faculty Coordinators were Dr. Renuka R Patil, Mrs. Kulkarni Varsha, Mrs. Sridevi N, Mr. Suresh P and Mr. Prakasha.
3. Department of Electronics and Communication Engineering, Sambhram Institute of Technology Bengaluru conducted an Essay Writing Competition on 'Role of Technology in Covid 19 situation' "ತೊವೆಡ್ -19 ಪರೋಧೋತ್ಯಲ್ಲಿ ತಂತ್ರಜ್ಞಾನದ ಪಾಠ್ಯರ್ " in English and Kannada. Around 50 Students participated from 12 different Institutions. Top three winners are Shashank, K. C Department of ECE AMC College of Engineering Bengaluru, Akshitha R, Department of CSE Sambhram Institute of technology Bengaluru and Jahnavi T, Department of CSE CMR University Bengaluru. HOD Dept. of ECE, Dr. CV Ravishankar addressed the participants. It was organized by ISF Coordinator Dr. C Rangaswamy and Faculty members of Dept. of ECE, Dr.K Ezhilarasan, Prof. K Trupti, Prof. Anupama, Prof. S Sowndeswari, Prof. Manjula Hegde, Prof. Anupama Hongal, Prof. Khammer Unnisha and Prof.Sudha J.
4. Dr. T. Thimmaiah Institute of Technology, KGF, Dept. of Electronics & Communication Eng. conducted competitions in Singing, Mehendi and Pencil sketching. Winners of the Singing competition are Dhivya priya 3rd Sem ECE, Bhavana 1st Sem ECE and Sujitha 3rd Sem ECE. Winners of the Mehendi competition are Faheen Taj 3rd Sem ECE, S.Rithika Srijai 1st Sem ECE and Akshaya 3rd Sem ECE. Winners of the Pencil sketching competition are Tabrej Ahamed 3rd Sem ECE, Syed Afrid, 2nd Sem ECE and Lohith K R 1st Sem ECE. Faculties Coordinators, Mrs.KaniMozhi S , Ms Mohana C , Mrs Nandini G N, Mr. Srinivas Babu N, Mr. Shashi Kiran S, Mrs.Inbalatha K and Dr.T. Bhuvanendiran contributed as Jury for the Events. Arrangements were made by Prof VijayaBharathi, HOD, ECE and Mr. Jesudas J.

Shr. Ranjeet Kumar, Hon. Treasurer proposed the Vote of Thanks in conclusion of the Engineers' Day Program.



Student Day Participants



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Ref. IETE/J-216/2021

15 November 2020

IETE AWARDS-2021: "CALL FOR NOMINATIONS"

The Institution of Electronics and Telecommunication Engineers (IETE) is a leading professional society devoted to the advancement of Science & Technology in Electronics, Telecommunications, Information Technology, Computer Science and other related disciplines. IETE recognises the outstanding contributions made by scientists and engineers through its coveted annual / biennial awards, in various fields within the domain of IETE. These awards are presented during the Annual IETE Convention (AIC) held every year in the month of September.

The process for IETE Awards commences with the release of "Call for Nominations" every year. **For the purpose of these awards, the nominators and nominees need not be the members of IETE i.e. it is open to all except for few awards.**

You are requested to nominate suitable person(s) for the IETE awards and assist us to identify deserving persons in the fitting areas of various awards.

The nomination proformas for the IETE awards can be downloaded from IETE website: <http://www.iete.org>.

Six (06) hard copies of the nomination form & a soft copy in PDF format in a Pen Drive/CD as per prescribed proforma duly completed in all respects with all required documents and signed in original by the nominator as well as the nominee, may please be sent at the following address so as to reach the Chairman, Board of Awards (BoA), latest by 31st May 2021.

The Chairman
Board of Awards (BoA)
IETE HQ, 2, Institutional Area, Lodi Road, New Delhi - 110 003

IETE Awards 2021 Announcement, details of the Category of Awards, Nomination Form are available at: <https://www.iete.org/Call%20for%20Nomination%20IETE%20Main%20Awards-2021.pdf>

IETE Bangalore will assist you in preparing nominations hardcopies and soft copy in pen drive. Please contact at IETEB at: 99017 43330.

Tech Trends

Compiled by M H Kori

Factories with 5G

5G factory revolutionizes manufacturing

The World Economic Forum, citing IHS Markit research, expects the fifth-generation mobile network, 5G, to reach a global economic output of \$13.2 trillion and generate 22.3 million jobs by 2035. By unlocking a new realm of technological possibilities, the global wireless standard is expected to notably accelerate the shift toward Industry 4.0, the industrial Internet of Things.

Capable of meeting the power requirements of millions of connections to data-intensive applications, 5G is expected to boost the manufacturing industry with new and more powerful digital capabilities. Up to 100 times faster than 4G, 5G offers drastically reduced latency that makes it possible to share data extremely quickly, erase processing delays and ensure factory systems can react in real time. The reliability of 5G connectivity guarantees a stable and constant network connection anywhere and at any time on factory floors, ensuring the continuous and unhindered execution of business-critical missions. 5G could even usher in an era of massive machine-type communication (communication between machines).

One interesting early application is a collaboration between IBM, Samsung Electronics, Singaporean telecommunications company M1 and Singapore's Infocomm Media Development Authority to test 5G manufacturing use cases. The concept is to improve equipment monitoring and predictive maintenance by using AI in image recognition and video analytics, facilitating automated visual inspection and acoustic insights. In addition, the group is testing augmented reality's ability to boost productivity and quality in assembly.

AI on the EDGE

Edge AI transplants brains to factory tools and machinery

Considered the next wave of artificial intelligence, "edge AI" or "AI on the edge" is a network infrastructure that makes it possible for AI algorithms to run on the edge of a network, meaning closer to or even on the devices collecting the data. The sudden and dramatic changes

in network traffic that have accompanied Covid-19 lockdowns and the shift to working from home are likely to accelerate the move already underway toward edge computing.

Benefits of edge computing include preserving bandwidth and increasing efficiency by processing information closer to the users and devices that require it, rather than sending that data for processing in central locations in the cloud. By embedding AI locally, manufacturers can reduce latency issues and accelerate the generation of insights while lowering cloud services usage and cost. Connectivity cost also drops, as processing part of the data locally reduces bandwidth and cellular data usage. And because intelligence is being run locally, plants located in remote areas with poor communication infrastructure are less subject to connectivity losses that can hinder mission-critical and time-sensitive decision making.

As Prometheus stole fire from the gods and brought it to men, edge AI "steals" part of the intelligence from the cloud and brings it to machinery. Octonion, a start-up that integrates artificial intelligence into low-power microcontrollers, exemplifies how intelligence can be imbued into industrial products. The technology helps companies make smart decisions in real time, locally, by using continuous learning models and machine health scores. Examples include deploying edge AI on industrial motors and pumps to improve monitoring and develop predictive maintenance capabilities.

Tailored Insurance

Smartphone data powers usage-based auto insurance while improving driver safety

The market for usage-based insurance (UBI) is projected to reach \$126 billion by 2027. Developments in telematics, defined by Gartner as "the use of wireless devices and 'black box' technologies to transmit data in real time back to an organization," have fueled one example of UBI: automotive insurance programs tailored by driving behavior.

With 3.8 billion smartphone users expected by 2021, mobile telematics takes UBI a step further, allowing insurers to use sensors and tracking technologies embedded in smartphones to collect real-time data and better understand their customers' driving habits.

Ultimately, this will give insurers the opportunity to offer more competitive and innovative behavior-based insurance programs while fostering driver safety.

One mobile telematics platform, made by start-up TrueMotion, identifies good and risky drivers and adjusts premiums using driver behavior scores. Another of the company's products uses smartphone sensor signals to detect car crashes and provide context data on accidents. Customers can file a claim from their phones, streamlining the insurer's claim processes. On TrueMotion's app, users can see their driver behavior score and how many times they drove while distracted, hit the brakes too hard or found themselves in dangerous situations.

AI for All

Automated and explainable AI makes financial organizations smarter

Banks and insurance companies expect an 86% increase in AI investments by 2025, according to The Economist Intelligence Unit. For companies to exploit the full potential of AI, employees with little or no computer science background need to be able to use it to increase their operational performance. For this reason, user-friendly AI platforms that allow business employees to quickly build models, easily understand and trust their output, and confidently make decisions will be critical in the deployment of AI at a larger scale.

One example is DreamQuark's Brain, a fully automated AI platform for sales and customer engagement teams in the financial industry. Employees with no data science background can create AI models using prebuilt apps that leverage the start-up's proprietary deep-learning technologies. According to DreamQuark, one tier-1 bank used the platform to help build an application that detects more than 40% of credit fraudsters. A top French insurer is using it to assess customers' preferences for different products, such as pensions, retirement products or savings insurance, and provide the insurer's advisers insight into the rationale behind the scores.

Cyber Securities

In cybersecurity, authentication rights and network access get their due

According to Interpol, the Covid-19 crisis has created an unprecedented opportunity for cybercriminals to increase their attacks. Yet most companies overestimate

their cybersecurity performance, with only 24% actually meeting the bar, according to a 2020 Bain study. Identifying common IT security weaknesses and developing cybersecurity maturity is central to building truly resilient digital organizations.

One approach hackers take is to compromise a company's active directory (AD) infrastructure, which controls user authentication rights and company network access. Using this approach, a cybercriminal could take over a CEO's phone, usurp his or her identity, and access confidential internal information. Cybersecurity start-up Alsid advises clients to tailor security to their AD, invest in monitoring to detect attacks in real time and investigate all AD breaches. The networks involved can be sprawling. One large pharmaceutical company Alsid works with has 360,000 AD user accounts, spread over 170 countries. A major telecommunications client has more than a million AD users worldwide.

Health Data

Health data is gold

Healthcare's big data market is expected to reach nearly \$70 billion in 2025, almost six times its 2016 value of \$11.5 billion. The rapid acceleration of health data collection gives the industry an unprecedented opportunity to leverage and deploy ground-breaking digital capabilities, such as AI, to improve treatment. Smart use of health data has the potential to dramatically improve patient care.

Working with Bain's product and experience innovation team, a leading European distributor of medical supplies and services has applied AI—including machine learning—to the treatment of hard-to-heal wounds by developing a mobile app for healthcare professionals. The app, which is approved as a medical device, uses image recognition to identify whether a wound is infected or inflamed. Its use has led to a substantial decrease in unnecessary antibiotics and cut the healing time of hard-to-heal wounds from years to months.

Internet of Behaviours

As demonstrated by the COVID-19 protocol monitoring example, the IoB is about using data to change behaviors. With an increase in technologies that gather the "digital dust" of daily life — data that spans the digital and physical worlds — that information can be used to influence behaviors through feedback loops.

For example, for commercial vehicles, telematics can

monitor driving behaviors, from sudden braking to aggressive turns. Companies can then use that data to improve driver performance, routing and safety.

The IoB can gather, combine and process data from many sources including: Commercial customer data; citizen data processed by public-sector and government agencies; social media; public domain deployments of facial recognition; and location tracking. The increasing sophistication of the technology that processes this data has enabled this trend to grow.

IoB does have ethical and societal implications depending on the goals and outcomes of individual uses. The same wearables that health insurance companies use to track physical activities to reduce premiums could also be used to monitor grocery purchases; too many unhealthy items could increase premiums. Privacy laws, which vary from region to region, will greatly impact the adoption and scale of the IoB.

Zero Waste

Technology works toward zero food waste

According to the UN's Food and Agriculture Organization, more than 30% of the world's food is lost or wasted every year. Using technology to reduce waste could put a significant dent in the food discarded by retailers and businesses, increase food security, and alleviate the suffering of the hundreds of millions of people who go to bed on an empty stomach (821 million people in 2019).

A mobile app developed by start-up Phenix helps large food retailers, local businesses, manufacturers and wholesalers sell excess food to consumers at half price and donate the rest to food charities, saving 120,000 meals each day. Through the app, consumers can discover the nearest Phenix business partners, choose a business and a type of basket—vegetarian, organic, halal, etc.—safely pay, and receive alerts with their pickup time. Collaborating with one global leader in beverages, the company has helped save 2.3 million drinks from the garbage bin during Covid-19.

Across industries, Covid-19 has catalyzed a technological shift of unprecedented magnitude. In the race to build powerful new digital capabilities and successfully retool for the world of tomorrow, corporations need innovative partners. With a select group of trusted allies, they must prepare their businesses to thrive in the future by taking advantage of the critical technology trends of today.

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Hyper Automation

Hyper automation is the idea that anything that can be automated in an organization should be automated. Hyper automation is driven by organizations having legacy business processes that are not streamlined, creating immensely expensive and extensive issues for organizations.

Many organizations are supported by a "patchwork" of technologies that are not lean, optimized, connected, clean or explicit. At the same time, the acceleration of digital business requires efficiency, speed and democratization. Organizations that don't focus on efficiency, efficacy and business agility will be left behind.

<https://www.bain.com/insights/ten-technology-trends-moving-into-2021/>

<https://www.gartner.com/smarterwithgartner/gartner-top-strategic-technology-trends-for-2021/>

Prestigious Technical Institutes of Bengaluru & Karnataka



Indian Institute of Science
भारतीय विज्ञान संस्थान

INDIAN INSTITUTE OF SCIENCE, BENGALURU



History

In the 1890s, Jamsetji Nusserwanji Tata, a successful industrialist, decided to set up a world class university in India using his personal wealth. He strongly believed in the role of scientific research and higher education in social and economic transformation.

Tata's dream of establishing what eventually came to be known as the Indian Institute of Science (IISc) became a reality with the support of the Mysore State, whose rulers also shared his commitment towards education and research.

The Regent Queen Maharani Kempananjammani Vani Vilasa Sannidhana – her son Krishnaraja Wadiyar was a minor then – provided 371 acres and 16 guntas of land in Bangalore, funds for capital expenditure, and an annual contribution for Tata's ambitious project. The remaining money to set up IISc came from the colonial government of India.

After overcoming several hurdles, including those resulting from Tata's untimely death in the summer of 1904, IISc finally came into existence on 27 May 1909 in

Bangalore following a vesting order and resolution passed by the government of India to establish the Institute. Its first Director was the English chemist Morris Travers. Twenty-four students joined when the Institute opened its doors to students in 1911.

The Institute started with just two academic departments: General and Applied Chemistry, and Electrical Technology. During those early years, urged by Sir M Visvesvaraya, the Dewan of Mysore who was nominated to IISc's Council, researchers carried out studies that were of immediate importance to the country. This research even led to the establishment of six factories in less than five years. The most successful of these were the soap and sandalwood oil factories in Bangalore and Mysore. The Institute also grew to include departments such as those of Biochemistry and Physics. The latter was set up under Sir CV Raman, a Nobel Laureate who also became the first Indian Director of IISc in 1933.

During World War II, IISc contributed towards the war effort by training personnel, manufacturing military and industrial goods, and collaborating with Hindustan Aircraft Limited to repair and maintain British and American war planes. This period saw an expansion of research in engineering, and new departments such as those of Aeronautical Engineering, Metallurgy, and Mechanical Engineering were added in the 1940s.

In the 1960s, 70s and early 80s, under the stewardship of Director Satish Dhawan (an eminent aerospace engineer who also led ISRO), the Institute grew further to include a diverse range of research areas from materials science, computer science and automation, and molecular biophysics, to interdisciplinary work under the Centre for Theoretical Studies, which eventually led to the formation of other centres in ecology, atmospheric and oceanic sciences, and more. The social impact of advancements in science was also a key focus during this period, particularly under the Cell for Application of Science and Technology to Rural Areas (ASTRA), which continues today as the Centre for Sustainable Technologies.

Moving into the twenty-first century, IISc has set up an undergraduate programme, several new departments and centres in the areas of brain research, nanoscience and engineering, hypersonics and more, strengthened ties with industry, and incubated several start-ups. It has also expanded to include a 1500-acre campus at Challakere in Chitradurga district, Karnataka.

IISc counts among its former students and faculty several eminent scientists such as Homi J Bhabha, the founder of India's nuclear program, Vikram Sarabhai, the founder of India's space programme, the meteorologist Anna Mani, the biochemist and nutrition expert Kamala Sohonie, and solid state and materials scientist CNR Rao, to name just a few. The Institute also played a key role in establishing other academic institutions and organisations.

Two former directors, Sir C V Raman and Prof C N R Rao, have been awarded India's highest civilian honour Bharat Ratna, four former directors, Sir A G Borne, Sir Martin O. Foster, Sir C V Raman and Sir J C Ghosh, have been knighted. Among the IISc alumni, there are three Rhode SFellows of the Royal Society, and thousands of members of Indian and foreign Academy of Sciences. Hundreds of IISc faculty members have also received the Shanti Swarup Bhatnagar Prize for Science and Technology awarded to Indians who have made outstanding contributions under 45 years of age. Sir C. V. Raman has won Nobel Prize, but before becoming the Institute's first Indian director.

IISc has welcomed a number of distinguished guests, from Mohandas K. Gandhi and members of the Mysore royal family to Queen Elizabeth and officials of the British Raj, heads of state such as Ho Chi Minh of Vietnam and Nikita Khrushchev of the USSR, Nobel Laureates such as James Watson and Brian Schmidt, academicians such as the Tanzanian minister and diplomat WK Chagula, and Indian Prime Ministers such as Rajendra Prasad, Jawaharlal Nehru, HD Deve Gowda, Manmohan Singh, and Narendra Modi.

Over the last 111 years, IISc has become India's premier institute for advanced scientific and technological research and education. Its mandate is "to provide for advanced instruction and to conduct original investigations in all branches of knowledge as are likely to promote the material and industrial welfare of India." In keeping with this guiding principle, the Institute has strived to foster a balance between the pursuit of basic knowledge and applying its research for industrial and social benefit.

IISc's reputation and pre-eminence ensures that it attracts the best young faculty members trained in the best laboratories around the world. In 2018, IISc was selected as an Institution of Eminence (IoE) by the Government of India, and it consistently figures among the top Indian institutions in world university rankings.

IISc's research output is diverse, interdisciplinary and cuts across traditional boundaries. The Institute has over 42 academic departments and centres that come under

six divisions. It also places equal emphasis on student learning, with about 4000 students pursuing several postgraduate and PhD programmes, as well as a dedicated four-year undergraduate programme aimed at providing research-oriented training for young students in the basic sciences.

IISc has a vibrant and diverse campus spread over 440 acres of greenery in the city of Bengaluru (formerly Bangalore), India's hub of high-tech companies (in aerospace, electronics, and information technology), educational and research institutions, and numerous start-ups. With the help of a recently-established office called DIGITS, we are now in the process of creating a best-in-class IT and networking system. In recent times, IISc has also entered into collaborations with several technology giants to find solutions to problems in strategic areas. Many of its faculty members have established their own start-ups to take their research directly to society.

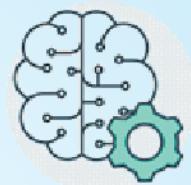
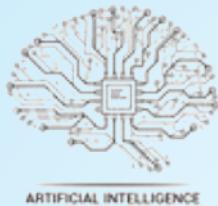
During its centenary in 2009, IISc acquired a new campus in Challakere taluk, Chitradurga district, Karnataka. The flagship project of this 1,500-acre campus, a training programme for rural science and mathematics school and college teachers, has trained more than 11,000 teachers, and has been recognized as a Centre for Excellence by the Government of India.

In the coming years, IISc aims to position itself among the world's foremost academic institutions. It will focus on building our core research strengths in all frontiers of science and engineering, develop world-class teaching programmes, nurture translational research and encourage the incubation of successful start-ups. IISc will continue to empower researchers from diverse disciplines to work together to solve pressing challenges. IISc will also continue to carry out activities with direct social impact, such as training school teachers, disseminating sustainable rural technologies, and research in areas like climate change, healthcare, water management, and renewable energy.



Dr Rajashekhar C Biradar was conferred with "Best PhD Thesis Supervisor Award" for the year 2019 in Electronics & Communication Engineering by BITES (Board for IT Education Standards)

IETE Bangalore congratulates Dr Rajashekhar Biradar and wishes many more laurels!



**IETE INTERNATIONAL CONFERENCE INDIA-2021 (IICI-2021)
ON
AI & ML DRIVING 5G & BEYOND
JULY, 2021
BENGALURU, INDIA**

ANNOUNCEMENT & CALL FOR PAPERS

IETE is organizing The Second 'IETE International Conference India -2021' (iici-18), on "AI & ML DRIVING 5G & BEYOND" in July, 2021 in Bengaluru. This conference attempts to highlight the technological developments in 5G with emphasis on the critical role of Artificial Intelligence and Machine Learning in efficient design of 5G & Beyond Networks.

Please contact: Dr M H Kori, iici-20 coordinator, at mhkori@gmail.com

Wi-Fi or Li-Fi?

Dr M H Kori

All of us use Wi-Fi routinely at home, office, hotspots, every day to connect our laptops, iPads, smart phones to browse internet, send emails, messages or make video calls using WhatsApp (or you may have switched to Signal now!). However there appears to be a new-kid-on-the-block – Li-Fi! There is a lot of buzz around “Li-Fi” – which some say will make Wi-Fi redundant. Let us compare Wi-Fi & Li-Fi to find will Li-Fi ever replace Wi-Fi.

Li-Fi stands for Light Fidelity and Wi-Fi stands for Wireless Fidelity (some say Wi-Fi is a brand name and not an acronym). Both Li-Fi and Wi-Fi technologies are mainly used for internet-based applications. Li-Fi uses light as medium for data communication whereas Wi-Fi uses Electro-magnetic waves at various radio frequencies for data communication. Light undergoes reduced interference when compared to radio waves, and so can be used in more crammed environments. Li-Fi is an optical communication technology whereas Wi-Fi is a radio communication technology. Let us understand them individually before we derive a brief difference between them.

Wi-Fi

Wi-Fi is a wireless networking technology that allows devices such as computers (laptops and desktops), mobile devices (smart phones and wearables), and other equipment (printers and video cameras) to interface with the Internet. It allows these devices--and many more--to exchange information with one another, creating a network.

Internet connectivity occurs through a wireless router. When you access Wi-Fi, you are connecting to a wireless router that allows your Wi-Fi-compatible devices to interface with the Internet. Wi-Fi is not an acronym; it is a brand name created by a marketing firm that's meant to serve as an interoperability seal for marketing efforts. On the technical side, the IEEE 802.11 standard defines the protocols that enable communications with current Wi-Fi-enabled wireless devices, including wireless routers and wireless access points. Wireless access points support different IEEE standards. Each standard is an amendment that was ratified over time. The standards operate on varying frequencies, deliver different bandwidth, and support different numbers of channels.

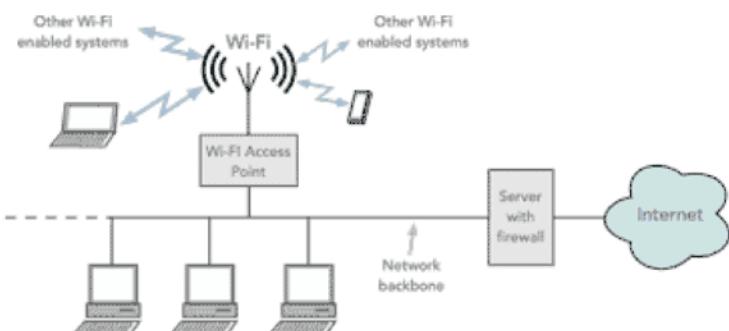
Although it is possible to trace the history of Wi-Fi back to many developments in radio or wireless technology, the

first release of IEEE 802.11 occurred in 1997. This was a time when the Internet was in its infancy and most personal computers were desktop computers. This first release of IEEE 802.11 was for a system that provided 1 or 2 Mbps transfer rates using frequency hopping or direct sequence spread spectrum. The standard was only referred to as IEEE 802.11 and there were no suffix letters as we see today. Then in 1999, the 802.11b specification was released. This provided raw data rates of 11 Mbps, and used the 2.4GHz ISM band: the first products were released in 2000.

The release of 802.11b was followed by 802.11a and this used an OFDM waveform and could transfer data at rates of between 1.5 and 54 Mbps and it uses RF channels in the 5 GHz ISM band where there was far more available space. Further releases of the took place as time progressed, each one providing improved performance or different capabilities, the major ones being: 802.11g (2003); 802.11n (2009), 802.11ac (2013), 802.11ax (2019). They are also called WiFi5, WiFi6 etc now.

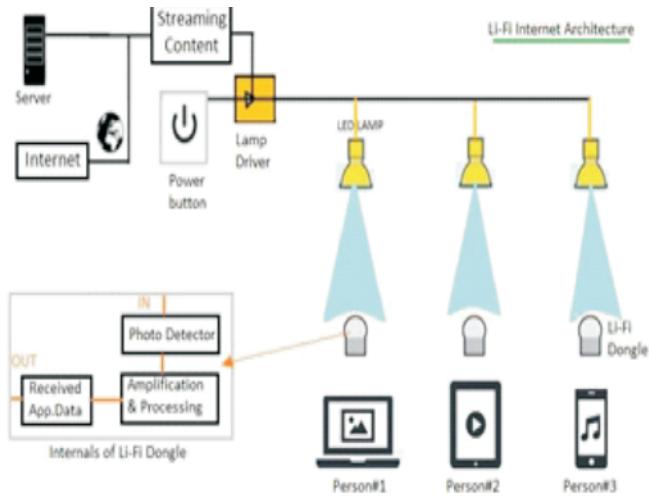
Another major milestone in the development of Wi-Fi 802.11 was the formation of the Wi-Fi Alliance in 1999. This is an industry body that works towards greater levels of adoption of Wi-Fi as well as ensuring that all devices can inter-operate successfully. It is separate from the IEEE which develops the standards, but naturally it works with them.

A Wireless Access Point (AP) allows wireless devices to connect to the wireless network. What a wireless access point does for your network is similar to what an amplifier does for your home stereo. An access point takes the bandwidth coming from a router and stretches it so that many devices can go on the network from farther distances away. But a wireless access point does more than simply extend Wi-Fi. It can also give useful data about the devices on the network, provide proactive security, and serve many other practical purposes.



Li-Fi

Li-Fi is high speed bidirectional networked and mobile communication of data using light. Li-Fi comprises of multiple light bulbs that form a wireless network. When an electrical current is applied to a LED light bulb a stream of light (photons) is emitted from the bulb. LED bulbs are semiconductor devices, which means that the brightness of the light flowing through them can be changed at extremely high speeds. This allows us to send a signal by modulating the light at different rates. The signal can then be received by a detector which interprets the changes in light intensity (the signal) as data. The intensity modulation cannot be seen by the human eye, and thus communication is just as seamless as other radio systems, allowing the users to be connected where there is Li-Fi enabled light. Using this technique, data can be transmitted from a LED light bulb at high speeds.



Comparison between Li-Fi and WiFi

Feature	LiFi	WiFi
Full form	Light Fidelity	Wireless Fidelity
Operation	LiFi transmits data using light with the help of LED bulbs.	WiFi transmits data using radio waves with the help of WiFi router.
Interference	Do not have any interreference issues similar to radio frequency waves.	Will have interreference issues from nearby access points(routers)
Technology	Present IrDA compliant devices	WLAN 802.11a/b/g/n/ac/ad ax standard compliant devices
Applications	Used in airlines, undersea explorations, operation theaters in the hospitals, office and home premises for data transfer and internet browsing	Used for internet browsing with the help of wifi kiosks or wifi hotspots
Merits(advantages)	Interference is less, can pass through salty sea water, works in dense region	Interference is more, can not pass through sea water, works in less dense region
Privacy	In LiFi, light does not pass through the walls and hence will provide a much secure data transfer	In WiFi, RF signal passes through the walls and hence there is a need to employ techniques to achieve secure data transfer.

Data transfer speed	About 1 Gbps	WLAN-11n offers 150Mbps, About 1-2 Gbps can be achieved using WiGig/Giga-IR
Frequency of operation	10 thousand times frequency spectrum of the radio	2.4GHz, 4.9GHz and 5GHz
Data density	Works in high dense environment	Works in less dense environment due to interference related issues
Coverage distance	About 10 meters	About 32 meters (WLAN 802.11b/11g), vary based on transmit power and antenna type
System components	Lamp driver, LED bulb(lamp) and photo detector will make up complete LiFi system.	requires routers to be installed, subscriber devices (laptops,PDAs,desktops) are referred as stations

Conclusion

- Li-Fi technology is not a replacement of a widely used Wi-Fi technology. Both the technologies Li-Fi and Wi-Fi co-exist together based on their respective unique features. However, commercial Li-Fi products are not available widely and the complete eco system has not developed yet.
- Li-Fi operates between wavelengths in the range from 380 nm to 780 nm whereas Wi-Fi operates at different frequency bands viz. 2.4 GHz and 5 GHz.
- Li-Fi is used to exchange data incredibly rapidly and securely at much lower power level compare to Wi-Fi. Li-Fi supports very high data rate due to very large bandwidth available in VLC compared to the Wi-Fi which operates at microwave or mm Wave frequencies.

Ref:

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