



# IETE Bengaluru Magazine

VOLUME 14 MARCH 2022 - MAY 2022

## From the President's Desk

I am glad to note that the 14th edition of the IETE Bengaluru Magazine is being released on 17th May 2022, World Telecommunications & Information Society Day. I congratulate the Bengaluru Centre on keeping up the publication of their quarterly journal at regular intervals, on important days that IETE observes every year.



WTISD has been celebrated annually on 17 May since 1969 to mark the founding of ITU and the signing of the first International Telegraph Convention in 1865. The theme this year 'Digital Technologies for Older People and Healthy Ageing' emphasises the ICTs' role in achieving healthier ageing, and in helping people to build smarter cities etc. IETE has a duty to spread awareness about this.

I appreciate the work being done by Bengaluru Centre under the Chairmanship of Mr. Satyanandan in opening new ISFs and conducting training courses on various topics. The Magazine has been showcasing these activities. I wish the Centre and the IETE Bengaluru Magazine greater success in future.

## Prof (Wg Cdr) P Prabhakar (Veteran)

President Elect (2021-22)

## From the Chairman

I am happy that this 14th edition of our Magazine is being brought out on the World Telecommunications & Information Society Day, an important celebration for IETE. It also happens to be on the eve of a 3-day Symposium that we are organising in collaboration with Bharat Electronics Ltd. The BEL- IETE Symposium 2022 (BIS 22) on 'Artificial Intelligence & Machine Learning for Next Generation', 18th – 20th May, is part of our effort to disseminate information and knowledge about Emerging Technologies and bring together experts in the field on a common platform.



We have in the last quarter observed the National Science day and International Women's Day which were well attended. ISF activities and Training Courses have been held regularly and more are planned for the immediate future.

I had the opportunity to attend the Mid Term Symposium of IETE and the Governing Council Meeting held recently at Kathmandu, Nepal. IETE has great expectations from its Bengaluru Centre and I am sure that we will stand up to them with the involvement of all our members and the goodwill of the readers. I appeal to all to send in their comments and criticism, so that we may progress in the right path.

## C Satyanandan

Chairman, IETE Bangalore

## CONTENTS

Messages from From the President	1
From the Chairman	
From the Hon. Secretary	2
From the Editor's Desk	
An Eventful Quarter	3
National Science Day A Report	4
International Women's Day Celebration at IETE Bangalore- A Report	6
Governing Council Meetings held in the Quarter	7
World Telecommunication and Information Society Day 2022	8
Words that Sound	9
Tech Trends	10
6G Corner	12

## IETE BENGALURU



## From Hon. Secretary



It is my immense pleasure that we are back with the 14th edition of IETE Bangalore Magazine released on a special day, World Telecommunication and Information Society Day.

**"An efficient telecommunications network is a foundation on which information society is built" quoted by Talal Abu-Ghazaleh.**

On this auspicious occasion I would like to wish you all a very Happy World Telecommunication Day, as the Telecommunications and Information Technology have made our lives lot easier and comfortable. Our Bangalore Centre continues to be vibrant and proactive in organising several technical activities for all the members, ensuring Quality as the main motto in various emerging technologies. I am also very happy to inform you about the BEL- IETE symposium – 2022 on Artificial Intelligence and Machine Learning for Next Generation on 18th – 20th May 2022.

The IETEB magazine continues to be very instrumental in showcasing all the activities that we have been conducting along with a few technical articles to give an update on emerging trends. I would be very happy and appreciate your sincere feedback and suggestions to improve and make the Bangalore Centre more proactive.

**Dr. S G Shivaprasad Yadav**

Honorary Secretary

From the  
Editor's  
Desk

Welcome to Fourteenth Issue of *iете Bengaluru Magazine!*



We are releasing this issue of IETEBM on World Telecommunications & Information Society Day. 17th May is celebrated as World Telecommunications and Information Society Day all over the world. The purpose of World Telecommunication and Information Society Day (WTISD) is to help raise

awareness of the possibilities that the use of the Internet and other information and communication technologies (ICT) can bring to societies and economies, as well as of ways to bridge the digital divide. 17 May marks the anniversary of the signing of the first International Telegraph Convention and the creation of the International Telecommunication Union (ITU). We are immensely proud and happy to release our 14th Issue of *ieteBM* on this very important day.

ITU has chosen "**Digital technologies for older persons and healthy ageing**" as theme for this year. The ageing of the global population will be the defining demographic trend of the 21st century—yet our societies struggle to see the opportunities that this trend can unfold. Telecommunications and information communication technologies (ICTs) have a role to play in achieving healthier ageing, but also in helping people build smarter cities, combat age-based discrimination at the workplace, ensure financial inclusion of older persons, and support millions of caregivers across the world. Appropriately we have included an article about WTISD & ITU in this issue.

This issue also covers all the major activities organized by IETEB which includes National Science Day & C V Raman Memorial Lecture, International Women's Day, Training Programs, Workshops, etc under able stewardship of Chairman Sri Satyanandan and his team, technical articles, Tech Trends etc. We have also included an exploratory article on futuristic "6G".

We would like to thank Mr Satyanandan for his interesting article, to IETEB Chairperson Mr Satyanandan and his team for their immense support in bringing out this issue of the magazine. Our thanks are always due to Prof P Prabhakar, President IETE for his message, constant support & blessings, IETE Bengaluru & IETE HQ staff for their support. Thanks to all members of IETEB Magazine Editorial Board for their 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.

Thank You

**Dr M H Kori**

On behalf of *iete Bengaluru Magazine* Editorial Board

**IETE Bengaluru Magazine Editorial Board:** Dr. MH Kori, Editor-in- Chief,

Sri. C Satyanandan - Chairman, Magazine Committee

Dr. S G Shivaprasad Yadav, Convener

Sri Ranjeet Kumar, Chairman, Finance Committee

Dr. CV Ravishankar, Member

Dr. S Mohan Kumar, Member

Dr. E Kavitha Ramesh, Member

## AN EVENTFUL QUARTER

1. IETE Bangalore celebrated the National Science Day 28th Feb. 2022 in the online mode (Report in this Issue)

2. IETE Bangalore celebrated the International Women's Day on 13th March 2022, for the first time in their premises (Report in this Issue)

3. ISFs were inaugurated at SRIDEVI INSTITUTE OF TECHNOLOGY, Tumkur, Karnataka and KALPATARU INSTITUTE OF TECHNOLOGY DEPT OF ELECTRONICS AND COMMUNICATION ENG. Tiptur, Karnataka on 18th April 2022.

Report about ISF Inauguration at Sridevi Institute of Technology  
in a local newspaper

## ಮುಮಕ್ಷುವಾರೆ

PAGE 02  
21 Apr 2022

### ಅಭಿವೃದ್ಧಿ ಹೊಂದಲು ಇಂಜಿನಿಯರಿಂಗ್ ಕೇಂತ್ರ ಅಗ್ತ್ಯ: ಎಂ.ಎಸ್.ಪಾಟೀಲ್



ಹುದುಕೂರು: ಇತ್ತೀಚಿನ ದಿನಗಳಲ್ಲಿ ತಂತ್ರಜ್ಞಾನದ ಅಭಿವೃದ್ಧಿಯಿಂದ ಸ್ಥಾರಿತ ಅಭ್ಯರ್ಥಿಗಳನ್ನು ಪ್ರಾಯೋಜನ ವಿಲೋನಿಂಬ್ರೆ ಮತ್ತು ಕರ್ಮಕ್ರಿಯೆಣಂತಹ ಇಂಜಿನಿಯರಿಂಗ್ ಕ್ಷೇತ್ರ ಅವಶ್ಯಕವಾಗಿದ್ದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಶಿಕ್ಷಣದ ಸ್ಥಾರಿತ ಮಾರ್ಗದರ್ಶನವನ್ನು ಸ್ಥಾಪಿಸಲು ಸ್ಥಾಪಿತ ಮತ್ತು ಮಾಡಿಕೆ ಮಾಡಿದ ನೀರ್ದೇಶಕ ಎಂ.ಎಸ್.ಪಾಟೀಲ್ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ತಿಳಿದರು.

ಸಗರದ ಶ್ರೀದೇವಿ ಕಾಂತಿಕ ಮಹಾವಿದ್ಯಾಲಯದ ಏಲೋನಿಂಬ್ರೆ ಮತ್ತು ಕರ್ಮಕ್ರಿಯೆಣಂತಹ ಇಂಜಿನಿಯರಿಂಗ್ ವಿಧಾಗದ ವರ್ತಿಯಿಂದ ಖಾದ್ಯಪನಾ ಸಮಾರಂಭ ಇನ್‌ಪ್ರೋಫೆಸ್ ಆಫ್ ಎಲೋನಿಂಬ್ರೆ ಅಂಡ ಟೆಕ್ನಿಕಲ್ ಮಹಿಳೆಣಿಂಗ್ ಎಂಜಿನಿಯರಿಂಗ್ ಸ್ನಾಯ್ಕೆಂಪ್ ಪ್ರೋರ್ಮೆ ಇಂಫೋರ್ಮೇಶನ್ ಎಂಬ ಮಾರ್ಗದರ್ಶನವನ್ನು ಸ್ಥಾಪಿಸಿದ್ದಾಗಿತ್ತು, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣದ ಸುಖಮ್ಯ ಮತ್ತು ಬಾಮುಖೀಕರಿಸಿದ್ದ ಬ್ರೇಂಡ್ ಮಾರ್ಕೆಟ್‌ನಲ್ಲಿ ಉತ್ತಮ ವಿಶೇಷತ್ವಗಳನ್ನು ಒಳಗೊಂಡಿರುವುದಲ್ಲಿ ಅತ್ಯುತ್ತಮವಾಗಿದೆ. ವಿದ್ಯಾರ್ಥಿಗಳು ಕೌರ್ಸ್ ಪಡೆದ ನಂತರ ದೇರಿ-ದೇರಿಗಳಲ್ಲಿ ಸಾಕ್ಷ್ಯ ಉದ್ದೇಶಗಾಳಿಕಾರಣದಿಂದ ಮೊದಲುತ್ತಿದ್ದು ಎಂದರು.

ಸಂಭಾರ ಹೆಚ್.ಎ.ಮುರುಗಳವರು ಈ ತಂತ್ರಜ್ಞಾನ ಪ್ರಾಯೋಜನ ವಿಶೇಷ ಉದ್ದೇಶ ನೀಡಿದರು.

ಕಾರ್ಯಕ್ರಮದ ಮುಖ್ಯ ಆಂತಿಕ ಗುಾಗಿ ಅಗಮಿಸಿದ್ದ ಚೆಂಗಳೂರಿನ ಬಾಟು ಕೇಂದ್ರದ ಉಪಾಧ್ಯಕ್ಷ ಡಾ.ಎ.ವಿ. ರಘುರಾಜ್ ಮಾತನಾಯಕರು, ವಿದ್ಯಾರ್ಥಿಗಳು ತಾಂತ್ರಿಕ ಗುಂಪುಗಳನ್ನು ಸುಧಾರಿಸುವ

ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವೃತ್ತಿಪರ ಅಭಿವೃದ್ಧಿಯನ್ನು ಸುಧಾರಿಸಲು ಬಾಟು ವೇದಿಕೆಯ ಅಗ್ತ್ಯವಾಗಿದೆ. ಹೆಚ್.ಎ. ಅಂಗಕ್ರಿಯ ಪ್ರಾಯೋಜನ ಜೋರ್ಡೆ ಉದ್ದೇಶ ಕೆಲ್ಲು ತರಬೇತಿ ಪಡೆದುಕೊಳ್ಳಬೇಕಂದು ವಿದ್ಯಾರ್ಥಿಗಳ ಅಭಿವೃದ್ಧಿ ವಾಗಿ ತಿಳಿದರು.

ಕಾರ್ಯಾಗಾರಕ್ಕೆ ಶ್ರೀದೇವಿ ಭಾರಿಯಲ್ಲಿ ಬ್ರ್ಯಾನ್‌ ಅಧ್ಯಕ್ಷ ಡಾ.ಎಂ.ಆರ್.ಮರೀನಾಯ್ಕ್ ವಾಗಿ ಶ್ರೀದೇವಿ ಹೆಚ್.ಎ. ಮಹಾವಿದ್ಯಾಲಯದ ಮಾರ್ಗದರ್ಶನ ಉದ್ದೇಶ ಕಾರ್ಯಕ್ರಮ ಆರಂಭಿಸಿದ್ದಾಗೆ, ಶ್ರೀದೇವಿ ಭಾರಿಯಲ್ಲಿ ಬ್ರ್ಯಾನ್‌ ಅಧ್ಯಕ್ಷ ಡಾ.ರಘುರಾಜ್ ಮರೀನಾಯ್ಕ್, ಶ್ರೀದೇವಿ ಭಾರಿಯಲ್ಲಿ ಬ್ರ್ಯಾನ್‌ ಅಧ್ಯಕ್ಷ ಕಾರ್ಯಾಗಾರಕ್ಕೆ ಭೂಭಾಗದಿಂದರು.

ಶ್ರೀದೇವಿ ಕಾಂತಿಕ ಮಹಾವಿದ್ಯಾಲಯದ ಪ್ರಾಯೋಜನದ ಕಾರ್ಯಕ್ರಮದ ಮತ್ತು ಏಲೋನಿಂಬ್ರೆ ಅಂಡ ಟೆಕ್ನಿಕಲ್ ಮಹಿಳೆಣಿಂಗ್ ಎಂಜಿನಿಯರಿಂಗ್ ಸ್ನಾಯ್ಕೆಂಪ್ ಪ್ರೋರ್ಮೆ ಇಂಫೋರ್ಮೇಶನ್ ಎಂಬ ಮಾರ್ಗದರ್ಶನವನ್ನು ಸ್ಥಾಪಿಸಿದ್ದಾಗಿತ್ತು, ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣದ ಸುಖಮ್ಯ ಮತ್ತು ಬಾಮುಖೀಕರಿಸಿದ್ದ ಬ್ರೇಂಡ್ ಮಾರ್ಕೆಟ್‌ನಲ್ಲಿ ಉತ್ತಮ ವಿಶೇಷತ್ವಗಳನ್ನು ಒಳಗೊಂಡಿರುವುದಲ್ಲಿ ಅತ್ಯುತ್ತಮವಾಗಿದೆ. ವಿದ್ಯಾರ್ಥಿಗಳು ಕೌರ್ಸ್ ಪಡೆದ ನಂತರ ದೇರಿ-ದೇರಿಗಳಲ್ಲಿ ಸಾಕ್ಷ್ಯ ಉದ್ದೇಶಗಾಳಿಕಾರಣದಿಂದ ಮೊದಲುತ್ತಿದ್ದು ಎಂದರು.

ಶ್ರೀದೇವಿ ಇಂಜಿನಿಯರಿಂಗ್ ಕಾಲೇಜನ ಏಲೋನಿಂಬ್ರೆ ಮತ್ತು ಕರ್ಮಕ್ರಿಯೆಣಂತಹ ಭಾಗದ ಮುಖ್ಯ ಸ್ಕ್ರೋಲ್ ಅಧ್ಯಕ್ಷರೆ ಪ್ರೋಫೆಸ್. ಇಂಫೋರ್ಮೇಶನ್ ಎಂಬ ಮಾರ್ಗದರ್ಶನ ಉದ್ದೇಶ ಕಾರ್ಯಾಗಾರಕ್ಕೆ ತಿಳಿದಿರುವುದಲ್ಲಿ ಅತ್ಯುತ್ತಮವಾಗಿದೆ. ವಿದ್ಯಾರ್ಥಿಗಳು ಕೌರ್ಸ್ ಪಡೆದ ನಂತರ ದೇರಿ-ದೇರಿಗಳಲ್ಲಿ ಸಾಕ್ಷ್ಯ ಉದ್ದೇಶಗಾಳಿಕಾರಣದಿಂದ ಮೊದಲುತ್ತಿದ್ದು ಎಂದರು.

#### 4. Training Courses conducted:

1. Embedded Systems & Design course concluded on 13th March 22

2. Started a one month Internship on Embedded Systems & IoT Applications for BE students on 26th March 22.

3. Wireless & Antenna online Course was started on 10th April

4. IETE Bangalore's Annual Summer School in Electronics and Computer for High School Students (SUSIEC 22) commenced for the first time after COVID lockdown.

5. Following Courses have been planned for the near future:  
**Blockchain online course**  
**Wi-Fi Training offline in association with C-DoT**

### Inauguration of ISF at Kalpataru IT at Tiptur:



SUESIC-2022



SUESIC-2022



### National Science Day Celebration- A Report



IETE Bangalore celebrated the National Science Day 28th Feb. 2022 in the online mode. The welcome address was given by Dr Shivaprasad Yadav, Hon. Secretary.

Dr MH Kori, Vice President IETE gave an introduction to the Science Day and its theme this year and also introduced the iete Bengaluru Magazine that was being released on the occasion. He mentioned the personal qualities of the great scientist Dr CV Raman and anecdotes about him. Dr Kori also talked briefly about the Space-based study of gravitational waves that was proposed to be undertaken by Raman Research Institute Bangalore in collaboration with ISRO.

Mr Satyanandan, Chairman IETE Bangalore welcomed the Chief Guest Mr M Sankaran, Director URSC at his Conference Room in URSC and said he was among the long line of eminent scientists and experts invited to bless the Centre by delivering the Sir CV Raman Memorial Lectures over the past years. He recalled the association of URSC with IETE, a notable instance of which was the IETE International Conference in 2018 held at URSC. He hoped ISRO's assistance to the Centre would continue in future too. Chairman and Immediate Past Chairman Prof Bhatia honoured the Chief Guest with a garland and shawl. Chairman then introduced Mr Sankaran by reading out his profile and requested him to deliver the Memorial Lecture.

Mr Sankaran said he was happy to participate in the event that marked a discovery made nearly a century ago; the purpose of such memorial lectures is to motivate and inspire young minds and develop the scientific temper. He discussed

the theme of an integrated approach to sustainability, in particular, the role of satellite technology. Protecting our planet is of the highest priority, he said, and next was economic development and taking the benefits to all people. ISRO's activities are targeted at developing applications to achieve these goals. Once the basic societal needs are met we then think of what we are proud of doing, like for example Space Exploration. Thus ISRO's mission includes Health of the Nation, Communication, Navigation and Exploration & Science, each complementing the others. Satellite Technology helps in weather forecasting, disaster management, water and soil monitoring and forest cover protection, he said. He concluded that we are on the path to achieve sustainable development in the country and India will soon be a technological power in the world.

Mr Satyanandan, Chairman presented the IETE Membership Certificate to Mr Sankaran who had become a Fellow of IETE very recently. Mr Sankaran also released the 13th edition of iete Bengaluru Magazine.

The Guest of Honour Prof Prasad Shastry, Professor at Bradley University USA welcomed IETE Bangalore's efforts to hold the Raman Memorial Lecture every year and said that it is important to familiarize the young generation with the contributions of India's own great scientists so that they may be motivated and inspired by these great souls. He suggested that IETE Bangalore institute a Prof JC Bose Memorial Lecture also on these lines. Prof Shastry also gave his views on how the galloping pace of Science and Technology was impacting our lives and advocated discretion in their use to ensure sustainability which includes harmony between the humans' internal and external worlds.



## International Women's Day Celebration at IETE Bangalore- A Report

IETE Bangalore celebrated the International Women's Day on 13th March 2022, for the first time in their premises. Ms HK Bharathi, Retd. CE & MD, KPTCL was the Chief Guest. Dr Shobha Yeduraj, Advocate Karnataka High Court, Ms AP Revathy, Scientist, ADE- DRDO, Ms MV Roopa, Scientist Engineer, ISTRAC- ISRO and Ms Disha Poovaiah, Cine Actress, were Guests of Honour. Mr Satyanandan, Chairman IETE Bangalore presided.



Dr YVS Lakshmi FIETE, Head, C Buddhi, the training wing of C-DoT Bangalore and Group Leader IPR, Marketing & Knowledge Management, C-DoT was awarded "IETE Bangalore Woman Achiever of the Year 2021-22" by the Chairman who read out the Citation.

Dr Nandini, ISF Coordinator anchored the event. Dr Shivaprasad Yadav, Hon. Secretary welcomed the Guests and Dr CV Ravishankar, Vice Chairman proposed the Vote of Thanks.

## IETE & Governing Council Meetings & MTS held in the Quarter

The 2nd Meeting of IETE Governing Council for 2021-22 was held on 26th/ 27th Feb 2022 at Hotel Central Park, Gwalior. Governing Council Members from Bangalore participated.



IETE 3rd Governing Council was held in Kathmandu during 30th April – 2nd May 2022.

During the Governing Council Meeting, the outgoing Chairmen of Major Centres were honoured by the President Wg. Cdr. Prabhakar and Past Presidents Dr. JW Bakal and Dr. KTV Reddy with mementos.

Along with the IETE GC Meeting, IETE Mid Term Symposium (MTS 2022) was also organized at Kathmandu on April 30 & May 1 jointly with IETE Kathmandu Centre. The MTS Conference Chair Dr M H Kori, Vice President & Chairman TPCC and Mr. Keshav Gyavli Chairman Kathmandu Centre coordinated the Symposium. Secretary of Nepal Ministry of Communications was the Chief Guest and top officials of Nepal Telecom Authority participated. Dr M H Kori gave the Vikram Sarabhai memorial Keynote Talk on 5G & Beyond. Many important decisions to help Kathmandu Centre to increase Membership etc. were taken by the GC in addition to usual business.





## World Telecommunication and Information Society Day 2022

Compiled by **Dr M H Kori**

The purpose of World Telecommunication and Information Society Day (WTISD) is to help raise awareness of the possibilities that the use of the Internet and other information and communication technologies (ICT) can bring to societies and economies, as well as of ways to bridge the digital divide. 17 May marks the anniversary of the signing of the [first International Telegraph Convention](#) and the creation of the [International Telecommunication Union \(ITU\)](#).

**World Telecommunication Day:** In November 2005, the World Summit on the Information Society called upon the UN General Assembly to declare 17 May as World Information Society Day to focus on the importance of ICT and the wide range of issues related to the Information Society raised by WSIS. The General Assembly adopted a resolution in March 2006 stipulating that World Information Society Day shall be celebrated every year on 17 May.

**World Information Society Day:** World Telecommunication Day has been celebrated annually on 17 May since 1969, marking the founding of ITU and the signing of the first International Telegraph Convention in 1865. It was instituted by the [Plenipotentiary Conference in Malaga-Torremolinos](#) in 1973 as Resolution 46.

**World Telecommunication and Information Society Day:** In November 2006, the ITU Plenipotentiary Conference in Antalya, Turkey, decided to celebrate both events on 17 May as World Telecommunication and Information Society Day. The updated [Resolution 68](#) invites Member States and Sector Members to celebrate the day annually by organizing appropriate national programmes with a view to: stimulating reflection and exchanges of ideas on the theme adopted by the Council, debating the various aspects of the theme with all partners in society, formulating a report reflecting national discussions on the issues underlying the theme, to be fed back to ITU and the rest of its membership.

### [World Telecommunication and Information Society Day 2022 Theme](#)

The theme of World Telecommunication and information Society Day 2022 is “Digital technologies for Older Persons and Healthy Ageing”.

### [Digital technologies for older persons and healthy ageing](#)

The ageing of the global population will be the defining demographic trend of the 21st

century—yet our societies struggle to see the opportunities that this trend can unfold. Telecommunications and information communication technologies (ICTs) have a role to play in achieving healthier ageing, but also in helping people build smarter cities, combat age-based discrimination at the workplace, ensure financial inclusion of older persons, and support millions of caregivers across the world.

This year's theme raises awareness of the

important role of telecommunications/ICTs in supporting people to stay healthy, connected and independent - physically, emotionally and financially. Supporting a life of healthy ageing is also critical for the sustainability of economic and health systems. The [International Telecommunication Union \(ITU\)](#) hopes to foster initiatives to accelerate digital technologies for older persons and healthy ageing that will contribute towards the [UN Decade of Healthy Ageing](#).

## Words that Sound

'Onomatopoeia' is the use of words that imitate the sounds associated with the objects or actions they refer to. It is derived from the Greek onoma "name" and poiein "to make", meaning "to make names".

In any language there are many common words that imitate the sounds associated with the objects or actions they refer to. English has an inexhaustible treasure of them.

Describing all sounds requires 'onomatopoeic' use of an infinite number of words. Animal sounds and sounds that humans and machines make, all add flavour to plain everyday language that can be pretty dull. Writers use onomatopoeia to enhance the expressiveness of written language to evoke the sounds and feeling of real life.

I remember the age when the **chug chug** of the trains that **rumbled** over the tracks was a familiar sound. They **puffed** smoke and were rather slow, unlike the modern ones that **whiz** past at breakneck speed. We still have those romantic trains, relics from the past, which **crawl** up mountain tracks allowing the passengers a **sniff** of the cool refreshing air of the hills.

**Cock-a-doodle- doo** woke up households in the era before the arrival of the 'alarm' clocks in bedrooms. I miss the **tick-tock** of the grandfather clock in our hall and its **ding dong** chime every quarter hour. The longest full hour chime at noon heralded lunch. The **hushed** anticipation of the elderly or the loud **clamour** of children would be

answered soon. The **clang** of copper vessels from the kitchen confirmed that food was underway. **Sputtering** of mustard in the pan was the reassuring finishing touch.

Watching the surf **surge** up the sun-swept sea shore was a delight in the evenings before the sun **plunged** in the Arabian Sea. The **clatter** of the wheels of the horse-drawn buggy, on the way back home, still **rings** in my ears.

**Popping** lemonade in summer was common with some ice **plopped** in the glass. The **tingle** of a **bubbly** soda-with-lime was even more refreshing. **Clinking** of wine glasses was rarely heard in the traditional Kerala home. **Guzzling** coconut water was rather the way of life. Festivals were occasions to **slurp** on the 'payasam', ending the meal with a satisfied **burp**.

A **splash** in the pond near home was a better alternative in the summer to a bath within home. **Swirling** waters in the river nearby made swimming in it risky; Uncle, in his **booming** voice, would reprimand us if we ever dared.

Uncle had a car that **whined** and **whirred** every time he started it with a **crank**, and he **honked** by **squeezing** hard on a rubber horn. The tyres **squealed** every time he rounded a corner.

Grandma's hobby was to make **squishy** pillows from natural cotton from the tree in the compound. She was particular that the house is kept **squeaky** clean and 'deepam' is lit at sunset. Its **flicker** signalled the end of the day's **bustle**!!

- Sri Satyanandan

# Tech Trends

Compiled by M H Kori

## AI-powered Cybersecurity

The steep increase in cyberattacks, email phishing scams, and ransomware is forcing cybersecurity firms to search for tech solutions to address the vulnerabilities. Criminals are hacking individuals' accounts, countries' critical infrastructure, and businesses of all sizes, causing millions of dollars in losses.

Workplace digitization and remote working in response to the COVID-19 virus made it a priority to retrain employees on online safety to reduce data breaches and losses.

Businesses are also adopting new cybersecurity technologies, such as artificial intelligence (AI), to monitor and guard networks against hackers in real-time rather than responding to the threat after the damage is already done. Moreover, cloud storage companies are offering end-to-end encryption for online data storage and data transfers.

## Internet of Behaviours (IoB)

A lot of customer data is collected by service providers through IoT devices in the home. Businesses are using analytics and big data techniques to determine the data's value in what is now known as the Internet of Behaviors (IoB).

By reviewing this customer information, businesses can personalize their services, market their products, and improve a customer's experience with the company.

While personalized solutions are important, companies face an uphill battle convincing users to share personal data with them to develop these solutions.

Website hacking and other cybersecurity challenges also make customers uncomfortable about risking their privacy in return for valuable services. A different approach to data collection will be vital for businesses' data analysis needs.

## Metaverse

Facebook's name change to Meta put a spotlight on the metaverse, described as the next evolution in social connectivity.

The metaverse is a virtual, three-dimensional space that people can log into as avatars to socialize, work, shop, collaborate, or play games together.

Companies are investing in novel technologies to bring the metaverse to life, such as virtual reality (VR) and augmented reality (AR). For example, VR headsets enable people to explore and immerse themselves in digital

worlds and share experiences.

Metaverse real estate sales reached \$501 million last year and have already topped \$85 million this year, according to MetaMetric Solutions. Thanks to blockchain technology, people can own these virtual assets or even make in-game purchases.

## Blockchain Technology

After years of uncertainty, blockchain technology is now establishing itself as a viable solution to many tech challenges.

Blockchain is a distributed ledger of decentralized data, and it underpins cryptocurrencies, digital payment technologies, encryption technology, and blockchain gaming. A rising trend is for content creators to use non-fungible tokens (NFTs)—blockchain data units that are not interchangeable—to create digital work, sell it online, and earn cryptocurrencies.

Blockchain's ledger feature is making the technology applicable for storing medical data and other personal records, protecting copyrights, listing title deed owners, tracking digital transactions, trading in NFT marketplaces, and supply chain monitoring.

## Collaborative Technologies

Office workers were restricted from going back to the office due to the COVID-19 safety guidelines. Thus, companies shifted to remote working, using collaborative technologies to recreate office settings, employee engagements, and workflows.

Companies that design collaborative tools went back to the drawing board, upgrading their services to meet the new and unexpected demand for shared online workspaces.

The most common collaborative technologies come from Google Workspace and Microsoft Teams. Both offer proprietary project management apps, third-party integrated apps, messaging apps, voice calling, and video conferencing tools for their digital workspaces.

The primary benefits of collaborative technologies are document synchronization and employee communication in real-time, ensuring work can be completed efficiently.

## Data Fabric

Data fabric provides a flexible, resilient integration of data sources across platforms and business users, making data

available everywhere it's needed regardless where the data lives. Data fabric can use analytics to learn and actively recommend where data should be used and changed. This can reduce data management efforts by up to 70%.

## Cybersecurity Mesh

Cybersecurity mesh is a flexible, composable architecture that integrates widely distributed and disparate security services. Cybersecurity mesh enables best-of-breed, stand-alone security solutions to work together to improve overall security while moving control points closer to the assets they're designed to protect. It can quickly and reliably verify identity, context and policy adherence across cloud and noncloud environments.

## Privacy-Enhancing Computation

Privacy-enhancing computation secures the processing of personal data in untrusted environments — which is increasingly critical due to evolving privacy and data protection laws as well as growing consumer concerns. Privacy-enhancing computation utilizes a variety of privacy-protection techniques to allow value to be extracted from data while still meeting compliance requirements.

## Cloud-Native Platforms

Cloud-native platforms are technologies that allow you to build new application architectures that are resilient, elastic and agile — enabling you to respond to rapid digital change. Cloud-native platforms improve on the traditional lift-and-shift approach to cloud, which fails to take advantage of the benefits of cloud and adds complexity to maintenance.

## Composable Applications

Composable applications are built from business-centric modular components. Composable applications make it easier to use and reuse code, accelerating the time to market for new software solutions and releasing enterprise value.

## Decision Intelligence

Decision intelligence is a practical approach to improve organizational decision making. It models each decision as a set of processes, using intelligence and analytics to inform, learn from and refine decisions. Decision intelligence can support and enhance human decision making and, potentially, automate it through the use of augmented analytics, simulations and AI.

## Hyperautomation

Hyperautomation is a disciplined, business-driven approach to rapidly identify, vet and automate as many business and IT processes as possible. Hyperautomation enables scalability, remote operation and business model disruption.

## AI Engineering

AI engineering automates updates to data, models and applications to streamline AI delivery. Combined with strong AI governance, AI engineering will operationalize the delivery of AI to ensure its ongoing business value.

## Distributed Enterprises

Distributed enterprises reflect a digital-first, remote-first business model to improve employee experiences, digitalize consumer and partner touchpoints, and build out product experiences. Distributed enterprises better serve the needs of remote employees and consumers, who are fueling demand for virtual services and hybrid workplaces.

## Total Experience

Total experience is a business strategy that integrates employee experience, customer experience, user experience and multi-experience across multiple touchpoints to accelerate growth. Total experience can drive greater customer and employee confidence, satisfaction, loyalty and advocacy through holistic management of stakeholder experiences.

## Autonomic Systems

Autonomic systems are self-managed physical or software systems that learn from their environments and dynamically modify their own algorithms in real time to optimize their behaviour in complex ecosystems. Autonomic systems create an agile set of technology capabilities that are able to support new requirements and situations, optimize performance and defend against attacks without human intervention.

## Generative AI

Generative AI learns about artifacts from data, and generates innovative new creations that are similar to the original but doesn't repeat it. Generative AI has the potential to create new forms of creative content, such as video, and accelerate R&D cycles in fields ranging from medicine to product creation.

## 6G Corner

by Dr M H Kori

Though 6G is still far away and expected to be commercially deployed around 2030, there is lot of interest in the "6G Research" and many countries have extensively funded research projects. In "6G Corner" we track all the new commercial and technological developments in the 6G domain in every issue of IETEBM!

### India aims to launch locally developed 6G Tech in 2024: Report

India expects to be in a position to launch indigenously developed 6G technology by the end of 2023 or early 2024, press reported, citing the Minister for Communication Sri Ashwini Vaishnaw.

Sri Vaishnaw said requisite permissions have already been given to scientists and engineers working on the technology. "6G development has already started. That will be seen somewhere in the time frame 2024 or end-2023. That is the direction in which we are going. We will have designed in India telecom software for running the networks, manufactured in India telecom equipment, served in India telecom networks which can go global," he said.

The telecommunications industry and a number of government agencies around the globe have started research on future 6G technologies and experts are currently expecting the first commercial launches of 6G networks to happen around 2028-2030.

### India, Vietnam and Singapore are joining the 6G technology race.

6G technology is the next big buzzword when it comes to connectivity. With the first commercial launches of 6G networks expected to happen towards the end of the decade, several countries have already begun research and development on 6G technology.

China, which was the first country to launch the world's first 6G satellite into space in 2020, recently announced a breakthrough in 6G technology. The government-backed Purple Mountain Laboratories said a research team had achieved 6G-level wireless transmission with speeds up to 206.25 gigabits per second for the first time in a lab environment.

According to reports by CGTN, the recorded speed was about 10-20 times faster than those of most 5G networks, a breakthrough for terahertz (THz) wireless communication. Lead researcher You Xiaohu highlighted the importance of THz transmission technologies for 6G networks, noting its potential when used with augmented reality (AR), virtual reality (VR), the metaverse, and other currently developing technologies.

With China's new developments in 6G technology, other countries in Asia are also now joining the race for supremacy in wireless communication. Interestingly, three other countries that are hoping to achieve some breakthrough in 6G technology are Singapore, India, and Vietnam. Singapore's 6G plans are part of a US\$ 50 million program announced last year. The Future Communications Research and Development Program is part of Singapore's solutions for building a more resilient digital economy. Part of the program is a 6G flagship coordinated effort with the Finland's University of Oulu on research and development collaboration on 6G technology.

The University of Oulu is also collaborating with Jio Estonia, a subsidiary of India's Jio Platforms to explore digital opportunities in 6G technology. Jio Platforms already has an active development program for its 5G RAN and Core Platforms. This collaboration not only extends Jio's 5G capabilities in exploring use cases in the 6G era but also builds India's presence in the 6G technology race. This includes 6G-enabled products in the defense, automotive, white goods, industrial machinery, consumer goods, efficient manufacturing, novel personal smart device environments, and experiences such as urban computing and autonomous traffic settings.

Interestingly, Vietnam is now the latest country that plans to work on developing 6G technology. Vietnam's Minister of Information and Communications Nguyen Manh Hung told a conference in Hanoi that the country will focus on the **development of 6G in 2022** to get ahead of the development curve as well as strengthen its digital infrastructure.

While it may be a while before the full commercialization of 6G is available, the reality is, innovation in wireless technology is picking up the pace. Countries that have yet to enable 5G technologies will only end up being left behind if they do not pick up the pace. For now, it seems that China, India, Vietnam, and Singapore are going all out to make a mark in 6G technology not only in Asia but globally as well.