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VIRTUAL REALITY

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From the Desk of Chairman, Publication Committee

Dear Fellow Members,

Greetings.

In my write up in the June issue of CSIC, I mentioned rather briefly, about a computer legend - Professor John McCarthay. I said Professor John McCarthy was an American and cognitive scientist. He was one of the founders of the discipline of artificial intelligence, developed the LISP programming language family and introduced time sharing concept.

Professor V. Rajaraman one of our esteemed members writes to me that he read my write-up. He adds that he wrote an article titled 'John McCarthay – Father of Artificial Intelligence' which was published in Resonance – a Journal published by the Indian Academy of Sciences. He forwarded a copy of this article to me. It is informative. Prof. Rajaraman writes " John McCarthy was a child prodigy and even though he joined school late due to a childhood illness he finished school early. ....I first met John McCarthy when he visited IIT, Kanpur, in 1968. During his visit he saw that our computer centre, which I was heading, had two batch processing second generation computers – an IBM 7044/1401 and an IBM 1620, both of them were being used for 'production jobs'..... McCarthy was a great believer in the power of time sharing computers. In fact one of his (Prof. McCarthay;s) first important contributions was a memo he wrote in 1957 urging the Director of the MIT Computer Centre to modify the IBM 704 into a time sharing machine....."

I thought that I should share with you these interesting facts. The present generation of computer professionals may like to know these.

Back home, the three journals of CSI are getting published as per schedules. Once again I request you to send quality oriented articles/ research papers for publication in these journals. Adyayan is for students. Let us encourage them. Certainly they would like to become members of CSI.

With best compliments

Dr. D. D. Sarma
Chief Scientist (R), CSIR-NGRI, Hyderabad

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Chief Editor: S. S. Agrawal

Editorial

Prof. (Dr.) S. S. Agrawal
Chief Editor

Dr. Ritika Wason
Editor

Dear Readers

"VR is a way to escape the real world into something more fantastic. It has the potential to be the most social technology of all time"

– Palmer Luckey

The above quote By ***Palmer Luckey***, Founder of Oculus Rift depicts the power of this technology called Virtual Reality. As per Wikipedia, Virtual reality (VR) is a simulated experience that can be similar to or completely different from the real world.

In today's world virtual reality has already penetrated into our lives. We are using many virtual reality enabled applications around us. We dedicate this issue to understanding and appreciating the role virtual reality is playing in this smart computational world. Continuing with our invited series Titbits from the History of Computing –XII by the legendary Prof. V. Rajaraman, this issue discloses, "**System R- The First Relational Database Management System**" This article traces the development of System R. The first article, "Virtual Reality: An Overview" by Himani Mittal details the nuances of virtual reality. The article, "VR-not a reality but neither a hallucination nor a dreaming imaginings..." by Jyotishmann Ray discusses how virtual reality in the present times is enabling augmented reality in a number of fields. The next article, "Virtual Reality: The New Reality" by Shreeveshith K. and Snigdha Sen delves into the working of virtual reality.

The research front showcases, "Interactive Virtual Reality (VR) Applications for Education and Training" by P. Ranjana and Thangakumar Jeyaprakash highlights the applications of virtual reality. The next article, "Influences of Augmented Reality in Education" by Jose Moses Gummadi and Supriya Nandikola evaluates the various tools available for creating virtual reality applications. The next article, "Panoramic Insights on Virtual Reality Technology" by S. Balakrishnan, S. Sheeba Rani and Rashi Kohli explains the various components of Virtual Reality.

The technical trends commence from the article, "Virtual Reality Role in the World" by A. R. Revathi, M. Shwettha and P. Rajalakshmi refurnishes the various types of virtual reality applications in the present world. This section also gives an insight to the domain of virtual reality. The article, "Virtual Reality and its Applications" by K. Shanmugam, B. Vanathi, Aarthi Prakash, Deepika P. and Harita Rajam D. elaborates on the same. The next article, "Virtual Reality and its Applications in Education, Healthcare and Agriculture" by M. Senthil Kumar, B. Chidambara Rajan, M. Rajakumar and P. Kiruthika highlights how virtual reality is being applied to education, healthcare and agriculture.

The issue also reports various webinars, student branch inaugurations and faculty development programmes conducted by various regions of CSI. A new trend in education / communication is very clearly visible that people have resorted to "online mode and the virtual mode for teaching and learning" at various levels. The experts in computer science and the CSI are assisting and showing the way for its effectiveness. It is very encouraging to see the reports from various chapters, specially the student chapters. We applaud all chapters and branches for conducting such activities even in these hard times. Varied student branch activities as well as workshops carried by different regional chapters of CSI like industrial visit and programming competitions have also been reported.

We are extremely thankful to all our contributors as well as readers. We are continuously receiving so many good quality articles each month that selection becomes a difficult task. May God bless you all with extreme strength and well-being to overcome these hard times safe and sound. Original, plagiarism-free, unpublished articles are solicited throughout the year from CSI members as well as non-members. Our sincere gratitude to the CSI publication committee members, editorial board members, authors and reviewers for their great contribution and support in realising this issue.

Our special thanks to Prof. A. K. Nayak, Immediate Past President, CSI for his constant encouragement, support and guidance in publication of July, 2020 issue.

We look forward to receive constructive feedback and suggestions from our esteemed members and readers at csic@csi-india.org

With kind regards,

Prof. (Dr.) S. S. Agrawal
Chief Editor
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President's Desk

From : President, Computer Society of India
Date : 01 July, 2020
Email : president@csi-india.org / Cell : (91) 98105 92760

Dear Members,

All of us are going through difficult days due to increase in pandemic of Covid-19 in the country, I hope that you are keeping yourself safe and following the guidelines of safety issued by government. The guidelines will surely keep all of us safe.

Present issue of CSI communication is on the theme Virtual Reality. Virtual Reality (VR) is the use of computer technology by creating artificial environment using software through which user belief as if they are in real environment. By using VR technology we allow the user to experience the natural phenomena, instead of viewing on screen in front of them, users are interacting in 3D world on a computer, it is primarily experienced through sight and sound. Through Virtual reality technology we create immersive experiences that can help educate and entertain consumers. Its popular use is in gaming, but virtual reality is also applied in different type of industries, like medicine, architecture, military and many more. Different types of virtual reality are Non-immersive reality (used in flight simulator), Fully immersive reality, Augmented reality, Collaborative reality and Web-based reality. The current scenario in the world has allowed us the use of Virtual Reality in more and more ways.

Thus many researchers had contributed their work on Virtual Reality in current issue and explained the future use of virtual reality to the IT Professional involved in various walks of life.

The Covid-19 pandemic and lockdown measures have led to the worldwide closure of technical & vocational education training institutes, threatening the employment scenario and continuity of economic & industrial development. But our Chapters & Student Branches are quite dynamic & vibrant and utilized this period for organizing quality activities at various from local to International level through online mode. Many of the reports have been published in this issue also & to accommodate large number of online activities the publisher has increased the number of pages in current issue. I congratulate all the respective organizers & members of the chapters & student branches for their tireless efforts & significant contribution.

CSI is continuing 15% concession in the life membership to attract more & more professional & bring them together for the growth of IT, the details are available on our portal www.csi-india.org.

I seek the active & kind support of the all Members to make CSI more Dynamic, Vibrant, Productive & Sustainable and help to tread the tough path ahead by enhancing the positive environment in all sphere of activities.

I sincerely request all the Office Bearers, Executive Committee Members, CSI officers and staffs to kindly continue working with full dedication, responsibility & honesty for CSI.

I am thankful to all Past Presidents, Fellows & Senior Members of CSI for guiding me to perform my duty. Let us all come together make a vibrant CSI.

At the end I will say at this juncture when country is facing acute problem due to COVID-19, let us all come together to make the CSI transparent, Clean, Healthy & Green.

Stay Safe, Stay Connected.

With warm regards,

Mr. Ram Krishan Vyas
President, CSI

6th International Conference on Emerging Applications of Information Technology (EAIT 2020)

During Feb. 25 - 27, 2021 : University of Kalyani, Kalyani, India

Theme: Advanced Techniques for IoT Applications

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The Computer Society of India (CSI) has been instrumental in guiding the Indian IT industry since its formative years. The mission of CSI is to facilitate research, knowledge sharing, learning and career enhancement for all categories of IT professionals, while simultaneously inspiring and nurturing new entrants into the industry and helping them to integrate into the IT community.

Encouraged by the earlier responses and keeping the tradition CSI Kolkata Chapter is organizing the Sixth International Conference on Emerging Applications of Information Technology (EAIT 2020) during February 25-27, 2021 at the Department of Computer Science & Engineering, University of Kalyani, Kalyani, West Bengal, India. The University of Kalyani is a NAAC A Grade University imparting quality education and research in Engineering, General Science, Arts & Commerce and Education(www.klyuniv.ac.in, http://www.kucse.in). A Pre-Conference Tutorial will be held on 25th February, 2021 at IIIT Kalyani.

Topics (not limited to the followings):

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  - ✓ Expert Systems
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  - ✓ Computer Vision
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  - ✓ Smart communications and
  - ✓ Embedded Systems and IOT Applications
  - ✓ Sensing, communications and smart infrastructure
  - ✓ Diagnostics, self-healing and reliability of smart systems

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The papers must be submitted ONLINE though Microsoft Submission Link. Please follow standard author instructions of Springer conference for paper format. Submission deadline: 31st October 2020; Notification of Acceptance: 31st December, 2020; Submission deadline for revised paper: 31st January, 2021; Registration of authors: 31st January 2021.

Paper Submission Link: **https://cmt3.research.microsoft.com/EAIT2020**

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Titbit from the History of Computing–12

System R – The first Relational Data Base Management System

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"History repeats itself. So you might wanna pay attention" – Quavo

The Cambridge dictionary meaning of titbit is "A small and particularly interesting item of gossip or information".

Prologue

In the late 1960s and up to the late 1970s there were two models of Data Base Management Systems (DBMS) that were used by organizations. One was promoted by the Database Task Group of CODASYL (Committee on DAta SYstems Languages) as an industry standard. This was called the network model as the records in the database were linked as a complex web using pointers. The other model promoted by IBM was called Information Management System (IMS). It was called the hierarchical model as the records in the database were arranged as trees. Neither model had any sound theoretical underpinning and required extensive training of programmers for proper use. They were, however, well supported by the computer industry and were efficient in terms of the use of computer resources. To retrieve a desired record a programmer had to "navigate" the database using the links connecting the records.

Edgar F. Codd who was working as a researcher at the IBM's San Jose Research laboratory in California was unhappy with the complexity of these DBMS. He started research on database theory which culminated in a landmark paper he published in the Communications of ACM titled " A Relational Model of Data for Large Shared Databanks" in 1970 [1]. In this paper he suggested that data be organized as a set of tables called Relations. Each relation consists of a set of records, one record per row, each record has a number of items (or fields) and one or more of them is a unique key. A group of relations relevant to an application constituted a relational database. Unlike the earlier systems, this model did not explicitly include "connections" between records. Attribute values across tables were compared rather than following record pointers for combining information in tables. Codd also proposed a relational calculus to manipulate relations and retrieve desired record(s) from the database. He was given the Turing Award by the ACM, USA in 1981 "for his fundamental and continuing contributions to the theory and practice of database management systems."

Edgar F. Codd
(Photo thanks alchetron.com)

System R

Codd's work attracted the attention of another group of around 30 researchers led by Donald Chamberlin working in the same IBM Research laboratory in 1973 and this group started implementing an experimental Relational Data Base Management System (RDBMS) called System R. It was not intended as an IBM supported product but was expected to be a proof-of-concept of RDBMS. The group's design did not follow strictly Codd's theory and Codd chose not to associate with this group in their implementation efforts. As the first step, the System R group developed during 1973 to 1975 a query language to retrieve data from RDBMS. They wanted the query language to be English-like that could be easily learnt by non-professional users as well as professional programmers. It used verbs such as CREATE TABLE, UPDATE TABLE, SELECT, DELETE etc. It was called Structured English Query Language (SEQUEL). SEQUEL was described in a paper in 1974 written by Donald Chamberlin and Raymond Boyce and presented at an ACM Workshop [2].

Left Donald D. Chamberlin
(Thanks to computerhistory.org)
Right Raymond F. Boyce
(Thanks to alchetron.com)

In this paper they described in detail the syntax and semantics of the language. They gave statements for creating Relations as tables and querying them using SEQUEL. The SEQUEL interpreter was written in PL/1 (the standard IBM high level language of the 1970s) and some parts in assembly language. It was pointed out to them that SEQUEL was a trademark of Hawker Sidley Aircraft Company. Consequently they abbreviated it as SQL. Software could not be patented those days. IBM was also quite liberal in allowing their researchers to publish their work. On the insistence of the referees of the paper they also gave the complete syntax of SEQUEL in BNF (Backus-Naur Form) notation. This led to many companies copying the syntax and semantics of SQL in later years and SQL becoming a de-facto ISO standard for querying RDBMS.

The next phase of the development of System R was during 1976 and 77. In this phase the group led by Chamberlin implemented a full function multi-user version of System R on an IBM mainframe computer using VM/CMS, a developer oriented operating system They also optimized the SQL system to reduce the retrieval time by compiling frequently asked queries as machine code.

The final phase of implementation was between 1978 and 1979 during which System

R was installed in user sites not as an IBM supported product but as experimental sites. The sites were at Pratt and Whitney Aircraft Engines and at Upjohn, a pharmaceutical firm. Users liked SQL and quickly adapted to the use of RDBMS. Compared with the IMS, System R was a little less efficient. This was offset by the ease of designing database using relations and retrieving desired data using SQL. Training time required to design RDBMS and learning SQL was considerably less compared to designing using IMS.

In a classic paper titled "A History and Evaluation of System R" authored by Chamberlin and 16 authors that appeared in the Communications of ACM in 1981 [3] the authors recount the development of System R over the period 1973 to 1979.

IBM in the 1970s and 80s was primarily a hardware company dominating the mainframe market. Software was promoted only if it increased hardware sales. It would have taken considerable resources to implement System R on the then most popular OS of IBM, MVS (Multiple Virtual Storage) , and market it. IBM was thus lukewarm about making System R as a product on their mainframes because IMS was doing very well in the market and the management was reluctant to promote a rival product. Meanwhile the computer scene was rapidly changing with the advent of minicomputers followed by PCs and powerful Workstations. Other companies, particularly Oracle was promoting RDBMS and SQL on many computer models as it was a software company and hardware neutral. RDBMS with SQL was rapidly gaining users due to its simplicity. As hardware was becoming powerful and cheaper, efficiency was not a major consideration. Ease of use was. In response to the new competition IBM released IBM SQL/DS RDBMS in 1981for their operating systems DOS/VSE and VS/CMS which ran on their smaller computers. This was followed by DB2 for MVS mainframe computers in 1983. Only in the 1990s IBM developed DB2 that ran on other operating systems such as OS/2,UNIX, MS Windows and Linux.

Epilogue

During the development of System R many seminal contributions in transaction processing emerged. An important contribution was the design of algorithms to prevent interference between concurrent users of a database. It resulted in the formal definition of ACID (Atomicity, Consistency, Isolation, and Durability) properties of all database transactions by Jim Gray. His work involved deep theoretical ideas and resulted in the classic 1000 pages book "Transaction Processing: Concepts and Techniques" written by him and A. Reuter. Gray received the Turing Award in 1998 for his "seminal contributions to database and transaction processing research and technical leadership in system implementation".

Jim Gray

(Photo thanks to ACM Sigmod.com)

IBM was very liberal in allowing the researchers to publish their work (without patenting) related to System R that resulted in over 40 papers in Conferences and Journals. This influenced many startup companies to implement and market RDBMS and SQL systems. Notably a company named Software Development Laboratories was started by Larry Ellison, Bob Miner, and Ed Oates in 1977. They were impressed by Codd's work on RDBMS and System R implementation. Using the published literature, they created their own version of RDBMS and SQL and called it Oracle RDBMS. Unlike System R that was oriented towards IBM's mainframes, Oracle RDBMS was written in C and was thus machine independent. It quickly captured the RDBMS market for PCs, minicomputers and later mainframes. Today (2020) there are around a dozen RDBMS companies most of them modelled on System R. Even though all the seminal research and implementation of RDBMS was done by IBM's computer scientists, today IBM is a minor player in the RDBMS market as it chose to support IMS too long.

Acknowledgment

I thank Professor Jayant Haritsa for reviewing this article and for his constructive comments that improved it.

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[3] D.D. Chamberlin and 16 other co-authors, A History and Evaluation of System R, Communications of ACM, Vol.24, No.10, October 1981, pp.632-46.

About the Author

Prof. V. Rajaraman (CSI Fellow) Ph.D. (Wisconsin) is Emeritus Professor, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore. Earlier Prof. Rajaraman was Professor of Computer Science and Electrical Engineering at IIT, Kanpur (1963-1982), Professor of Computer Science and Chairman, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore (1982-1994) and IBM Professor of Information Technology, Jawaharlal Nehru Centre for Advanced Scientific Research (1994-2001).

A Padma Bhushan awardee in 1998, he is also a recipient of the Shanti Swarup Bhatnagar Prize in 1976. He is a lifetime contribution awardee of the Indian National Academy of Engineering and the Computer Society of India. (A detailed biodata may be found in en.wikipedia.org/wiki/Vaidyeswaran_Rajaraman).

Virtual Reality: An Overview

Himani Mittal
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1. Definition

Virtual reality (VR) is interaction of human with simulated environment created using Computing technology involving primarily Computer Graphics and Artificial Intelligence. The word Virtual means imaginary and reality means truth. In VR, the human can actually hold the virtual objects or animated objects. The 3D environments created using Virtual reality are used for many interesting applications eg. driving practice for cars and airplanes, computer games and many more.

There is another term often confused with VR, known as augmented reality. Augmented reality is mixing of virtual objects in real environment eg. adding stickers in Snapchat. VR is introduction of human in simulated 3d environment with human actually experiencing the sound and sight of the 3D scene creating an illusion that it is a reality. To understand it better, the game created by the protagonist in movie Ra.one where the child interacts with R.one with VR headset and other gear is an example of Virtual environment. As can be seen in figure 1, the woman is interacting with virtual environment through the VR gear.

Fig. 1 : Virtual Reality
(Source: www.aljazeera.com)

2. History

The VR came into existence with 3D movies. In 1956 cinematographer Morton Heilig's Developed Sensorama (Fig. 2).

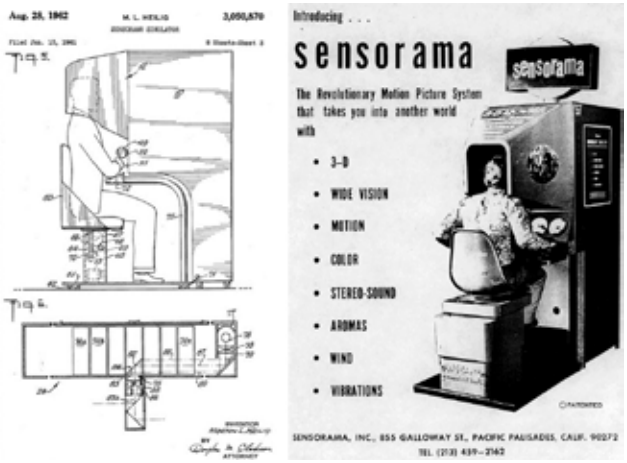

Figure 2 Sensorama (Source: www.radiantvisionsystems.com)

He wanted people to experience being themselves in the movie. The VR he created let people to ride a motorcycle in the movie and they could actually see the road, hear sounds of engine, feel the vibration of wind and smell the exhaust. He patented a head-mounted display device, called the Telesphere Mask, in 1960. Since then a lot of development has taken place.

3. Hardware

To give the user a sense of immersion a lot of hardware and software are required.

Input devices: It lets the user interact with the virtual world. It can be joysticks, controller wands, data gloves, On-device control buttons, motion trackers, bodysuits and Motion Platforms.

- gyroscopes and
- motion sensors for tracking head, body, and hand positions
- 3D mouse,
- the wired glove,
- motion controllers, and
- optical tracking sensors.

Output Devices: These devices stimulate a sense organ to create the VR environment. These include visual, auditory or haptic displays, headphones and speakers.

- small HD screens for stereoscopic displays;
- VR headset
- omnidirectional cameras
- head-mounted displays or the CAVE
- haptics and sensor technology

4. Applications of virtual reality

Virtual reality has applications in military, healthcare, education, scientific visualization and entertainment. Though these are not the only uses. The industry is growing fast and newer and better applications with advanced hardware are reaching the market. There is demand for VR based products in the market. However there are certain philosophical, privacy and health concerns related to virtual reality.

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VR-not a reality but neither a hallucination nor dreaming imaginings…

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VR stands for virtual reality. It is neither a hallucination nor a dreaming of imaginings. It is an intriguing experience of using an human-computer interface, laying oneself in either partial/full/non-immersion in a simulated environment making oneself feel as if he/she is in a real world and enjoying its effects too. Actually the simulation process and the kind of experience includes control over the senses being used (sight/hear/taste /touch/smell etc) to create a simulated environment in the actual world using technologically advanced interfaces. It is a paradigm shift in a real time.

This academic paper discusses about the journey of VR, the various VR interfacing devices (to assess and control the simulated sensory channels to the brain) used by the human to interface with the computer/smart phones, and the types of immersive simulation with a variation in techniques and technology. It first throws some lights on the definitions of VR, simulation, simulated environment, immersion etc. The insights include the pioneering computer scientist/engineers/philosophers etc who had contributed their time and research developments in VR and in its different areas to further develop it. It simply focuses on the ideas and the intricacies of a simulated reality and the further developmental scope in the future. The major application of VR are- education, games, medical treatments, entertainment (films), defence (army, air force, navy), sports, scientific research, industry, aviation, space etc.

A simulated environment is created innovatively in any given discipline of its application after performing a lot of research in that domain area by the computer scientists/engineers. Simulation means the creation of near about replica of the real physical objects and their characteristics (like size, color, weight, width, height etc.) in a real world in real time. The simulated environment also called virtual environment is mathematically the presentation of the objects in a 3 Dimensional look and feel. The journey of VR began around seventy years ago (but can be backtracked to the 1860s before the birth of digital technology). It started to get attention at large by the public in 1980 to 1990s. There were many who had contributed to VR, but the records says the term was coined by the founder of VPL Research company-Jaron Lanier in the year 1987 (in the year 1999 it was then acquired by SunMicrosystems). Later Lanier teamed up with Zimmerman (inventor of first data glove) and produced a wide range of interface devices such as glasses, gloves, head mounted displays (HMD). It was Mortein Heilig, who added the term experience with this idea of VR (this was done by using an oscillating fan in a 3D film for the viewer to feel the force of blowing wind on their face). Other pioneering computer scientists/engineers who in a way contributed to the term VR are: Douglas Engelbart (contributed to participation of a user through mouse/keyboard), Ivan Sutherland (credited for creating the first head mounted display), Myron Krueger (credited for computer graphics with audio in video projection of a user/person in a space, similar to the modern CAVE (Cave automatic virtual environment, but with no interaction). VR can be expressed in a schematic representation as shown below:

User ➡ Interface Devices ➡ Computer/Smart Mobile Phone ➡ Brain ➡ Sensory Channel of Digital Impulses ➡ User Actions Stored in a Database ➡ Response to Stimuli ➡ Virtual Objects

An example of virtual reality can be a trip to mars or moon or anywhere else in the galaxy, and feel like he/she is moving there and enjoying the ambience of its surroundings, surface and the environment etc while being seated on a chair connected with a computer interface. Virtual reality is truly an application which enhances a user or a participant to perform navigation and interactivity with the virtual objects in a virtual environment/ situation in a real world. Is it the same as seated on chair, in a theatre and watching a movie and enjoying as if he/she replaces the actor/actress of the movie. Not at all! The difference between this scenario and the trip to a mars/moon or anywhere else in the galaxy, lies in inclusion of motion (sight and possibly sound, haptic etc., he/she can move around along with the computer-interface), which is not there while watching a movie in a theatre (normal case). This motion makes him/her to interact with the surroundings as if it is real, but actually it is not (interactions are not there in case of watching a movie while seated on a chair). First case is interactive (senses interact with the virtual situation created) in a immersive (encasing of the user at times) experience while second case is non-interactive and traditional watching of a movie on a flat surface. Generally virtual reality includes mainly two senses-sight and sound basically to make the user/participant feel it, like a real while it is not real, hence the term, virtual reality is synonymous with such a simulation/situation. In the first case interface devices used are a head mounted display set, earphone for audio/speakers and a computer/smartphone. Basically the virtual reality world is infinite as the seemless brain can think of any such situation which is unprecedented (as such a simulation is possible). The interfacing devices like HMDs (Head Mounted Display unit), controllers, gloves, (also other body parts) etc., tracks the position of the objects in the Euclidean space and transmits to the computer for further processing and storage in the databases to operate. The stored information in the database further takes necessary response to stimuli (the feedback system) for the corresponding movement of the tracking device or the body parts (like hand etc.,) moved partly/fully by the user. In other words to make the simulation effective, the natural impulses between the user's body and the nervous system should be blocked (the headphones used blocks the surrounding noise from the virtual simulated environment) at the same time enhancing to receive the digital impulses of the virtual world (by using fused nano sized robots to the neurons). In other words, central nervous

system needs to be manipulated and further research is being done. Normally, a user of a 6 DOFs (a modern HMD) is capable of using his/her own body movements for small positional adjustments (turning around, bending down, repositioning etc.). A user of 3 DOFs using hand held devices (eg. Joy-stick, space ball, 3D mouse) uses to move more distances like walking down from one room to another room. Basically the simple head mounted display units supports three degrees of freedom and the more sophisticated ones supports six degrees of freedom. The first three degrees of freedom includes the three translational movement along the three axes of x,y and z (moving forward and backward, left or right, up or down). The later ones (the other three DOFs) refer to the rotational movement around the three axes of x, y and z (also known as pitch, yaw and roll). However the tracking can be implemented using many technologies. It can be wireless, optical, trackers with markers, markers less tracking, inertial tracking (like accelerators or gyroscopes), sensors fusion etc. In case there happens to be a delay/latency more than say 20 ms between the user's actions and response of the system, the immersive experience get's stalled. In case of VR, normally the HMD interfacing device is used. In case of AR (augmented reality) the interfacing devices used are Mobile phones, Google Glass etc.

Head sets used are: Google's Cardboard, Google's Daydream, Samsung's Gear VR (both Cardboard and Daydream does not support positional tracking), PlayStation VR, Oculus Rift and HTC Vive Pro. The price may range from 70$ to 1500$. The features used in them varies from Cardboard to more advanced in HTC Vive Pro. Research on the VR headsets has to be done properly on its specification for positional tracking, sensors and its uses, and the latency time.

The features of VR: The features of VR can be minutely classified into: (I) **S**imulation (of as many senses) (II) A **c**omputer (III) **I**nterface devices (IV) **P**resence/ **T**elepresence (V) **I**nteractions/**I**nteractivity (VI) **E**xperience and (VII) **I**magination (VIII) **I**mmersion.

(I)Simulation is an idea of creating a situation artificially using as many senses as possible to believe into something that would exist in reality. This could be created by using any/all of the five senses (sight/ hear/smell/touch/taste) and controlling them to carry sensory information to the human brain (by the neurons). In otherwords, the use of technology almost blocks the senses of sight (panoramic), sound (acoustics), haptics and feedback (tactical), smell (olfactory) and taste (gustation). (II) The information flow is then made to flow as a stream of bits to the computer to interprete it and then act upon it through an human-computer interface device.(III) The interface device is a combination of sensors, hardware and software, to read the signals coming and going through it to interact with the user's brain to make a feeling of the simulated situation altogether. The user can be present closely to the computer being used or at a remote distance (presence/telepresence). (IV) Presence simply means that the user is physically present there and connected with the virtual objects in the real time (outside the body of the user). Then the user/ participant feels as if he/she is disconnected from the physical world and lost in the virtual world in a deep connection with the virtual objects therein where he/she starts feeling of being there through the simulated sensory channels of brain. (V) Interactions includes that of the user movements through the sensory channel of digital impulses and the virtual objects in the real world (via the computer and the interfacing devices). (VI) Such a situation is said to be called an experience. (VII) Imagination also plays role here, as the ideas coming from the seemless mind needs to be plotted innovatively in a given situation. (VIII) Laying a user into such a situation as said before, cutting away from the natural sensory channels and getting submerged in a digitally created sensory channel is called an immersion.

According to Michael Abrash at Valve in 2014, presence has to satisfy the following criteria: (i) a wide field of view (80 degrees or better), (ii)adequate resolution (1080 pixels or more), (iii) Low pixel persistence, (iv) a high refresh rate (>60 Hz), (v) global display (all pixels has to be illuminated) and optics (atleast two lenses per eye needed).(vi) When this happens with a user in real time, it is called an experience of virtual reality which is not real. All interactions can be monitored and controlled by the user through the interfacing devices. To create such a simulation, understanding the brain and the neuron-to-neuron communication gateway through the computer interface must be understood by the computer scientists/ engineers. Immersion can be defined as the number of senses of a user, which has been stimulated to a certain level of interactivities with the virtual objects in real time to let the user feel as if it's really happening.(vii) Low latency value greater than or equal to 20ms (between the last motion and the photon) is to be maintained.

Other technical factors of VR: (I) Field of View (FOV): Human's average field of view is approximately is 200 degrees. Headsets supports a minimum of 90-110 degrees. The higher value of FOV gives much better immersive experience. (II)Frames per second (FPS): Is the rate at which frames of images is refreshed in a second in time scale. The higher the FPS value is, the smoother is the motion to make the immersive experience a comfortable one. Optimally, FPS should be greater than 90 fps/ Hertz, to avoid nausea. Lower values of FPS will be slow motion and it will cause nausea. (III)Motion-to-Photon Latency: It is the measure of the time between the real motion occurring in real time and the eye that perceives a photon back from the HMD display screen. Higher value of motion-to-photon latency will become the cause of so called motion sickness. (IV)Motion tracking: This factor tricks the senses into make the user think that he/she is participating in the virtual environment. (V)Positional tracking: This also plays a important role in immersive experience of VR. More the accurate is the positional tracking, the more the user feel like to be in a virtual environment. (VI) Inertial Measurement Unit (IMU): This is an electronic device for detection of motion. IMUs are made of an accelerator, gyroscope and a compass for measuring the rotation of the device with a low latency value (example is that of Samsung Gear). (VII) Eye tracking : The cameras installed inside the HMD can track, which direction the user is looking by tracking the movement of the eyes. With the higher value of the screen resolution, immersive experience becomes more clearer and more realistic. (VIII)Spatial Audio: Spatial audio is used to synthesize the sound originating from a specific location in the virtual world. This helps the user to hear the sound as he/she moves around. (IX) Steoreoscopy: Most steoreoscopic phenomena consists of presenting two offset images (2 Dimensional) separately to the left and right eyes of the user. They are then combined in the brain to give the perception of 3D depth. (X) Haptics/ Kinaesthetics: It helps to recreate the sense of touch through feedback devices by application of forces, vibrations or motions to the user. The technique is to use the tactile sensors to measure the forces exerted by the

user on the interface devices.

Types of virtual reality technology: There are basically many types. A few of them are: (I) Non-immersive (II) 2 Fully immersive (III) Augmented reality (IV) Collaborative/ Distributive (V) Web-based. (I) Non-immersive virtual reality (also called at times as Desktop VR) is a situation in which the participant is not put in any kind of immersion in a virtual world. The participant remains in control of the surrounding physical environment while being conscious of the sensory channel of sight, sound and haptics mainly. An example of non-immersive can be that of visualizing a 3D structure in CAD tool or simply watching a movie. An example of semi-immersive virtual reality is a case of flight simulator used to train the unexperienced pilots. Simulators used to train the pilots of fighter planes or that of astronaut travelling in a spacecraft is fully-immersive. In 2 fully immersive-simulation the user is put in a full immersion by using the HMD and the sensory hand gloves to detect sight, sound and even the movements in a given situation/environment (it uses two monitor display units and a sound system). Ernest W.Adams (university professor and game design consultant) has classified immersion into three types: (i) Tactical immersion, (ii) Strategic immersion and (iii) Narrative immersion. (i)Tactical immersion is a kind of experience, attained while performing tactile operations which are skilfull.(II)Strategic immersion experience is associated with a lot of planning, analytical and thoughtful ideas (like in a game of Chess).(iii)Narrative immersion is a kind of experience where the user/participant takes a role in a story (like in a movie or a novel/story etc).(III) Augmented reality was introduced in the year 1990, by Tom Caudell (a Boeing researcher), though it was there since the beginning of the twentieth century unawarely. It is an ideology in which a virtual set up is superimposed on the top of real environment. Interface devices used are normally Mobile phones, Google Glass etc. Examples of AR can be playing video games in real world, educating students, watching a spacecraft land in a nearby field/ locality where he/she lives (it was shown in hindi Bollywood movie Koi Mil Gaya (2003), PK (2014) etc.) (IV) Collaborative/ Distributive virtual reality gives the user a kind of interactive experience which the user can coordinate with others the same virtual environment. (V) Web based virtual reality is used on the internet by the computer scientists/engineers by programming in virtual mark up language (VMRL). Web based VR applications has a great scope in internet browsing, shopping, and socializing. Example of collaborative is seen in social web sites where they interact with others to enjoy its effects.

Staffan Bjook and Jussi Holopainen has identified the following types of immersion (in designing patterns in games): (i) Sensory-motoric immersion (ii) Emotional immersion (iii) Cognitive immersion (iv) Spatial immersion. Other factors affecting immersive digital simulation are: (i)Believable 3D computer graphics, Acoustics (sound), (ii) User input and output responses, (iii) Simplicity, (iv) Functionality, (v) Potential for enjoyment, (vi) Effects of wind, seat vibration and (vii) Lighting etc.

Fields of application:

(I) Education: Virtual laboratories are being created through ICT (Information communication technology) tools that offer a lab experience on a desktop or the mobile phone or a laptop of the learners. Virtual labs is free of cost. It is learning management system for all types of learners in various disciplines of studies in the interests of the learners. It provides all the necessary resources of learning materials, pre-test, post-test at one place. It provides both simulated type and remote type lab experiences. The learners can learn at their own pace further motivating themselves towards their interests rather than in the actual labs where they might loose interest or at times risk the chances of getting hurt like performing a real lab experiment in a chemistry lab (say a reaction of concentrated acid etc.). This is beneficial for all types of learners at the school, undergraduate, graduate, or post-graduation levels of education. At this time of covid-19 lockdown of last two/three months globally, virtual labs is providing many thousands and lakhs of students to learn their lab tests through virtual labs. In India, many universities and college students resorted to virtual labs since January 2020 and amid the lockdown of covid-19 pandemic [10]. International Institute of Information Technlogy, Hyderabad has registered over 1,00,000 learners of virtual labs since January 2020 (IIITH). National Institute of Technology, in Surathkal, Karnataka has registered over 69,000 for remote based experiments/remote-triggered labs (virtual lab) as learners in last three months. Indian Institute of Technology, Guwahati in Assam (IITG) has reportedly registered over 26,000 learners for remote based experiments in virtual labs in this covid-19 pandemic lockdown etc.

(II) Judiciary: Recent covid-19 pandemic and hence the long lockdown (since March 25, 2020) has compelled the Delhi's subordinate judiciary judges to get trained to log into virtual space to conduct cases to gain virtual courtroom experience instead of a real courtroom. In the past three months about 130 trainee judges have been trained on how to conduct courtroom proceedings through videoconferencing, mock trials etc. This virtual reality kind of experience have proved to be more beneficial as an effective means of training these trainee judges instead of going to a real courtroom to conduct the cases. The trainees might have felt the training programme as a movie in the digital space in real time [10].

(III) Films: VR experiences is being used in films (hindi Bollywood movie-Krrish, its sequel and Hollywood science fiction movies like The Matrix etc.) to put the audiences in a immersive situation. The interactivity technique is used there to let the users make and feel the narration of the story more deeply with an impact. Example for such a film is Carne y Arena [7].

(IV) Games: simple to multiplayer online games, in flight and other driving simulators etc. For a case of illustration, Facebook has developed Spaces in which the Oculus Rift users enter a virtual space that they shared with others. Doing so in this shared space, makes it possible to experience 360 degree videos and movies altogether, and create virtual objects. The users were also able to emote with facial expressions for their virtual avatars to perform. Even the avatars were made to take virtual selfies too.

(V) In medical science, VR is finding a lot of applications in making virtual tours of the organs of human bodies. For example Bioflight VR is one such company which creates an experience specifically meant for smokers, who tried to quit, taking them in a tour from their mouth, lungs, heart and other organs to see first look and feel of the damage caused by smoking. It has also found usage in treating patients for schizophrenia, pain related, surgical operations, postural balance and motor functioning [6], rehabilitation application etc.

(VI) Architecture designs: It is used by the achitects in desgining buildings, analysis (finite element analysis) and navigation, evaluation, CAD, operations and IoT devices installed etc.

(VII) Lighting: It is used to study the patterns of lighting.

VIII) Construction of large scale bridge simulation etc.

IX) Sports: In competitive sports at the level of Olympics, virtual reality has been very effective in both training of the sportsmen and in game planning, analyzing, in official sports events etc. [2] Like for example, in international cricket matches, it is being used by the bowlers to study the attacking styles of the batsmen of the opponent teams, quite ahead of the real time. Also in other athletics training events, virtual reality technology is finding a great acceptance. VR reduces the cost of training the sportsmen etc., as it is done in a simulated environment.

Accomplishments of VR: (i) VR based training with little/no risk (ii) Saves time and cost (iii) Can be done remotely (iv) Improves retention and recall (v) Simplifies complicated problems/ situations (vi) Suitable for learning skills (vii) Creative and enjoyable experiences.

Benefits of VR: Virtual reality through 360 degrees of freedom has proved to have efficient functions of attention and memory, according to research performed among two groups having healthy memory [5]. In the field of medical sciences, Virtual reality exposed therapy is used in treatment of patients having acute pain (VRET). Augmented reality exposure based therapy (ARET) is also used and it has been found to be more beneficial than VRET.

Disadvantages of VR:

(i) Simulation/Cyber sickness (when the user is stationary but a induced sense of motion through the exposure to changing visual imagery) (ii) Motion sickness (caused due to exposure to rotational motions) (iii) Stress, addiction, isolation, mood etc. (caused by immersive VR). (iv)System factors (whole system set up), individual user factors, application design factors (software), (v)VR headsets causes strain to eyes.

Types of AR:

Based on the superimposition of virtual objects in real world and interactions, it has been classified into following: (i) Recognition-Based AR (emphases on recognition of objects), (ii)Location based-AR (utilizes GPS (global positioning system), digital compass and accelerator as data provider based on location), (iv) Outlining AR (is also based on object recognition) (v)Superimposition based AR (provides an alternative option to replace an entire/partial view of a object with an augmented view). With further research and developments in the technology and with more input and output devices usage, the future would see more types of AR.

AR devices:

AR devices can be classified into four types: (i)Heads Up Display (complicated digital information is displayed relatively in a small area of display), example is that of airplanes etc. (ii) Smart Glasses (provides user information on the top of virtual world). Smart Glasses can be either optical or camera based. (iii)Holographic Display (is projection based) and (iv) Smartphone (handheld AR). Usage of AR is widely accepted in education, medical science, retail industry, real estate etc.

Conclusion:

VR has a high potential growth in the future real time. As of now, due to covid-19 pandemic, VR technology is being used globally in political conferences across the boundaries, in different levels of the government functioning etc. VR is also being used in education departments in different levels, in judiciary matters, etc., in the covid-19 pandemic globally.

Future scope:

With the time moving ahead of us, more input devices will find usage in VR. For example body suits and full body to finger tracking will make a user to experience VR naturally and realistically. This will allow the users to reach out with their hands and interact with the virtual environment as if in a real case. VR might have a future in using quantum computer in the future with variation in techniques and the technologies. The growth aspect of VR technology is quite higher. Investment in VR and AR will multiply 21 times over the next few years and is expected to reach 15.5 billion euros by the end of the year 2022.

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Virtual Reality: The New Reality

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Introduction

Technology advancements often surprise us and make human life more enjoyable. A 3-D movie in theatre always thrill us amazingly and create a fun filled attractive experience with the application of Virtual reality. Generally, Virtual Reality (VR) is a simulated environment which is created to experience a world different from the original world. The term 'virtual' in virtual reality means "not present physically but made to appear by software". A person can embrace the virtual environment using the VR Equipment. Using this a person can view, move and interact with the virtual objects. VR is a display technology which stands different from the traditional user interfaces as contents are more visually viewed and felt. Few examples of VR systems are HTC Vive, Oculus Rift and PlayStation VR (PSVR) [4].

Fig. 1: Virtual Reality

In 1929, Edwin Link built the 'Pilot-maker' the first ever flight-simulator. The simulator bought attention of the Army Air Corps, who purchased six simulators in 1934 and also used it to train pilots for World War II. In 1950 Morton Heilig wrote an essay on "Experience Theatre" that could bound all the senses in an effective manner, thus drawing the viewer into the onscreen activity. Sutherland developed the Sword of Damocles in 1968 – the first virtual reality head-mounted display. It did not get popular as it was unwieldy and large but established a crucial model for future goggle-based ways of accessing VR [1]. The then developed VR related devices were more focused towards military applications. From 1970 to 1990, the virtual reality industry thrived in sectors like medical, flight simulation, automobile industry design, and military training. The early 2000s was the beginning of a new era for the VR industry as more new-age VR devices were developed and funded.

Fig.2: Pilot-maker [1]

VR during Covid-19: Recent advancements in VR has made it more mesmerizing and cost effective. During these pandemic times, VR is used in every industry sector to transform the way people look at the industrial process. During lockdown when people were confined and bored inside home throughout the day, VR products demands was on high rise. VR has made a huge impact as it is eye-captivating and is highly customizable, dynamic, engaging and is the principal update to the way things are viewed in modern times. VR has reformed education by enabling students to learn in a more mesmerizing and innovative method. Students can learn the history of various places and can understand practically through VR. Many companies are on the verge in building VR Classrooms so that students can learn from lecturers around the world [2]. Early attempts of VR like the View-Master toys tried to create an illusion of depth to make the images seem real but were not clear and was not quick enough. Modern VR changes the whole game. It uses advanced technology to create moving stereoscopic images, with a slight offset between the two images to mimic how the human eye sees it. This makes the images look real and lifelike and respond to touch just like in real world. Additionally, the user may wear specialized accessories that allow user to virtually move, manipulate objects, and explore the virtual environment [3]. Moreover upcoming high speed 5G network will definitely increase the usage of VR application.

Fig.3: Sword of Damocles[1]

Technology

Virtual Reality Modelling Language (VRML) in 1994 and Web3D syndicate in 1997 was invented to develop web-based 3D graphics and create virtual environments. The syndicate also developed X3D standards from the VRML framework. MDN developed WebXR, a group of standards used to support rendering 3D scenes to hardware designed for presenting virtual environments. VR's most famous component is the head-mounted display (HMD). Production of VR images and video has increased with the development of 360-degree cameras, that have the ability to record 360-degree responsive photography and also record 360-degree panorama videos, but they are in highly compressed format and low resolution as the 360-degree video is streamed online. For Example, CAVE Automatic virtual environments display 360-degree room-sized content. Leading VR devices are HTC Vive Pro Eye, Oculus Quest and PlayStation VR, but there are other companies like Google, Apple, Samsung and others who also produce VR Devices [6]. Let be any VR device, the HMD must be

usable everywhere and affordable making HMDs the core of VR Technologies. Special input devices like 3D mouse, the wired glove, motion controllers, and optical tracking sensors can be used for interaction with the virtual world.

How does VR work?

As mentioned above, VR requires devices like HMD, motion-tracking sensor and a smartphone/computer or any other device to create digital environment. HMDs are used to display the content to the user. The content is transferred from PC to screen via a HDMI cable. Devices like GearVR and Google Cardboard use smartphones which acts both as a display and the source of the content. A 110-degree field of sight is achieved with 60fps in VR devices and using lenses change flat images into three-dimensional which makes simulations look real [4]. For user interaction there are several options:

- **Head-tracking:** Follows the movements of your head to sides and angles by assigning X, Y, Z axis to directions and movements.
- **Eye-tracking:** Tracks the motion of the eye through infrared controller.
- **Motion tracking:** Using 6DoF (six degrees of freedom) and 3D space, motion tracking is divided into two groups optical and non-optical. Optical is where a camera is used to track motions and non-optical is where sensors are used to track motions.

Types

There are mainly three types of VR:

- **Fully immersive simulations:** Fully-immersive simulations provide more realistic experience possible, with both vision and audio. The VR headsets provide higher resolution and wide area view. This type is usually used in gaming and entertainment purposes.
- **Semi-immersive simulations:** In this kind of simulation only partial virtual environment is provided for the user to interact with. Using graphical interfaces and large projector systems, these simulations are used for educational and training purposes. Example: Flight simulations
- **Non-immersive simulations:** These types mof simulations are used in everyday lives. A normal video game is considered a non-immersive VR where the game responds to particular physical actions performed by the user. Example: Wii Sports

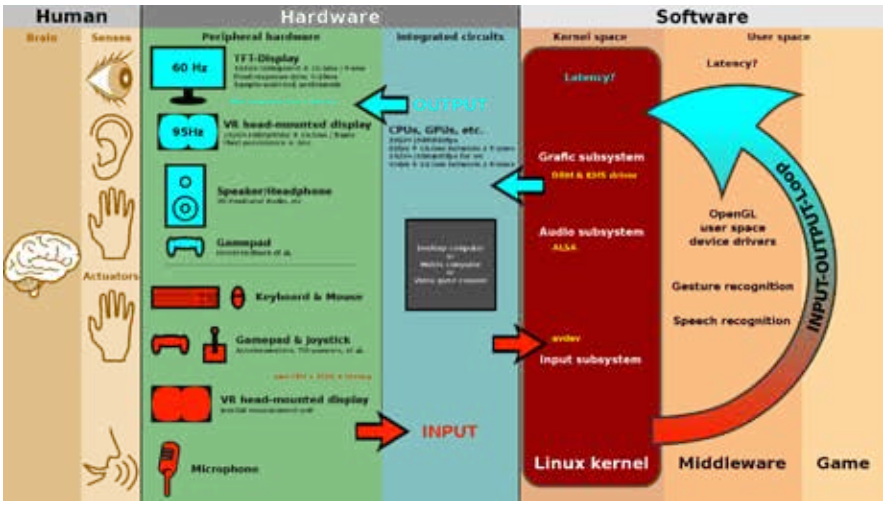


Fig. 3: VR Technology [6]

Applications

- Among all the applications of VR, Gaming is the most heard and sought after application but there are many other uses of VR some which are challenging and different from other applications.
- VR has been adopted by military for training purposes without the risk of death and real-world risks. Flight simulation, virtual boot camp and battlefield simulation are a few examples used in military. Soldiers suffering from battlefield trauma use VR's guarded environment to treat their symptoms and recover sooner. VR components like HMDs with tracking system, data gloves for interaction and 3D glasses are used by military. Both time and cost are saved by virtual reality in military, for example airborne training exercises are done in flight simulators and they can also introduce an element of danger without risking the life of trainees [2].
- Healthcare sector has changed tremendously with introduction of VR. Healthcare professionals use VR models to learn working on real life bodies. VR Exposure Therapy is used to treat mental health issues and has been found effective in the treatment of post-traumatic stress disorder (PRSD), anxiety issues and in therapy-related issues.
- Online shopping and fashion industry use body-scanning technology in VR, which would allow us to try on clothes in the virtual world to see what they would look like in person. A European retailer ASOS, invested in software development company "Trillenium" to bring VR shopping experience.

Fig. 4: VR used in healthcare

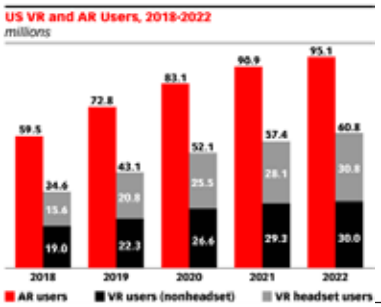
- Tourism uses VR to bring the virtual experience of a particular place before visiting it. Google Expeditions makes tourism more accessible. Users can travel the whole world at the comfort of their homes allowing people of all ages to visit and experience many places.
- VR changed the game in architecture. Architects design and experiment with their work using VR. Using VR, we not only can see the outlook of a building but also experience how it feels living in it before constructing the building. Revit Live is VR tool that is used by architects instead of 3D models [5].

Fig. 5: VR used in architecture

- To intensify the movie experience, devices like JauntVR and GearVR are used for 360-degree view experience. Flipside, Tiltbrush and MasterpieceVR are effective tools which help to create artwork and 3D models in the virtual world. This helps to experience life-size artwork. VR is also exploited in creating social groups, such as High Fidelity, vTime, AltspaceVR, Oculus Rooms and Parties, and VRChat. Altspace is the most popular application among all. We can explore our hobbies in VR making it more accessible and can visit any place in the world based on our interests [5]. The media has also exploited VR technology by bringing the news coverages in VR. Example: NYTVR app
- Live matches can be viewed with apps like NextVR and LiveLikeVR which sanctions broadcasters to deliver live sporting experience in mobileVR. Using the 360-degree VR view, we can watch the whole match in any corner of the stadium making it more scalable.

How is VR different from AR?

Augmented Reality (AR) and Virtual Reality (VR) are two sides of the same coin. AR augments digital 3D objects to a live view using the camera on the smart phone or digital screens while VR completely eliminates user real-world experience and connects the user to a simulated one. AR is more used in remote assistance, training purposes, and product maintenance. VR applications are ideal for simulation or complete immersion with desired environments. VR is more used in training purposes, virtual tours, gaming and in entertainment industry. In coming years AR and VR play a pinnacle role in marketing with various strategies and companies leverage the use of AR and VR [3]. Example: Instagram and Snapshot filters have become part of daily life activities today.



Note: Individuals of any age who experience VR content at least once per month via any device; AR users are individuals of any age who experience AR content at least once per month via any device.
Source: eMarketer, March 2020

Fig. 4: VR and AR

Conclusion

Though VR has few health concerns like seizers, motion sickness and mental issues, still VR can behold great changes in future. Although it is likely that machines displace humans in manufacturing, VR is an effective tool to gradually increase the manufacturing efficiency without displacing humans.

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Interactive Virtual Reality (VR) Applications for Education and Training

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In Recent trends of computer science, Virtual reality (VR) plays a vital role in education and training which has been evolved from the computer-based education. Students uses virtual reality applications for real time learning purposes. Educators are started using virtual reality applications as one of the teaching pedagogies which helps them to teach with lots of innovation in the classroom. In this article, important interactive virtual reality applications have been discussed which really helps the students and educators in teaching and learning.

Keywords: Virtual Reality, Real Time Applications, Education, Training

Introduction:

Virtual reality is a powerful technology as a tool which provides teaching and learning process effectively beyond the conventional educational model. The virtual reality can be used to meet the programme educational objectives by interactive simulation and three-dimensional computer simulation. Always an interactive simulation can provide the real time scenarios apart from classroom teaching. Steinberg [1] states that "Students should know that simulations make it possible to explore new domains, make predictions, design experiments and interpret results". Nowadays, virtual reality plays a significant role from nursery to universities. Many research studies are being conducted since 1980s on the effectiveness of virtual reality in teaching and learning process. Many VR applications are being developed to understand and realize the knowledge of real time concepts. In this article, such virtual reality applications have been discussed which helps the educators and students to explore more learning opportunities.

Explore Augmented Reality app [2]:

This application provides a digital learning powered with Augmented Reality technology developed by Cambridge University Press. It has been developed for the primary school children. It enables the young learners to reinforce the key concepts taught in the classroom. It integrates the textbooks literature as interactive digital virtual reality assets. It can be accessible on Android and iOS based mobile phones and tablets. This app can be used in three simple procedures such as Scan, Browse and Learn. The students can scan either the book cover page or the chapter opening page to get access to the relevant content. This VR application offers the content in the form of animations, slideshows, audios and interactivities.

Fig. 1: Cambridge University Press - Explore Augmented Reality App [2]

Solar System Scope [3]:

Solar System Scope [3] is an incredibly accurate solar system tour, allowing you to explore the solar system, the night sky and outer space in real-time [3]. In this app, students can find any object which includes sun, planets comets, spacecraft, stars, constellations, stars etc. This app has been developed specifically for real time education about the solar system. This app provides the knowledge about the orbit, position of

Fig. 2: Solar system Scope [3]

the planet, encyclopedia, and the structure of all the objects in the solar system. The learner can also know the distance between each object. It gives a real time experience of planets and stars in the galaxy. The educator can teach about any object depends about the preference of the students.

Anatomyou – A 3D immersive app [4]:

In the field of medicine, this app can be used to teach younger students about the human anatomy. This app provides a new digital experience in learning human anatomy such as respiratory, digestive, circulatory etc with its ground-breaking technology. It navigates inside the human body to learn Human Anatomy with its interactive virtual reality applications, as if you were navigating in a real minimally invasive [4] procedure. It is fully interactive with 360-degree navigation control and dynamic signalling of the major anatomical structures present in the conduits forming the endoluminal systems Users can use their smart phone or tablet with the help of any virtual reality to experience the digital learning of Anatomyou

Engine Maintenance through Augmented Reality [5]

EON Reality [5] have developed an Augmented Reality application called LKDF Interact for Volvo's Selam Vocational Training Centre. This AR application can be used by the educators to teach mechanical and automobile engineering students to demonstrate the diesel engine maintenance through digital learning using a gamified AR experience. This allows the instructors to utilize the augmented reality to deliver information visually instead of theoretically which leads the students to get a digital learning experience in engine maintenance.

This application which provides a gamified learning module, students have a fun while learning technical subject easily.

Fig. 4: Engine maintenance through AR Training [5]

In mind VR – A Scientific VR App [6]

Psychiatric students can experience the exciting journey inside the human brain using In mind VR. This app is relating the human emotion [6], In Mind VR 2 is set inside the brain of John, a teenage boy. Students must shake his head to catch the right neurons with the virtual reality device to control the brain of John. During this crucial time, John will face several key moments, and his reaction to these moments may lead to forming new interests and relations. These molecules will control John's reactions to the situations around him, which shapes his future as an adult.

Conclusion:

Virtual reality makes the classroom with more fun and interactive. In this article, the virtual reality apps such as Cambridge explore augmented reality app, Solar system scope, Anatomyou, Engine maintenance through augmented reality and In mind VR have been discussed which can helps the educators and students in teaching learning process with real time experience.

Fig. 4: Engine maintenance through AR Training [5]

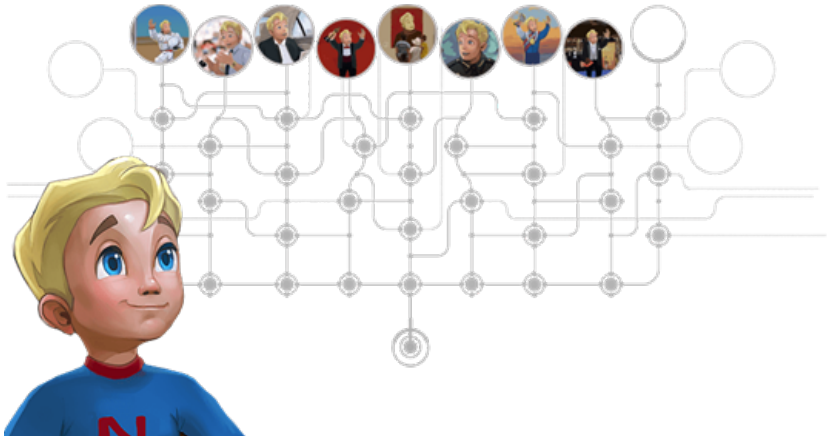

Fig. 5: In mind VR [6]

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Influences of Augmented Reality in Education

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Introduction

Augmented Reality applications in education provide novel ways of teaching and learning, which bridges the gap between the virtual world and real world.

Now a days most of the student's own smartphones with internet, some of them are living in smart homes and some are using voice assistants in their daily life. The children in this generations are acquiring knowledge by experiencing. AR applications helps us to build a completely different environment that enhances this type of learning which can **engage and motivate** students. Creating an exciting world with Augmented Reality technology extends the real world. it **adds layers of digital effects** onto what we can see through our eyes. It augments our surrounding by adding animations, videos, 3D/2D objects, and sounds. A virtual **world** that replaces the real world and in which the students can immerse themselves.

As we know that if we hear we forget, if we see we remember, if we experience we understand. Practice by experience is considered one of the most effective methods of learning. By using AR we can add virtual objects to the real world, so that the students can train their skills by using physical devices.

Advantages of AR

AR technology provides virtual examples and it can add animation effects to the subjects that are learnt by the students. As a result, classes become more interactive and the student can easily understand and remember the complex information what they learn. It also improves student engagement and learning performance as it consists of interactive content.

Teachers know that the process of learning should be with interaction and creativity.

Using Augmented Reality we can provide affordable learning as we can animate by adding 3-D models or some visuals to the content given in textbooks which could grab the students attention and motivate them to study which would give students a deep understanding of the content.

Traditional lecturing and solving the problems helps the student to earn a better knowledge of the lesson but only theoretical knowledge is not enough to obtain proper skills in the professional areas. The students need to have practice and hands-on experience in their specializations. Through interaction with AR features like digital modelling and simulations they can perform virtual hands-on experience and can acquire some practical experience so that they can easily understand the subject and learn faster and remember longer.

Augmented Reality Education Apps & platforms to create AR App

Some AR apps available in Google Play store [1] are shown in the below Fig. 1.

AR Solar System: 3D solar system with touch interface

Snaplearn: Reading and learning to live with AR mixed reality lab of national university of Singapore (NUS)

VR Math: 3D maths with visualisation

Arloon Geometry: 3D models with AR for geometry shapes

Anatomy Learning: 3D app for studying human anatomy with 3d touch interface

Arloon Chemistry: 3D models with AR for chemical formulas

Arloon Mental Math: similar to classic abacus performing mathematical operation without having to use paper.

Atom Vizualizer for Arcore: explore atomic models in AR

Respiratory System Anatomy: app for studying respiratory system which allows to rotate in 360 degrees and zoom.

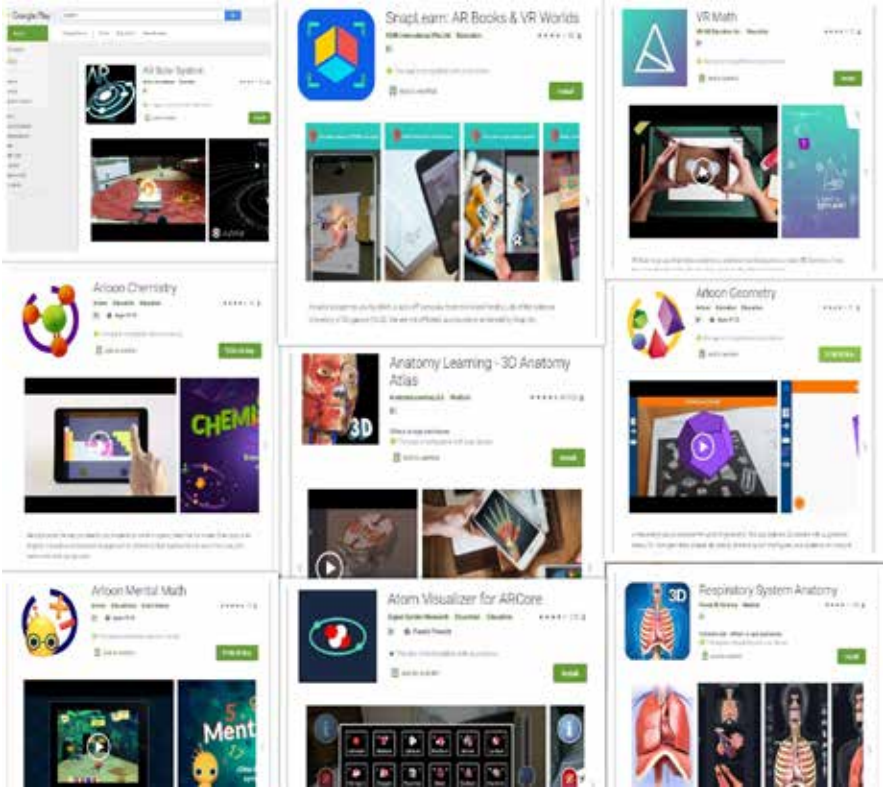

Fig. 1: Some AR apps available in Google Play store.

Some platforms to create AR apps are shown in the below figure

Fig. 2: Some platforms to create Augmented Reality applications

Blippar [2]: AR creation tool to visualise topics and imposing 3D objects.

Augment [3]: To make AR applications with 3D Models.

Layar [4]: To make AR applications with guides, tutorials.

Unity [5]: To develop AR/VR applications with 2D and 3D Models and packages for easily deployment.

Daqri [6]: To create AR apps in education like anatomy, chemistry in 3D.

Creating AR app by using Unity [7] and Vuforia [8] with an example by superimposing the CSI Executive committee members (2020-2021/2022) when CSI logo is detected through camera.

Fig. 3 : Unity with Vuforia Package

Fig. 4: Displaying the CSI logo

Fig. 5: CSI image is recognised and it is superimposed by the CSI Committee members.

Conclusion

Augmented Reality mobile apps are already available in the market and the numbers are increasing day by day in different fields, but it is still not being used effectively in education field. By integrating AR apps in teaching it provides new ways of effective learning so that the teachers can easily grab the attention of students by using animations and 3D objects in the subjects they teach. The students can also gain practical skills and can learn the complex problems in an easy way and can remember as they will experience the visualisation.

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Themes for CSI Communications

Month & Year	Theme	Month & Year	Theme
August, 2020	**Open source software**	November, 2020	**Deep Learning**
September, 2020	**Digital Twins**	December, 2020	**Industry 4.0**
October, 2020	**Robotics**		

Panoramic Insights on Virtual Reality Technology

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Virtual Reality (VR)/Augmented Reality (AR) is a "key field of the new-generation information and communications technology, which features large application space, huge industry potential, and wide technical span". As per Mark Zuckerberg, Facebook's CEO "Virtual Reality is really a new communication platform. By feeling truly present, you can share unbounded spaces and experiences with the people in your life. Imagine sharing not just moments with your friends online, but entire experiences and adventures". The objective of VR is to give people a virtual environment where we can interact with a PC similarly as we do in reality, that is, by conversing with a virtual human in a communicated in language, by composing a letter, or by drawing an image. This article presents an overview of basic aspects of Virtual reality.

1. Introduction

The Concept of Virtual reality (VR) in the real world is the proficiency of complete engagement in a virtual world accomplished by means of equipment (for example headsets) and programming. Fashioners make VR encounters (for example virtual galleries) shipping clients to 3-D conditions where they unreservedly transfer and act as an interface to perform foreordained errands and achieve objectives (for example learning).

Naming irregularities aside, the thought proceeds as in the past - using PC development to make a reenacted, the concept of three-D world in which a customer is able to control and explore simultaneously feeling as he is actually involved in the process or the world. Analysts, researchers and various designers have arranged numerous contraptions and requests to achieve this target. Notions differentiate on what definitely contains a veritable to have a VR proficiency and relevant experience, yet when everything is said in done it should include:

- "Three-dimensional images that appear to be life-sized from the perspective of the user
- The ability to track a user's motions, particula¬rly his head and eye movements, and correspondingly adjust the images on the user's display to reflect the change in perspective"

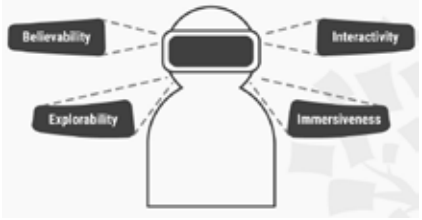

Fig. 1: Four focus points when designing for VR

1.1 Variables to define Virtual Reality

Encouraging VR encounters involves understanding human physiology and brain science—clients' needs, confinements, and so forth.— and that's what builds up the VR encounters charming against disagreeable. One should concentrate on:

(i) "Believability" – fuse highlights (mainly pictures and sound) to wrap clients totally in 3D situations.

(ii) "Interactivity" – make plans instinctive; expel outside-world impedance. While you're introducing shiny new situations, how clients associate with these should balance what they're accustomed to undertake in actuality.

(iii) "Explorability" – guarantee clients can unreservedly transfer nearly and discover the "truth" advertised.

(iv) "Immersiveness" – joining the factors described above accomplishes the objective: embeddings clients' existences in your structure.

Correspondence can be human–human correspondence, human–condition correspondence, or human–PC correspondence. On account of human–human correspondence, an assortment of means is available to us. We talk together to impart. We compose letters or draw pictures and now and again impart utilizing pictures and movies. In human–condition correspondence, we perceive our condition by means of our five detects: feeling, contact, taste, vision, and smell. In human–PC correspondence, we communicate with a PC by methods for a mouse, a touch cushion, or a console.

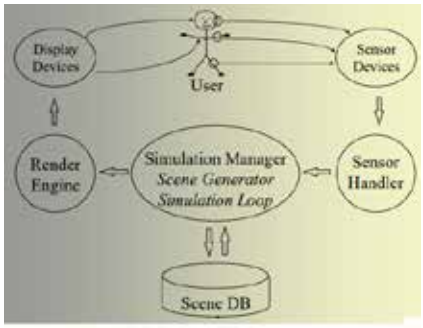

Fig. 2: System Architecture in Virtual Environments (VE)

Human–human correspondence and human–condition correspondence have been created over a long history of collaboration. It is attractive to furnish individuals with a human-accommodating condition where we can cooperate with PCs

simply as we connect in human–human correspondence or human–condition correspondence.

2. VIRTUAL REALITY IMMERSION

In the actual VR atmosphere or a setting, a customer may combat immersion, or the emotion of being inside and a piece of that planet. He is likewise willing to interface with his condition in substantial manners. Telepresence can be rephrased and define as *"The blend of a sense of immersion and interactivity"*. Jonathan Steuer defined the concept as "the extent to which one feels present in the mediated environment, rather than in the immediate physical environment." In nutshell, a compelling VR familiarity makes one become unconscious of the sincere environmental aspects and focus on the reality inside the virtual atmosphere.

The researcher and scientist Jonathan Steuer also projected two main components of immersion: "depth of information and breadth of information". "Depth of information indicates the capacity and description of information in the signs of a customer which gets while interfacing in a virtual environment". For the customer, this could refer to a showcase's goals, the multifaceted nature of the earth's illustrations, the complexity of the skeleton sound yield, and so on. He also emphasizes on characterizing the bulk of data as the measure of the *"quantity of tangible measurements at the same time introduced."*

VR administration advancement is partitioned into the accompanying stages (appeared in the Fig. 3), with various improvement stages relating to various experience necessities.

Organizations that provide a "user force feedback and touch interaction are called haptic systems".

3. The Virtual Reality Environment

Other sensory output from the VE framework ought to change continuously as a client investigates the environment. On the off chance that the "earth joins 3-D sound, the customer needs to be convinced that the sound's direction moves in a characteristic manner as he moves through nature". Tactile incitement must be predictable if a customer feels overwhelmed inside a the environment that caters to the need of virtual reality. In the event that the VE shows an entirely still scene, you wouldn't hope to feel intense breezes. In the same approach, if

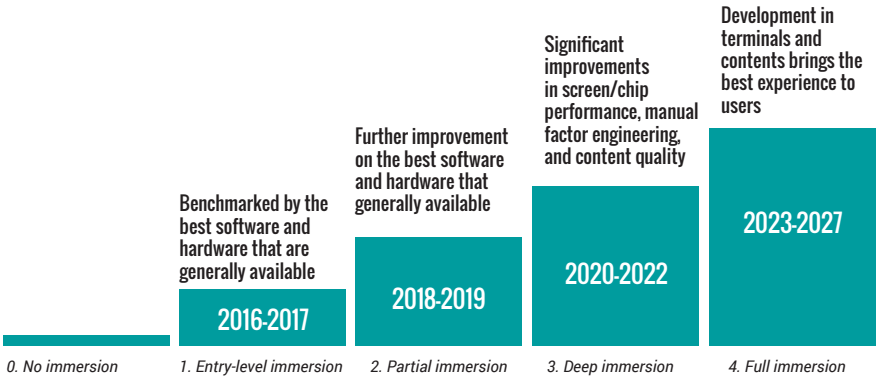

Fig. 3: Levels of VR immersive experience

Fig. 4: VR Environment

the environment supported by "virtual reality" places you in a storm, you wouldn't hope to feel a gentle waft or distinguish the aroma of roses.

Slack time amid when a customer demonstrations and after the computer-generated condition mirrors that activity is so-called as dormancy. Idleness typically alludes to the postponement amid the time a client tries to move his head or moves his eyes and the adjustment in the perspective, however the period can likewise be utilized for a slack in other tactile yields. Studies with pilot training programs show that people can identify an inertness of in excess of 50 milliseconds. At the point when a client distinguishes inertness, it makes him become mindful of being in a fake situation and wrecks the feeling of immersion.

4. Virtual Reality Interactivity

Immersion inside a virtual domain is a sure something, anyway for a customer to feel truly required there must in like manner be a segment of joint effort. Timely requests consuming the advancement essential in VE structures nowadays allows the customer to develop most part of the standoffish experience. Customers might observe a "pre-recorded picture while trying a head-mounted display (HMD)". Customers might sit in a development seat and lookout the film as the structure presented them to numerous upgrades, for instance, moving air on them to replicate breeze. While customers experienced a sentiment of submersion, instinct was obliged to moving their point of view by observing everywhere. Their way was pre-chosen and unalterable.

4.1 Immersion vs. Interaction

Developers consume have been exposed that "users feel a stronger sense of telepresence when interaction is easy and

interesting, even if the VE isn't photorealistic, whereas very realistic environments that lack opportunities for interaction cause users to lose interest relatively quickly".

5. Challenges and Concerns of Virtual Reality

The "enormous number of experiments in the field of computer-generated reality are escalating better after systems, finding dynamically trademark systems to deal with license customers to interface inside an area that is virtual in nature and lessening the interval it takes to build virtual plots". Additional test for VE system fashioners

Fig. 5: VR Interactivity

helps in making a structure that avoids terrible ergonomics. Numerous configurations trust upon hardware which prevents a customer or limits his decisions through physical ties. Without especially arranged hardware, a customer could encounter trouble on his sentiment of counterbalance or torpidity with a reducing in the sentiment of telepresence, or he could suffer cybersickness, with reactions that can join disarray and disorder.

Essentially, there's a fear that VE theater arrangements might raise a period of sociopaths. Another rising concern incorporates criminal acts.

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Virtual Reality Role in the World

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"Virtual reality was once the dream of science fiction. But the internet was also once a dream, and so were computers and smartphones"

– Mark Zuckerberg, CEO of Facebook

Introduction

Before moving on to the Virtual reality development timeline, it is important to know about the "VR" that counts as Virtual reality or can be realized as precursor to it. Once people recognize the need of Virtual reality they come to the conclusion to believe something is real, even when it isn't. Virtual reality is a computerized simulation which has been designed with software and handed over to the end user so that the end user dangles belief and accepts it as real environment. In terms of data processor, Virtual reality can be described as two of the five senses as sight and sound.

Virtual world, Immersion, Sensory Feedback and Interactivity are some of the key elements that involved while defining the Virtual reality. Computer based web communication through which two or more people interacts each other comes under virtual world. Immersion has the ability to generate the impact of presence. Sensory Feedback is the key to transfer the information regarding virtual world to the end user. Virtual world responds the user action. Virtual reality can be done fortuitously and produce pragmatic scenarios. They are able to face the complex situations.

Every Virtual reality modernization corresponds to the early 1838 when the first stereoscope was discovered and patented in 1939. Ivan Sutherland and his student Bob Sproull designed the VR head mounted display in 1968. They connected the display to a computer but not able to integrate with the camera. It gave an outsized and terrifying look which was too hard for any end user to wear it and was hang from the roof. Later in the mid of 1980s, Jaron Lanier who is the founder of VPL Research, decided to design the gear that including gloves and stare.

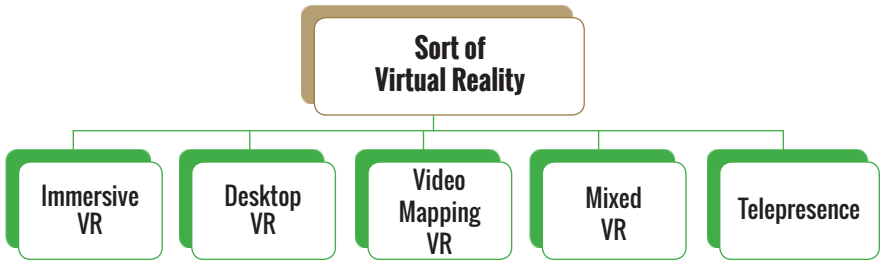

Figure 1: Classes of Virtual Reality

Figure 2: Sorts of VR (2A. Immersive VR; 2B. Desktop VR; 2C. Video Mapping VR; 2D. Mixed Reality)

While developing the model, Jaron Lanier thought of experiencing the Virtual reality. Nowadays, Virtual reality is being used in sort of ways. They have many

applications and with the increase in smartphone technology VR is going to be even more accessible as expressed in [1].

Types of Virtual Reality

There are various Virtual Reality that allow us to immerse in computer generated world and they are illustrated in Figure 1.

Immersive VR

Immersive is the way of understanding of being physically present during a non-physical environment. Immersiveness is an essential key element while considering the application of virtual reality such as VR gamming and VR therapy. Normally immersive Virtual reality are structured by replacing the user's real world by 3D environment that is made up of the combination of different kinds of senses such as sight, sound, touch, smell and taste as said in [2] and represented in Figure 2A. They are often furnished with a Head Mounted Display (HMD).

Desktop VR

Desktop Virtual reality displays the 3D environment with the help of conventional computer monitor as represented in Figure 2B. There is no need of any special hardware. In simple terms, Desktop VR make use of Head Mounted display (HMD) to view and interface the user with their desktop. They allow the end user to acquire all of their desktop windows software like game, web browser, photo editing software and so on with the help of Virtual reality. Sometimes they are also known as Windows on World (WoW).

Video Mapping VR

Video Mapping Virtual reality is the key of spatial Augmented Reality. It is the one where the video is interfaced with the surfaces and also modifying some of the objects like buildings, runways, stages and even water into bilateral displays as structured in Figure 2C. They have the capability of rejecting the multiple sides of an objects by aligning it with the use of virtual equivalent and presenting them to the real world using various animations and interactions as depicted in [3]. They are also called as Projection Mapping.

Mixed Reality

Mixed Reality is the process of combining the physical world with the digital world in order to supply new environment and visualizations, where both physical and digital world view and interact with each other in real time environment as represented in Figure 2D. The upcoming evolution in human and computer interaction is termed as mixed reality. It unlocks the possibilities that already were restricted to our imaginations that have been achieved by advancements in computer vision, display technology and input systems.

Figure 3a: Input devices used in VR

Telepresence

Telepresence is a revolutionary structure of remote control during which a person's operator features a sense of being on location in order that the experience resembles computer game.

The main objectives of telepresence VR to interlink the audio and video among the location in form of near life like audio quality and near life size video images as said in [4]. In short it is the kind of discrepancy on visualizing the overall computer based environment which has the capable of connecting the real world with the human operator.

Major Components in VR

In Virtual reality, input devices are used to interrelate the human with virtual environments and output devices helps the user to realize that they are in real world. Some of the input and output devices are listed below and also represented in Figure 3 a & b.

- Leap Motion – To spot hand motions in 3D space, Leap motion makes use of stereoscopic cameras and infrared light.
- Stem – It is a wireless, motion tracking platform for playing video games, virtual reality and much more. It enables the players to interact with other players in the game
- Razer Hydra – It is similar to Stem and brings the reality nearer to the virtual game. Players get an real experience when they use the Razer Hydra as it provides a true 3D effect.
- Control VR – This is the only component that helps one to perform other activities even after wearing it.
- 3D Audio – To control the sound effects produced by the surrounding environment and makes sure of sound sources in 3D space.
- VR Headset – VR Headset is a VR device that gives an incredible gaming experience including trainers and simulators.
- Sensing Gloves – Sensing gloves which consist of sensors to avoid the problems arrived due to vision. This device is widely used because of its benefits and comforts it provides to the

Figure 3b: Output devices used in VR

users.

- **Helsinki** – It was launched in 2018 that provides physical capture of the popular landmarks all around the world. It gives the most realistic VR experience.

Applications

Virtual Reality is applied in almost all the fields as said in [5]. Let's take a look at some important applications.

VR in Education

When talking about the use of VR in education and training it plays a very essential role. People say learning has to be done practically only then the concepts can be concepts can be remembered forever. But it is not possible to learn everything using practical sessions, VR actually makes it possible thing. VR helps the students and everyone who wants to learn not just for marks but for knowledge. Students can be thought geographical topics well with the help of VR. By visualizing a globe and studying about the places will be interesting and also is a fun learning method. History when reading at times is boring but it is the other way when VR comes into the play. Not only social studies but any subject to the matter can be done in the same way. It is not only fun but also interactive and unforgettable for life.

VR in Medical

In medical industry, practice can be done my medical students using VR who are pursuing their degree for better learning experience. Even doctors before doing an operation may know what challenges they will face while handling complicated cases as represented in Figure 4. This will eventually reduce the risk while performing the task and make sure that no further problems arrive.

VR in Industries

While designing products, it plays an important part. It assists in seeing the final output at the beginning and be cautious and careful about the mistakes that are usual made. The failure rate can be reduced to the maximum extent if it is done correctly.

Figure 4: VR in Medical Industry

For example, in chemical, mechanical experiments et cetera as depicted in Figure 5. It helps a lot more in scientific visualization for researches to come up with solutions to all the world problems.

Challenges

- The cost to purchase a device for VR is high and not everyone can afford it.
- Health is a major issue as it is bounded to people who have eye problems and can also affect people who have good eye sight.

Figure 5: VR in Product Industry

- It will become a big chaos when VR is preferred among the real worlds reality.
- Continuous wearing of electrical devices may generate radiations which is harmful to humans.
- There is no standardization since new technologies are coming up and people often get confused which one is good.

Future Possibilities

The next evolving technology that can take over VR is seeing the real world inside the virtual world. This can happen only when the hardware is fully designed and integrated for the complete human body. Virtual reality uses a fifth gen computer technology. Researchers say that by 2030 there is a chance that the virtual world can fully turn into a real one such that there will be no difference between the two and people will spend most of their time in the virtual-reality world.

Conclusion

To sum up, VR is an energising experience that is completely different from real world environment. Though VR is applied in many fields because of the advantages it still has a few demerits. In almost every industry VR is employed to bring in new products and highly accessed researchers to find solutions.

It has introduced a new path for communion between humans and machines.

It is one such booming technology; it mainly focuses on gaming and entertainment. Prediction has always been difficult moreover it is hard to predict the future that VR is going to be a part in.

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Virtual Reality and its Applications

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Fig. 1: Virtual reality experience

Introduction:

Virtual reality is one among the popular, efficient and blooming technologies in the world of computer science. Virtual reality involves user interface that interacts with the sensory inputs of human and sense the artificial or stimulated environment. Breaking virtual reality into terms VIRTUAL - does not actually exist; REALITY – the real existing thing; Thus in general terms virtual reality is creating or stimulating an artificial environment that actually does not exist using computer but able to sense the environment which gives the reality feel. This provides people an excellent three dimensional experience that could be sensed by vision (eyes), sound (ears), smell (nose), taste (tongue) and touch (skin).

What is VR?

Virtual Reality is a technology that amuses a person's mind by providing virtual environment with three dimensional objects created by the computer. VR generally involves behavioral interface, interactivity, real-time, virtual world, stimulation, teleoperation, computer graphics, etc. The environment that the user interacts with using VR is called as Virtual Environment.

Why VR?

What is the need of VR? Why is VR necessary when the actual world exist?

The imagination power of brain is far more than its actually found and used. VR is helps in creation of virtual world that makes us experience the virtual imagination through sensory organs. **This could be seen in computer too, then why VR?** VR gives a three dimensional view but the computer gives only two dimensional one. The sense of touch, smell, taste could not be provided by normal 2D computer but could be provided by VR. Always human are amused by things beyond imagination. Escaping the real world and experiencing things virtually recreates huge imagination.

When VR (Timeline):

- 1965 – Thesis on birth of VR
- 1977 – Interaction via body movement
- 1980 – First virtual environment
- 1987 – Birth of immersive VR
- 1995 – VR language
- 1999 – Birth of VR movies

Virtual Reality Triangle:

The VR triangle is an important concept in VR. The Virtual Reality triangle includes *i) interaction ii) imagination iii) immersion.* This is also called as I3 concept. Initially the user has to *Interact* with the environment. Then *Imagination* of being in a real environment though stimulated one. and then *Immersing* themselves into the virtual world. Thus I3 is a key concept in VR.

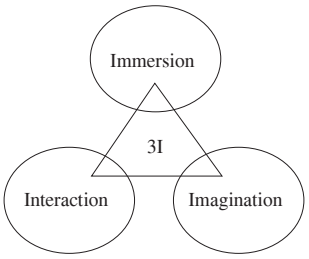

Fig. 2: Virtual Reality triangle

How vr is used? :

Currently VR is used in several devices. These devices are mostly commercial. These devices are used by many for several purpose. VR is used in understanding things that aren't easy to be known with normal vision. This could be either micro or macro. To be precise, the structure of micro-organisms, cell, inner organs and their functioning could be made to see and on the other hand the galaxy, solar system, universal structures could also be made to see. The ancient civilizations destroyed several years ago, could also be seen virtually using VR. Some devices using VR are

- Head Mounted display: to be worn overhead covering the eyes thus enables viewing 3D images and videos via virtual camera.
- Cave environment: this is automatic virtual reality rooms using projectors covering the walls with stereoscopic images.
- Wired Gloves: used in measuring bones in hand and related measurements. Fiber optics wired gloves also uses VR.

Where is VR used?

VR technology is quite largely used in this modern era. It plays a key role in almost

all the major fields. Some applications of VR are discussed as follows.

1. **Training Medical Students**

The VR technology is widely used in the medical field. It is used to help the medical students to learn and acquire work experience faster. Since experimenting on patient lives can be risky, VR helps perform real surgeries without putting lives at risk. This can be highly useful for trainees who can practice without any fear of risk.

2. **Recruitment and Training**

Like the medical field, the VR is highly useful in business, architecture, and manufacturing and leisure industries. In manufacturing, the trainees can gain immense work experience with the help of VR. Recruitments can be conducted but conducting VR based tests where the user can be tested on is practical knowledge and industrial work experience.

3. **Implementation of Creative Ideas**

VR allows businesses to come up with new ideas without any fear of risk. They can implement any creative ideas on VR environment and can be able to analyse the pros and cons before implementing it in the real-world. This can prevent the company from any kind of financial crisis.

4. **VR in Construction**

Fig. 3 : VR in Construction Management

Virtual reality(VR) is widely use in architecture and construction. We can experience a 360° tour of the entire infrastructure which is helpful in making changes and modifications to fit our needs and comforts even before the establishment of the structure. This prevents rework of the physical structure and gives a prior idea about the looks and utility of the structure. The implementation of VR in construction management can be viewed from Fig. 3.

5. VR in Military

The military (army, navy and air force) has adopted VR to help train the soldiers with battlefield training, medic training and many more. Fight simulation is a major role of VR in military. This gives the soldiers a virtual scenario and helps them provide efficient training and improves their decision taking skills. The VR training method in military has proven to be more efficient and less costly than efficient training methods.

6. VR in Edutainment

Edutainment refers to the concept of blending education with entertainment. Education can be made more effective and intractable when it is combined with entertainment. VR assists us achieve this. VR aids students with practical learning and it increase the involvement into the concepts which is even more effective than theoretical way of classroom education. From figure 4we can see how VR plays a key role in edutainment.

Fig. 4: VR plays a key role in edutainment

7. VR and Scientific Visualisation

Scientific visualization is the concept of communicating abstract concepts to an audience which also aids in improved understanding. This can be accomplished with VR. VR helps scientists demonstrate their models and convey complex information through visual data which aids by giving a detailed view of each aspect of the model.

Which Technologies are related to VR?

Virtual Reality (VR) is the use of IT to develop a simulated environment. The most readily identifiable aspect of VR is head-mounted monitor. Human beings are visual species and computer hardware is perhaps the single biggest distinction between interactive Virtual Reality environments and conventional user interfaces

Mixed Reality:

Real Environment - Virtual reality is a software-created simulated world that is introduces to the consumer in such a manner that the consumer suspends confidence and recognizes it as a real environment.

Augmented reality – Augmented Reality (AR) is a kind of VR technology that mixes what the customer experiences in their actual world with machine software-generated visual content. The additional software-generated images with the virtual scene typically enhance the manner in which the real surroundings appear

Augmented virtuality (AV) – In a gaming environment, augmented virtuality means that real objects can be predicated and participated in a virtual world, even the gamers themselves.

Virtual Environment - A device running in a virtual machine environment where virtual machine display and hardware interface are combined. VMware running on an x86 computer for example is a virtual environment.

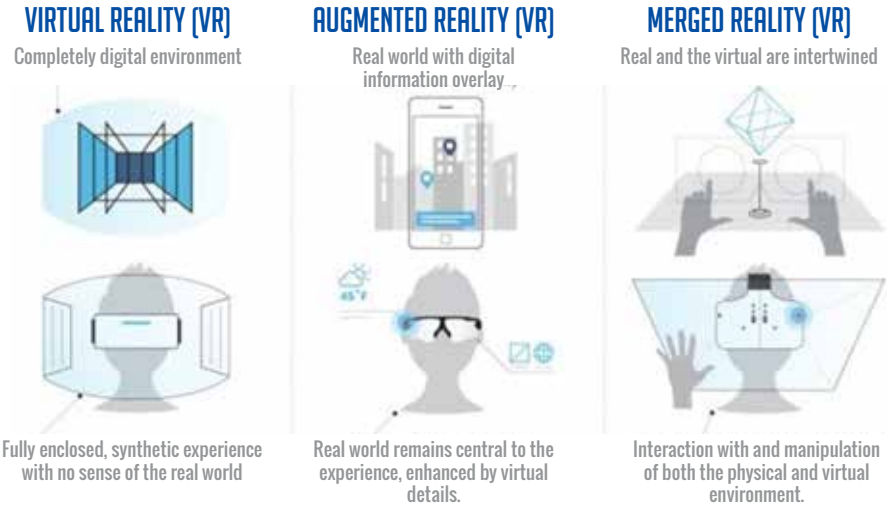

Fig. 5: Difference between VR, AR and MR

Difference between Augmented Reality and Virtual Reality:

Augmented reality (AR) is a perfect compilation of the digital world and physical elements to create an artificial environment. In AR we don't need any particular device like headset or visualizers. Whereas for VR we need VR headsets. VR stands for Virtual reality. In VR, visual senses are under the control of the system but in AR we will always have the presence of the real-world environment. AR is 25% virtual and 75% real whereas, VR is 75% virtual and 25% real. While using VR, the VR user is completely isolated from the real-world environment and is made to experience a completely fictional world. AR users can always have the presence of the real-world but can able to interact with virtual objects. These virtual objects in AR are mostly computer-generated simulations. With the help of VR, we can develop a realistic world and the user can have a completely different experience that is isolated from the real-world environment. the VR technology is widely implemented in gaming field to create creative gaming environments. Fig.1 gives an birds view of the key difference between AR and VR.

Fig. 6: Difference between VR and AR

Types of VR:

- Textual Virtual Reality – only interaction no immersion
- Desktop Virtual Reality – interaction and immersion
- Immersive Virtual Reality – interaction and high immersion
- Augmented Virtual Reality – interaction and no immersion

File Formats, Language, GUI used:

File formats: Film box (FBX), Stereo lithography (STL), Wave front Object, 3DS, COLLADA (DAE), AUTOCAD Drawing Interchange Format (DXF)

Assimp: contains library files for using 3D model formats (open source)

Language: object oriented languages mostlu C#.

GUI: GTK# (GTK + GUI) – open source

Future Scope:

The planning cycle plots are using virtual reality to help them conquer the apprehension of height. With the help of VR, scientist are also able to understand the chemical reaction in a better way help them gather the tiny details of any reaction. Virtual reality gives a lot of entertainment too with Galleries and Museums. With the aid of oculus reality headsets and VR it is easy to see and witness a stroll around in museum. The museums should be reconstructed online for this purpose, or can be accessed by the user for a real life experience. These might also be used by surgeons during an operations.

Virtual reality eyeglasses like the Oculus Rift are expected to become cost efficient in subsequent years. So making visible to them for human benefit.

Immersive films can be experienced in cinemas. A mesmerizing learning happening in schools. In interior designing entrancing Visualization of design.

Conclusion:

Virtual reality arguably is the next step towards the development of the modern era. With the ability to save lives, act as a medium for business development, improved quality of education and provide endless hours of entertainment, learning and discovery, the world is pushing for an increased presence of VR in almost each and every field. The concept of VR was introduced quite a long time ago and is still being enhanced in each and every aspect. Therefore in the near future VR is more likely to be implemented in homes, offices and medical centers.

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Virtual Reality and its Applications in Education, Healthcare and Agriculture

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I. Introduction

Virtual Reality is a three-dimensional system based interactive environment which reflects the real world. Virtual Reality is a unreal, fake and stimulated environment. To look back the history of virtual reality, the virtual reality ideas raised during late 1950's. It was illustrated with odor motors and sensors with moving chairs by a cinematographer Morton Heiling. Then, it was rarely seen during 1960 – 1980. In 1980 – 1990 it became more popular. Simulation of real-world experience and any danger in real world can be avoided in virtual world are some of its benefits. In this paper, the basics of virtual reality and its applications in areas such as education, healthcare and agriculture are discussed.

II. Methods

A. Principle behind Virtual Reality

The working of virtual reality systems are as follows:

1. Initially, the real-world physical movements are loaded into the systems.
2. The VR systems captures and redraws the movements.
3. Finally, it reflects the same that it captured as the output.
4. This makes the users feel like completely "immersed" in the virtual world and makes them feel like they are in the virtual world itself.

B. Classification of Virtual Reality Systems

Virtual Reality systems has three major classifications:

1. Immersive Virtual Reality
2. Non – Immersive Virtual Reality
3. Hybrid Virtual Reality

1. Immersive Virtual Reality

In Immersive Virtual Reality, the user completely loss connectivity to physical world and enters into virtual world. The VR devices like Head Mounted Display (HMD) and Binocular Omni – Orientation Monitor (BOOM) are used to provide the virtual experience. An HMD and BOOM placed in front of eyes of the user and fills the user with the feel of virtual world.

Fig. 1: Immersive virtual reality

2. Non-Immersive Virtual Reality

In Non-Immersive Virtual Reality, the user does not loss any contact with the physical environment but observes the virtual world by means of any devices. Viewing a virtual world through a computer screen or a graphics workstation is more likely to be non-immersed virtual reality.

Fig. 2: Non-Immersive Virtual Reality

3. Hybrid Virtual Reality

Hybrid Virtual Reality can also be said as Semi – immersive virtual reality. In this, the user gets a feel of being immersed in the virtual world. This can be done by superimposing virtual images which take them into the virtual world.

Fig. 3: Hybrid Virtual Reality

C. Virtual Reality in Agriculture

Virtual reality applications in Agriculture can be referred as Virtual Agriculture. Virtual Reality can be applied in all parts of agriculture such as plant growth process, soil adsorption process, migration process and so on. Some of the applications of virtual reality in agriculture are as follows:

1. Machinery Design

The machines used in the manufacturing process can be design in the computer and its performance level can be analysed. If the design does not meet the requirements it can redesigned easily which reduces the time and cost of physical manufacturing. This method even reduces a lot of physical work involved in manufacturing process.

Fig. 4: Machinery design

2. Virtual Plant

The rapid development of an information technology paves way to introduction of virtual plant. Virtual Plant technology helps to analyse plant morphology in the growth process. We can go through the whole plant life cycle and decide whether it is useful or not. This saves lot of time, cost and physical work involved. Ecology, breeding, plant type analysis pruning of fruits, fertilization and etc… can be known by virtual plant. Thus, virtual plant is an advantageous technology.

Fig. 5: virtual plant

3. Virtual Farm for Learning

Nowadays, the agricultural processes such as planting of crops cultivation, crop maintenance and crop growth analysis can be taught to students virtually. This can be done by setting up virtual farms with virtual crops. Using mouse and keyboard the students can view the crop in any angle and can understand the concept deeply.

Fig. 6: virtual farm

D. Virtual Reality in Education

Researches prove that compared to traditional learning the students are more committed and active in virtual learning. The students learn more precisely with virtual objects. The academic performance of the students is also efficient in virtual learning. The virtualizations and feel from the virtual objects make the students more motivated.

Virtual environment creates more information and ignites the thought of learning more Virtual reality in education is supported by three main hardware components namely,

1. Dedicated Head Mounted Display (HMD)
2. Smartphones Mounted on Headset
3. Augmented Reality Glasses

Smartphones mounted on headsets gives a better virtual environment.

Fig. 7: Smartphones Mounted on Headset

By using, Head Mounted Display an immersive virtual experience can be attained.

Fig. 8: Dedicated Head Mounted Display (HMD)

Augmented Reality Glasses allows us to view the virtual world. To obtain more immersive feel, external sensors can be used.

Fig. 9: Augmented Reality Glasses

Some of the main benefits of VR in education are:

- Free interaction with the virtual objective
- Nowadays, its affordable and the devices are more easily available
- Ease of access
- Immersive experience with more interaction

The major drawback of this development is the youngsters lose their interaction with real physical world. Apart from this, the fact that VR technology leads us towards the more constructive path is inevitable.

E. Virtual Reality in Health Care

Health care is a field with enormous challenges. The applications of Virtual reality in health care plays a major role in prevention as well as cure of diseases. The first implementation of VR in healthcare started in 1993 for mental healthcare which obtained above 90% success rate. Later on, its role in healthcare are numerous. Some of the applications of VR in healthcare are as follows:

1. Physical and Cognitive Rehabilitations

VR in cognitive rehabilitation deals with patients with brain damage, Parkinson's disease and physical rehabilitation. VR can be used by the patients in the home itself via internet. The feel of threaten and inconvenience by human trainers can be avoided by virtual reality. The advantages of using VR in cognitive and physical rehabilitation are consistency, ease of manipulation and proper interaction.

2. Surgical Planning

Surgical Planning using virtual reality

Fig. 10: Cognitive Rehabilitation

collects the physical data of every patients and arrives at a decision by combining it with computer – generated graphical data according to patient's body. In USA, the robotics led surgeries are in proactive since 2000. Then after, several VR simulators were used. The advantages of using VR in surgical planning are less pain, low infection rate, less prone to error and fast recovery.

Fig. 11: Surgical Planning

3. Distraction Therapy

Sometimes, the medications may cause pain. To distract the patient from the pain, virtual environment or any kind of distraction therapy is used. These distraction therapies immerse the patients in the virtual world so that they feel less pain sometimes, unlike pain some medications can cause anxiety or depression. Cancer patients are more likely to have that feeling. So, hospitals use the distraction therapy along with chemotherapy which reduces their anxiety.

Fig. 12: Distraction therapy

III. Conclusion

Virtual reality has wide applications in almost all fields. Apart from the above applications there are numerous applications of VR in many fields such as defence, entertainment, architecture etc... In future, there may be situation where a world without VR is impossible. Thus, this paper summarizes few areas of applications of virtual reality.

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About the Authors

Dr. M. Senthil Kumar (LM- I1504760) is currently working as an Associate Professor in Computer Science and Engineering department at SRM Valliammai Engineering College of Tamil Nadu. He is a CSI-Student Branch Counselor of the College. His research interests are in IOT, Big Data, Software Engineering and development of new tools for effort estimation.

Dr. B. Chidambara Rajan (LM-00063930) working as a professor/Principal at SRM Valliammai Engineering College, Affiliated to Anna University, Chennai. He has more than 20 years of teaching experience in government and reputed private institutions. He is a member of professional societies like CSI, IEEE, IETE, IEI, ISTE, ISOI, etc. He has published several technical papers in national and international journals and conferences His research interests include IOT, Big Data, Software Engineering and Networking.

Mr. M. Rajakumar is a UG pursuing student of SRM Valliammai Engineering College in Computer Science and Engineering department. His areas of interests include blockchain and IoT.

Ms. P. Kiruthika (01491613) is a UG student of SRM Valliammai Engineering College attaining degree in B.Tech Information Technology. Her area of interests include Internet of Things and Blockchain.

Emerging Demand of Online Education : Post COVID-19

Organized by: **Indian Institute of Business Management in technical collaboration of CSI Region-II**

Reported by **Md. Shams Raja**, CSI Regional Vice President, Region-II

Dr. N. K. Yadav, VC,
Central University of Jharkhand

Dr. Ranjit K. Varma, VC,
Munger University, Bihar

Dr. Saikat Maitra, VC MAKAUT,
West Bengal

Prof. Sanjay Kumar, VC, Symboisis
University of Applied Sciences, Indore

Dr. Dolly Sinha, Pro VC, Patna
Univeristy, Bihar

Prof. A, K, Nayak, Immd. Past
President, CSI

A one day webinar was organized by Indian Institute of Business Management in technical collaboration of region 2 of computer society of india on theme "Emerging Demand Of Online Education Post Covid 19"

1. **Prof. Nand Kumar Yadav,** VC Central University of Jharkhand in his inaugural address told, Corona virus has passed the world in a great economic crisis to the whole human existence.

Face to face teaching, learning is a byegone era, research fieldwork, project, recruitment, teaching, learning were all put to a sudden break. Online education is the default mode of this Cvod-19. Pandamic time. We thank to modi government who already started some online portals digital platforms like Swaym, Swaym Prabha, National Digital Sindhu. Education institutions need to go for collaboration with the digital learning specialists and organizations to train the teachers, trainers and redesign the newest online trend.

2) Speaking as the Chief Guest, **Prof. Ranjit K. Verma,** Vice Chancellor, Munger Univ. told, we have several avenues where we can find alternative ways and rightly said that behind any crisis there are opportunities where we can make advances. The advent of ebooks about almost 2 decades back the advent of several softwares like adobe reader which led to more interactive e-learning modules and e-pg pathshala project. Online studying will be a permanent feature of Post Covid 19 in all the universities.
We are starting one electronic multimedia resources center at Munger Univ. We will upgrade credits of syllabus from 30 to 60% to this online mode of teaching and learning.

3) Participating as the Guest of Honour, **Prof. Saikat Maitra**, VC Maulana Abdul Kalam Azad University of Technology, WB told that Industry 3.0 started with the emergence of micro electronics and computers and it is totally relying on robotics, artificial intelligence and cloud computing.
We have to encourage customized mode of teaching and learning in the era of education 3.0.
Now industries need more technologically advanced employment to cope up with AI, cloud computing ,robotics. etc.

Prof. U. K. Singh, Chancellor,
TGOU, Nagaland

4) In his keynote address, **Prof. Sanjay Kumar,** VC Symbiosis univ indore told, today face to face teaching has lost his relevance. Gross enrollment ratio has improved from 25%tp 35% in online teaching mode. Now the world is looking to have a very robust building of a cloud based infrastructure that can be levered even post Covid. This pandamic gives growth to gig economy with part time education.

5) The distinguish guest, **Prof. Dolly Sinha**, former Pro VC of Patna University told that, We all have to afford a digital device either individual or university college level. Now we need more and more animation in our online based e notes and study materials. State University need more to be ICT advance with advanced ICT infrastructure. We have to create multilingual language resources at university level.

6) While welcoming the guest and presenting the theme, the webinar chairman and past president of computer society of India **Prof. A K Nayak** told that the online education is not a trend now rather became a great demand. He expressed his concern that in a country like India where there is a BIG digital devide, low gross enrollment ratio in higher education, non availability of infrastructure at the remotest place there providing online education to the masses will be a difficult task.

7) In his Presidential address **Prof. U. K. Singh** told about the various measures are being taken by the Central Government, State Government and different statutory bodies to address the challenges of imparting online education in Post Covid Era. Prof. Shams Raja, RVP-II of CSI proposed the vote of thanks.

Call for Contributions in CSI Adhyayan

(A National Publication dedicated to IT Education, Research and Student Community)

CSI Adhyayan is being positioned as a national publication dedicated for IT education, research and student community. This quarterly electronic publication performs the functions of a newsletter, a magazine and journal. We take this opportunity to invite the contributions in this venture. Your invaluable contributions, suggestions and wholehearted support will be highly appreciated. We appeal to all our Chapters, Student Branches and member academic institutions for encouraging and motivating the students in terms of contributing innovative ideas, exploring new vistas of knowledge and new findings through CSI Adhyayan.

We especially invite news and updates from our member institutions and student branches.
Please send your article to the Chief Editor **Dr. Vipin Tyagi** via email **dr.vipin.tyagi@gmail.com** with a copy to the publisher Prof. A. K. Nayak in the email : aknayak@iibm.in

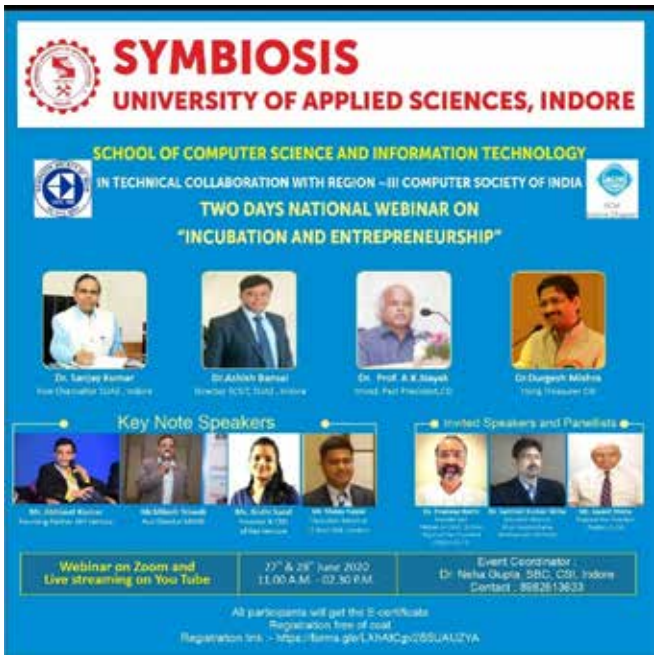
On behalf of CSI Publication Committee

Prof. A. K. Nayak, Publisher

National Webinar on Incubation and Entrepreneurship

Organized by: **School of Computer Science and Information Technology with CSI at Symbiosis University of Applied Sciences, Indore**

Reported by **Dr. Neha Gupta,** Asst. Professor, SCSIT



A National Webinar on Incubation and Entrepreneurship was organized by School of Computer Science and Information Technology on 27th and 28th June, 2020 under the Institutional Chapter of Computer Society of India at Symbiosis University of Applied Sciences, Indore. The Theme of webinar was to discuss ecosystem and services required to support entrepreneurship ecosystem to help young entrepreneurs fulfil their dreams and become 'job givers' rather than 'job seekers'.

This webinar was of 2 days duration and was inaugurated by Vice Chancellor, Symbiosis University of Applied Sciences,Indore. Dr. Sanjay Kumar and Dr. A. K. Nayak, Immediate Past President, CSI in presence of Dr. Ashish Bansal, Professor and Director, SCSIT and Dr. D. K. Mishra,Treasurer, CSI and Mr. Jayant Bhide,Vice President Region-III.

The webinar included the participation from Mr. Abhijeet Kumar, Founder Partner Ah Ventures, key note speaker (an IIT Mumbai alumni), Mr. Nilesh Trivedi, Assistant Director, MSME as keynote speaker, Dr. Malay Nayak, executive director AT Buzz Ltd London as our guest speaker , Ms. Nidhi Saraf ,Founder and CEO , key venture as keynote speaker, Mr. Pradeep Rathi, an entrepreneurship and Innovation ecosystem enabler, Founder and Mentor in Chief 3i zone and Regional Vice President, Region-VI and Dr. Santosh Kumar Sinha (Executive Director, Bihar industrial area development authority).

The program was organized and conducted by Dr. Ashish Bansal, Professor and Director, SCSIT as Program Chair and Dr. Neha Gupta (Asst. Professor, SCSIT) and SBC (CSI) as Event Chair respectively.

The webinar was a grand success and received overwhelming response across the nation from all the participating students and a very good feedback rating 4.4/5 was obtained at the end of the webinar. The entire webinar was organized without any Financial Involvement and was Self Sustaining.

Key note speeches and guest speeches were delivered on both days and a panel discussion was held on the concluding day Chaired by Vice Chancellor, SUAS, Indore. Guest Speakers and Key Note Speakers were present in the Panel to discuss the issues related with Incubation and Entrepreneurship.

The webinar ended with a Valedictory note by Dr. Neha Gupta.

Webinar on "Transformation of the Security Landscape"

Reported by **Prof. S. S. Agarwal**, Director General, KIIT Group, Gurgaon, F. Emeritus Scientist & Advisor CDAC, (N)

KIIT World of Education conducted a webinar on "Transformation of the Security Landscape" as it's a very basic need to remain safe while surfing, downloading and doing online transactions by Colonel Inderjeet Singh, Chief Cyber Security Officer, Vara Technology Pvt Ltd at KIIT on 5th June 2020.

The main idea was how to be cyber safe. He shared with us his experience and from his knowledge, he told us that how Cybercriminals are leveraging emergencies and targeting people via phishing emails and tricking them into clicking on malicious links and giving up their sensitive information. While companies continue to fight against the increasing cyber-crimes and threats, a lot is happening around the world.

One of the biggest concerns of organizations across the world right now is cyber security. With workforces now at home connecting to their business networks remotely, ensuring these connections are secured is of paramount importance during and after COVID-19 crisis.

He made all of us aware of various types of Phishing tactics circulating via Facebook, emails, what Sapp etc through various examples. During the session he also advised for security during virtual meetings.

Participants of various organization like Manav Rachna , MVN, KR Manglam University along with KIIT were actively participated and appreciated the session.

The session was coordinated by Dr.S.S.Agrawal (Director General KIIT) in association with Mr.Vivek Varsheney (CSI chapter) with the support of Sh.B.R.Kamrah Ji (Chairman ,KIIT) and Dr.Neelima Kamrah (Registrar ,KIIT).

Mr. Vivek Varshneya proposed a vote of thanks. Mrs. Neelima Kamrah introduced the speaker. Many faculty members and students from KIIT and other institutions participated in the webinar.

Stay Safe, Stay Cyber Safe.

Five Days Online FDP on "Advancements in IoT"

Organized by: **Marathwada Mitra Mandal's College of Engineering, Pune and CSI Region-VI**

Reported by **Pradeep Rathi**, CSI Regional Vice President, Region-VI

Department of Computer Engineering organized five days online Faculty Development Program in "**Advancements in IoT**" during 8th to 12th June 2020 in association with CSI Students Chapter, MMCOE, Pune. The FDP received overwhelming response with total 427 participants participating in from different colleges from all over India.

The FDP began with inauguration function with welcome and introduction of MMCOE, Computer Department and followed by introduction of Chief guests by Mrs. Asma Shaikh and Mrs. Sarita Sapkal, FDP coordinators. Dr. Sandeeep Chaware, FDP convener briefed about the FDP. Inaguration was further addressed by Dr. S. M. Deshpande, Principal, Dr. H. K. Khanuja, HOD, Department of Computer Engineering, MMCOE, Pune. Mr. Pradeep Rathi, Regional Vice President, CSI Region-VI, Chief Guest of inaugural function addressed the participants with his motivational speech. Mrs. Shubhada Mone, Mrs. Geetha Chillarge also coordinated the FDP.

The First session of day one began with topic "Overview of IIot" by Mr. Tushar Kute, MITU Skillologies, Pune from 2.00 to 3.00 pm.

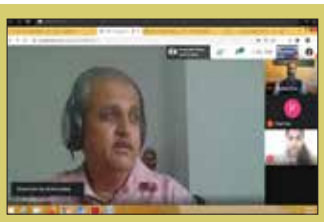
FDP Outcome

1. Learn basics of internet of things and its applications
2. Knowledge and understanding of concepts of Overview of IIot, IIoT 4.0
3. Effective usage of IoT deployment for different sectors.
4. Understanding various sensors and sensor based applications using wireless sensor modules
5. Knowledge and understanding of AWS IoT and Iot networking and Cloud
6. Exploring various research opportunities in IoT

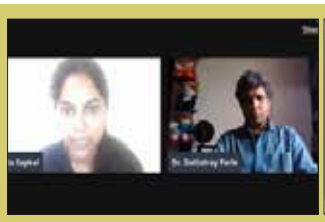
Relevance to POs and PSOs for FDP :

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
2	2	2	2	2	1	1	2		2		3	3	2

Mr. Pradeep Rathi, Chief Guest



Dr. S. M. Deshpande, Principal, MMCOE, Pune

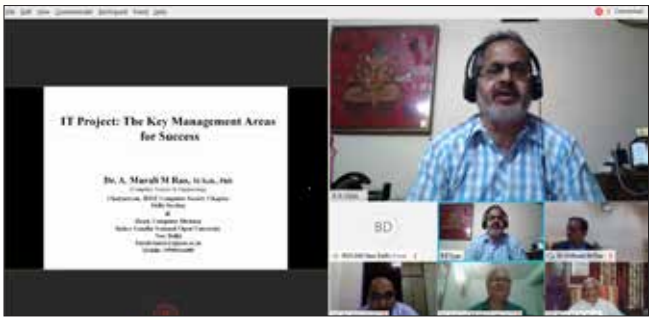


Dr. Dattatray Parle, Resource Person along with Mrs. Sarita Sapkal,FDP coordinator

Dr. S. M. Chaware, FDP Convener and resource person

Webinar on "IT Project: The Key Management Areas for Success"

Reported by **Narinder Kaur,** Assistant Professor, BVICAM, New Delhi



AICTE's Industry Institute Partnership Cell (IIPC) of Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi, in collaboration with Computer Society of India (CSI), IEEE Delhi Section, IEEE Computer Society, Consultants Network Affinity Group, Inter Society Relations, Institution of Electronics and Telecommunication Engineers (IETE), Delhi Centre and Indian Society for Technical Education (ISTE), Delhi Section organized a one week online FDP on "Emerging Trends in Computer Science & IT" from 08th to 19th June 2020.

The Webinar was held on 19th June, 2020 in the benign presence of Prof. Subrata Mukhopadhyay, Chairperson, CNA Group, IEEE Delhi Section, Prof. Ajay P. Thakre, Chairman, TPPC, IETE, Gen. (Dr.) Ajay Chandele, Past President, IETE, Prof. Subramanian Krishnamurthy, Immediate Past Section Chairperson, Mr. R. K. Vyas, President, CSI. The webinar began with the welcome address of Prof. M. N. Hoda, Director, Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi. He welcomed all the panelists & attendees and discussed the background note of conducting this Webinar. The Webinar was also addressed by Prof. Ajay P. Thakre.

Dr. A. Murali M. Rao, Chairperson, CS Chapter, IEEE Delhi Section, was the main speaker of the webinar. He began his discussion with defining project management which involves planning, organizing, leading and controlling various activities of project development. He primarily emphasized on various aspects of Project management like risk management, scope management, time management, quality management, procurement management with essential characteristics that define the success of any IT project. He also threw light on IT Project Methodology while discussing different PLC (Project Life Cycle) phases.

The session concluded with Question & Answer session in which participants willingly asked their queries. Prof. Subrata Mukhopadhyay highlighted the importance of such webinars and also briefed about the forthcoming activities of IEEE Delhi Section along with all the collaborating Societies. He also thanked to BVICAM, New Delhi for taking such initiatives and appreciated the hard work of the team members. Mr. R. K. Vyas gave his vote of thanks to the speaker & all participants, and also appreciated the commendable efforts made by BVICAM, New Delhi, in collaboration with IEEE and other professional bodies for organizing such webinars. The webinar attracted a huge number of participants from all parts of the country including participation from overseas like Spain, Egypt, Australia, Saudi Arabia, Qatar and Pakistan.

National Level Webinar on Emerging Trends in Online Education: Post Covid-19

Organised by **CSI Kancheepuram Chapter**

Reported by **Dr. M. Senthil Kumar**, Asso. Professor, Dept. of CS and Engg., SRM Valliammai Engg. College, SRM Nagar, Kattankulathur-603 203

The Computer Society of India, Kancheepuram chapter organized a Webinar on 24th of June, 2020. It was a good way to make use of the time in the quarantine period. The National Level webinar was about "EMERGING TRENDS IN ONLINE EDUCATION: POST COVID-19" which is the most needed topic today. Dr.Rajeswari Mukesh, Chairman, CSI Kancheepuram Chapter welcomed the Guest speaker Dr. A. K. Nayak, Immediate past president, Computer Society of India and the participants from various Institutions. Prof A.K.Nayak has 35 years of experience in teaching, training, research and administration in the field of Information and Communication Technology He is one who significantly contributes in the areas of promoting the IT education & awareness in India. The participants got to know about the emerging trends in the online education and the various ways in overcoming the disadvantages in online education. He clearly explained the various steps should be taken for improving the teaching methodology & learning management system. He also gave suggestions in conducting online exams and how to overcome the problems in evaluation system. The participants got the opportunity to know how to take advantages in this system and everyone enjoyed the session as it was interactive and interesting. More than 200 Professors from various institutions in all parts of India were registered for the webinar and got benefited. Two professors from National University of Science and Technology, Oman were also attended the webinar and got benefited.

Webinar Reports of Allahabad Chapter

Organised by **CSI Allahabad Chapter**

Reported by **Prof. Ratnesh Mishra**, Chairman, CSI Prayagraj Chapter

CSI Allahabad Chapter organised a Webinar Series 10, hosted by Prof. Ratnesh Mishra (Chairman, CSI Allahabad Chapter) and Prof. Narendra Gupta (Secretary, CSI Allahabad Chapter), Welcome to all participants and speaker by Ratnesh Mishra (Chairman, CSI Allahabad Chapter). The topic of this program was "Stress Management: Meditation and Self-Realization Through Sahaja Yoga", which was delivered by Mr. Nischal Kapoor:Vice President and Head of Global Strategy at Tech Mahindra India. Mr. Chandrakant Deoda : Senior Technical Delivery Manager (DevOps) - Visteon Corporation Pvt. Ltd., Pune India. Start the session by Mr. Nischal Kapoor. He has told us about the Chakra of body. The chakras are thought to vitalise the physical body and to be associated with interactions of a physical, emotional and mental nature. The function of the chakras is to spin and draw in this energy to keep the spiritual, mental, emotional and physical health of the body in balance. Chakra balancing is the process of reaching a place of balance between the spirit, body and health. It ensures that there is a harmonious flow of energy throughout the body. From focusing on the overall well being to feeling relaxed and grounded, each of the 7 main chakras is of unique importance. They start from the very end of your spinal cord and go all the way to the pinnacle of your head. First is the root chakra , second sacral chakra, third solar plexus chakra, fourth heart chakra, Fifth throat chakra, six third eye chakra, seventh The crown chakra. Mr. Chandrakant has been delivered lecture on meditation and body in balance by yoga which was practiced by every participant. Then start the question session, in this session participated by Mr. Vijay Pandey, Dr. G. P. Sahu. Dr. Avinash Dwivedi, Conclude the program by Dr. G. P. Sahu (Past Chairman, CSI Allahabad Chapter).Votes of thanks by Mr. D. K. Dwivedi (Patron, CSI Allahabad Chapter). Programme attended by Dr. Dushyant Singh, Prof. Sheel Shalini, Mr. Sanjay Singh, Mr. Himanshu Agrawal, Mr. K. K. Pandey ,Mr. Vishal Gupta, Mr.Suraj, Mr. Manish. Ms. Nancy, Ms. Akansha.

Report on Webinar Series-09

Mr. R. K. Vyas (President, CSI India) has given good wishes to CSI Allahabad Chapter for this webinar series 09.

Host: Prof. Ratnesh Mishra (Chairman, CSI Allahabad chapter) and Dr. Narendra Gupta (Secretary, CSI, Allahabad chapter). Welcome to resource person and participants by: Mr. D. K. Dwivedi (Patron CSI Allahabad chapter" Application of Clustering Algorithms in Data Science", which was delivered by speaker Dr. Rajesh Prasad, Department of Computer Science, African University of Science & Technology, Abuja, Nigeria. Data science involves using automated methods to analyze massive amounts of data and to extract knowledge from them. It is helping to create new branches of science, and influencing areas of social science and the humanities. Looking at the increase in size of data, data science is expected to accelerate in the near future. Data science is an umbrella that contains many other fields like data mining, machine learning, big data, statistics, data visualization and data analytics etc. Clustering, a data mining techniques is defined as partitioning large number of data points into smaller number of groups. It groups the objects in such a way that object with similar characteristics are in one group and objects in dissimilar characteristics are in different groups. The similarity can be measured in terms of distance measures function (e.g. edit distance). In data science, we can use clustering analysis to gain some valuable insights from our data by seeing what groups the data points fall into after applying a clustering algorithm. Clustering can be used in data summarization, social network analysis (community detection), customer segmentation and outlier detection. Then start the question session, in this session participated by Mr. Vijay Pandey, Mr. Suraj, Mr. Manish, Prof. A K Shukla and Conclude the program by Dr. G. P. Sahu (Past Chairman, CSI Allahabad Chapter). and votes of thanks by Mr. D. K. Dwivedi (Patron, CSI Allahabad Chapter). Programme attended by Dr. Dushyant Singh, Prof. Sheel Shalini, Mr. Sanjay Singh, Mr. Himanshu Agrawal, Mr. Shubham Dwivedi, Mr. Vishal Gupta, Mr. Suraj, Mr. Manish. Mr. Naveen Trivedi.

Report on Webinar Series-08

Prof. A. K. Nayak (Past President, CSI India) has given good wishes and go into raptures over to CSI Allahabad Chapter for this webinar series. In this webinar series, topic was "E-Government Applications", which was delivered by Dr. G. P. Sahu, Professor, Department of Management, School of Management, MNNIT Allahabad. In this program Dr. G. P. Sahu has discussed about the E-Government Service; G2C-Government to Citizen, G2G-Government to Government, G2B-Government to Business, G2E-Government to Employee. E-government is defined as: utilizing the Internet and the world-wide-web for delivering government information and services to citizens. Information and Communication Technology in Transport Sector; Less Paper office, Data Security/Safety, Easy and Instant Data Access, Transparency, Less Processing Time. Essential Features; Data Capacity, Secure Tamper Proof, Fool Proof, Provide Effective Enforcement, Off Line verification on road. After that he has discussed about the SWABHIMAN – SERVICE ON CALL, which was implemented in kerla. Kozhikode Essentials;Scarcity of the service personnel, Repair shop availability in locality. lack of information of various, service centers. erratic schedules of the service personnel, huge variation in the user-charges, no mechanism to ensure QoS. Then start the question session, in this session participated by Mr. Vijay Pandey, Mr. Apoorva Agha and Dr. Avinash Dwivedi. Welcome to all participants and speaker by Ratnesh Mishra (Chairman, CSI Allahabad Chapter). Conclude the program by Mr. Vijay Pandey (Member of MC, CSI Allahabad Chapter). and votes of thanks by Mr. D. K. Dwivedi (Patron, CSI Allahabad Chapter). Programme attended by Dr. Dushyant Singh, Mr. Apoorva Agha, Prof. Sheel Shalini, Mr. Sanjay Singh, Mr. Himanshu Agrawal, Mr. Shubham Dwivedi, Mr. Vishal Gupta, Mr. Suraj, Mr. Manish.

Report on Webinar Series-07

CSI Allahabad Chapter organised a Webinar Series 7.0, hosted by Prof. Ratnesh Mishra (Allahabad Chapter Chairman) and Prof. Narendra Gupta (Secretary, CSI Allahabad Chapter), Welcome to all participants and speaker by Prof. Dushyant Kumar Singh (Vice-Chairman, CSI Allahabad Chapter). The topic of this program was "Applications of Artificial Intelligence in Classification", which was delivered by speaker Dr. K. K. Mishra, Professor, Motilal Nehru National Institute of Technology U.P. In this program speaker talked about the application of artificial intelligence in classification. Artificial Intelligence is a branch of computer science which deals in designing smart machines which are capable to do all those task which requires human intelligence. Artificial Intelligence techniques are used to solve those problems by computer which can be easily solved by the human being but are difficult for a computer. Solution of such problems requires implementation of human intelligence in computer program. Automatically convert any problem in to a mathematical model which can be handled by computer hardware and software. If more than one solution exist, program should be able to pick the best solution in minimum time. Conclude by Mr. Vijay Pandey (Member of MC, CSI Allahabad Chapter). votes of thanks by Mr. D. K. Dwivedi (Patron, CSI Allahabad Chapter).

One Week Online Faculty Development Programme (FDP) on "Emerging Research Trends in CS & IT"

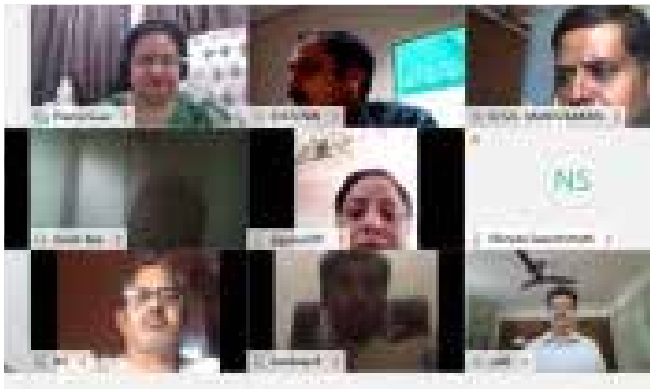
Reported by **Narinder Kaur,** Assistant Professor, BVICAM, New Delhi

AICTE's Industry Institute Partnership Cell (IIPC) of Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi, in collaboration with Computer Society of India (CSI), IEEE Delhi Section, IEEE Computer Society, Consultants Network Affinity Group, Inter Society Relations, Institution of Electronics and Telecommunication Engineers (IETE), Delhi Centre and Indian Society for Technical Education (ISTE), Delhi Section organized a one week online FDP on "Emerging Trends in Computer Science & IT" from 08th to 19th June 2020.

The current situations posed by COVID-19 pandemic are demanding us to adapt to new virtual environments. In this regard, teachers need to be encouraged to prepare themselves for delivering effective online lectures using different tools and technologies. BVICAM, is continuing its annual FDP series by conducting online FDP(s), to promote awareness on various emerging research trends in the domains of CS, IT and Management. The objective of the online FDP was to nurture the research aptitude and competency development of the young research scholars and faculty members doing research.

The FDP began with the Inaugural Session on 8th June, 2020. Prof. M. N. Hoda, Director, Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi, welcomed all the members and discussed the background note of conducting this FDP. He sensitized the participants about the changing teaching learning system in the backdrop of Industry 4.0, in general, and COVID-19, in particular. He also briefly discussed about Education 4.0, which may drastically transform the entire academic system and could prove to be a major disruption to the century old tradition processes of existing academic system. Prof. Prerna Gaur, Chairperson, IEEE Delhi Section, was the Guest of Honour and highlighted the activities of the IEEE Delhi Section. The Chief Guest of the Inaugural Session was Prof. Yogesh Singh, Vice Chancellor, Delhi Technological University (DTU), Delhi. He discussed the urgent need of mentoring teachers for online teaching as current situations posed by Covid-19 pandemic are demanding to adapt virtual environments. He also emphasized on online examinations and other related issues in such scenarios.

There were 20 interesting and knowledge imparting sessions in this two week FDP. Mentoring Teachers for Effective Virtual Teaching by Mr. Rajeev Jain, Corporate Trainer, Gurugram, Nature Inspired Optimization and its Application to Complex Engineering Problems by Dr. A. P. Agrawal & Dr. Ankur Choudhary, Sharda University, Gr. Noida, Deep Learning Techniques and Applications by Dr. V. Ajantha Devi, AP3 Solutions, Chennai, Next Generation Innovations and Research: Opportunities and Challenges by Dr. Nasib Singh Gill, MDU, Rohtak, Industry 4.0 by Mr. Vijay Anand, Altran Technologies, Gurugram, Docker and Kubernetes by Dr. Vipin Gupta, U-Net Solutions, Punjab, SDN by Mr. Manish Aggarwal, Altran Technologies, Gurugram, Virtual Reality Application Development by Dr. George Tsaramirsis, King Abdulaziz University, K.S.A, Information Security in 2020 and Emergence of Blockchain Technology by Dr. Rahul Johari, USIC&T, GGSIPU, New Delhi, New Dimensions of NAAC Accreditation by Dr. Peeyush Pahade, H. V. Desai College, Pune, The Challenges of Online/Digital Learning Globally by Prof. Gurdeep Singh Hura, University of Maryland, U.S.A., Internet of Things: Approach and Applicability in Manufacturing by Dr. Loveleen Gaur, Amity University, Noida, Application of Intuitionistic Fuzzy Logic to Decision Making by Dr. Rekha Gupta, LBSIM, New Delhi, Data Protection Issues in Medical Imaging Techniques by Dr. Mohammad Athar Ali, University of Buckingham, U.K, Getting Ready for an AI Powered World by Mr. Rahul Agarwal, 3SRCTechnologies, Noida, Predictive Computing Techniques and Applications by Dr. P. K. Gupta, JUIT, Waknaghat, H.P., Data



Analytics using R by Dr. Umang Singh, I.T.S., Ghaziabad, Progression from Machine to Deep learning in Medical Image Analysis by Dr. Ibrahima Faye, Universiti Teknologi PETRONAS, Malaysia, Artificial Intelligence & Big Data Analytics by Mr. Gaurav Pahwa, Altran Technologies, Gurugram and Role of Academia in Industry 4.0 by Dr. Mani Madhukar, IBM, Noida.

The FDP was aimed to provide an open exchange of ideas that gave all the participants an opportunity to learn about emerging trends in research and benefitted their academic career growth. The FDP observed active participation from various research scholars and faculties with positive outcomes. There were 156 participants from all over the world, including participants from University of Kashmir, Chandigarh University, Gharuan, National Institute of Technology Jamshedpur, Jharkhand, Villa Marie Degree College, Sharda University, JSS Academy of Technical Education Noida, Amity University, UP, Indira Gandhi Delhi Technical University for Women, Delhi Technological University, Jamia Millia Islamia, New Delhi, Bhilai Institute of Technology, Durg, B. S. Abdur Rahman University, Babasaheb Bhimrao Ambedkar University, Lucknow, Guru Jambheshwar University of Science & Technology, Hisar to name a few.

Last day of the FDP witnessed Valedictory Session. Dr. Vishal Jain, Associate Professor, BVICAM, presented a brief report on two weeks FDP program. Prof. M. N. Hoda welcomed all the guests and thanked all the speakers for conducting interactive sessions on emerging research trends in CS and IT. He also discussed the art of writing research papers in digital age and good practices to be followed up while doing research.

The Guest of Honour of the event Prof. A. K. Nayak, Immediate Past President, CSI, discussed the need for conducting such FDPs in this digital era. Prof. K. K. Aggarwal, Noted Academician, Chairman, NBA, New Delhi and Former Founder Vice Chancellor, GGSIP University, New Delhi, was the Chief Guest. He expressed his appreciation on the success of FDP and acknowledged the need to format our Education System in order to cope up with the challenges posed by Covid-19 pandemic. Also present in the event were Dr. A. Murali M. Rao, Chairperson, CS, IEEE Delhi Section and Prof. Ajay P. Thakre, Chairman, TPC, IETE. Mr. R. K. Vyas, President, CSI, expressed his satisfaction over conduct of such FDPs and felt that online FDPs will be the new normal of academic system.

At the end, few participants shared their experiences on two weeks program and gave their valuable feedback. The entire FDP was coordinated by Dr. Vishal Jain, Associate Professor, Mr. Manish Kumar, Assistant Professor and Mr. Uttam Singh, Assistant Professor, BVICAM. All the participants were awarded with certificates of participation electronically. Dr. Vishal Jain expressed his vote of thanks to all the attendees for making this event a huge success.

CSI BBDNITM Student Branch - Webinar

Reported by **Prof. Diwakar Tripathi**, President, CSI BBDNITM Student Branch, Lucknow

Student Development Program

CSI Student Council, had conducted a two-day workshop on 'Web Development using DJANGO' on the 13th and 14th June 2020, lasting a total of 5 hours. The workshop has Prof. A. K. Nayak (Past President CSI) as chief guest and Dr. Swasti Agrawal (Director, Precursor) as Trainer and receive an overwhelming response of 220 participants from all colleges across INDIA. The workshop was marked by the presence of CSI Chief Patron Director BBDNITM, Prof. (Dr.) Bhavesh Kumar Chauhan, CSI Chair Patron HOD-IT, Prof. (Dr.) Manuj Darbari, CSI Branch Coordinator HOD–CSE, Prof. (Dr.) Diwakar Yagyasen, CSI Branch Counselors Asst. Professors Prof. Shadab Siddiqui and Prof. Zulfikar Ali Ansari.

The day 1 of workshop begin with HTML, CSS, Bootstrap, Jquery, and Python Programming. The 2 day of the workshop covered Introduction to Django Architecture and Django Project Creation with Database Connectivity .The entire session was very informative and interactive. All the queries were solved by the trainer. By the end of the session students were asked to give a assessment on the basics of workshop session. Online feedback form was given among all attendees and ask for their personal feedback by strictly maintaining the data privacy in the form. Amazing (55.5%), better (40%) , good (39.6%) , Bad (2%).

E-Workshop

CSI BBDNITM Student Branch was conducted a two-day e-workshop on 'Web Development using DJANGO' on the 13th and 14th June 2020, from 10:30 am – 1:00 pm . The workshop had Prof. A.K Nayak (Past President CSI) as chief guest and Dr. Swasti Agrawal (Director, Precursor) as Trainer and received an overwhelming response of 220 participants from all colleges across INDIA. The workshop was marked by the presence of CSI Chief Patron Director BBDNITM, Prof. (Dr.) Bhavesh Kumar Chauhan, CSI Chair Patron HOD-IT, Prof. (Dr.) Manuj Darbari, CSI Branch Coordinator HOD-CSE, Prof. (Dr.) Diwakar Yagyasen, CSI Branch Counselors Asst. Professors Prof. Shadab Siddiqui, Prof. Zulfikar Ali Ansari and CSI BBDNITM STUDENTS CHAPTER President Diwakar Tripathi. The session was inaugurated by welcoming the chief guest, guests, trainer and all the attendees. The day 1 of workshop begin with HTML, CSS, Bootstrap, jQuery, and Python Programming. The 2 day of the workshop covered Introduction to Django Architecture and Django Project Creation with Database Connectivity. The main aim of this event was to train the students with live projects demonstration and live proto-type building. The entire session was very informative and interactive. All the queries were solved by the trainer and the session was concluded with the Vote of Thanks. By the end of the session, students were asked to give an assessment in the form of quiz on the basics of workshop where the qualifying criterion was 40%. Top 3 scorers were declared as winner and those who secured between 70-100% were granted 'E- Certificate of Achievement' and those who secured between 40-70% were granted 'E-Certificate of Participation'. Online feedback form was given among all attendees and ask for their personal feedback by strictly maintaining the data privacy in the form. Amazing (55.5%), Better (40%), Good (39.6%), Bad (2%).

IT Modernization

Webinar on IT Modernization in association with HCL Technologies was organised by the CSI BBDNITM STUDENT CHAPTER of Dept. of CSE and Dept of IT. Mr. Anil Srivastava (Director, IT) of HCL Technologies was the speaker of the day. It was conducted on Microsoft Team on 20/06/2020 from 11:00 am 1:00 pm. It was inaugurated with the Welcome of our guest including CSI Chair Patrons Director BBDNITM Prof. Dr. Bhavesh Kumar Chauhan and HOD IT Prof. Dr. Manuj Darbari Sir, CSI Branch Co-ordinator, HOD CSE Prof. Dr. Diwakar Yagyasen Sir, CSI Branch Counselors Prof. Shadab Siddiqui and Prof. Zulfikar Ali Ansari Sir and Training & Placement Officer Prof. Anurag Tiwari. Then, the speaker explained about the IT Modernization, what are its importance and its services. He elaborated the leveraging technology to meet expanding business goals with proper screen demonstration. The event was witnessed with 205 participants including the students and faculties across India. Q/A round was conducted then the event was signed off with the vote of thanks.

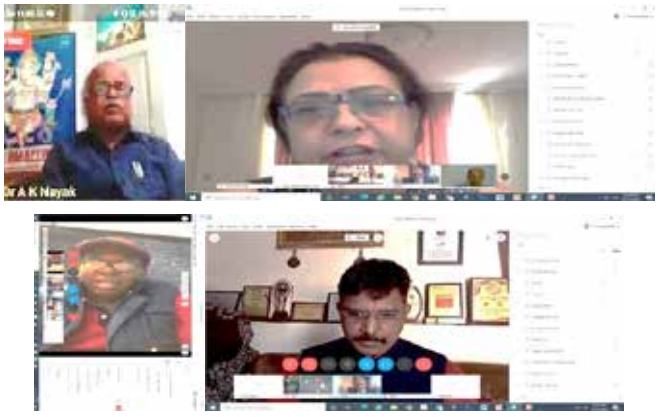
The audience was highly pleased to be a part of such an event and heaped praises and wanted to have some more events like this. Quiz was conducted and top 3 scorers of the quiz were declared as the Winner of Webinar Quiz. Students who secured more than 70% were granted E-Certificate of Achievement and all those who appeared in QUIZ was granted E- Certificate of Participation.

International Webinar on ICT for Health Care

Reported by
Prof. (Dr.) Ripu Ranjan Sinha, Chairman, CSI Jaipur Chapter, Rajasthan
Dr. Ashish Chandra Swami, MC Member CSI Jaipur Chapter

Jaipur 21st June 2020 In Line with ॐ सर्वे भवन्तु सुखिनः। सर्वे सन्तु निरामयाः (May All Be Prosperous And Happy May All Be Free From Illness) The Computer Society of India, Patna and Jaipur chapter, in association with Council for Sustainable Peace and Development, WAIMS and Innovation society of India organized an International webinar on ICT for HealthCare under the Dynamic Leadership of Prof. (Dr.) Ripu Ranjan Sinha and his very eminent team. This International Webinar witnessed participants from all across the globe namely participants are from Philippines, Bhutan, United Kingdom, Turkey, Nigeria, Saudi Arabia and other African Countries. This International Webinar Moderated By Prof.(Dr.) K.S Charak as Organizing Member and at the Beginning he expressed the importance of event in the current prospective of Global Pandemic COVID-19.

The Chief Guest of the webinar Dr. Dinesh Upadhya, National Convener – Ministry of AYUSH, Government of India presented his view on utilization of Information Communication Technologies in Ayurveda, Yoga, Homeopathy, Naturopathy, Siddha and Unani medicine practices. He expressed various Initiative of Ministry of Ayush , Govt of India for the promotion and popularization of AYUSH practices at global level in line with Promotion and Propagation of Bhartiya Chikitisha Padati. Dr Dinesh Upadhya emphasized on practice of yoga in daily routine life will make our body not only fit physically it will also make us fit mentally. He also stated that these health care streams needed to be taken seriously and promoted as much as possible at global level. These medicine practices normally do not have any side effects on human body.



The Chairman of the Event Prof. (Dr) A. K. Nayak, Immediate Past President Computer Society of India in his address spoke about new advancements taking place in the field of Information Communication Technologies related to the field of Healthcare system. He described the utilization of Nano Computing in the field of telemedicine and healthcare that how nano medicine shall treat the effected part of body and heal it more effectively in coming decades. Taking one step further Prof. Nayak emphesised on the new research to be done in the field of Ayurveda and yoga to scientifically prove the importance of these streams of medical science. He urged new startups in the field of ICT and Computer to further create new benchmarks in these fields. At the end of Prof Nayak told about the research going on Nanobots that shall be applicable for complex treatments of patients.

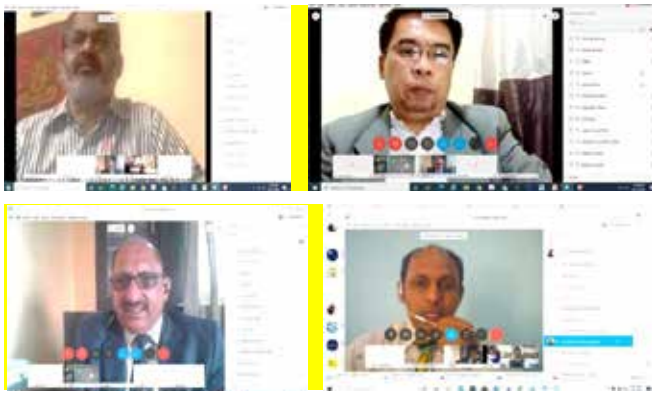
Presidential address of the International webinar was delivered by Prof. Ram Kishan Vyas, President Computer Society of India. He with statical data mentioned about advancements done in the field of ICT for Healthcare. He mentioned about support of CSI in the promotion and awareness programs conducted at pan India level by CSI. The international webinar was addressed by many intellectuals who shared their knowledge and wisdom on the of scenario of ICT for HealthCare.

Moving ahead moderator Prof.(Dr.) K. S. Charak invited Prof Ripu Ranjan Sinha, Chairman, CSI Jaipur Chapter for his address. Prof. Sinha launched "AyushmanBhava: Chikatsalya evam Anusandhan Kendra" project of Council for Sustainable Peace and Development. He further told about the new innovations and actions taken by Council for the promotion and research done till date for promotion of

AYUSH Ministry schemes at global level. Prof. (Dr.) R R Sinha further added that without knowledge of past inventions new innovations in the field of ICT for Health care are not possible, so its now right time to trigger off new startups and upcoming entrepreneurs to start their new projects along with Computer Society of India and Council for sustainable Peace and Development.

In his address he pounded the effect of COVID-19 and Human and Humanities Loss in 21st century as reported by WHO. He Congratulated Indian Life Style and Eating food Habit and Importance of Yoga, Naturopathy and Ayurveda as Powerful Healing Mechanism of Human Bodies in views for the same he congratulated Council for Sustainable Peace and Development for Global Health Care Reformation Project "AYUSHMAN BHAVA CHIKITSALAYA AVEM ANUSANDHAN KENDRA" with the vision and commitment to establish 100 centers in asian and african countries with a udget of $ 100 million usd to make "Eak World Shresht World" with free Healing Service to Humanties In Line With Unsdg-2030, Aua-2063, Uganda Development Agenda 2040 and india sustainable development growth index india@75.

Prof. Sinha expressed towards the Importance of Peace, innovation and Sustainable Development Opportunities as Global Mission and Pioneer Professional Body of India in ICT Promotion, Discussion and Deliberation Computer Society of India are bound and Council for Peace and Sustainable development is happy to be the partner for the same in tune with CSI Vision and Mission and Council for Sustainable Peace and Development directive we can do miracle for the Human and humanities development. He also express his profound thanks to Ranjit Kumar Secretory Ministry of Ayush towards working Ministry for the promotion and Success of International Yoga Day on 21st June 2020.



Prof. Sinha expressed his views on yoga as group of physical , mental and spiritual practices or disciplines which originatied in ancient india and after long time we all are retaining our vadic values, ethics and culture india, has a current population of 1.35 billion.by 2050, it is expected to reach 1.6 billion. For the public health planners of the country have a big challenge to cater to. the performance of the health sector is suboptimal because of an increased burden of factors like political instability, underdevelopment, weak institutions, scarcity of resources, inadequately developed social sectors and evident social inequalities. however, with an increase in population, healthcare service resources will not increase in the same proportion. there are big geographical disparities in health and wellbeing of the population along with demographic and epidemiological transitions that take place. this demands non-stop spatio-temporal adjustments in plans and readjustment in allocation of healthcare resources though the government has made huge budget expenditures under ambitious schemes like NRHM , accessibility to low-cost healthcare is poor.

Information and Communication Technologies has a huge potential to grow capacity in this sector due to low-cost innovation, low-priced mobile phones and more 'inclusive' solutions that fill crucial gaps in health information and access. to tackle these challenges, the process of health planning needs to evolve by the use of ICT in healthcare delivery and distribution and public health decision making at every level. this will ensure delivery of right health services to right people at the right place as well as on right time. ICT has the capacity to influence all aspects of the health sector. for instance, in public health, management of information and communication processes are very crucial and are assisted or limited by the availability of information. we are leading nations of the world and ICT transforming the healthcare industry whether it's information-sharing between patients and doctors or aiding in a high-risk surgery, it's clear that dynamic applications of technology are well underway in disrupting the healthcare industry. and now technologies at our fingertips. technology is impacting the sector, ranging from Artificial Intelligence ,virtual healthcare ,nanomedicine,Virtual Reality,3d printing while technological adoption into the medical field doesn't come without challenges, the value is clear – and we've barely scratched the surface of tech-driven possibilities in the healthcare industry. We Indian are working too hard to make New Bharat, Sustain Bharat, Developed Bharat.

Key note address given by the Dean Pastor Arguelles jr, University of Perpetual help Milano campus, Dean College of Computer Science, Manila Philippines, Mr. Dewale Mohommed, executive President Global South Economic Forum, United Kingdom , Mr. Jackson Dupe, GVC Bhutan, Ms Neyra Raydan, Saudi Arabia, Mr. Oreshi Terhemba Ephraim ACA, Nigeria,Ms. Sonali Sinha Roy, Turkey, Dr Arun Agarwal, MD Jaipur India and Dr. Ashish C Swami MC Member of CSI Jaipur Chapter.

Ashish Swami Thanks to the Organizers and expressed Council enabled Project "AyushmanBhava: Chikatsalya evam Anusandhan Kendra" for promotion of innovations of ICT in the field of Ayurveda, Yoga and Naturopathy. He described about the project expansion plan to open 100 centers of "AyushmanBhava: Chikatsalya evam Anusandhan Kendra" in African and Asian continent upto 2030 with estimated budget of USD 100$ Million. Dr Swami said that ancient knowledge of Indian Sages (Rishis) needs to be innovated with use of ICT for HealthCare. He further added that Vedic Healing System (VHS) system is still as effective as any other Treatment Mechanism in Various Medical Practices. we must need to adapt in our daily life. Vote of Thanks Presented by Dr. D. Shunmuganathan from International Association of Sports and ICT With recommendable requirement of Vedic Yoga, Naturopathy, Ministry of Ayush initiative and overall organizers, Participants and Keynote Speakers from Global time zone. ■

One Week STTP on E-Learning Tools, Methodologies and Content Management

Reported by **Dr. Sachin S. Agrawal**, Assistant Professor, Department of CSE, College of Engineering & Technology, Akola-444 104.

Dr. Gajendra R. Bamnote, Professor & Head, Dept. of CS & Engg., Prof. Ram Meghe Inst. of Technology & Research, Badnera-Amravati (Maharashtra) INDIA, Past Chairman, CSI India, Amravati Chapter

Dr. Pradip M Jawandhiya, conducting session on "Swayam" Principal, Pankaj Laddhad Institute of Technology & Management, Buldhana Chairman, Computer Society of India, Amravati Chapter, Amravati

College of Engineering and Technology, Akola in Association with CSI Amravati Chapter and Indian Society for Technical Education, New Delhi organized an online One Week Short Term Training Program (STTP) on "E-Learning Tools, Methodologies and Content Management" from 13th to 18th June 2020. Around 180+ participants from all over India participated in the STTP.

Dr. Gajendra R. Bamnote, Past Chairman, CSI Amravati, Amravati inaugurated the STTP program and also conducted the session on "Flipped Classrooms for Distance Learning During Covid-19". Different resource persons Dr. Mohammad Atique, Dr. Aarti M. Karande, Dr. N. M. Tarbani, Dr. N. M. Thakare, Dr. Pravin Satav, Dr. Shrikant Sonekar, Dr. S. A. Bhura, Dr. S. S. Agrawal and Dr. R. S. Jaiswal also conducted the sessions during the STTP. Dr. Pradip M Jawandhiya, Chairman, CSI Amravati Chapter, Amravati conducted session on "Swayam" on the last day of the session.

Dr. S. L. Satarkar, Head and Associate Professor, Department of CSE was the Convener for the STTP and the event was coordinated by Dr. S. S. Agrawal and Dr. R. S. Jaiswal.

Webinar on Robotics

Organized by School of Computer IPS Academy Indore and CSI Indore Chapter

Date : 27 June 2020 at 11:00am to 1:30 pm

Reported by **Jayant Bhide**, RVP-III

CSI Indore Chapter at School of Computers IPS Academy under SOC Technovation Webinar Series at IPS Academy on the possibilities and employment opportunities in the field of Robotics. Artificial Intelligence Expert Mr. Mudit Thakkar Founder & CEO Edu square Training and Research Center and Mentor of NITI Aayog Government of India and Chief Guest By Professor Anil Gupta Chairman CSI Indore Chapter various aspects of Madhya Pradesh and India Students and professionals from different regions of India in online mode Shed light on various aspects of the robotic field in online mode. In this how the robot is developed And its various fields like manufacturing industry and the utility in industry and education field .It was described as well as different types of robots

It was described as well as different types of robots: humanoid, artificial body part of robots, artificial Mind Control Highlights. How work is done in the field and what are the prospects of employment.

The efforts of the institution were appreciated by all the participants.

Webinar Convener Mrs. Kavita Chaudhary and Dr. Manish Pundlik, Head of Department School of Computer IPS Academy Students' talent regarding the success of the program congratulate them.

While thanking the students for their talent and success of the program, they have also asked to continue doing it smoothly to Coordinators of the webinar Assistant Professor Nikita Jain and Assistant Professor Tarunesh Verma.

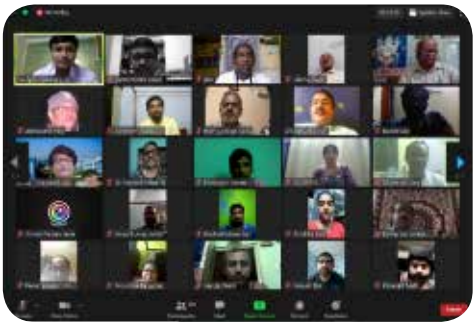
One week Faculty Development Program on Image Authentication, WSN & IoT

Reported by **Dr. Aniruddha Nag**, CSI Kolkata Chapter Chairman, Treasurer, IETE, Sr. Member CSI, IETE, ISOC, ISC, FOSET

Gist of the Event

One week Faculty Development Program on Image Authentication, WSN & IoT from 22.06.2020 to 26.06.2020 was organized by Department of Computer Science & Engineering, JIS College of Engineering in Association with Computer Society of India, Kolkata Chapter.

The program commenced on 22nd June, 2020 with a beaming inaugural session. The inaugural program was attended by all the distinguished dignitaries from Computer Society of India, as well as from JIS College of Engineering.



The welcome address was delivered by Prof. (Dr.) Partha Sarkar, Principal of JIS College of Engineering, succeeded by Dr. Sila Singh Ghosh, Registrar, JIS College of Engineering, who encouraged our audience across the country through her highly motivating words.

Subsequently, there was a digital felicitation ceremony, where all the dignitaries from Computer Society of India - Shri Ram Krishan Vyas, President, CSI, Prof. A K Nayak, Immediate Past President, CSI, Mr. Md Shams Raza, Regional Vice President, Region-II, CSI, Dr. Aniruddha Nag, Chairman, CSI Kolkata Chapter, Mr. Goutam Hazra, Immediate Past chairman. CSI Kolkata Chapter, Mr. Sourav Chakraborty, Vice chairman CSI Kolkata Chapter, Prof. (Dr.) Debashis De, Secretary CSI Kolkata Chapter & Professor, Department of CSE, MAKAUT, Amrut Ranjan Jena from Guru Nanak Institute of Technology, Kolkata Dr. Somnath Mukhopadhyay, Region II Student Coordinator, Dr. Diganta Sengupta, West Bengal CSI State Student Coordinator, Prof. (Dr.) J.K. Mandal, University of Kalyani-were felicitated with a digitalized token of appreciation.

The effulgent inauguration of this the One-week Faculty Development Program on Image Authentication, WSN & IoT was done by our Chief Guest Shri Ram Krishan Vyas, President, Computer Society of India. He captivated all the participants with his words. The JISCE Student chapter received huge appreciation from such an eminent persona for coming up with various events and organising them successfully amidst the pandemic.

Our guest of honour Prof. A K Nayak, Immediate Past President, Computer Society of India, carried the session further with his expertise view. He enlightened us regarding the importance and beauty of our topic, IoT, which is the need of the hour. IoT is not only restricted to machine to machine communication, but also, machine to man, man to machine, and also various other agents like, humidity, temperature and many more. He also mentioned that through IoT, in the future we would be able to communicate with the animals. He added that "Whether in West Bengal whether you move South or North or you move east or west you can find JISCE is the best".

This was followed by inspirational words from Mr. Md Shams Raza, Regional Vice President, Region-II. He thanked the whole team for organising such event and encouraged for more such events. He emphasized that this kind of sessions are not only important for the youngsters, but also for the elder people to learn something; because of course, learning does not have any age limit.

The essence of this program was fostered further, when Dr. Aniruddha Nag, Chairman, CSI Kolkata Chapter, and advisor of this Faculty development Program shared his view on request. He was really proud of JIS College of Engineering, and praised for doing fantastic job pre and during the pandemic situation in putting up with organising events on behalf of CSI. He wished luck for the program with its 214 eager participants and told this event might be a milestone.

After that, Dr. Somnath Mukhopadhyay, Region II Student Coordinator, was requested to say a few words. He wished all the success for this intriguing event enriched with all the best teachers from across the country and also to the participants and the college.

The event was magnified with the words from Prof. (Dr.) J K Mandal, Professor, University of Kalyani as well as advisor of the program. He was glad to be part of such a program. He showered his blessings to all the members for their deep involvement in this activity. To him, the digital platform is working out with more success rate than the physical ones.

Up next, Dr. Debasish De, Professor, CSE Department, Maulana Abul Kalam Azad University of Technology, West Bengal was requested to address the audience. He welcomed all the panel members. He wished luck for the FDP, and gave a little bit of knowledge regarding how to be equipped digitally since digitalization during this situation has pushed us more into the digital world.

In the concluding remarks of the Inaugural Session, Dr. Dharmpal Singh, HOD, Department of CSE, JIS College of Engineering conveyed the Vote of thanks.

This National Level FDP was coordinated by Shri Sudipta Sahana, Student Branch Counsellor where we had around 214 active participants from various domains of Science & Technology.

The Day-1 Keynote session entitled Chaos based Image Authentication, was delivered by Prof. (Dr.) J.K. Mandal, Professor, Department of CSE, University of Kalyani.

The Day-2 (23.06.2020) Keynote Session was on Dual Image Authentication, which was delivered by Dr Biswapati Jana, Associate Professor, CS, Vidyasagar University, WB.

The Day-3 (24.06.2020) Keynote Session was covering the topic of Wireless Sensor Networks, which was delivered by Prof. Prasanta K Jana, Professor, CSE, IIT (ISM) Dhanbad, Jharkhand.

On Day-4 (25.06.2020), the Keynote Session was on Security in Wireless Sensor Networks, which was delivered by Prof. Subir Kumar Sarkar, Professor, ECE, Jadavpur University, WB.

The Day-5 (26.06.2020) Keynote Session covered multifaceted aspects ofSensor Networks and IoT, which was delivered Prof. Debashis De, Professor, CSE,MAKAUT, WB.

Standing at this point of global pandemic situation the feedback received from all the participants for this online FDP proved that acquiring new knowledge can never be stopped. Stay Home Safe Education is thus fully justified here.

Technology Disruption in Business Innovation

Reported by **Prof. Ganesh Panday**, Dy. Director, IIBM, Patna

An one day National webinar on "Technology Disruption in Business Innovation" was organised by Indian Institute of Business Management. Patna in collaboration with CSI Patna Chapter on 13 the June 2020. The Webinar was Inaugurated by Prof. U. K. Singh, Fellow & LTA of CSI and Director General of IIBM & Dr. Zakir Husain Institute group of Institutions, Opening address was delivered by Prof. A. K. Nayak, Immd. Past President and Chairman, Academic & Awards Committee of CSI. Mr. Pradip Rathi, Founder and Mentor-in-Chief 3i Zone, Mumbai & Regional Vice President, CSI Region-VI delivered the Key note Address where as Dr. Malay Nayak, Executive Director, IT Buzz Ltd., London, U.K was the Invited Speaker.

In his opening address, Prof. A. K. Nayak pointed out about the Emerging Trends of Technology with its fastest growth & changes which is changing every domain of Business. To cope with the rapid changes the challenges & opportunities in the concerned areas is required to be properly addressed. In his Inaugural address Prof. U. K. Singh, Chief Guest of the webinar called upon the students & youths to develop a research bent of mind to innovate the new ideas to forward the Make in India project to transform the nation to be self confident and independent for its own requirement.

Mr. Pradeep Rathi spoke upon the subject Technology Disruption in Business Innovation. He highlighted that disruption is nothing but convergence of technologies and product innovation, business model innovation that enable entrepreneurs and companies develop new products and services that do two things, first they develop new markets and second, they right away or latter destroy or drastically transform the existing industry. By citing several examples, he

explained how new business models and new products can be developed by technology convergence. He also discussed the cost curves of various technologies that are driving the Industry 4.0 revolution and predicted their trend.

In his invited address, Dr. Malay Nayak, Executive Director, IT Buzz Ltd,London spoke on entrepreneurship and it's different characteristics. He explained about the entire roadmap starting from the idea generation to reaching at the product.

Md. Shams Raza, the Regional Vice President of CSI Region II proposed the vote of thanks. The webinar was also attended by Prof. Ganesh Panday, Day. Director, IIBM, Prof. Nilesh Narayan, Chairman, CSI Patna Chapter, prof. Gopal Krishna, CSI Bihar State Student Coordinator. The Webinar was hosted by Prof. Rohit Kumar, Asst. Prof, IIBM, Patna and attended by more than more than 500 participants.

KIND ATTENTION !

Prospective Contributors of CSI Communications

Forthcoming Issues : August 2020 : Open Source Software

Please note that Cover Theme for the August 2020 issue is **Open Source Software**. Articles may be submitted in the categories such as: Cover Story, Research Front, Technical Trends, Security Corner and Article. Please send your contributions by 20th July, 2019.

The articles should be authored as original text. Plagiarism is strictly prohibited.

Please note that CSI Communications is a magazine for members at large and not a research journal for publishing fullfledged research papers. Therefore, we expect articles written at the level of general audience of varied member categories. Equations and mathematical expressions within articles are not recommended and, if absolutely necessary, should be minimum. Include a brief biography of four to six lines, indicating CSI Membership no., for each author with high resolution author photograph.

Please send your article in MS-Word format to Chief Editor, **Prof. (Dr.) S. S. Agrawal** in the email ids **csic@csi-india.org** with copies to the Publisher **Prof. A. K. Nayak**, in the email id : aknayak@iibm.in and Editor **Ritika Wason,** Associate Professor Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM) in the email id : rit_2282@yahoo.co.in

Issued on the behalf of the Editorial Board, CSI Communications.

Prof. (Dr.) S S Agrawal
Chief Editor

International Virtual Conference on Opportunities and Challenges in Computer Science after Covid-19

Organized by **Department of Computer Science, DBF Dayanand College of Arts and Science, Solapur, Maharashtra, India**

Reported by **Prof. Dr. G. S. Shahane**, Incharge, Department of Computer Science, DBF Dayanand College of Arts and Science, Solapur - 413002

Since last three-four months the entire world is going through the pandemic situation due to the corona virus (COVID-19). For the first time, almost all parts of the world were under lockdown and stopped their working. There are various challenges in different fields after Covid-19. Computer Science and Technology has the pivotal role in this situation. Looking to these facts an International Virtual Conference on Opportunities and Challenges in Computer Science after Covid-19 was organized by Department of Computer Science, DBF Dayanand College of Arts and Science, Solapur, Maharashtra, India on Monday, 29 June 2020. The conference has received overwhelming response. About 1450 participants from different parts of the country and abroad registered for this conference. The international participation was from different countries like South Korea, Saudi Arabia, Kuwait, Iraq, Ethiopia, Nigeria, etc. Honorable Prof. Akshaya Kumar Nayak, Director, Indian Institute of Business Management, Patna, and President, Computer Society of India was the Chief Guest and Key Note Speaker for this conference. Dr. G. Ajay Kumar, Daegu-Gyeongbuk Institute of Science and Technology, Daegu, South Korea and Prof. R. R. Deshmukh, Babasaheb Ambedkar Marathwada University, Aurangabad, India were the Invited Speakers.

The conference was inaugurated virtually at the hands of Honorable Shri Mahesh ji Chopra, Local Secretary, Dayanand Institutions, Solapur and Secretary, DAV College Management Committee, New Delhi. Prof. V. P. Ubale, Principal, DBF Dayanand College of Arts and Science, Solapur addressed the participants and discussed about challenges in the educational system in this pandemic situation. Prof. G. S. Shahane, Convener and Head, Department of Computer Science briefed about the purpose and importance of the conference on the background of Covid-19.

In the key note address Prof. A. K. Nayak discussed about various opportunities and challenges in the field of Computer Science. He throw light on importance of Information Technology, IT enabled services, various industrial standards, IOT, IOE, the upcoming different computing technologies He also discussed about the generations in the educational system and importance of Education-4.0 on the background of Covid-19. Dr. G. Ajay Kumar discussed about the importance of automated driverless cars. This technology will certainly help in near future in the pandemic situations. Prof. R. R. Deshmukh discussed about role of ICT for sustainable development by giving the example of smart cities.

Every presentation was followed by question and answer session. All the three sessions were very informative and certainly motivate young minds towards this challenging field. The conference was very fruitful. The organizing committee members Mr. D. D. Misal, Mr. S. R. Aland, Mr. A. S. Kale, Miss. V. A. Kagwade, and Mrs. L. G. Bichhal took lot of efforts for the success of this conference.

Instructions for submission of Chapter & Student Branch Reports

Viewing the huge number of online activities conducted by our Chapters and Student Branches through out the country, the Editorial board requests to the Chapter Office Bearers and Student Branch Coordinator to restrict the size of the report upto half page for a Chapter event and quarter page for a Student Branch event along with one photograph.

Student branches are requested to send their report to sb-activities@csi-india.org with CC to admn.officer@csi-india.org

Chapters are requested to send their activity report to chapter-activities@csi-india.org with CC to admn.officer@csi-india.org

Kindly send **High Resolution Photograph** with the report.

Prof. A. K. Nayak
Publisher

STUDENT BRANCHES INAUGURATION

REPORTS

CHRIST COLLEGE OF ENGINEERING, THRISSUR, KERALA (REGION-VII)

Reported by **Prof. Raisa Varghese**, SBC, Christ College of Engineering, Thrissur

The "Computer Society of India" is a professional body where computer professionals meet to exchange views and information, to learn and share ideas. The wide spectrum of members is committed to the advancement of the theory and practice of Computer Engineering and Technology Systems, Science and Engineering, Information Processing and related Arts and Sciences.

CSI Student Branch of Christ Engineering College was inaugurated by the Kerala state student coordinator Dr. M V Rajesh. He shared his expertise and experiences on being a member of the CSI and apprised the students of its advantages and the various opportunities it offers. He appreciated the endeavors undertaken by the college and its keen interest in such pursuits.

To determine the best programmers among students a coding competition was held. Representing the prodigies among students, a special student master's program was conducted by Cyril Paul and Anand Antony. Inventive and utilitarian ideas were presented by many student teams in the idea pitching competition and the best among them were selected and awarded.

The presidential address was given by Reverend Father John Paliakkara, the Executive Director of Christ College of Engineering. Principal Dr. Sajeev John, Vice Principal V D John, Joint Director Father Joy Payyipilly, Student branch coordinator Raisa Varghese, Professor Premakumar and Student Branch Chairman Lazar Tony addressed the gathering.

DHANEKULA INSTITUTE OF ENGINEERING AND TECHNOLOGY, VIJAYAWADA

Reported by **Prof. Yalamanchili Salini**, Dhanekula Institute of Engineering and Technology

CSI Student Branch at Dhanekula Institute of Engineering and Technology, Vijayawada established under the department of Computer Science and Engineering on 30th Oct 2016, the purposes of the society are engaging and imparting professional quality education to the students for graduating in Computer Science and engineering. It is a professional body where professionals meet to exchange views and information, to learn and share ideas. The activities of this CSI Student Branch include Seminars, Workshops, Guest Lectures to keep faculty and students updated with latest developments in various technologies. CSI student branch initiated and 136 student's registration with CSI. Student's ID cards distribution is done by Dr. Sudhir Babu.

TECHNO INDIA UNIVERSITY, WEST BENGAL (REGION-II)

Reported by **Dr. Aniruddha Nag**, Chapter Chairman, CSI. Sr. Member CSI,IETE, ISOC,ISC,FOSET

On 20/6/2020, CSI Student Branch was inaugurated at Techno India University, West Bengal, on behalf of department of computer science and computer application. The overall program was conducted by Prof. Dr. Maumita Sengupta of TIU.

At the beginning of the session Prof. Manashi Roychowdhury Hon'ble Co- Chancellor of TIU-WB, delivered her welcome address and inaugurated the session. After that Vice chancellor of TIU, WB-Prof. Dr. Goutam Sengupta addressed and delivered his valuable speech regarding this CSI student chapter. Then Dr. Aniruddha Nag, present chairman of CSI, kolkata chapter gave brief idea about the benefit of organising student chapter . Mr.Gautam Hajra, immediate past chairman CSI, Kolkata Chapter and Mr. Sourav Chakraborty, Vice chairman CSI, Kolkata chapter shared their valuable views regarding the opportunities of CSI. After that Prof. (Dr.) Sujoy Biswas, Director and CEO of Techno India Group addressed and delivered his speech. Then the special guest of this event ,Prof. (Dr.) Amlan Chakraborty, Professor and Director, A.K. Choudhury School of Information Technology-University of Calcutta, delivered his marvelous speech about machine learning. Students were highly motivated by this excellent speech and overall Program. Thereafter, Prof. Dr. Jayanta Porey, the Hod of computer science department announced the activities to be undertaken in the year 2020 by the CSI student chapter of TIU. Finally Prof. Anil Bikash Chowdhury, Hod of computer application department expressed the vote of thanks to all dignitaries.

At last, It must be mentioned that this wonderful event was completely organized under the leadership of hon'ble Director of TIU, Dr. Rina Paladhi who has always given the whole hearted support to all the organizer to make this event successful.

Needless to say that total 246 students participated in this event.

CHAPTERS REPORT

CHENNAI CHAPTER

Reported by Dr. A Prema Kirubkaran, Hon Secretary, CSI Chennai Chapter

The CSI Chennai Chapter organised the following six webinar events jointly with ACM Chennai and IEEE CS Madras during May-Jun 2020.

Webinar on "Neo-skilling for Digital Transformation & AI Revolution" by Mr. S Ramachandran, Principal Consultant, Infosys Knowledge Institute, Infosys on 20th May 2020 from 6 PM to 7 PM IEEE TEMS Madras and Wiley also were the joint organisers. Mr. M Arun, Vice Chair, IEEE TEMS welcomed the participants & introduced the speaker.

Link to the invitation: https://bit.ly/2WNNSFP.

Video (one hour and 19 minutes) recording link at https://bit.ly/3epSDwM

In collaboration with Classle SKILLNET conducted a series of two-day webinar sessions on "Certified Virtual Classroom Teacher' certification program" from 10 AM to 11:30 AM on the following dates:

a. First batch: 21st May and 23rd May 2020
b. Second batch: 28th May and 30th May 2020
c. Third batch: 4th June and 6th June 2020

The program comprised two mandatory phases, "Introduction and Overview on Teaching a Virtual Classroom" and "Mastering Virtual Classroom Delivery" by Mr. Parthasarathy Soundararajan & Mr. Ananth Raman, Classle SKILLNET.

Webinar on "Research Directions in IoT and Fog Computing" by Dr. C S R Prabhu, Former Director General, National Informatics Centre (NIC) on 30th May 2020 from 6 PM to 7 PM

Over 100 participants who attended this event, found it extremely useful, interesting, and informative and felt further research could be carried out in few areas which were discussed in the webinar.

Link to the invitation: https://bit.ly/2y8SAFU. Video (one hr & two minutes) recording link: https://bit.ly/2XKrz4r

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Along with Hindustan Chamber of Commerce CSI Chennai, ACM Chennai & IEEE CS Madras jointly organized a webinar on "Digital Marketing for Maximum Reach at Minimum Cost" by Mr. Vijay Verghis, Digital Marketing & Customer Experience Leader & Mr. Edwin Benedict Bellarmine, Digital Marketing Strategy Lead, Cognizant Interactive on 5th June 2020 from 4 PM to 5:15 PM

While Mr. Vijay gave an overview of how the industry is reacting to COVID19 situation and the prevailing business trends and the role of Digital Marketing, Mr. Edwin explained the various DM services with use cases.

CA Sarguru Das, President, HCC welcomed the participants and set the tone for the webinar title Digital Marketing. Mr. Hiren B Shah, Past Chair, CSI Chennai Chapter and Vice Chairman, Expert Committee on IT, HCC introduced the speakers.

Link to the invitation: https://bit.ly/2ZBIokG

Video (one hour and 11 minutes) recording link: https://bit.ly/37nVBz2

Webinar on "Insights on Business Agility in the IT sector for growth during and after COVID pandemic" by Mr. T V Balakrishnan, Sr. Business Analyst, FIS Global Solutions Ltd, Chennai on 6th June 2020 from 6 PM to 7 PM

Mr. Balakrishnan explained the power of Business Agility and essential levers of it and benefits for the growth of IT sector during this difficult situation of Covid-19.

Link to the invitation: https://bit.ly/36EgdTu

Video (one hour and 6 minutes) recording link: https://bit.ly/2Uj9Bov

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Webinar on "Industrial IoT and Cybersecurity" by Dr. Sithu D Sudarsan, ABB Corporate Technology Center, Bangalore on 13th June 2020 from 6 PM to 7 PM

The webinar covered differentiating features of Industrial IoT and specific cyber security implications thereof and highlighted the roles of professionals.

Link to the invitation: https://bit.ly/3ckX4Y6

Video (one hour and 15 minutes) recording link https://bit.ly/2UKF8Qv

While Mr. P V Subramanian, Chair, CSI Chennai Chapter welcomed the participants and introduced the speakers in the events 2,5 & 6, Mr. HR Mohan, Past President, CSI and Chair, ACM Chennai moderated the Q&A session at the end of the webinars 1, 2,4,5 & 6. These webinars were well attended, and the participants felt the events were timely, interactive, and found the content highly relevant, interesting, useful.

COIMBATORE CHAPTER

Reported by Mr. N Duraiswamy, Hon Secretary, CSI Coimbatore Chapter

The webinar by CSI Coimbatore Chapter was held on 20th of May 2020, at 3 pm with overwhelming registrations of more than 200. The speaker was Dr. Natarajan Venkatachalam, Postdoctoral Research Fellow, Quantum Engineering Technology Labs, University of Bristol, UK, and the topic was "Quantum Computing: An Introduction."

The chairperson of CSI Coimbatore Chapter, Dr. G Radhamani welcomed all the participants and introduced the Keynote Speaker. Dr. Natarajan Venkatachalam briefed the basic concepts of Quantum computing and the application of this concept in various domains such as Data analytics, Internet of Things.

Quantum computing (QC) is the study on the computer technology development based on the principles of quantum theory. Quantum computers leverage quantum mechanical phenomena to handle information. Quantum computing uses quantum bits or qubits instead of the traditional binary bits '0' or '1'. The quantum computer gets enormous processing power through the ability for bits to be in multiple states. The researchers throughout the globe apply quantum processors for applications in different fields. Many applications which involve computation of large data sets uses quantum computers. Quantum computing can be integrated with the applications deployed with the concepts like Internet of Things (IoT), Machine Learning and Data Anlaytics.

As the computational power of the Quantum computers is huge, they are suited for problems which have large dataset computations. This concept can be applied in various fields like Healthcare, Finance, Marketing and Logistics etc. The usage of the Qiskit (QC Simulator) has been discussed. The attendees raised the queries related to the usage of simulators for computing. The session was an eye opener to the researchers and the students. Mr. N Duraiswamy, Secretary, CSI-Coimbatore Chapter proposed vote of thanks.

KANCHEEPURAM CHAPTER

Reported by Dr. M Senthil Kumar, Hon. Secretary, Kancheepuram Chapter

CSI Kancheepuram Chapter in association with SRM Valliammai Engineering College CSI Student Branch organized a Webinar on 2nd of May 2020 (6.00 PM to 7.30 PM). It was a good way to make use of the time in the quarantine period. The webinar was about "Machine Learning & Deep Learning - A Project Approach". More than 50 students have registered and got benefited. The speaker was Mr. Sumod Sundar, Machine Learning Trainer, Additional Skill Acquisition Programme. He has 5+ years of research and 4+ years of academic experience in field of Machine Learning. He has trained more than 400 professionals, employees, students in Machine Learning. The students got to know about Machine Learning, Supervised – Unsupervised – Reinforcement, platforms for Machine Learning, SVM – basic theory, Clustering, Regression and Deep Learning. The students had basic hands on training too. The students got the opportunity to clear the doubts based on Machine Learning & Deep Learning and everyone enjoyed the session as it was interactive.

The support of Dr. B Chidhambararajan (Principal, SRMVEC), Dr. M Murugan (Vice Principal, SRMVEC) and Dr. B Vanathi (HOD, Department of CSE) gave the platform for the students. The guidance of CSI Staff Coordinators Dr. M Senthil Kumar (Associate Professor, Department of CSE), Dr. S Ravikumar (Assistant Professor, Department of IT) and Mr. V Santhana Marichamy (Asst. Professor, Department of General Engineering) brought the webinar to the maximum success. This event organized under the guidance of Dr. Rajeswari Mukesh, Chapter Chairman.

CSI Kancheepuram Chapter organized a National level coding competition in GUVI contest platform on 30th May 2020. It was a good way to make use of the time in the quarantine period. Around 120 students participated and got benefited. The competition had three problem statements based on difficulty level to be solved in the time period of three hours. Top 3 places were calculated based on few criteria like copy – paste, tab switching and satisfaction of test cases. The first place was shared by three people who are J. Sabarish (3rd year, SRM Valliammai Engineering College, Tamil Nadu), Bavesh Ram (1st year, Amrita Vishwa Vidhyapeetham, Tamil Nadu), R. K. Ganeshan (2nd year, Hindustan Institute of Technology and Science, Tamil Nadu). Sandeep Patel (1st year, Utkal University, Odisha) secured the second place. S Sonali (3rd year, SRM Valliammai Engineering College, Tamil Nadu) got the third place. Cash prize were awarded to these students for their achievement. GUVI platform gave a wonderful interface to conduct this coding competition in any comfortable coding language.

The support of Dr. Rajeswari Mukesh (Chairman, CSIKPM), Dr. M Murugan (Vice Chairman, CSIKPM), Dr. M Senthil Kumar (Hon Secretary, CSIKPM) and Dr. J Frank Vijay (Treasurer, CSIKPM) gave the platform for the participants and brought the competition to the maximum success.

LUCKNOW CHAPTER

Reported by Mr. Vinay Kumar Johri, Hon Secretary & Dr. Pankaj Goswami, Lucknow Chapter

CSI Lucknow Chapter organized a Webinar on Psycho-Social Impact of Pandemic: Challenges, Adjustment and Coping which was held on 13th June 2020 (Saturday) at 11.30 AM. Prof. R K Vyas, President Computer Society of India presided over the event. Sri Vinay Kumar Johri, Hon Secretary CSI Lucknow Chapter welcomed the keynote speaker Prof. Nachiketa Tripathi, Prof. R K Vyas, Prof. A K Nayak, Sri Arvind Sharma and all the participants from Computer Society of India, Research Scholars, Academicians, Students etc.

The programme started with the welcome address by Sri G P Singh, Immediate Past Chairman CSI Lucknow Chapter who welcomed all and apprised about the Lucknow Chapter of CSI.

Prof. R K Vyas, President Computer Society of India blessed the Organizing Committee of the event and all the participants. He stressed upon e-Activities during this crucial period where it is not possible to meet in person.

Dr. Pankaj Goswami, Chairman CSI Lucknow Chapter welcomed Prof. Nachiketa Tripathi, the keynote speaker from Indian Institute of Technology Guwahati, Prof. R K Vyas, Prof. A K Nayak, Sri Arvind Sharma and all present in the Webinar. He made brief description of Prof. Nachiketa's profile and about the event. Dr. Goswami also mentioned quotes of famous psychologist Carl Rogers, "The good life is a process, not a state of being. It is a direction, not a destination." and famous Sociologist Dale Carnegie "When dealing with people, remember you are not dealing with creatures of logic, but creature of emotions."

Prof. Nachiketa Tripathi delivered his lecture on the Theme "Psycho-Social Impact of Pandemic: Challenges, Adjustment and Coping". He apprised the audience about the current pandemic of COVID-19 and its social, economic and psychological impact on the whole world. He mentioned that impact of COVID-19 is on all irrespective of Gender, Age profile etc. He also shared the data analysis done by John Hopkins, University of Medicine in respect of India. He stressed upon Positive Psychology focused on Psycap (Psychological Capital) and positive traits that enhance human performance and growth and a shift of thinking – from repairing what is broken to nurturing what is best. His delivery of speech was so easy to understand that a complex subject was such an easy take by all the participants that approx. 200+ inclined participants from different fields and different part of the Country got connected to their full extent which was reflected in the Question Answer session of the event.

Dr. Puneet Misra from Management Committee CSI Lucknow Chapter collaborated the Question & Answer session. The questions were compiled by him during the event and raised justifiably to answer by Prof. Nachiketa.

The webinar was concluded by Sri Harish Chandra Gupta, Vice Chairman (Chairman Elect) from CSI Lucknow Chapter, to delivered vote of thanks to Prof. Nachiketa Tripathi, Prof. R K Vyas, Prof. A K Nayak, Sri Arvind Sharma (Regional Vice President, Region – 1), Dr. Pankaj Goswami, all participants of Webinar and entire Management Committee CSI Lucknow Chapter.

Technical support for the smooth execution of the Webinar was provided by Sri Vinod Shankar Tripathi. Ms Shivanshi Puri, Sri Gulab Chandra & Sri Pawan Kumar Nigam from Management Committee significantly contributed towards the success of the event

PATNA CHAPTER

Reported by Prof. Ganesh Panday, Deputy Director, IIBM, Patna

An one day National webinar on" Business Intelligence" was organised by Indian Institute of Business Management, Patna in technical collaboration of Computer Society of India Patna Chapter on 6 the June 2020. The webinar was inaugurated by Prof. U. K. Singh, the Chancellor of The Global Open University, Nagaland. Prof. A. K. Nayak, Immd. Past President and Chairman Academic & Awards Committee, CSI delivered the opening address where as Prof. M. S. Prasad Babu delivered the Key note address. Prof. Sunil Pandey, Director (IT& UG) of Institute of Technology & Science, Ghaziabad & Dr. Vijay Agrawal, Prof Incarge, Deptt. of Management, Birla Institute of Technology were Invited Speaker.

In his opening address while welcoming the guests, Prof. A. K. Nayak highlighted about the importance of the theme with it's emerging trend. He also pointed out regarding the importance of Business Intelligence due to the exponential growth of data in Business & Industry sector due to big competition which need the proper analysis for decision making. In his Inaugural address, prof. U. K Singh advised the management & IT students to exploit the big opportunities to be created in the field of Business Intelligence.

In his key note Address, Prof M. S Pd. Babu told that Business Intelligence can help companies to make better decisions by showing present &historical data within their business context. Further he talked on various scope and extent of tools,applications & techniques involved in business intelligence. Prof. Sunil Pandey in his Invited talk explained about the Scope & opportunities of the BI in future days to come particularly in Business world.

Md. Shams Raza, the Regional Vice President of CSI Region-II proposed the vote of thanks along with the concluding remark. Others who present in the webinar are Prof. Ganesh Panday, Deputy Director, IIBM, Patna, Prof. Nilesh Narayan, Chairman, CSI Patna Chapter, Mr. Gopal Krishna, Bihar State Student Coordinator,CSI. The webinar was hosted by Mr. Rohit Kumar, Asst. Professor, IIBM,Patna & attended by more than 600 participants from all over India

HIMALAYAN SCHOOL OF SCIENCE & TECHNOLOGY, DEHRADUN (REGION-I)

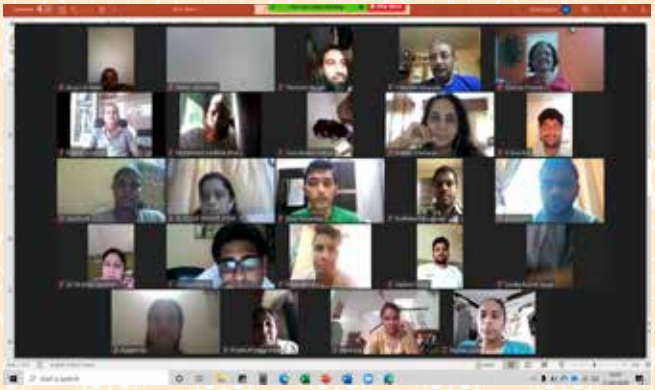
Reported by **Prof. Arpit Goel**, SBC, Himalayan School of Science & Technology

The CSI Student Branch of Himalayan School of Science & Technology, Dehradun has organized online C Programming Quiz Competition on 25th April 2020. Committee welcomed the participants and briefed rules and regulations of competition in WhatsApp Group (specifically created for participants). Subham Singh (BCA IV Sem), Nainsi Rautela (B.Tech VIII Sem) and Priya Pandey (BCA VI Sem) secured 1st, 2nd and 3rd Position respectively. Special thanks to Dr. R C Ramola (Dean, HSST) and Mr. Bineet Kumar Joshi (COD, CIS Deptt.) who have provided their valuable guidance to conduct the event successfully. The support of volunteer Kanhaiya (Diploma CSE VI Sem) was appreciable.

The CSI Student Branch of Himalayan School of Science & Technology, Dehradun has organized a online Hand Drawn Doodle Art Competition on 6th May 2020. Committee welcomed the participants and briefed rules and regulations of competition in WhatsApp Group (specifically created for participants). Prajna Bahuguna (B.Tech VI Sem) and Ritik Bhandari (B.Tech IV Sem) secured 1st and 2nd Position respectively. Special thanks to Dr. R C Ramola (Dean, HSST) and Mr. Bineet Kumar Joshi (COD, CIS Dept.) for their guidance for the smooth conduct of the event. The support of volunteer Kanhaiya Bhayana (Diploma CSE VI Sem) was appreciable.

MAHARISHI MARKANDESHWAR (DEEMED TO BE UNIVERSITY), AMBALA (REGION-I)

Reported by **Dr. Avinash Sharma**, SBC, Maharishi Markandeshwar (Deemed to be University)



Webinar on Microsoft Excel (12th June) and Microsoft Powerpoint (21st June) was organized by CSI Student Branch of Maharishi Markandeshwar (Deemed to be University), Ambala. Webinar has been coordinated by Dr. Avinash Sharma, Department of Computer Science and Engineering. This Webinar was in technical association with Voksen Corporate Training, Mumbai. Overwhelming response and received 2000+ nominations due to continuous promotion by mails, watsapp social media and facebook information. Allowed only the first 500 participants in the Zoom and rest on Facebook. Mr. Altaf Karimi - Corporate Trainer and Healer (14 years of global experience) as resource person delivered this topic and he is also life time CSI member. This Webinar was arranged complete free of cost. Participants were from all over India from various colleges and university. Very good feedback of Participants was seen during the webinar. More than 150 Participants was on zoom seen during the webinar and also many watched live on Facebook.

JAI PARKASH MUKAND LAL INNOVATIVE ENGINEERING AND TECHNOLOGY INSTITUTE, RADAUR (REGION-I)

Reported by **Prof. Vishal Garg**, SBC, Jai Parkash Mukand Lal Innovative Engineering and Technology Institute

Jai Parkash Mukand Lal Innovative Engg. & Technology Institute (JMIETI), Radaur has organized one day workshop on research methodology in collaboration with Computer Society of India on 28th May 2020. The workshop started with a joining session followed by a workshop guidelines. Inauguration was done by Dr. R S Chauhan, Director, JMIETI, Radaur. A detailed history of the Mukand group was discussed and their future vision in academics was shared. First talk was delivered by Dr. Pardeep Rana on "Importance of literature survey". He beautifully explained various basic terms related to research methodology. Then he explained how to do the literature survey with the help of mendeley software online. Second talk was given by Prof R S Chauhan on "Defining the research problem". He explained the steps are to formulate a research problem. What challenges a researcher will face at this stage of problem formulation. The problem should try to solve some issues related to our society and its needs. Dr. Sukhvinder delivered the third talk on "Interpretation and report writing". He highlighted the importance of correct interpretation in report writing, precautions that should be taken at write-up stage. Finally, he highlighted the UGC's guidelines related to levels of plagiarism and corresponding penalties for the same. The total number of participants was 114. A quiz link with all registered participants was shared and a total 95 E-certificates issued.

THE NORTHCAP UNIVERSITY, GURGAON (REGION-I)

Reported by **Dr. Shaveta Arora**, SBC, The NorthCap University

Keeping the current crisis in mind, the CSI Student Branch of The NorthCap University, Gurugram had organized an online webinar session on the topic, Secret Recipe to be Skillful, on 10th May 2020, dealing with how you can stay healthy, calm and productive in such times. The speaker, Ms Vibha Sood, is a successful IT Professional who has been working in the IT industry for over 20 years. She is leading the User Experience Research at GM Financials in Dallas. She is also a Director of SattvikLife, which is a Health and Wellness Firm. She is a certified Youth counsellor, a Mindfulness teacher and Yoga practitioner. She conducts workshops for the youth and mentors high school and college students throughout the USA. She broadcasted the webinar from Texas, USA where she currently resides. The webinar was broadcasted on YouTube Live (at 6:30 PM IST) and attracted a crowd of 350+ students from our college across the world. 400+ participants registered for the event each getting an E-Certificate for participation. The speaker taught a few breathing techniques, followed by a meditation session to overcome the stressful environment. The webinar ended with a Q & A session where Ms Vibha cleared various doubts that student had asked during the session. The webinar was planned and organised under the guidance of the faculty coordinators Dr. Shaveta Arora and Dr. Anuradha. The student coordinators involved were: Nishtha (Anchor), Kartik Yadav (Backend), Kartik Rao (Backend), Deepanshu (Graphics), Muskan (Graphics), Purvansh (Content), Parth (Publicity), Elisha (Publicity), Manit (Publicity), Hritik (Registration), Yashasvi (Publicity), Diksha (Registration) and Raksha (Publicity).

DEVANG PATEL INSTITUTE OF ADVANCE TECHNOLOGY AND RESEARCH, ANAND (REGION-III)

Reported by **Drashti Garadharia**, Devang Patel Institute of Advance Technology and Research

CSI Student Branch of Devang Patel Institute of Advance Technology and Research (DEPSTAR) had organized National Level Workshop on Blender in association with Association with Spoken Tutorial IIT, Bombay. The Workshop was conducted from 13th May 2020 to 15th May 2020.The mode of workshop was remote training. Spoken Tutorial is an initiative by the National Mission on Education through Information and Communication Technology (ICT) launched by the Ministry of Human Resources and Development (MHRD), Government of India and is being developed by IIT Bombay. The Spoken Tutorial Project is about teaching and learning a particular FOSS (Free and Open Source Software) such as Linux, Scilab, LaTeX, PHP & MySQL, Java, C/C++, Libre Office etc. via an easy Video tool – Spoken Tutorials. The workshop was conducted through remote training. A total of 180 participants participated in the Workshop. The Workshop was conducted at the National level wherein the faculties and the students were invited to attend the Workshop. The Workshop was free and Students find the workshop very amazing and fruitful.

B.V.M. ENGINEERING COLLEGE, VALLABH VIDYANAGAR (REGION-III)

Reported by **Dr. N M Patel**, SBC, B.V.M. Engineering College

Benjamin Franklin said that an investment in knowledge pays the best interest. So, in the time of pandemic, Computer department of Birla Vishvakarma Mahavidyalaya and CSI BVM student branch organized a National level webinar on ASP.NET CORE on 7th June 2020. Platform for national level webinar was Google Meet as well as YouTube Live. Mr. Mr. Mitesh Patel is a resource person. The webinar was addressed by the Principal Dr. Indrajit Patel and Head of Computer Department, Dr. Darshak Thakore with their words of encouragement and appreciation for all attendees. They emphasized the importance of such webinars for the upliftment of the students, especially during the lockdown.

Overall, 171 participants (136 students and 35 faculty members) from 7 states attended webinar. The webinar was attended by students as well as teachers including Senior Faculty Dr. N M Patel Sir from Computer Department of BVM. Firstly, the agenda of webinar was made clear to attendees. Expert Mr. Mitesh Patel enlightened the students with the importance of ASP.NET Core and difference between ASP.NET and ASP.NET Core. The hands-on to start development was

carried. He also focused on topics like MVC Architecture, Middleware Pipeline, Dependency Injection. Lastly the webinar ended with Q&A round. The Department intends to organize more such webinars in future so that students can gain maximum knowledge and exposure.

Successful game developers should found a way to make a game more than the sum of its graphical and programming parts, by focusing on and emphasizing design. So, in the time of pandemic, Computer department of Birla Vishvakarma Mahavidyalaya and CSI BVM student branch organized a webinar on How to Create 3D Games Using Unity on 10th June 2020. Mr. Paresh Chauhan: CEO, Creative Design and Multimedia Institute, Surat was the Resource person for the event.

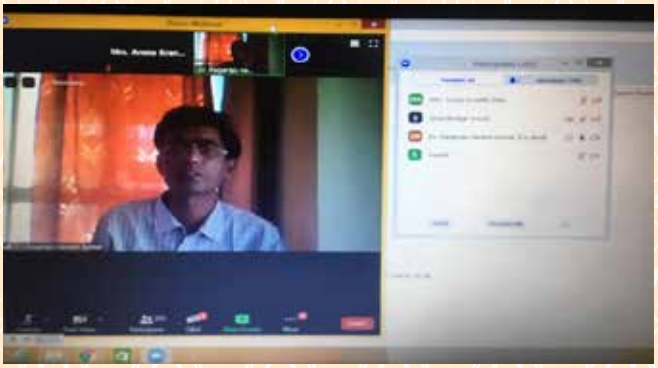
Unity is a cross-platform game engine, used to build 2D, 3D, AR, VR games. Apart from game development it is also used in film, automotive, architecture, engineering and construction industries.

The webinar was addressed by the Principal Dr. Indrajit Patel with their words of encouragement and appreciation for all attendees. They emphasized the importance of such webinars for the upliftment of the students, especially during the lockdown. Dr. Darshak Thakore, Head, Computer Department spoken to the participants. The webinar was attended by 182 participants including students and faculties across India via Google Meet. The webinar was also live streamed on CSI BVM SB YouTube channel. The expert Mr. Paresh Chauhan started with the basics of Unity. He explained about setup environment for game development using Unity. He talked about concepts and architecture of the game development. He also demonstrated creation of simple 3D game using Unity. Webinar ended with Q&A with expert and vote of thanks. The Department intends to organize more such webinars in future so that students can gain maximum knowledge and exposure.

VAAGDEVI ENGINEERING COLLEGE, WARANGAL (REGION-V)

Reported by **Prof. Ramesh Gadde**, SBC, Vaagdevi Engineering College

CSI Student Branch of Vaagdevi Engineering College, Warangal has organized a one-week workshop on IoT using Raspberry PI from 7th March 2020 to 14th March 2020. Seats were very limited and 60 students participated in this workshop. The following topics were covered. IoT and its applications, Sensors and Application, Code python programming & Code IoT Kits using Python interface. The resource persons for the workshop are Dr. Rakesh Nayak, Professor, Dept., of CSE, Vaagdevi Engineering College, Dr. Nishu Gupta, Assistant Professor, Dept., of ECE, Vaagdevi College Engineering, & Mrs. T Sravanthi, Assistant Professor, Dept., of CSE, Vaagdevi Engineering College, The Convener of the Workshop Mr. Dr. R Naveen Kumar, Professor, Dept., of CSE. Faculty Coordinators are Mrs. Dr. J. Srikanth, Professor Dept., of CSE & Mr. K Goutham, Assistant Professor, Dept., of CSE. Student Coordinators are Mr. Ch Akhil, 3rd Year, CSE & Mr. P Srujana, 3rd Year, CSE.



CSE Department of Vaagdevi Engineering College in association with VEC-CSI Student Branch is organizing a online workshop on "Tech talk on trending technologies" on 20th May 2020. This workshop gives brief idea about recent technologies and how to make mini and major projects. Dr. R Naveen Kumar, HOD in his inaugural address requested the students and faculties to utilize the online platform for learning. A total of 724 students from 42 colleges were participated. E-certificates were distributed to all participants. Artificial Intelligence, Machine Leaning, Data Science, Python, Internet of things were enlighten in the workshop by the Resource person Mr. Jay Prakash, Marketing Manager and Technical Consultant, Smart Bridge Pvt., Ltd,. Hyderabad, Telangana. Faculty coordinators are Mrs. G Aruna Kranthi, Associate Professor Dept., of CSE, Mr. G Ramesh, Associate Professor, Dept., of CSE & Student Branch Coordinator. The Student Coordinators are Mr. G Shiva Kumar, 3rd Year, CSE & Mr. Ch Anuraag, 3rd Year, CSE.

ANURAG GROUP OF INSTITUTIONS, HYDERABAD (REGION-V)

Reported by **Prof. V. Rama Krishna**, SBC, Anurag Group of Institutions

Department of CSE Anurag Group of Institutions in association with CSI Student Branch has conducted a event on "GoCode–Coding Competition" on 8th June 2020, Students are participated from different colleges. The main objective of the event is a coding competition in the C-Language, focused to nurture the problem-solving skills of a student.

BVRIT HYDERABAD COLLEGE OF ENGINEERING FOR WOMEN, HYDERABAD (REGION-V)

Reported by **Prof. S. Rama Devi**, SBC, BVRIT HYDERABAD College of Engineering for Women

BVRIT HYDERABAD College of Engineering for Women, Department

of Computer Science & Engineering and Department of Information Technology in association with CSI BVRITH Student Branch organized National Level Quiz on Test Your Skills in Machine Learning with Python from 15th June 2020 to 18th 2020. A total of 571 participants and more than 60 college students all over India has participated in this event. Quiz consisted of 3 rounds. Students who got 50% marks are promoted for next round and participation certificate was given. Students who cleared all the three rounds are awarded with special appreciation certificate.

DR. K V SUBBA REDDY INSTITUTE OF TECHNOLOGY, KURNOOL (REGION-V)

Reported by **Prof Bushra Tahseen**, SBC, Dr. K V Subba Reddy Institute of Technology

The Department of Computer Science & Engineering, Dr. K V Subba Reddy Institute of Technology in association with CSI Student Branch has conducted a National Level Webinar on "Cyber Security" through YouTube platform on 3rd June 2020. Resource person for the Event is Mr. H Ateeq Ahmed, Kurnool. In this Event, Total 308 students have been participated across all Branches. During the Technical Talk, topics covered are: Growing use of Internet, Cyber Crime, Types of Cyber Crime Methods, Security Measures

PRAGATI ENGINEERING COLLEGE, SURAMPALEM (REGION-V)

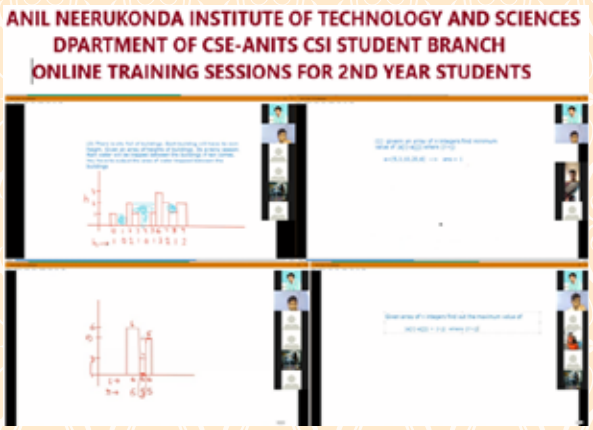
Reported by **Dr. M. Radhika Mani**, SBC, Pragati Engineering College

The National Level Webinar on "Creating and Testing Block Chains with Hyperledger Composer" was organized by CSE Department of Pragati Engineering College in association with CSI Student Branch on 19th June 2020 in Microsoft Teams app. The Event was started by Dr. M Radhika Mani, Professor and HOD-CSE by welcoming the Chief Guest Prof M S Prasad Babu, Regional Vice President, Region V. The Principal of Pragati Engineering College Dr. S Sambu Prasad expressed his gratitude to the Chief Guest and Invited Speaker of the webinar. He also congratulated the HOD and all the faculty of CSE Department for conducting this webinar for the benefit of faculty and student community.

Mr. T Sivarama Krishna, started the session by initially explaining the present economical transactions model i.e. the traditional approach that has a trusted third party. He discussed the drawbacks in this approach and then introduced the Block Chain technology and how it can overcome these drawbacks. He pointed the immutability of Block Chain and dealt with crypto currencies, bitcoins and the related terminology. He continued giving real life examples. He also significant contribution for the students and enlightened all the participants by introducing this leading-edge block chain technology. Mrs. K Divya proposed the vote of thanks. Totally 258 participants are attended the webinar. E-certificates and the material shared by the invited speaker are given to all the participants.

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES, SANGIVALASA, VISAKHAPATNAM (REGION-V)

Reported by **Prof S.Joshua Johnson**, SBC, Anil Neerukonda Institute of Technology & Sciences

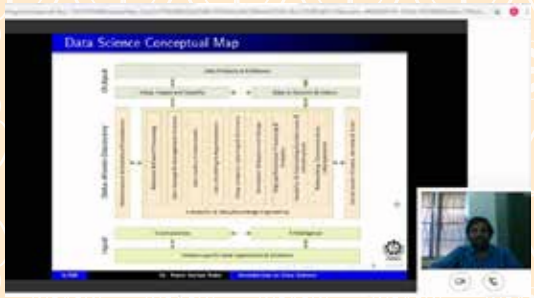


"Online Coding Class" conducted by department of CSE of Anil Neerukonda Institute of Technology and sciences, in association with CSI Student Branch.

Arrays, Bit manipulation concepts have been discussed on 21-05-2020. Two pointers concepts have been discussed on 28-05-2020. The sessions went on for 2 hours from 3:00 PM to 5:00 pm on both the days. A total of 15 problems have been given and solved by the resource person Mr. Surya Teja Suvarna Raju Chevati. The session enhanced the knowledge of students and made them ready for different online coding classes, and competitions.

RAGHU ENGINEERING COLLEGE, VISAKHAPATNAM (REGION-V)

Reported by **Prof B Meena**, SBC, Raghu Engineering College



The CSI Student Branch of Raghu Engineering College, Visakhapatnam has organized a Five-day Faculty Development program on Python for Data Science. This program was conducted from 1 June 2020 to 5 June 2020 through online platform – ZOHO meeting. Prof Jose Mozes, Department of CSE, Raghu Engineering College was the Event Convener. Prof B Meena, Department of CSE, Raghu Engineering College was the CSI Coordinator. The resource persons for FDP are Prof S Srinadh Raju, Dr. A Anupama, Dr. S Satyanarayana & Mr. A Lakshman Rao, CSE Department, Raghu Engineering College and Prof Korra Sathya Babu, CSE Department, NIT-Rourkela, The Details of the session are Basics of Python using Spyder Tool, Control Structures, Data types and Data structures, Function Numpy, Pandas Dataframe and operations on dataset, Data visualization, Machine Learning - Regression, Decision Tree, Classification Algorithms

Introduction to Data Science, Research Directions in Data Science.

CHALAPATHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, GUNTUR (REGION-V)

Reported by **Dr. K. Kiran Kumar**, SBC, Chalapathi Institute of Engineering and Technology

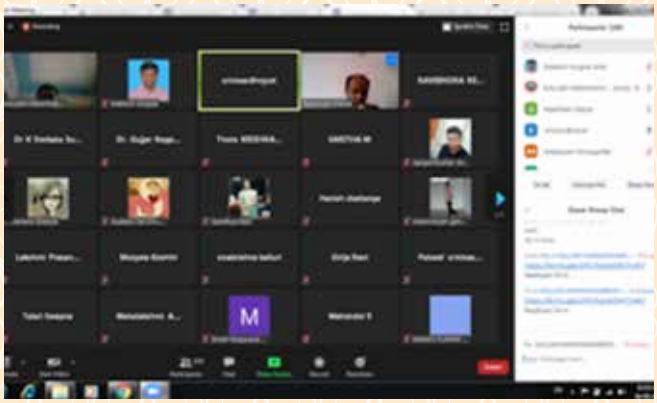
A webinar on Virtual & Augmented Reality in Industry 4.0 was organized by the department of CSE, Chalapathi Institute of Engineering and Technology on 26th May 2020 in Association with CIET CSI Student Branch. The webinar was inaugurated by the CEO of the CIET Dr. B Raveendra Babu and Principal Dr. M Chandrasekhar. The host is Mr. K Vijayarajan, CEO, MAX, Chennai. In the first session of the webinar, participants are given overview of AR & VR and later he explained clearly showing the live demos what is augmented reality and how it can used in our life. In the second session, he explained what is virtual reality with real time examples and videos. The session was concluded with vote of thanks by Professor & HOD of CSE, Dr. K Kiran Kumar. The webinar got very good response and about 1200 students & faculty participated from 19 different states and two from Indonesia acquired good amount of knowledge. Entire programme was coordinated by Dr. K Kiran Kumar, HOD-CSE, CIET. We thank all the participants for making this event successful. Finally, there was a good feedback for the webinar conducted.

A Webinar on Career Guidance was organized by the department of CSE, Chalapathi Institute of Engineering and Technology on 15th June 2020 in Association with CSI Student Branch, Indian Servers and Freshers Plane. The Program was hosted by Dr. K Kiran Kumar, HOD CSE of CIET. Initially CEO, Dr. B Raveendra Babu welcomed the participants and told them about the importance of these webinars during these hard days. Mr. V V Lakshmi Narayana, IPS (Retd) was the resource person for this webinar. The webinar is on Career Guidance. This was a motivational talk in its core. The main thing is a quote by Dr. A P J Abdul Kalam. Kalam says that one must be remembered, be unique, and be great. The whole talk centered on these three qualities a person should possess. He demonstrated every aspect of life and how we should be positive in all circumstances and how a should change the attitude to a positive manner etc were clearly told with real time examples. Principal of CIET, Dr. M Chandrasekhar concluded the meeting by vote of thanks. About 821 students and faculty participated from 19 different states in India and acquired good amount of knowledge. Entire webinar was coordinated by Dr. K Kiran Kumar. We thank all the participants for making this event successful. Finally, there was a good feedback for the Webinar conducted.

KALLAM HARANATH REDDY INSTITUTE OF TECHNOLOGY, CHOWDAVARAM (REGION-V)

Reported by **N. Md Jubair Basha**, SBC, Kallam Haranath Reddy Institute of Technology

Three Day Online FDP on Recurrent Neural networks - A Deep Learning Approach conducted by KHIT CSI Student Branch on 14-16 May 2020. The level of faculty development, training and support available for those teaching online also has a direct impact on faculty readiness, and therefore acceptance of online teaching and learning. This course provides practical foundation level training that enables immediate and effective participation in Recurrent Convolution neural networks and Deep learning. The resource persons for the event are Dr. Srinivas Jagirdar, Muffakham Jah College of Engineering and Technology, Hyderabad and Dr. G. Rajesham, Muffakham Jah College of Engineering and Technology, Hyderabad.



Day-1 Online FDP Session hosted by Prof B Satyanarayana Reddy @ 11:00AM using Zoom Cloud Meeting App-License Version. Zoom Cloud Meeting classroom allowed maximum count of 100 participants initially. Day-1 Online FDP Session start with keynote speaker Dr. Srnivas Jagirdar, Basic concepts of Neural networks will be delivered in this session. Mr. Rajesham Gajula addressed Day-1 Online FDP session discussed and Demonstrated CNN for object recognition using python. More than 500 participants have been registered for Online FDP. Using Zoom cloud meeting only first 100 participants are allowed in to zoom classroom based on the timestamp of the registration form. Rest of the participants are attended online FDP by accessing YouTube live stream.

NMAM INSTITUTE OF TECHNOLOGY, NITTE (REGION-V)

Reported by **Dr. Sharada U Shenoy**, SBC, NMAM Inst. of Technology

Amid the lockdown, CSI Student Branch of NMAM Institute of Technology has been successful in conducting an online drawing competition from 7th to 14th April 2020. Seven days was given as the deadline for the participants to upload their drawings into the link provided. One individual could submit a maximum of three drawings. There was a total of 33 participants with different kinds of artwork like sketches, paintings, mandala etc. The CSI student branch counsellor Mrs. Sharada Shenoy along with other faculties were assigned with the task of judging the competition. The competition witnessed three amazing art works out of all the submitted securing the top three spots, the winner's include Mr. Shiv Shankar Shyam who won first, Mr. Vignesh Acharya won second and Mr. Rahil Hasan took third place.

Gist of the event : Amid the lockdown, CSI Student Branch of NMAM Institute of Technology has been successful to conduct a photography event from 14th to 24th April 2020. Ten days was given as the deadline for the participants to upload their pictures into the link provided. Well coordination of the organizers led to the success of this event. The competition witnessed three amazing pictures out of 15 submitted securing the top three spots. The winners include Shreepada Bhat who won first, Kiran holla won second and Shashank N took third place.

NEW HORIZON COLLEGE OF ENGINEERING, BANGALORE (REGION-V)

Reported by **Dr. B. Rajalakshmi**, SBC, New Horizon College of Engineering

CSI Student Branch of New Horizon College of Engineering, Bangalore organized a Five days online Faculty Development Programme on Image and Video Processing Techniques using Python Programming from 15 June 2020 to 19 June 2020. Mr. Ganesh has rich experience in Image and Video Processing. During his presentation, he highlighted the various industrial projects that are being carried out in Image processing. He also emphasized how Python is taking importance in programming part. Around 60 participants from across the country, covering 5 major states have registered for the FDP. E-Certificates were distributed to the participants. The resource person of the event is Mr. Ganesh Attarde, Founder, GB Softronics Solutions, Nasik, Maharashtra. Beneficiary: All faculty members from across the country.

BANGALORE INSTITUTE OF TECHNOLOGY, BANGALORE (REGION-V)

Reported by **Prof. Y. Shobha**, SBC, Bangalore Institute of Technology

Event on Real Time Application of Machine Learning by Karthik Narayan Rao, Research Head, Theremin.ai, delivered a talk on "Real World Applications of ML/AI & challenges on 20 May 2020 between 4:00 pm - 5:00 pm. Block Chain Fundamentals by Dr. Jaya R, Assistant Professor, Dept of CSE, New Horizon College of Engineering, delivered

talk on block chain fundamentals 20 May 2020 between 6:00 pm - 7:00 pm

Cyber Security Awareness by Mr. Nagaraj S, CEO, IT Security Systems delivered talk on how attacks happens, different attacks and gave awareness about cyber security, insight about the digital transactions vulnerabilities on 21 May 2020 between 5:00 PM - 6:00 PM. Text Analytics by Dr. G. Kumaravelan, Asst. Professor, Dept. of CSE, School of Engineering & Tech, Pondicherry University, delivered talk on "Text Analytics" on 22 May 2020 between 5:00 PM - 6:00 PM

Building Dynamic Web Projects using Servlets and JSP by Dr. Harish Kumar B T, Assistant Professor, Department of CSE, BIT delivered hands-on session on "Working on web projects" on 23 May 2020 Between 11:00 AM - 1:00 PM. Block Chain Applications by Keerthan S, App Developer, Nvest Technologies delivered a talk on "Block Chain application" on 23 May 2020 between 4:00 PM - 5:00 PM

K S INSTITUTE OF TECHNOLOGY, BANGALORE (REGION-V)

Reported by **Prof. Deepa S R**, SBC, K S Institute of Technology

CSI Student Branch of K.S. Institute of Technology, Bangalore has organized a webinar on the topic "Internship Talk" on 7th June 2020. 75% of the people staying at Home search for online work. During this quarantine period, Indians along with the people from around the world are now looking for Jobs online to work from Home. Similarly, most of the internships are also being conducted online. Rapsol Technologies had hosted Webinar on Internship Talk through online to address the same. This talk was organized for the students of KS Institute of Technology on 7th June 2020 at 11:30 am for the student of 6th sem. The meeting was conducted through Zoom to make the students know about online Internship.

AMRITA SCHOOL OF ENGINEERING, BANGALORE (REGION-V)

Reported by **Dr. N Rakesh**, Amrita School of Engineering

The Dept. of CSE with support of Amrita CSI Student Branch hosted a webinar on "IoT & Smart Networks" at 4.00 PM to 5.30 PM on 22 May 2020. The event aimed to provide students community, academicians & industry participants to get in insight of Internet of Things domain. It was kick started by outline of agenda by Ms Sreevidya B, Asst Professor, then First speaker Dr. N Rakesh, Vice Chair & Mentor of CSI gave a talk on Introduction to IoT, Second speaker Dr. Uma Maheshwari B, Asst Professor briefed on spectrum of application about IoT, Third Speaker Mr. Rajesh M, Asst Professor gave a demo on Sensor Automation & finally Mr. Ullas S & Mr. Vishwas H N, Asst Professor shown simulation demo on IoT Home Automation using Cisco tools. All the members belong to Dept of CSE, Amrita School of Engineering, Bangalore. The event was well supported by our Dept. Admission coordinators Ms Nalini S & Ms Jyostna C – Asst Professor Dept of CSE. The webinar had excellent response of 783 registrations and active participants we had around 150 members combination of students, academicians & industry background. The event concluded with Question & answer sessions followed by feedback of the session.

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI

Reported by **Dr.Suvarna Nandyal**, SBC, Poojya Doddappa Appa College of Engineering

Online Workshop on "Advanced C and Kernel Programming" is organized from 25th June 2020 to 30th June 2020 for the benefit of students to gain very useful knowledge on Advanced C and Kernel Programming who are willing to make a career in system programming. Mr. Sharanabasappa Sali, Tech Lead, Global Edge Software Ltd, Bangalore is the resource person for this workshop. Dr. Suvarna Nandyal is convenor for the program and Dr. Sujata Terdal and Mrs. Pooja Aspalli of CSE department PDA are coordinators. Mr. Sharanu of 4th Sem CSE is the student coordinator for the event. The Online workshop was inaugurated by Prof M Surendra Prasad Babu, CSI Regional Vice President Region V. Prof. M. Surendra Prasad Babu presented inaugural address to the participants.

Dr. Suvarna Nandyal, HOD, CSE Department, PDACE Kalaburagi introduced the CSI Vice President and briefed the student branch activities. She then introduced resource person and welcomed the participants and guests. Dr. S S Hebbal, Principal PDA College of Engineering, Kalaburagi, addressed the participants, and encouraged CSE department by appreciating efforts taken up in organizing this event.

335 students from various engineering colleges of various states have registered for the course. 102 students attended the first session on 25 June 2020. We extend gratitude to the RVP and official members for providing an opportunity to be in association with CSI.

DR. D.Y. PATIL ARTS, COMMERCE & SCIENCE COLLEGE, PUNE (REGION-VI)

Reported by **Prof. Sunayana Shivthare**, SBC, Dr. D Y Patil Arts, Commerce & Science College

By considering the scenario caused by Corona virus and Lockdown Dr. D Y Patil ACS College Pimpri CSI student branch has taken initiative to host a live Webinar on "Lockdown : You and Positive View " for CSI Students. It was be hosted by Dr. Ranjit Patil, Vice Principal and HOD (Computer Science) on 5 May 2020 at 3.00 pm

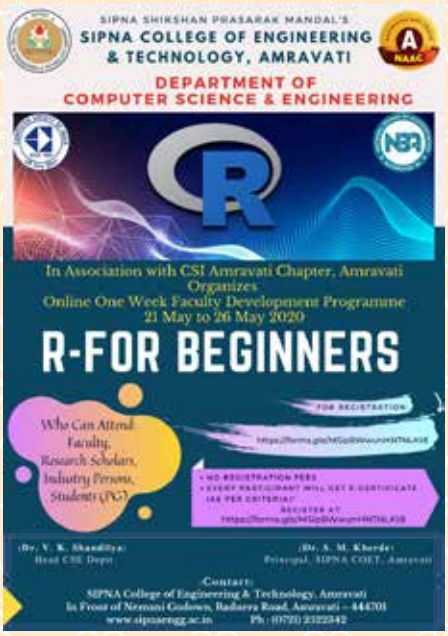
SUMAN RAMESH TULSIANI TECHNICAL CAMPUS, PUNE (REGION-VI)

Reported by **Prof. Sonali Patil**, SBC, Suman Ramesh Tulsiani Technical Campus

CSI Student Branch of Suman Ramesh Tulsiani Technical Campus, Pune has successfully conducted a webinar on " Internet of Things (IoT) for Music Therapy "on 2nd June 2020, Tuesday at 09:30 am - 11:00 am. Total participant was 294 from Industry & Academics. Prof Yogesh Pingle, Assistant Professor in Information Technology Department of Vidyavardhini's College of Engineering & Technology, Vasai, Maharashtra is the resource person for this event. He is conferred with Visharad degree for harmonium from Akhil Gandharva Mahavidyalaya Mandal, Miraj and IoT expert.

SIPNA COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRAVATI (REGION-VI)

Reported by **Prof. Yugandhara Thakare**, Sipna College of Engineering and Technology



Department of Computer Science & Engineering, Sipna College of Engineering and Technology, Amravati in association with CSI Amravati chapter conducted Online one week Faculty Development Programme on "R-for Beginners" from 21st May to 26th May 2020. In this Online FDP 359 faculties were enrolled from various colleges. R is a programming language and free software environment for statistical computing and graphics supported by the R Foundation for Statistical Computing. The R language is widely used among statisticians and data miners for developing statistical software and data analysis. In Amravati region SIPNA organized the Online Faculty Development Programme on this topic in such Covid-19 pandemic situation.

Faculties of CSE department Dr. Pritish Tijare, Prof Harsha Vyavhare, Dr. Ashish Bardekar, Dr. Girish Thakre, Prof Ketki Ingole, Prof Prachi Khanzode and Prof Nitin Chavan were the resource person for this FDP. FDP got a huge response from participants. Participants were awarded by E-certificate as well. President of Sipna Shikshan Prasarak Mandal, Hon'ble Shri Jagdishji Gupta, Principal Dr. S M Kherde and Head of Department Dr. V K Shandilya guided for the successful accomplishment of this event. Faculties of Computer Science & Engineering department Dr. Pritish Tijare, Prof Harsha Vyavhare, Dr. Ashish Bardekar, Dr. Girish Thakre, Prof Ketki Ingole, Prof Prachi Khanzode, Prof Nitin Chavan, Prof Amar Sable, Prof Ameet Shah and Prof Amol Zade took efforts for the successful accomplishment of this programme.

PROF RAM MEGHE INSTITUTE OF TECHNOLOGY & RESEARCH, AMRAVATI (REGION-VI)

Reported by **Dr. S R Gupta**, SBC, Prof Ram Meghe Institute of Technology & Research

The CSI Student Branch of Prof Ram Meghe Institute of Technology & Research, Amravati has organised online Technical Competitions on Come, Compete and Conquer on 23rd May 2020. Total 140 Students participated. The program was Conducted in presence of Dr. G R Bamnote, Head, CSE & Past Chairman, CSI Amravati Chapter, Dr. S R Gupta, SBC-CSI Student Branch and all teaching faculties of Computer Sci & Engg Department attended the event online. Event was coordinated by Prof Poonam Lohiya, accompanied by the CSI Student Branch President Mr. Allahad Deshmukh with Student Coordinators Mr. Durvesh Singh Thakur, Mr. Ghazi Khan, Ms Janki Dehankar, Mr. Rudresh Deshpande, Mr. Digvijay Taywade, Mr. Sarvesh Sharma Computer Science & Engineering department. Total prizes of ₹ 6,000/- were given to the winners. The whole program was a grand success. We are also thankful to our respected Principal, Dr. A P Bodkhe for his motivation, guidance and necessary support.

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE, CHENNAI

Reported by **Prof. D. Chitra Devi**, SBC, Hindustan Institute of Technology and Science

The School of Computing Science, Department of Computer Applications organized a Webinar on "SOFTWARE TESTING" in association with Computer society of India via Microsoft Teams on 11-05-2020. Chief Guest Mr. G Prabhu was introduced by Ms D Chitradevi,

SBC, CSI Student Branch. Ms D Chithradevi gave the welcome address of the guest that he was an alumni who studied in Hindustan Institute (Batch of 2009-2012).

The Chief Guest started the webinar by explaining the students about Software Testing and Specifications of Software Testing. He explained about SDLC, Waterfall model with a Diagram, Agile and Iterative with a Diagram. He also explained the difference between agile software development model and waterfall model with an example and STLC Life cycle. He has elaborated about the Types of Software Testing i.e. Regression, System, Compatibility, Functional, Integration, Security, Smoke and User acceptance. At the End of the session Nishanth Ravikumar (Student of BCA) gave a vote of Thanks and then MS D Chitradevi Concluded the Seminar for the day.

SATHYABAMA INSTITUTE OF SCIENCE & TECHNOLOGY, CHENNAI (REGION-VII)

Reported by **Dr. Jabez J**, SBC of Sathyabama Institute of Science & Technology

Sathyabama Institute of Science and Technology, in association with Computer Society of India, Chennai conducted series of webinars in the recent trends from 4 May 2020 to 16 May 2020. Speakers from reputed organizations shared their perspectives about various technologies and highlighted the challenges in their field of specialization. It was mind-blowing knowledge sharing sessions to the students, faculties, and researchers in different platforms. More than 2000 participants participated from various colleges, Industries across the nation. The webinar was beneficial to all the participants during this Covid-19 Pandemic. The topics covered by the webinar are Agent-based Intelligent Systems, Modern Automation, Machine learning using python, AI and NLP, Outcome based Education, Technical walk through about the client and server side skeleton with latest technologies, How to use Cloud effectively, AWS cloud, Understanding and implementing teaching Research nexus, Getting Started with Endnote online Referencing Software, Basics of Router, Machine Learning, Cloud Computing, Data Analytics, Digital Revolution – Post COVID Scenario, Front end Frame Work Angular. Effective initiatives were taken by many staff members of CSE and IT departments with the support of the Department Heads. All the Webinar events were completed successfully with the motivation of Dr. T Sasikala, Dean, School of Computing.

VELAMMAL ENGINEERING COLLEGE, CHENNAI (REGION-VII)

Reported by **Prof T. Subashini**, Velammal Engineering College

CSI Student Branch of Velammal Engineering College (VEC) has organized online faculty development program on Theory of computation from 18.5.2020 to 22.5.2020 with the duration from 4.00

pm to 6.00 pm using a licensed zoom tool. The programme is convened by Dr. S Chakaravarthi, Prof &HoD, CSE, and organized by Mrs. S RajalakshmiAsst Prof, Dept of CSE, VEC, Mrs. A Bhagyalakshmi, Asst Prof, Dept of CSE, VEC and Mrs. D Jena Catherine bel, Asst Prof, Dept of CSE, VEC. Total of 435 faculties and research scholars of various colleges inside and outside India have attended and benefitted from this FDP. This faculty development program included five-session, which were taken by faculties of Velammal engineering college and resource persons from other institutions. Resource persons of this online FDP are Mrs. D Jena Catherine Bel, Asst Prof, Dept of CSE, Mrs. A Bhagyalakshmi, Asst Prof, Dept of CSE, Mrs. S Rajalakshmi, Asst Prof, Dept of CSE, Dr. G Geetha, women scientist trainee, TIFAC, Dr. D JemiFlorinabel, professor, Dr. sivanthiaditanar college of engineering. The topics discussed in this FDP are Finite Automata and its types, Regular Expression and Regular Languages, Context Free Grammars and Normal forms, Pushdown automata, Turing Machines and Undecidability. The online class PPTs and subject notes had been sent to the participants at the end of each session. The E-Certificates were sent to the participants on the final day. The participants actively participated and gave good comments about the FDP program.

CSI Student Branch of Velammal Engineering College (VEC) has organized online faculty development program on Data Structure from 25.05.2020 to 29.05.2020. The programme is convened by Dr. S Chakaravarthi, Prof & HoD, CSE, and organized by Dr. S GUNASUNDARI, Asso Prof, Dept of CSE, VEC, Dr. M Usha, Asst Prof, Dept of CSE, VEC and Mrs. G Sumathi, Asst Prof, Dept of CSE, VEC. The 345 participants of various colleges inside and outside India

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FROM CSI STUDENT BRANCHES

have attended and benefitted from this FDP. Resource persons of this online FDP are Dr. S Gunasundari, Asso Prof, Dept of CSE, VEC, Dr. P Prittopaul, Asst Prof, Dept of CSE, VEC, Dr. M Usha, Asst Prof, Dept of CSE, VEC, Mrs. B Hemalatha, Asst Prof, Dept of CSE, VEC, Mr. K Sundar, Asst Prof, Dept of CSE, VEC, Ms K Devi, Asst Prof, Dept of CSE, VEC, Mrs. G Sumathi, Asst Prof, Dept of CSE, VEC. The topics discussed in this FDP are Linear Data Structures - Array & List: Implementation and Applications, Stack: Implementation and Applications, Queue: Implementation and Applications, Non Linear Data Structures: Bst, Avl, B Tree: Implementation and Applications, Graphs Representation, BFS, DFS, Biconnectivity, Hashing, Application of Graphs, and Sorting. The participants showed great enthusiasm towards understanding and applying the concepts and techniques taught during the entire sessions.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM (REGION-VII)

Reported by **Dr. R Alageswaran**, K L N College of Engineering

Computer Society of India (CSI) Student Branch of K L N College of Engineering organised online International Seminar on "Big Data Engineering for Analytics" on 25th May 2020. Dr. A Suriya Priya, Principal Lecturer and Consultant, Software Systems Practice, National University of Singapore was the resource person. Around 260 participants from India and Abroad registered for this International Seminar.

Dr. R. Alageswaran, SBC of CSI Student Branch delivered welcome address and briefed about the objective of conducting this event. In the inaugural address, Dr. A V Ram Prasad, Principal told that the faculty members should learn continuously and the knowledge must be disseminated to the students. The participants of the International Seminar should utilise this opportunity to learn from Eminent Professors like Dr. A Suriyapriya, he told.

In the technical session, Dr. Suriya covered Big data Engineering, 6Vs of big data, challenges and use cases of Big data Engineering. She clarified all the doubts raised by the participants. The participants were involved very actively, and E-certificates were given to all the participants who attended this event online. Coordinators Dr. G Ramesh and Mr. J Gautam made all the technical arrangements for this event

RAMCO INSTITUTE OF TECHNOLOGY, RAJAPALAYAM (REGION-VII)

Reported by **M. Swarna Sudha**, SBC, Ramco Institute of Technology

The Computer Society of India Student Branch, Ramco Institute of Technology organized "WorkShop on LMS–Canvas" from 8 June 2020 to 10 June 2020. Faculties from Ramco Industrial Training Institute, Rajapalayam have participated and got benefited. Ms M Swarna Sudha, Assistant Professor (SG) has coordinated event under the guidance of Dr. K Vijayalakshmi, Professor and Head. Dr. M Kaliappan, Associate Professor was the resource person. The resource person provided hands-on training on creating a course, assignment, announcement, quiz, discussion, files, and folders in Canvas. Also, he discussed the benefits of learning management systems to participates.

The Computer Society of India Student Branch, Ramco Institute of Technology organized a "Covid-19 Contest by RIT-Ramco" from 1 June 2020 to 5 June 2020 for the school students. Various quizzes were conducted for the first three days on the topic of General Knowledge, Covid-19 Awareness and Python Programming. In addition to that drawing and essay competition on "Covid-19 Awareness" were conducted for the school students. 70 participants from various schools were actively participated and enjoyed in each contest