CSI Communications
Knowledge Digest for IT Community

COMPUTER SOCIETY OF INDIA
ESTD. 1965

SMART CITY

INTERNET of EVERYTHING (IoE) Applications

SMART EDUCATION

WORLD NEWS

Happy EARTH DAY

SMART AGRICULTURE

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an individual.

2 are friends.

3 is company.

more than 3 makes a society. The arrangement of these elements makes the letter 'C' connoting 'Computer Society of India'.

the space inside the letter 'C' connotes an arrow - the feeding-in of information or receiving information from a computer.

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Contents

Editorial

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

Prof. Prashant R. Nair
Editor

Dear Fellow CSI Members,

"IoT is transforming the everyday physical objects that surround us into an ecosystem of information that will enrich our lives. From refrigerators to parking spaces to houses, the IoT is bringing more and more things into the digital fold every day, which will likely make the IoT a multi-trillion dollar industry in the near future."

– Pricewaterhouse Coopers report

"The global industrial sector is poised to undergo a fundamental structural change akin to the industrial revolution as we usher in the IoT. Equipment is becoming more digitized and more connected, establishing networks between machines, humans, and the Internet, leading to the creation of new ecosystems that enable higher productivity, better energy efficiency, and higher profitability. While we are still in the nascent stages of adoption, we believe the IoT opportunity for Industrials could amount to $2 trillion by 2020. The IoT has the potential to impact everything from new product opportunities, to shop floor optimization, to factory worker efficiency gains that will power top-line and bottom-line gains"

– Goldman Sachs Report

The theme for the Computer Society of India (CSI) Communications (The Knowledge Digest for IT Community) May 2018 issue is 'Applications of Internet of Everything'. We are continuing with the issue on Sensors for IoE with this applications of IoE feature.

For the benefit of giving our CSI members more time to present their original research and empirical results, we are extending the announced research theme of CSI Communications May 2018 viz. Digital Revolution in Speech and Language Processing for Efficient Communication and Sustaining Knowledge Diversity to June 2018 issue

We have 1 cover story which covers the entire gamut of application domains of IoE, "Sensors based Internet of Everything Applications and related issues" by Dharmendra Patel and Atul Patel

There are 2 research front articles which highlights original research results in Image processing and pattern recognition. These are

- "Pattern recognition in Bioinformatics" by Sherin K, Suma L S, Vijayalakshmi B, Arya K R and Achuthsankar S Nair. Achuthsankar S Nair, a distinguished computer science researcher is also a past editor of CSI Communications .
- "Person re-identification with content and context re-ranking" by Reshma O.S and Reshma Sheik.

The technical trends featured is "IoE Sensor Connectivity Technologies - An overview" by C. Jagadees from Oil and Natural Gas Corporation Limited, Chennai.

We have 3 articles providing us applications of IoE and IoT in healthcare, agriculture and information security domains. The articles are:

- "Importance of Sensor Fusion in the Internet of Everything (IoE)" by Dipesh Vaya and Teena Hadpawat
- "Medical Internet of Thing (MIoT) for Healthcare using cloud' by Sunil Gupta and Shivank Singh
  "Sensors for Internet of Everything; Smart Irrigation System" by S. Pramila, S. Shwetha and S. Ranganathan

The Security Corner contribution is "Pattern Discovery for Insider Threat Detection" by Ratnik Gandhi, Mehul S. Raval and Sanjay Chaudhary and "State of Research on User Psychology involved in Phishing Attacks" by Aniket Bhadane and Sunil B. Mane

In Practioners Workbench, we have "Efficient Handling of Data Structures using Python with Minimum Lines of Code" by Baisa L. Gunjal

Both of these sections are reappearing after a gap.

This issue also contains reports of national, regional and state student conventions & CSI activity reports from divisions, chapters & student branches.

In our Tech Leader interview series in this issue, we are very proud to present an interview of Dr. Gulshan Rai, National Cyber Security Coordinator, Government of India. In this interview, he nicely outlined what professional societies like CSI as well as academic institutions, who are our institutional members and student branches can contribute towards promoting cyber security through skilling, research and innovation

We seek the support of all CSI members for suggestions and support for this next exciting section of CSI Communications.

We are thankful to entire ExecCom for their continuous support in bringing this issue successfully.

We wish to express our sincere gratitude to the CSI publications committee, editorial board, authors and reviewers for their contributions and support to this 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

Prof. Prashant R. Nair
Editor

President's Message

From	:	**President, Computer Society of India**
Date	:	**01 May, 2018**
Email	:	**president@csi-india.org / Cell : (91) 9861010656**

CSI Incubation Centre

As you are aware, the launch of the CSI Incubation Centre is a great milestone for CSI in the spirit of the national mission, "Start-up India". I take this opportunity to call upon all CSI members, both professional and students or graduates who are venturing into the start-up space to make use of this facility. Our diverse talent of CSI fellows and senior members will also be available for guidance and mentoring of start-ups in this facility. I request for the support of all CSI fellows, past presidents, office bearers, executive committee members, chapter & student branch office bearers to support his centre with your expertise, contacts and support.

CSI General Body Meeting

CSI General Body meeting and Special AGM will be held on 20th May, 2018 at India Islamic Cultural Centre, New Delhi. Along with regular agenda issues such as administrative and financial matters, we will be taking a decision on the CSI National elections and the calendar for the same. I look forward to the participation of each of one of you to strengthen CSI.

CSI Tech Leader Interview with Dr. Gulshan Rai

Cyber security is becoming a huge concern in India in the wake of NSA snooping, worldwide company hacks and government websites including Supreme Court, various ministries etc. CSI is privileged to publish an interview of Dr. Gulshan Rai, National Cyber Security Coordinator of India in this issue of CSI Communications. Here, he has nicely outlined what professional societies like CSI as well as academic institutions, who are our institutional members and student branches can contribute towards promoting cyber security through skilling, research and innovation.

Divisional Events
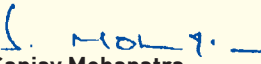
It is heartening to note the organizing of various high quality divisional events of CSI. First International Conference on "Contemporary Advances in Innovative and Applicable Information Technology" (ICCAIAIT 2018) at Kingston Educational Institute, Kolkata in collaboration CSI Division IV (Communication) and national level Seminar on "Cyber Hygiene and Opportunities in Cyber Security" organized by CSI Division IV (Communication) along with CSI-Vijayawada & Koneru Chapters at 4 institutions and universities in the region.

Student Conventions

CSI Student branch activities and initiatives are at a record high. We have had maximum number of CSI Student Conventions. CSI National Student Convention, Regional Student Conventions in regions 2 and State Student Convention at Telangana have been recently conducted with funding from CSI HQ and active participation from CSI student members and high quality technical contests and competitions.

Please write your valuable ideas for growth of CSI at president@csi-india.org

With kind regards

Sanjay Mohapatra
President, CSI

Interview

Tech Leader Interview with
Dr. Gulshan Rai, National Cyber Security Coordinator, Government of India

Cyber security is becoming a huge concern in India. In the wake of NSA snooping and worldwide company hacks, the Indian government has been actively trying for Internet sovereignty where local Internet traffic remains on servers hosted within the country. In the wake of increasing cyber threats in India, the Narendra Modi government has appointed Dr. Gulshan Rai, a cyber security expert who has over 30 years of experience in different areas of Information Technology as the special secretary for the department in the Prime Minister's Office. He is designated as Chief Information Security Officer (CISO) performing the role of National Cyber Security Coordinator of the Government of India. Prior to this, he was the director-general of the Indian Computer Emergency Response Team (Cert-In) and Group Coordinator of E-Security and Cyber Law Division in the Ministry of Communications and Information Technology. He has led the team to set up National Watch and Alert System in the country as part of cyber security initiative and Computer Emergency Team. Several international cooperation agreements have been entered under his leadership. He led a team from time to time to draft and bring out National Policies in the area of cyber security and cyber law. Prior to this, he was executive director of autonomous scientific society, ERNET India for over seven years, and was instrumental in setting up of the first large scale education and research network in the country. Rai has been working since 1998 in the area of evolving legal framework to address issues arising out of cyberspace, which resulted in second Technology Legislation in the country i.e. Information Technology Act and recent amendments in the Act.

Here are excerpts from the interview with Dr. Gulshan Rai with Prof. Prashant R. Nair, Editor, CSI Communications and Vice-Chairman, Department of Computer Science & Engineering, Amrita Vishwa Vidyapeetham, Coimbatore

Q : As the national cyber security coordinator, what are the agenda items for the country as such? The major initiatives so as to speak?

A : My objective is to enable secure cyber transactions so that we achieve the overall objective, i.e., the vision of the Honourable Prime Minister of India. Now, in that overall vision, my role is to coordinate among different departments, different ministries, and different sections of the society so that there's a synergy and we achieve the objective set forward by the prime minister.

Q : We've been hearing about this national cyber security policy and I'm told its been reviewed adding the data privacy aspects and so on. Sir, Is there something on the anvil?

A : The policy is being reviewed from time to time and it's a dynamic and regular affair to review the policy and there's a intention to bring forward a revised, upgraded policy. Also, to address the emerging issues of the technology challenge is also there. Areas like AI, Machine Learning, IoT different aspects of these technologies are applicable to different areas. These apply to many sectors like the IT sector, telecom, critical sector etc. We need to look at it and we are looking at it.

Q : That means, every year there are periodic updates happening to the policy?

A : We cannot change a policy by responding to every change in technology. Policy is a long term affair. As long as an attempt is always there, policy should be agnostic. It should be wide enough to be made applicable. And it is high time that the gaps in the policy addresses the emerging challenges that needs to be reviewed and then the updating of the policy, wherever possible, can address these challenges.

Q : So, that's what is expected this year, the change in policy?

A : The process is on, and I don't know how much time it will take but certainly the review shouldn't take much longer.

Q : What do you think, considering so many issues like cyber-crime and cyber terrorism and all. What do you think universities and professional societies like CSI can do? I have heard you often say to universities that their cyber security research should address national issues. Can you throw us some light on that?

A : You see, universities play a crucial role. In the sense that, the whole cyber part, I'm not talking about cyber security since it includes that. Whole cyber security

has multi-stake holders. They are all different stake holders there. Today, it not possible to have a structure or a system which gets into a vertical kind of a double partnership. A partnership should be there between industry, academia and the government. These are very important. So it's a multi-stake holder, even in the civil societies. And, in an organisation like computer societies like Computer Society of India (CSI), it's very clear. See, there are different organisations. Computer Society of India is a very old organization. CSI's job was to look after the interest of civil society after the NGOs. You also are a stake holder in the entire process and every stake holder has a role to play there. So, academia is a very powerful kind of a stake holder where they do the capacity development. They bring the basic foundation; they help in skilling and educating the people to handle these things. You and I can use skills if we have a good basic foundation. Academia provides that basic foundation.

Then of course there's upgrading your skill set. There's M.Tech, B.Tech, diploma and other programmes. So, academia is very important aspect. They can play a role in the capacity development. They can create courses dynamically to address the challenges which the industry and the government are facing. A student coming out of a university needs to be seasoned out to address the issues in the industry and the society in all areas – policy, maintenance, R&D, diplomacy, legal etc. Academia can play a major role in developing technology and developing short term solutions. We don't need any large solutions. Any solution has many components; they're all built on components. If anyone requires a proof of concept, then academia is the best place to proof your concept. Societies like CSI can play an important role in the skilling aspect of capacity-building.

Q : I've heard a lot about CERT-in, and how you built it brick by brick.

A : I built ERNET and many other things too brick by brick. The position I'm in, that also started out brick by brick. (laughs) I don't know, I think it's my bad luck that wherever I go, my job starts by building brick-by-brick. I never got to enjoy a built house. I've struggled in my life and I believe that this luck came with me when I came to this world.

Q : Regarding CERT-in, there was something pertaining to android where there was some vulnerability that was brought out? Is there any major thing that you're proud of during your time at CERT-in?

A : First of all, I'm really proud that we were able to lay the foundation of the emergency response team. That itself is a major achievement and it is sustaining by itself

there. And, CERT, at one point of time was considered a contemporary with other CERTs worldwide, including the one in the US. So, it was a collective effort, it wasn't mine alone. My colleagues at CERT cooperated with me and each one of them was fantastic person. I used to spend almost ₹ 2 crore per annum to equip them with their skills. It was a collective effort of all my colleagues, I was simply facilitating them. It was indeed a good job and we are all very proud of CERT. We are also very proud that IT Act was the second technology legislation. So, I'm proud to be a part of it. We started writing it at 1998 and we brought out the act in 2000 and we were the 12th nation to do so. There was also an amendment 10 years back. All those issues and concerns that were there then are still valid. And people who are there currently, they are also building it up in the same spirit in which it was created. So yes, I do feel very happy and proud to be associated with these key projects. Apart from that, I was associated with almost every common computerization projects like income tax, PAN etc. That's why I say that my luck, or rather my fate that I never enjoyed a finished work.

Q : On a lighter note, I'm told you don't use WhatsApp or Internet banking?

A : No no, what I said was that I don't use international internet banking. I was misquoted by a Times of India reporter. If you read the second paragraph in that interview, I would've said that I use a debit card. I do use debit card for transactions, but I don't use international debit cards, because who knows who is internationally capturing the data and that's why I don't use it.

I don't use WhatsApp or other social media either, but I do carry out net banking. Today, it's not possible without net banking. I pay my mobile bills on the net. I also encourage people to do so.

Sensors based Internet of Everything Applications and related issues

▶ **Dharmendra Patel**
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▶ **Atul Patel**
Dean and Professor of Faculty of CS and Applications at CHARUSAT, Changa

I. Introduction

Internet of Everything is the popular expression in the industry. It re-imagine the businesses at three principle levels : know as PMM implies Process, Model and Moment. As organizations digitalize items and process, totally better approaches for working together in ventures rise. More transformational changes as digitalization re-concocts enterprises at the plan of action level. The third level of digital re-imagine is made by the need to contend with unprecedented business speed and dexterity. Millions of new objects and sensors play an essential part in Internet of Everything that is in charge of generating real time data.

Industries have been utilizing a different sort of sensors for quite a while, however the concoct of the Internet of Everything has taken part of sensors and developments of sensors to a totally unique level. Applications of Internet of Everything combine a set of sensors and a communication network in such a way that the devices become smarter and share information with one another and enhance their functionalities. Table-1 describes the key sensors and their characteristics in the context to Internet of Everything.

II. Sensors based Smart IOET Applications

IOET platforms function and deliver various kinds of intelligence and data using a variety of sensors. Sensors collect the data and share them with a whole network of connected devices. The devices function autonomously due to such platform and become smarter. There are various IOET based applications exist in the different ventures that broadly utilize sensors and carry on shrewdly. Here we will examine few intriguing and promising sensors based keen IOET applications.

1) Smart e-Health Gateway: This

(Table-1 Key Sensors for Internet of Everything)

Sr. No.	Sensor	Subcategories of Sensors	Internet of Everything Domains
1.	Temperature	Infrared Sensors Semiconductor Thermistors RTD	Manufacturing Processes Health Care Agriculture
2.	Pressure	Barometer Pressure gauges	Manufacturing Processes Weather Forecasting Water System Heating System
3.	Proximity	Inductive Capacitive Photoelectric Ultrasonic	Retail Industry Vehicle Industry Parking System Airport
4.	Gas	Gas Detector Oxygen Sensor Hydrogen Sensor Breathalyzer Air pollution sensor	Manufacturing Processes Health Care Agriculture
5.	Smoke	Optical Smoke Sensor Ionization Smoke Sensor	Infrastructure Manufacturing
6.	Infrared	IR Sensor	Smart Devices Home Appliances Health Care
7.	Optical	Fiber Optic Sensor	Health Care Digital Camera Industrial Automation Environment
8.	Level	Point Level Continuous	Fuel Industry Recycling Industry Alcohol Industry Medical Equipment
9.	Image	CCD CMOS	Digital Camera Medical Imaging Radar IRIS Device Biometric Device
10.	Gyroscope	Rotary Vibrating Structure Optical MEMS	Navigation Game Controller Cellular and camera device Robotics Control Drone

application utilizes sensor hubs, remote server and clients that offer more elevated amount administrations, such as local storage,real time local data processing and embedded data mining. Empowered by Internet of Everything based advancements, all the entities of health care an be monitored and managed ceaselessly. It needs repository to store sensor and client information. A few information mining methods like information fusion,aggregation and interpretations are expected to improve the sensor information and to produce a constant effective yield in view of applying intelligence for this information.

2) **Smart Weather Station:** The application gives climate data in our neighboring condition.

There are different kinds of sensors are required in such application that detects the genuine circumstances, for example, temperature,pressure, humidity,light intensity, rain value and so forth. Whenever these values exceed a chosen threshold limit for each an SMS, an E-mail and a Tweet post are published alerting the owner of the appliance to take the necessary measures.

3) **Smart Home Automation:** The application comprises of a server and different classifications of sensors. Server controls and monitors the various sensors, and can be easily configured to deal with an extensive number of sensors. The system can be accessed from anywhere using a browser or any handheld device having internet connectivity. The system makes an alarm in view of the circumstance of the different sensors.

4) **Intelligent Video Analytics :** The application utilizes machine learning algorithms to video feeds, enabling cameras to perceive individuals, objects, and situations automatically. Vision sensors with video ability are the fundamental segment of the system. Vision sensors with video capability are the main component of the system.

The most common use cases of this application are optimizing operations, enhancing public safety, increasing employee productivity, and improving maintenance.

5) **Internet of Robotics Things (IoRT):** The application broadly utilizes the equipments , for example, robots, sensors, advanced cell, vehicles and so forth. Sensors are the primary segment of an application. An assortment of modern sensors is utilized as a part of the framework for various functionalities. Primary utilization of IoRT is industry automation.

6) **Smart Mobile Gaming:** Present day advanced mobile phone involves sensors, accelerometers and a camera. Versatile gaming application broadly utilizes these enhancements for dissecting and following the correct information. The sensors catch the outward appearances, nonverbal signals and discourse of the player. Savvy versatile gaming measures the satisfaction level of the player by utilizing Internet of Everything.

7) **Smart Farming:** The applications in this class comprise of various sensors, associated gadgets and cultivating offices. Sensors assume a key part in this. Sensors gather the information from genuine circumstances and help in a few routes, for example, remote harvest checking, determining of product, atmosphere observing, livestock following and so forth.

8) **Intelligent Drones:** The uses of this class basically subject to sensors, reception apparatuses and implanted programming to give two-route correspondences to remote control and checking. Movement sensors gather the data about genuine situations. The fundamental utilizations of savvy Drones are military observation, distribute to the client's doorstep and debacle reconnaissance and help.

9) **Issues of Sensors in IOET Environment**

Sensors are the fundamental piece

of any IOET application. Sensors are extremely valuable for gathering the continuous information and causes an application to go about as a keen way. However, numerous issues are there in sensor in setting to IOET applications that should be delivered in a successful way.

- **False Messages:** If the sensor is inadequately designed or hacked may produce false messages to the clients.

- **Sensor Interoperability:** Assortment of sensors is utilized as a part of the IOET application so the likelihood an application may not adjust to the information from an assortment of sensors.

- **Security challenges of wireless sensors:** Sensors impart secret information to the associated gadgets. It is plausible that the hacker may hack this information

- **The power problem with sensors:** Sensors require power for working and that is the principle leap for IOET application.

- **Data Transmission issue:** Sensors may collect lots of data and transmit them with originality is the real issue in IOET application.

- **Breaks in Communications:** Sometimes interrupts are utilized as a part of the sensor based application for estimation and that may cause the break in communication.

III. CONCLUSION

The Internet of Everything (IoET) is an idea that intends to take a gander at the master plan in which the Internet of Things fits. While the Internet of Things today, for the most part draws closer from the point of view of their detecting capacities. In this article we have portrayed the primary classes of sensors with their subtypes and their application spaces in Internet of Everything (IoET). We have portrayed a few promising applications where sensors are to be utilized widely. Finally, we have talked about issues of sensors in IOET condition. We concluded

After Assam, Nagaland and Sikkim, CSI now at Meghalaya
Inauguration of CSI Student Branch at NIT Meghalaya, Shillong

The student branch at National Institute of Technology, Meghalaya was inaugurated on 27 April, 2018 at the NIT Meghalaya's Shillong campus. The inauguration ceremony was well attended by the new CSI student members as well as incumbent CSI members and also attracted faculty participation. The ceremony was Inaugurated by Prof. A. K. Nayak, Honorary Secretary, CSI. Prof. D. P. Sinha, Regional Vice President, Region 2 and Mr. Manas Pattnaik, Treasurer, CSI also graced the occasion. Prof. Nayak emphasized on the need of professional memberships for students in professional courses like B. Tech and M. Tech. He also provided the comprehensive list of facilities that student members can be entitled by means of their CSI memberships. Prof. Sinha detailed the historical significance of CSI in pioneering computer education and training in India with a brief historical perspective and its present-day relevance. Mr. Manas Patnaik ,the treasurer of CSI advised the students for the upgradetion of their professional capabilities through the professional Societies like CSI

The session was very interactive with queries and clarifications sought by the student branch members that were patiently addressed by the dignitaries. Different Competitions & contests were organised among the students for which the awards were distributed on this occasion. At the beginning the Welcome address was delivered by Dr. Diptendu Sinha Roy, Head Dept., of Computer Science & engineering. & the ceremony concluded with a vote of thanks by Dr. Alok Chakrabarty, the Student Branch Councellor, NIT Meghalaya.

that IOET applications are required in all spaces and if sensor issues address legitimately we can plan IOET applications successfully.

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Dr. Dhrmendra Patel (membership No. 2060000012) received his Master of Computer Application degree from North Gujrat University. He received his Ph.D degree in computer science from Kadi Sarva Viswavidyalaya. His area of research is Web Mining, Fog Computing, Image Processing, Interenet of Things etc. He has published 20 papers in national/international journal of repute. Currently he is working as an associate professor at CHARUSAT, Changa.

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An IoE Application: Smart parking solution

▶ **C Jagadees**
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Introduction

Internet of Everything (IoE) can be defined as the intelligent connection of people, process, data and things. This is a concept that extends the Internet of Things (IoT) based machine-to-machine (M2M) communications to describe a more complex system that also encompasses people and processes yielding smart solutions to people. This paper looks into the aspect of how IoE concept could be implemented in the case of smart parking solution in an urban scenario. This makes sense when India has jumped into the bandwagon of creating 100 smart cities. People in cities waste a lot of time in getting a parking slot. In addition to waste of time, other side effects of this are increased fuel consumption, more green gas release, productivity loss, wastage of money etc. This smart parking solution would help the people to identify, locate and pre-book parking slots as per their requirement. Others on the move can also get to know about the nearest parking lot available through this application. The ability to connect, analyze and automate data gathered from devices, powered by and

described as the Internet of Everything, is what makes smart parking possible.

Smart Parking involves the use of low cost sensors, real-time data and applications that allow users to monitor available and unavailable parking spots. The goal is to automate and decrease time spent manually searching for the optimal parking floor, spot and even lot. Some solutions will encompass a complete suite of services such as online payments, parking time notifications and even car searching functionalities for very large lots.

Parking solution

In a typical urban scenario, the city is divided into Zones (Fig-1) and the parking slots in each Zone are marked.

Smart sensors are placed in each parking slot and a group of such sensors shall be connecting to the nearest gateway, which is the aggregation point for that zone. A typical solution is shown in Fig-2. The sensor is placed below the road level and it shall sense the presence or absence of vehicle in that parking slot. Additional information like temperature, noise, visibility and

moisture levels also could be detected. Data collected by the sensor is sent to the gateway using any IoE communication technology. The data is then aggregated and is sent to the Datacentre through the internet, where it is analyzed using applications. The information is relayed to the traffic control centre for monitoring and control. The information is made available to users with web-based applications, so that they can select the parking slot without wasting much time.

There is human to machine interaction here, which is the basis of IoE. Somebody looking for a free parking slot in a particular zone may open the application, search the area and check the availability of free parking slot. Using the integration of parking solution with Global positioning System, the person can navigate the vehicle to the desired location. Once the parking slot is allocated, it would be shown as allocated. Once the slot is occupied, the status is shown as occupied and the billing starts as per the rate chart built into the system. Once the person leaves the parking slot, his billing stops
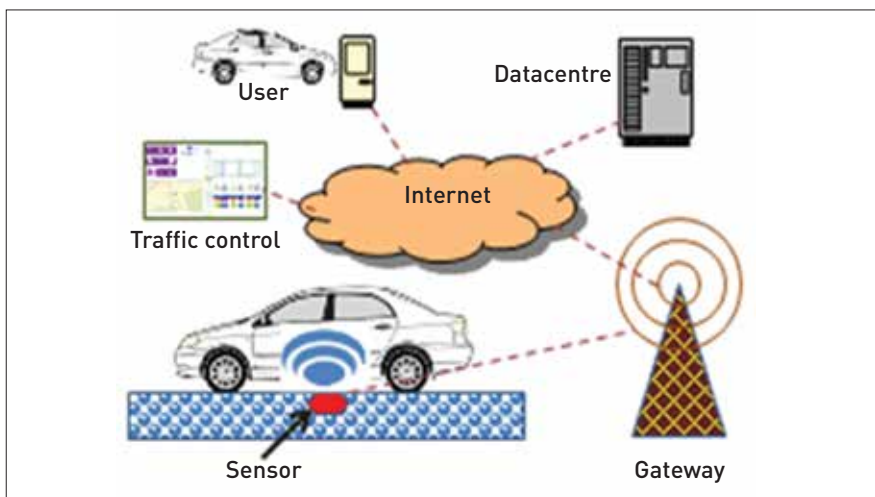

Fig. 1 : Area demarcation

Fig. 2 : Typical smart parking solution

Sensors

i) Sensor

ii) Sensor placement

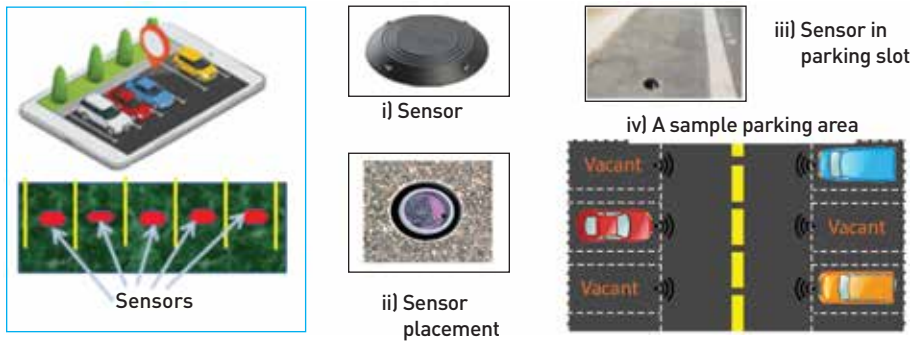iii) Sensor in parking slot

iv) A sample parking area

Fig. 4 : Sensor placement

and the app will pop up the payment invoice for online payment or may get the payment deducted from the users connected e-wallet.

The data could also be used by the traffic control department to monitor the traffic conditions, vehicular movements, parking violations, parking regulations, redirecting the traffic during some specific events etc.

Sensors and placement

In a particular Zone, the sensors are buried under the surface of the road inside a waterproof casing at every parking slot. A typical scenario is shown at Fig-3. One type of sensor is the Magnetic field sensor, fitted with smart parking sensor board. These sensors detect the variation of the magnetic field generated by a car parked on it. A sample sensor is depicted in Fig-4(i). Placement of sensor below the surface is shown in Fig-4(ii). A typical installation is given in Fig-4(iii). Fig-4(iv) shows a typical parking area provided with the sensors.

The information from the sensors is relayed to the gateway and in turn is sent to the Datacentre. The information is then made available to citizens through their access devices connected to the internet using an application. The traffic authorities are also provided with the complete information for traffic monitoring, control and regulation. Each Zone can also be provided with panels displaying the parking status and the availability of free slots. A polling frequency is configured as per the requirement. A sample frequency is five minutes, for data updation. These sensors could also be integrated with the Global Positioning System to get accurate location of the parking slot and for navigating to the location.

Connectivity

Sensor to gateway connectivity is based on Low Power Wide Area Network (LPWAN) technology, which is designed for low-power, long range wireless communication. They are ideal for use within large scale deployments of low power IoE devices like wireless sensors. LPWAN technologies include LoRaWAN (Long Range WAN), Haystack, SigFox, LTE-M (Long Term Evolution for Machines) and NB-IoT (Narrow Band-IoT). These technologies help to transmit and receive data from the sensor assembly with low data rates, over a long distance using very less power. This will help the sensor to function for a long time, without any battery replacement. The selection of the sensor connectivity would depend on the range required, number of sensors, number of gateways, data size and power available.

Conclusion

This IoE based parking solution offers many benefits like optimized parking, reduced traffic, reduced pollution, enhanced user experience, new revenue streams, integrated payments, increased safety, real-time data and trend insight, decreased management costs and increased service and brand image. The solution can be made more futuristic by adding more intelligence and smartness into the application for a better user experience. Main issue at present is the lack of standardisation of different sensors, which makes compatibility a problem. However, standardisation agencies and research bodies are working on this matter. India has a long way to go to make these things available with Indian technologies. The software and hardware technologists, technical bodies, companies and governments should come together to develop Indian technology solutions for Internet of Things, which is the next big thing happening now along with blockchain technology.

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Pattern recognition in Bioinformatics

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In view of fact that biological data is a huge information resource from which useful knowledge need to be extracted, pattern recognition gains its significance. Recognizing different patterns from data, analyzing and interpreting it, is a real challenge to life science researchers and bioinformatics comes handy with various tools and techniques. Pattern recognition technique reveals molecular and cellular processes that can enable better understanding of life processes. This article gives an overview on the steps involved in pattern recognition, tools and techniques used frequently and its application in the field of bioinformatics.

Introduction

Pattern recognition is one of the key strategies by which brain performs analogical reasoning of many life problems based on the information accumulated through its sense organs. In a general perspective, pattern recognition involves receiving an input data, analysing it for similar, specific, regular patterns based on which meaningful interpretation is made. Pattern recognition can be employed to make computers execute tasks like humans, even faster and more accurately, by figuring out actual problems and using a set of mathematical, statistical, heuristic and inductive techniques to find solutions [1]. When a computer program is trained to learn the pattern and categorize the data, then it is machine learning or machine intelligence. Solutions based on pattern recognition may be employed almost everywhere and anywhere - medicine, health and pharma industry, agriculture, financial markets, forensic investigations. During the last few decades, enormous amount of biological data in different formats has been generated using advanced technologies. Moreover, more databases are also added by researchers, which accumulate huge molecular data. Consequently, demand for new computational techniques is also increased for better processing of this data.

Pattern recognition plays key role in interpreting varied data related to sequence and structure of biomolecules, microarray data, phylogenetic studies, clinical data and drug discovery. Biomolecules (DNA, RNA, proteins) in sequence form and structural form contain different patterns that are functionally relevant. These patterns also known as motifs are very much involved in the characterization of these biomolecules. In proteins, patterns may also occur for the elements found in secondary structure. Helix turn helix is a widely studied motif that falls in the category of DNA binding motifs [2]. Recent studies in drug discovery show that proline rich linear motifs are excellent mediators for intermolecular interactions seen in many faces of immune response activities, and hence these motifs are considered as drug targets in immune mediated diseases [3]. Alignment method, local search, heuristic approach are a few among the applied techniques for this pattern identification task. In the field of medical science, pattern recognition is the basis for computer-aided diagnosis (CAD) systems that describe a procedure that supports the doctor's interpretations and findings [4]. Detection of patterns demands computational techniques that produce optimum results.

Pattern Recognition

Pattern recognition is the process of efficiently detecting any patterns or regularities in the given data. Clustering is an example of unsupervised machine learning while classification is supervised learning. The processes can be parametric where in the data is summarised by a set of parameters or can be non-parametric. Linear discriminant analysis, a parametric classification algorithm is used in testing the significance of gene pathway and gene network models [5].

Classification and Clustering

Classification assigns instances to predefined classes based on features. It analyses and learns association between the features from the training data to classify the unknown variables. The common classification technique, decision tree, divides the search space into subsets using divide and conquer technique. Linear regression is a simple classification method wherein relationship between observed variables are modeled [6].

The input data are categorized into training data and test data. Training data comprises of representative data from a known category and the test data is unknown data. A feature extractor is used to extract features from input data. Features are the parameters or explanatory variables most relevant to the problem extracted from observations. It can be either categorical, ordinal, integer or real valued and is represented as a vector. When applied in bioinformatics the vector consist of frequency of nucleotides such as A, T, G, C or its 2-mer, 3-mer etc. Dimensionality reduction techniques are implemented to reduce the number of features. Feature selection is

another pre- processing methods used to filter features to remove unwanted and redundant data and include most relevant or quality data to produce reliable output. A trainer/classifier, implements any of the clustering or classification algorithm and maps input to the corresponding class.

Binary classifiers are used in predictive models in computational biology. Often prediction may lead to identifying normal or diseased condition. There are several evaluation measures to analyse these classifiers and the measures are obtained from states of output (whether true os false case) plotted in a contingency table. The true predictions of each condition is denoted as true positives and true negatives and false predictions are denoted as false positives and false negatives. The evaluation measures such as sensitivity, specificity and accuracy are commonly used [7].

The clustering algorithm is an exploratory data analysis technique which groups similar instances on the basis of similarities and learns from the grouping rather than from a training set. Here no apriori knowledge is available about classes or members. Number, size, shape, density absolute and relative position of the clusters are all determined by clustering.

Clustering algorithms are broadly classified into hierarchical and partitioning algorithms. Hierarchical clustering builds cluster by merging together or dividing them in various steps and is named respectively as agglomerative and divisive. In agglomerative clustering each observation starts on its own and iteratively merges all clusters till it reaches single cluster. It is built in a bottom-up approach. In divisive clustering all instances are taken as a single cluster and it is divided to clusters with instances having minimum distance between them. Hierarchical clustering is represented with a tree or dendogram. In partitional clustering, clustering is done iteratively and the number of clusters required has to be provided beforehand. Considering K-means clustering, K is the number of clusters required and the instances are moved to each cluster until K number

of cluster is reached. The instances are assigned to each cluster with lower Eucledian distance among the elements in the same group. The mean of each cluster is calculated iteratively and each instance is assigned to the cluster with lower distance between the instance and the mean. Nearest neighbour, Squared error, PAM, BIRCH etc are other partitional clustering techniques[8].

Dimensionality Reduction

Enormous amount of gene expression data is available from Microarray data analysis. The generated data is converted into real valued numbers after a series of pre-processing steps and stored in a matrix. Here, each row corresponds to the gene selected for experiment and column corresponds to the sample taken for experiment or a given condition. This set is of high dimension as it contains expression values of thousands of genes and very challenging to extract useful information from this input by reducing its dimension without losing any information. The principle of dimension reduction is to store data in compressed form as smaller size vectors and then reconstruct the original dataset with minimum error[9].

Principal Component analysis (PCA) is a popular technique used in a number of problems. Here data set with p variables are reduced to a smaller set with k variables without losing relevant information. This is facilitated by choosing principal components or axes that are linear combination of original p variables. PCA has been successfully applied on gene expression data where the principal components are referred to as expression vectors or eigen genes. These eigen genes are viewed as major patterns or clusters in the expression data. As the number of expression vectors increases, the accuracy of representation also increases. But, we must keep an optimum number of such eigen genes so that the noise is eliminated sufficiently. Feature transformation approach for dimension reduction transforms or projects data onto smaller feature space rather than eliminating the unwanted features. Singular Value Decomposition (SVD) and Non Negative Matrix Factorization

(NMF) are two major methods coming under this category.

Non negative Matrix Factorization is another technique that reduces data dimension by generating matrix factors of lower dimensions. Moreover, these lower dimension matrices must satisfy non negativity constraints. Hence NMF is applied for applications where the data can be encoded into non negative values. The algorithm selects a cost function that reflects the distance between the given input matrix and the product of factors. Then update rules are applied iteratively so as to minimize this distance.

The amazing power of NMF is revealed with mining of biclusters from microarray data. As the microarray data contains expression values of genes in various conditions/samples, similar genes may not be coexpressed in all experimental conditions or samples. Instead, these co-expressed genes may exhibit similar expression patterns only in a subset of conditions. In this context, conventional clustering algorithms may fail to extract these biclusters because clustering is to be performed on genes as well as conditions simultaneously. This requirement leads to the development of biclustering techniques and NMF and its variations proved that it can reveal the inherent patterns in the microarray data[10].

Feature selection

Feature selection increases the accuracy of prediction since the features which contribute in decision making is selected for classification. Feature selection reduces complexity and over fitting and makes the interpretation of model easier. The selection methods can be filter, wrapper or embedded. Filter methods is independent of the classification method used and score the data depending on its relevance using statistical test based on the correlation with the output. Examples are chi-square test and correlation coefficient. Wrapper method finds the best subset based on performance by choosing different combination and then comparing and evaluating with other combination. Embedded methods do feature selection along with the modelling process and it is included as a normal functionality or extension [11].

Artificial Neural Network

Artificial Neural Network is a classification technique inspired by working of neurons in nervous system of human brain. The principle behind ANN is that knowledge is acquired through learning As the neurons in our brain receives input signals from other neurons, artificial neurons facilitates learning process through weighted inputs as well as interconnection among neurons. The input received by the network of neurons is represented as a vector. These inputs are multiplied with assigned weight values and added up. The whole ANN model has 3 layers- input layer, output layer and hidden layer. It is the hidden layer that converts the given input into an intermediate form to be used by the output layer. Learning methods used in a given ANN model has significance in generating the output. Gradient Descent, Back propagation etc are a few learning algorithms commonly used [12]. Among various neural network architectures, Multilayer perceptrons, Self organizing maps, Radial basis function network are found to be effective in pattern recognition applications. The techniques discussed so far has the limitations of extracting and processing huge raw data for feature extraction and processing. The limitations are overcome by the deep learning algorithm with the power of parallel and distributed computing, and sophisticated algorithms. Moreover the limitation of complex feature extraction is also overcome by deep learning. Deep learning is ANN with multiple non-linear layers. It has been used in protein structure prediction, protein classification, subcellular localization etc

DNA sequences, known as promoters serve as regulators of gene expression by interacting with RNA polymerase. Recognizing and predicting such promoter regions is an important problem solved efficiently by ANN [13]. Finding the functionality of various RNAs is found to be significant in study of diseases like cancer, cardiovascular diseases etc. Unsupervised neural network model was created and applied for predicting new pre-miRNAS from coding sequence human regions and obtained a very high accurate results [14]. Apart from this, ANN was a successful tool in various protein related problems like secondary structure identification, protein binding site prediction, motif detection etc. Drug design is a very dynamic field which demands highly sophisticated tools and techniques in bioinformatics. Artificial neural network has been used successfully in almost all phases-. Discovery and validation of targets, hit evaluation, virtual screening of compounds, deciphering quantitative structure–activity relationships etc. It is also used in the study of various aspects in pharmacokinetics and pharmaco dynamics [15].

Dynamic Programming

The major macromolecules of life DNA/RNA and the proteins are encoded in large sequences of nucleic acids or amino acids respectively. Analysis of this sequence data is crucial for finding homology, mutation, conserved regions and evolutionary patterns. Pattern recognition is used to compute the evolutionary distance between two or more finite sequences through dynamic programming. In principle, the technique involves calculating the global alignment (spanning the entire length of query sequences) or local alignments (pairs of intervals in each of the sequence resemble each other) using Needle-Wunsch algorithm and Smith-Watermann algorithm respectively. Scoring matrices like BLOSUM62, BLOSUM50 are designed to detect and give penalty for mismatches in the sequence. Some of the sequence similarity search tools include BLAST, FASTA, HMMER, SSEARCH.

In case of proteins and sometimes RNA, structural data can help in better alignment of sequences as structures are more conserved than sequences [16]. Protein functions are conditioned by their spatial structures, so protein structure comparison is important for predicting protein structures from amino acid sequences, understanding the evolutionary relationships among proteins and predicting protein functions [17]. DALI is a protein structure alignment comparison tool which performs distance matrix alignment for successive hexapeptides in the query sequence based on contact similarity patterns in their structure. CATH (Class, Architecture, Topology, Homology) is a protein-fold database in which SSAP (sequential structure alignment program), a dynamic program is used for structure alignment based on atom to atom vectors in structure space.

Phylogenetic Analysis

Phylogenetics is the study of finding relationship among species or genes using a branching diagram or tree structure. Classical way of representing the evolutionary relationship between species is also called as phylogenetic tree. Multiple sequences are considered and a pattern matching-based approach is employed for the construction of phylogenetic network. Some of the methods utilised for multiple sequence alignment (MSA) include dynamic programming, progressive alignment construction, iterative methods, consensus methods, hidden markov models, genetic algorithms and simulated annealing, simulated quantum computing [18]. Using dynamic programming technique pairwise alignment of sequences followed by a sum-up is adopted . Some of the commonly used tools include ClustalW, MAFFT, T-Coffee (based on progressive alignment construction), MUSCLE, DIALIGN (based on iterative methods), M-COFFEE, MergeAlign (based on consensus methods), HMM-based tools like POA (Partial-Order Alignment), SAM (Sequence Alignment and Modelling System) and HMMER.

Microarray Analysis

Micro array data is subjected to fold change (FC) method or T-test to evaluate the absolute expression levels of gene expression based on up regulation or down regulation for a given set of experimental conditions. Pattern recognition methods such as k-means clustering and time series based techniques like Short Time-series Expression Miner (STEM), Linear Mixed Model mixtures and Dynamic Time Warping relate gene expression with their phenotypes. In addition to PCA and SVD, more sophisticated methods like Bayesian Belief Networks (BBN) are implemented in the analysis.

Pattern Recognition Tools

There are numerous tools available

Table 1 : Popular Pattern recognition tools

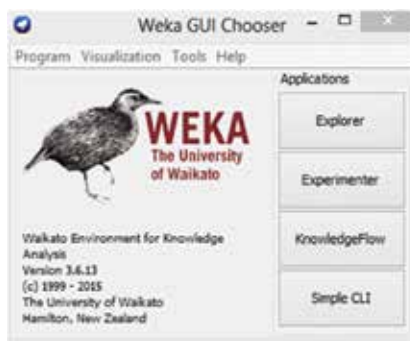| Name	Description	Environment	URL
Orange	Open source with interactive data analysis	Python	http://orange.biolab.si/
Scikit-learn	Open source for ML	Python	http://scikit-learn.org/
Waffles	Open source Library	C+	http://waffles.sourceforge.net/
PRTools	Full range of ML algorithms	MATLAB™	http://prtools.org/
RapidMiner	Data preparation, machine learning, deep learning, text mining, and predictive analytics	Java	https://rapidminer.com/
Knime	Open source for data driven innovation	Java	https://www.knime.com/knime-analytics-platform

for pattern recognition. PRTools is the Matlab toolbox. OpenCV and SciKits are packages provided by Python. Some of other popular pattern regulation tools and details are given in Table 1.

WEKA a popular open source developed in java is introduced here. It is created by researchers in University of Waikato, Newzealand [19]. It has a collection of numerous machine learning algorithms including regression, classification, clustering, association rules and visualization. It has also incorporated pre-processing steps and selection process.

WEKA by default support Attribute Relation File Format (ARFF) along with Comma Separated Values (CSV), C4.5 and binary. The main GUIs are Explorer (exploratory data analysis), "The Experimenter" (experimental environment) and the Knowledge Flow. Explorer is an environment for exploring data. The Experimenter allows users to analyse and experiment between the learning schemes more conveniently. WEKA GUI and sample iris dataset in ARFF file formal provided by WEKA is given below in Fig. 1(a) and Fig. 1(b)

Fig. 1(a) GUI of WEKA

Fig. 1(b) Iris dataset in ARFF format

Conclusion

The complexity of biological data demands better pattern recognition algorithms since it ultimately ends up in many life-saving researches, especially in the field of health and disease management, drug discovery and 'omics' studies. Many pattern recognition models seldom used in other research areas are found effective in bioinformatics. The exponential growth of biological data from heterogeneous data sources in various formats bring in challenges for pattern recognition. To facilitate complex needs, new algorithms are also increasingly discovered. Pattern recognition task is sure to increase multi-fold as more research areas are focused and attached with bioinformatics.

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Person re-identification with content and context re-ranking

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Introduction

In recent years, surveillance system plays an important role in public, and has become more important in crime investigation. In this situation, investigators want to detect and track the person in an area covered by multiple cameras. Here, manual browsing is time consuming and is not efficient for the crime investigation. To solve this problem, person re-identification that is matching persons across different camera views, attracts more and more research interests.

In video surveillance system, a sequence of video frames is obtained from their source mainly from closed circuit television (CCTV) and processing of these frames help to extract relevant information. Surveillance in public places is mainly for monitoring various locations and people in that locations and observing their behaviours. Nowadays, events like terrorist attacks have occurred more frequently in different public places. So, there is a growing need for video network systems to guarantee the safety of people in those areas.

In addition, intelligent surveillance has proven to be a useful tool for detecting and preventing potentially violent situations in public transport such as airports, train stations or even inside trains and air planes. The growth of computational capabilities in intelligent systems provided more opportunities in video surveillance system. This includes segmentation, object detection, tracking, classification etc. Person re-identification is one of the most important topic in this area.

In 1961, Alvin Plantinga provided one of the first definitions of re-identification: "To re-identify a particular, then, is to identify it as (numerically) the same particular as one

Fig. 1 : Person Re-identification

encountered on a previous occasion".

According to Paul McFedries, re-identification is the process of matching unknown huge amount of data with the individuals who provided the data. In generally, person re-identification can be defined as the process of recognizing individuals over different camera views in various locations under the condition of large illumination variations. In other words, it is the process of finding a person of interest from large number of images and video frames that track the persons in a network of cameras. The important applications of person re-identification are in video surveillance such as human tracking, human retrieval, and activity analysis. Searching a person from a large number of images and videos are time consuming. In this situations person re-identification technique saves a lot of human efforts. At the same time, it is a challenging research topic in computer vision due to large illumination variations, low resolution images, pose variation, background

noises and occlusions.

When a person stays within a single camera view, the system has knowledge about his location, position, background and lighting condition. When the person moves from one camera view to another camera view the important question is, how does the system know that person observed from the camera was same as the person observed in another camera. This issue is called re-identification problem. It is the technique of recognising persons separated in time and location. Person re-identification is a complex problem due to the lack of spatial continuity for the information received from different camera observations.

Traditionally, person re-identification can be considered as a matching problem. There is a gallery set and probe set. Gallery set contains huge amount of candidate person images and probe set contains query person images. For each test image or group of test images of an unknown person,

the goal of person re-identification is to return a ranked list of individuals from the gallery set (Figure 1). It is a key point of many applications, at the same time a most challenging research topic in Pattern Recognition.

Challenges in person re-identification

The issues in person re-identification can be classified into two categories i.e. Inter camera and Intra camera issues. Inter-camera issues can cause problems in identifying people in a network of cameras. The different illumination conditions that exist at different camera views should be consider here. The cameras have differences in illumination, because they have different features even if the cameras are from the same manufacturer. Another important issue is the different poses of persons in different camera views. These problems decrease the detection rate (Fig. 2).

Some of the problems in person re-identification are due to varying light condition at different times of the day (Figure 3). In addition, low resolution cameras reduce the quality of frames. So, the methods depend on quality of frames decrease the detection rate. Another important issue is occlusions in camera frames create difficulty in image segmentation (Figure 4). This is called Intra-camera issues.

The system must be powerful against illumination variations, background noises and occlusions in order to identify the same person in different camera views.

Methods used for person re-identification

Many methods are based on gait or shape of the moving person, different camera views can also cause problems in these methods. Occlusion in public places is another issue that should be addressed. Some methods are based on appearance of people. In that situations clothing of the object shown from one camera to another should not be changed; otherwise the system would fail. Persons observed from different camera views has significant variations on their poses, these changing poses will create difficulties for approaches that try to extract a model based on the movement of the person. Hence, more flexible methods are needed for

Fig. 2 : Differences in poses and lighting conditions in four different cameras

Fig. 3 : Lighting conditions at different times of day

Fig. 4 : Sample of occlusion in scene

re-identification can be done using two methods either appearance based or gait (motion) based. The appearance based methods try to extract signature from colour, texture and other appearance properties. In other ways, gait based methods try to extract features from the motion of persons. This gait based methods are restricted due to view point variations in which person's motion is not clearly shown.

Whether the using method is appearance based or gait based, re-identification consist of three main stages. The first stage is to extract imagery features. The second stage is to construct a representation. Final stage is to compare the features between

the similarities.

Existing person re-identification methods are based on unidirectional matching. In which compare an object on the probe side with all objects on the gallery side. This is the one cause of failure of person re-identification. So, we need some consistent characteristics for person re-identification problem. The introduction of bi-directional matching in person re-identification achieves better results. So, introduce a bi-directional re-ranking technique with reference to content and context to solve many problems of unidirectional matching. The basic idea comes from the best friendship between individuals in a social network. 1) If two persons are

best friends, then they treat each other as best friend. 2) Good friends always have more common friends. In the same way, images of the same person are visually similar. Also, they possess similar k-nearest neighbours.

We firstly obtain the initial ranking list by querying probe image a gallery set, it is called forward querying. Next every gallery image queried in a new gallery consisting of other gallery images and the original probe image, and then position of the probe image is calculated, it is called backward querying. This reflects the content similarity between probe and gallery image. Then we count the common k-nearest neighbours between bidirectional ranking lists. Images of the same persons have more common k-nearest neighbours than that of different persons. So, images of the same persons not only have similar visual content but also, they have neighbouring context. It is called context similarity. Finally, this content and context similarities are used to re-rank the initial ranking list.

Conclusion and Future Work

In this article we briefly discuss the application and challenges of person re-identification. In addition, we also discuss the general methods used for person re-identification. Existing methods are mainly based on single directional matching. Single directional matching is not efficient in the case of variation of illumination and poses. Based on the drawbacks we proposed a bi-directional re-ranking method for getting better results. Future work will introduce more thoughts of reducing computational complexity when there is a large dataset and aim at incorporating deep learning techniques.

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Recognition for CSI Communications Editor

Amrita Vishwa Vidyapeetham, Coimbatore (Deemed-to-be-University) has emerged as the 8th best university in the Government of India's National Institutional Ranking Framework (NIRF) Rankings 2018 for Indian Universities. Along with Dr. Sasangan Ramanathan, Dean-Engineering, Prof. Prashant R. Nair, CSI Communications Editor & Vice-Chairman, CSE & Internal Quality Assurance Cell (IQAC) @ AMRITA received the ranking certificate from the Union HRD Minister, Shri Prakash Javadekar on 3 April, 2018.

Importance of Sensor Fusion in the Internet of Everything (IoE)

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UdaipurAfter the inception of Internet of Things (IoT) a very new term is get into existence i.e. Internet of Everything (IoE). Before discussing on Internet of Everything one must know the meaning if it. In Internet of Everything process, people, data, & things are connected intelligently. Internet of Everything is a platform which makes the connection among process, people, data, & things more valuable & relevant. IoE generates new capabilities for businesses, individuals and countries by converting information into actions.

Internet of Everything is based on Internet of Things with the inclusion of intelligence in the network. By intelligence in network we mean that a network of various things must possess visibility across earlier different systems along with the orchestration & convergence properties.

Today's IP-Enabled modern devices & easy availability of broadband & internet services along with the advantages of IPV6 has made it possible to create new connections joining the Internet of Everything. IoE has significance over IoT in terms of security, network congestion, privacy and consumption of energy.

IoE comprises of network of context aware devices which plays an important role. This secure infrastructure of IoE can be scaled up without compromising with intelligence and security.

Essentials of IoE:

People: LinkedIn and Facebook like social networking platforms are available for People to connect through tablets, PC's and Smartphones. And due to progress in internet facilities people now has become more interactive with the helping hand of IoE. For example we can see many people wearing digital jewellery on skin. Some very common example of such digital jewellery is

People
Connecting people in more relevant, valuable ways

Process
Delivering the right information to the right person (or machine) at the right time

Data
Turning data into more useful information for decision making

Things
Physical devices and objects connected to the Internet and each other for intelligent decision making

Fig. 1 : Major components of IoE

smart watches, by which one can measure his/her daily workouts along with diet plans. Various sensors are available that can be wear with cloths. In IoE people may act as nodes. And these nodes of people are the source of constant static data stream.

Data: In present scenario data is gathered and sent to central repository by the devices through internet. Once all the data reach at central source, analysis and processing is done over the data. In all cases the data has short-lived value. The value of data is becomes almost zero as fast as it is generated. So

it is not necessary to store all data.

Things: Things in IoE comprises of various physical objects or things like sensors, actuators, meters and more devices which have the capability to interact with other devices and networks for information sharing. Things/devices share their sensed data, provide proper responses for control inputs and also helps in decision making processes. Example of Things in IoE consists of production line robots that automate factory production planning, smart electricity metering devices that shares consumed energy etc.
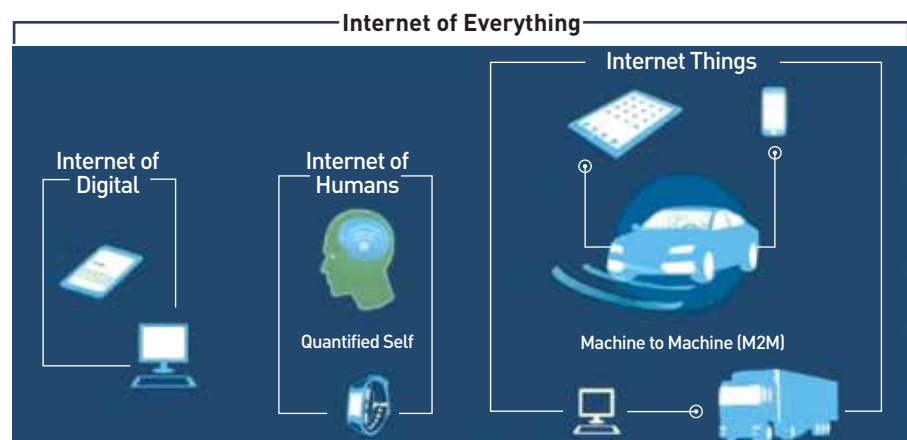

Internet of Everything

Internet Things

Internet of Digital

Internet of Humans

Quantified Self

Machine to Machine (M2M)

Fig. 2 : IoE consists of IoT, IoH & IoD

Process: Another essential part of IoE is process. Evolution of technology is required in explosively scalable large extent, automated businesses and organizations. Process is the important aspect of IoE as it is responsible for interaction among data, people & things in order to provide economic value and benefits to the society.

Major difference between IoT & IoE: In IoT T stands for physical or virtual things that can be made addressable & have the capability to send the data or information without the need of human being. Autonomous interaction among various things is the central part of IoT. On the other hand IoE includes accepting communications initiated by users and interactions allied with the global entirety of networked devices. Conceptualization of IoE is done at Cisco. According to Cisco, IoE is a communication and connection among data, things, process and people, but in an intelligent way. Interactions are among IoT, machines and M2M are occasionally considered identical. The more liberal IoE theory includes, besides M2M communications, machine-to-people (M2P) and technology-assisted people-to-people (P2P) communications.

Importance of sensors fusion in IoE: Sensors has become the essential part of any IoT and IoE based devices and applications. With the use of appropriate sensors now humans can make ultimate sensing machines which can mimic like humans or can be said more intelligent than humans in various cases. Now a day's use of sensors has become very common. We can find

Fig. 4 : Various sensors for many tasks

various sensors in automatic systems, health care, climate monitoring, oil searching and smart computing and mobile devices. Sensor fusion is an important aspect of IoE. It can be understand easily by taking example of human body. A human body is the live example of sensors fusion. At a time, many sensors work simultaneously e.g. when humans eat something there are a lot of sensors working together to support the action 'eating'. For example while eating, eyes works as visionary sensor, nose smells the food, hands works as actuators, and finally the test buds are used to know about the taste of food. So it can be said that it's a combination or fusion of various sensors. And at the mainstream human brain takes inputs from all sensors of the body and according to the input

accurate decision is taken. So fusion of sensors makes the tedious task very easy.

One more very popular example of health apps can be found these days e.g. Pedometer. These health based apps measures the number of steps you have taken in whole day along with the amount of calories burned while making these steps. Day by day advancement in technology making these apps now even smarter. Revolutionary improvements came after the use of MEMS-based inertial sensors. And now the next generation of pedometer apps makes use of Altimeter, which is used to determine and account for the altitude changes while a person is walking, from a fixed reference point (elevation).

Fusion of sensors along with embedded connectivity & processing enables context awareness & it tends to a new world of services.

Fig. 3 : Fusion of sensors in humans

Fig. 5 : context awareness due to Sesnsor Fusion

Conclusion: People lives can be

made easier with the help of information collected through sensors. Further with the use of data mining people can feel more secure and can ensure privacy for their secret data and information. With the sensor fusion & Remote Emotive Computing (REC) technology one can generate more capable IoE devices. It can be said without any doubt that Internet 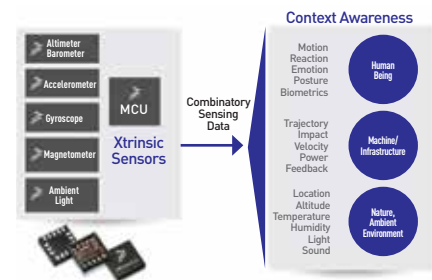of Everything (IoE) will be a masterstroke and will touch all the important details of life in coming one or two decade. Are you ready to be a part of it?

■

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Medical Internet of Thing (MIoT) for Healthcare using cloud

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The indispensable part of life is health. The aging population and there related illness issues is placing significant stress on electronic healthcare monitoring systems. The physical demand of resources in hospital like beds to doctors and nurses is extremely high. Medical healthcare is one of the challenges in internet of thing (IoT) to provide a society with higher attention and at a low cost for remote patient observation. IoT makes object smart to be used for the development of numbers of applications including healthcare. Now day's researchers are performing on the higher use of wearable sensors for remote observation of patients. These sensors are helpful for maintaining the record of patient body and store history in the cloud database. The benefits of these sensors is that once you seem for the physical examination the doctor will access and estimate your physiological and metabolic activity of body. Doctors may access the information and make decision which is useful for the treatment and helpful for taking the life decisions. So this type of medical healthcare could really contribute in a society for the better heath and at very low cost. This article discuses that how to improve the life of millions of people using medical IoT (MIoT) and cloud for healthcare industry success worldwide.

Introduction

The remote monitoring in medical is one of the active elements of the IoT in health care. It helps for the access in internet of medical backbone, and used for the conduction and treatment of medical data [1]. The current research is more focus to improve and provide the better solution of electronic healthcare using IoT based system [2].

As per report of P&S Market Research the healthcare IoT is growing at the rate of 36.7 % compound annual growth rate (CAGR) due to chronic diseases [3].

To remove the strain of hospital resources like doctors, nurses, bed and infrastructure to monitor non-critical patient we could use remote health monitoring based on IoT devices. This could provide a better provision in rural area, senior people living alone to access better healthcare advice and medicine remotely. This can improve the utilization of resources and give people better attention on their medical health requirement all the times. IoT based healthcare give people a time to take more attention on self. The system helps in providing all the information

as well as appointment of doctors. In addition they also help to give advice and suggest a medicine based on medical data.

Internet of Things in Healthcare

Fig. 1 : Healthcare Scenario
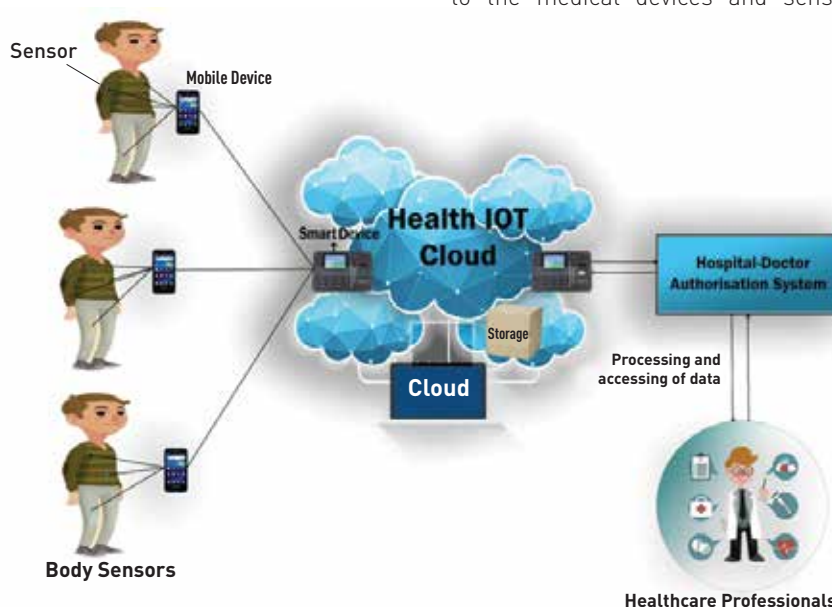
(IoTH)

Fig. 1 describes a medical healthcare scenario in which a patient's health are captured using on body sensors and information is transferred to the medical devices and sensors

attached to his or her body. Captured data are then transferred to mobile devices. The data is uploaded to the cloud by registered patient using smart devices. The patient is first sends a request for registration for uploading the data and gets access of cloud by service provider. To access the service the patients have to authenticate it using security credentials. The cloud is used for the data aggregation and they connect the patient to the doctors. Doctor analysis the data after login to authorisation system to authenticate itself to the channel. Based on data analyses and aggregation, the doctors and nurses can monitor the patients from any location and respond accordingly [4].

Due to real time connection of IoT, the patient and the healthcare provider directly access the data and give constant alert to the individuals for medical treatment if required. Healthcare provider gives alert to patient on regular basis through smartphone apps and IoT enabled cloud for health check-up. Due to secure channel all the medical data are easily available to doctors, patients and healthcare provider. So this enables the reduction in cost and provides better healthcare solution based on medical reports and health patterns.
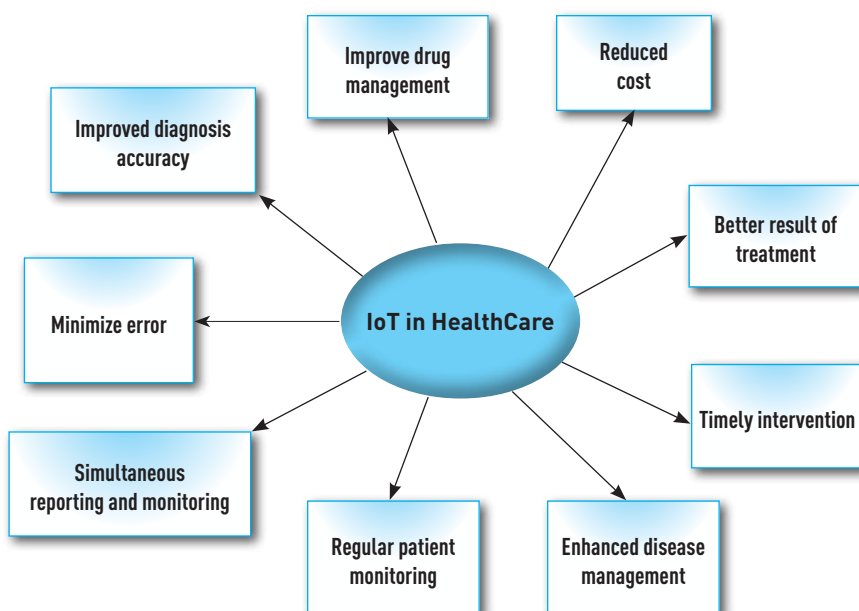
Benefits of IoT in Healthcare

Due to advancement of technology in the healthcare and the other industries, medical facilities is less depend on human and more patient oriented at same time [5][6]. Internet of things provides lot of advantages in medical healthcare organisations as shown in Fig. 2.

1. Reduced cost: IoT allows monitoring the patients in real time using IoT enabled mobile devices for healthcare. This process may reduce the cost of unnecessary visit to the doctors. In addition the IoT healthcare provides home care facilities that cut down the cost for hospital stay and admissions.

2. Better result of treatment: The treatment is improved due to the regular connectivity of patient to doctors. Doctor give decision as well as treatment through virtualization technique used in cloud infrastructure. The doctor can access the real time information and give the result in terms of improvement in better treatment.

3. Timely intervention: People can get benefited by IoT based services and become healthy and active due to timely monitoring of disease. The service provide great impact for senior people who are living alone and want to monitor their body activity like blood pressure, blood sugar, etc. in daily activity. By monitoring they timely inform this activity to their caretaker and a family.

4. Enhanced disease management: The diseases are treated before they find out of control, if monitor regularly. So effective disease management on continuous basis will able to access the real data and give diagnosis with in a time.

5. Regular patient monitoring: Some survey says that the average cost for patient is 1800 US dollar and it involves more resources, infrastructure and unnecessary waste of capital. A regular monitoring of patient is improved by using remote monitoring of patient and they get benefits in terms of infrastructure and capital.

6. Simultaneous reporting and monitoring: Monitoring in real time scenario using IoT improve to save life of people in emergency like diabetes, heart failures and attacks, etc. Due to real time monitoring like smart medical device that are connected to your mobile app, transfer information to doctors on time. This simultaneous reporting of data may lead to diagnose the disease effectively in a period of time.

7. Minimize error: Due to digital availability of data and automation in workflow with data driven results, it reduce the system cost and minimize the error.

8. Improve diagnosis accuracy: IoT helps a medical staff for searching of medicines and drugs and track easily and also effectively prevent infections in hospitals. This improves the diagnosis accuracy for treatment of patient and give prescriptions.

9. Improve drug management: The management of drugs is the major expenditure in medical industry. The IoT based system improves
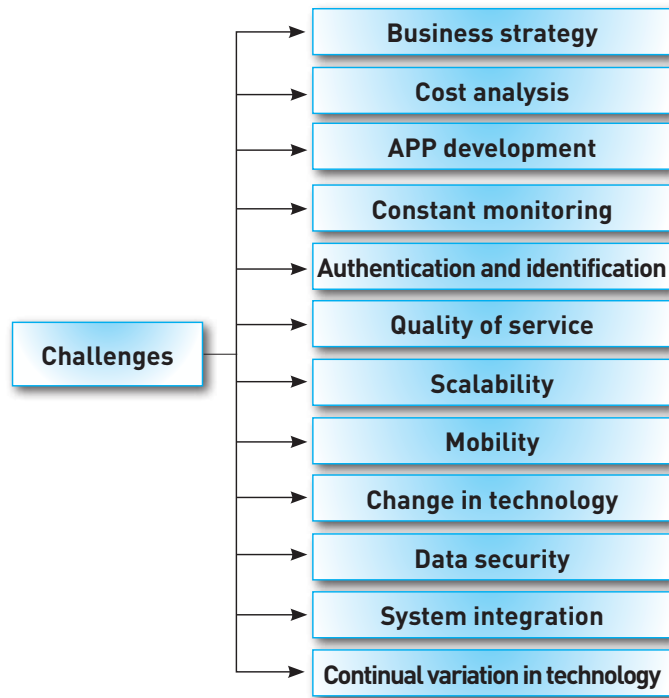

Fig. 2 : Benefits of IoT in healthcare

the process and make it possible to manage the cost better.

IoT Healthcare Challenges.

The lot of researchers have worked on the design and implementation of internet based medical healthcare services. They are able to solve different categories of technical and architecture problems for healthcare services. There are many challenges in the literature that concern open issues to address it carefully [7]. Due to the enhancement in the technology in IoT it makes a difference in a patient survives. Internet of things allows a user or patient to capture and monitor the data without physically going for doctor visit. This development can save time and help to improve the patient complications in high risk situations. IoT has achieved a lot of attention in healthcare and have advantages but there are many numbers of challenges that are listed and shown in Fig.3.

1. Business strategy: The business strategy should be robust so that we involve all the elements and there requirement in policies and other operational process. There is a need of business model so that each user, doctors and nurses may get facility to learn and use the new technology. The strategy should be distributed to the targeted customers and converted as per organisational needs.

2. Cost analysis: As there is no survey as per author knowledge that shows the availability in context to cost of IoT-based healthcare services. To be use effective this technology a low cost could be taken care into the account, so that every patient may use the same technology with less cost.

3. App development: To construct a mobile healthcare app, an authorised medical expert is needed to ensure the quality of app. The same approach could be followed for developing app. We should be taken care into account to first setup, then develop, debug and test for the publishing an mobile app. A regular updates is also required with consultation of medical practitioner, and development of science and

Fig. 3 : IoT heathcare challenges

technology.

4. Constant monitoring: The constant or long term monitoring is required in many situations. (Example, a patient having a chronic disease).

5. Authentication and identification: IoT Based medical services generally deal with online multi-patient environments in which many doctors and nurses are on duties. So the actual identification and authorization should be necessary. The authentication must be needed to access the account by both the doctors and the patients.

6. Quality of service: A medical service demands the reliability and trust ability as quality of service (QoS) for highly sensitive data. So, the quantitative dimension of such parameter is necessary to provide useful structure. QoS gives assurance of availability and robustness of central facilities like cloud in disaster situations of medical healthcare.

7. Scalability: The database, services, application of healthcare and IoT network should be scalable. Due to increase in the demand of IoT healthcare application, the scalability will result to give actual

amount of supply, if the growth is increased in terms of number of demands.

8. Mobility: Mobility allows to increases the interaction between patient and physician to access the medical data. Due to integration and aggregation of data, the mobility faces a challenges while accessing the data online.

9. Change in technology: Medical organisation are now using a modern and smart devices to replace the existing one for smart healthcare using IoT approaches in present secure channel. So there is challenge to adopt IoT based smart system from legacy system.

10. Data security: Data security is an open challenge due to presence of numbers of attacks, vulnerabilities and threats present in a open channel. The security is needed at both the ends of the scenario. Patient and doctor must be authenticated before processing and accessing the channel.

11. System integration: System integration is about to collecting and monitoring the medical data. The integration is important to reduce the expenses for care

delivery and improve the health care performance.

12. Continual change in technology: Due to continual changes in technology and hardware configuration the patient are using more than one device for capturing and storing the data and making healthcare record. This may cause that we need more than one IoT device for processing of the information.

Conclusion

IoT changes the way of facilities that are delivered to the healthcare industry. These technologies improve the product, causing a larger effect by bringing together minor changes. The article gives a broad overview of recent and on-going advances in health sensors, mobile devices, cloud applications, and other technologies. The article states the potential of IoT-based healthcare services for accessing health data and routine check-up for treatment of diseases using cloud server. Article discuses on various benefits and challenges in IoT based healthcare services.

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Dear Member,

As the announced theme of **CSI Communications May 2018** issue is a research-based theme with thrust on experimental and empirical results, viz **Digital Revolution in Speech and Language Processing for Efficient Communication and Sustaining Knowledge Diversity**, we are extending this theme for **CSI Communications June 2018** issue so as to give more time to our CSI members to present their original research results. Contributions in Technical Trends, Security Corner and Practitioner Workbench may also be sent.

Please send your contributions by 20th May, 2018. The articles should be authored in as original text. Plagiarism is strictly prohibited. Include a brief biography of four to six lines, indicating CSI Membership number, for each author with high resolution author photograph.

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(Issued on the behalf of Editorial Board CSI Communications)

Dr. S.S. Agrawal
Chief Editor

Sensors for Internet of Everything (IOET): Smart Irrigation System

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The objective of the proposed system is to control the Water flow based on the moisture content in the soil. Our system will adjust time interval of the watering the crops in the field according to the moisture level in the soil and the surrounding temperature. The system uses DHT-11 and moisture sensor to monitor the temperature, humidity and moisture level in the soil at a selected location and automatically cancels water flow process when the soil is moist enough. When the soil dries down, the sensor lets the controller run its irrigation cycle. The Sensor data collected from the sensors are updated constantly to the web server (MYSQL) through PHP and also to the cloud server (Thingspeak). The data uploaded to the server can be accessed through the mobile application and also be used for various analytics. Daily, Weekly and Monthly reports of water usage and other statistical information can also be generated through the application. The system can also be controlled using the mobile application. Whenever the moisture level goes beyond the critical level an alert message is sent to the farmer's mobile application so that using his mobile application he can switch on the motor for watering the plants.

Introduction

Agriculture mainly focuses on the cultivation of crops for the people to have their food. India is agriculture based country and hence agriculture plays an important role in our Indian economy. Most of the people in India depend either directly or indirectly on agriculture. Nowadays as the population rate goes on increasing there is a demand for even the natural resources that we use. The major natural resource that is under demand nowadays is water. Agriculture majorly uses water. About 70% of groundwater is taken from rivers are used for irrigation purpose. Farmers do irrigate their field daily. Sometimes due to climatic conditions, the soil remains moist but still, the farmers irrigate their field the next day resulting in wastage of water. Nowadays the world is moving towards technology and hence the technology must be applied in the field of agriculture too. To avoid wastage of water and to get best the yield of crops with minimal water usage we use the Internet of Things (IoT) to automate the irrigation process. Internet of Things is the trending technology which is used for controlling the device remotely. Challenges in agriculture due to unpredictable climatic conditions and drastic population growth led the concept of IoT to be used in agriculture. The product must be cost efficient for the farmers so that it can be implemented in their field daily without any hurdle. In this paper, we explain how the irrigation process can be automated. This paper thus provides a low cost and an effective product that can be used by the farmers.

Block Diagram:
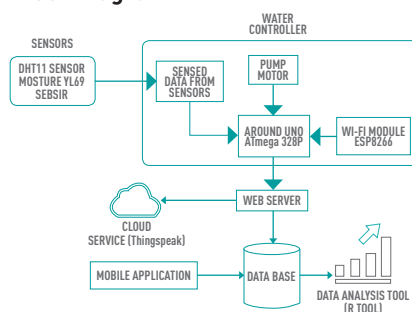
Module Description:

Module - 1: Moving Sensor Data to Web Server

This module comprises of various sensors placed in the farm field, collecting those sensor data such as temperature, humidity, moisture content and sending those data to the server. The components used here are:

- DHT-11 Sensor (Digital Temperature and Humidity sensor)
- Moisture Sensor – YL69
- Wi-Fi module

DHT – 11 Sensors:

The DHT-11 is a Digital Humidity and Temperature Sensor, which senses the surrounding temperature and humidity level and generates the digital output. DHT-11 can be interfaced with Arduino to get instantaneous results. This sensor is available at low cost and is affordable by the farmers.

**Digital Temperature & Humidity Sensor**

Moisture Sensor:

The moisture sensor (YL69) or the hygrometer is usually used to check the moisture content of the soil. Hence it is easier to generate/build an automatic watering system used to monitor the soil moisture of the plants. The sensor has a built-in potentiometer for sensitivity adjustment of the digital output (D0), a power LED, LM393 comparator and a

digital output LED. The sensor outputs changes accordingly to the water content present in the soil.
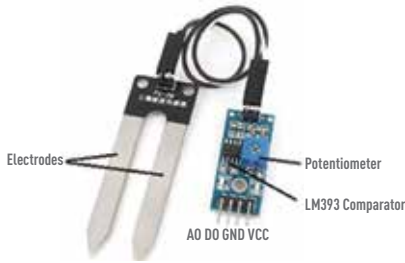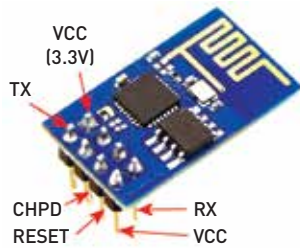

MOISTURE SENSOR

These sensor data are collected and sent to the server (MY SQL database) through PHP. The sensor data are also sent to the cloud server (Thingspeak).

ESP8266 WI-FI Module:

ESP8266 Wi-Fi module is already programmed with AT command so that you can simply connect this to Arduino device and get the Wi-Fi connection.

Connect ESP8266 module with Arduino as follows:

- VCC shall be connected to the 3.3V power supply.
- RX: Goes to Arduino digital pin 3 (But needs a voltage adjusting).
- CH_PD: Chip enables. Keep it on high (3.3V) for normal operation.
- GND is ground.
- TX: Goes to Arduino digital pin 2.

WI-FI MODULE (ESP8266)
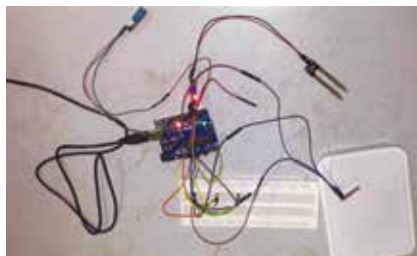
Sensors Connected to Arduino Board

Module – 2: Automate the Water Flow

This module ensures that the water flow is automated. The moisture sensor checks the moisture level in the soil, whenever the moisture content goes beyond the desired level the water pumps from the motor automatically. The sensor outputs changes accordingly to the water content in the soil. When the soil is:

- **Wet:** the output voltage decreases
- **Dry:** the output voltage increases

The output can be a digital signal (D0) LOW or HIGH, depending on the water content. If the moisture exceeds a certain predefined threshold value, the modules output LOW. Otherwise, it outputs HIGH. The DC motor is taken and with the help of 12-volt battery, the power supply is given to the motor. When the moisture value becomes lower than the threshold value, then the water pump is said to be automated.

The user is also given an option to operate the motor from the remote location through the developed mobile application. Whenever there is a failure in automation of water flow an alert is sent to the farmer.

Module – 3: Mobile App for Visualizing The Data

Android Studio:

Android is an open source and was developed by the Open Handset Alliance for mobile devices like tablet computers and smartphones. Android applications are developed in the Java language using the Android Software Development Kit. Once the applications are developed, they can be uploaded to the store such as Google Play store for the people to use.

Using the mobile application the sensed data such as moisture content which is taken from moisture sensor (YL69), temperature and humidity data taken from the DHT-11 sensor can be retrieved from the web server (MY SQL database) and can be visualized. The temperature, humidity and moisture content values are displayed along with the date and time when the data were recorded through the mobile application to the user. The user also can view the graphical representation of data from Thingspeak. Live data is uploaded to the server every 10 min.

Thingspeak:

Thingspeak is an Internet of Things (IoT) platform where we can collect and store sensor data in the cloud. The Thingspeak IoT provides a platform where the data can be analyzed and visualized. Sensor data can be sent to Thingspeak from Arduino, Raspberry Pi, Beagle Bone Black, and other hardware.

Using the Wi-Fi ESP8266 module the data read by the sensors are updated
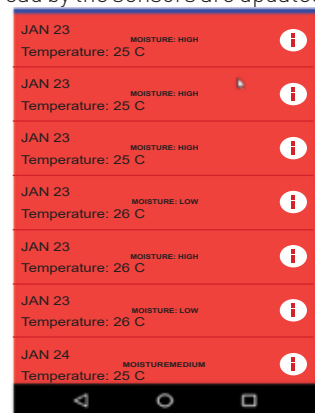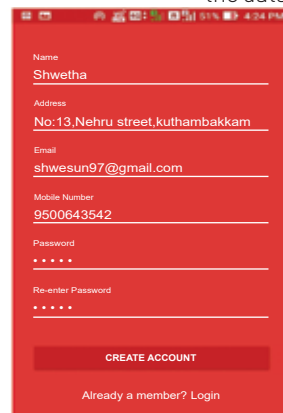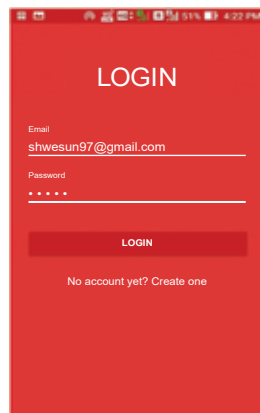
to the database every 10 minutes. The data is uploaded to the MySQL server using PHP and it is also sent to the cloud server (Thingspeak).

MY SQL:

MySQL is the widely used database for web-based applications which are used by Facebook, Twitter, YouTube, and so on. It supports all the relational database features. To access this database, one need not establish any kind of connections for it like JDBC, ODBC, etc.

MySQL database stores the temperature, humidity & moisture data along with the date and time of recording of data.

Date	Temp	Hum	Mois
2018-01-23 14:13:26	0.00	0.00	1022
2018-01-23 14:14:00	25.00	60.00	1023
2018-01-23 14:14:34	24.00	61.00	1023
2018-01-23 14:15:09	24.00	62.00	1023
2018-01-23 14:16:17	24.00	62.00	1023
2018-01-23 14:16:51	24.00	62.00	1023
2018-01-23 14:38:32	0.00	0.00	1021

Module – 4: Analysis on Daily Collected Sensor Data

The analysis is done on the data that are collected daily using sensors. Using R tool analysis is done. R is a programming language and software environment for statistical computing and graphics. Here we analyze the moisture content present in the soil and thus a report is generated.

Device Connections:

Limitations of the Existing System

1. The existing system uses Zigbee module for communication between the sensors. The range of Zigbee module is only within 100 meters.
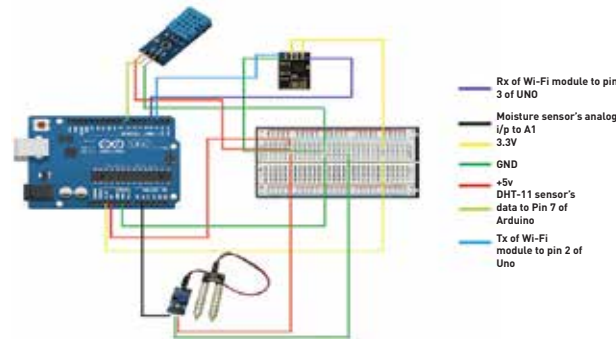
2. The existing system uses a robot to monitor the parameters. The cost required to maintain a robot is very high.

Advantage of Proposed System

The proposed system uses the Wi-Fi module for the communication. So, even if the distance from the farm and the farm house is more, the information will be transmitted without any issue.

Future Expansion:

This project can be further expanded such as the app can suggest what type of crop can be produced in the field based on the soil type and the water resource used for irrigation, source of availability of seeds, organic manures to be used for the best yield, methods for preserving the produce till marketing and so on.

Conclusion:

Once this idea gets implemented we can save the water wasted unnecessarily. The various moisture, temperature, rainfall and humidity value are monitored using the various sensors. The moisture value is compared with the threshold and the water pump is automated when the moisture value is lower than the threshold value. The information is sent to the user through the android application. Thus we can save our natural water bodies for future generation.

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[2] Automated Irrigation System Based On Soil Moisture Using Arduino
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[3] http://www.arduino.cc

[4] http://github.com

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Pattern Discovery for Insider Threat Detection

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One of the central problems in cyber security is identification of an adversary. With the advent of internet technologies remote access of resources have skyrocketed. In this changing scenario it is difficult to identify and prevent access by unauthorized users. In fact, there are many examples of attacks on individuals and organizations planted from remote locations using the Internet [1]. These attacks are known to cause significant monetary losses and have caused harm to repute and privacy of organizations [1, 2].

Insider Threat

Attacks which remain hidden for a long time cause significant damage to institutions. Recent reports suggest some of these attacks can manipulate a country's general election or a referendum [3]. At the level of an organization such attacks can influence outcomes of tender processes.

Most organizations' security focus is on defense against outside attacks. On the other hand they have limited focus on people with rightful access to resources and systems but having malign intentions to harm other people, system, data, organization and business from within.

At times, it is possible that due to lack of information about organizational policies some activities of non-malicious users might be reported as activities of a malicious user [4]. This can happen with naïve or careless users. A different category of users are those who on purpose ignore security guidelines. This article focuses on the users of latter category i.e., malicious and willful insider. Further, the discussion is primarily focused on security related to IT resources in an organization. Formally, an insider and insider threat is defined as follows [4,5]:

- **An Insider:** A person with authorized accesses to resources and data of an organization.

- **Insider threat:** Actions by an insider that causes losses or

People requests access → Exclude potential adversary → Minimize access and things to know → Detect, delay and respond → Mitigate conse-quence

Fig. 1 : Sequential defense approach to insider threat [12].

harm to organizations or individual working in them.

Effects of Insider attacks

The Yahoo! reported breach of 1.5 billion user account in 2016. Of all the global data breaches a 25% of the data breach is due to inside actors [6]. These data breaches cost millions of dollars in revenue or monetary losses to organizations. A comprehensive list of 24 such attacks is reported in [7]. There are also reported instances of stealing millions of data records from credit card, insurance and health care companies by an insider [8]. It has been observed that 40% of these cyber-incidents are caused by insiders [9]. The CERT [10] maintains summary of various reports with more than 1000 cases of insider attacks. It also suggests practices to detect and prevent some of these insider threats. Insider threats have highest impact on public healthcare and finance organizations [6]. A malicious user can also sabotage IT system and can steal intellectual properties (IPs) for personal gains or to cause financial losses to organizations and individuals.

Mechanisms for Protection

For understanding nature of possible threats, system vulnerabilities and attacks, consequences must be well studied. Some of the research goals in this area must be directed towards effective detection, prevention, mitigation, punishment, and remediation methods. Some of the commonly employed protective mechanisms employed by organizations are [11]:

- Monitoring and auditing user activities.

- Screening of employee for security.

- Deployment and execution of relevant organizational policies.

- Security mechanisms for protecting material, device control and counter intelligence.

- User training for identifying risks and how to take counter measures.

Machine Learning Approaches

Identifying malicious user activities, due to absence of sufficient data, are a difficult problem to handle using machine learning [13]. One of the known public dataset in this area is by CERT [14]. The dataset has been created by synthetically generating malicious activities based on the knowledge of attacks in past.

Considering the analysis of user behavior, [13] develops a framework (BAIT-Behavior Analysis of Insider Threat) for identifying insider threat. They observe that a malicious user is likely to be more active and fetches more data. For classifying an honest or normal user from a malicious user they propose algorithms using Support Vector Machine (SVM) and Multinomial Naive Bayes classifiers.

In a different approach [15] presents a prediction tool for insider threat on file and directory resources. Results in [16] present security architecture for insider threat detection. It is worth noting that in contemporary scenario isolated strategies for mitigating insider threat are bound to fail and thus a more comprehensive approach is required [17]. Results in [18] combine some of the above methods and with the help of psychology and Bayesian nets identify insider threat. The article also discusses twelve behavioral signals for detecting insider threat. Further, the article uses
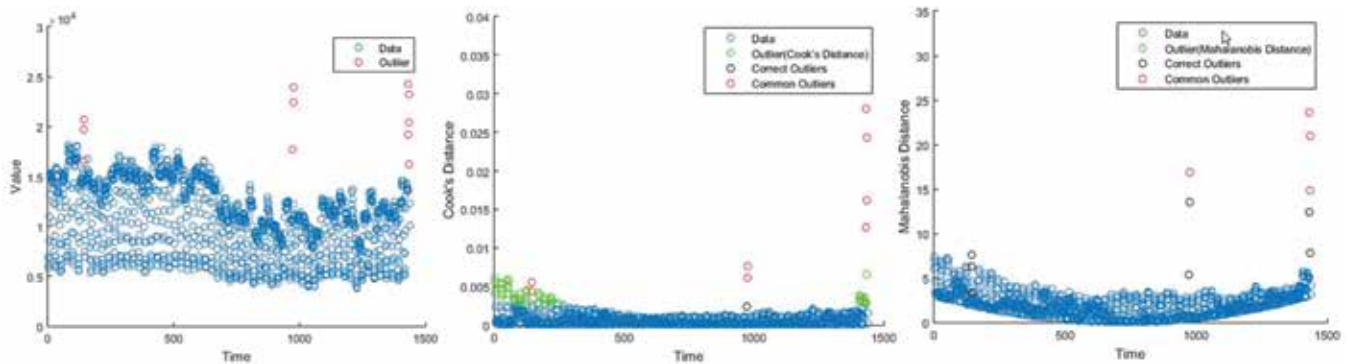
Fig. 2a : Yahoo Time series Benchmark Dataset with marked data and anomaly points; 2b. Cook's distance and Mahalanobis distance of Data in; 2c. Outliers -True and False positive (green), Benchmark positive(Black) and Both positive(Red)

Artificial Neural Network (ANN) along with these signals for identifying insider threat.

With the availability of user activity data at various levels of an operating systems (OS), [19] proposes an external threat model for detecting insider attack. Their method makes use of supervised anomaly identification with frequency parameters like *n*-grams and histograms of user activities. The results in [20, 21] considers insider threat detection in access control scenario. The method presented in [21] uses rules and density estimation for identifying anomalies. They use ranking for categorizing the threats.

For mitigating insider threat monitoring an organization's user activities such as network access, login-logoff and device inserted/removed (some other activities being super user account access; sensitive data accesses; excessive database access; repeated failed logins; user login through alternate accounts) is useful. But these activities produce significantly varied data in high volumes. Designing rule based analytics or human analytics of such actives is thus impractical. Machine learning based approaches can help and scale these analytical capabilities. Benefit of machine learning based approaches is that the deployed algorithms do not require modeling of insider threat behavior explicitly. The work in [22] detects intrusion with the help of a single layer neural network model. More advance results use recurrent neural networks (RNN) and train using Unix commands for predicting intrusion [23]. On the other hand results in [24] use autoencoders for learning in online scenario.

Simple Case Study

There have been studies characterizing user activity data as time series logs and algorithms for anomaly identification [25-29]. Let us consider an example in which network traffic of a server is used to identify Denial of Services (DoS) attack. These presented algorithms for anomaly detection will then model the traffic profile using parameters such as IP packages, new connections requests and can identify abnormal activities by considering data models. Figure 2 shows results of one such anomaly identification algorithm on Yahoo's time series benchmark data [30]. The model considered is linear regression (unsupervised machine learning) and then for identifying anomalies the algorithm uses Cook's and Mahalanobis distances [31].

The experiments clearly give comparative analysis of two statistical measures on benchmark time series data. The methods presented have some false positive and false negative rates. In this scenario we should consider Machine Learning algorithms as an important primary filter for rejecting obvious true positive and true negative cases. We must also deploy separate methods or human analytics on the false positive and false negative data to further classify them correctly and identify/prevent malicious user activities.

Conclusion and Research Avenues

In this article we discussed the threat caused by a malicious insider. We also discussed machine learning approaches to identify some of the malicious activities. It must be noted that the volume of data for malicious users activities is insignificant. It is known that the machine learning

algorithms are sensitive to volume of data and hidden trends inside them. In this scenario the choice of a machine learning model must be done with care. The machine learning algorithms automate the process of insider threat detection and scales well with volume of data. These algorithms are independent of data and consider only the choice of feature within data.

As potential research avenues, methods based on analysis of psychological parameters of individuals in conjugation with machine learning algorithms to assess threat are promising. It would also be relevant to provide rigorous test results of such combined methods in practice. Another interesting research avenue is to consider the applications of deep learning methods to natural language processing, behavioral analysis and sentiment analysis [32]. Further, as the activities of malicious users have temporal correlations it would be interesting to study the problem of insider threat detection using a deep learning architecture called Long Short Term Memory (LSTM) which can help find this temporal correlations [33].

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State of Research on User Psychology involved in Phishing Attacks

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We present a survey of literature on User Psychology involved in Phishing attacks. Phishing messages and websites masquerade as a trusted source and continue to be a problem for corporates and individuals causing huge tangible and intangible losses. Phishing is a wide-spanning attack and cannot be solved in one single way. It requires a collaborative effort in all directions. Solutions to mitigate phishing are mainly detecting the attack using automated software techniques, training users, and designing better interfaces to guide users in taking informed decision. It is important to understand end-user psychology which is exploited by social engineering techniques used in these attacks, to build effective countermeasures. Phishing is constantly on rise with current trends showing huge increase in Spear Phishing attacks and Social Media-based attacks.

Keywords: Phishing, Social Engineering, Usable Security, Human Computer Interaction, User Characteristics

1. Introduction

Phishing attacks masquerade as a trustworthy source, often spread using socially engineered messages using media such as emails, social media, SMS, online multiplayer games, VoIP, etc. to persuade victims to perform certain actions of attacker's benefit [1]. These actions can be persuading the user to enter sensitive information on a phishing website; clicking a malicious/ phishing link in an email; performing certain actions, such as money transfer, installing malicious software etc., as stated in the socially engineered message. Social engineering is psychological manipulation of people to make them perform certain actions [2].

Phishing attacks caused loss of over $3 Billion in last 3 years [3] and have seen an increase of 65% in 2016 over 2015 [4]. Spear Phishing attacks constituted 90% of all phishing attacks. A Spear phishing attack costs $1.6 Million on average, and $3.7 Million is spent a year by an average 10,000-employee company dealing with phishing attacks [5]. Very recent major phishing incidents include phishing attempts after Equifax data breach, the Google Docs phishing attack and the DNC hack. Phishing emails and websites were found masquerading as Equifax after its massive data breach [6][7]. In the Google Docs phishing scam, almost 1 million Gmail users were affected [8]. And the DNC hack [9] led to the leak of 19,252 emails and 8,034 attachments from the DNC, the governing body of the United States' Democratic Party.

The past work on phishing can be categorized into four categories: understanding why people fall for phishing, automated software techniques to detect phishing, training people to not fall for phishing attacks, and better user interfaces to help people make better decisions when confronted with an attack [10].

We provide an ordered study of the current state of research on User Psychology involved in phishing, so that effective counter-measures can be developed. This understanding can be used in designing better User Training programs and User Interfaces. We do not cover related topics in details, such as spam, but we do touch upon such points wherever required.

Section 2 describes human psychology involved in phishing. In Section 3, we provide the learnings of our study and their uses in designing better training programs and user interfaces. Lastly, we conclude in Section 4.

2. Phishing Psychology

A semantic attack like phishing exploits human vulnerabilities. Before knowing what anti phishing techniques have been developed, it is essential to know the human factors such as why users fall for phishing, demographics, etc. involved in phishing, to understand what countermeasures need to be taken. It is necessary to have detailed understanding of users' motivations and perspective of the system, in order to build strong countermeasures.

Phishing messages generally use sentiments and psychological principles of influence authority, scarcity, curiosity, fear, urgency, social proof etc [11].

An early study by Dhamija et al. [12] found that even experienced users can fall prey to visual deception attacks. Good phishing websites fool most of the users. Their results show that the standard security indicators and cues are not effective for a large fraction of users and did not help in preventing users from falling victim to phishing attacks. The study by Wu et al. [13] also backed these findings. Dhamija et al. also mentioned five types of users based on strategies users used to classify whether a site was legitimate or not.

Khonji et al. [1] state that

Table 1 : Hypothesis on Facebook Habits and their Results as per Vishwanath [20]

Hypothesis	Result
Higher habitual facebook users are more likely to frequently use facebook	Proved
Higher habitual facebook users are more likely to have large social network of friends on facebook	Proved
Higher habitual facebook users are more likely to be deficient in their ability to regulate their social media use	Proved
Higher habitual facebook users are more likely to fall victim to level1 and 2 attacks	Proved
Higher attitudinal commitment users are more likely to fall victim to Level1 and Level2 attacks	Level1 Proved, Level2 Not Proved
Users with higher level concern for online privacy are less likely to fall victim to Level1 and Level2 attacks	Level1 Proved, Level2 Not Proved

employees' use of computers in places other than corporate environment where IT infrastructure exists, can make people imbibe habits such as disregarding security indicators and warnings, and people can carry those habits at workplaces too.

Downs et al. [14] found that even though people have awareness of phishing, they cannot effectively use this awareness to identify phishing attacks. In another study [15], they showed that users' awareness of negative consequences did not contribute much in reducing their susceptibility to attacks.

According to Gonzalez and Locasto [16], the main components of phishing attacks are: psychology, computation, and sociology. They mention that study of interdisciplinary fields is important to understand social engineering attacks, so that the psychological and sociological vulnerabilities exploited in attacks can be better understood.

Canfield et al. [17] conducted experiments to find performance of users in Detection deciding whether a mail is phishing or not, and Behavior deciding what action to take on a mail. With the help of signal detection theory, they show that phishing-related decisions are sensitive to users' confidence and view on consequences.

Wang et al. [18] state that prior studies have overstressed on prospective overconfidence (people's beliefs about their capabilities) in phishing detection ability of users, but retrospective overconfidence (judgmental confidence) has more effect on users' behaviors.

Conway et al. [19] conducted interviews, with the help of cognitive psychology, with employees from a financial services institution on their experiences of Phishing. They found that the variation in workload and the number of unimportant mails that an employee interacts with on a daily basis, have relations with phishing susceptibility. They also found that employees had more secure feeling within the IT infrastructure of the company, which may make their behavior less cautious. Additionally, people with low beliefs of their technical capabilities had lesser willingness to share their experience of victimization with peers.

Older studies such as Sheng et al. [21] found age and gender to be leading demographics that predict phishing susceptibility. Women were found to be more susceptible to phishing than men, mainly due to lesser exposure to technical whereabouts. Younger users in ages 18 to 25 had worst performance among all age groups, mostly due to lesser risk aversion. Sheng et al. considered middle-aged, and not older (60 years and older) Internet users. A study in 2017 by Oliveira et al. [11] included older adults (65 years and older). They created fake spear phishing emails considering Principles of Influence (called Weapons of Influence in the paper) and Life Domains. They also provide examples of different types of messages they used for spear phishing. Data collection took place at the participants' homes to increase ecological validity. From prior literature, they mention that general cognitive processing capacities and sensitivity to deception decline with age, and scamming is most effective in older adults. Their research findings show that younger users were found to be most susceptible to scarcity (e.g.: "once in a lifetime opportunity" type messages), while older users were most susceptible to reciprocation (e.g.: luring user to install malware by offering a free gift).

Vishwanath [20] studied users' Facebook usage habits and their relation with user susceptibility to social media phishing attacks. He categorizes attacks as: Level1 attack friend request, Level2 attack information-request. He mentions six hypotheses and tests them. This is shown in Table 1. The results show that habitual facebook use, resulting in automaticity of response is a leading factor involved in an individual's victimization in social media attacks.

Summarizing, people of different demographics have different psychological vulnerabilities. People have different habits and perceptions in different environments, with habituation playing a major role in user susceptibility to social media phishing attacks. Users' confidence and their view on consequences are also involved in users' susceptibility to phishing attacks.

3. Discussion

We discussed about state of research of on User Psychology involved in Phishing Attacks. Phishing attacks have shown to be evolving over time, and continue to be a threat to corporates and individuals. Phishing cannot be dealt in one specific way, but requires a collaborative effort in all directions.

3.1 Social Psychology

It is important to understand human psychological factors leading to phishing victimization, such as confidence, perception of

consequences, habits, automaticity, attentional models, etc. Users of different demographics can be studied to understand which demographics play major role in success of phishing attacks today. It is necessary to have detailed understanding of users' psychological factors involved in phishing, to build strong countermeasures. Factors such as ecological validity need to be considered when designing such studies.

3.2 Use in designing User Training Programs

Use of psychological factors and demographics can help in designing user training approaches for phishing detection. Interdisciplinary fields such as Learning Sciences, Cognitive Sciences and Educational Psychology can prove to be helpful in designing training approaches for enabling retention of knowledge learned in training and its application at the time of attack. Instead of only giving knowledge about these attacks to users, it is also important to teach them how to deal with these attacks in real time. And training users at the time of the attack has been found to be the most effective way of training users. The best way of training against phishing attacks is "at the moment of attack periodic demographic tailored" training.

3.3 Use in designing User Interfaces

When a user is confronted with an attack, if proper indicators are shown to him at that time, it can guide him to take better informed decisions. Lack of effectiveness of security indicators also plays a major role in why users take wrong decisions when dealing with phishing attacks. Using the principles of Human Computer Interaction and Warning Sciences can help in designing such interfaces.

4. Conclusion

In this paper, we provided details on different aspects of User Psychology involved in phishing. Phishing remains to be a major security threat for the corporates and for the general internet users. Phishing is not limited to a single communication media, and spans across different types of media such as Emails, Social Media, online

multiplayer games, etc. We provide an organized study covering aspects of User Psychology to build effective counter-measures against phishing. Phishing, being a multifaceted attack, requires research to be done in all aspects. Technical solutions to mitigate phishing are not 100% effective and some attacks do reach the end users. Hence, it is important to research on developing better training programs and user interfaces, with the help of understanding users' psychology. Moreover, phishing attacks, especially Spear Phishing attacks, continue to become more sophisticated and cause loss of billions of dollars and also intangible loss such as damaged brand reputation. To build effective countermeasures, it is important to understand the psychology of users which makes them fall for phishing attacks. It is important to secure all doors to not allow phishers to conduct such attacks.

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Efficient Handling of Data Structures using Python with Minimum Lines of Code

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Python is an interpreted high level programming language which increases readability and it is used for general purpose programming. It is combination of various programming paradigms such as object-oriented, functional imperative, procedural and large standard library. Traditionally, C/C++ are used for handling data structures such as arrays, lists, stacks, queues, files etc. This article elaborates how data structures can be efficiently handled using Python with minimum lines of code (LOC) on both windows and Linux platforms and recommends use of Python in various application areas.

Special Features of Python Programming

i.   Minimum LOC

Python programs can be written with minimum lines of Code. Handling various data structures using python is easy.

ii.   Open Source

Python is open-source software. It means the source code is freely available for users and allowed to access, modify and/or distribute to the code publically without the developer's prior permission.

iii. Large Scale standard library

Working Python with graphical user interfaces, modules for manipulating regular expressions and modules for unit testing needs support of Python Library which is strengthen enough.

iv.   Platform Independent

Python can run on different platforms, such as Windows, Linux, Mac, Solaris, PocketPC and many more.

v.   Procedure and Object-Oriented features

Python supports both procedure-oriented and object-oriented functions. The procedures and functions are reused in this language. It also supports object oriented features like C++ and Java programming

vi.   Code Embedding Capabilities

Python code can be embedded in C/C++ program allowing users to enhance scripting functionality.

vii. Simple code and easy to Learn

Python can be learnt without prior knowledge of any programming language. Beginners can start Python as their first programming language.

Working with Python in Windows Platform

Step-I: Download python-2.7.5 or higher version from following url and install it. https://www.python.org/downloads/

Step-II: Select "All Programs" of windows and then select "IDLE (Python GUI) s shown in fig.1.
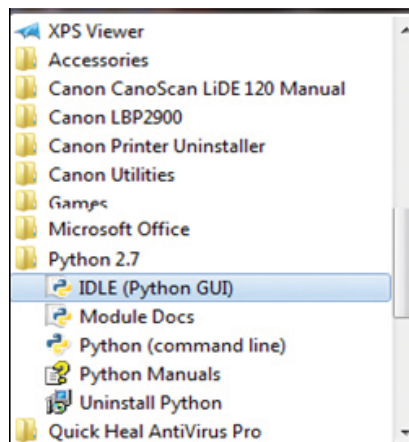

Fig.1 : Starting Python in Windows
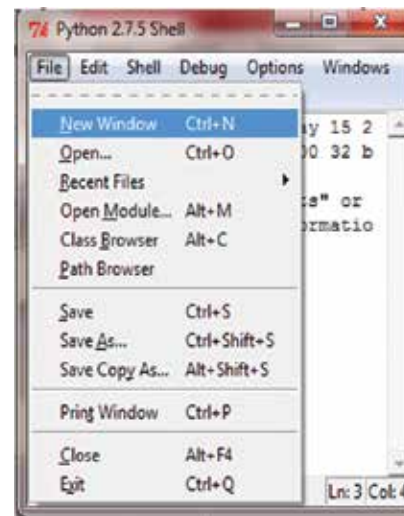
Step-III: Select new windows shown in Fig. 2

Fig.2 : Editing with Python

Step-IV: Save program with "Sample. py" and select "Run" option as shown in Fig.3

Fig. 3 : Executing Python program

Working with Python in Linux Platform
Step-I: Edit and save Python program say "Sample.py" using vim or gedit
$ vim Sample.py
OR
$ gedit Sample.py
Step-II: Execute Python Program using following
command
$python Sample.py

Implementing List in Python
Fig.4. shows python code for linear search using list to search a given number from list of numbers and output of the same is given in fig.5.

```
def Linear_Search(List, Number):
    index= 0
    found = False
    while index < len(List) and not found:
        if List[index] == Number:
            found = True
        else:
            index  = index  + 1
    return found, index
print(Linear_Search([10,20,30,40,50],40))
```

Fig. 4 : Program Listing 1

```
>>>
(True, 3)
>>>
```

Fig. 5 : Output of Program Listing 1

Implementing Arrays in Python
Fig. 6 shows Python code to sort the numbers using Bubble Sort using arrays. The input is accepted from keyboard. The output of the same is shown in Fig. 7.

```
a = []
i = 0
j = 0
n = 0
number = 0
sum = 0
temp = 0

print "Enter total Numbers:",
n = input()
for i in range (0, n):
    print "Enter", i + 1, "Number: ",
    number = input()
    a.append(number)

for i in range (1, n):
    for j in range (0, n - i):
        if( a[j] > a[j + 1]):
            temp = a[j]
            a[j] = a[j + 1]
            a[j + 1] = temp

print "The sorted array is: "
for i in range (0, n):
    print a[i]
```

Fig. 6 : Program Listing 2

```
>>>
Enter total Numbers: 5
Enter 1 Number:  50
Enter 2 Number:  40
Enter 3 Number:  30
Enter 4 Number:  20
Enter 5 Number:  10
The sorted array is:
10
20
30
40
50
```

Fig. 7 : Output of Program Listing 2

Implementing Stack in Python
Stack works on the principle of "Last-in, first–out (LIFO)". The inbuilt functions in Python make the code short and simple. In Python, we use append () function to add an item to the top of stack i.e., to push an item and we use pop() function to pop out an element from top of stack. These functions work quiet efficiently and fast. Fig.8 shows Python code for stack implementation and output of the same is shown in Fig.9.

```
stack = ["Disc A", "Disc B", "Disc C"]
stack.append("Disc D")
stack.append("Disc E")
print(stack)

print(stack.pop())
print(stack)
print(stack.pop())
print(stack)

print(stack.pop())
print(stack)
print(stack.pop())
print(stack)
print(stack.pop())
print(stack)
```

Fig. 8 : Program Listing 3

```
>>>
['Disc A', 'Disc B', 'Disc C', 'Disc D', 'Disc E']
Disc E
['Disc A', 'Disc B', 'Disc C', 'Disc D']
Disc D
['Disc A', 'Disc B', 'Disc C']
Disc C
['Disc A', 'Disc B']
Disc B
['Disc A']
Disc A
>>>
```

Fig. 9 : Output of Program Listing 3

Implementing Queue in Python
The general queue works on the principle of "First-in, first-out (FIFO)".

There are different variations in queues such as linear queue, circular queue, priority quque, double ended queue (dequeue). Dequeue is specially designed to have fast appends and pops from both ends i.e. front end and back end. Fig.10. shows implementation of dequeue using Python code and output of the same is shown in Fig.11.

```
# Implementing deque using list
from collections import deque
queue = deque(["Amar", "Akbar", "Anthony"])
print(queue)

queue.append("Rancho")
print(queue)
queue.append("Farhan")
print(queue)

queue.append("Raju")
print(queue)

print(queue.popleft())
print(queue.popleft())
print(queue.popleft())
print(queue)
```

Fig. 10 : Program Listing 4

```
deque(['Amar', 'Akbar', 'Anthony'])
deque(['Amar', 'Akbar', 'Anthony', 'Rancho'])
deque(['Amar', 'Akbar', 'Anthony', 'Rancho',
'Farhan'])
deque(['Amar', 'Akbar', 'Anthony', 'Rancho',
'Farhan', 'Raju'])
Amar
Akbar
Anthony
deque(['Rancho', 'Farhan', 'Raju'])
```

Fig. 11 : Output of Program Listing 4

Implementing Recursion in Python
Recursion involves the function calling itself again and again. Recursion is the method of solving problems that involves breaking a large size problem down into small size sub problems. Recursively process is applied until we get to smaller problems that can be solved trivially. Fig.12 shows Python code calculating the sum of list of numbers using recursion and Fig.13 shows output of the same.

```
def CaluculateSum(N):
    Total = 0
    for I in N:
        Total = Total + I
    return Total
print(CaluculateSum([10,20,30,40,50]))
```

Fig.12. Program Listing 5

```
>>>
150
>>>
```

Fig. 13 : Output of Program Listing 5

Implementing Files in Python

File data structure stores the records permanently. Various types of file organization includes sequential file organization, direct access file organization and indexed file organization.

In sequential files records are stored sequentially. The records are also accessed from file sequentially. In direct access files we can write a record to particular position and record can be assessed directly by record number. There exist some relation between the record key and record address.

In Indexed file organization records

are stored in sequential file which is main file. A primary key with its offset is stored in index file. When we want to search a given record, first it is searched in index file. From index file, we can get exact location of that record in the sequential file. The sample Python code for writing data to text file and displaying contents from file is given in Fig.14 and output of the same in displayed in Fig.15.

```
fp = open("Input.txt", "w")
fp.write("Department of Information
Technology, Amrutvahini College of
Engineering, Sangamner, Ahmednagar,
Maharashtra")
fp.close()
# Read a file
fp = open("Input.txt", "r")
Message = fp.read()
fp.close()
print Message
```

Fig. 14 : Program Listing 6

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Fig. 15 : Output of Program Listing 6

Concluding Remarks

As elaborated with few examples, handling the data structures is very easy in Python with minimum lines of code. As Python is platform independent, same Python code can be executed on multiple platforms. Because of its multiple special features, Python is becoming popular and widely used in applications such as developing desktop graphical user interfaces (GUI), software development, education purpose, web based and internet development, scientific and numeric and business applications. ∎

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A Division-IV Report

Seminar Report on "Cyber Hygiene and Opportunities in Cyber Security"

In association with CSI Division-IV-Communications and under the ageis of CSI-Vijayawada & Koneru Chapters a national level Seminar "Cyber Hygiene and Opportunities in Cyber Security" was held at four premier institution's in Vijayawada and Guntur Districts of Andhra Pradesh from 15th to 17th March,2018.

The Dr. Durgesh Kumar Mishra, Chairman,Division-IV,CSI, Dr. K. Rajasekhara Rao, Vijaywada Chapter Chairman, Prof. A. V. Praveen Krishna, CSI-AP State Student Coordinator and resource persons from Anastomosis Sri Mayank Acharya, C.F.O, Anatomosis and Sri Sahit Modem, V. P. Training, Anastomosis are taken key lead in organizing the event. The organization of the event was successful and hosted for three days at the institutions on -15th March, 2018- P B Siddartha College of Arts & Science, Vijayawada, 16th March, 2018- Usha Rama Engineering College of Engineering and Technology, Telaprolu & Vignan's Nirula Institute of Technology & Science for Women Guntur and 17th March, 2018- K L Deemed to be University (KLEF), Vaddeswaram, Guntur Dt.

The workshop provided a platform to learn various tools, techniques and applications in Cyber Security and forensic. This program also focused on exploring various research opportunities and challenges in respective areas. The seminar had thrown the lime light on the concepts like-Career Opportunities in Cyber Security, Basics of Web Application Security,Basics of Mobile Applications Security,Mobile App Reverse Engineering, Cyber Security Controls for Personal Hygiene etc.

The Institution dignitaries from Vijayawada Chapter Dr. J. Rajesh, Vice Chairman Elect, Prof. M. V. Ramana Secretary, Prof. G. Rama Koteswara Rao, Treasurer and Prof. T. S. Ravi Kiran, HOD-Computer Science of P. B. Siddartha College of Arts & Science, Vijayawada, Prof. M. Samba Siva Rao, HOD-CSE of Usha Rama Engineering College of Engineering and Technology, Telaprolu, Dr. P. Radhika, Principal, Prof. Dr. B. Renuka Devi, HOD-CSE and Prof. B.V.Suresh Kumar, HOD-IT of Vignan's Nirula Institute of Technology & Science for Women, Guntur and K L Deemed to be University Dr. V. Srikanth, Dean-Skill Development, Dr. E. Suresh Babu, HOD-CSE Dr. G. Krishna Mohan, Alternate Head-CSE and CSI-Koneru Chapter Office bearers Dr.K.Thirupathi Rao Immediate Past Chairman, Dr. V. Krishna Reddy, Chairman, Dr. M. S. R. Prasad Chairman Elect, Dr. K V D Kiran Secretary are the people involved in the key handling of the seminar event at the respective host places. The event got the overwhelming response from the student community at all the places and suggested to organize this type of events in more count in future by CSI, HQ.

At Inaugural Section of **Cyber Security Seminar** on 17th March, 2018 at CSI-Koneru Chapter, K. L. Deemed to be University- Dr. Durgesh Kumar Mishra, Chairman-Division-IV, CSI, Mr. A. V. Praveen Krishna, CSI-AP State Student Coordinator and Dr. G Swain, NSF Research Group Head along with resource persons Mr. Mayank and Mr. Sahith. In this event 200 B.Tech [CSE] students had participated.

A REPORT ▸▸▸

CSI Divisional Event
First International Conference on "Contemporary Advances in Innovative and Applicable Information Technology" (ICCAIAIT 2018)

Preamble

Kingston Educational Institute organized the First International Conference on "Contemporary Advances in Innovative and Applicable Information Technology" (ICCAIAIT 2018) during March 24-25, 2018 at its college campus at Berunanpukuria, Barasat, Kolkata-700126.

The conference was organized in collaboration with the Computer Society of India (CSI), Division IV (Communication) as its Technical Sponsor. It has also been Technical Co-Sponsored by the the Institution of Engineering and Technology (IET) and the Institute of Electrical and Electronics Engineers (IEEE), Kolkata Section. The proceedings of the conference have been will be published in the AISC series of Springer AG, the Publication Partner of the event.

The conference was focused mainly but not limited on the following areas:
• Computational Intelligence
• Data Analytics
• Nature Inspired Computing
• Circuit System and Devices
• Wireless, Mobile and Cloud Computing
• Social Networking

Program Details

On the opening day, 24th March, 2018, the programme started with a pre-conference tutorial session in which the welcome address was delivered by Prof. Dr. J P Bandyopadhyay, Emeritus Professor, University of Calcutta and Academic Chairman of KEI. The first speaker of the tutorial session was Dr. Amlan Chatterjee, Department of Computer Science, California State University, Dominguez Hills, Carson who was introduced by Mr Partha Ghosh. Dr Chatterjee presented on line through Skype. The next tutorial lecture was delivered by Prof. Atal Chowdhury, Vice Chancellor, VSS University, Odisha, India. The tutorial session was chaired by Prof Asish K Mukhopadhyay, Academic Adviser, KEI.

Inauguration Programme was held during the post-lunch session after a short cultural program. Smt. Uma Bhattacharjee, Secretary, Kingston Educational Institute welcomed the galaxy of dignitaries including the Chief Guest Prof Saugata Roy, honourable Member of Parliament, Prof. Basab Chaudhuri honourable Vice-Chancellor, WBSU, Barasat, and Prof. Saikat Maitra honourable Vice-Chancellor

MAKAUT, W.B. and other dignitaries.

Session for the Keynote Addresses followed the Inauguration Programme. Eminent speakers like Prof. Lalit Mohan Patnaik, Emeritus Professor, Indian Institute of Science, Bangalore, Dr. Manishankar Chakraborty, Higher Colleges of Technology, United Arab Emirates, Prof. Dr. Basabi Chakraborty, Faculty of Software and Information Science, Iwate Prefectural University, Japan and Mr. Pradeep Ramchandra Joshi, Kwality Business Initiatives Six Sigma Consultant, Pune. Dr. Sanjay Sengupta, Principal Scientist and Editor of Journal of Scientific & Industrial Research (JSIR), National Institute for Science Communication & Information Resources, CSIR (Ministry of Science & Technology, Govt. Of India), New Delhi, India took part in the session. The key note session was chaired by Prof. Dr. J P Bandyopadhyay, Academic Chairman, KEI and Mr Devaprasanna Sinha, RVP-II and Fellow, CSI. The first day session was concluded with a vote of thanks by Mr. Diptarup Bandyopadhyay, Principal, Kingston Polytechnic College.

On the Second day, 25th March, 2018, the programme started with some Invited Lectures. The speakers were Dr. Anirban Basu, Former President of Computer Society of India (CSI), Dr. Amit Banerjee, Dept. of Electrical & Computer Engineering, National University of Singapore and Dr. Takaiki Goto, Ryutsu Keizai University, Ryugasaki, Japan(Over Skype). There was a tutorial by Prof. Dr. Amlan Chakrabarti, Dean, Faculty of Engineering and Technology, Professor & Director, A K Choudhury School of Information Technology, University of Calcutta, India. The session was chaired by Prof. Dr. Joyanto Kumar Roy, Managing Director, Systems Advance Technologies Pvt Ltd and Past Chairman, IET Kolkata Section

The Technical Session commenced from 12.00 noon where there were several sessions given as under:

Session 1: Computational Intelligence, chaired by Prof. Dr. Paramartha Dutta, Professor, Visva Bharati.

Session 2: Circuit System and Devices, chaired by Prof. Dr. Indranil Sengupta, Prof. IIT, Kharagpur, India.

Session 3 Nature Inspired Computing, chaired by Prof. Dr. Soumya Sen, Assistant Professor, University of Calcutta.

Session 4: Data Analytics, chaired by Dr. Anirban Basu, Former President of Computer Society of India (CSI).

Session 5: Wireless, Mobile and Cloud Computing, chaired by Prof. Dr. Achintya Das, Professor, Kalyani Govt. Engineering College.

Session 6: Social Network, chaired by Dr. Tanushyam Chattopadhyay, TCS Innovation Lab, Kolkata.

In the evening there was a Panel Discussion on Cyber Crime with nine panelists in the dais. The Moderator of the Panel Discussion was Prof. D K Sinha, Former Vice Chancellor, Visva Bharati and Dr. Manishankar Chakraborty, Higher Colleges of Technology, United Arab Emirates. The Conference ended with a Valedictory Session and Distribution of Certificates to the paper presenters and awards to two best papers.

I.T.S National IT Convention – 2018

Organized at I.T.S., Mohan Nagar, Ghaziabad in association with I.T.S. CSI Student Branch on 21.04.2018

Dr. Sunil Kr Pandey
Professor & Director (IT), CSI Student Coordinator - UP

I.T.S National IT Convention – 2018 was organized by Dept. of IT at I.T.S, Mohan Nagar, Ghaziabad in association with CSI Student Branch at I.T.S and Dr. APJ Abdul Kalam Technical University Lucknow on Saturday, 21st April, 2018.

The event was formally inaugurated by Shri Arpit Chadha, Vice Chairman - I.T.S- The Education Group, Chief Guest Dr. A.K. Nayak - National Secretary of CSI, Dr. Sunil Kr Pandey – CSI State Student Coordinator – UP & Director (IT) at I.T.S, Ghaziabad, Key Note Speakers - Mr. Ravinder Arora, CISO, IRIS Software and Mr. Vineet Love, Associate Director - BDO, Special Guest Mr. Pratyush Chaudhary - Actor & Model, Shri Surinder Sood – Director (PR), I.T.S - The Education Group Event Coordinators Dr Umang, Prof. Saurabh Saxena, Prof. Puja Dhar, Prof. Smita Kansal – CSI Student Branch Coordinator at I.T.S, Ghaziabad and Prof. Varun Arora by lamp lighting before Goddess Sarasvati.

"I.T.S National IT Convention" organized by Dept of IT concluded on a grand note with participation of 88 Colleges, about 1000+ participants in 14 different activities organized under 04 Categories (all were to be conducted in a single day) from far off places including - Varanasi, Jaunpur, Kanpur, Lucknow, Moradabad, Meerut, Muzzafarnagar, Saharanpur, Bijnor, Baghpat, Shamli, Aligarh, Delhi, Noida/ Gr. Noida, Ghaziabad, Hapur, Bulandshahr, Faridabad, Gurugram etc. with full packed Chanakya Auditorium of the Institute. The activities include - Technical (C Programming, Java Programming, IT Quiz, Web Designing, Project Presentation), Cultural (Solo Song, Duet dance, Solo Dance), Literary (Paper Presentation, Extempore, Poster Presentation) and Fine Arts (Rangoli, Face Painting, Movie Making).

Inaugural Session commenced with welcome note of Event Coordinator Prof Puja Dhar followed by motivational address of Director PR, I.T.S - The Education Group Sh. Surinder Sood who emphasized on the need of being focused on improving and skilling with technical as well as communication skills.

Vice Chairman I.T.S- The Education Group Shri Arpit Chadha expressed his happiness on huge participation from various institutes across the states and welcomed the guests. He said that this event will help students not only to compete with the sportsman spirit in a healthy competitive environment and showcase their learning in various event but will also provide an opportunity to meet and understand what others are doing.

While welcoming the guests, Dr. Sunil Kr Pandey, Director – IT & CSI State Student Coordinator of UP set the tone of event by giving warm welcome address to all Chief Guest, key note speakers and Special of this event and addressed the gathering. Dr. Pandey expressed his confidence that various activities shall witness high class of deliberations and shall open the new directions to the participants. He has also highlighted that this event is in the series of various national/ international activities in association with Computer Society of India organized by Department of IT, I.T.S Ghaziabad. Earlier, Event Coordinator, Dr. Umang presented a brief on objectives and structure of the event.

In his address, Dr A.K. Nayak, Chief Guest of the Convention appreciated the efforts of I.T.S Ghaziabad in providing such a platform to the students to demonstrate & showcase their talent on a large forum in a competitive environment. Dr. Nayak greeted all the participants and motivated them and said that knowledge needs to be transmitted in order to make it more useful and meaning. In his address, He has also congratulated and give best wishes to I.T.S for organizing such a wonderful event along with huge participation.

Mr. Ravinder Arora, Keynote Speaker emphasized on serious engagement with Technology and understand as how young minds can contributed to take it to masses.

Mr. Vineet Love, Key Note Speaker touched upon evolution of technologies and related applications and also motivated delegate students to always participants in such activities which will help them to improve their communication, technical and research skills.

Special Guest Mr. Pratyush Chaudhary suggested participants to set the goals of life which will be helpful for their bright future.

Inaugural session was concluded with overwhelming cultural performance by MCA Students followed by vote of thanks of Event Coordinator Prof Smita Kansal.

The event concluded with the Prize distribution ceremony in the evening in which Chief Guests Dr. A. K. Nayak and Director (IT) & CSI Student Coordinator of UP gave away the Cash Prizes, Certificates and Trophies to the winners of different activities. On this occasion Prof. Nancy Sharma, Vice Principal UG, Dr. Umang, Prof. Puja Dhar, Prof Smita Kansal and Prof Varun Arora (Event Co-Convener(s)), faculty members, students from different courses of the Institute and also outside the Institute were also present.

CSI Student Conventions

National Student Convention

CSI National Student Convention was organized by Sri Ramakrishna Engineering College, Coimbatore on 16th and 17th March 2018. During the inauguration function on 16th March 2018 the Chief Guest Shri B Rudramani, Vice President and Center Head, Dell EMC, Bangalore highlighted on the Changes in Consumer / Producer Model and the Digital Transformation. These changes happen too fast before the students complete their graduation. Faculty and students should collaborate with industry, publish research papers in reputed journal and make use of good utilization of the results. He also advised the students to participate in Co-curricular activates, enroll in professional bodies, be well versed in etiquettes and constantly have interactions with the industries. According to him, all these would take students to greater heights. The welcome address was given by Dr. A Grace Selvarani, Professor and Head, Dept. of CSE. Presidential Address was given by Dr. N R Alamelu, Principal, Sri Ramakrishna Engineering College, Coimbatore. Felicitation was given by Mr. N Valliappan, Chairman, CSI Coimbatore Chapter and Dr. G Radhamani, Secretary, CSI Coimbatore Chapter. The convention souvenir was released during the occasion. Dr. M Senthamil Selvi, Prof. & Head, Dept. of IT proposed the vote of thanks. Mr. P R Rangasamy, Fellow, CSI, Dr. R Nadarajan, Fellow, CSI and Dr. Ranga Rajagopal, Past Hon Treasurer, CSI were also participated in the event. Events like Paper / Project Presentation, Codathon, Treasure Hunt, Best Manger, Technical Quiz, Web Designing, Star of the Event and surprise events were conducted for the students. Around 200 students from various states participated in the above events.

Regional Student Convention (Region-II)

The Regional Student Convention of CSI, Region-II was organized at B P Poddar Institute of Management and Technology, Kolkata on 10th February 2018. The convention was inaugurated by Prof. A K Nayak, Hon Secretary, CSI and the programme was illuminated by distinguished dignitaries of Computer Society of India. Total 129 students from 5 Institutes were actively participated in different events in the convention. Legendary Professor Mohit Kumar Roy was presented Lifetime Achievement Award by Computer Society of India for his contribution to the society. The Industry Invited Talk was delivered by Manash Chaudhuri, CEO, ConvergeHub and Corelynx on "Still confused on Cloud Computing". He discussed about the opportunities in Cloud Computing and

how they as young leaders can utilize Cloud to move in their career. The second Technical Talk was presented by Dr. J K Mandal, Professor, Dept. of CS & Engg., University of Kalyani, West Bengal on the topic titled "Aspects of Security and Authentication-State-of-the-Art". Technical Quiz competition and App Development competition was conducted and many teams from different Colleges/Institutes were participated. The session was judged by Debdip Roy, Founder and CEO of Cleonix Technologies, Kolkata. In the Technical Paper Presentation session, four papers selected by the programme committee were presented by the authors. The session was chaired by Prof. J K Mandal. The presented papers were submitted for review for possible publication in a referred journal.

State Student Convention - Telangana

Telangana State Student Convention was organised at MVSR Engineering College on 9th and 10th February 2018. The theme of the convention was Machine Learning and Intelligence. Variety of events were planned which witnessed a student participation of 600 students from colleges across Telangana. On 7th February 2018, a training program titled Microsoft Office-Training was organized. The event was presided by Prof J Prasanna Kumar. On 9th February 2018, the Inaugural function was organized, the chief guest for the event was Mr. P Phani, MD Iphi group, Hyderabad and Chinta Subramaniyam was the guest of honour. The event was presided by Dr. G Kanakadurga, Principal, MVSR Engineering College, Mr. Mohan Raidu, Chairman, Mr. Rajeev Ranjan Kumar, Hon Secretary, Mr. Amit Kumar Gupta, Hon. Treasurer and Mr. Bala Prasad Peddigari, Dr. Santanu Chaterjee, Dr. A Krishna Prasad and PVK Patanjali. The Chief Guest delivered the keynote address to the gathering, emphasizing on the importance

of Critical Thinking in the present scenario. He outlined the major keywords for the development of student community: Critical Thinking, Questioning, Reasoning and goalmaking. The Guest of emphasizing on the importance of Programming

and softskills. Technical Quiz was a highly challenging contest on coding with concepts from C & C++ domains, with an aim to test the student's ability to debug and optimize a solution to a problem based on different constraints.

One Week Awareness programme on ICT Standards, Benchmarks and Guidelines organized at VIT Vellore by CSI Student Branch

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

The event was organised by School of Information Technology & Engineering in association with IEEE CS, ACM and CSI student branches of VIT Vellore. The student members of these professional societies had set up info-booths for creating awareness to these professional societies and their roles in formulating ICT standards, benchmarks and guidelines.

The programme was attended by about 570 participants and about 30 faculty members in different activities of the programme such as (a) Invited talks from working professionals from ICT industry on the role of standards, benchmarks and guidelines in enhancing organizational productivity and quality of products and services (b) Presentation by faculty members on leading organizations engaged in formulation of standards, benchmarks and guidelines (c) Presentations by final semester project students - sharing their experience how they used/incorporated standards/benchmarks/guidelines in their project (d) Oral and poster presentations by students on standards, benchmarks and guidelines (e) Quizzes.

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

On 13th March 2018, Prof. H.R. Vishwakarma, Senior

Professor, School of Information Technology & Engineering and Fellow & Past Hon. Secretary, CSI shared a few opportunities for faculty and students to work with leading organizations that are engaged in formulation of ICT standards, benchmarks and guidelines.

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

On 15th March 2018, Prof. K. Ganesan, Director, TIFAC-CORE on Automotive Infotronics and Past Chairman, CSI Vellore Chapter delivered a talk on Motor Industry Software Reliability Association (MISRA) C Software Development Standard. On 16th March 2018, Dr. Anand Subrmanian, Senior Delivery Manager, IBM India Pvt. Ltd., Bangalore the role of standards in software project management.

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

Dr. Aswani Kumar, Dean, School of IT & Engg. and Dr. B. Valarmathi, Head of Department of Software and Systems Engineering, Prof. H. R. Vishwakarma, Faculty Sponsor, ACM VIT Student Chapter and Dr. G. Jagadeesh, Past Chairman, CSI Vellore Chapter coordinated the overall programme while Profs G. Chemmalar Selvi, S.S. Manivannan, G. Gunasekaran, J. Prabhu, Srinivas Perumal coordinated day-wise activities of the programme. The student coordinators included: Aquib Ajani, Sarath Chandra Addepalli, Nikita Baid, Akansha Sinha, Shaik Asma Bano, Raj Katira, Shankar Kotha, Saurav Kumar, Kashmira Pramod Sharma and Sunayna Ray.

AMRAVATI CHAPTER

The CSI foundation day was celebrated by CSI Amravati Chapter at Prof Ram Meghe Institute of Technology & Research, Amravati on 6th March 2018. Various Technical Events were organized for students. Total 280 students participated. The event was inaugurated by Dr. A P Bodkhe, Principal, Dr. G R Bamnote, Chairman CSI Amravati Chapter, Dr. M A Pund, Hon Secretary, Amravati Chapter, Dr. Ms. V M Deshmukh, HoD CSE, Dr. S R Gupta, SBC PRMIT&R Student's Branch and Ms. Heena Chainanni, the Student representative were on the dias. Dr. V M Deshmukh in her welcome speech told the objectives of CSI and detailed about the events. Dr. G R Bamnote greeted the CSI members on the occasion and appealed the students to join CSI. Dr. A P Bodkhe congratulated the organizers for organizing such useful events. The program was coordinated by Ms. Poonam Lohiya, conducted by Saurabh S Kulkarni and Ms. Sanjot Mahure proposed vote of Thanks. In the valedictory function all the achievers and winners were felicitated.

CHENNAI CHAPTER

Chennai Chapter organised CSI Day Celebrations on 17th March 2018. The Celebrations were divided into 4 sessions. Session 1 : The celebrations opened with project presentations by teaMs. from colleges; 23 teaMs. (consisting of 2-4 members each) submitted projects for consideration. A team of experts examined the projects, evaluated them and selected 10 projects for presentation. 8 teaMs. presented their projects during the first session of CSI day Celebrations. Based on assessment done by the expert committee, 3 projects were ranked for prizes. Session 2: Unveiling of the portrait of Major General Balasubramanian, Founder Secretary of CSI: This session opened with a

welcome speech by Chairman T R Vasudeva Rao outlining about various sessions of the event; then he talked about formation of CSI on March 6, 1965 and spoke briefly about Maj Gen Balasubramanian- fondly called by his colleagues and friends ' Bala'. Mr. H R Mohan – Past President and Fellow of CSI made a presentation about Major General and talked about his role, achievements in CSI and his qualities. The portrait of Major General was unveiled by Mr. H R Mohan, Past President Mr. P Unnikrishnan, Past Hon National Secretary-CSI.

Session 3: QUIZ. Mr. H R Mohan, ably assisted by Dr P Sakthivel, Past Chairman, CSI conducted an quiz which consisted of three rounds including audio and video rounds; the audience consisting of students, teachers and professionals participated very enthusiastically; cash prizes were awarded for right answers. Session 4: Valedictory : CSI Chennai Chapter conducts Model examination in Computer Science for 12th Standard State Board students every year; Based on the exaMs. conducted during 2017-18 on 3rd Jan 2018 (1138 students from 23 schools wrote this exam) and their evaluation, 4 students (First rank=1;second rank=1;third rank=2) were chosen ; prizes with Certificates were distributed by T R Vasudeva Rao to these students during this session; also based on assessment and selection of best three projects, three teaMs. were given prizes. Participation certificates were given to all students who presented projects. The celebrations ended with vote of thanks by Ms. Mythili Prakash, Secretary CSI-Chennai chapter.

Extra-ordinary General Body Meeting of CSI Chennai Chapter was held on 24th March 2018. Mr. T R Vasudeva Rao, Chairman (2017-18) presided over the meeting; Mr. B Srinivasan, Chairman (2016-17) and Ms Mythili Prakash, Secretary (2016-18) were also on the dais. The agenda for the meeting was to pass accounts of Chennai Chapter for 2016-17- which was not passed during the AGM held on 17-9-2017, as the members wanted clarifications on Receivables from HQ. Mr. T R Vasudeva Rao provided necessary clarifications on queries relating to receivables relating to TDS as well as on Chapter share and other receivables from HQ. These clarifications were based on the interaction - Mr. T R Vasudeva Rao had with Office bearers of CSI, Accounts Dept-HQ and the auditors of CSI. Based on

the above, the accounts of the Chennai Chapter for 2016-17 were passed unanimously by the EGM.

The Chapter organised the SBCs meet on 24th March 2018. The meeting began with the welcome address by Mr. T R Vasudeva Rao, Chairman, Chennai Chapter. He talked about his education and career over 40 years with the evolution and developments in IT industry. He said that e-Learning is increasingly becoming popular. Mrs. Mythili Prakash, Secretary talked about her experience in arranging SBC meet and her interaction with student chapters. Mr. G Ramachandran, Fellow and Past Vice President said that any society is respected by the strength of its members. Mr. S Ramasamy, National Student Co-ordinator gave a motivational talk to teachers interspersed with short stories and anecdotes from his over 100 visits to colleges to drive home his points mainly that they should shape and motivate the students; he further said that soft skills of students eg: communication-verbal and written and ability to work in a team, presentation skills etc., need to be improved and teachers should instill these as well self confidence in students; he made the suggestion that students of first year itself should become members of CSI so as get orientation and knowledge from day one. Mr. Y Kathiresan, Executive Secretary, CSI chennai chapter also shared his experiences with Student Branches. Mr. S Venkata Krishnan, Past Director (Education), CSI Education Directorate mentioned that SBCs should keep in touch with Alumni of the CSI so as to enlist them for Guest talk/lectures to students. During the Open Forum, SBCs presented their experience, views and expectations from CSI; they said that they expect support and co-ordination from CSI with regard to getting internship for Final Year students in Industries. Senior members of CSI asked teachers to encourage students to send articles for publication in various CSI magazines. The SBC meet concluded with vote of thanks by Mr. T R Vasudeva Rao.

HARIDWAR CHAPTER

Haridwar Chapter in association with Faculty of Engineering and Technology organized an Invited lecture by Mr. Gurukiri on the topic Big Data and Docker Technology on 20th March 2018. Students from CSE participated in the event. Mr. Gurukiri told about the latest technologies that are driving the great companies, how linux and docker software are providing platform to run various applications based on

big data. The informative theory session was followed by lab session in which students were informed about the installation of these software on a Linux based system. The event was coordinated by Mr. Namit Khanduja, Dr Mayank Aggarwal presented vote of thanks and Mr. Nishant Kumar and Mr. Suyash Bhardwaj of dept of CSE were present in the event.

MYSORE CHAPTER

Mysore Chapter organized one day National Seminar on Indian Language Computing in association with JSS Science & Technology University, Centre for Development of Advanced Computing (C-DAC), Pune and Central Institute of Indian Languages (CIIL), Mysore on 27th March 2018. The program was attended by more than 200 participants. The invocation was rendered by Mr. J G Venkatesh. Mrs. K A Anitha Venkatesh, Chairperson CSI Mysore Chapter presided over the program and addressing the gathering quoted that CSI is the oldest and largest body of IT professionals whose aim & mission is to INSPIRE, NURTURE & assist students to integrate into the IT community. CSI also facilitates research, knowledge sharing, and caters to both Academic community & professionals which has a mechanism to reach masses in remote locations. She also quoted that India being a multi lingual country and for proliferating the fruits of multilingual technology to all the sectors of the society. Chief Guest Prof. B G Sangameshwara gave a call to students to take up projects on Language Computing which is in great demand and advised to do projects on their own, rather than purchasing readily available projects. Dr. C N Ravikumar, Principal, Mysore College of Engineering & Management, delivered Key Note Address & mentioned that developing multilingual products is a challenge and interested in the areas of Machine learning, Natural Language Processing,

voice recognition etc. Mr. Mahesh D Kulkarni informed regarding the opportunities in Multilingual Computing in areas like localization, digitization and International Standardization for researchers, developers, translators etc. Prof. K S Lokesh appreciated the effort of CSI in organizing the seminar which is beneficial for the society at large.

NASHIK CHAPTER

Nashik Chapter in association with Digital Impact Mr. Vaibhav Dabhade, Hon. Secretary and MC members of Nashik Chapter. The Overall project competition was handled and co-ordinated by Dr M R Sanghavi Square organized regional level Project Competition on 24th March 2018 for providing platform to the students to showcase their Project Ideas and Model. Selected Project Ideas & Models will be awarded

and assigned mentors to convert this Project into Product and to form Business Firm. Dr Alexander Klonczynski, Vice-President of BOSCH Pvt Ltd was the Chief Guest of Function. Valuable guidance and hand to hand support provided by Mr S B Karkanis, Chairman.

▶FROM STUDENT BRANCHES ▶▶▶

REGION-I	
Chitkara University, Patiala	**Chitkara University, Barotiwala, Solan**

16-3-2018 - Mr. S C Jain, Chairman CSI Chandigarh Chapter inaugurated the Technical Event on Code Cracker

24-3-2018 – Dr Varinder Kanwar, Mr S C Jain and Mr. D S Chhabra during Tech Fest : TECHELONE 2018

REGION-II
Haldia Institute of Technology, Haldia

9-2-2018 to 11-2-2018 - Workshop on Linux, DevOps and Automation

23-3-2018 to 25-3-2018 - Workshop on Machine Learning with Python

REGION-V

Bharat Institute of Engineering and Technology, Hyderabad

23-3-2018 & 24-3-2018 - Two Day National Level TECH FEST-2K18

29-3-2018 - PROJECT DAY : 2K18

Vasavi College of Engineering, Hyderabad

6-3-2018 - Aptitude Quiz

CMR Technical Campus, Hyderabad

27-3-2018 - Students Project Expo-2018

Santhiram Engineering College, Nandyal

11-4-2018 - Awareness Seminar on
CYBER SECURITY HACKATHON

NBKR Institute of Science and Technology, Nellore

24-3-2018 - Releasing the CSI Newsletter during
Technical Symposium : Techvyuha 2K18

AMC Engineering College, Bangalore

15-3-2018 to 17-3-2018 - Workshop on Cyber Security and
Ethical Hacking by Mr. Samarth Bhat

22-3-2018 to 23-3-2018 - Workshop on ARM7 Processor by
Mr. Sanjay Kumar Bhagat

REGION-V	
B M S Institute of Technology & Management, Bangalore	**REVA University, Bangalore**

5-2-2018 – Event on Python and its applications

22-3-2018 & 23-3-2018 - Techno Cultural Fest

JSS Academy of Technical Education, Bangalore	**B N M Institute of Technology, Bangalore**

10-4-2018 - Technical talk on Software Engineering: Present Industry Standards

16-3-2018 & 17-3-2018 – Workshop on Virtual Reality

Acharya Institute of Technology, Bangalore	**Don Bosco Institute of Technology, Bangalore**

3-3-2018 - Workshop on PROGRSSIVE WEB APP

16-3-2018 – Student Branch Inauguration & Technical Seminar on Impact of Artificial Intelligence in the Digital Universe

Maharaja Institute of Technology, Mandya	

19-3-2018 - Workshop on High Performance Computing

13-4-2018 - Workshop on LaTeX

▶ FROM STUDENT BRANCHES ▶▶▶▶

REGION-VI	
K K Wagh Institute of Engg. Education & Research, Nashik	**SNJB's Late Sau Kantabai Bhavarlalji Jain College of Engineering, Chandwad**
21-3-2018 & 22-3-2018 - National Level Technical Symposium on Equinox 2018	9-3-2018 to 12-3-2018 - IoT Training Session
Prof. Ram Meghe Inst. of Technology & Research, Amravati	**Marathwada Mitra Mandal's College of Engineering, Pune**
16-3-2018 - CSI Foundation Day Celebrations	20-3-2018 - Technical Quiz Contest - TechRex
AISSMS Institute of Information Technology, Pune	
24-3-2018 – Competition on Game Implementation	24-3-2018 - Paper Presentation in NCET-2018
REGION-VI	REGION-VII
Pune Institute of Computer Technology, Pune	**Chennai Institute of Technology, Chennai**
14-3-2018 to 18-3-2018 – Event on ENTHUSIA '18	9-3-2018 – CSI Student Branch inauguration and National Level Seminar on Challenges in Digitization

REGION-VII	
Panimalar Institute of Technology, Chennai	
2-2-2018 & 3-2-2018 - New India Student Championship 2018 - Largest Learnathon of India	23-2-2018 to 2-3-2018 – Workshop on Programming with Python Language
Rajalakshmi Engineering College (Autonomous), Chennai	
17-3-2018 - INNOVISION 18 : an Exhibition Venture and Creative Idea Presentation for exploring the ideas of young minds	23-3-2018 - Release of proceedings by Prof Muthukrishnan, Mr Vasudeva Rao and Mr Govindan during National Conference on Innovative Research Trends in Digital India
Ramco Institute of Technology, Rajapalayam	**Jeppiaar Institute of Technology, Sriperumpudur**
23-3-2018 - State Level Coding and Mobile App Development Hackathon - DaVinci Koodittaa	20-2-2018 – Mrs Gladdis Merlin handling the Seminar on Machine Learning
IFET College of Engineering, Villupuram	**St Joseph's Institute of Technology, Chennai**
7-3-2018 - Mini Project Expo : EPROZYNE'18	22-3-2018- Talent search : Poster Design Contest

▶ FROM STUDENT BRANCHES ▶▶▶▶

REGION-VII

Kongunadu College of Engineering & Technology, Trichy

10-3-2018 - National Conference on Innovations in Computing and Communication Technology (NCICCT'18)

SVS College of Engineering, Coimbatore

24-3-2018 - Workshop on Deep Learning using Keras and Theano

Sri Sai Ram Engineering College, Chennai

20-3-2018 - Mini Project Exhibition- Projectxpo-18

27-3-2018 - National Conference on Smart Innovations in Communications and Computing – NCSICC'18

Dr. M G R Educational and Research Inst. Univ., Chennai

27-3-2018 - Guest Lecture on Corporate Etiquette

Kalaignar Karunanidhi Institute of Technology, Coimbatore

20-2-2018 - MINI PROJECT EXPO : Showcase Your Skills

Valliammai Engineering College, Kattankulathur

23-3-2018 - Project Exhibition Day

24-3-2018 - National Seminar on Recent Trends in Soft Computing by Mr Ramprakash