# Shell

**Newsletter**

***Department of Computer Science & Engineering***

**Volume 4** **Issue 2** **June - 2019**

## Vision and Mission of the Institute

**Vision**

- To be one of the premier Institutes of Engineering and Management Education in the country

**Mission**

- To provide Engineering and Management Education that meets the needs of human resources in the country
- To develop leadership qualities, team spirit and concern for environment in students

**Objective**

- To achieve educational goals as stated in the vision through the mission statements which depicts the distinctive characteristics of the Institution
- To make teaching-learning process an enjoyable pursuit for the students and teachers

## Vision and Mission of the Department

**Vision**

- To be a premier department for education in Computer Science and Engineering in the state of Karnataka, moulding students into professional engineers

**Mission**

- To provide teaching/ learning facilities in Computer Science and Engineering better than prescribed by University for easy adaptation to industry and higher learning
- Provide a platform for self-learning to meet the challenges of changing technology and inculcate team spirit and leadership qualities to succeed in professional career
- Comprehend the societal needs and environmental concerns in the field of Computer Science

*This issue of*

**"Shell"**

*from the Department of Computer Science and Engineering is dedicated to **Elon Musk** who is a technology entrepreneur, investor and engineer. He is the founder, CEO of SpaceX and OpenAI. He is the co-founder of Tesla, Neuralink and Paypal.*

**Inside Shell ….**




*B. N. M. Institute of Technology*

Vidyaya Amrutham Ashnuthe

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**All UG branches – CSE, ECE, EEE, ISE & Mech.E accredited by NBA for academic years 2018-19 to 2020-21 & valid upto 30.06.2021**

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## *Editor's Message*

Dear Readers,

It is indeed a pleasure to introduce the Issue 2 of the Newsletter which we hope you will enjoy reading. We take this opportunity to thank all those who have contributed for this issue. The assistance provided by the Editorial Committee is highly appreciated. Here you have "SHELL", the long awaited NEWSLETTER of BNMIT for the even semester 2018-2019. This is a platform that exhibits the skills and innovative ideas of students and teachers. The editorial team has striven hard in co-ordinating with the Department in bringing out this Newsletter. These contributions required a generous amount of time and effort. It is this willingness to share knowledge, concern and special insight with people of common interest that has made this newsletter possible.

**Editorial Team**

## *Department Profile*

The Department of Computer Science & Engineering that started in the year 2001 is known for imparting quality education and carrying out cutting edge research. In addition to the strong UG program, PG CSE program and research facilities for M.Sc (Engg) and Ph.D courses are also offered. The Department has a well-equipped R&D Centre and is currently headed by Dr. Sahana D Gowda.

The Department is associated with professional bodies like Computer Society of India, IEEE (USA), the student branch of Institution of Engineers and Indian Society for Technical Education. Major areas of specialization of the faculty include Image Processing, Computer Vision, Pattern Recognition, Data Mining, Wireless Sensor Networks and Network Security. The Department has attracted some of the brightest students and faculties into its portal. Faculties are involved in Campus Connect Program of Infosys and they are reviewers of reputed National and International Journals and have chaired National and International Conferences.

The Department regularly organizes Faculty Development Activities, workshops, technical talks and industrial visits for students as well as faculties so that they are abreast with recent trends. The students are placed in leading IT companies with handsome pay packages. They also pursue higher studies in reputed universities across the globe.

In addition to academics, the Department is striving to upgrade students' skills with programmes like Skill Development Programme, Innovative Project Laboratory, T5, TW5 and Engineering Exploration Laboratory Programmes.

**Best Outgoing Students for the Year 2018-19**

1. Akshara G Dutt of B.E (Computer Science & Engineering) has been awarded 'the Best Outgoing Student' for the year 2018-19.
2. Manjushree K of M.Tech (Computer Science & Engineering) has been awarded 'the Best Outgoing Student' for the year 2018-19.

## *Cognitive Technology*

**"Technology made large populations possible; large populations now make technology indispensable."**

**- Joseph Wood Krutch**

*What is Cognitive Technology?*

Before I answer the question of what Cognitive Technology is, I really want to tell you why I am excited to talk about this subject matter. The "why" is quite simple. The data today is really exploding the markets; Let me give you a couple of statistics.

In the last two years, ninety per cent of data that is available today has been created. So, since the existence of mankind, only 10% of data has been created prior to these two years. So, without moving to technological solution, we just cannot handle this explosion of data.

Cognitive Technology is the ability of humans to train a machine to think like human beings. It means that we are going to teach computer to recognize patterns, to generate hypothesis and to get reasonable outcomes. Cognitive Technologies are the products of the field of Artificial Intelligence. They are able to perform tasks that only humans are able to do. Products of Cognitive Technology include computer vision, machine learning, natural processing, deep learning, neural networks, sentiment analysis, speech recognition and robotics.

A number of Artificial Intelligence technologies is required for a computer system to build cognitive models that mimic human thought process. In general, Cognitive Technology is used to assist humans in the decision making process. Currently, Cognitive Technology is used in seventeen major industrial sectors which include defence, agriculture, automobiles, banking, healthcare and media. A famous example for use of Cognitive Technology was to improve the recommendation feature of the NETFLIX online movie rental service that uses machine learning to provide the choicest movie a customer requested for. This feature has significant impact on customer's use of the service and it accounts for seventy five per cent of NETFLIX users.

So, we can conclude that cognitive technology is all around us, even in forms that we use daily but wouldn't know of its existence in that form.

**Shashank D**
**IV CSE 'B'**

## *Edge Computing: Critical for IoT*

Today, tech devices that are always connected take advantage of cloud computing, Internet of Things (IoT), manufacturers and application developers are starting to discover the benefits of doing more compute and analytics on the devices themselves. This on-device approach helps reduce latency for critical applications, lower dependence on the cloud and manage the massive deluge of data being generated by the IoT. An example of this trend is the recently announced Nest Cam IQ Indoor Security Camera, that uses on-device vision processing to watch for motion, distinguish family members and send alerts only if someone is not recognized or doesn't fit pre-defined parameters.

The ability to do advanced on-device processing and analytics is referred to as "edge computing." Think of the "edge" as the universe of internet-connected devices and gateways sitting on the field counterpart to the "cloud." Edge computing provides new possibilities in IoT applications, particularly for those relying on machine learning for tasks such as object detection, face recognition, language processing and obstacle avoidance. The rise of Edge Computing is an iteration of a well-known technology cycle that begins with centralized processing and then evolves into more distributed architectures. Edge Computing will have a similar effect on the IoT, fuelling strong ecosystem growth as end devices become more powerful and capable of running sophisticated applications.

Edge Computing delivers tangible value in both consumer and industrial IoT use cases. It can help reduce connectivity costs by sending only the information that matters instead of raw streams of sensor data, which is particularly valuable on devices that connect via LTE / Cellular such as smart meters or asset trackers. Security and privacy can also be improved with edge computing by keeping sensitive data within the device. For example, new retail advertising systems and digital signage are designed to deliver targeted ads and information based on key parameters set on field devices such as demographic information.

Edge Computing in these solutions help to protect user privacy by anonymizing, analysing and keeping the data at the source rather than sending identifiable information to the cloud.

Processing at the edge also reduces latency and makes connected applications more responsive and robust. Avoiding device-to-cloud data round trips is critical for applications using computer vision or machine learning, for instance, an enterprise identity verification system or a drone tracking and filming its owner or an object. With Edge Computing, the opportunity for system architects is to learn how to harness the benefits of the available distributed computing power from end to end, tapping into the capabilities of field devices, gateways and cloud altogether. Edge devices are being created with increasingly sophisticated compute capabilities. Couple that with not so far off advanced connectivity technologies such as 5G, which will deliver faster, more robust and massive connectivity and it becomes obvious that we are about to witness the emergence of a new breed of smart devices and applications. It's truly a fascinating time to watch and participate in this space.

**Fatema Malu Bhai Wala**
**IV CSE 'B'**

## *The Smart Spaces*

With technology growing rapidly and becoming a part of our lives, there comes yet another trend "THE SMART SPACES'. Smart Space is one of the top strategic technologies in 2019 to which the world's heavy weights like Google, Apple, Microsoft, etc. may aspire to provide.

Smart spaces are interactive environments where humans and technology can openly communicate with each other. These spaces can either be physical or digital. Smart spaces enable a more immersive, interactive and automated experience for the targeted people. Smart spaces bring the people, the data and the processes together. Smart office, smart city, smart home, smart stores and connected factories are some examples of smart spaces.

Smart office is the first smart space that many people will encounter. Starting with smart desks and walls, employees can share most of what they work with to provide a seamless experience.

A collaboration of sensors, Internet of Things (IoT), Artificial Intelligence, Virtual Reality etc., bring us the smart offices. Wiring an office with sensors allows for automatic responses to any number of stimuli such as changes in light, temperature and motion.

Working in unison with the sensors is the IoT, that allows the collection and retention of data transmitted by sensors. Artificial Intelligence is used as a tool to govern investments and automatically update management systems. Also, AI along with IoT plays a massive role in smart energy management. Using Virtual Reality (VR), all the participants who are located in far off places can be brought together in a meeting room.

Smart spaces provide innumerable conveniences such as preventing and curbing crimes. However, individuals will have to decide whether these technologies are a threat to privacy.

**Prateeksha M**
**IV CSE 'B'**

## *AI Controlled Hummingbird Robot*

Hummingbird has the ability to hover and make sharp turns. This has inspired drones and now the researchers at Purdue University have built a hummingbird inspired robot. This robot is trained by machine learning algorithms based on various techniques this bird uses naturally. Artificial Intelligence combined with flexible flapping wing allows the robot to teach itself new tricks. Although the robot cannot see, it creates a map by touching surfaces. It can fly over obstacles or run underneath them. It also adjusts its width to crawl or run on flat surfaces, it climbs over large obstacles and up closely-spaced walls or squeeze through a tunnel, pipe or narrow gaps.

The robot can be used for search and rescue applications as it can fly over various obstacles and crawl between or underneath cracks where a regular drone cannot fly. The robot can also be used in agriculture, maintenance, cleaning, filming, entertainment as well as law enforcement and anti-terrorist applications. Since the robot can fly silently, it can also be used for covert applications.

The robots have 3-D-printed bodies, wings made of carbon fiber and laser-cut membranes. The researchers have built one hummingbird robot weighing 12 grams, the weight of the average adult Magnificent Hummingbird and another insect-sized robot weighing 1 gram. The hummingbird robot can lift more than its own weight up to 27 grams. The robot requires only two motors and can control each wing independently of the other. This is how flying animals perform highly agile maneuvers in nature.

This robot is an example of how fast robots are developing in 2019 and so in future we can expect the sky to be filled with hundreds of robot hummingbirds.

**Lekhana A V**
**IV CSE 'A'**

## *Upgraded Cyber Security using Artificial Intelligence and Machine Learning*

The year 2020 is a significant year in technology. Trends are already showing that the tech world is focusing on cyber security and is keeping up with our adversaries by using Machine Learning and Artificial Intelligence to predict and protect against attacks. As these technologies learn and improve, we will certainly see a much quicker and less costly response to our adversarial attacks.

While security as a percentage of IT continues to grow at a robust rate, the cost of security breaches is growing even faster. Organizations are spending close to $100 billion on a dizzying array of security products. In fact, it is not uncommon for organizations like CISCO to have 30 to 40 security products in their environment. However, if you ask Chief Information Security Officers how they feel about their security risk, they will express concerns over being highly exposed and vulnerable. Artificial Intelligence (AI) and Machine Learning (ML) can offer IT security professionals a way to enforce good cyber security practices and shrink the attack surface instead of constantly chasing after malicious activity.

*Why Isn't Cybersecurity working as it should be?*

There are many reasons that security measures are lagging behind. But one of the biggest reasons for not succeeding is that we always seem to be one step behind the bad guys. Most security products are focused on understanding malware or attacks. This is an unbounded problem and as a result, we are always playing catch-up with malicious actors. The number of malware and loss of file attacks run into the billions, with hundreds of millions getting added each year. On top of that, the bulk of these products focus on infiltration prevention.

By homing in on preventing infiltration almost exclusively, we are conceding the asymmetry advantage to the attackers-while they just have to get it right once, we must get it right every time. We must figure out a way to bound the problem. Focusing solely (or primarily) on chasing the bad is not going to help us succeed.

*How Cybersecurity Threats Can Be Contained?*

The principle of least privilege is one of the oldest information security principles, with the original formulation by Jerry Saltzer stating: "Every program and every privileged user of the system should operate using the least amount of privilege necessary to complete the job." If we enforce this principle to our IT environments, where every application is confined to perform only what it must to complete its job, we'd have dramatically reduced the attack surface and would consequently have bounded the problem. While this does not eliminate the need to monitor for threats, it simplifies the problem. You are no longer looking for a needle in a haystack, but looking for a needle in a few pieces of hay. So, the right solution architecture would include two components: A foundational piece that shrinks the attack surface by enforcing least privileges (also known as cyber hygiene).

Some argue that AI can solve the problem of "chasing bad" and dramatically increase our security. If this were true, one might argue that we do not need the foundational piece described above. There is little doubt that with the resurgence of deep learning owing to multiple factors, we have seen phenomenal improvements in heretofore hard problems in AI. This includes object detection in images and videos, speech recognition, natural language processing, self-driving cars, search recommendation engines and much more.

Some of these problem domains are adversarial but have well-defined rules like chess and Go. There are others like self-driving cars and speech processing that have few rules that can be used to describe them. However, these problems often do not have adversaries involved and frequently have large amounts of data - a prerequisite for deep learning algorithms.

Using AI and ML to achieve cyber hygiene and enforce least privilege environments at scale is the breakthrough idea that will help us secure modern IT environments against ever-evolving threat landscape.

**Sanket S Kulkarni**
**IV CSE M.Tech**

## *Departmental Activities*

### Industrial Visit to TATA Consultancy Services

On 5th March 2019, the students visited Tata Consultancy Services, Whitefield, Bengaluru. During this visit Mr.Sreenivasa. Ramanujam, Academic Relationship Manager from TCS initiated the talk and provided the details about the company and the sessions. Further, Mr. Vijaykumar B from one of the Banking, Financial Services and Insurance (BFSI) Unit from TCS delivered a talk on "IT Employability – Road Map to Success" that focused on General Aptitude, Technology Focus, Project Preparations, Projects and Interviews.


### Technical Talk on Advances in Machine Learning Application

On 12th April 2019, Dr. Jay Bharatheesh Simha, Chief Technical Officer/Director (Analytics) - Abiba Systems, Bangalore delivered a talk on Advances in Machine Learning Applications to the students of 4th Semester Computer Science and Engineering branch. The objective of the talk was to give an insight to the recent trends in Machine Learning techniques such as Fuzzy Modeling, Neural Networks and Deep Learning.


### Workshop on I/O Interfacing with Embedded System

A two-day workshop on I/O Interfacing with Embedded System was conducted under CSI-BNMIT student branch on 3rd and 4th May 2019 in association with the Indian Tech-Keys, Bengaluru. Fifty one students had actively participated in the workshop. The resource person was Mr. Kotresh M, Director, Indian Tech-Keys, Bengaluru. The objective of the workshop was to give a hands-on exposure about interface of multiple sensors and driver circuits with embedded system and Embedded System Programming with Arduino Microcontroller Architecture

### Felicitation of First Class with Distinction Holders

On 26th April 2019, Mr Pavan Iddalagi, Technical Specialist, Alcatel Lucent Enterprise delivered a talk on "Next Step in Networking Industry". The talk gave an insight on the requirement of Computer Networking Concepts, Operating System Concepts and Data Structures. After the talk, certificates were distributed to FCD Holders.

## IoT Exhibiton

A visit to IoT exhibition was organized by BNMIT CSI student chapter on 28th February 2019. The event included 9 conferences, 18 Training Courses and 6 Tutorials in various domains like Block Chain and Distributed Ledgers, Python for Data Science, IoT in Agriculture, Edge Analytics and Hierarchical Temporal Memory (HTM). Industrial Automation, Street Light IoT, Auto Face Detection, Home Automation, Smart Watch products were exhibited.

## Workshop on Mobile Control Robotics

A Two day workshop on Mobile Control Robotics was conducted in collaboration with Finland Labs and Revert Technology, Gurugram and CSI-BNMIT Student Chapter on 15th and 16th February 2019. The resource person Mr Vignesh Shinde is robotics and embedded system trainer. The topics covered include Introduction to robotics and microcontrollers, installation of software and debugging, assembling the kit, generating different LED patterns and development of mobile controlled robot.

## *Biz-Tech Quiz*

1. Robert Williams was an American Engineer who worked at Ford's Factory in Michigan. He died in 1979 due to an accident while he was gathering parts in a storage facility. His family sued Ford for a total of $15 million and the court concluded that there were not enough safety measures in place to prevent such an accident from happening. Why is his death so historic in the world of technology?
2. The Deutsche Bank Twin Towers are situated in Frankfurt and serve as the worldwide headquarters of Deutsche Bank. These towers are nicknamed X and Y, the two basic aspects of every financial transaction. ID X and Y.
3. Which fictional character co-founded a ridesharing start up called "Cabracadabra" with an intention of creating safe spaces for women? This app was meant exclusively for female users, and the cab drivers were also compulsorily women.
4. The full form of X suggests a well-structured and layered organisation, conveying truth and wisdom and used in offices, all around the world. However, one reason for naming was the founder's girlfriend calling him X in a sense which was opposite to what the full form indicates. ID X.
5. 'Me at the Zoo' was the first item to be uploaded to the website X. It was uploaded by the Jawed Karim, co-founder of X, which has now grown to be one of the busiest websites in the world with over a billion users. ID X.

Answers: 1. First Human death by a robot
2. Credit & Debit
3. Todd Chavez
4. YAHOO (Yet Another Hierarchical Officious Oracle)
5. YouTube

**Varun Kashyap**
**VI CSE 'B'**

## *Student Achievements*

### *Technical*

- Keerthana Velilani and Soumiya Rao T of VI Semester won the Second Runnerup for developing the product TECHKRITI at the Product Display Competition held from March 6th to 10th 2019 at IIT, Kanpur.

- Shwetha Lokesh, Sudhanva G Hebbale, Suraj D M and Varun A Prasad of VIII Semester are developing a product "Obstacle Detection for the Blind" under the guidance of Dr. Sahana D Gowda and is funded from Innovation and Entrepreneurship Development Cell (IEDC).

- Manu K J, Nihaarika A Jagadish, Nama Venkata Nagasukesh and Murudeshwar Barole of VI semester have generated and developed Money Bin idea which was selected for the final competition at Anveshana 2019. The project is guided by Dr. Sejal Santosh Nimbhorkar and is funded by Innovation and Entrepreneurship Development Cell (IEDC).

- Ankitha S, Namitha G and Raksha H of VI Semester are developing a product "Lifeline Emergency Response Vehicle" under the guidance of Prof. Sneha K and is funded from Innovation and Entrepreneurship Development Cell (IEDC).

### *Cultural*

- Janardhan S of IV Semester bagged B High Grade in All India Radio Audition.
- Dyuthi Jahagirdar of VI Semester has bagged First Prize in BNM Idol.
- Adithi Nadig of II Semester has bagged Second Prize in BNM Idol.

### *Ambassadors for the year 2018-2019*

- Rahul Niranjan, Sanjana B Rao and H C Ullas Prajwal are the Cultural Ambassadors for the year 2018-19.

- Akshara G Dutt, Rakshitha T J, Ranjeetha J, Akshay G Rao and Anubhav are the Sports Ambassadors for the year 2018-19.

## *Editorial Team*

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Mr. Skanda D Meda – VI B
Ms. Fatema Mustafa Ali – IV A
Mr. Srinidhi S P – IV B
Mr. Shreyas B – IV B
Ms. Anushree Dutta – VIII B