

# Shell

**Newsletter**

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



**Volume 4**

**Issue 1**

**December - 2018**

### **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**

### **Vision and Mission of the Department**

- 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



**“Shell”**

*from the Department of Computer Science and Engineering, is dedicated to Alan Turing who was an English mathematician, computer scientist, cryptanalyst and logician. Turing is the father of theoretical computer science and artificial intelligence.*

### **Inside Shell ....**

- ✓ Augmented Reality
- ✓ Video Surveillance
- ✓ Bramble Bee
- ✓ Metasploit
- ✓ Technical Talks & Workshop
- ✓ Student Achievements
- ✓ Amul Hits

**B. N. M. Institute of Technology**



Approved by AICTE, Affiliated to VTU, Accredited as grade A Institution by NAAC

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## **Editor's Message**

Dear Readers,

A weak link is better than a strong memory. It can make a reader travel down the lanes of memory, giving rise to a surge of emotions of many hues and colours. BNMIT Newsletter is going to give the same pleasure to all the brilliant minds who traverse through the portals of this temple of learning.

From being readers of the newsletter to being a part of the editorial team, we have had a phenomenal and prodigious experience. We gladly present "SHELL"- the December 2018 release. We are happy to see the amount of enthusiasm of eminent members of the college to contribute to the magazine. Not to be outdone, the students have devoted time and plunged into creating powerful stories and informative articles.

We thank the tireless endeavours set forth by the team in making the newsletter release a success. We would like to take this opportunity to thank the Computer Science and Engineering Department. We invite you to read and immerse yourself into the unfolding art and be exulted.

## **Editorial Team**

## **Department Profile**

The Department of Computer Science and Engineering at BNMIT is known for imparting the art of education and carrying out a cutting edge research. In addition to the strong UG Program, PG CSE Program and research facilities for M.Sc (Engg.), Ph.D. courses are also offered. The Department has an equipped R&D centre and on going sponsored projects from VTU, DST-IISc and company incubated facilities.

The Department is associated with professional bodies viz. IEEE (USA), ACM (USA), Computer Society of India (CSI), Student Branch of Institution of Engineers & Indian Society for Technical Education. Major areas of specialization of the faculty include Image Processing, Computer Vision, Pattern Recognition, Computer Networks, Network Security, Embedded Systems, Compiler Design, Wireless Sensor Networks and Data Mining.

The Department organizes National and International conferences regularly. Guest lectures are arranged in every semester for the benefits of the students. The students are placed in leading IT companies. They are also pursuing higher studies in reputed Universities around the globe.

The Department of Computer Science and Engineering had applied for accreditation in 2018. The National Board of Accreditation visited the college from 24th to 26th August 2018. The expert committee that visited the department, appreciated the good teaching practices being adopted by the department.

*Keerthana Velilani and Soumiya Rao of 5<sup>th</sup> Semester won the First Prize and a Training in Entrepreneurial Skill Development at the Sentinel Hack 2018, a hackathon conducted by KSIT, Bangalore for making a product to overcome Vericos veins.*

***The Department of Computer Science and Engineering has been accredited by the National Board of Accreditation for a period of three years.***



Keerthana & Soumiya at KSIT, Bangalore

## **Augmented Reality**

*"Technology, like art, is a soaring exercise of the human imagination".*

**-Daniel Bell**

Throughout the years, when we were syncretising to the unrevealed world, there always had been a parallel hunt in the field of technology to aid the human kind in many fields, the most efficacious one being related to the human visualisation.

The human memory is capable of perceiving a coherent 3-dimensional visual world, i.e we have evolved to think, visualise and consequently retain memory in three dimensions.

With this level of visualisation, the fact that we can tap into our three dimensional computer, i.e our head is the biggest promise a technology holds for us, it being the Augmented Reality.

Augmented Reality is an enhanced version of reality where live direct or indirect view of physical real world environment is augmented with superimposed computer generated images over a user's view of the real world, that enhances one's current perception of reality.

Augmented Reality is aided by Conferencing Systems. Conferencing System allows virtual images (Virtual Monitor) of remote collaborators to be overlaid on user's real environment, thus dramatically changing our interaction with the world, decreasing our learning curve and increasing our brain's productivity.

When we look at a picture of information lying on a 2D prospect (paper or a screen), it takes some time for our brain to translate that back into 3D, for us to use.

But while using this AR conferencing system, we can easily change the arrangement of virtual monitors, placing the virtual images of remote participants about them in real world and they can collaboratively interact with 2D and 3D information.

Another supposition that can exist is about the Augmented Reality(AR) versus the Virtual Reality(VR). Unlike VR, which requires you to inhabit an entirely virtual environment, AR uses your existing natural environment and simply overlays Virtual information on top of it.

This is the promise that AR holds for us, that instead of isolating us even more, it will free us from the tiny addictive screens in our hands and we will take

the data and place it all around us. Like Iron Man, we will be surrounded by data in 3D models that we can actually grab and interact with.

Applications of AR can be as simple as a text notification or as complicated as an instruction on how to perform a life threatening surgical procedure, while the most widely used being the Markless (also called the Local-based, position-based or GPS), even though recent stories would want to make you believe that augmented reality is all about chasing Pokemon in the traffic (Pokemon-Go) and planting flowers via Snapchat.

Via Augmented Reality and human's high, three dimensional brain compatibility, knowledge transfer would get easier and more universal and if someone would ask me to define future in one word, I would say 'Augmented Reality'.

**Sanskriti Bayri**  
III CSE 'C'

## **Video Surveillance using Deep Neural Network**

Video Surveillance is an effective tool in the recent years (also referred as CCTV). It has reached a tremendous level due to its feasibility and interactivity with the real world. Yet, factors such as high cost, poor image quality and limited ability to distribute information have contributed to the need for this technology to evolve. The difficulties are hard due to the wide range of diversity in the appearance of people, the difference in the environmental conditions and sudden change in the number of individuals. If it is fuelled in a perfect way, then there will be a substantial growth in various government, private, retail, healthcare and commercial sectors on the basis of security concerns.

Deep Learning (DL) uses layers of algorithms to process data, understand human speech and visually recognize objects. Information is passed through each layer and it produces an output in each layer with the output of the previous layer it provides input for the next layer. All the layers between the two are referred to as hidden layers. Feature extraction is another important aspect of Deep Learning. Feature extraction uses an algorithm to automatically construct meaningful features of the data for purposes of training, learning, and understanding. For example: Convolutional Neural Network is being widely used for object detection, image classification, segmentation, etc.

Video analytics is a subset of video surveillance. They involve sophisticated algorithms and methods that process the video signals to extract information and structure the information to support the real-time alert and search functionalities. Complex levels of techniques and tasks are used to find the object detection, tracking the motion of an object, person's identification, behavioural analysis (body posture, gesture and facial expressions), etc. Moving object detection is the basic step which is generally used for further analysis of the captured video. The objects are identified based on certain features which differ in their characteristics and appearance. Tracking method requires an object detection mechanism either in every frame or when the object first appears in the video. It handles segmentation of moving objects from stationary background objects.

Object tracking helps to reduce false positives by showing the difference between the moving objects and the static objects in the video sequence.

The general framework for Video Surveillance System multi-camera tracking focuses on the different views of the camera. In order to track the motion of unusual trajectories of the objects or the people, the spatial velocity and curvature models are trained and tested for the unusual behaviours. Person's identification in resource-constrained environments is a challenging issue where packet loss may prevent the capture of high-quality data. In order to address this challenge, heterogeneous information is used to handle the problem of personal identification for low-quality data. Relationship Based Data Cleaning (ReLDC) can improve the quality, effectiveness and efficiency even on low quality video data for person identification.

**"UMBO CV"** is one of the top video surveillance providers in the world. In order to make its product more efficient and to improve its accuracy, it mainly focuses on streaming the high-quality video at a lower bit rate and thereby saving the transmission delay and also to attain the utmost quality. This involves a process of rebuilding a high-resolution frame from a low-resolution frame. This model has proposed a high real time performance and also it helped in the video enhancement. The lightweight structure of the CNN has achieved the on demand usage with pure quality and speed.

Deep Neural Networks are changing the lives of several people, solving numerous problems in many efficient ways. It also defines Artificial Intelligence more precisely than any other techniques.

With the advent of such a game changing algorithm, the Video Surveillance system gets smarter day by day and will soon out perform humans in monitoring CCTV cameras across several areas simultaneously. Even though there is no reliable independent generic Autonomous Smart Video Surveillance System existing at present, it can outperform human beings. There are a high number of possibilities that the deep neural network architecture will contribute to the development of a single integrated generic smart Autonomous Video Surveillance System.

**Namitha G**  
V CSE 'B'

### *Bramble Bee – An Autonomous robot to pollinate bramble plants*

BrambleBee is the precision pollination robot. Natural pollinators, particularly honey bees are disappearing at an unprecedented rate. This poses serious risks for agriculture, the economy and the sustenance of humans and animals. Bees are the primary pollinators of a vast variety of crops. So their disappearance could compromise the work of food producers, ultimately reducing the amount of food available on the market.

Researchers at West Virginia University (WVU) have recently developed an autonomous robot inspired by bees, which can pollinate bramble plants within a greenhouse environment. BrambleBee uses state-of-the-art localization and mapping techniques as well as other tools that enable visual perception, path planning, motion control and manipulation.

To address this problem, Gu and his colleagues have designed BrambleBee pollinator robot to pollinate bramble, blackberry and raspberry plants in a greenhouse environment.

BrambleBee first obtains up-to-date information about flower cluster locations and pollination readiness by making an 'inspection pass' of the greenhouse. As BrambleBee drives around, nearby flower clusters are detected using the on-board camera. The locations of the detected clusters are then recorded into a map of the plant rows. After this initial inspection phase is complete, Bramblebee decides where it will move to pollinate flowers. It reaches this decision by balancing the number of reachable flower clusters that are ready for pollination and minimizing the distance driven.

The robot then plans paths to efficiently reach these locations avoiding any obstacles on the way.

Once parked at a pollination location, BrambleBee scans the plant and builds up a more detailed map. It will then use the manipulator to access each flower that needs pollination.

In constructing their bramble pollinating robot, the researchers were partly inspired by the ecology and behaviour of bees particularly mason bees, which collect pollen for their offspring. For instance, just like bees, BrambleBee first finds flowers and then keeps track of their location, using this information to plan the best path to reach them.

In addition, BrambleBee's pollination mechanism attached at the end of its robotic arm acts in a similar way to that of bees. The robot manoeuvres this mechanism using precise motions, distributing pollen into pistils without damaging the flowers. This allows the development of a complex autonomous robotics system that can work in a common agriculture setting.

The precision localization, evaluation and manipulation of small and delicate plant parts provides fundamental capabilities for enabling a variety of other precision agriculture applications such as automated irrigation, fertilization and harvest, monitoring plant damages as well as weed and pest control. The precision robotic pollination system created at WVU is the first of its kind. In future, it could help growers to solve short-term pollination challenges and could even be adapted to develop new agricultural tools for harvesting, pruning and fruit picking.

**Prajwal M**  
**III CSE 'B'**

## **Metasploit**

**"I was addicted to hacking, more for the intellectual challenge, the curiosity, the seduction of adventure; not for stealing or causing damage or writing computer viruses. - Kevin Mitnick"**

When hackers say "Penetration Testing tool", the first thing that comes to their mind is the world's largest Ruby project with over 7,00,000 lines of code- "**Metasploit**".

Metasploit Framework is an open source penetration tool used for developing and executing exploit code against a remote target. It has the world's largest

database of publicly tested exploits. In simple words, Metasploit on one hand is used to check the vulnerability of computer systems in order to protect them. Whereas on the other hand, it can be also used to break into other systems.

Metasploit was created by H.D Moore in 2003 as a portable network tool using Perl which was later rewritten in Ruby in the year 2007.

Specific to automated vulnerability assessment, hacking with Metasploit has arguably become the most popular way to exploit and has become a critical tool in defending networks. As any information security tool, Metasploit can be a boon and a bane. Unfortunately, it is so good at identifying and exploiting an organization's weak spots that most attackers know Metasploit as a way to find and exploit a vulnerable system. As a framework, the user can build their own specific tools that can be used for specific tasks. For example, if you wanted to test for vulnerabilities in a particular operating system, then that would work just fine using Metasploit Framework.

Metasploit is patient and a great listener of incoming connections. It can be used on a couple of interfaces. The first option is the MSF console which is the most preferred method used by hackers. Also, one can use Armitage to perform exploits. Metasploit currently has 1677 exploits organized under platforms like AIX, Android, Cisco, Firefox, Irix, Java, JavaScript, Linux, PHP, Python, R, Ruby, Solaris, Unix, Windows and many more in the list and it has over 500 payloads. The command shell payload enables users to run collection scripts or run arbitrary commands against the host. Meterpreter enables users to control the screen of device using VNC.

Dynamic payloads enable users to evade anti-virus defence by generating unique payloads. The upcoming developments are leading to an automated version of Metasploit which will be definitely more dangerous and will make the security systems more vulnerable.

Metasploit has great potential with all of the features that have been presented. But again like many security tools there is the possibility of misuse. It is up to the individual end user to decide how it will be used.

**Vaibhav Prakash**  
**III CSE 'C'**

## Talk on E-Waste Management

Mr. Hrushikesh Jadhav, Project Manager at EnsydeIndia delivered talk on “E-Waste Management” on 27<sup>th</sup> September 2018 for students of Computer Science and Engineering. Mr. Hrushikesh had enlightened the students on various issues of e-waste like - different types of e-waste, health hazards on e-waste mismanagement, how to manage e-waste efficiently without harming environment or health, and the safe unmolding of e-waste elements, recovery and reuse of the materials, production process modification, and sustainable product design. The scenario in India - world is marvelling at the technological revolution, countries like India are facing an imminent danger. E-waste of developed countries, disposes their wastes to India and other Asian countries. Managing E-waste imported from different countries is necessary.

## Workshop on Circuit Prototyping

A two days workshop on Circuit Prototyping was conducted under CSI-BNMIT student branch on 2<sup>nd</sup> and 3<sup>rd</sup> November 2018 for students from Computer Science. The resource person, Mr. Kotresh M is an experienced trainer and currently the director of organization Indian Tech-Keys, Bengaluru. He is a skilled PCB Designer with experience in the RS Components and Controls-India industry. The workshop included ITK introduction, Analog Circuit Explanation with working, PCB Technology and Tool Explanation, Schematic Design Practice, Foot Print Design, Foot Print Transfer and Etching. The students had a hands on session on PCB Drilling, Info Layer, Component Placement, Soldering, Unit Testing, Circuit Integration and Product Testing. The students were able to design and develop PCB board for a product and they learnt PCB design using Designspark PCB software.



Students attending the Circuit Prototype Workshop

## Entrepreneurship Awareness Camp

Entrepreneurship Awareness Camp (EAC) was organised by Entrepreneurship Development Cell, BNMIT in association with Computer Science and Engineering Department on 14th, 15th and 19th November, 2018. This camp was supported by National Science and Technology Entrepreneurship Development. Mr. Sachin Srivastava, Assistant Vice President, Novopay Solution Pvt. Ltd. gave a talk on “Innovation and Entrepreneurship” on how innovation can help to become an Entrepreneur. Mr. Santhosh Muruganantham, Co – founder and Managing Director of Kolapasi gave a talk on “Entrepreneurship” and discussed his journey to become an Entrepreneur. An industrial visit to Indian Space Research Organization (ISRO) was organized on 19th November, 2018. Students have explored Various Cameras and Antennas used for satellite, prototype of Apple communication satellite and Chandrayaan-2 satellite.



Students at the Entrepreneurship Awareness Camp

## Felicitations of First Class with Distinction Holders – Even Sem 2017-18

Mr. Rajendra S Patil, Director at Ornage IT solutions Pvt. Ltd. Delivered a talk on “A Software Life Cycle” on 29<sup>th</sup> October 2018 for the students of Computer Science and Engineering. Mr. Rajendra had enlightened the students on software life cycle on gathering information about client requirement, analyzing the requirement, coding, and difference between front end, back end, connectivity, testing, and release of the product. After the talk, Certificates were distributed among the Activity Toppers.



Student receiving FCD award from Mr. Rajendra Patil

## **Student Achievements**

### **Technical**

- Kshithij R Kikkeri of 5<sup>th</sup> Semester won a Second Prize at the 15<sup>th</sup> ISTE Karnataka State Students Convention 2018 - Poster Exhibition held at Mangalore Institute of Technology and Engineering, Moodabidri.
- Manu K J, Murudeshwar and Niharika A Jagadish of 5<sup>th</sup> Semester won the Second Prize at the 15<sup>th</sup> ISTE Karnataka State Students Convention 2018 – Hackathon held at Mangalore Institute of Technology and Engineering, Moodabidri.
- Manu K J, Niharika A Jagadish, Nama Venkata Naga Sukesh and Murudeshwar Barole, 5<sup>th</sup> Semester students' project has been selected for Student Project Showcase at IEEE International Conference on Cloud Computing in Emerging Markets (CCEM) 2018.

### **Cultural**

- Mathangi S of 5<sup>th</sup> Semester bagged the First Prize in Mimicry and Elocution at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.
- Janardhan S of 3<sup>rd</sup> Semester bagged the First Prize in Non Percussion(Violin) at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.
- Sanjana Rao of 7<sup>th</sup> Semester and Archita V, Asmitha V and Soumya Rao T of 5<sup>th</sup> Semester bagged the First Prize in Folk Dance at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.
- Pooja Baburaj of 3<sup>rd</sup> Semester bagged the Second Prize in Western Group Song at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.
- Rahul Niranjan and H C Ullas Prajwal of 7<sup>th</sup> Semester and Janardhan of 3<sup>rd</sup> Semester bagged the Third Prize in One Act Play at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.
- Adithi Nadig of 1<sup>st</sup> Semester bagged the First Prize in Indian Group Song at Janani-2018 VTU Youth Festival held at Bheemanna Khandre Institute of Technology, Bidar.



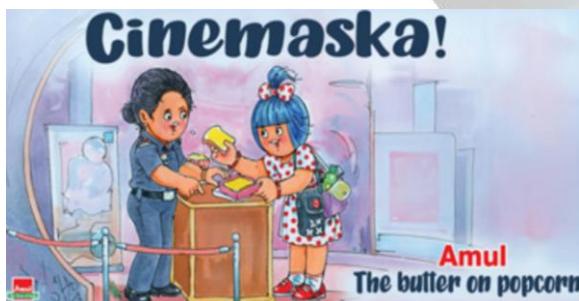
Winners of the VTU Youth Festival held at BKIT, Bidar

## Staff Achievements

- Dr. Bhargavi M. S was awarded Ph.D. at the R&D Center, Department of Computer Science and Engineering, BNMIT.
- Dr. Savitha G was awarded Ph.D. at the R&D Center, Department of Computer Science and Engineering, BNMIT.

## Guess what the Amul hits have to tell you!!

1.



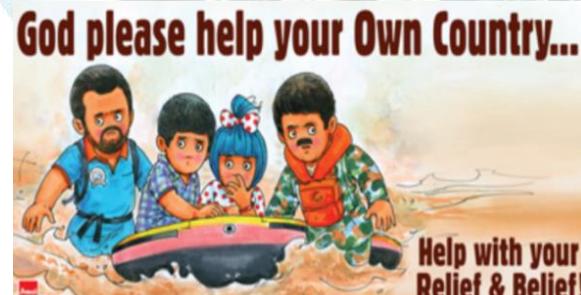
2.



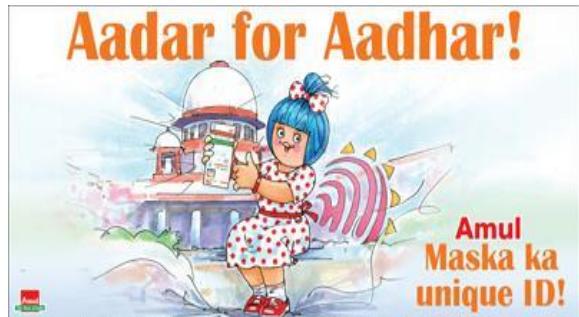
3.



4.



5.



6.



6. A tribute to the Sardar Vallabhbhai Patel on unveiling his statue!

5. Supreme Court verdict on UID!

4. The tragedy of the Kerala Floods

3. The messaging service limits „forwards“ to 5 users to contain rumors!

2. Indian Content excels at Asian Games!

1. The issue of outside food being allowed into multiplexes in Maharashtra

**Answers:**

## Editorial Team

### Students

- Ms. Anushree Dutta – VII A  
Ms. Zainab Noorain – V C  
Ms. S Mathangi – V B  
Mr. Skanda – V B

- Mr. Abhishek J – V A  
Ms. Fatema Mustafa Ali – III A  
Mr. Srinidhi – III C  
Ms. Madhushree N – III B

### Staff

- Prof. Shraddha P.W  
Prof. Reshma J