MALNAD COLLEGE OF ENGINEERING

(AN AUTONOMOUS INSTITUTION UNDER VTU, BELAGAVI)

HASSAN, KARNATAKA 573202, INDIA

Computer Science and Engineering

Newsletter: Aug-Dec 2019

The Malnad College of Engineering (MCE) is an engineering college located in Hassan, Karnataka, India. It was established in 1960 during the second 5 year plan of India, as a joint venture between the Government of India, Government of Karnataka and the Malnad Technical Education Society, Hassan. The institution is affiliated with the Visvesvaraya Technological University in Belagavi. The college is a reputed institution in the country. The college has received the Best Engineering College award by the Indian Society for Technical Education (ISTE) during the year 2007.

The college is built on a campus of about 44 acres and is a technical education center. At present, the college conducts 9 B.E. programs and 5 M.Tech Programs and the MCA program and has 2750 students on its rolls. All programs have got NBA accreditation under Tier-I. The college is one amongst 19 Engineering colleges in the state qualified for the Technical Education Quality Improvement.

Institute Vision

"To be an Institute of Excellence in Engineering education and research, producing socially responsible professionals"

Institute Mission

- *Create conducive environment for learning and research.*
- *Establish industry and academia collaboration.*
- *Ensure professional and ethical values in all institutional endeavors.*

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VISION

"To become a prominent department of Computer Science & Engineering producing competent professionals with research and innovation skills, inculcating moral values and societal concerns"

About the Department

The department of Computer Science & Engineering was established in the year 1983 and the department offers Bachelor of Engineering degree in Computer science and Engineering with an intake of 180 students. This degree programs prepare graduates for successful, profitable and lifelong careers in Computer Science & Engineering. Computer Science and Engineering students study hardware and software systems through innovative classroom instructions, supported by laboratories equipped with the state of the art hardware and software. The department ensures that the students are introduced to both fundamental and advanced knowledge in areas such as Machine learning, Networking technology, computer security and software engineering etc.

Salient Features of the department are as follows.

- The department has got NBA accreditation under Tier-I.
- The VTU has recognized the department as a research center for carrying out research work leading to M.Sc. Engg. & Ph.D degrees.
- State of the Art Computing Facilities.
- ICT in Teaching and Learning.
- Teacher as Mentor.
- Research & Publications with Social Impact.
- Supportive Learning for Placements.
- Professional Development for Industrial Engagement.

The department is regularly organizing several seminars, workshops, Conference, FDPs and Industry institution Interaction programs to help the faculty members and students to update their knowledge about the latest developments.

Program Educational Objectives

- **PEO 1:** Graduates will be efficient software developers in diverse fields and will be successful professionals and/or pursue higher studies.
- **PEO 2**: Graduates will be capable to adapt to new computing technology for professional excellence and Research and will be lifelong learners.
- **PEO 3**: Graduates will work productively exhibiting ethical qualities for the betterment of society.
- **PEO 4 :** Graduates will possess leadership qualities, work harmoniously in a team with effective communication skills.

Mission

- Provide learning ambience to generate innovative and problem solving skills with professionalism.
- To create facilities and expertise in advanced computer technology thereby promote research.
- Enhance Industry Institute Interaction program to get acquainted with corporate culture.
- To induce ethical values and spirit of social commitment.

Orientation Program

For second year of computer science & Engineering students, Induction Program was conducted in the department on September 20, 2019. The topic covered during this program were Introduction of Department, Personal Development, Social Awareness and self discipline.

As a part of Familiarization to Department and Innovations for Second Year Engineering Students, Expert Lectures were conducted by the Department of Computer Engineering on September 20, 2019. The Topics delivered were Importance of Certification and Positive Attitude.

Workshop on Machine Learning with Python

The department has conducted Two Day Workshop on "Machine Learning with Python" on 11th October 2019. Dr. K. S Jayantha Principal of MCE, Dr. B. Ramesh Professor CS&E, Dr. Chandrika J HOD, CS&E, Prof. Shashidara H.V, Dept of CS&E, Dr Jyothi N S, TEQIP coordinator along with resource persons Dr. Jagadish Patil, CEO, Nagbridge Technologies India Pvt Ltd, Bangalore and Dr.Nagaraj M, Associate Professor, SVCE, Bangalore, inaugurated the ceremony by watering the plant. Dr. B. Ramesh, briefed about the application of machine learning and how it has gained its popularity in the recent times. The Chief Guest, Dr. Jagadish Patil delivered his address by stating that machine learning have been in existence since the 1960's but has only recently gained popularity due to advancements in computing and hardware technologies.

The attendees of this workshop, will be technically competent in the basics and the fundamental concepts of Machine Learning such as:

- Understand components of a machine learning algorithm.
- Apply machine learning tools to build and evaluate predictors.
- How machine learning uses computer algorithms to search for patterns in data.
- How to uncover hidden themes in large collections of documents using topic modeling.
- How to use data patterns to make decisions and predictions with real-world examples.

MACHINE LEARNING IN TRANSPORTATION DATA ANALYTICS

"One machine can do the work of fifty ordinary men. No machine can do the work of one extraordinary man."
- Elbert Hubbard

Machine **L**earning is a collection of methods that enable computers to automate data-driven model building and programming through a systematic discovery of statistically significant patterns in the available data. While machine learning methods are gaining popularity, the first attempt to develop a machine that mimics the behaviour of a living creature was conducted by Thomas Ross in 1930s. In, 1959 Arthur Samuel defined machine learning as a *"Field of study that gives computers the ability to learn without being explicitly programmed"*. While the demonstration by Thomas Ross, then a student at the University of Washington and his professor Stevenson Smith, included a Robot Rat that can find a way through artificial maze, the study presented by Arthur Samuel included methods to program a computer *"to behave in a way which, if done by human beings or animals, would be described as involving the process of learning."* With the evolution of computing and communication technologies, it became possible to utilize these machine learning algorithms to identify increasingly complex and hidden patterns in the data. Furthermore, it is now possible to develop models that can automatically adapt to bigger and complex data sets and help decision makers to estimate impacts of multiple plausible scenarios in a real time.

The transportation system is evolving from a technology-driven independent system to a data-driven integrated system of systems. For example, researchers are focusing on improving existing Intelligent Transportation Systems (ITS) applications and developing new ITS applications that rely on quality and size of the data . With the increased availability of data, it is now possible to identify patterns such as flow of traffic in real time and behaviour of an individual driver in various traffic flow conditions to significantly improve efficiency of existing transportation system operations and predict future trends. For example, providing real-time decision support for incident management can help emergency responders in saving lives as well as reducing incident recovery time. Various algorithms for self-driving cars are another example of machine learning that already begins to significantly affect the transportation system. In this case, the car (a machine) collects data through various sensors and takes driving decisions to provide safe and efficient travel experience to passengers. In both cases, machine learning methods search through several data sets and utilize complex algorithms to identify patterns, take decisions, and/or predict future trends.

Machine learning includes several methods and algorithms, some of them were developed before the term "machine learning" was defined and even today researchers are improving existing methods and developing innovative and efficient methods.

— Subramanya T N
2 year CSE

" Technology changes the quality of life. Technology cannot replace human intelligence."

— Dr. T.P chia

DIGITAL TWIN

A digital twin is a digital representation of a physical object or system. The technology behind digital twins has expanded to include large items such as buildings, factories and even cities, and some have said people and processes can have digital twins, expanding the concept even further. The idea first arose at NASA: full-scale mockups of early space capsules, used on the ground to mirror and diagnose problems in orbit, eventually gave way to fully digital simulations. But the term really took off after Gartner named digital twins as one of its top 10 strategic technology trends for 2017 saying that within three to five years, "billions of things will be represented by digital twins, a dynamic software model of a physical thing or system". A year later, Gartner once again named digital twins as a top trend, saying that "with an estimated 21 billion connected sensors and endpoints by 2020, digital twins will exist for billions of things in the near future."

In essence, a digital twin is a computer program that takes real-world data about a physical object or system as inputs and produces as outputs predications or simulations of how that physical object or system will be affected by those inputs.

How does a digital twin work?

A digital twin begins its life being built by specialists, often experts in data science or applied mathematics. These developers research the physics that underlie the physical object or system being mimicked and use that data to develop a mathematical model that simulates the real-world original in digital space.

The twin is constructed so that it can receive input from sensors gathering data from a real-world counterpart. This allows the twin to simulate the physical object in real time, in the process offering insights into performance and potential problems. The twin could also be designed based on a prototype of its physical counterpart, in which case the twin can provide feedback as the product is refined; a twin could even serve as a prototype itself before any physical version is built.

The process is outlined in some detail in this post from Eniram, a company that creates digital twins of the massive container ships that carry much of world commerce – an extremely complex kind of digital twin application. However, a digital twin can be as complicated or as simple as you like, and the amount of data you use to build and update it will determine how precisely you're simulating a physical object.

For instance, this article outlines how to build a simple digital twin of a car, taking just a few input variables to compute mileage.

Digital-twin Applications

- **Manufacturing** is the area where rollouts of digital twins are probably the furthest along, with factories already using digital twins to simulate their processes.
- **Automotive** digital twins are made possible because cars are already fitted with telemetry sensors, but refining the technology will become more important as more autonomous vehicles hit the road.
- **Healthcare** is the sector that produces the digital twins of people we mentioned above. Band-aid sized sensors send health information back to a digital twin used to monitor and predict a patient's well-being.

Digital twins and IoT

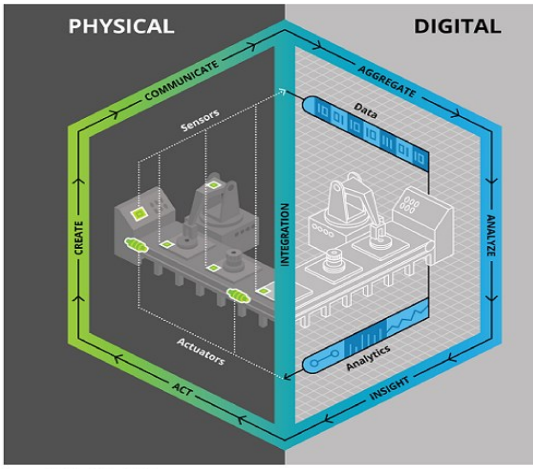
Clearly, the explosions of IoT sensors are part of what makes digital twins possible. And as IoT devices are refined, digital-twin scenarios can include smaller and less complex objects, giving additional benefits to companies.

"Let go invent tomorrow instead of worrying about what happened yesterday."
- Steve Jobs

Placements

Company Name	Number of students placed
Accenture	29
TCS	05
Global Logic	01
Simeio solutions	01
Hexaware Technologies	01
Mercedes-Benz	04
Cognizant	02
Infosys	07
Tata Elxs	01

Figure 1: Manufacturing Process Digital Twin Model



Source: Deloitte University Press

Digital twins can be used to predict different outcomes based on variable data. This is similar to the run-the-simulation scenario often seen in science-fiction films, where a possible scenario is proven within the digital environment. With additional software and data analytics, digital twins can often optimize an IoT deployment for maximum efficiency, as well as help designers figure out where things should go or how they operate before they are physically deployed.

The more that a digital twin can duplicate the physical object, the more likely that efficiencies and other benefits can be found. For instance, in manufacturing, where the more highly instrumented devices are, the more accurately digital twins might simulate how the devices have performed over time, which could help in predicting future performance and possible failure.

Benefits of digital twins

Digital twins offer a real-time look at what's happening with physical assets, which can radically alleviate maintenance burdens. Chevron is rolling out digital twin tech for its oil fields and refineries and expects to save millions of dollars in maintenance costs. And Siemens as part of its pitch says that using digital twins to model and prototype objects that have not been manufactured yet can reduce product defects and shorten time to market.

But keep in mind that that Gartner warns that digital twins aren't always called for, and can unnecessarily increase complexity. "[Digital twins] could be technology overkill for a particular business problem. There are also concerns about cost, security, privacy, and integration."

International Conferences

- H Hanebel Alva, Dr. Chandrika J, " Interdisciplinary approach to Palliative Care: A survey of tools and an affordable technique", 2nd International Conference on Recent Innovative Trends in Computer Science and Applications, 25th & 26th October 2019.
- Dr. Chandrika J, " Voice Based Email System for visually Impaired people" 3rd International Conference on Data Engineering and Communication Systems, 19th & 20th December 2019.
- Dr. Chandrika J, " Machine Learning Based Approach for Assessment of crop field" 3rd International Conference on Data Engineering and Communication Systems, 19th & 20th December 2019.

Activities

- CSE Department Students actively participated in various activates like
  - **E-Step Start-up Boot-Camp** conducted on 14th September 2019 in K-tech Innovation Hub NAIN Centre at MCE, Hassan.
  - IOT workshop organized by **Engineer '19**, NITK, Surathkal, Mangalore.
  - **PRAGYATHA '19**, state level entrepreneurial fest held on 8th -10th November 2019.
  - **20th VTU Youth Festival "INSIGNIA"** held at Dharwad from 6th to 9th December 2019.
  - **VTU Sports**.