# MALNAD COLLEGE OF ENGINEERING

(AN AUTONOMOUS INSTITUTE UNDER VTU, BELAGAVI)

HASSAN, KARNATAKA

## THE MALNAD TECHNICAL CLUB

# TECHsandhya 7TH EDITION


## THE RISE OF SPATIAL COMPUTING: A NEW ERA OF TECHNOLOGY

In recent years, there has been a surge in the development of spatial computing, a technology that uses Augmented Reality (AR) and Virtual Reality (VR) to create immersive digital experiences. Spatial computing is not just a buzzword, it's a technological revolution that has the potential to change the way we interact with digital information and the world around us.

Spatial computing allows users to interact with digital information in a three-dimensional space, making it easier to visualize complex data and interact with it in a more intuitive way. This technology can be used for a variety of applications, from gaming and entertainment to education and healthcare.

One of the main drivers of spatial computing is the increasing availability of high-speed internet and advanced computing power. These advancements have made it possible to create more sophisticated and immersive digital experiences that were once only available in science fiction.

Spatial computing is also being driven by the proliferation of mobile devices, which are becoming more powerful and versatile every year. This has made it possible to create AR and VR experiences that can be accessed from anywhere, at any time.

In the future, spatial computing is likely to become even more important as more industries begin to embrace this technology. For example, in the field of healthcare, spatial computing could be used to help doctors and surgeons visualize complex medical data and perform surgeries in a more precise and efficient manner.

Similarly, in the field of education, spatial computing could be used to create immersive learning experiences that help students better understand complex concepts. And in the field of architecture and construction, spatial computing could be used to create virtual models of buildings and other structures, allowing architects and engineers to test and refine their designs before construction begins.

Overall, spatial computing represents a new era of technology that has the potential to transform the way we interact with digital information and the world around us. As this technology continues to evolve, it will be exciting to see how it will be used to create new and innovative applications in a wide range of industries.

**Aditya R Shetty, 3rd year**
**Electronics and Communication Engg**

## EDITORIAL COLUMN

The power of technology lies in its ability to unite people. In today's rapidly evolving world, technological advancements are happening at a breakneck pace.To this end, the Malnad Technical Club has been fostering an environment conducive to budding engineers by undertaking various activities and projects since its inception.

An ideology was conceptualized by our alumni,as a platform for science and technology enthusiasts to share their thoughts and experiences through Techsandhya- the only technical newsletter of MCE.It was launched during the 2016 edition of Enigma, the club's grand state-level technical fiesta. Techsandhya has since become a hub of cutting-edge technology as it represents the voice of inquisitive minds that seek to make an impact through their engaging columns.

The latest edition of Techsandhya aims to present a variety of topics and perspectives on technology for readers to contemplate by featuring incredible projects, puzzles, facts, and many more. We extend our sincere gratitude to all students, faculty members, and technology enthusiasts who have been an integral part of this journey. With this latest edition, we hope that the spark that ignites the minds will continue to burn bright, and more people will join us in taking this venture to even greater heights. Join us now and take your skills to the next level!

# WAVELINE MAGNET BY SWEL

Sea Wave Energy Ltd (SWEL) has developed a breakthrough technology called the Waveline Magnet, which is a Wave Energy Converter (WEC) that can produce substantial power levels at an exceptionally low cost. The Waveline Magnet has been tested in wave tanks and live sea environments, and SWEL's R&D indicates that it can compete with non-renewable sources. The Waveline Magnet's low cost of manufacture is due to the low mass of materials used, such as plastics and reinforced plastics. SWEL's technology uses materials and components that can be found and supplied without the need for new specialized production lines or a huge new infrastructure.

The Waveline Magnet is a floating, wave-riding generator that can produce over 100 MW in energetic environments. The electricity it produces is nearly free, and SWEL claims that a commercial-sized device using their technology will achieve a Levelized Cost of Energy (LCoE) less than 0.82 INR/kWh, which is significantly lower than today's energy costs. The Waveline magnet can convert wave power into electricity, making it a clean and renewable energy source.

SWEL's breakthrough technology challenges the conventional understanding of how the power of a wave may be harnessed and converted to produce astonishing results. The Waveline Magnet has the potential to revolutionize the energy industry by providing clean and cheap energy. With a clear development schedule and route to commercialization, SWEL is looking to collaborate with other experts to bring the Waveline Magnet WEC to market sooner. The Waveline Magnet has the potential to be a game-changer in the renewable energy industry, and it is an exciting development for engineering students to follow.

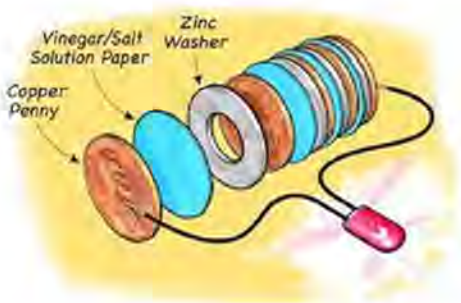
**Reon Julius Rodrigues,4th year**
**Mechanical Engg**

# DO IT YOURSELF

## BATTERY OUT OF COINS TO POWER LED:

Batteries convert chemical energy into electrical potential energy.That enegry can be used to power a circuit.

### MATERIAL LIST




1Teaspoon of salt
1 Cup of water
1 Red LED lights
6 copper pennies
6 zinc washers
¼ cup of vinegar
1 piece of construction paper
1 pen
1 pair of scissors

### INSTRUCTIONS:

1.In a bowl,mix 1 teaspoon of salt into ¼ cup of vinegar.
2.Soak the pennies in the salt /vinegar mixture for 5 min,then wipe them off.
3.Trace pennies on construction paper and cut them out to make 6 paper discs.
4.Soak the paper disks for 5 min in a mixture of 1 cup of water and 1 tablespoon of salt.
5.To assemble the battery, stack the items in this order:coin,paper,washer,coin,paper,washer,coin, paper,washer,and so on.
6.Hold the LED light's long wire to the penny side of the stack , and the short wire to the zinc side of the stack.
7.Dim the light and your LED should light up!.

# HOW TO FILE A PATENT IN INDIA?

In India, the provisions related to registration and enforcement of patents are contained under the Patent Act, 1970 ("Patent Act") and its corresponding rules namely Patent Rules, 2003 ("Patent Rules"). Intellectual property rights such as patent are applied for new technologies and innovations. In India, where there have been rapid developments in the tech industry in the recent past, there are numerous innovations which are eligible to be protected by the exclusive right of a patent. Any person (having locus standi under the Patents Act) is permitted to apply for a patent for an invention. A grant of patent is made for a period of 20 (twenty) years in India.

# WHAT IS A PATENT?

A 'Patent', in basic terms, is an exclusive right that is granted to any invention(whether a process or a product) under the Patents Act. An 'invention',as per the Patents Act is defined as 'a new product or process involving an inventive step and capable of industrial application'.

The definition highlights three important components, also referred to as the patentability requirements, namely:

1.The invention should be a new invention i.e., the invention should not be disclosed in the public domain in any manner prior to the date of filing of patent application.

2. The product or process that has to be patented should involve an inventive step i.e. the invention should in some manner involve technical advancement as opposed to the existing knowledge. In simple words, the invention should not be obvious to another person possessing the same skillset.

3. The invention should be capable of industrial application, i.e. the processor product intended to be patented should have the ability to be used or made in a particular industry or any industry.It is only upon satisfying these requirements that an invention becomes eligible for protection under the Patents Act, 1970.

# DOCUMENTS REQUIRED FOR FILING A PATENT :

- Patent application form
- Provisional/complete specification
- Drawings (if required)
- Power of attorney (if applicable)
- Priority documents (if applicable)
- Proof of right
- Fees

# STEPS TO REGISTER A PATENT:

The steps from the initiation of an invention to the grant of patent for the invention are elaborated below:

1.Patent Search: Conduct a search to determine if your invention is novel and non obvious.This search can be conducted online or by engaging a patent agent or attorney.

2. Drafting the Patent Application: Draft a patent application that includes a detailed description of your invention, claims, drawings (if required), and an abstract. The application can be filed online or by post.

3.Filing the Application: Once the application is complete, file it with the Indian Patent Office along with the required fee. The application can be filed either online or by post.

4.Publication of the Application: The patent application is published in the official journal after 18 months from the date of filing. Once it is published, the application can be viewed by the public.

5.Examination of the Application: After the publication of the application, the Indian Patent Office will examine the application to determine if the invention meets the patentability criteria.The examination process may take several months.

6.Response to Examination Report: Once the examination report is issued, the applicant needs to respond to the objections raised in the report within a stipulated time period.

7.Grant of Patent: If the application meets all the patent ability criteria, the patent will be granted, and the patentee will receive the patent certificate.

**Monish D Naik, 3rd Year**
**Electronics and Comminication Engg**

# QUOTE

*"In the attempt to make scientific discoveries, every problem is an opportunity and the more difficult the problem,the greater will be the importance of its solution."*

*- E.O WILSON*

# EYEGAZE

Eye trackers are used in research on the visual system, in psychology, in cognitive linguistics and in product design. The mounting package is required so the patient has access to the communication device day and night in all environments, including while sitting in a wheelchair, at medical appointments, and at home while in bed.


Eye-gaze assistive technology provides these children with opportunities to access a computer through control of eye movements, thereby to perform a range of activities for play, communication, and learning. In addition, limited evidence supports the influences of EGAT on communicative interaction between these children and their partners. The Eye tracking package is required to provide them access, via the movement of their eyes, to the functions of the communication software including eye-typing keyboard, phrase pages, medical communication pages and emergency call bell features.

As a user sits in front of the eye gaze monitor, a specialized video camera mounted below the monitor observes one of the user's eyes. Sophisticated image - processing software in the eyegaze System's computer continually analyzes the video image of the eye and determines where the user is looking on the screen. Nothing is attached to the user's head or body. An infrared-sensitive video camera, mounted beneath the System's monitor, takes 60 pictures per second of the user's eye.

The bright-pupil effect enhances the camera's image of the pupil and makes it easier for the image processing functions to locate the center of the pupil.

Prior to operating the eye-tracking applications, the eyegaze System must learn several physiological properties of a user's eye in order to be able to project his gaze-point accurately. The System learns these properties by performing a calibration procedure. The user calibrates the system by fixing his gaze on a small yellow circle displayed on the screen, and following it as it moves around the screen.

A user operates the eyegaze System by looking at rectangular keys that are displayed on the control screen. To «press» an eye gaze key, the user looks at the key for a specified period of time. The gaze duration required to visually activate a key, typically a fraction of a second, is adjustable.


**Angel Joseph, 3rd year**
**Electronics and Communication Engg**

## Tech Facts

- On "Facebook" if you type @[4:0] in comments and hit enter, Mark Zuckerberg's name will appear.
- Rainbows are circular in shape. You don't typically see a full circle rainbow because the earth's horizon blocks the lower part.
- The colour which we see when we close our eyes is EIGENGRAU, which is different from black.
- The entire internet is stored and delivered using 540 billion trillion electrons, which all together weighs about 50 grams or about the weight of one strawberry.

# IMPROVING DRIVER SAFETY USING ADAS


Advanced Driver Assistance System (ADAS) is increasingly becoming standard features in modern vehicles. ADAS is a set of technologies that are designed to assist drivers with driving, parking and other tasks.

The components that power ADAS are as follows,

Sensors : Sensors are used to ensure that adequate safety measures are taken, based on a specific situation. Hence, multiple orthogonal and complimentary sensors are used as a part of ADAS, which together provide information and redundancy to enhance safety and improve the driver's performance.

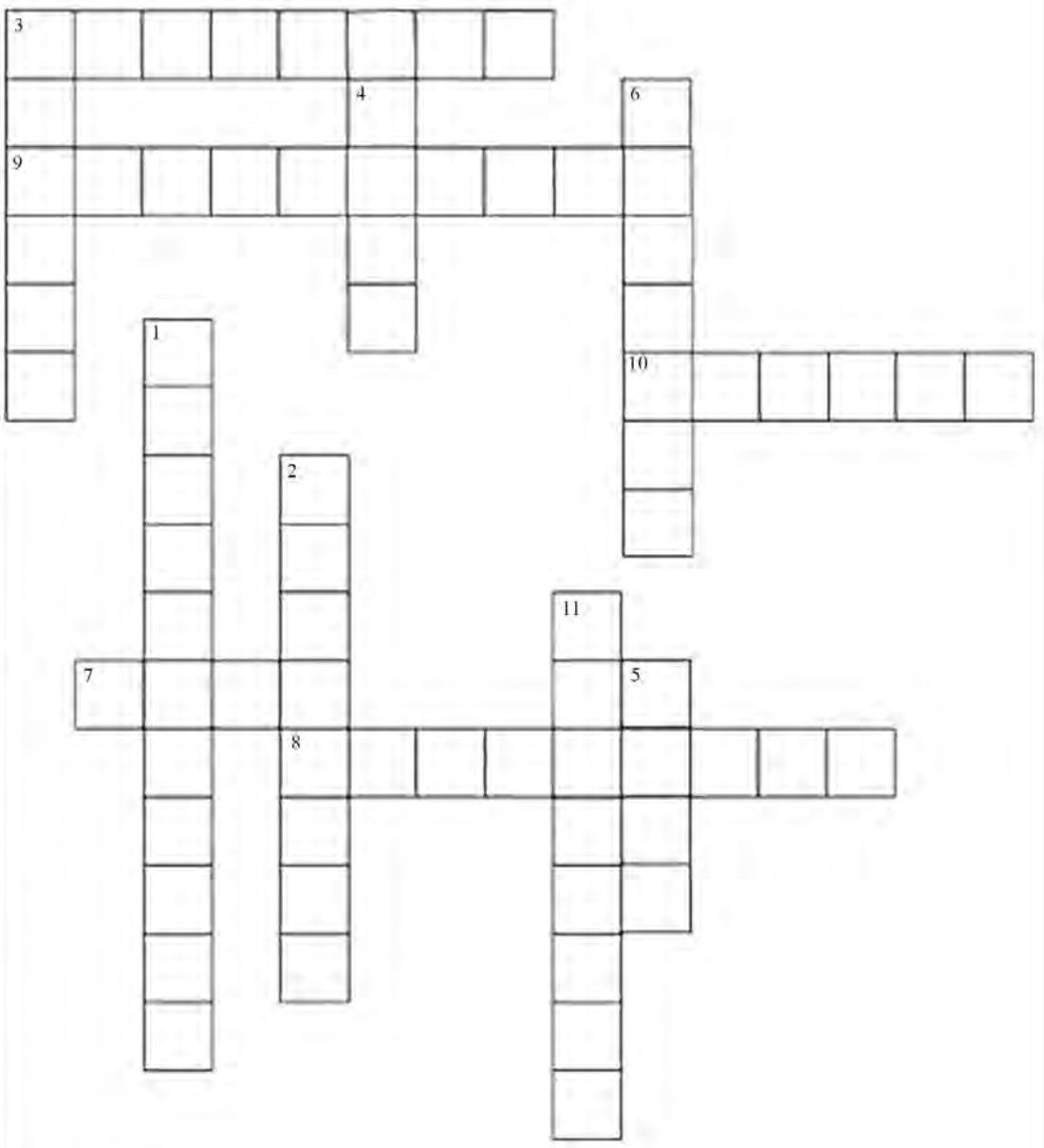
Software : Today, with changing customer expectations, almost every automotive company relies as much on software as it does on the actual vehicle.

Actuators : The electrification of the actuation system in vehicles has been a major facilitator of ADAS. The processors are capable of analyzing the data from the vehicle sensors and the ADAS system can make the resulting decision achievable by actuators.

Processors : In ADAS applications, processors are used for everything from building a real time 3D spatial model of a car's surroundings to calculating proximity and threat levels based on the environment. However, due to the length of the qualification process in the automotive industry, the adoption of advanced manufacturing technologies is almost six years slower than the rate at which average smartphone processors are adopted.

Mapping systems : The geographical and infrastructure information is gathered, stored and updated via sensors to govern a vehicle's exact location. This information is maintained and communicated to the control system even if the GPS coverage fails. Since automotive OEMs and other competitors search for low-cost options, third party applications are generally used to meet this demand.

**Mayura M L, 2nd year**
**Computer Science and Engg**




**DOWN :**

**1.The only technical newsletter of Malnad College Of Engineering.**

**2.A measure of computer processor storage as well as real and virtual memory.**

**3.This programming language is named after a type of snake.**

**4.It is a technology that allows electronic devices to connect to the internet wirelessly.**

**6.Software app that allows access to the web.**

**11.This vast network of interconnected devices allows people to access information and communicate with each other from anywhere in the world.**

**5.Load the operating system on a computer.**

ACROSS:

**7.A programming language that is commonly used in the development of client-server web.**

**8.This technology is often used to connect headphones or speakers to a phone without wires.**

**3.A standard or set of rules that computers and other devices use when communicating with one another.**

**9.This component is able to switch or amplify.**

**10 Turn a circuit on or off with this.**

# DO IT YOURSELF:

## EMERGENCY LIGHT/CHARGER FROM FIRE AND WATER:

It converts heat energy (from candles) into electricity. It could also be scaled up and used in homes where electricity is not very given. It could also be used as a battery charger or to power other electronic devices.

**Applications:**
Mainly constructed to power LEDs but can be used for other things as well
Battery/smartphone charger
External fan

**Materials:**
2x cans of 85mm diameter
2x40x40x3mm sheets of aluminium
LEDs
TEC or TEG module
Voltage step-up (1 to 5V).
Thermal paste (better if specified for high temperature 200+°C)

**Construction:**
Prepare Can 1:
This will be used to absorb heat from the candles. Fire needs air and that is why you need to make lots of holes in the can. Remove labels with hot water. Drill 18x3 = 54,6mm holes. Use the file to reduce sharp edges. Heat up the can from outside.

Prepare Can 2:
Can 2 will just contain water.
Prepare aluminium distance plates: They will act as a distance between the cans. Depending on what you can use, you might skip those, but they can help in getting a more even heat transfer. Make them 40x40mm, that makes them compatible with different TEG-modules. Also make 10x10mm chamfer on the corners to fit the flat surface of the cans. Use fine sandpaper or steel wool to make them flat and nice

**Assemble Mechanics:**
Prepare one side of plate 1 with thermal paste. Place plate 1 on top of can 1 (with thermal paste facing down). Place the TEG module on top of plate 1. Place plate 2 on top of TEG. Prepare plate 2 with thermal paste. Place can 2 on top of plate2.
The order is:
Can1-Paste-Platel-Paste-TEG-Paste-Plate2-Paste-Can2
Connect the two cables on TEG-module to your step-up booster (check polarization). Connect LEDs to the output of the step-up booster. Lit your candles and enjoy! Be careful with the temperature and make sure your TEG-module can handle it. Also, if you don't want to use fire, then just try with a glass of hot water and fill the upper can with ice. That gives light for 30 min!

**Anish Kashyap N, 3rd year**
**Computer Science and Engg**

# SHORTCUT KEYS:

Ctrl+A - Select All
Ctrl+C - Copy
Ctrl+X - Cut
Ctrl+V - Paste
Ctrl+Z - Undo
Ctrl+B - Bold
Ctrl+U - Underline
Ctrl+I - Italic
F1 - Help
F2 - Rename selected object
F3 - Find all files
F4 - Opens file list drop-down in dialogs up one page
Shift + Del - Cut selected item
Ctrl + V - Paste
Shift + Ins - Paste
Home - Go to beginning of current line
Ctrl + Home - Go to beginning of document
End - Go to end of current line
Ctrl + End - Go to end of document
Alt+Tab - Cycles between open applications
Alt+F4 - Quit program, close current window
Alt+F6 - Switch between current program windows
Alt+Enter - Opens properties dialog

# BRAIN-COMPUTER INTERFACE

Brain Computer Interface (BCI) technology is a game-changer in the field of neuroscience, as it enables communication between the human brain and an external device. The purpose of BCI is to improve the quality of life for people who have physical or sensory impairments by allowing them to control a computer or other device with their thoughts. It has also become an exciting area of research for exploring the potential of human-machine interaction. In this article, we will discuss the working of BCI and its significance in the modern world.

BCI technology is based on the principle of translating brain signals into digital commands that can be interpreted by a computer. This is achieved by placing electrodes on the scalp or directly on the brain which can detect the electrical activity generated by neurons in response to various stimuli. These signals are then processed by algorithms that can distinguish between different patterns of activity and interpret them as specific commands. For example a person with paralysis could use a BCI to control a robotic arm or a computer cursor by imagining moving their own limbs.

BCI systems can also be used for non-invasive brain monitoring and diagnosis of neurological disorders. For instance electroencephalography can detect abnormal brain activity associated with epilepsy, sleep disorders, or traumatic brain injury. In addition, functional magnetic resonance imaging can visualize changes in blood flow and oxygenation that occur in response to specific cognitive tasks, allowing researchers to study the neural basis of behavior and cognition.

The development of BCI technology has opened up a new frontier in human-computer interaction and has the potential to revolutionize the way we interact with machines. BCI systems can provide a means of communication and control for people with physical disabilities allowing them to live more independent and fulfilling lives. Moreover BCI research can provide insights into the functioning of the brain leading to new treatments and interventions for neurological disorders. However there are still technical and ethical challenges to be addressed, such as improving the accuracy and reliability of BCI systems and ensuring privacy and security of brain data. Nonetheless the future of BCI technology is exciting and we can expect many new developments and applications in the years to come.

**Keerthi H B, 2nd year**
**Electronics and Instrumentation Engg**

# BEST PROJECTS OF MCE:

## FIELD OPERATOR ROBOT ROBOTIC ARM

FIPER (Field Operation Robot) is the next generation robot that aids the automation personnel in monitoring, improving the accuracy, reducing the risk that are involved in the industry. In industry 4.0, some of the most anticipated tippling points include Robotics and Artificial Intelligence. Over the past few years, we have seen usage of the robots in various automotive industries.While FIPER is way different from those in terms of its appearance and operation.

Few of the capabilities of FIPER includes turning ON and OFF of the emergency switch, object detection, reading valve values, fire analysis, fire detection, fluid analysis and many more.One of the cardinal-part of FIPER(Field Operation Robot) is object identification.

It involves the identification of various valves and gauges used in automation industry. The main emphasis on classifying the object and training our model to detect the different elements of a process plant like gauges ammeter, voltmeter, pressure valves etc.

"Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world."

-Louis Pasteur

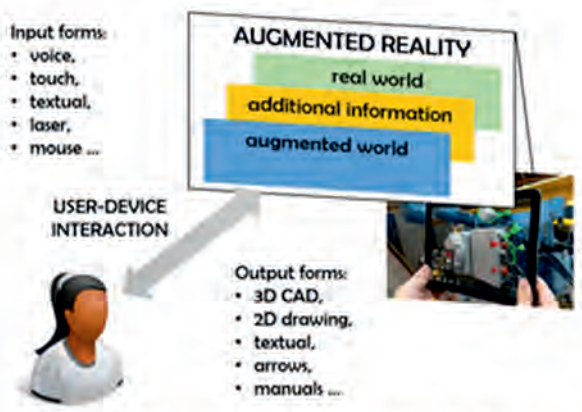
Continued From Page 7

This is a four-fold step process, it starts with the collection of data-set then labelling the dataset once they are labelled, we trained our model using appropriate neural network.
Once they are trained data set are to be validated against test cases and finally it will be deployed in realtime. Robotic Arm is trained to operate autonomously by training the neural network with the images and making it intelligent regarding Arm movement.

**Team Members**
Apoorva Padmanab
Abhishek G R
Adithya M S
Aiman Fathima

**Guided by**
Mr.H S Murali
Assistant Professor
Electronics and Instrumentation Engg

## SMART CLASS MONITORING SYSTEM




Embracing technology enabled teaching and learning methodologies are crucial to the success of a teaching and learning program. The students in rural schools/colleges (specifically in Government) are not able to absorb all the knowledge delivered by their teachers, as the teachers at the rural schools/colleges are lacking in adopting to the technology enabled teaching and learning practices. One reason being the cost involved in using the technology-based teaching learning methods and the other being they are not tech savvy. This work proposes a technology enabled framework which offers an augmented reality based smart board to draw the images and sketches easily during teaching. The framework also contains the student management system to manage the students details regularly with ease. The framework also proposes an Artificial Intelligence based attendance marking system which allows the teachers to mark the class attendance through a single snap. The proposed system is evaluated and proved to be cost effective and performed well in achieving the above said module. So, the proposed system could be effectively used.

**Team Members**
Adwin H R
Rakshith C J
Srivathsa E R

**Guided by**
Mr.Balaji Prabhu B V
Associate Professor
Information Science and Engg