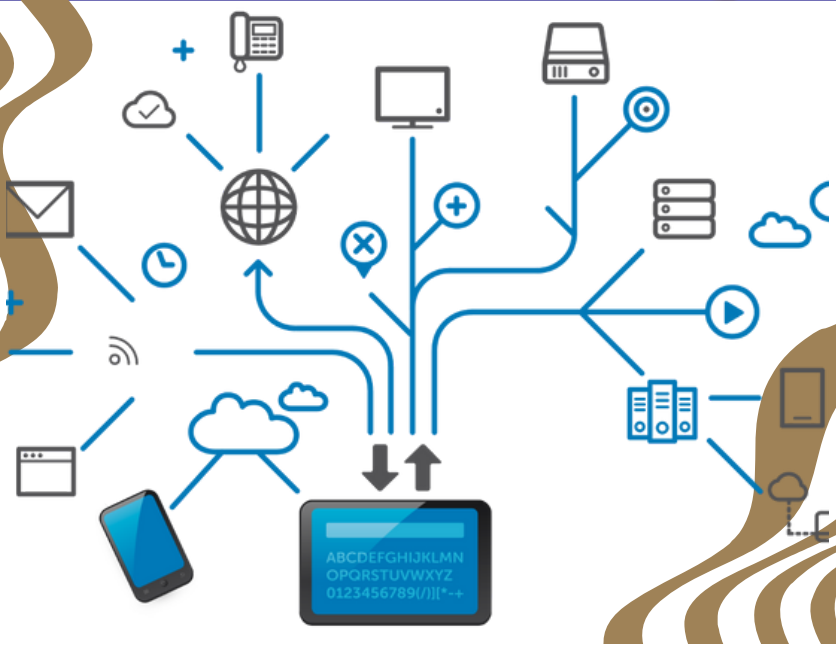
Hope Foundation's
International Institute of Information Technology, Pune

Gyanamrit

2021-22

Department of Electronics and Telecommunication



Department Magazine
Issue-03

Department of Electronics and Telecommunication

VISION

To nurture young minds and provide them with a strong foundation through academic excellence & skill-based knowledge, transforming them into efficient professionals who can take on challenges in the fields of Electronics and Telecommunication Engineering for a sustainable technological development.

MISSION

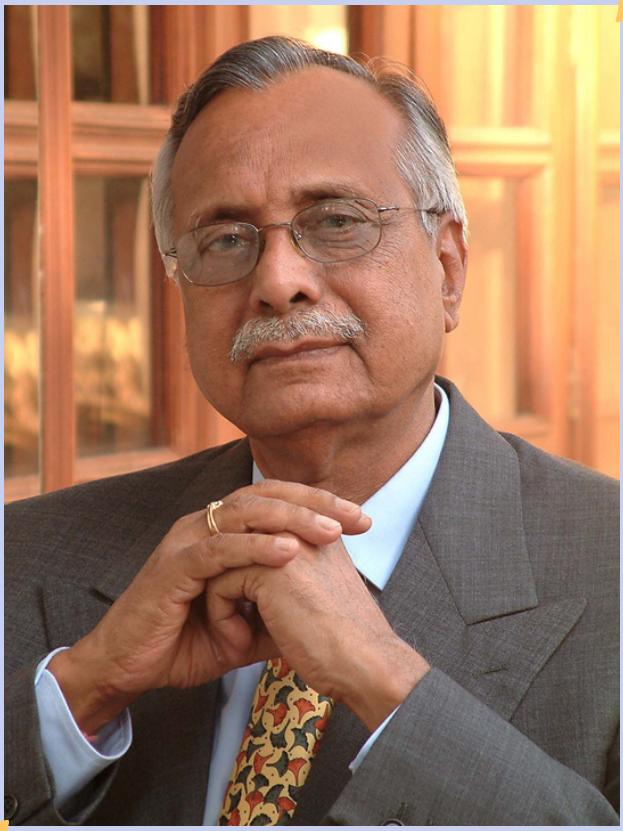
- To educate students on domain knowledge in Electronics and Telecommunication Engineering using adaptive teaching-learning practices.
- To create a conducive learning environment that offers value-added education, enabling students to be career ready.
- To cultivate research & innovation as a bent of mind among students by industry-academia interaction.
- To enrich students with self-learning ability to sustain with technological changes.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- Apply skills acquired in E&TC to analyze problems & design innovative solutions
- Inculcate the habit of self-learning using state-of-the-art technologies & innovations for continuous improvement.
- Internalize and display professional ethics, team spirit & respect societal values.
- Inspire students for higher studies & research.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- Understand fundamental concepts and acquire co-design skills of E&TC to apply them to its cognitive areas.
- Enhance programming skills for efficient coding practices using open source platforms.
- Develop analytical skills to achieve optimized and cost-effective technological solutions for challenges in E&TC.
- Bringing awareness about electromagnetic radiation hazards for the work environment



"An abiding trust in your abilities to perform, a strong determination to never give up and unshakeable belief in yourself are all you need to conquer the pinnacles of success"

Late Shri. Pralhad P. Chhabria
(12/03/1930 - 05/05/2016)
Founder President - I^2IT, Founder Chairman - Finolex Group

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- Prof. Tanuja Zende

HoD's Message (Chief Editor)

Congratulations to the committee and the writers for their laudable contribution. To all the readers of the Third edition of Gyanamrit, we hope that you'll be able to take in all that we wish to convey while we've compiled this issue, considering the unmitigated hard work and all the efforts put in by the magazine committee and the faculty in charge. Every bodies contribution in the form of papers and articles helps them develop their linguistic, semantic and technical expertise. Hence, we are providing the readers with enthralling and noteworthy information. Departmental magazine, Gyanamrit has the supreme intent of providing potential and budding engineers a vast platform to showcase their technical knowledge and to write down their most off-centre and ingenious ideas. In this edition, we aim at sharing with you the insights about the recent developments in Electronics and Telecommunication. Thank you for your valuable time and efforts worthy of note.

Prof. (Dr.) Risil Chhatrala

Faculty Incharge's message (Faculty Editor)

This GYANAMRIT magazine's debut issue will be enlightening, explicative, commutative, and inspiring. We have made an effort to discuss issues that are very relevant to the current technology developments.
I think that this issue will likewise be a huge success thanks to the fervent support and all the hard work put in by everyone engaged in the creation of this magazine. I want to sincerely thank the department's academic members and the editorial staff for their tenacious efforts. Additionally, I want to thank the authors for their contributions in the form of articles.

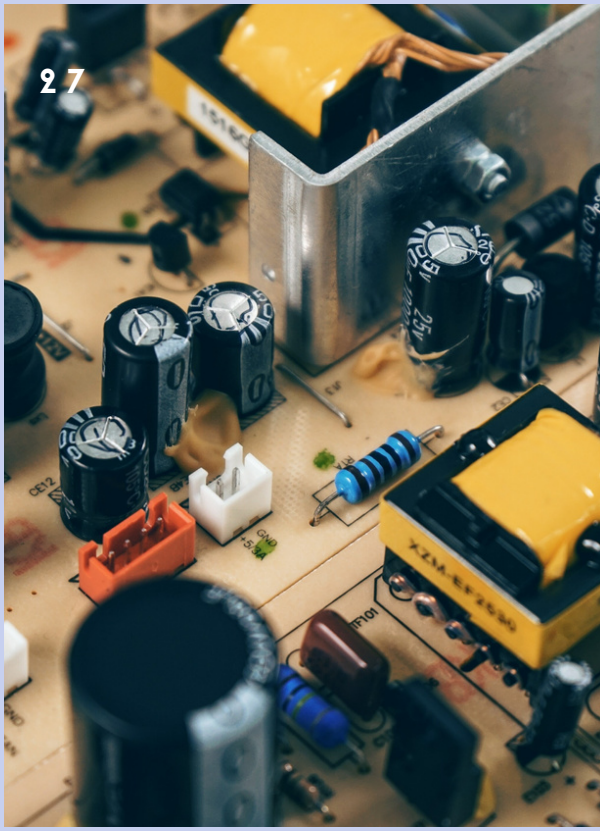
Greetings to everybody.

Prof. Tanuja Zende

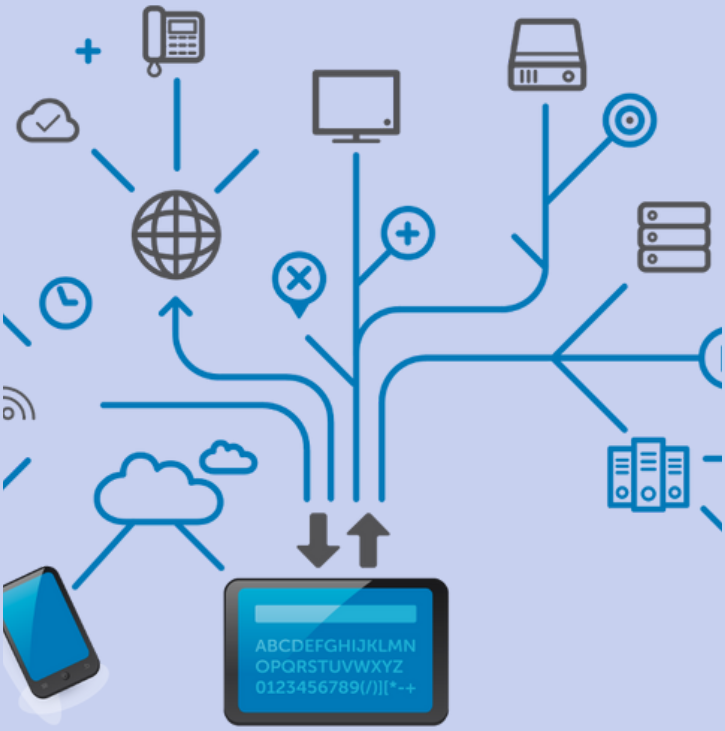
Editorial Head (student) message

Gyanamrit has now become even more insightful and gives it's readers a better platform to learn about the activities held by the Electronics and telecommunication department. We have conducted some interviews of students on certain activities of the department, viz. Project Based Learning. The department's main motto of including these activities in the curriculum is to bridge the gap between short comings of the academics and the needs of the industry. Students from all the levels agreed upon this fact and were quite optimistic about it becoming a great success. Inclusion of mini projects straight from the SE level in each and every subject will indeed help generating practical interests in the minds of the students. This practice will help students in their BE projects. Interaction of the faculty with students over these technical aspects helps them learn things quickly and in a more professional manner. We are quite sure that our readers will enjoy reading and acquiring information form these interviews.

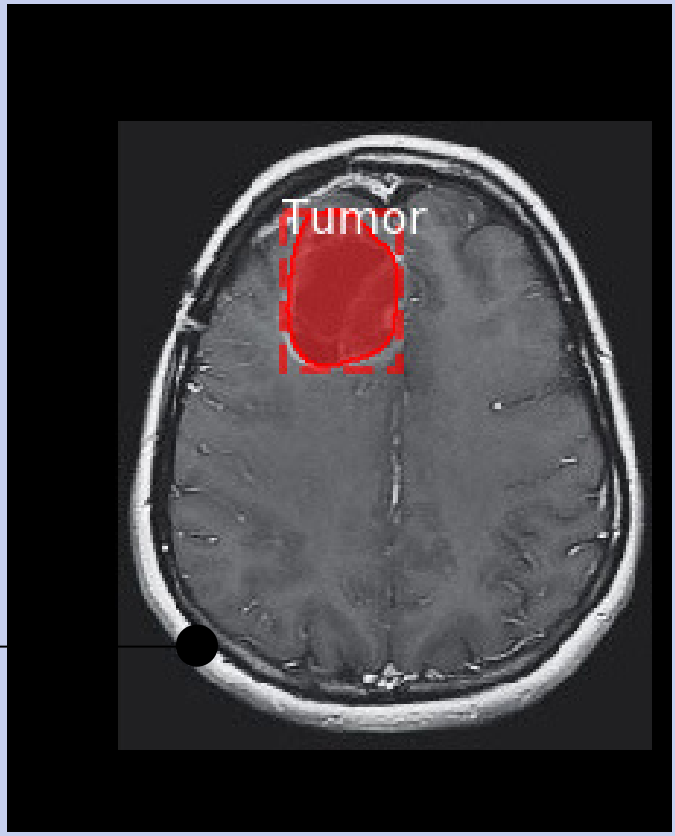
Priya Ghadge
Lead Editor-Gyanamrit



Gyanamrit



Brain Tumour Detection System



Ishan Modi BE E&TC
Ishan Srivastava BE E&TC
Soham Devharkar BE E&TC
Tajagny Patel BE E&TC
Isha Pathak BE E&TC
Kalyani Kathane TE E&TC

This article describes the hardware Edition for Smart India Hackathon 2020. This particular system was developed for soldiers and was a problem statement by DRDO. The project was to make a suitable device/strap for soldiers. It was designed with many functionalities. It was designed to measure and record the maximum number of vital body parameters such as heartrate, temperature

The sensors selected are also able to detect other parameters such as oxygen level and blood pressure can also be measured or calculated from the heartrate and temperature data. The sensors attached will be in sleep mode, which is when sensors measure data every particular interval of time based on location. This interval can vary from 5 to 10 minutes.

Once the data has been measured it will then be passed to the sub-station and eventually to the head station. Now the challenge here is that there are no or very limited mobile towers in areas where soldier patrol, hence transferring data using a cellular network will not be of any use, hence a Manet is being implemented which is mobile ADHOC network. Now ADHOC networks are a decentralized type of network, so here each soldier would act as a node, so each node is a transmitter and receiver.

The system of data transfer would work based on routing protocols. Here the routing protocol being used is AODV/E-AODV protocol. The protocol is very secure, consumes less energy, and can communicate over a long distance. Such routing protocols had already been implemented in military of Germany and it had proved to be successful.

02.

In case of emergency, where the MANET cannot be used, the device is designed to communicate via the public network. Now at the head station, a doctor will always keep track of the parameters of every soldier, this would be done using database. This is very similar to the doctors at NASA, who keep track of the astronaut's condition aboard the ISS daily.

03.

Here in case, if the doctor determines that a soldier's condition is getting bad, necessary actions can be taken, thereby saving human life. The device also has GPS functionality, so that GPS location of the soldier can be tracked efficiently. The device is also equipped with an SOS button facility so that in case of an emergency, the soldier can request help.

04.

HThe innovation in this project was the use of flexible-batteries. These batteries could be easily worn around the strap. The coding for the network script is done using TCL Script on Network Simulator 2 and other codes have been written on Arduino Code Editor. The advantages to this system are, it is decentralized and secure and thus ensures the constant track of medical conditions.

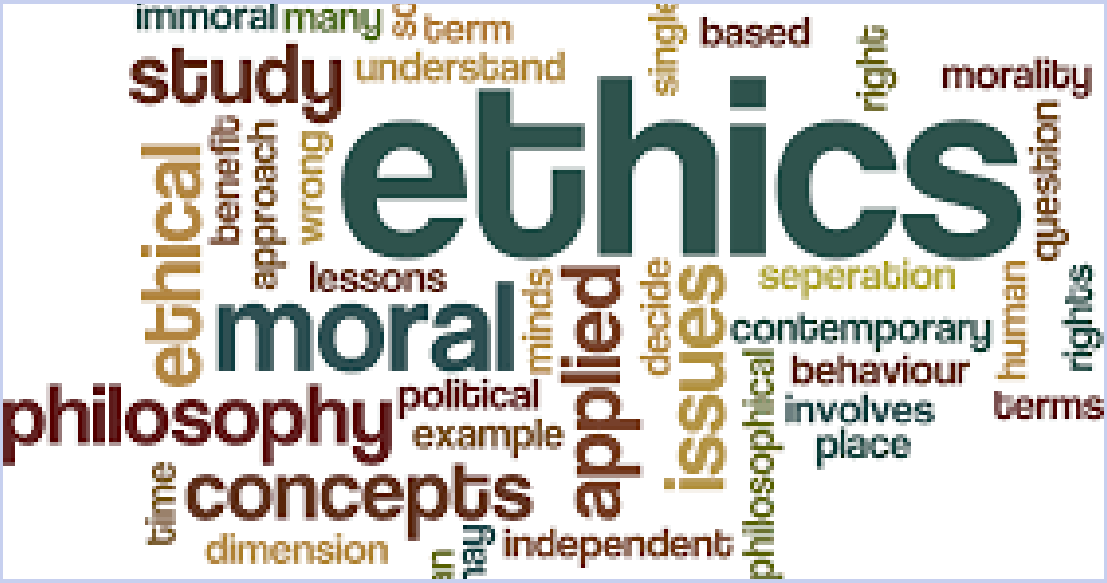
05.

The Dilemma of a Data Driven Society

Kumar Shivam Singh
T.E E&TC

In this new digital era, we have reached a paradoxical stage where, as a society and as an individual we are influenced by our own digital footprint in terms of what art we consume and the political ideologies we are allowed to be influenced by, In the world of data where even a small detail is being stored, it is very difficult to not be paranoid by the privacy of an individual and the factors influencing one's decision. The world of data is influencing every facet of our decisions through the various digital mediums and at a certain point it does become scary if are we totally in control of our own choices.

The key to a data driven society where people are not paranoid about their privacy lies in the consent of data from an individual and a level of transparency that needs to be maintained by every digital platform as to how a digital footprint of a person is being used and stored. A data driven society also can be a boon for our society with the various predictions which can be made with respect to the various factors such as health/economics/lifestyle of a person and can even help predict various epidemic disasters such as SARS/COVID – 19.

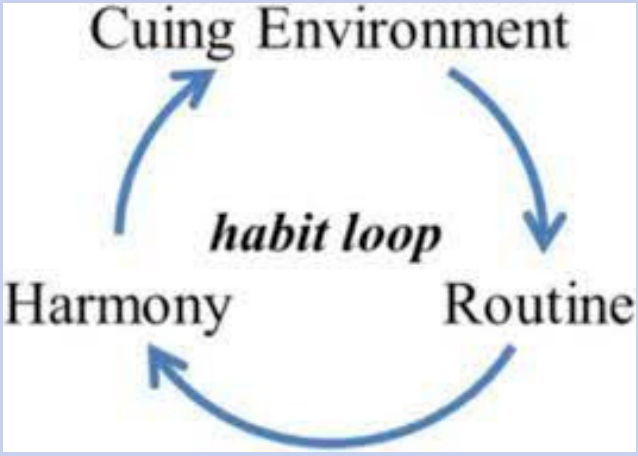


We as a society need to redefine our understanding of what data means in the 21st century and understand that it can act as a big asset or a big burden on the society depending on how it is going to be used. The responsibility of sharing and understanding what information is being taken from them also lies with the individual thus "data literacy" should also be a topic which should be taught and discussed about in our society. Data play's a substantial role in the choices we make consciously or subconsciously but being aware about it is the key which can help us make informed decisions as a society and individual so that our data can be used and protected.

Digital data as a construct is a tool, a powerful tool which has the capability to change the world, now it boils down to our society as to what they want to achieve with it.

Ronald Coase once said: - "Torture the data and it will confess to anything."

Habits aligning towards existing core competencies



-Sahil

1. Clarity
It provides clarity on whether you are physically and psychologically invested in the thing you want to improve at. 30 days of effort is a real commitment. If you are half-in, you won't want to take it on and commit to the 30 days. It's a commitment razor.

2. Removes Intimidation
30-for-30 is small enough that you can mentally take it on. Pre-start self- intimidation is one of the biggest drivers of stagnation. We make something too daunting, so we don't take it on. New habits and improvement initiatives can often feel that way.
Example: A lot of people say they want to get into great cardiovascular shape. But if they're currently out of shape, it can feel like a daunting task. 30-for-30 breaks the intimidation down into something reasonable and manageable. 30 minutes per day for 30 days. Simple!!!!!!

3. Effective Compounding
30 days of 30 minutes per day is 900 total minutes of accumulated effort. It can have surprisingly significant results. There's almost nothing in the world that you won't improve at if you spend 900 minutes of focused, dedicated effort on it. 900 minutes of Zone 2 cardio puts you in much better cardiovascular shape. 900 minutes of writing makes you a dramatically better writer. 900 minutes of reading can cover several classic books and many articles. 900 minutes of meditation can build toward a clear mind.

BE Projects

Speech emotion recognition using Machine Learning

Akanksha Wadekar
Vedant Shinde
Varun Kulkarni

Recently, increasing attention has been directed to the study of the emotional content of speech signals, and hence, many systems have been proposed to identify the emotional content of a spoken utterance. In this research paper, three important aspects of design of speech emotion recognition system have been depicted, which are suit- able features for speech representation, design of an appropriate classification scheme, proper preparation of an emotional speech database. Proposed method makes use of LFPS to represent speech signal and HMM as classifier. Emotions are classified into six categories of Anger, Disgust, Fear, Joy, Sadness and Surprise. Performance of LFPS feature parameters is compared with that of LPCC and MFCC feature parameters commonly used in speech recognition systems. Results show that the proposed system yields an average accuracy of 78 percent and the best accuracy of 96 percent in the classification of six emotions. Berlin and Spanish databases are used for experiments. For Berlin Database all classifiers achieve accuracy of 83 percent
when SN and feature selections are applied to the features. For Spanish database best accuracy of 94 percent is achieved by RNN classifier without SN and with FS.

BE Projects

Breast Cancer Detection Using Machine Learning Algorithm

Apurva Shelke
Sakshi Buchade
Priya Ghadge

Breast cancer is a topic that we hear a lot about these days. It is one of the most common illnesses. The National Cancer Institute says that breast cancer is the second most common cancer diagnosed for women. Cancer is a disease that develops when alterations or mutations occur in genes that aid cell proliferation.

These mutations allow the cells to proliferate and replicate in a very unregulated and chaotic manner. These cells continue to multiply and begin creating replicas,resulting in a more aberrant situation. These aberrant cells eventually grow into a tumor. Tumors, unlike normal cells, do not die when the body no longer requires them. According to the National Cancer Institute, every year around 2000 new instances of breast cancer are diagnosed in males, while approximately 2,30,000 new cases are diagnosed in women. This condition must be diagnosed

quickly so that women can receive treatment. This is a critical phase in the rehabilitation and therapy process. Traditionally mammograms, biopsy, MRI, ultrasound, PET-CT and Scintimammography are used to identify breast cancer.

But these tests take lot of time for detection. When breast cancer is detected early, the chances of survival improve because better treatment is available. So in this project, we're creating a web-based diagnosis system for which we've conducted a comparison analysis of supervised machine learning classifiers to see which one has the best accuracy. This will help in early detection of breast cancer.

BE Projects

Automatic Car Parking Using RFID Technology

Dakshesh Rai
Shahabaj Inamdar
Sanket Choudhari

In an RFID system, a database is used to keep track of when a vehicle is checked in and checked out. To make the system, both hardware and software are used, so it can be made. There is a database with information about all of the vehicles, including their model, number, and where they are parked. The tags and their tag ids are given to the user, so all of the information can be accessed at any time.

When the vehicle checks in, the reader looks at the data on the tag that was given to the driver. This means that if the vehicle doesn't have a tag on it, the barrier will stay closed. The main purpose of the reader is to scam the tag id and get all the data regarding the particular vehicle and enter in the program. For information: When you check your tag's id number with your database, you can open your gate if it matches. If not, you'll get an alert and your gate won't open.

When the vehicle leaves the parking lot, the vehicle's information is looked up in the database. Only if the vehicle is allowed to check out will the gate open. If it isn't, the gate will not.

BE Projects

Surveillance Bot

Rudrang Gade
Uday Ghatge
Vaibhav Bagade

A surveillance robot is a partially automated machine that works as per instructed by operator and which gather required data, work and move to destination by detecting the obstacles in the way using the sensors, Streaming or capture images which can then analysed by the operator. Our aim in this paper is to provide a solution/example for the wireless controlled robot vehicle that can sense the object, measure the distance between the vehicle and person, and stream video of the surrounding to the operator through wireless medium. This study proposes a feasible real-time approach for surveillance robots in remote places and enemy territory, based on a remote controller based robotic vehicle that may be used for defence and military applications. Sensors and cameras are used to detect and identify people, objects, and other things. This vehicle is designed to work in limited area with better efficiency for example In Armed forces. They can use these types of robot vehicles in hostage situations to determine the number of terrorists in the building, types of weapons used, bombs etc. The processing unit used in proposed system is Raspberry pi working on raspbian operating system. The Pi board controls the movement, gather information using sensors and camera that is used to stream the real time video of surrounding to the operator. It can walk on any surface and provide surveillance over a large area thanks to image processing, which can analyse and manipulate digitised images and videos. The proposed system consists of a single unit that will monitor the environment and provide video feedback for various hazardous conditions.

BE Projects

Credit Card Fraud Detection

Rutika Patil
Ankita Nawale
Mansi Mhaske

Credit card frauds are easy and friendly targets. E-commerce and many other online sites have increased the online payment modes, increasing the risk for online frauds. Increase in fraud rates, researchers started using different machine learning methods to detect and analyse frauds in online transactions. Credit card fraud continues to be a menace especially in developing countries. But credit card companies and issuing banks are working to stay one step ahead of large global syndicates. Credit cards are more secure than ever before, with regulators, card issuers, and banks spending significant time and effort collaborating with investigators throughout the world to guarantee that fraudsters do not succeed.

Regulations that hold the card supplier and bank accountable frequently protect cardholder's money from scammers. Credit card technology and security measures are becoming more complex, making it more difficult for criminals to steal money.

With Credit Card Fraud Detection, this project demonstrates the modelling of a data collection using machine learning. Modelling prior credit card transactions with data from those that turned out to be fraudulent is part of the Credit Card Fraud Detection Problem. The model is then used to determine whether or not a new transaction is fraudulent. Our goal is to detect 100 classifications. On the PCA converted Credit Card Transaction data, we concentrated on analyzing and pre-processing data sets, as well as deploying different anomaly detection techniques

such as the Local Outlier Factor and Isolation Forest algorithm. It is vital that credit card companies are able to identify fraudulent credit card transactions so that customers are not charged for items that they did not purchase. Such problems can be tackled with Data Science and its importance, along with Machine Learning, cannot be overstated.

BE Projects

Smart Waste Management System

Mrunalini Misal
Isha Pathak
Navteg Bhalla

Waste management is one of the primary issues confronting the globe today. The garbage is usually spilling over the dumpsters and laying nearby. As a result, a number of dangerous illnesses spread over the surrounding area. All of these issues stem from a lack of coordination and communication among the members of the waste crew. Also, according to the study, waste management may be significantly more effective if rubbish is separated at the source and then disposed of separately at dumping sites. As a result, appropriate waste management is quite important. In addition to the previously mentioned challenges, this study presents a method that would attempt to lessen these drawbacks to a larger extent. Internet of Things (IoT) is used to monitor garbage levels in bins. The data about bin levels is relayed over the internet to a server, where the system evaluates the data in real time and raises warnings to manage waste collection. The information gathered by the system may be utilised to develop more effective waste management strategies and preserve a cleaner environment. The Internet of Things (IoT) is a concept in which items in the environment are connected via wired and wireless networks without the need for human interaction. The Internet of Things (IoT) allows devices to interact and exchange data in order to give more intelligent services to consumers. This project addresses the issue of waste management in smart cities with inefficient garbage collection systems. The enterprises may use this initiative to suit their demands for smart trash management solutions. This technology allows the user to know the fill level of each waste bin in a neighbourhood or city at all times, allowing truck drivers to choose the most cost-effective and time saving path possible.

BE Projects

IoT Based Smart Live Vehicle Tracking System

Aditya Rajput
Abhinav Gandhi
Himanshu Tekade
Pratiksha Wale

Vehicle automation is one of the most important uses of Industry 4.0, especially for tourism enterprises who rent out their vehicles to migrants. Maintaining trust between the travel firm and its consumers is challenging. Although there are many existing trust-related solutions in the study, the most of them are based on centralised architecture, such as cloud computing, where data is vulnerable to numerous security threats. In this work, the authors suggest a vehicle tracking system based on the integration of blockchain and IoT, which is motivated by the previous discussion. The suggested technology will build confidence among entities by giving openness in vehicle monitoring details. Due of the immutability and decentralised nature of the trip details, blockchain is employed to store them. The system will also provide a trip report that includes the route information, the number of kilometres travelled, and the overall trip cost. The system's performance has been measured using Ethereum, Remix IDE, MetaMask, and RinkeyBy. A vehicle tracking system is extremely useful for tracking a vehicle's movement from any location at any time. An effective vehicle tracking system is designed and implemented to track the movement of any equipped vehicle at any time from any location. The proposed system made effective use of popular technology, which combines a smartphone with an ATMEGA328P. This is simple to prepare and inexpensive in comparison to others. The built-in device employs Global Positioning System (GPS) and Global System for Mobile Communication (GSM, GPRS) technology, which is one of the most widely used methods of vehicle tracking. The device is embedded within a vehicle, and its location is to be determined and tracked in real time. The GSM, GPRS module and GPS receiver is controlled by an ATMEGA328P. The GSM, GPRS module sends and updates the vehicle's location to a database. This system provides a minute-by-minute update on vehicle location by sending SMS via GSM, GPRS modem. This SMS includes the vehicle's latitude and longitude coordinates. The ATMEGA328P receives the coordinates from the GPS modem and sends them to the user via text SMS. This information is sent to the vehicle owner via SMS using a GSM, GPRS modem. The location is displayed on the app. The location and name of the location are then displayed on the cell phone. As a result, users can use their smartphones to continuously monitor a moving vehicle on demand.

BE Projects

IoT Based ECG Monitoring System

Mukta Ghawde
Rishita Gawande

Cardiovascular diseases are abnormal functions of the heart or blood vessels. Cardiovascular diseases can cause an increase in risk for heart attack, stroke and cardiac rhythm problems. Heart disease shows a range of conditions that affect our heart. This include: Coronary artery disease, Heart rhythm problems, Heart valve diseases, Heart muscle diseases, Heart infection. There are various types of heart rate monitors that are different according to their functionality. Some are used in hospital, and others at home during daily activity. Common heart monitor types are: A electrocardiogram (ECG) is a type of heart monitor that uses ten wires attached to the chest, arms, and legs using stickers called electrodes which are connected to the patients, and the wires transmit the waveform of the heart to the screen where it is printed. A Telemetry monitor is a machine used in a hospital at the patient's bed, which uses six wires attached to electrodes on the chest to display the waveform of the heart. A Holter monitor is a device which is as small as a camera that is designed to record the activity of our heart for 1-2 days. The recording is done while we are in our daily routine. This monitor consists of a digital recorder and five to seven electrodes. The primary goal of this project is to create a remote healthcare system. In our system, we acquired ECG Signal using 3-lead ECG electrodes and AD8232 ECG sensor. We collected different samples of ECG such as ECG while sitting with respiration, sitting without respiration, sleeping with respiration, sleeping without respiration. The motive behind collecting these ECG samples was to filter and analyze the ECG using HeartPy python module. As a result, we obtained filtered ECG using peak detection and notch filter for removing noises and also obtained heart rate in normal 8 range for all taken samples. This project is based on Arduino platform which is FOSS (Free Open Source Software). It provides accurate data and eliminating the error where possible.

BE Projects

Single Channel Indoor Microphone Localization

Akhilesh Khot
Avinash Kumar
Rama Vaidya
Saurabh Kadu

The project implements set of techniques and methods using single microphone for finding origin and location of source of sound. The data received from microphone is processed using signal processing algorithm to estimate the probable location of origin of sound. The methodology trains microphone by positions and trajectories as inputs. The localization information is computed by performing signal processing task on DSP processor or highperformance personal computer. The mathematical model capable of describing the features of the microphone signals and sound trajectory model is stated. The stated model reaches out for position sequences that is enabling; the learning and recognizing of trajectories. This training method exhibits practical advantages; attributes like room acoustics, uniformity, and placement of sensors seem significant. Simulations on synthetic as well as real-world data test the usefulness and efficiency of the stated system. Solution to locate a single channel microphone in a confined known space is suggested. In this project speaker and a microphone and advantage of the room acoustics to locate the co-ordinates of the microphone is taken. The concept of echo labelling that assigns the correct echoes to the known geometry of the room is used. Calculation the Euclidean distance matrix (EDM) from the distances between virtual image source and the microphone is done.

BE Projects

Body Mass Index (BMI) Using Facial Feature

Hritik Lalchandani
Tajagny Patel

Body Mass Index (BMI) is a very important parameter which plays key role in identifying whether the person is in good shape. As we all know BMI is measured with the help of two important parameters of the human body namely weight and height. Where weight is measured using weighing scale and height is measured using measuring tape. Weight of the person should be in kilograms (Kg) and the height should be in meter square (m sq.). Formula for BMI is weight in kg divided by height in m sq. With the help of output we can state whether the person is underweight, normal or in overweight condition. If the value obtained from BMI is less than 18 it is in underweight condition,18.5-24.9 falls under the normal range and last is overweight or obese class which is from 25.BMI can help us to assess the persons health condition. If a person is in underweight condition then we can estimate the person can have malnutrition or some deficiencies of vitamins.

If the person is in normal condition which refers that the person is in good condition and if the person is overweight condition then he could suffer from hypertension, diabetes, cardiovascular diseases and is exposed to many such problems. As we all know to calculate BMI, we need measuring tools like weighing machine and measurement tape. Then we have to put this parameter in the formula to calculate the BMI. So, the traditional method consumes both time and resources to execute, so people does not check their BMI too often.

To overcome this problem with the help of modern learning methods like artificial intelligence, machine learning and deep learning we can solve the issues which are observed in traditional method. With the help of techniques like convolution neural network (CNN) which falls under the category of deep learning which will help to discover new methods to find BMI. These methods have structure like brain in which neurons are connected with each other. There are many architectures depending on the neurons present in the model. Basically, model has an input layer where it takes input and there is hidden layer which does all the processing task and then final layer gives output.

BE Projects

Contactless Dry Hand Fumigating Machine with In-Built Temperature Analysis and HealthCare Assist

Anandhu Krishnan R
Rohit Kale
Shamish Kadam

The emergence of a number of new infectious diseases, many of which posed significant public health risks and necessitated extensive infection prevention measures. Close contact between individuals is consumed a high risk of compromising on personal hygiene and making the epidemic more contagious. Non-health-care community settings such as publicly accessible buildings, faith-based community centres, marketplaces, transportation, and commercial settings, are becoming the epicentre of pandemic. A study at defence research Development Organization at Canada have found a significant reduction in infection can be achieved by fogging method. With the objective of effective disinfection, this system of dry hand fumigating machine with fog is designed. In this method of disinfection natural resources are not exploited. Our proposed system in helping in drastically reducing the frequency of consumption of natural resources like water. Otherwise water will be exploited heavily in ensuring personal hygiene. The project is also achieving an aspect of contact less feature by ensuring that there is no in hand contact coming with the disinfectant and water. So, it is an advantage in hindering the further contamination. The system also contributed to limit the overuse of chemical soaps such we are contributing in reducing environmental pollution.

BE Projects

Drying and Dehydration of Vegetables Using Smart Dehydrator

Rujula Shinde
Asit Raut
Soham Devharkar

According to reports, India accounts for about 15 percent of the world's vegetable production. But because of the perishable nature of these products, they are difficult to store over a longer duration of time and most of the time create losses for producers. To counter this problem, drying has proved to an important aspect when it comes to storing foods and preserving them. Drying is the oldest method used for increasing shelf life of food products. It can significantly reduce food wastage. To achieve this, different types of food dehydrators have been designed and implemented over the ages. They evaporate moisture content from vegetables using a heat source such as sunlight (solar energy) or by creating a controlled artificial heating environment. Drying changes several parameters of the product during the process such as volume, density, mass, moisture content, product size, chemical changes along with the product quality. To achieve optimal dehydration, an electronic temperature control system can be implemented. In addition, this model can predict the time required for drying the product based on temperature and humidity. This is made possible with the help of DHT11 temperature and humidity sensors and ESP32 micro-controller. The logic is written and programmed into the microcontroller.

BE Projects

Air Pollution Monitoring System

Pratiksha More
Hrutuja Mungase
Suruchi Kothare

In today's world, the continuous rise in air and sound pollution has become a serious problem. Controlling and carefully monitoring the situation has become necessary in order to take the necessary steps to alleviate the situation. The Air Quality Index and Noise Intensity of a region has been proposed in this research. The Air Quality Index Monitoring Module, the Sound Intensity Detection Module, the Cloud-based Monitoring Module, and the Anomaly Notification Module are the four modules that make up the recommended technology. Firstly, to begin, the Air Quality Index is calculated based on the presence of five specific air contaminants. For the past ten years, air pollution levels 10 have been steadily increasing. In developing countries like India, the situation is far worse. The average PM10 concentration in Delhi has climbed by over 66 percent since 2010 and is continuing to rise. Human health has been demonstrated to be harmed by rising air pollution levels. The first step is to raise awareness of the problem by alerting people about the quality of air they are breathing in their immediate surroundings. Unfortunately, India lacks the infrastructure necessary to quantify pollution on a granular level. Because most pollution monitoring sites are located in areas with low population density, calculating personal exposure to pollution is challenging.

BE Projects

Drowsiness Detection Using OpenCV and DLIBollution Monitoring System

Utkarsh Sontakke
Janhavi Chaudhari
Aditya Kapadane

The automobile section is one of the flourishing sectors as it is changing from conventional fuel consuming engines to hybrid and electric vehicle applications, where vehicles can be intelligent by using Internet of Things, Machine Learning and Artificial Intelligence to improve driving experience as well as safety. These also include Drowsiness detection to avoid accident. But unfortunately, these features and technologies are being used in latest cars. These types cars are around 15-20 percent of the Indian roads. Rest of the 80 percent, of vehicles lack these such type of advance features. Many vehicles manufactured before 2010-12 didn't even included of basic safety feature such as Anti-lock Braking System and Air Bags. Also, vehicles suffer from many crimes such as robbery of items in vehicle and also vehicle theft. Hence it has become a big challenge for people to avoid such these crimes from professional thieves. Hence, this project is an attempt to reduce these crimes to a certain extent. Recognizing an individual with an image has been popularised due to rapid growth in electronic media. This report describes the face detection and recognition project undertaken for the visual perception. It reports the technologies available in the OpenComputer-Vision (OpenCV) library and methodology to implement them using Python. A computer's vision-based concept has been used for creating this Drowsy Driver Detection System. The camera is the main component of system which provides live feed of the driver that is towards the face of driver and checks the driver's eyes with a particular objective to catch drowsiness of the driver. If the driver is detected in drowsy state immediately the buzzer will pass an alarm or a sound. The framework moves the control of the program forward using information picked up from the picture to find the facial tourist spots, which helps the system to identify where the eye's location of an individual exist. If the eyes of driver are closed for a specific amount of time it would pass a message. The system works after initially face is recognized and eyes are spotted, it also works well in dim lighting conditions too. The accuracy rate of face detection in our system is 85 to 90 percent.

BE Projects

Face Recognition System for Alzheimer Patient

Samiksha Kamble
Aseem Mishra

Alzheimer's disease is a state characterized by a progressive indicative decline over several years. It causes memory loss and affects daily task performance. Memory loss leads to challenges like remembering people's names, faces, places, or other information. The prevalence rate for Alzheimer's disease is increasing and accordingly, needs more attention and address. Thus, the objective of this project is to support Alzheimer's patients with mild (early-stage) and moderate (middle-stage) conditions to stay involved in society and continue to live independently. The proposed system is a web application which uses facial recognition technology and location detection along with daily task reminder feature. The web application aims to improve daily communication, enhancing their ability to perform daily tasks by including a notification feature. It has location 11 tracking/detection to maintain the safety of Alzheimer's patients, and help prevent them from getting lost outside their house by tracking their location. Results have shown that the application has benefited those living with the symptoms of Alzheimer's, and significantly support their daily lives.

BE Projects

Indoor Positioning System

Malay Sheth
Ritu Swain
Harshad Sonar

Today the world is all about being efficient and saving time. This includes finding routes in the most complex architectures, such as malls. The no network area like mines and tunnels can seem like a labyrinth, especially when one does not have access to any sort of communication due to lack or inaccessibility of network. Therefore, these days the focus is shifting towards finding ways of creating a system that will make it easier to navigate under such circumstances of absolutely no network areas and enclosed spaces that include variety of facilities. Developing and implementing a technology that will help us navigate in such enclosed spaces will make it easier for us to find our destination. Many enclosed areas come under the category of no network area, such as mines, tunnels, etc. In the case of areas like malls, airports, and other huge and complex architecture, the usage of GPS is something that doesn't seem preferable. This is so because various studies show that the GPS has a minimum error of up to 5 per cent, which won't really be useful in places where the shops or various facilities lie close to one another. Hence many Smart homes have begun to use various sensors in order to detect location. To improve indoor positioning, accuracy has become a primary topic of importance. Bluetooth Low Energy (BLE) beacons have emerged as one of the most promising models when concerned with the accuracy, simplicity and life of the system. This is because of the ambiguity of Bluetooth compatible devices around us, such as iPhones and Android devices. BLE beacon has an edge cutting application and is reliable in signal detection and distance estimation methods, along with its sustainability due to its low energy consumption. This project focuses on studying and highlighting this prominent option in the field of Indoor Positioning. While browsing through this report, one will get a brief understanding of why BLE is being preferred over its other alternatives, followed by various researches that have helped us select it in particular. In the end while be the required representation of the physical implementation of the BLE module, right from circuitry to its software requirements which would depict the required information about achieved results and end conclusion. This will also be a glance at the possible future scope that could be acquired at the later stage of the project.

BE Projects

Air Pollution Monitoring System

Anagha Anand
Chaitrali Pare
Mohnish Sancheti
Soham Jarandikar

In today's world, the continuous rise in air and sound pollution has become a serious problem. Controlling and carefully monitoring the situation has become necessary in order to take the necessary steps to alleviate the situation. The Air Quality Index of a region has been proposed in this project. On this data, multiple Support Vector Machine (SVM) Machine Learning (ML) methods were used to estimate emission rate and a comparison study was performed. These algorithms were written in Python. Firstly, to begin, the Air Quality Index is calculated based on the presence of five specific air contaminants. For the past ten years, air pollution levels have been steadily increasing. In developing countries like India, the situation is far worse. The average PM10 concentration in Delhi has climbed by over 66 percent since 2010 and is continuing to rise. Human health has been demonstrated to be harmed by rising air pollution levels. The 12 first step is to raise awareness of the problem by alerting people about the quality of air they are breathing in their immediate surroundings. Unfortunately, India lacks the infrastructure necessary to quantify pollution on a granular level. Because most pollution monitoring sites are located in areas with low population density, calculating personal exposure to pollution is challenging. Environment monitoring is so important because it is based on the first right of people, life and health. For this reason, this system monitoring air quality with different sensor nodes in the Ibarra that evaluate the parameters of CO2, NOx, UV Light, Temperature and Humidity. The data analysis through machine learning algorithms allow the system to classify autonomously if a certain geographical location is exceeding the established emission limits of gases. As a result, the k-Nearest Neighbour algorithm presented a great classification performance when selecting the most contaminated sectors.

BE Projects

Smart Waste Management System

Mrunalini Misal
Isha Pathak
Navteg Bhalla

Waste management is one of the primary issues confronting the globe today. The garbage is usually spilling over the dumpsters and laying nearby. As a result, a number of dangerous illnesses spread over the surrounding area. All of these issues stem from a lack of coordination and communication among the members of the waste crew. Also, according to the study, waste management may be significantly more effective if rubbish is separated at the source and then disposed of separately at dumping sites. As a result, appropriate waste management is quite important. In addition to the previously mentioned challenges, this study presents a method that would attempt to lessen these drawbacks to a larger extent. Internet of Things (IoT) is used to monitor garbage levels in bins. The data about bin levels is relayed over the internet to a server, where the system evaluates the data in real time and raises warnings to manage waste collection. The information gathered by the system may be utilised to develop more effective waste management strategies and preserve a cleaner environment. The Internet of Things (IoT) is a concept in which items in the environment are connected via wired and wireless networks without the need for human interaction. The Internet of Things (IoT) allows devices to interact and exchange data in order to give more intelligent services to consumers. This project addresses the issue of waste management in smart cities with inefficient garbage collection systems. The enterprises may use this initiative to suit their demands for smart trash management solutions. This technology allows the user to know the fill level of each waste bin in a neighbourhood or city at all times, allowing truck drivers to choose the most cost-effective and time-saving path possible.

BE Projects

Brain Tumor Detection System

Ishan Srivastava
Ishan Modi
Janhavi Panambor

Brain tumours, in medical terms are the intentional or unintentional growth of mass cells which hamper the conventional functioning of the shape of brain. For correct diagnosis and efficient treatment planning, it is necessary to detect the brain tumour in the early stages. The tumour within the brain is one of the most dangerous diseases and might be diagnosed easily and reliably with the assistance of detection of the tumour using automated techniques on MRI Images. Positron Emission Tomography, Cerebral Arteriogram, spinal tap, Molecular testing are used for tumour detection. Digital image processing plays an important role in the analysis of medical images. Segmentation of tumours involves the separation of abnormal brain tissues from normal tissues of the brain. Over few past years, various researchers have proposed semi and fully automatic methods for the detection and segmentation of Brain tumours. The motivation behind this project is to detect neoplasm and supply better treatment for the suffering. The objectives 13 for the project are to develop an end-product (Web Application) that can be installed at hospitals. To facilitate this a detection model is developed that may accurately predict if an uploaded MRI scan of brain shows it is affected by tumour or not. To implement the project a Convolutional Neural Network (CNN) was used to define the model. Transfer Learning is implemented in order to efficiently train the model. The data-set used is split into 3 sets which are train, test and validation, in the ratio 80:10:10. The model is meant to be trained for 12 epochs. Callbacks also have been given to automate the model save process. The test accuracy of 97% is achieved. This trained model will be connected with an online Application via API. Within the proposed Web App, the user is having access to four routes which is welcome page and this contains information about the system, second route is information and awareness about the brain tumour in medical terms, third is detection page, where the trained model is deployed. The user is able to provide an input image, MRI images in our case, and last route is the team information. Images which are fed to the model route will be processed by the developed convolutional neural network which is able to then confirm if a tumour is present or not and intimidate the user for the same through an output Display. The advantage of using this system is that it will automate the detection process, and ease the workload of the hospital staff. However, for the advantage to become a reality, careful selection of accurate data is needed, else there is a chance of false results.

BE Projects

Image Restoration Using Convolutional Neural Network

Nikheel Lunawat
Prasad Shinde
Salim Anwar Khalid Shaikh

Image restoration is process of recovering the original image by removing noise and blur from image. Image blur is difficult to avoid in many situations like photography, to remove motion blur caused by camera shake, radar imaging to remove the effect of image system response, etc. Image noise is unwanted signal which comes in image from sensor such as thermal or electrical signal and Environmental condition such as rain, snow etc. Researchers have proposed many methods to remove noise and blur. In this project we used deep fusion CNN algorithms to remove blur and noise from the image. 14 Image restoration and classification is a classical problem of image processing, computer vision and machine learning. In recent times, with the increase of Artificial Neural Network (ANN), Deep Learning (DL) has brought a dramatic twist specifically in the area of machine learning by making it more Artificial Intelligence (AI). DL is used remarkably used in vast ranges of fields because of its diverse range of applications such as surveillance, health, medicine, sports, robotics, drones, etc. The Project deals with image classification using Convolutional Neural Network (CNN) which is performed by using Python TensorFlow. Image restoration is an important issue in high level image processing which deals with recovering of an original and sharp image using a degradation and restoration model. During image acquisition process degradation occurs. Image restoration is used to estimate the original image from the degraded data. Aim of this project is to provide a concise overview of most useful restoration models. Different methods of image restoration techniques are wiener filter, inverse filter, regularized filter, Richardson Lucy algorithm, neural network approach, wavelet-based approach, blind deconvolution is described and strength and weakness of each approach are identified. The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision. For example, given many pictures of cats and dogs, it can learn the key features for each class by itself. CNN decreases the human efforts. CNN has the highest accuracy among the algorithms.

BE Projects

Movie Recommendation System using Restricted Boltzmann Machine

Shriya Rastogi
Ankita Rana
Poorvaja Rao

On the internet, there are a broad variety of choices for a particular kind of item. It is difficult for a consumer to manually browse through all of the products in a certain category and select the best one. As a result, manual searching is ineffective. In this scenario, the recommendation system plays an important role in recommending the best things. Recommendation algorithms are crucial in the recommendation of items, especially in streaming services. Collaborative filtering (CF) and Content-based filtering are two of the most frequently used approaches in the recommendation framework. It works better when there are enough user rating records, but it struggles with sparse data. Content-based filtering works effectively in sparse datasets because it discovers similarities across movies by examining their properties. In this project, an artificial neural network approach is proposed based on the Restricted Boltzmann Machine algorithm method to build a Movie Recommendation System. RBMs (Restricted Boltzmann Machines) are energy-based models that predict ratings well and constitute the foundation of deep learning. This study demonstrated how RBMs may be used to model tabular data, such as movie user ratings and states that RBMs can be effectively applied to the Movie Lens dataset, which contains over 1 lakh movie ratings by presenting efficient learning and inference methodologies for this class of model.

BE Projects

IoT based Smart Agriculture using Machine Learning

Abhishek Nejkar
Mayur Madiwalar
Sahil Dhanawde

Agriculture is India's most significant and fundamental occupation, since it balances human food needs while also providing essential raw materials for a variety of industries. Innovative farming techniques are gradually improving crop yields, making them more stable and reducing irrigation waste. The proposed system is a smart irrigation working model that predicts a crop's water requirements using machine learning algorithms. Moisture, temperature, and humidity are the three of the most critical factors in determining the amount of water which is required in any agriculture produce. A temperature, humidity, and moisture sensor are placed in an agricultural yield, and the data is sent to the cloud via a microcontroller. The Random Forest algorithm, an efficient machine learning approach, is applied to the data collected from the yields to forecast results efficiently. Farmers receive the algorithm's outcome, allowing them to make informed water supply decisions ahead of time.

BE Projects

Solar Charge Controller with RMS

Adwait Bhondwe
Mayur Sathe
Aditya Sangale

The aim of this project is to construct a solar charge controller and to connect it with remote monitoring system, using mostly discrete components. The design consists of four stages which include current booster, battery level indicator, battery charge controller and power supply unit. The designed system is very functional, durable, economical, and realisable using locally sourced and affordable components. This work is a prototype of a commercial solar charge controller with protection systems that will prevent damages to the battery associated with unregulated charging and discharging mechanisms.

BE Projects

Flood mapping using Sentinel -1 SAR and Sentinel-2 datasets

Utkarsh Shastrakar
Pratiksha Ghule
Ajinky Gude

As there is rise in flash floods in recent years, proper flood risk management is an important aspect of flood mitigation in urban areas. In flood-prone areas flood risk maps are the most essential tool for land use planning. A flood risk map is considered as a primary yet necessary initial step for all regional development policies. According to flood 15 return periods, the criteria for mapping are chosen. Population, land use, build up area, and environmental factors are some other important factors which are also taken into consideration. Flash floods pose a high risk in urban areas receiving heavy rainfall and low elevation. Floods has very negative impacts such as loss of human life and negative effects on population, damage to the infrastructure and essential services, damage to crops and animals, spread of diseases, and contamination of the water supply. Mumbai is flood prone city and witnesses severe disruptions almost every year; for example, between 2004 and 2007, Mumbai experienced flooding each summer. Flood mapping is thus essential for flood modelling, hazard and risk analyses and can be performed by using the data of optical and microwave satellite sensors. Although optical imagery-based flood analysis methods have been often used for the flood assessments before, during and after the event; they have the limitation of cloud coverage. With the increasing temporal availability and spatial resolution of SAR (Synthetic Aperture Radar) satellite sensors, they became popular in data provision for flood detection. Assessment of flooded areas can be done using radar data, such as the Sentinel-1 SAR imagery provided by the European Space Agency (ESA).The features obtained from Sentinel-1 and Sentinel2 processing results were fused in random forest supervised classifier. The results show that Sentinel-2 optical data ease the training sample selection for the flooded areas.

BE Projects

Credit Card Fraud Detection

Rutika Patil
Ankita Nawale
Mansi Mhaske

Credit card frauds are easy and friendly targets. E-commerce and many other online sites have increased the online payment modes, increasing the risk for online frauds. Increase in fraud rates, researchers started using different machine learning methods to detect and analyse frauds in online transactions. Credit card fraud iv continues to be a menace especially in developing countries. But credit card companies and issuing banks are working to stay one step ahead of large global syndicates. Credit cards are more secure than ever before, with regulators, card issuers, and banks spending significant time and effort collaborating with investigators throughout the world to guarantee that fraudsters do not succeed. Regulations that hold the card supplier and bank accountable frequently protect cardholders' money from scammers. Credit card technology and security measures are becoming more complex, making it more difficult for criminals to steal money. With Credit Card Fraud Detection, this project demonstrates the modelling of a data collection using machine learning. Modelling prior credit card transactions with data from those that turned out to be fraudulent is part of the Credit Card Fraud Detection Problem. The model is then used to determine whether or not a new transaction is fraudulent. Our goal is to detect 100classifications. On the PCA converted Credit Card Transaction data, we concentrated on analysing and pre-processing data sets, as well as deploying different anomaly detection techniques such as the Local Outlier Factor and Isolation Forest algorithm.

BE Projects

Fruit Detection and Recognition Using CNN

Shalaka Tarare
Swati Dhumal
Vrushali Madane
Anuja Kadam

As there is a variety and diversity in fruits. There is need of classification and automation of fruits so we need high data variance of fruit images that requires a proper feature which recognizes. In past few years computer vision and image processing techniques have been found increasingly useful for fruit industry as the utilization of any single feature is not helpful there is a need of a high data variance, a hybrid approach which would provide solution. External shape appearance is the main source for fruit classification. Some studies have shown that the hybrid method has potential and several features that has been proven to enhance accuracy, also attempted a project to propose a fruit recognition system using CNN. Fruit identification supported machine system not only consumes less

BE Projects

Tea or Coffee Serving Robotic Arm

Omkar Mandlik
Kaveri Gangurde
Shruti Malpure

In recent years, the industry and routine works are found to be more attracted and implemented through automation via Robots. The pick and place robot is one of the example of technologies used in manufacturing industries which is designed to perform pick and place operations. The system is designed in such a way that it eliminates the human error and human intervention to get more precise work. There are many fields in which human intervention is difficult but the process under consideration has to be operated and controlled. This leads to the area in which robots find their applications. Literature suggests that the pick and place robots are designed, implemented in various fields such as; in bottle filling industry, packing industry, used in surveillance to detect and destroy the bombs etc. The project deals with implementing a pick and place robot using microcontroller for any pick and place functions. Most importantly using them has also helped in making processes more efficient and less noisy. The use of Robotic arm is highly recommended for industries especially for safety and productivity reasons. The pick and place robot are controlled using potentiometer. The project deals with designing and analysing the structure of robotic arm with different materials. It will pick and place an object from source to destination safely. The soft catching gripper used in the arm will not apply any extra pressure on the objects.

BE Projects

Automatic Car Parking Using RFID Technology

Dakshesh Rai
Shahabaj Inamdar
Sanket Choudhari

In an RFID system, a database is used to keep track of when a vehicle is checked in and checked out. To make the system, both hardware and software are used, so it can be made. There is a database with information about all of the vehicles, including their model, number, and where they are parked. The tags and their tag ids are given to the user, so all of the information can be accessed at any time. When the vehicle checks in, the reader looks at the data on the tag that was given to the driver. This means that if the vehicle doesn't have a tag on it, the barrier will stay closed. The main purpose of the reader is to scam the tag id and get all the data regarding the particular vehicle and enter in the program. For information: When you check your tag's id number with your database, you can open your gate if it matches. If not, you'll get an alert and your gate won't open. When the vehicle leaves the parking lot, the vehicle's information is looked up in the database. Only if the vehicle is allowed to check out will the gate open. If it isn't, the gate will not.

BE Projects

Breast Cancer Detection Using Machine Learning Algorithm

Apurva Shelke
Sakshi Buchade
Priya Ghadge

Breast cancer is a topic that we hear a lot about these days. It is one of the most common illnesses. The National Cancer Institute says that breast cancer is the second most common cancer diagnosed for women. Cancer is a disease that develops when alterations or mutations occur in genes that aid cell proliferation. These mutations allow the cells to proliferate and replicate in a very unregulated and chaotic manner. These cells continue to multiply and begin creating replicas, resulting in a more aberrant situation. These aberrant cells eventually grow into a tumour. Tumours, unlike normal cells, do not die when the body no longer requires them. According to the National Cancer Institute, every year around 2000 new instances of breast cancer are diagnosed in males, while approximately 2,30,000 new cases are diagnosed in women. This condition must be diagnosed quickly so that women can receive treatment. This is a critical phase in the rehabilitation and therapy process. Traditionally mammograms, biopsy, MRI, ultrasound, PET-CT and Scintimammography are used to identify breast cancer. But these tests take lot of time for detection. When breast cancer is detected early, the chances of survival improve because better treatment is available. So, in this project, we're creating a webbased diagnosis system for which we've conducted a comparison analysis of supervised machine learning classifiers to see which one has the best accuracy. This will help in early detection of breast cancer.

T.E. Mini Project

Smart Home System with Fire Alarm

Abhishek Kulkarni
Ashwini Vilas Chaudhari
Sushant Sarode

Smart Home domain is a new trendy way of home automation and energy conservation. This report elaborates on the control of Light Bulbs and Fire alarm not in a standard way but by using speech. The system is composed of various devices and is also low cost, or simply cost-efficient. In this system Speech control is achieved by using MQTT services like Adafruit.io and IFTTT. These services help in establishing connections between Google Assistant and the Microcontroller in use. This system consists of Node MCU, 4- Channel Relay, Light Bulbs, Flame Sensor, Buzzer, 2-pin Power Supply Connector, and Wires. This system recognises voice commands and further processes the information to convert them to desired data coordination and data transmission through our microcontroller. Depending on the commands, either Light 1 or Light 2 will be turned ON or OFF, and if a fire is detected, or if in case of a false alarm, a certain command can be said to stop the buzzer from continuously making the alarm sound. The communication between the devices and the microcontroller is achieved through Arduino IDE, a programming language application that allows us to write codes in C and C++. The communication between google assistant and the microcontroller takes place over the internet, Hence, this project belongs to a subcategory or a wide ranged domain named IOT (Internet of Things).

We live in the age of Smart Cities, where everything is planned and organised. Urban migration has increased dramatically in recent years. As a result, rubbish wastage has increased everywhere. One of our key environmental problems has been solid waste management, which has an influence on our society's health and ecology. Garbage disposal in public locations pollutes the environment in the neighbourhood. It has the potential to spread a variety of dangerous diseases to those who live nearby. Checking, collecting, and removing rubbish waste is one of the major problems faced by today's society, as its absence of upkeep will have bad ecological consequences. The old method of manually monitoring garbage in garbage containers is ineffective since it requires a lot of human effort. Currently, certain steps are being taken to improve the country's cleanliness. People are becoming more involved in cleaning up their environment in any way they can. The administration has also launched a number of initiatives to improve cleanliness

T.E. Mini Project
Automatic Car Wiper System

Sachin K Patil
Sharath C Palle
Umesh R Pawar

Now a days the technology will enhanced to focusing on autonomous vehicle on different implementation. In all likelihood major of accidents occur due to the disturbance of driver. Sometimes many cases the deficiency of proper vision accountable for road accident during heavy rain falls. The usual wiper system requires driver's attention to switch on the wiper system during rainfall. Whereas in traffic condition, driver should not be unfocused by manual adjustment of switching the wiper system which may lead to accident. In this framework we proposed a weather recognized method to construction an automatic rain sensing wiper on the wind screen during rain so as to avoid frenzy of driver. The state of the art in this project was not only money-making but also highly dispatch and more accurate and economically inexpensive which can be implemented in all low and middle intensity vehicles.

T.E. Mini Project

IoT Based Pulse Oximeter

Sadanand R Jori
Sakshi S Kshirsagar
Samiksha S Sarnaik

Currently, all are facing pandemic due to emergence of new virus called covid19. In order to tackle with it some precautions need to be taken for proper health and one of the devices that was commonly used at home and hospitals is pulse oximeter and thermometer. These two independent devices for regular health check-up. Pulse oximeter is a device that checks the SpO2 level in Blood using reflection and absorption phenomenon. That is IR rays and passed through our index finger and amount of IR rays absorbed gives the amount of SpO2 level in blood. Carrying these two devices independently and taking the measurement was little bit tedious.

T.E. Mini Project

Smart Farming Using IoT

Alan Roy
Archit Verma
Ayush Gopal Gupta

Internet of Things has brought revolution to each and every field by making everything smart and intelligent. IoT refers to a network of things which make a self-configuring network. The development of Intelligent Smart Farming IoT based devices are turning the face of agriculture production by not only enhancing it but also making it cost effective and reducing wastage. The aim / objective of this report is to propose an IoT based Smart Farming System assisting farmers in getting Live Data (Temperature, Soil Moisture) for efficient environment monitoring which will enable them to increase their overall yield and quality of products. The IoT based Smart Farming System being proposed through this report is integrated with Arduino mixed with different Sensors and a GSM module giving live data feed that can be obtained on your Phone through a Text message. The proposed product has been tested in the agricultural sector and provides high accuracy. Agriculture is the backbone of the economy and a major way of working. The daily life of many of the world's population depends on agriculture. About 70\% of India's population is dependent on agriculture. Most cultivations are not productive by physical activity alone, so innovative processing is required. So, we use innovations in the Internet of Things and SMS notifications to solve the important tasks of agriculture. A past way to turn on the smart water system with a smart idea. Controlling for each of these tasks is controlled by a sensor paired with an internet-connected PC and the task performed by the Arduino. Based on the observations, decisions are made.

T.E. Mini Project

Weather Monitoring System Using IoT

Deep Maroti Waghmare
Pratik Dilip Paymode
Sidheshwar Ashok Raut

Air quality, water pollutants, and radiation pollutants are important elements that pose real challenges inside the surroundings. appropriate monitoring is vital so that the arena can reap sustainable growth, via keeping a healthful society. In current years, the weather monitoring system is stepped forward with the advances inside the net of things (IoT) and the improvement of current sensors. beneath this scenario, the prevailing manuscript aims to accomplish a vital overview of noteworthy contributions and research studies on climate monitoring system, that contain tracking of air first-class, water highquality, radiation pollutants, and agriculture systems. The specified evaluation follows the huge assessment which has counselled most important recommendations and influences of studies on the premise of dialogue effects and studies tendencies analysed. The advances in sensor generation, IoT and device studying strategies make surroundings monitoring a actually smart tracking system. sooner or later, the framework of robust methods of gadget studying; denoising strategies and development of appropriate standards for wireless sensor networks, has been recommended. This project mostly blends two-observe fields primarily based on manipulate systems with facts acquisition method and builds a database device to provide the statistics in step with the selected attributes. The IOT based climate monitoring and Reporting device 20 assignment is used to get live reporting of climate situations. it'll reveal temperature, humidity, moisture and rain level. assume Scientists/nature analysts need to display adjustments in a particular environment like volcano or a rain-wooded area. The new technology for the development of databases are taken into consideration the principle venture of this research. The whole system tracks and controls positions centrally and remotely depending at the normal weather alternate that occurs, to hold the preferred positions in most advantageous environmental conditions

T.E. Mini Project
Non-Touch Automatic Door System

Maithilee Mule
Manisha Sonawane
Priyanka Rajesh Kolhe

Traditional doors usually have a key house and a key to open it. In the current epidemic caused by Covid-19, it is important for everyone to be careful not to wear masks, to keep their distance, to wash their hands, or to touch anything that is not unnecessary. Research Methods Literature study, collection of supporting materials and tools, program design and achievement, analysis of test and program results, preparation of final report. A nontouch-automatic door open-closed system with a body sensor is a model designed to prevent the spread of the Covid-19, which spreads by reducing direct physical contact through drops attached to a conventional door knob. The technology can be applied to crowded areas such as shopping centres, offices, indoor areas or restaurants located in indoor areas that are not exposed to direct sunlight. The components are Arduino Uno 3, Infrared Sensor, MLX90614 Temperature Sensor, 16x2 LCD, Buzzer, Servo Motor. Large Weather Forecasting System Using Renewable Resources Energy is nothing but the ability to do the work. In day to day life, Electricity is most commonly used energy resource. Now-a-days energy demand is increasing and which is life-line for people. Due to this number of energy resources are generated and wasted. The production of electric power from the foot step movement of the peoples and the pressure exerted during walking which is fritter away, is the main purpose of this project. The mechanical power transformation into electrical power as the pressure exerted by the footstep and by using transducers is basically called as “Foot step power generation system”. Power is produced by the power generating floor and it is basically the production of electrical energy from kinetic energy. As today electricity demand is increasing and it is unable to overcome this global issue by using the traditional power generating sources. In metro cities we all see the weather forecasting screens which consumes the power from common electricity duct, rather than using this costly energy we are introducing the usage of power generated by the footsteps using piezo-electric sensor and forecasting the weather condition using this never-ending energy. Piezoelectric materials are being more and more studied as they turn out to be very unusual materials with very specific and interesting properties. In fact, there materials have the ability to produce electrical energy from mechanical energy

T.E. Mini Project

Smart Jacket for Visually Impaired

Akash Solunke
Ashish Prasad Hande
Darshan Satish Patil

Visually challenged people face many difficulties in real life. The problem which they face is mainly that they collide with obstacles unknowingly which causes accidents. Keeping this concept in mind we tried to find a solution to this problem. We researched and pondered on the thought of how we should be able to facilitate them in manoeuvring in real time, keeping in mind that a person can't be there with them all the time. We started to think about a device or a module that should help them and should be easy to use. Lack of visibility is a major issue and so the proposed system should be easy to learn to use and should help them in real time. 21 In this report we have implemented a "Smart Jacket for Visually Impaired" people using the simple Arduino Lilypad development board, integrated with the ultrasonic sensor along with a vibration motor for the sense and a buzzer to alert the wearer. Our system alerts the user of the objects coming in their way by sounding the buzzer and also via vibration according to the proximity of the obstacle in the way. It is a plug and use system that can be fixed on clothing of the wearer and not just on jackets.

T.E. Mini Project
Smart Glasses

Aditi Navneet Naik
Anamay Vasant Dhepe
Namita Achandrashekhar

The visually impaired always have a problem in manoeuvring through places without colliding into obstacles. They have to memorize the neighbourhood area and then walk around on assumption. About half of the population of India suffer from visual impairment. There have been numerous efforts to solve this issue, utilizing the trends in technology. However, the cost and usage of the product does become an issue which the user needs to consider. With a blend of Machine Learning algorithms and Internet of things, there has been a manifold of solutions for different issues, Visual Impairment being one of them. We shall discuss in depth about the present solutions in the market in the below sections and how our model is a proper blend of technology, being cost-effective at the same time. Here, we are proposing a device which helps the blind user to navigate through any area, where the distances of the observed obstacles is conveyed to the user through an audio output. Main objective of this model is to assemble a device that is cost-effective and easy to use without many complications. This is a speech-based guiding system which shall alert the user about his/her surrounding area. Even though there are new technologies, available, they are too expensive while the others don't have as many features. This proposed device is equipped with an Arduino nano and ultrasonic sensor, which brings down the cost and becomes accessible to the masses.

T.E. Mini Project
Talking Multimeter

Atharva Nathe
Ceana Saji
Chaitali Anil Bhamere

Reading the values of electric components and parameters can be a time-consuming and difficult task. Other factors, such as the rising popularity and usage of very small packaged components, as well as handling inventories of components with unreadable markings, lead to more problems. All of these challenges combine to create a huge barrier for students and electrical/electronic enthusiasts who want to pursue careers in the field. This paper examines one of the viable alternatives by constructing and inventing a one-of-a-kind talking multimeter that can measure and call aloud the value of the measured value as and when desired. The talking multimeter project is built around an Arduino Nano, amplifier and speaker with LCD outputs. Talking mustimeters provide a digital display of voltage and resistance through analog-to-digital conversion. Since the display is digital, there is no parallel reading error. Since gauges use less energy than LEDs, they use an LCD display to show digital values. Then comes the Arduino record and playback interface. This Arduino outputs the appropriate voltage and resistance readings through the speaker. The project finds applications in technical laboratories, workshops and all technical workshops where voltage readings and measurements are required, providing a practical voltage measurement tool with visual display and audio output.

T.E. Mini Project

Single Axis Solar Tracking System

Aayush Joshi
Alankrit Sinha
Vinayak Parashar

Currently, most electricity is generated from fossil fuels such as coal, oil and natural gas, but these traditional energy sources face several challenges, including rising prices and safety concerns due to reliance on imports from a limited number of countries. Growing environmental concerns about the risks of climate change associated with fossil fuel reserves and fossil fuel power generation. As a result of these and other challenges faced by traditional energy sources, governments, businesses and consumers are increasingly supporting the development of alternative energy sources and new energy generation technologies. Unlike fossil fuels, which consume finite resources and can ultimately be too expensive to mine, solar energy is infinitely available. Solar energy has become one of the fastest growing renewable energy sources. Because solar power generation does not require fossil fuels, it is less dependent on limited and expensive fossil fuel resources. The amount and duration of sunlight can vary by day, season and year, but a properly selected and tuned system can be designed to provide long-term power with high reliability and at a fixed price. However, there is a problem with collecting solar energy because there is a problem with changing the angle of incidence of the sunlight during the day. Our project is a solution based on electricity generation and a sensor-based solar tracking system that uses the maximum solar energy via solar panels by automatically adjusting the devices to receive maximum sunlight. The proposed system continuously monitors the maximum light intensity. When the illuminance changes, the system will automatically move along the axis direction to reach the maximum illuminance. In this way, the system tracks sunlight throughout the day, maximizing the amount of light that reaches the solar panel and increasing the amount of energy produced.

T.E. Mini Project
Vehicle Speed Detector

Hritik Mahanto
Prathmesh Suhas Lande
Pratik Kumar Tiwari

In several parts of the highway road, accidents found a major social problem. There are several reasons to why vehicle accidents. Most of the accidents on the highway road cause by high-speed driving. Some highway road has signboards signifying maximum speed limit permitted while driving such as 100 km/h for the driver's safety, but some people does not follow speed limit. Therefore, the vehicles keep a constant speed within the speed limit over a particular area. The Over Speed is the major cause for increase in the occurrence of accidents nowadays. Many methods are being used for over speed monitoring. However, these methods require lot of manpower. In this project, we present the design and execution of a system, which provides a simple way to traffic authorities for monitoring of all the vehicles from the control room itself. This system calculates the speed and the maximum speed allowed in the respective area. The speed and the over speed of vehicle calculated will be sent to the control room using GSM technology. If the speed of any vehicle exceeds the speed limit, the driver is alerted through a buzzer indicating the same. If the driver still does not drive within the speed limit, an SMS is sent to traffic authorities. Accordingly, an Over speed ticket can be issued against the same vehicle. The objective of this project is to detect the over speed for vehicles on the highway road. Although the maximum speed limit on the highway, many accidents keep on because of over speed driving. It is necessary to solve these problems through electronics circuit. This project describes speed detection system for vehicles. The highway traffic police are easy to check over speed by using this system. This system mainly consists of Arduino UNO, two IR sensors (MD-0138 Infrared Obstacle Avoidance Sensor), 1602A LCD display and buzzer. The detected speed is displayed on LCD. Moreover, if the vehicle crosses the 23 limited speed, this system displays the condition of over speed on LCD and the buzzer is alarmed.

T.E. Mini Project
Audible Lab

Avantika S Tellawar
Samiksha Swattamwar
Sampada D Waghmare

Text-to-speech or TTS system converts normal text into Speech. This tech enables the system to speak out the text in a human voice. There are many examples of Text to Speech conversions like the announcements at public transport, the customer care calls, voice assistants in your smartphones, or the navigation menu of any machine. You can even find the TTS in Microsoft Wore where you set it to speak out the text written in the document. The system uses an open source hardware Arduino as a module to generate the phonetics pf the text given as an input to the Arduino in the form of source code. The code is compiled and written using a smartphone application. Then the code is processed by the Arduino and the corresponding phonetics are created which are available in the library of the Arduino. Then the amplifier circuit comprising of IC LM386 is used in its maximum gain for the amplification of the output and clear sound. The output of amplifier is then provided to the speaker which gives the output audible to human ears. The goal of this project is to make the impaired people enable a new to speak out their voice with the help of this device.

T.E. Mini Project

IoT Based Hostel Reservation System

Jay Raviraj Deore
Piyush Rajendra Nagpal
Shubham Chauhan

Hostel reservation and hostel management are probably the most tedious non-academic thing that every college student and staff has to deal with. The current system demands too much to and fro from the hostel to the accounts department and related staff offices. Moreover, the hostel's electrical power consumption is unnecessarily high and there is no readily available way to minimise energy loss. IoT based hostel management system tries to reduce energy consumption and a completely digitalised system for booking hostel rooms, reduces the amount of tedious paperwork and the annual trek one has to go through to book a hostel room. Face recognition Entry System is a process of fetching the face for taking In- time of scholars/ workers at institute entrance by using face biometrics on camera and at same time recording their body temperature using thermal detectors as per covid protocols. In this design, a computer system will be suitable to find and fetch mortal faces in images or videos that are being captured through a surveillance camera. Multitudinous algorithms and ways have been developed for perfecting the performance of face recognition but the conception to be enforced in Deep Literacy. It helps in conversion of the frames of the videotape into images so that the face of the pupil/ workers can be fluently honoured for their entry information so that the Gate- entry database can be fluently reflected automatically. This system will enter data in database through face recognition and automatically record name, in- time and their body temperature. Facial recognition system is a technology able of matching a mortal face from a digital image or a videotape frame against a database of faces, generally employed to authenticate druggies through ID verification services, works by setting and measuring facial features from a given image.

T.E. Mini Project

A Glove That Translates Sign Language into Text

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Tejal Santosh Wagh
Shekinah Walter Ezekiel

“Read Aloud,” is a low-cost wireless glove that detects gestures of the finger was developed using flex sensors. It is a glove that can recognize hand gestures, that responds to words and phrases given by the user in American Sign Language (ASL). Every finger of the hand glove contains a flex sensor that can record hand position and movement and send data through an LCD Display and to the computer. In our system using Processing and Arduino is done to allow the user to specify his/her desired finger gestures in an easy way. A simple mobile robot (mo-bot) was used to recognize and demonstrate the abilities of the glove in operating devices. The user's hand movements are detected by the glove and displayed on the LCD Display. The computer detects the gesture and recognizes data through the given data, similar to a neural network. If the data matches a gesture, then the word or phrase is displayed through an LCD Display. In this project, the flex sensors are used to detect the hand gestures using the angle of bending.

T.E. Mini Project

Fingerprint Based Attendance System

Kunal Bhimrao Kanase
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Vaishnavi Tawde

In today's world the student's classroom attendance has become more important part for any organizations/institutions. The old methodology of taking the attendance by calling the names of students or taking the signatures of students on paper is very time consuming and insecure, hence inefficient. This report presents the Fingerprint Based Attendance Management System for convenience or data reliability. The objective of the system is the integration of such systems into classroom for managing the student's attendance using Fingerprint scanner and to overcome the current problems in available attendance system. The system is designed in order to implement an attendance management system based on fingerprint scanner which the student's will need to use in order to mark their attendance successfully where only the students can mark their attendance if they have already enrolled their fingerprint in the system. Due to this only authentic student can mark his/her attendance during the class. This system takes 25 attendance electronically with the help of the fingerprint scanner. As every person has a unique fingerprint this makes the Fingerprint Based Attendance System ideal and environment friendly. The proposed system mainly comprises of two processes namely, enrolment and authentication. In the enrolment process the unique features of one's fingerprint called minutiae are extracted and stored in the database. During authentication, the fingerprint of the user is captured again and the extracted features are compared with the template in the database to determine a match before the attendance is marked by the attendance system.

T.E. Mini Project

Anti-Sleep Alarm System

Himadri Shankar Behera
Harsh Mewada
Dhruvil Bhavsar
Dipak Datta Munde

Drowsiness and Fatigue of drivers are amongst the significant causes of road accidents. Every year, they increase the amounts of deaths and fatalities injuries globally. In this paper, a module for Advanced Driver Assistance System (ADAS) is presented to reduce the number of accidents due to drivers fatigue and hence increase the transportation safety; this system deals with automatic driver drowsiness detection based on visual information and Artificial Intelligence. We propose an algorithm to locate, track, and analyze both the drivers face and eyes to measure PERCLOS, a scientifically supported measure of drowsiness associated with slow eye closure. Driving under the influence and distracted driving are well-known hazards, but few people think twice about getting behind the wheel when feeling drowsy, a sleep expert warns. Each year, nearly 100,000 traffic crashes can be attributed to drowsy driving, including more than 1,500 deaths and over 70,000 injuries, according to the U.S. National Highway Traffic Safety Administration. Most drowsy driving accidents occur between midnight and 6 a.m. among drivers who are alone in their vehicle. Risk factors for drowsy driving include: sleep loss - even just one hour less than you need. Drivers are the obvious target market for antisleep alarms. Truck drivers with tight schedules often find themselves hauling freight overnight. An alarm worn over the ear and a thermos of coffee could be enough to keep drivers alert without resorting to pharmaceuticals. Even the casual spring break road tripper could use a sleep alarm. Over-the-ear alarms have uses beyond the driver's seat. Anti-sleep alarms would help travellers who'd rather hit the road than the hay, but the best and safest remedy for a driver's drooping eyelids is to stop and take a nap.

T.E. Mini Project

UV Cleaning and Obstacle Detection Robot

Varun Singh
Vedangee Milind Diwate
Yash Arjun Chavan

Now day's many industries are using robots due to their high level of overall performance and reliability and that is a notable help for humans. Obstacle avoidance robotics is used for detecting obstacles and avoiding collisions. this is a self-sufficient robot. The layout of an obstacle avoidance robot requires the integration of many sensors according to their project. Obstacle detection is the primary requirement of this self-sufficient robot. The robot gets the data from the surrounding places via installed sensors on the robot. some sensing devices are used for obstacle detection like bump sensors, infrared sensors, ultrasonic sensors etc. The ultrasonic sensor is most suitable for obstacle detection and it is of low price and has excessive ranging functionality

T.E. Mini Project

Soldier Health Monitoring & Position Tracking System

Madhusudan S Kumbhar
Pranav M Gaikwad
Pranav Lahu Kulkarni

In present era, the threat of enemies plays an important role in security policies of any state. In this prospective, the military soldiers play an important and vital role. There are several considerations concerning the security of those troopers. So, for the security purpose of troopers, a number of equipment or devices are attached with them to take the look on their health status and their ammunitions.
Health relating sensors like body temperature measuring sensor, transmission and processing capabilities, can thus help to make low-cost wearable solutions for health Monitoring. GPS used for basically point the latitude and longitude to find exact location of soldier. GSM module can be used for effective strange of high-speed transmission that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions. So, by using these equipment's we are trying to implement the basic life guarding system for soldier in low cost and high reliability. The Soldier Health and Position Tracking System allows military base unit to track the current GPS position of soldier and also checks the health parameter including body temperature. The system will be providing both this information continuously to the base unit. Besides, it includes additional features such as soldier alertness program which monitors soldier activities time to time. An emergency switch is also provided with the soldier in case of emergency purpose. The system is very helpful for getting health status information of soldier and providing them instant help

T.E. Mini Project

Temperature and Face Mask Monitoring for IoT Enabled Doors

Kalyani kathane
Kavita Vitthal Gaikwad
Kumarshivam A Singh

The COVID-19 pandemic is causing a worldwide health crisis. Wearing a face mask in public places and wherever else is the most effective safety tool. The COVID-19 outbreak compelled governments all over the world to enact lockdowns in order to stop the virus from spreading. According to surveys, wearing a face mask in public settings considerably minimizes the chance of transmission. This research describes an IoT-enabled smart door that monitors body temperature and detects face masks using a machine learning model. Any commercial mall, hotel, or apartment building can benefit from the proposed approach. As a result, a cost-effective and dependable approach to utilizing AI and sensors to create a healthy atmosphere has been developed. A person can only enter the passageway if they wear a face mask and their body temperature is normal. If the person is qualified for both, the entry point allows them to enter and sprays the disinfection solution from head to toe on their entire body. The system includes a display that instructs the user on how to properly wear the mask. The project's major goal is to reduce the amount of time people spend checking face masks, measuring body temperature, and sanitizing themselves in public settings. It ensures that citizens and front-line workers are safe in these unusual circumstances and that everyone respects the government's instructions

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-The Editorial Team
Gyanamrit

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