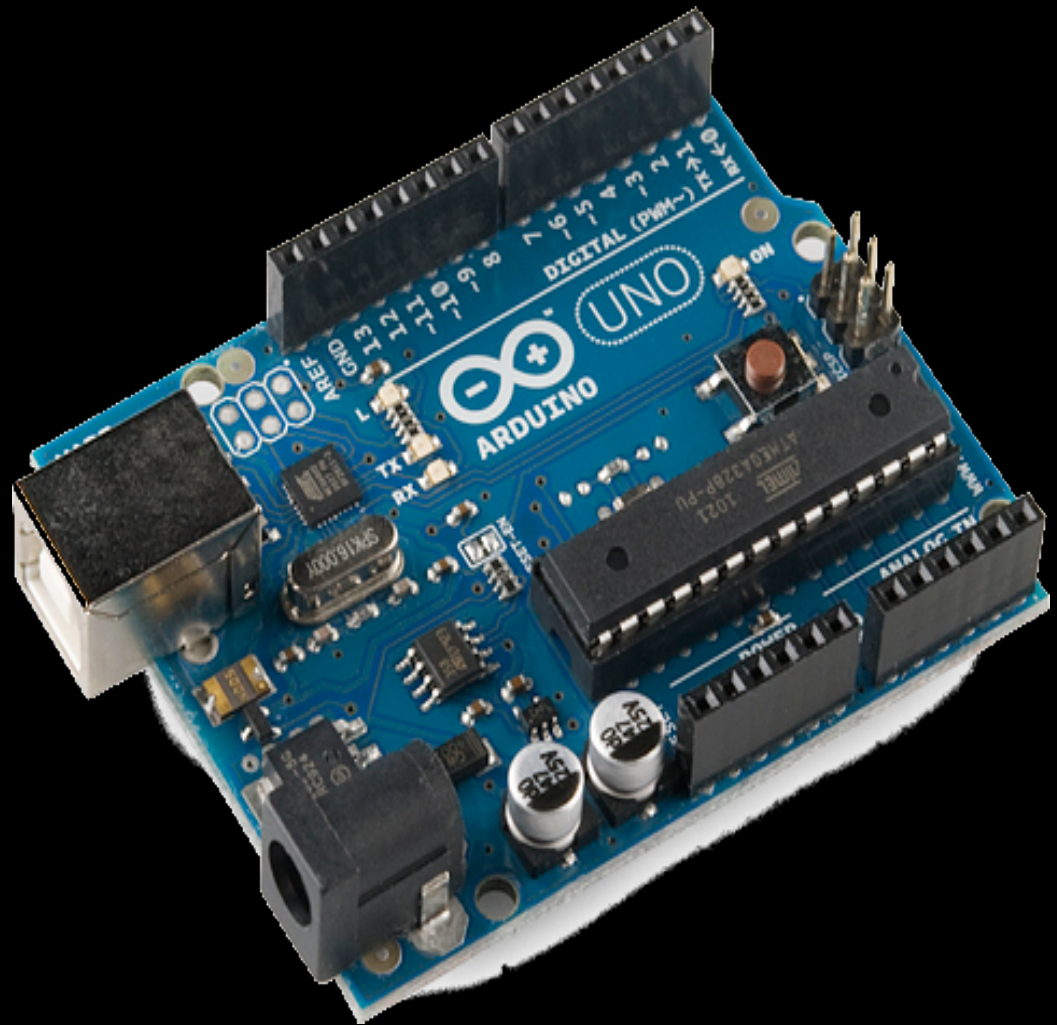


# CYBER SHADEZ - 2020

## IDEA PRESENTATION

# Project Booklet on IOT Projects



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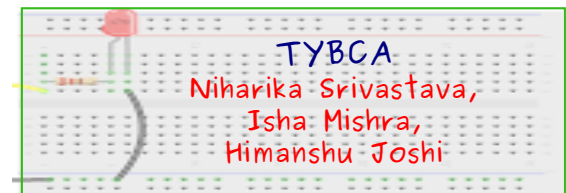
# Projects on Embedded Platforms

The embedded platform has a nearly limitless array of innovative applications for everything from robotics and lighting, to games and gardening! It's a fun way to automate everything, enabling you to control simple devices or manage complex Halloween displays.

Here are some of the best do-it-yourself Arduino and Raspberry Pi projects to educate and inspire you to make great things!

## Road Surface Quality Inspection System (RSQIS)

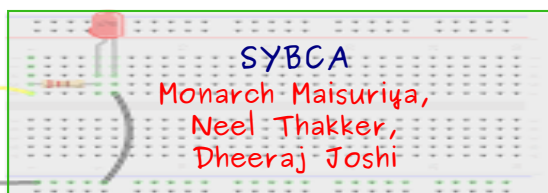
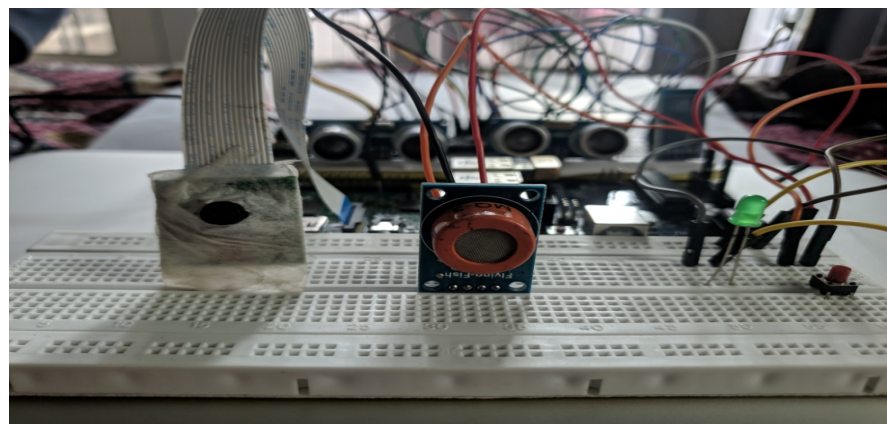
Roads are like the backbone of any nation and quality of road surface is of prime importance for the development of any country. In today's world making longer length of road is not a great challenge due to technological advancement but maintaining the infrastructure up to the mark in diverse road traffic loads and varied climatic terrains become more important. Conventionally, there are road inspection authorities who dispatch workers to videography the roads and the video logging is analysed offline afterwards in the office which is substantially time consuming and not a full proof system. Our project Road Surface Quality Inspection System is a cost-effective development of special instruments with very sensitive vibration sensor, GPS logger and on event triggered Video Camera mounted on a vehicle to accurately distinguish and locate all the rough surfaces of roads by just the vehicle passing through the road. A smart software scans the data from device and presents the status of road quality effectively on our website for the concerned organization. Intelligence regarding the exact location along with the video proof of all identified roads requiring reconstruction are effectively presented on our website. Furthermore, we have developed a mobile application for construction workers where they are presented working spot related information and are also provided the feature of uploading weekly work proof. This feature would help the organization to monitor the ongoing work in an easier and quicker manner. Our mobile application also provides the ability to register complaints and report information regarding damaged roads to the general public. This project efficiently digitizes and reduces manual intervention in the entire process of gathering data, analysing it and taking measures for increasing the road quality and safety.



## Alcohol Car Safety System



Nowadays several accidents occur due to drunk driving and it needs to prohibit people from driving after a drink. The alcohol car safety system provides a system that prevents such accidents in an intoxicated position. This system uses the sensors and uses it to detect whether driver is intoxicated or not if it detects such thing then it automatically sets the warning alert to the driver that he is not in the position to drive the car and this system automatically turns off the ignition of a car. Additionally, a system sends a warning message to the listed contacts of the driver with the current location. To measure alcohol level we have used MQ 3 sensor. This created system is compact so it can be easily installed in car and it is quite cheap so people can afford it.

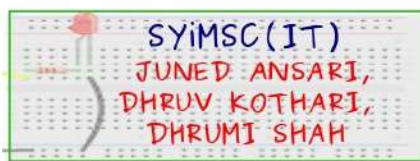




# Projects on Embedded Platforms

## Green House Monitoring System

In today's greenhouses, many parameter measurements are required to monitor and control the good quality and productivity of plants. But to get the desired results there are some very important factors which come into play like Temperature, Humidity, Light, and Water, which are necessary for better plant growth. Keeping these parameters in mind we have built a GreenHouse Monitoring System. Green House Monitoring System consists of dht11, soil moisture sensor, and LDR sensor. The system analyzes the surrounding of the greenhouse and according to the temperature, humidity, light intensity and moisture in the soil, it regulates the fan and water pump to maintain the atmosphere of the greenhouse appropriate for the particular plant. Every information which is calculated and the work is done by the system is informed to the owner by the use of GSM800a. If the sensed data crosses a predefined threshold range a message will be generated which would alert the owner. It is informing the owner about the temperature, humidity, moisture, and light in the greenhouse. The surrounding is checked again and again to regulate and take care of the plant for better growth.

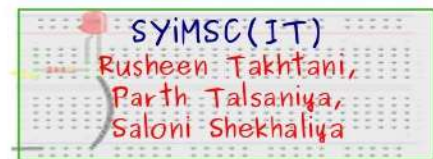


## Driverless Train

Nowadays modern technologies are helpful in all aspects of our life. Due to this a large number of developments have been done in the field of transportation. In the previous years, regular train accidents occur due to various reasons like the fault of the driver, signal errors. Another major problem is the human-operated train. It has no control over time, which means inaccuracy in time which affects the railway network management system. To solve this problem we have a new concept of the driverless train. The operation of the driverless train is controlled by an arduino microcontroller. The train is programmed to run on a predefined path that has fixed distance of stations and the speed of the train is also predefined and it is controlled by the motor. The stoppage of the train on the stations is also predefined. The RFID sensors are used for stopping the train. The whole operation of the train is controlled and performed by a controller so it does not require a driver or a train attendant for the operation of the train.



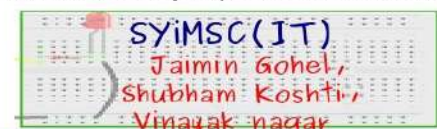
Some other additional features like LCD display to give messages to the passengers, alarms to give an indication to the passengers, LCD messages as well as for indication of door operation, automatic door controlling, passenger counting section by using IR modules, MQ2 smoke sensor, and emergency brake button.



## Fire Fighting Robot



According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from 2010-2014. Even though there are a lot of precautions taken for Fire accidents, these natural/man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resources which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. Today we are going to build a Fire Fighting Robot using Arduino, which will automatically sense the fire and start the water pump. We In this project, will learn how to build a simple robot using Arduino that could move towards the fire and pump out water around it to put down the fire. It is a very simple robot that would teach us the underlying concept of robotics.





# Projects on Embedded Platforms

## Smart Helmet

Helmets are the most important accessories for motorcycle riders. Not only to keep their head protected, but the recent boom in smart helmets have also turned them into great communication and entertainment tools.

The smart helmet includes features like google navigations, google assistant, LED indicators ( Left / Right direction ) and music. To get navigations, the rider needs to enter destination in the mobile app. Speakers are placed in the helmet to give directions to riders. Riders can listen to music through the speaker. For music, google assistant is interfaced with raspberry pi. Left and Right LEDs are placed at the backside of helmet to show indications to followers of riders.



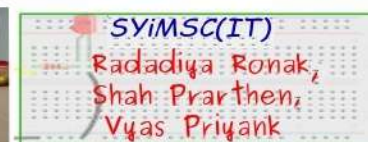
## Robotic Arm

This is an arduino based project which involves SG90 motors and other hardware parts to make the project work. It works according to the input given from the mobile application. This model works like a human hand. It picks up the object and drops it to the destined place. The model will move according to the specified degree in the application and the pick and drop operation of the object will be controlled by the application. It has 3 motors in which 1<sup>st</sup> motor works like the portion of the hand above elbow, 2<sup>nd</sup> motor works similar to the portion of the hand below the elbow whereas 3<sup>rd</sup> motor works as the fingers or palm of the human hand. Robotics has been acknowledged as a mainstay in the industrial automation domain for decades. It is gradually making its headway into the domains of the military, medical and vehicle applications domain. This project aims to enhance the interactivity for controlling the robotic arm in open source by adding a virtual world input by enabling the users to interact with the real world and making the entire process user-



## Gesture Control Spider Robot

A Robot is an electro-mechanical system that is operated by a computer program. Robots can be autonomous or semi-autonomous. An autonomous robot is not controlled by human and acts on its own decision by sensing its environment. Majority of the industrial robots are autonomous as they are required to operate at high speed and with great accuracy. But some applications require semi-autonomous or human controlled robots. Some of the most commonly used control systems are voice recognition, tactile or touch controlled and motion controlled. One of the frequently implemented motion controlled robot is a Hand Gesture Controlled Robot. In this project, a hand gesture controlled robot is developed using MPU6050, which is a 3-axis Accelerometer and 3-axis Gyroscope sensor and the controller part is Arduino Nano. Instead of using a remote control with buttons or a joystick, the gestures of the hand are used to control the motion of the robot. The project is based on wireless communication, where the data from the hand gestures is transmitted to the robot over RF link (RF Transmitter - Receiver pair). The project is divided into transmitter and receiver section. It contains 2 arduino- one is for sender and second is for receiver. sender sense the gesture and send to the receiver and receiver perform the task. In receiver per leg 3 servo motor attached. We have used components like Arduino uno, RF433 sender, receiver, MPU6050 accelerometer, servomotor. This project can be used in various applications like modifying the hardware and software of spider robot to use in Artificial Intelligence, also use in wheelchairs for senior citizens etc.

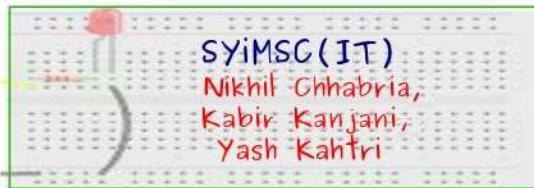




# Projects on Embedded Platforms

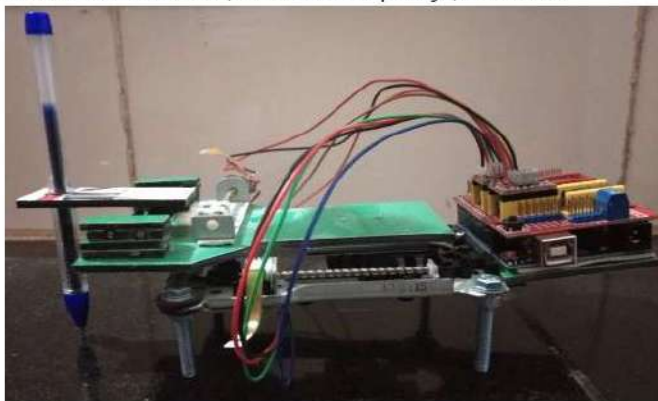
## Automatic Water Deployment Project

The arduino project has been created to provide the facility and to help the farmers who don't have the proper knowledge. Another reason to work on this project is to manage the frequency of water required for particular plants and to manage the quality of the soil. Therefore having such technology that can provide proper water at the time required is a huge benefit for the farmers and the plants. The project has been created using Arduino and moisture sensor which constantly checks the soil moisture and whenever the soil requires water it provides them with the proper amount of water. The moisture of the soil might differ from soil to soil. The system has been connected using a motor that pumps water that is to be provided to the soil. The system is simply an automatic water deployment system using various sensors.



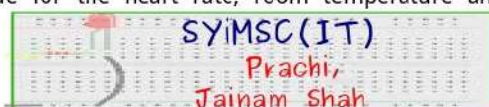
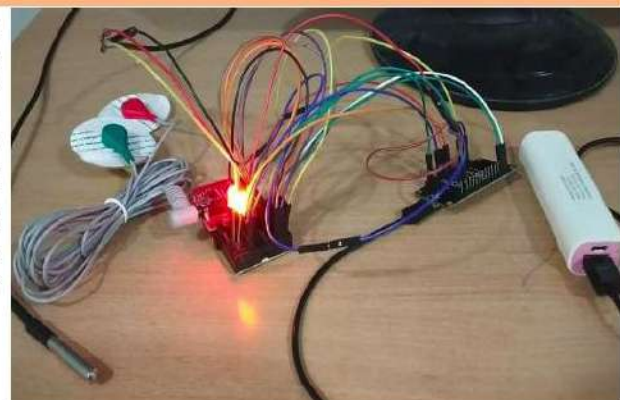
## Computer Numerical Control

CNC stands for Computer numerical control, a machine which is a computer-controlled structure that receives instructions through a serial port sent from a computer and moves its actuators depending on the received instructions. It has small stepper motors in its axis and these steppers will move an active tray and make it move in a double-axis plan to create the drawing design using a drawing pen. A stepper motor is a brushless DC electric motor that divides a full rotation into several equal steps. The heart of our machine is an arduino UNO board that will control the movement of each actuator depending on the instruction received from the computer, to control these stepper motors we need a stepper motor driver to control the speed and direction of each actuator. We are using BEN-BOX software to give a command and components like USB Type-B cable, 10mm smooth rods for long axis, 8mm smooth rods for short axis, 20-Tooth GT2 pulleys, GT2 belt.s



## Patient Monitoring System

The aim of this project is to inform the doctor about the ICU patient condition through wireless. For the medical professionals it becomes important to continuously monitor the conditions of a patient. In a large setup like a hospital or clinical center where a single doctor attends many patients, it becomes difficult to keep informed about the critical conditions developed in each of the patients. Here system using arduino uno. It is used to measure the ECG of the patient, the BODY TEMPERATURE and the ROOM TEMPERATURE as well. This project provides a system that gives the live data of the patients medical condition. LM35 is used for detecting the room temperature as we need our patient to be more comfortable with our environment. As per the normal human being's heart rate, we have set the threshold value for the heart rate, room temperature and the body temperature.





# Projects on Embedded Platforms

## Smart Irrigation System

Current global technology plays an important role in the field of agriculture. Automation is the technology with which a procedure or process is executed without human assistance. The main objective of this work is to determine how a person can use the automatic irrigation system of his own moderately economical facilities in a few hours to connect some electronic components and other materials. An automatic irrigation system based on sensor-based systems has been designed and implemented as one of the most widely used and advantageous automatic systems. This will help people in their daily activities, thus saving their time and hard work. This system uses sensor technology with the microcontroller, relay, DC motor and battery. It behaves as an intelligent switching system that detects the soil moisture level and irrigates the plant if necessary. The ON / OFF motor will automatically be based on the dryness level of the soil. The bluetooth module is used to communicate with mobile. Android app is created to get all notifications regarding irrigating plants. This type of irrigation system is easily controlled. In general, this system applies automatically for small and large gardens, nurseries, greenhouses and green roofs. This will also save time and energy, as well as minimize water loss. It will also help the farmer to benefit from the plantation without solving irrigation planning problems. The system uses solar power to conserve electricity by reducing the usage of grid power and electricity losses.



## Voice Control Robot

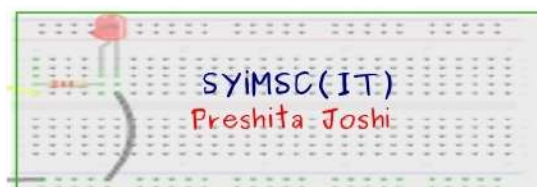
Voice control robot is controlled by Bluetooth HC-05 via a smartphone app. The app is developed in such a way that it converts and transfers the voice command to text and transfer the text to the connected bluetooth device. The bluetooth connected on the arduino board receives a text from the Android app as characters and stored them as string to the assigned string. There are words pre-programmed (forward, backward, right, left, stop) to the arduino, whenever the received text matches with the pre-programmed words, the arduino executes the command that assigned to the words. Arduino can connect to Laptop to monitor serial communication and check the working process and the words received by the bluetooth.



## Street Light Control using Arduino



Street lights are the major requirement in day to day life of transportation for safety purposes and avoiding accidents during the night. Street lighting systems are becoming more complex with the rapid growth of cities. To control and maintain such complex street lighting systems, various street light control systems are developed. In this project, we are going to develop a project called Street Light Control using Arduino UNO, in which the street lights are automatically turned ON or OFF based on the movement of the vehicles. The important considerations in the development of street light control systems are automation, power consumption, and cost-effectiveness. The principle behind the working of the project lies in the functioning of the IR Sensor. If there is an obstacle against the IR Sensor, the IR Sensor gets input and this can be configured to turn ON or OFF the LEDs (or street lights) with the help of arduino.

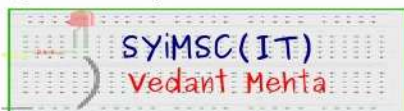




# Projects on Embedded Platforms

## Automatic Locker System

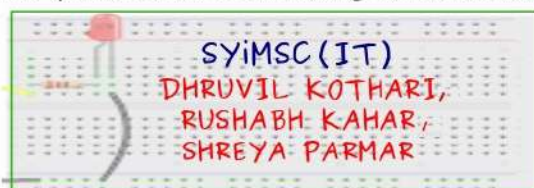
This project's main objective is to provide security to the bank lockers, house secrete areas and protect the company's confidential area. It is based on technologies like IOT, Cloud Computing, Ethical Hacking, Software As A Service (saas) and AI Assistant/ Virtual Assistant. The devices and services used for the project are like nodemcu, Photon, PIR motion sensor, Blynk application, Laser sensor, LDR light sensor, fingerprint sensor & jumper wires. For security purposes we have implemented a fingerprint sensor, if there is an authorized user then the door will open and no alarm will buzz. But if any unauthorized person tries to unlock the security system then a 50-60 random WIFI security system will be created and if anyone breaks it and enters into the room then the buzzer will buzz as well as leaser light have erupted. And the notification will be sent to the owner.



## Automated Toll Collection System

If one attempts to calculate the time taken by one vehicle at the toll gate, one can assume that a vehicle may take 60 seconds to stop and pay taxes at the toll gate so the total time taken by one vehicle in a month would be  $60 \times 30 = 1800$  seconds. In a year it will take 216200 seconds or 6hrs. So one vehicle might stop at the toll gate in one year for six hours and that to the engine of vehicle is not turned off. Further, imagine if 100 vehicle passes through a toll plaza in a day meaning 36000 vehicles stop at the toll gate. Taking 6hrs time in a year while stoping and paying their taxes and also adding pollution to the environment and wasting money and fuel. This study looks a bit convincing only if one vehicle takes one minute, but imagine if it takes 5 minutes?

The above calculation only consideres one toll plaza, what if we take in consideration 100 toll plazas. The end results is drastic. The wastage of fuel, money will increase and pollution will also increase. Automated Toll Collection System used for collecting tax automatically. In this we do the identification with the help of radio frequency. A vehicle will hold an RFID tag. This tag is nothing but unique identification number assigned. This will be assigned by RTO or traffic governing authority. In accordance with this number we will store all basic information. Reader will be strategically placed at toll collection center. Whenever the vehicle passes the toll naka, the tax amount will be displayed on the LCD display. Incase if one has insufficient balance, we are providing recharge options at tolnaka. To tackle this problem, we are alarming a sound, which will alert the authority that this vehicle doesn't have sufficient balance and that particular vehicle can be trapped. As vehicles don't have to stop in a queue, it assures time saving, fuel conservation and also contributing in saving of money.



## Micro Servo Robot

This robot can follow and learn. And this robot can repeat endlessly. It loses all its memory if the batteries are low. This makes it new all the time it is powered again. We have created an application to control this robot. According to selection input of degree via the app, the robot can drop the picked thing. There are four micro servos are used as shoulder, knee, palm & finger. The best and interesting part of this project is its feature to record the motion and pay it again in an infinite loop unless & until you press reset or pause button, after pressing reset the all old recorded moves get erased and the robot is ready for new instructions.

