UE18CS390A – Capstone Project Phase – 1

SEMESTER – VI

END SEMESTER ASSESSMENT

Project Title   : SMART PARKING SYSTEM
Project ID   : PW22SR01
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Abstract and Scope

- As we all know about the parking problems we face in our day-to-day life , with the increase in population and vehicles it has almost been impossible to find parking slots.

- With the increase in vehicles there is increase of environment hazards like global warming, air pollution etc

Abstract and Scope

- We would be implementing a Smart Parking System with the help of IOT.

- This will ease the traffic problems and also reduce environment hazards.

Problem Statement

Implementation of smart parking system using IOT.

- There would be Sensors and LED placed on-site, as soon as the vehicle approaches, sensor detects the vehicle and LED glows indicating the slot is already occupied.


- There would be a LCD displaying the number of available slots

Literature Survey

In the paper written by Anandhi T and team:

- They create a separate application for smartphone and use this application to find an easier way to get to your destination using the Bluetooth module.

- The system consist of a camera which is used to capture the number plate. Once the user books a slot using the android application the server blocks a parking slot. Then the camera captures the image and then the number plate is verified with the existing booked slots and allots the slot to the user.
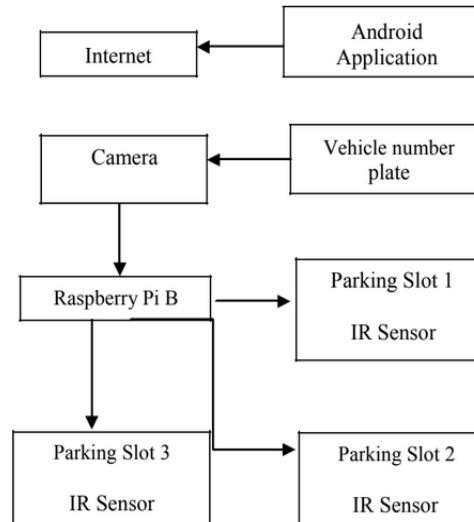
Literature Survey

- Existing System:-The current process is where a person is employed to generate parking tokens, to check the availability of parking slots, to help in getting the vehicle parked in parking slots and then to collect the parking fee. In this system, people have to wait for some time for their car to be parked.
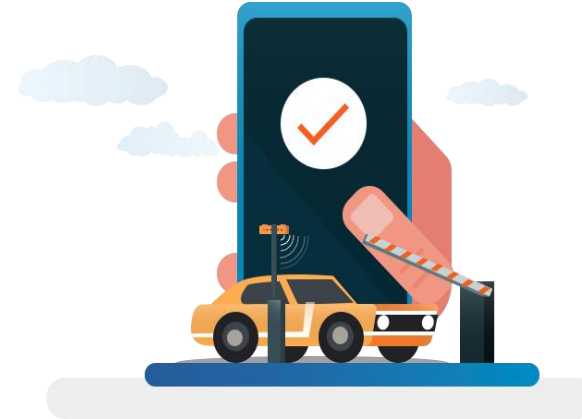

- Proposed System:-The customers can check the number of occupied and vacant parking slots and can book the parking slots in advance to park their vehicles. The vehicle information is stored securely in the server. When the car enters the parking area the camera detects the number plate of it and verifies it with the database to check for advance booked parking slots.

Literature Survey

In the paper written by Vidhya Sagar and Team

- The proposed system has micro-controller based parking lots, GSM which is used for finding available spaces and reservation of slot can be made with the help of android application.
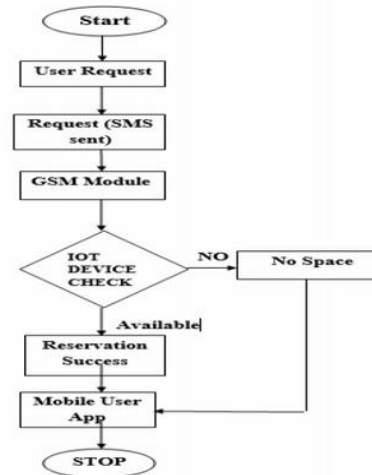
- It follows IoT device to sensor connection establishment, Raw Display with device Connection, GSM Module implementation and the Mobile Application Development.
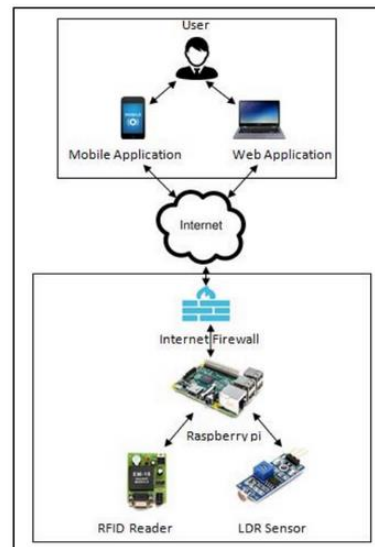
Literature Survey

- Information exchange is made to the mobile application with the help of GSM module.
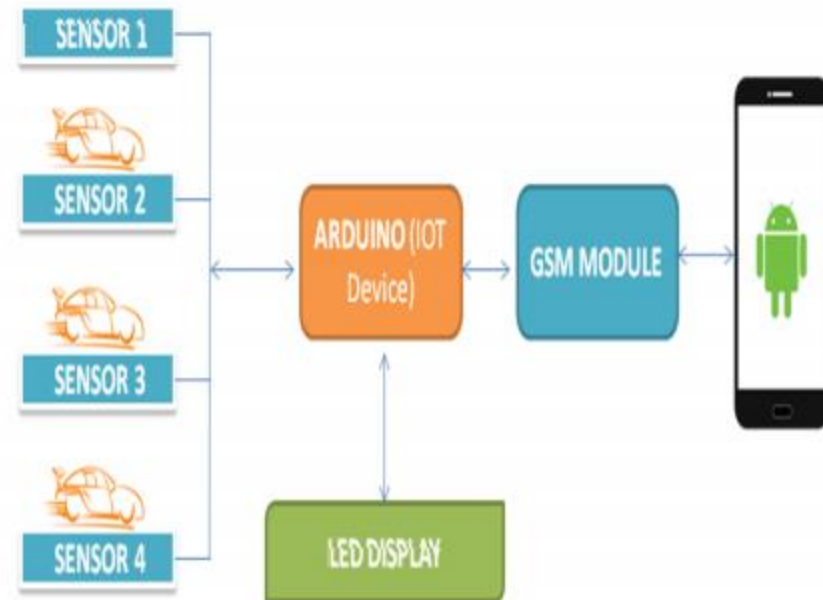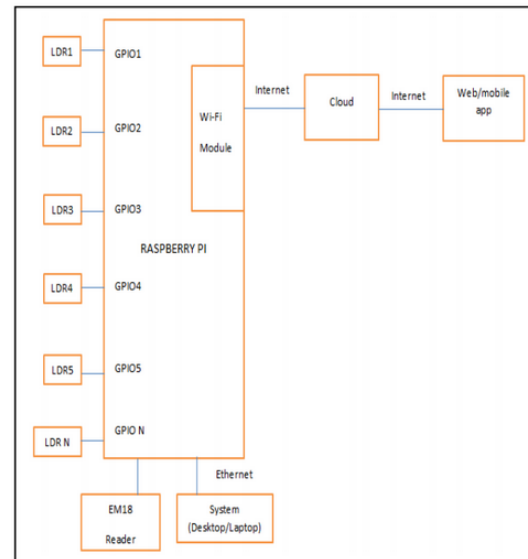
Literature Survey

In the paper written by Likith Prasanna and team:

- The application enables users to send a request to book a slot in the parking area. The user has to first register through the smart parking application which is a web application.

- Each parking slot has a light dependent resistor (LDR) sensor. If a slot is free it is booked and a SMS is sent to the user's mobile showing the slot number which is booked. A unique slot is booked for each user.

Literature Survey

- When each time a vehicle is detected the data is updated. Each vehicle is incorporated with a radio frequency identification (RFID) tags and when the vehicle enters the parking area the tag is scanned by the RFID reader. This serves the purpose of vehicle identification and calculating the amount for each vehicle parked separately. All these functions are performed by Raspberry Pi using the internet.

Literature Survey

In the paper proposed by A. Khanna and R. Anand.

- When user gets registered, all the details of the particular user are stored through the database in the cloud storage. We are using IP cameras for detecting number plate of the vehicles of the users and when the user enters, the details are extracted from the database and the user will be guided to the slot through mobile.
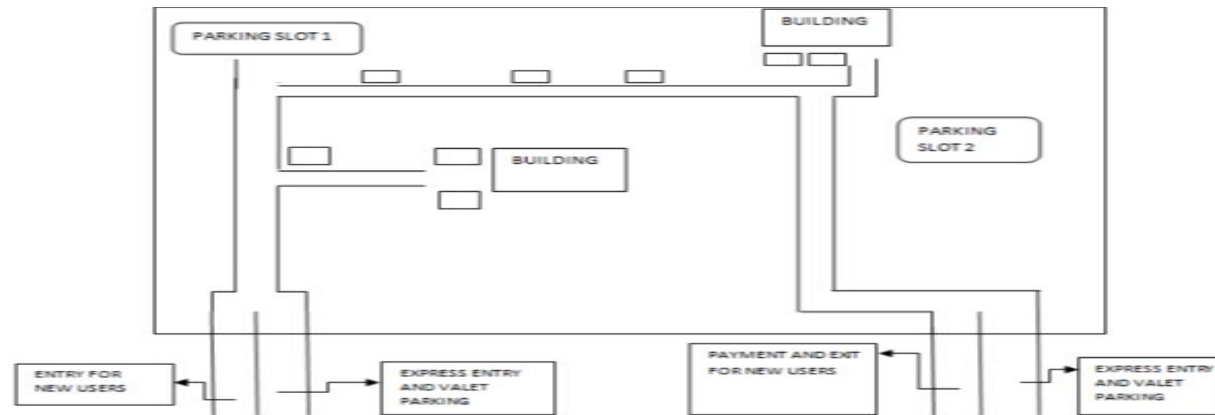
- When the vehicle enters the parking space, PIR sensors are triggered and the timer starts. When the vehicle leaves the parking space, PIR sensors are again triggered and the timer stops which is connected to the raspberry pi and the server connects to pricing algorithm.

Literature Survey

- The approach of the algorithm provides more accommodation of vehicles, user- friendly parking, less power consumption, facilitates more efficient use of space and also solutions to various problems which might occur during parking the vehicle.

- Here, sensors which are placed throughout the parking area are connected to Raspberry Pi where Raspberry pi is connected to sensors on one side and database on the other side. It works on Python platform which is user-friendly.
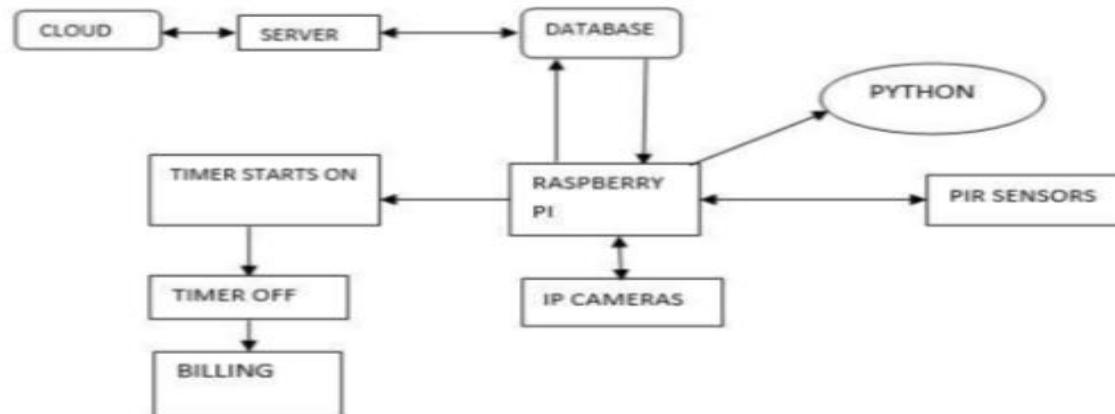
Suggestions from Review - 3

- Suggested to implement a android application similar to movie booking system where users will be able to easily identify free slot.

- As per the suggestion we will be implementing a LCD where users will be able to view the number of available slots

Design Constraints, Assumptions & Dependencies

- Stable Power Supply.

- No breakage of sensors.

- High maintenance.

Proposed Methodology / Approach

- When car arrives at the parking area, the user/driver looks at the LCD display for the number of available slots. If the slots are filled he need to exit.

- If parking slots are empty the user enters the area and looks for a empty slot by looking into Led. When LED is ON, it indicates that the slot is filled, if not, user can park his/her vehicle.

- As soon as car leaves or enters the parking slot there should be update in LCD display.
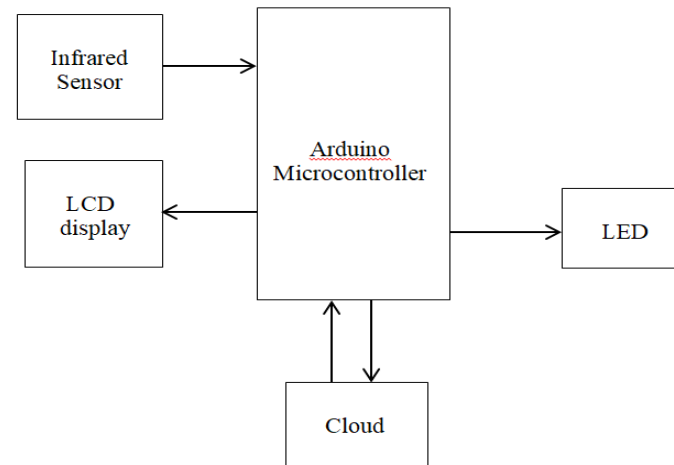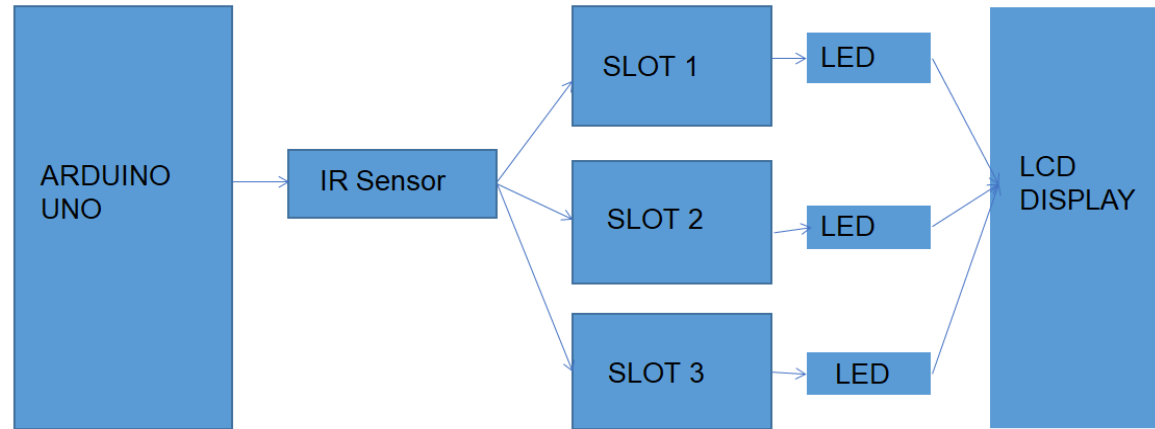
CHANGE IN APPROACH?

- If the sensors we have used now doesn't support implementation of LCD and cloud . There would be chances of changing sensors.

- DRAWBACK

  1. There would be change in system architecture.

  2. There might be a chance of new sensors not working.

Architecture

- It gives us an idea of basic system architecture of our project.

- **EXPLANATION**: Arduino Uno will be having IR Sensor connected to it and will be placed at every slot in parking area. All the slots in parking area will be associated with LED and there would be LCD display outside parking area.
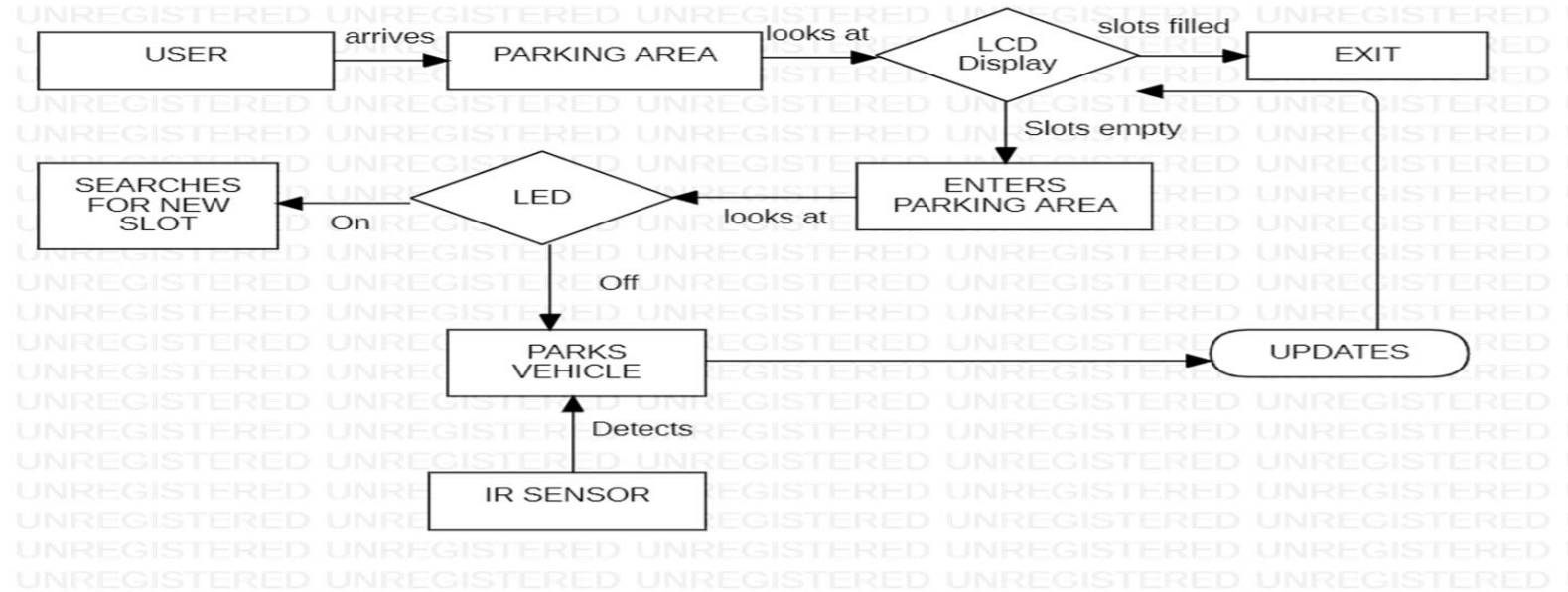
USE CASE DIAGRAM
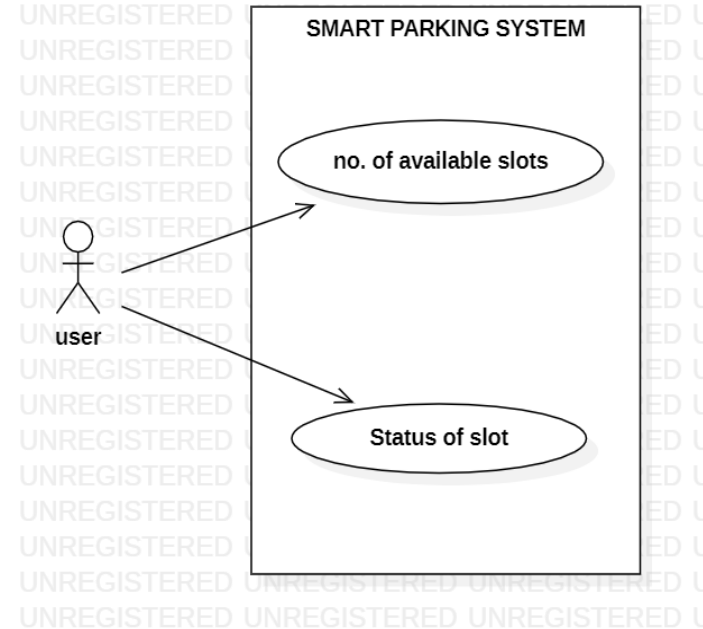
- **<u>EXPLANATION:</u>**
1. This shows the interaction between the user and our system.
2. For user visibility, they will be able to see the status of parking slot through LED and total number of available slots in LCD

E-R DIAGRAM

- This diagram helps us in understanding overall working of our system.
- **EXPLANATION:** when user arrives in parking area he/she will first look at the LCD Display if slots are filled he/she may need to exit, in case slots are empty he/she enters parking area. They will next look at LED, if LED is glowing then he needs to search for a new spot if its not the user can park their vehicle.

CLASS DIAGRAM
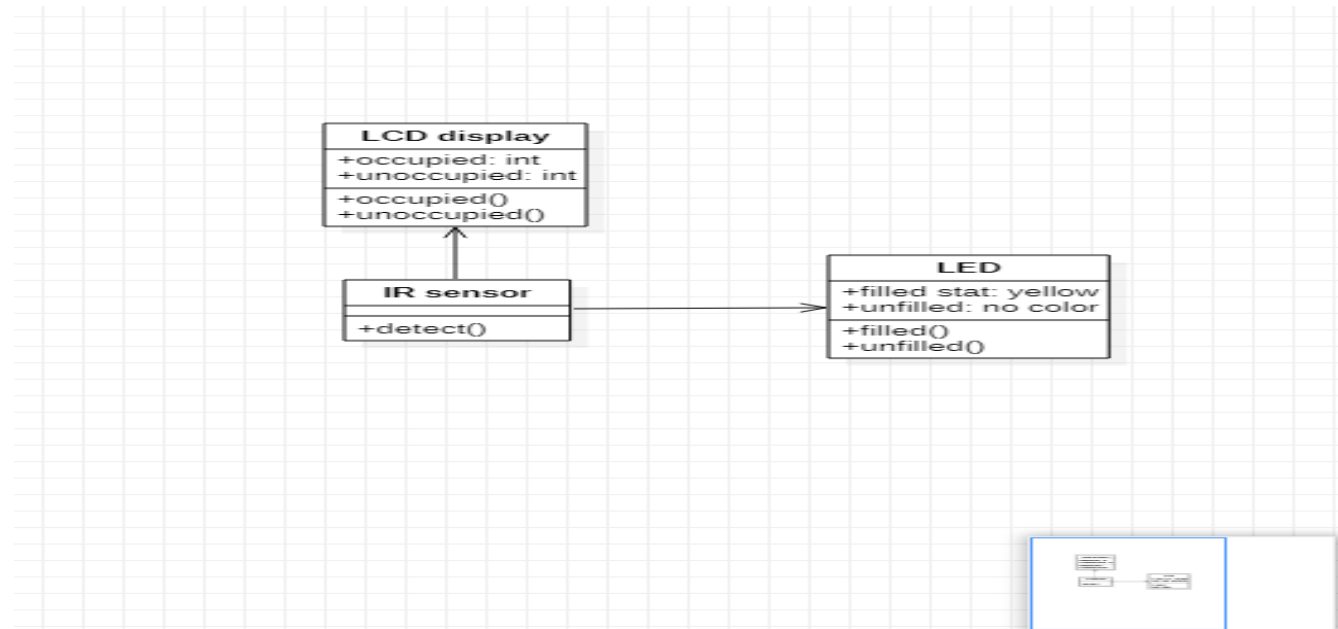
- This diagram helps us to understand the dependencies between different classes.
- **<u>EXPLANATION:</u>** Here IR sensor will act as dependency class to LCD display and LED.

Only if IR sensor detects the presence of car there would be update in LCD Display and LED.

Technologies Used

- Arduino UNO

- OS: Windows/ linux / MAC any version with arduino installed.

Project Progress

- We have successfully completed smart parking for one slot.

- We would be updating LCD Display with available number of slots.

- We have completed 40% of our project.

Walkthrough

- https://drive.google.com/file/d/12WvwBu7GGJowG3ZansvIH-v-r2jIMAa1/view?usp=sharing

Summary of work done in Capstone Phase-1

- We have completed the real time implementation for one slot.
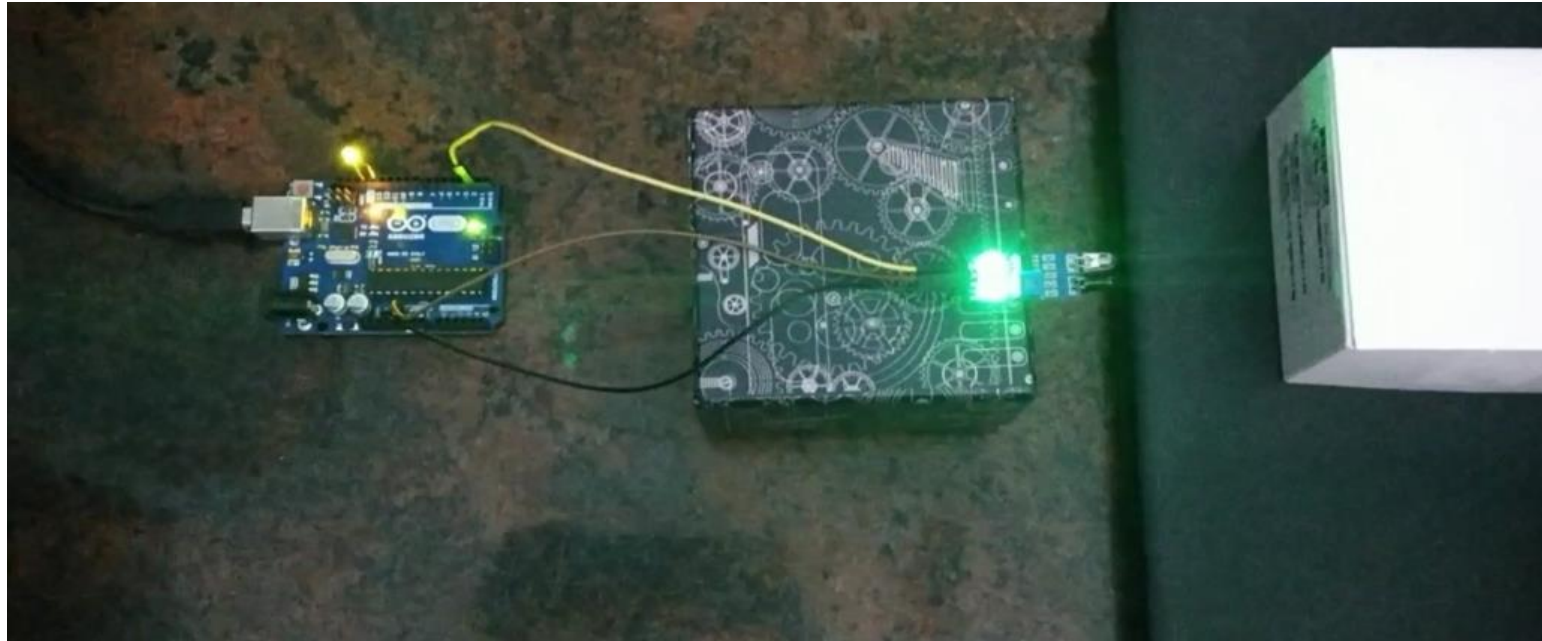
Project Plan for Capstone Phase-2

- We would be implementing LCD display where it should automatically update the number of available slots.

- Our current system is only for parking of vehicle. We would be increasing the number of slots.

References

- Mahendra B M, Dr.Savita Sonoli, Nagaraj bhat, Raju ; Raghu T ,"IoT Based Sensor Enabled Smart Car Parking for Advanced Driver Assistance System" in IEEE International Conference On Recent Trends in Electronics Information; Communication Technology (RTEICT), May 19-20, 2017.

- Anandhi T, Kishore Kumaar V.S, Maha Ganesh S ; Gomathi R.M, "A Sustainable Vehicle Parking using IoT" in Proceedings of the Third International Conference on Trends in Electronics and Informatics (ICOEI 2019).

- Likith Prasanna P, Karthik K, Nandakumara R P, Nagarjuna N ; Prof.H.D Kallinatha, "A Smart Parking System using Internet of Things with Automated Payment System for Smart Cities"in IEEE International Conference on Recent Trends in Electronics, Information;Communication Technology (RTEICT-2018), MAY 18th-19th 2018.

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- Dharmini Kanteti, D V S Srikar and T K Ramesh, "Smart Parking System For Commercial Stretch In Cities" in International Conference on Communication and Signal Processing, April 6-8, 2017, India.

Thank You