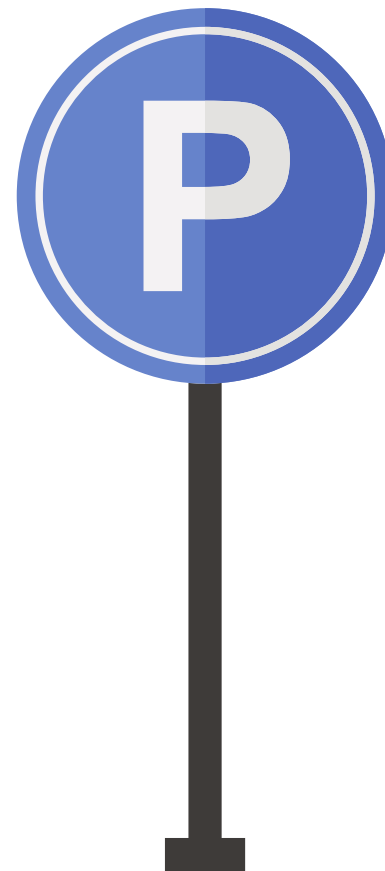DIY GROUP PROJECT

IOT BASED CAR PARKING MONITORING SYSTEM

P

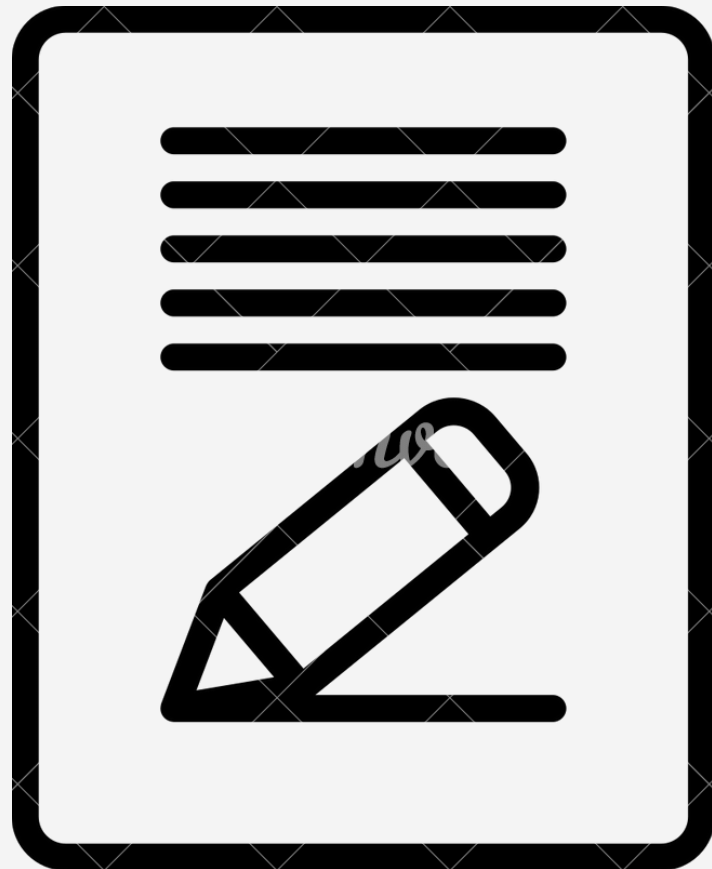TEAM-1

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Contents of the Report

anknowledgement

We are extremely grateful to our mentors Mr. Vikrant Rachlera , Mr. Sandeep Saha , Mr. Jayan Coral , for their advice and guidance without which this project would not have been complete. We'd also like to express our gratitude to all of the TAs for their support and assistance in making this initiative a success.
 Also, we would like to thank our parents for their support and patience. Thanks to all of our fellow batchmates and seniors who advised and assisted us when we needed it, fellow group members for standing by each other and fighting the odds together.
Ultimately, we would like to thank the supreme power for providing us strength to face all the obstacles and challenges.

motivation

Now a days the number of personal vehicles usage is increasing on a large scale. People prefer personal vehicles than public transportation. It is very difficult and frustrating as well to find parking space in most metropolitan areas, especially during the rush hours. It is often costly in almost every major city in the world to find proper and secure parking space. Due to this there is a need to provide sufficient parking places providing plenty of slots to help the user park his vehicle safely. The aim of this project is to propose a design of IOT based smart Parking System that regulates the number of cars to be parked on designated parking areas and hastle-free mobile phone booking.

Issues of available smart parking models

High cost of maintenance and installation : The components required for maintaining and installing the system are all very expensive and need to be maintained regularly as its all automated and may go wrong at any time.

Breakdown of tech system: As the parking system is based on software so it may breakdown at some point and may cause issues with parking of cars parked at wrong slots and so a human surveillance is also needed almost all the time.

Operation: A lot of people are not familiar with using smart parking systems and may only cause further complication in the operation of the system.

Knowledge of the infrastructure of the building: There must a small amount of knowledge of the infrastructure for the people parking there and also for the staff for the smooth running of the system
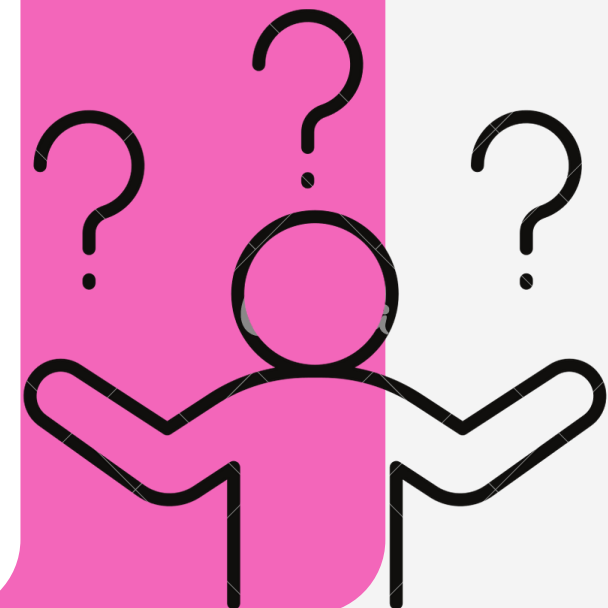
Our Proposed Model

Our product improvises the idea of this concept adding a gate allowance system for controlling traffic of cars in and out of the parking slots and it displays the the slots available directly on a screen installed near the gate. The drivers can select the slot they wanna park in and We also are thinking of improvising this concept even more by directing the specific car to the parking slots.

Our idea rules out the idea of needing an app for the system to function as it can also function even from parking pace directly.
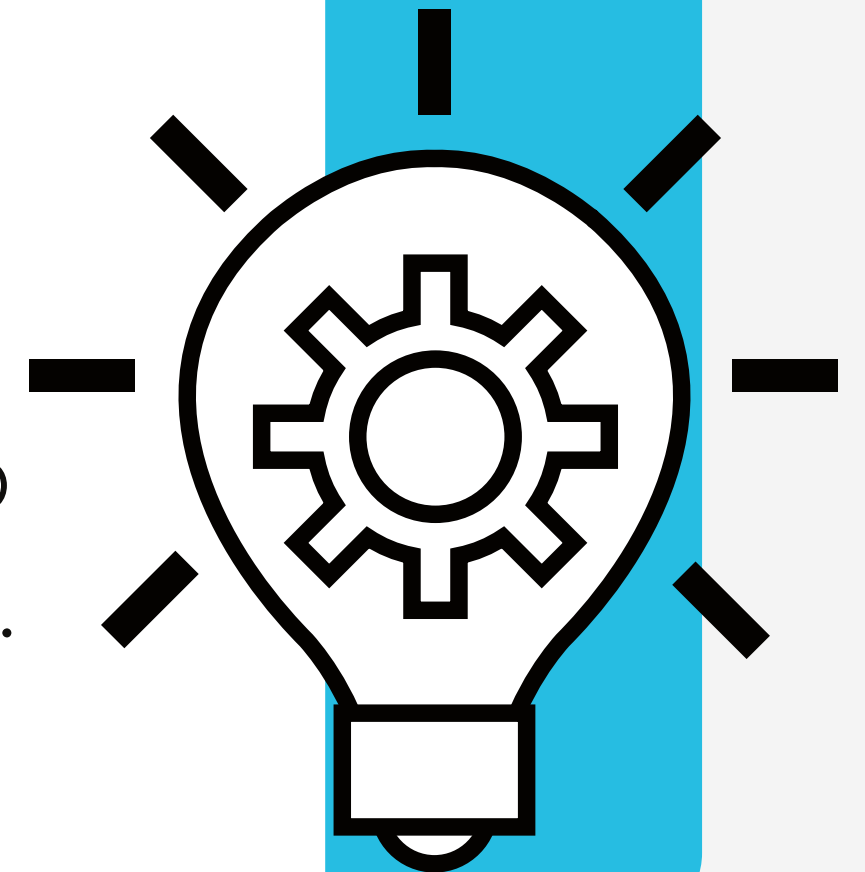
INTRODUCTION

Smart Parking is a solution to all traffic problems we can reduce the human effort and also provide a more secure and fast working parking stations. Now people doesn't have to waste their fuel, time and money in searching for the parking spaces. They can easily find the nearest available parking space through their application they don't have to go and check every parking station for searching empty parking lots. They also have the option to book the parking slots from the application. This will help the owner of Parking Station to check the statistics of their parking station from analysing the previous data.

1 Centralised Server

Maintains databases which contain information about parking spaces present in the city.
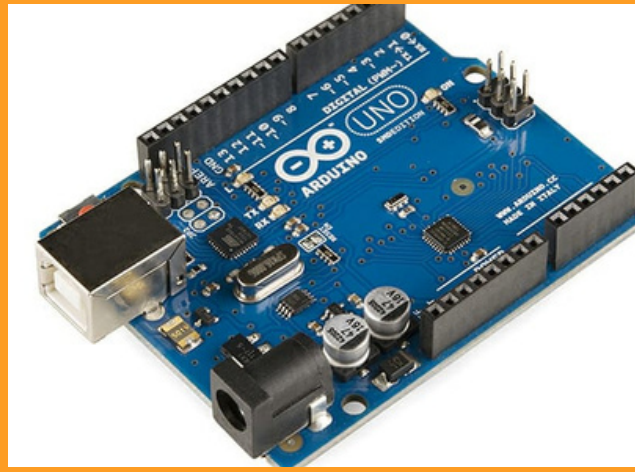
2 User Device

User can connect with the smart parking system with their smart phones or with some browsers.
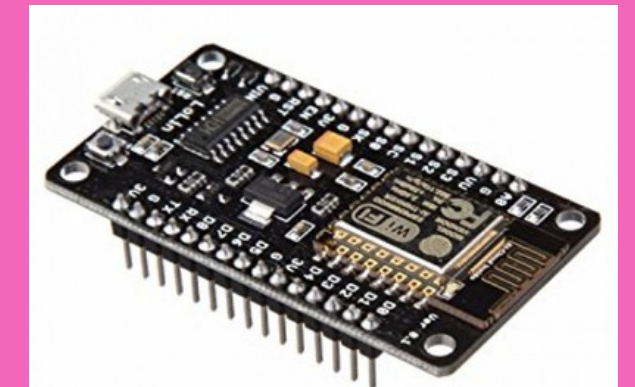
3 Automated Entry

Automated Entry that allows only pre booked slots and also a real time display
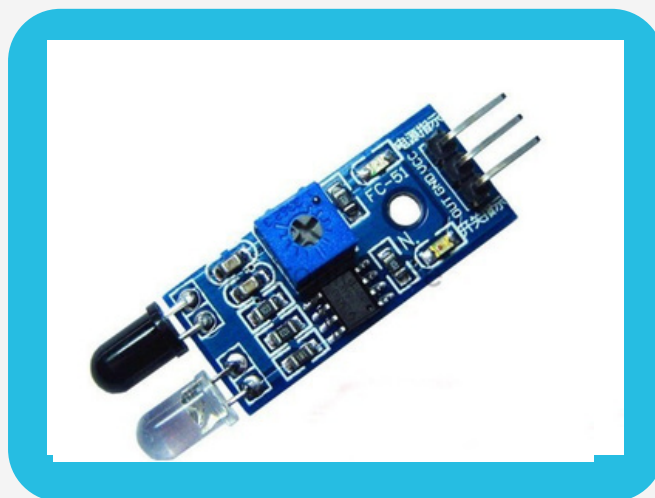
COMPONENTS USED

Arduino Uno R3

It is a micro controller based on the ATmega 328P. It will be controlling the sensors,servo motors and other devices used.

NodeMCU ESP8266

This is the Nodemcu ESP8266 wifi module, with the help of this module we can monitor the car parking slots from anywhere around the world. It is an open source IoT platform .We will configure it with the mobile app to monitor our system.

Infrared Sensor

An Infrared sensor is an electronic device that emits in order to sense some aspect of its surroundings .It measures the distance by using IR waves in time between the emission and reception.
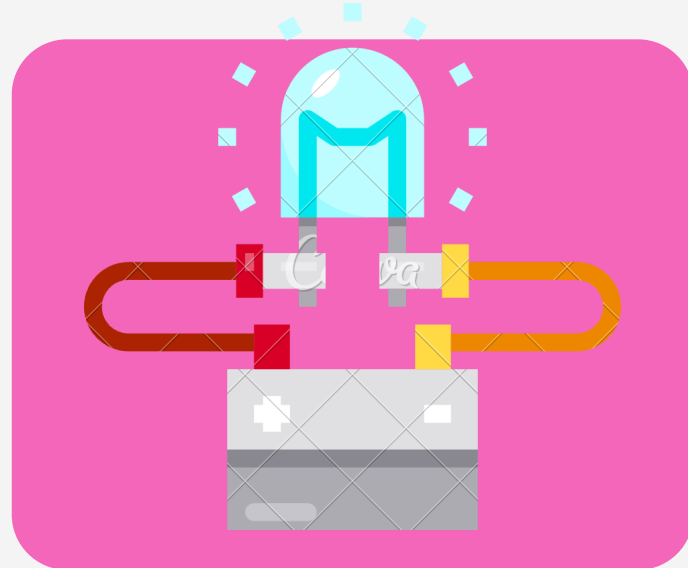
→

COMPONENTS USED

Servo Motor

A servo motor is a rotatory actuator or linear actuator that allows precise control of angular or linear position, velocity, acceleration. In our proposed system we will be using it at entry-exit gates. It has an operating voltage of 5V and operating speed of 0.12 sec\60 degree and torque of 1.8 kg-cm.
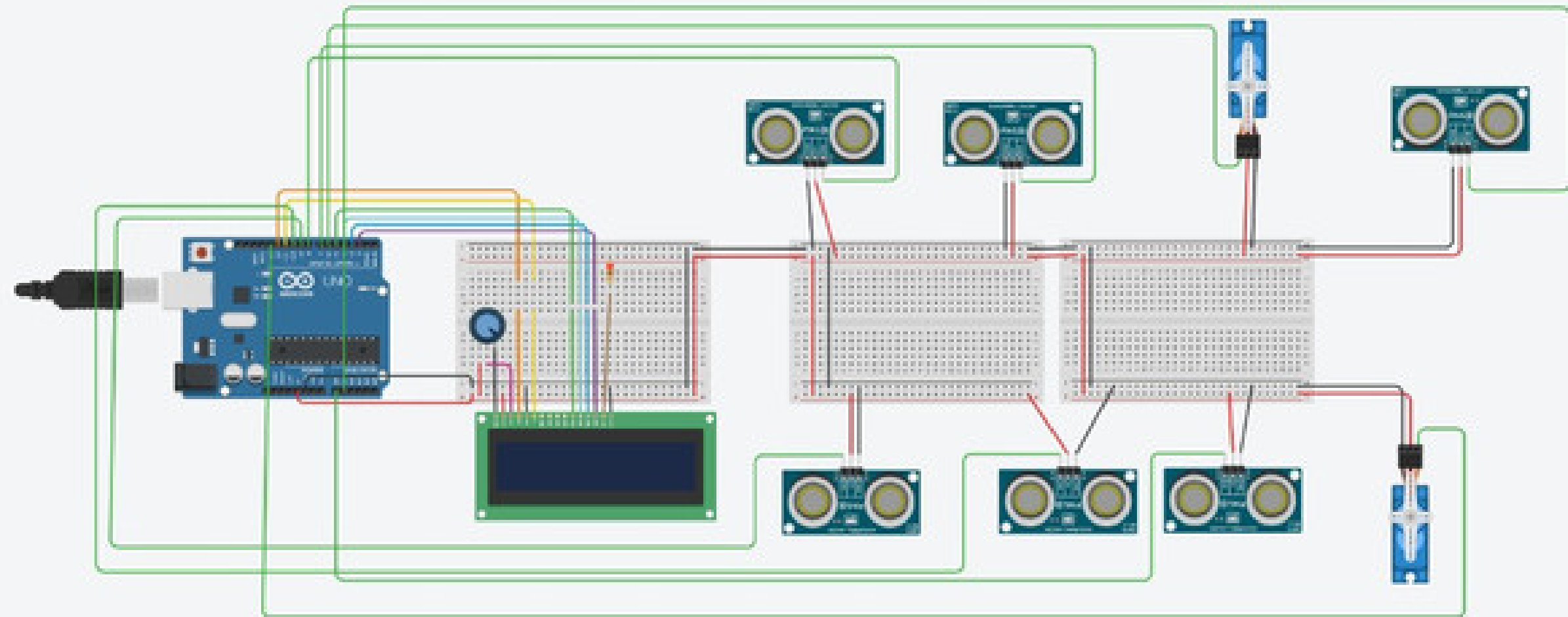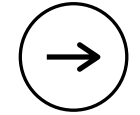
Other Components

Jumper Wires
breadboard
cars and some others necessary for whole hardware setup

TINKER CAD CIRCUIT DIAGRAM

All connections are done to Arduino ,breadboard houses the connections. A LCD Display for showing the slots available.

Four IR Sensors present at one parking slot each and two IR Sensors and servo motors at entry and exit gates.

WORKING AND CONSTRUCTION

We have made a IOT based car parking system using Arduino, Nodemcu esp8266 wifi module, and Blynk application. With the help of the Nodemcu esp8266 wifi module and Blynk application, the parking slots can be monitored from anywhere around the world. In this Tutorial, you will also learn how to use the tabs and led widgets in the Blynk application.

Parking has 4 Slots and every slot has one infrared sensor. So we have a total of 4 infrared sensors. Each sensor is used to detect the presence of Car in the Slot. These infrared sensors are connected with the Arduino. So when a car is parked in the slot, the Arduino sends a command to the Nodemcu esp8266 wifi module, then Nodemcu then sends the command to the Blynk application.Two IR sensors and servo motors at the entry and exit gate .

Process flow

Microcontroller transmits trigger pulse to sensors.

Microcontroller receives analog signal from sensors.

Microcontroller program sends the parking information to the cloud .

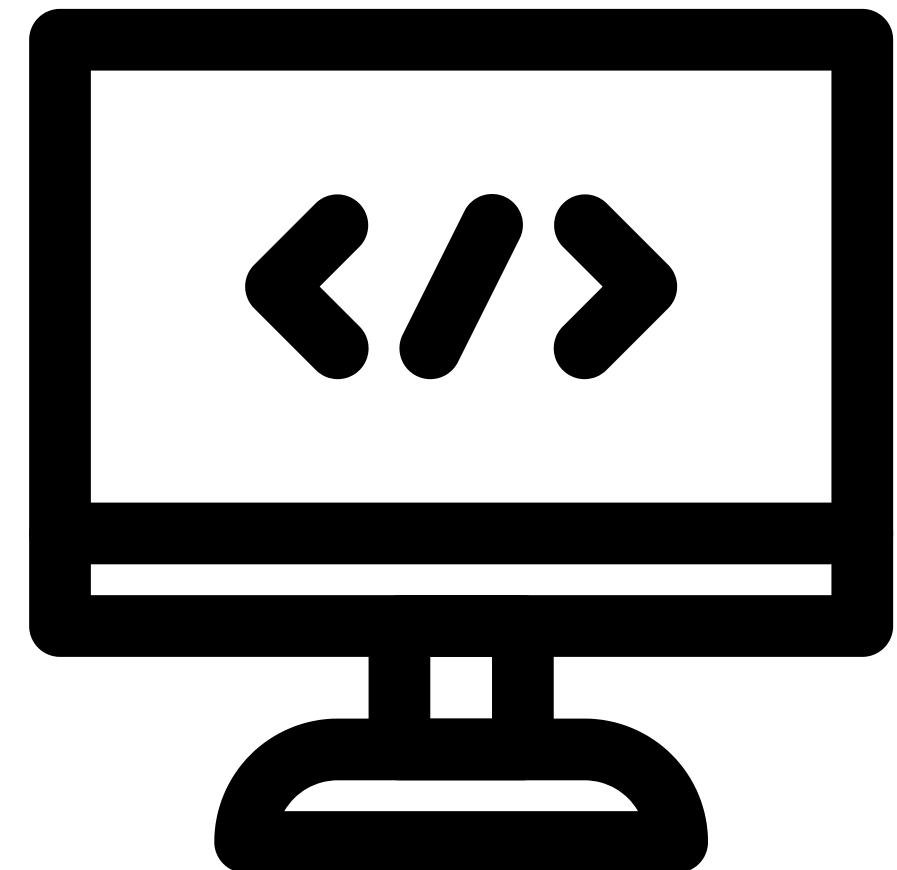Mobile app gets the data from the cloud about free car parking slots.

PROJECT CODE

Code is loaded to Arduino and ESP Module using Arduino IDE.

A Drive link is attached here which contains zip file of both codes.

→

Arduino CODE

NodeMCU CODE

LINK------> **extras - Google Drive**

BLYNK

What is Blynk Application

The Blynk App, which is available for both Android and iOS, **allows the user to create intuitive interfaces for their projects**. The Blynk Server is responsible for the communication between your hardware like Arduino and your application on the smartphone.
We will be using the application for getting the available parking slots and booking.

Blynk Set Up

First you have to setup a project in Blynk app in your smart phone. After setting the app you will receive an AUTH TOKEN which has to be provided in the code.
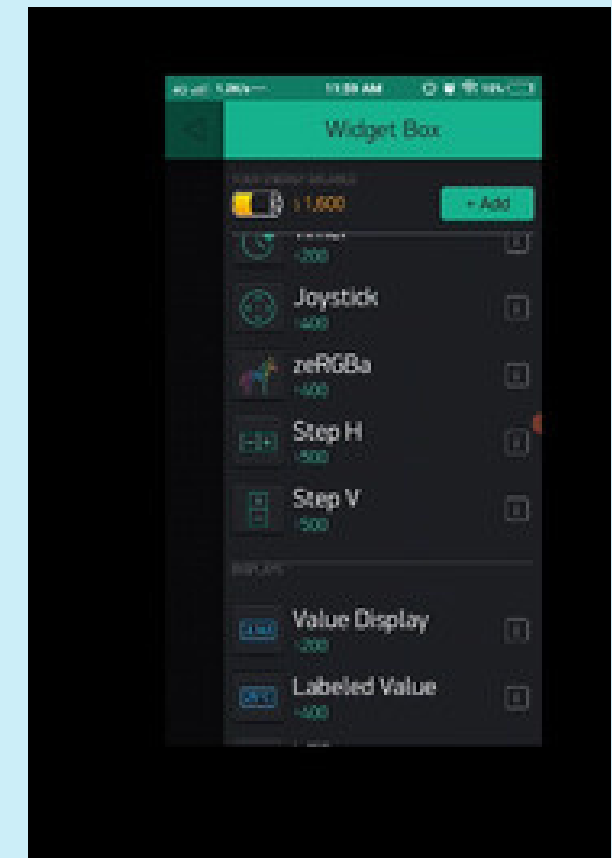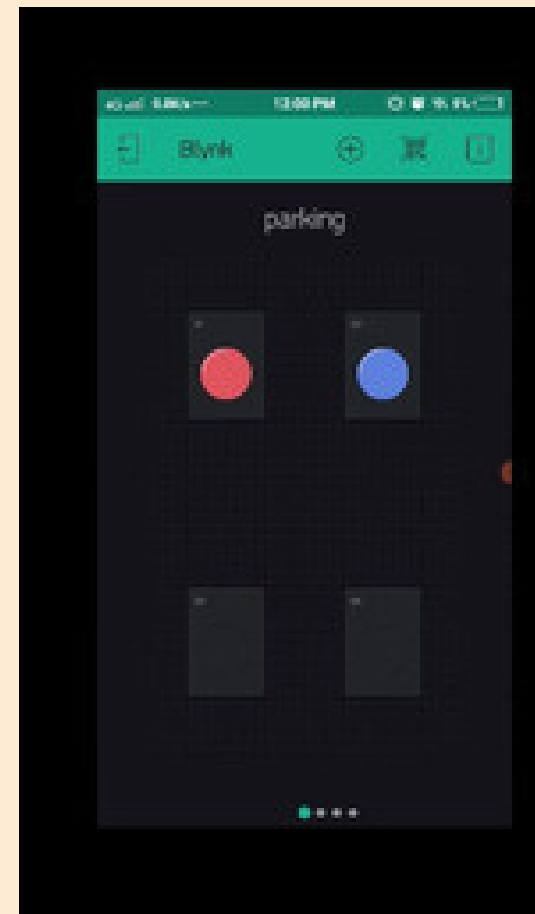You can download the Blynk app from below links based on you mobile OS platform.
- **iOS**
- **Android**

Open blynk app, register with an email ID and then login.
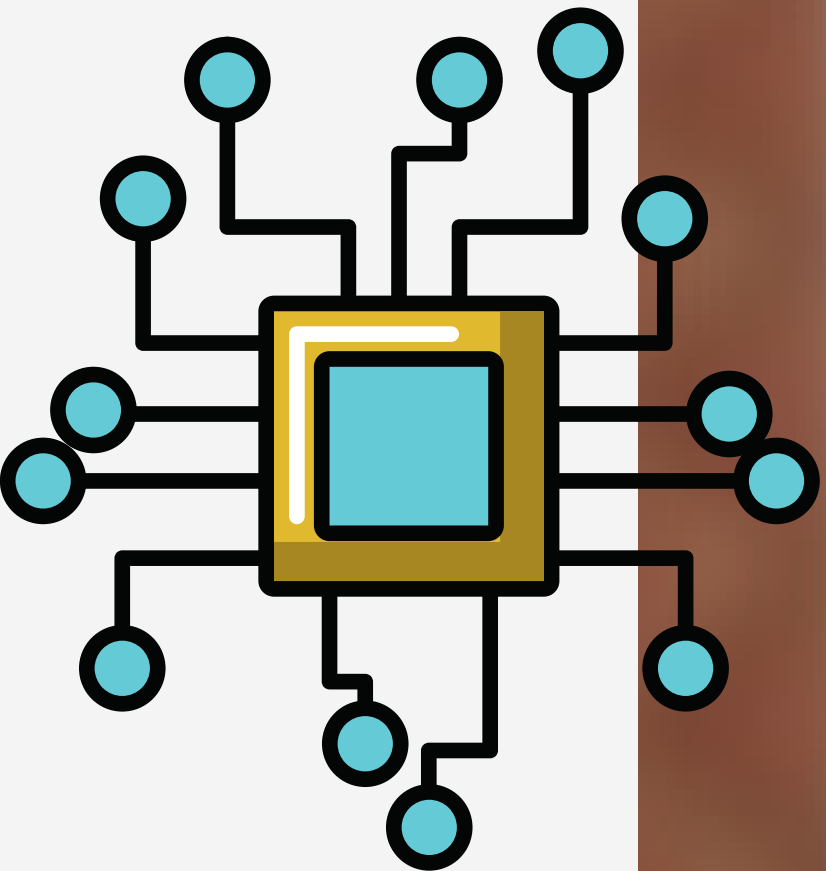After logging in we will create a project.

Creating Parking

Connecting to Cloud

Hardware Assembely

Two IR Sensors and servo motors are present at entry gate and exit gate and are connected to Arduino .Four infrared sensors are used as you can see all Arduino pins attached sensors. The VCC pins of the infrared sensor are attached to the 5v of the Arduino. Grounds are attached to the ground of the Arduino while pin connects the out pins of all the infrared sensors. The tx and Rx pins of the Nodemcu module are connected to Arduino's pin2 and pin3. The voltage controller output is connected to the 5v nodemcu Vin pin power supply based on the lm7805 voltage controller and tw0 470uf capacitors are attached to the controller output and input. In series, a 330ohm resistor is connected to a 2.5v led. This is a resistor that is currently limited. Although J1 is a female dc socket,
you can attach a 12v adapter or battery to the nodemcu module for power-up with your laptop or USB device I'm going to use two USB cables, I'm going to use the cable to power the Arduino, and the other USB cable to power the nodemcu.
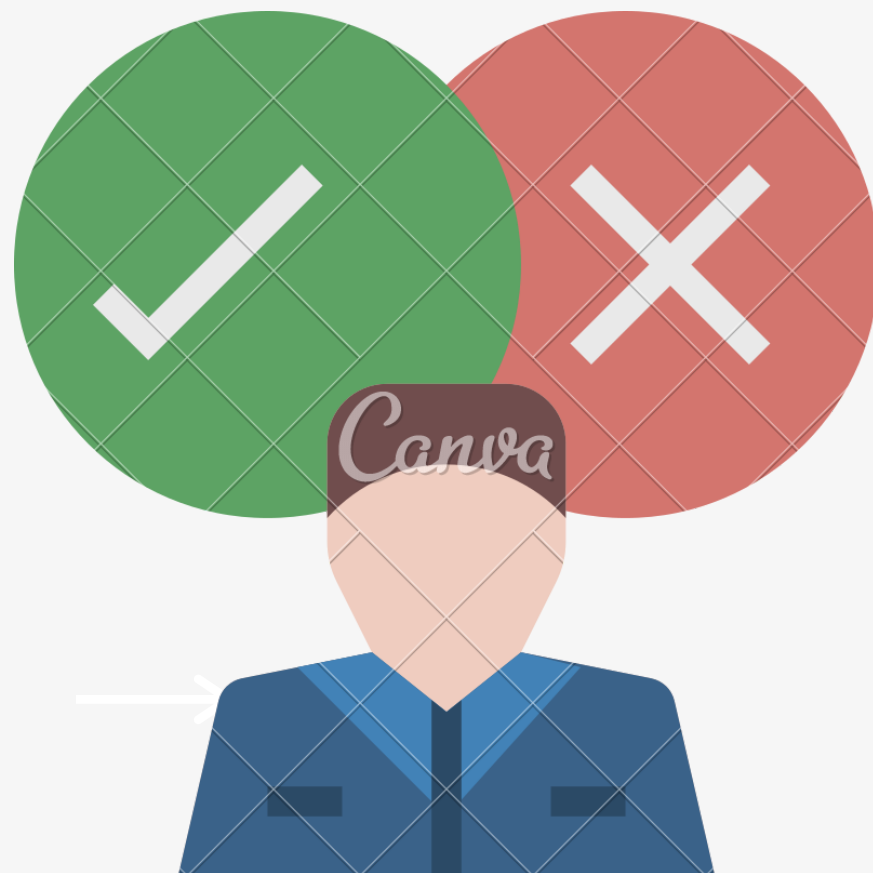
Demonstration

Here We are attaching the youtube video link of full demonstration and explanation

https://youtu.be/F-EUDLi7ciU
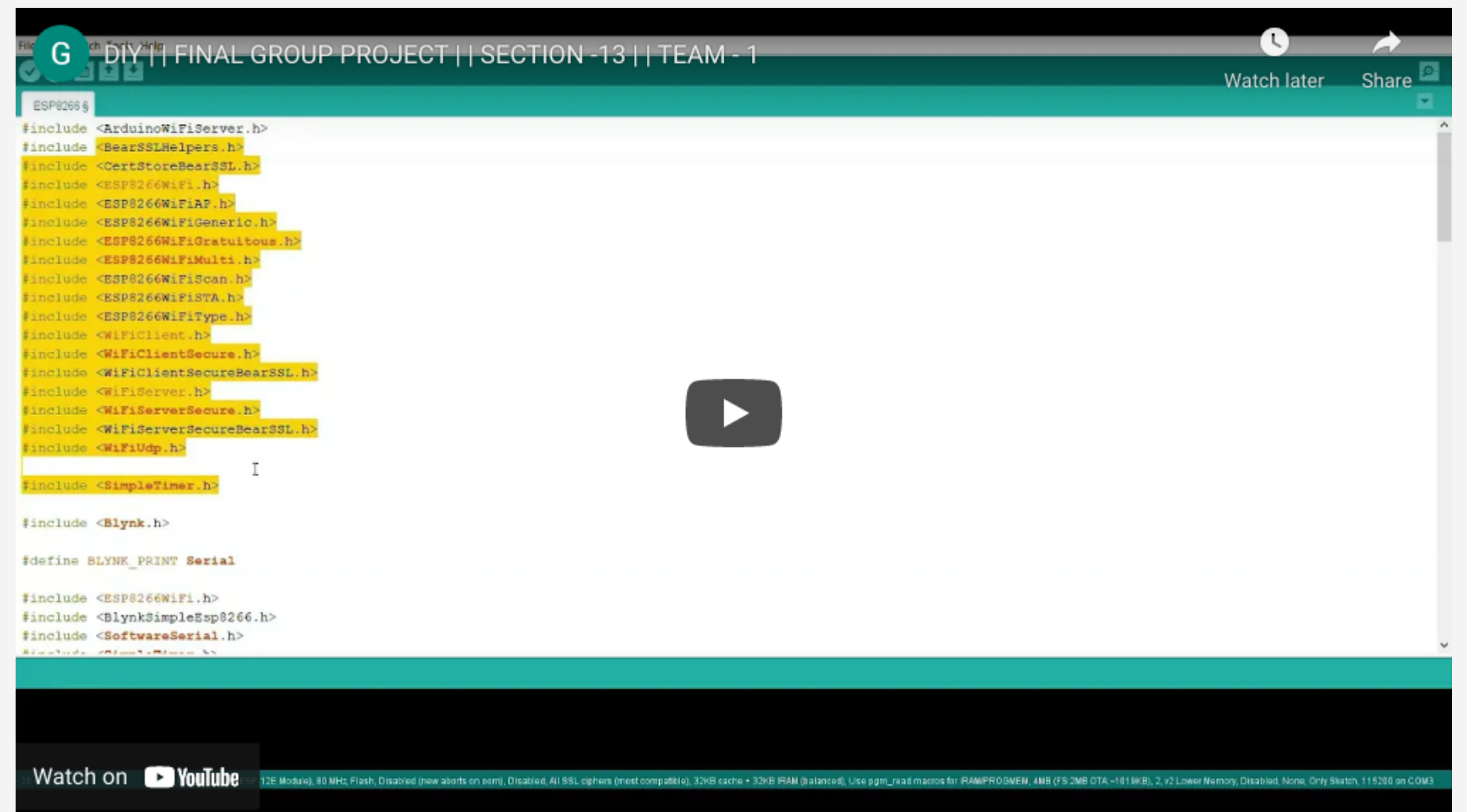
Major Outcomes of Our System

1
IOT based Car Parking System can be used at all the parking areas include commercials, Industries, and Offices and will save time a lot.

2
The System will help to read the statistics and manage man-power accordingly. Drivers can book parking slots at convience of their phone.

3
Smart Parking systems can include real-time and electronic payment methods via an app or a browser. This makes the parking experience far easier and provides more structured data to income streams (i.e. Categorising revenue by parking facility, area, road, etc).
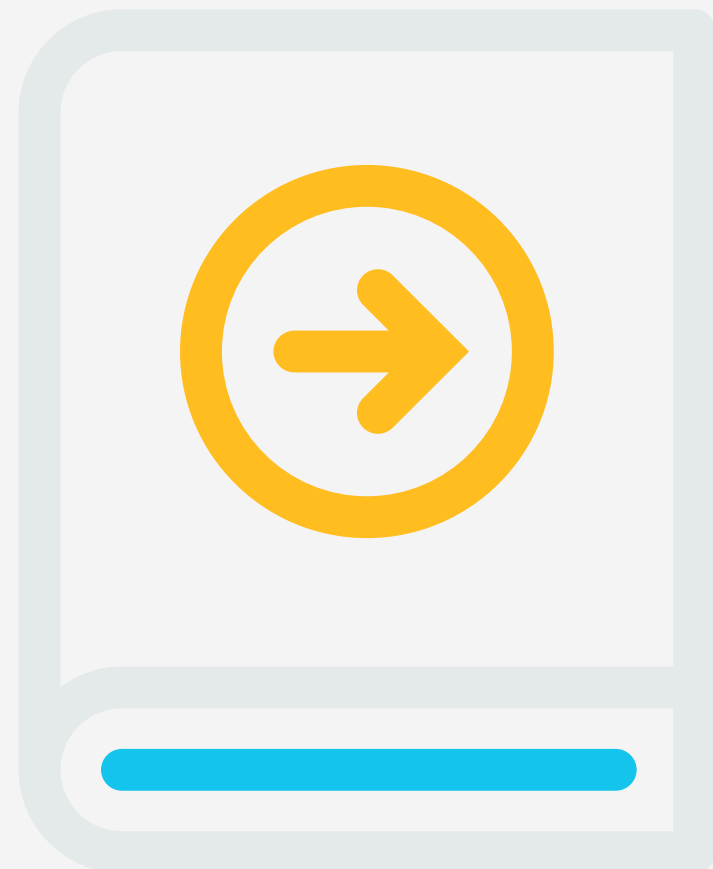
REFERENCES

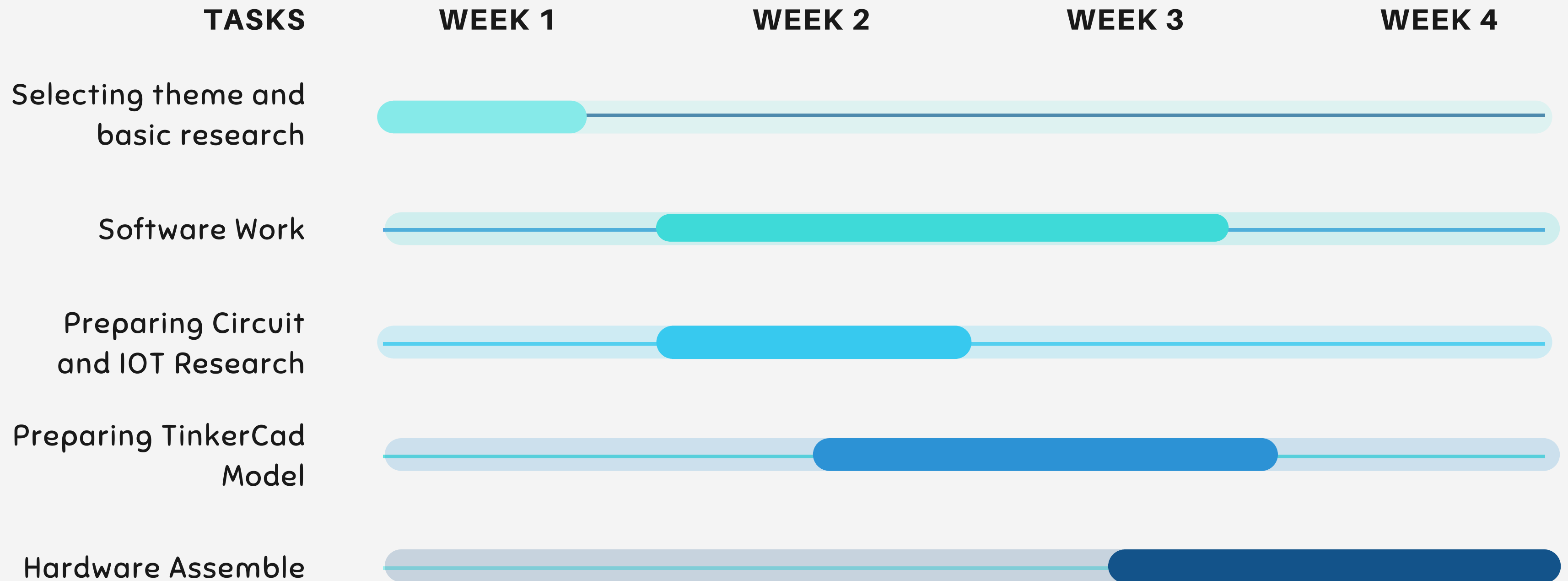www.electroniclinic.com,www.iotdesign.com, different site sources for IOT Projects.

M. Fraifer and M. Fernström, Investigation of Smart Parking
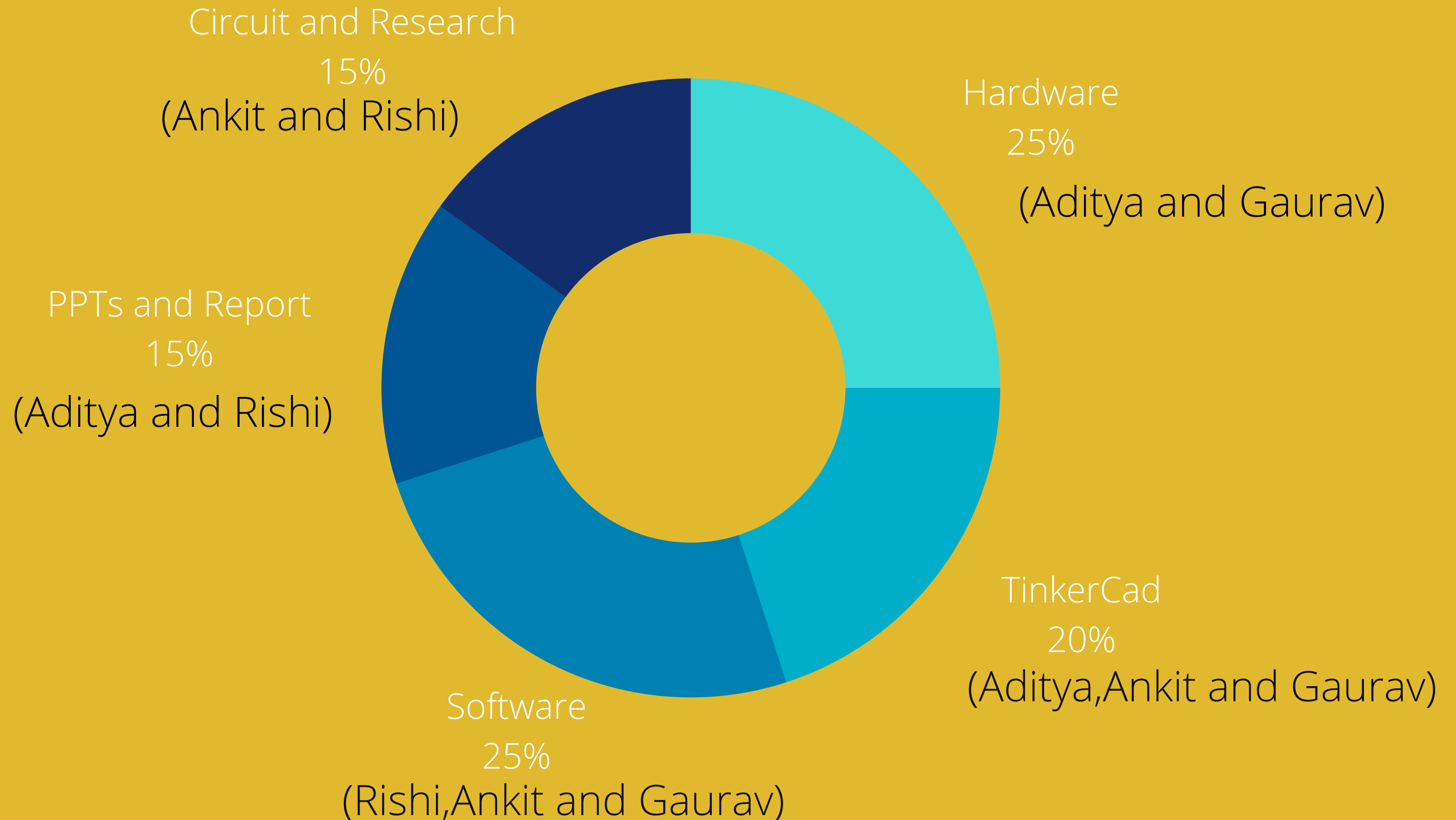Systems and Their Technologies, pp. 1–14, 2016.

S. Nandyal, (2017). Smart Car Parking System using Arduino
UNO, vol. 169, no. 1, pp. 13–18.

Week-Wise Progress

TASKS	WEEK 1	WEEK 2	WEEK 3	WEEK 4
Selecting theme and basic research				
Software Work				
Preparing Circuit and IOT Research				
Preparing TinkerCad Model				
Hardware Assemble				

WORK DISTRIBUTION

Circuit and Research
15%
(Ankit and Rishi)

Hardware
25%
(Aditya and Gaurav)

PPTs and Report
15%
(Aditya and Rishi)

TinkerCad
20%
(Aditya,Ankit and Gaurav)

Software
25%
(Rishi,Ankit and Gaurav)

THANK YOU