

SMART PARKING SYSTEM IN MALLS

A COURSE PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report titled “SMART PARKING SYSTEM IN MALLS ” is the bonafide work of “G SAI TEJA [RA2011029010042];KOLLI SAI JAHNAVI [RA2011029010045]; R V V KRISHNA [RA2011029010063]” who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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ABSTRACT

Smart Parking makes use of sensing devices such as vehicle counting equipment, cameras, sensors installed in pavements, etc. to discover occupancy of the parking lot. The strong sensing systems are being built to examine and transfer the data to the database in real time. The system increases the accessibility of parking with the use of sensors. The sensors placed in the pavement of the selected parking spaces to recognise if parking slot is occupied or vacant.

Sensors communicates with gateway and that data will be push to the cloud. Sensors then immediately show the availability of parking slots. This can be viewed on the APP or the sensors placed on the parking slots so drives can easily identify the space.

Smart Parking is one of the most acquired and developing Smart City Solutions across the world. Airports, shopping malls, universities and city garages etc are just a few establishments that have started to realise the remarkable benefits of automated parking technology.

Some solutions will enclose a complete suite of services such as parking time notifications, online payments and even car searching functionalities for very huge lots.

INTRODUCTION

2.1 Objective of the Project

The smart parking management system makes parking management ease in shopping mall. This system will make availability of parking during weekends/rushing hours in shopping malls. This system includes two steps. One is pre-reservation of parking for vehicle owners, and the other is parking management system for vendor. Smart parking system will provide current parking availability status for vehicle owners.

If available, they can reserve the parking after making online payment or else they can find another parking area. The application used by parking management will manage all parking areas and will be used for making reservation on entry of vehicle. This will be very helpful in saving the time and a lot of efforts for finding a space to park the vehicle, especially during the weekends. User can connect to the smart parking system from anywhere with their smart phones in any browser. And this information is also available to the parking operators to determine the free parking areas, and statistics can be measured at different times in a day on each parking space.

2.2 Purpose

Smart parking solutions enable the municipalities to manage and reduce parking search traffic on the streets. This technology also ensures parking safety, but its major contribution to traffic congestion are the factors of making the parking experience faster, more convenient and hassle-free.

The basic objective of a smart parking solution is to identify a vehicle's presence or absence in a particular parking space with a high degree of accuracy, and to pass on this data into a system for visualization and analysis – to be available for parking asset managers and/or enforcement officers.

LITERATURE SURVEY

Title of the paper	Year of the paper	Inference from the paper
Smart Parking System using IoT Technology	2020	The distributed sensor network consists of Dual Technology Ultrasonic and PIR sensors for detecting the incoming vehicle and illuminates the aisle lights. The Parking Sensor detects human presence or vehicle presence in any given area. It operates on both Passive Infrared and Ultrasonic technology In case of a multi-storied parking system. With help of a display mounted on each entrance, user can decide on which level to park.
Web-based framework for smart parking system	2021	In this framework. We have online booking for the vacant area for car parking. It is a payment mode which we need to pay to get a parking lot. By sensors the parking spaces will be notified whether occupied or vacant Then the parking lot status will be updated scanning the number plate of the car the electronic gate automatically check the entry and In case the number plate issues the driver can give booking number.
Intelligent Vehicle Parking System (IVPS) Using Wireless Sensor Networks	2021	Intelligent Vehicle Parking System using sensors are modeled for the Smart parking system with real time scenarios. Wireless autonomous sensors plays a vital role in building the intellectual based smart parking system.
A Smart Parking System: An IoT Based Computer Vision Approach for Free Parking Spot Detection Using Faster Method	2022	The main motivation of this project is to reduce the time taken for finding parking slot in crowded and public places, sometimes it take an hour to find parking slot in specified location due to traffic congestion. Due to this, it burns lots of fuel. Also burning of fuel emits lot of harmful gases which affect the environment by means of pollution As the state-of-art in smart parking system, Srishti Nene et al., started incorporate the employment of varied forms of sensors like Radio-frequency identification (RFID), image sensors, Infrared sensors (IR), supersonic

3.2 Scope of the Project:

The system benefits of smart parking go well beyond avoiding the needless circling of mall blocks. It also enables malls to develop fully integrated multimodal intelligent transportation systems that do not rely on cars in the first place. In future, the system can be extended which is not only specific to a private parking like Malls, Company parking, etc. but also can be implemented over various multiple platforms such as public parking also extending the feature by giving parking information based on cost in real time. This will make the management of the parking spaces more efficient, by purging the need of human labour.

REQUIREMENT ANALYSIS

4.1 Software Requirements

- 1) TinkerCAD
- 2) Cisco Packet Tracer

4.1.1 TinkerCAD

Tinkercad is an excellent tool that allows users to simulate Arduino-based systems. For our project the hardware setup for the gas detector can be easily setup and coded using Arduino in the TinkerCAD Platform. The setup is simple and enables us to test codes without actual physical implementation.

4.1.2 Cisco Packet Tracer

Cisco packet tracer enables developers to view the flow of data packets and carry out analysis on the data packets transmitted in the IoT network. All the IoT devices on Cisco Packet Tracer can be run on standard programs or can be customized by programming.

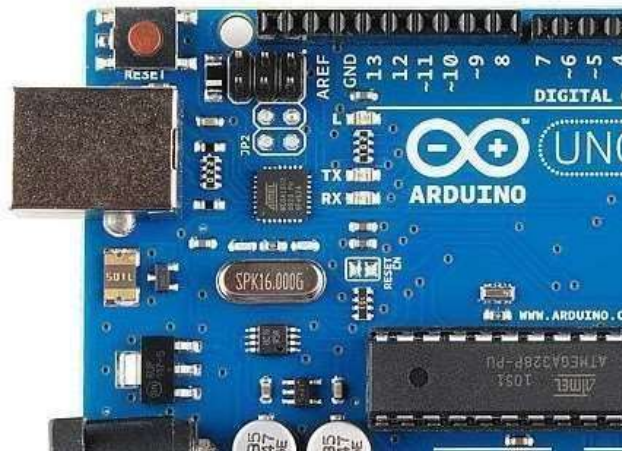
For our project we will use Cisco Packet tracer to simulate the IoT network so that an abstract view of the deployment can be obtained without the use of physical sensors Cisco Packet Tracer provides users with an array of sensors to work with such as temperature, humidity, smoke etc. it also has variety of actuators which covers our project's requirements sufficiently.

4.2 Virtual Hardware

Since this project uses an array of sensors, virtual versions of them have been deployed and used in the implementation.

4.2.1 Arduino

This system is capable of finding the empty slots that are available for parking automatically. If the slot is empty in the automated car parking the new vehicles are allowed to enter the parking else the entrance is blocked by using the servo barrier in case no empty slot is found by the system.



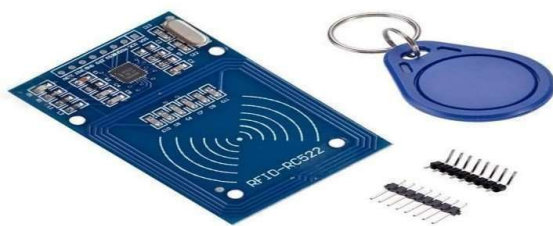
4.2.2 IR sensor

An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm ... 50 μ m. IR sensors are now widely used in motion detectors, which are used in building services to switch on lamps or in alarm systems to detect unwelcome guests.



4.2.3 RFID

Sensors and RFID System. RFID is short for “radio-frequency identification” and points to a technology whereby a reader catches digital information encoded in RFID tags or smart labels via radio waves. Like barcode technology, RFID Scanner recognizes locations and identification of tagged items — but instead of reading laser light reflections from printed barcode labels, it leverages low-power radio frequencies to collect and store data.

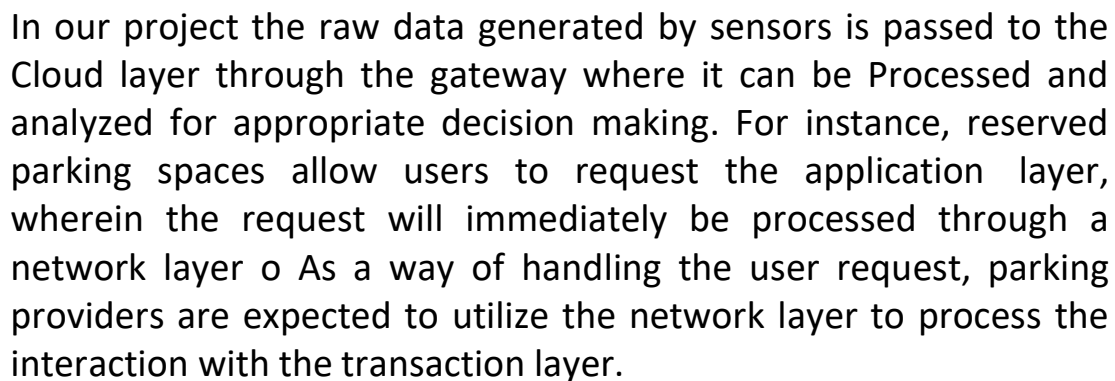


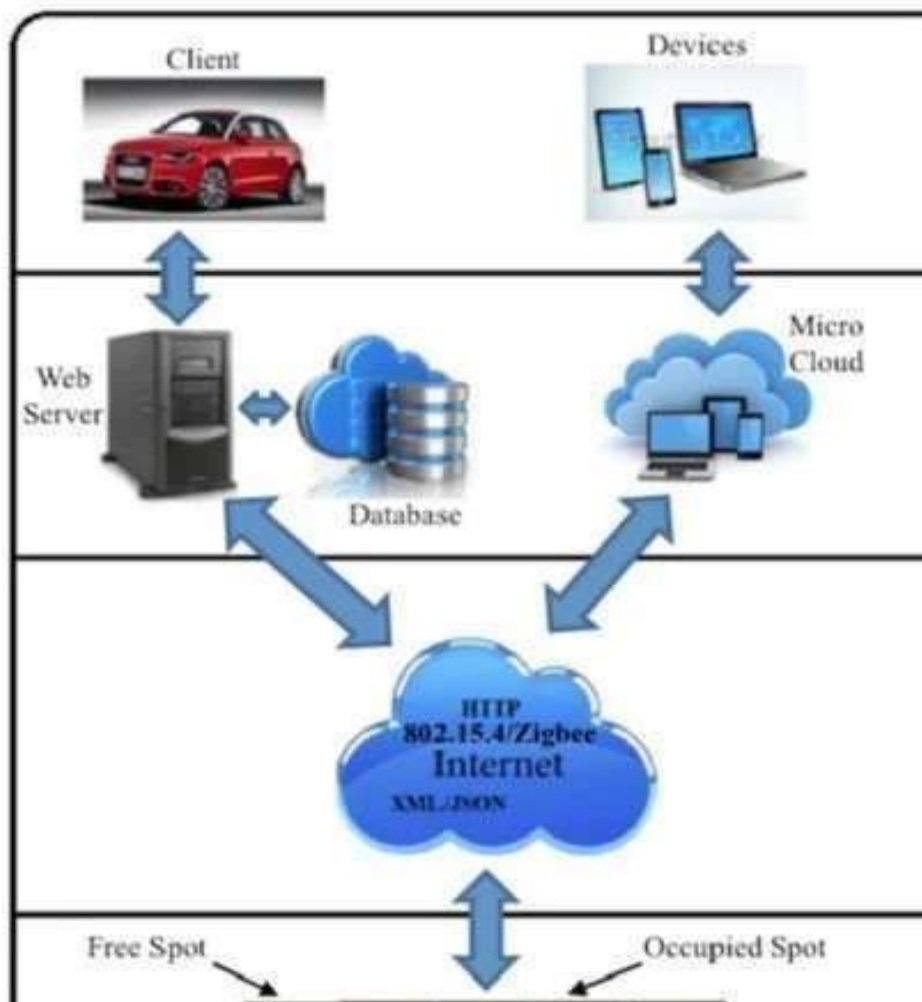
4.2.4 In ground sensors

In-ground sensors Smart Parking's unassuming yet highly innovative in-ground sensors monitor individual parking spaces and relay occupancy status to our SmartSpot gateways, which in turn send this live status information to the SmartCloud platform, allowing real-time parking information to be viewed on multiple devices.

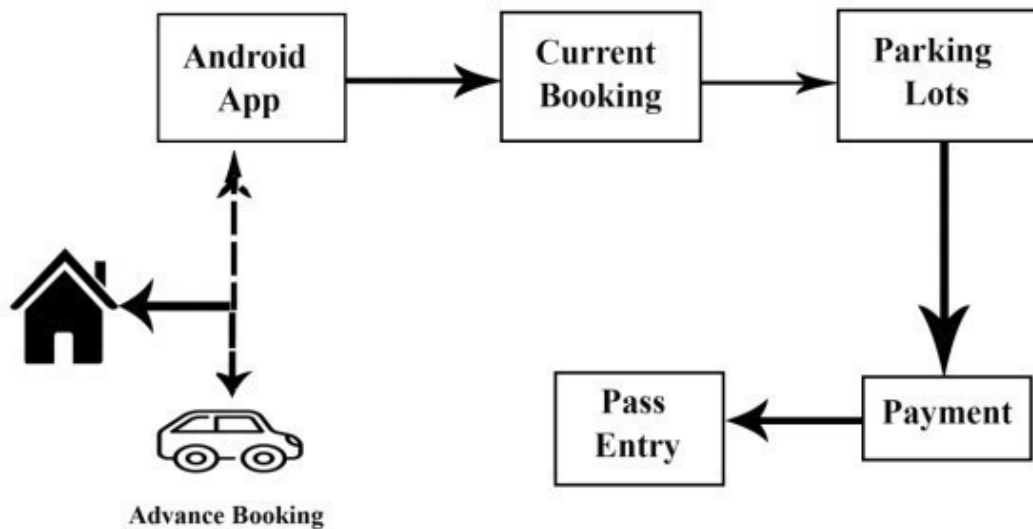


5.1 SYSTEM ARCHITECTURE





5.2 DATA FLOW



It drives the user to the selected parking for the vehicle and, at destination, allows to pay or to activate and end the parking stop at departure. The whole process will be seen in the web application of the smart parking system .

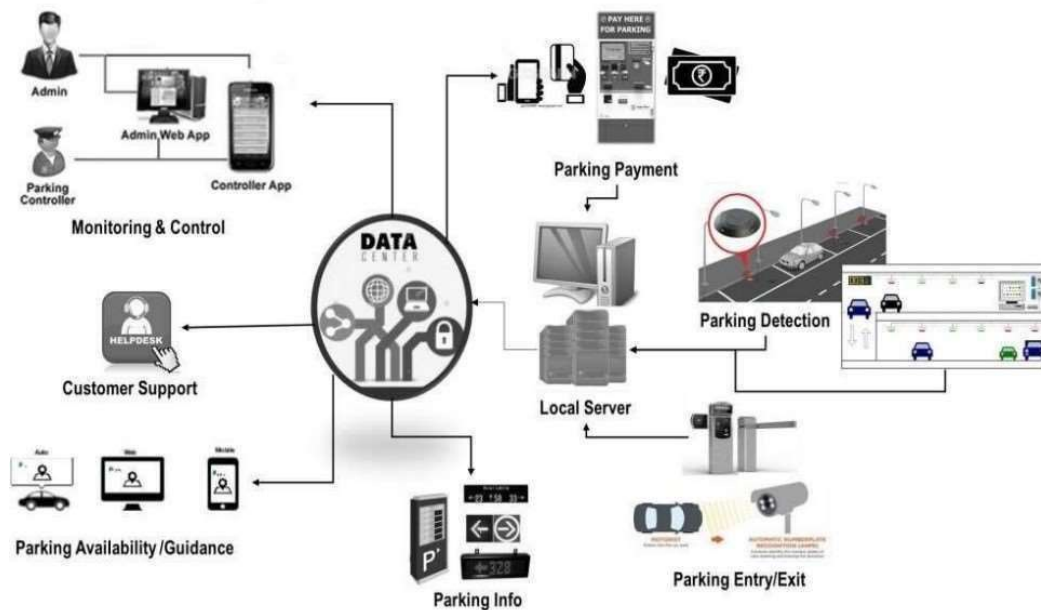
The System can be realized by using various networks and communication protocols such as LoRaWAN[®]. It optimizes parking space and make processes efficient

WORKING

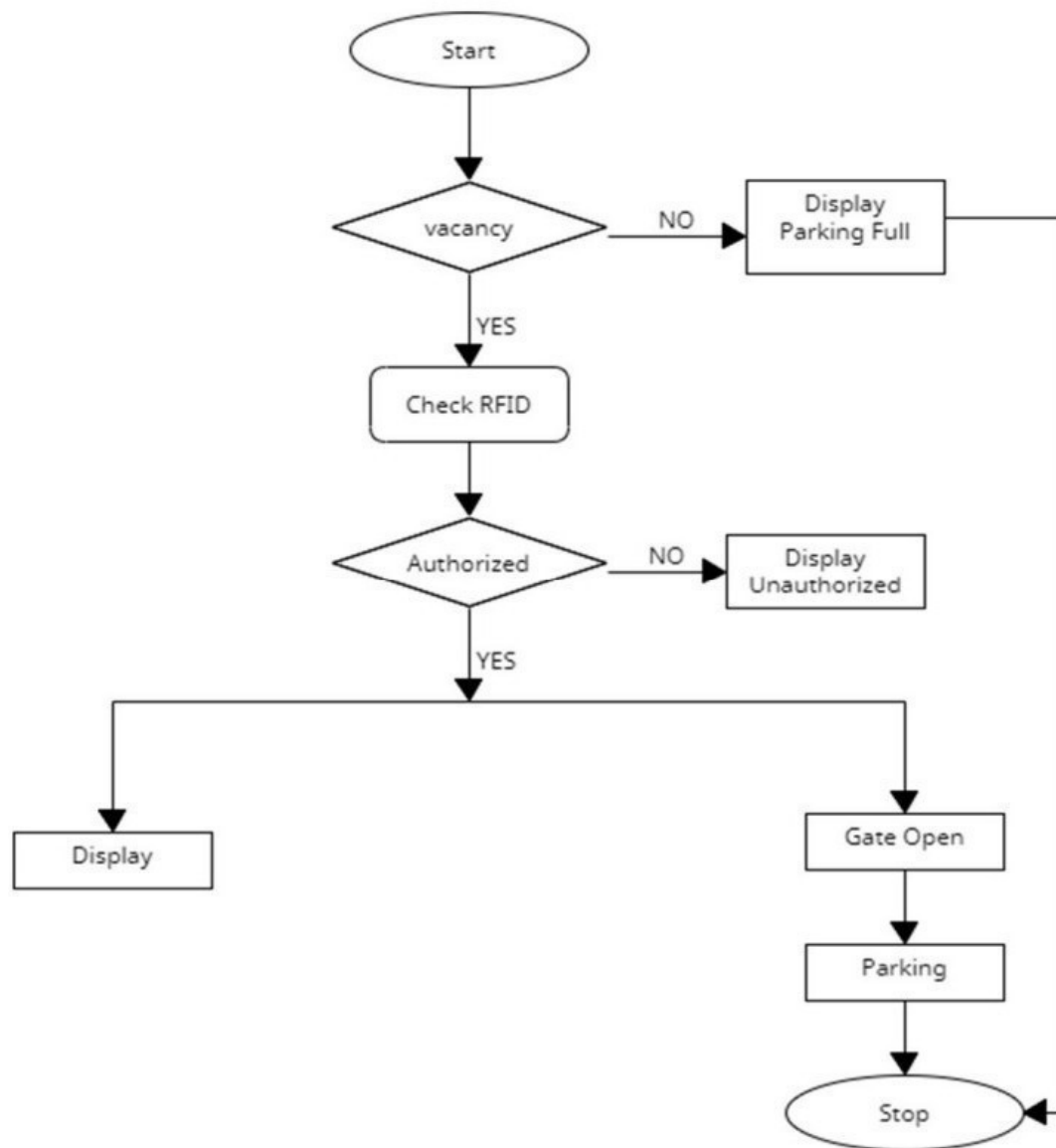
6.1 METHODOLOGY

Smart parking systems can use various devices such as vehicle counting equipment, cameras, and sensors installed in malls and pavements to gather data about the occupancy of different parking lots. This data is then transmitted in real-time via the internet to a database where it's aggregated and analyzed. The information can then be fed into a mobile app. Such an app then guides the driver with a GPS, providing directions to the nearest available parking space. By the duration of the time of parking ,the payment will be generated .

6.2 STRUCTURE

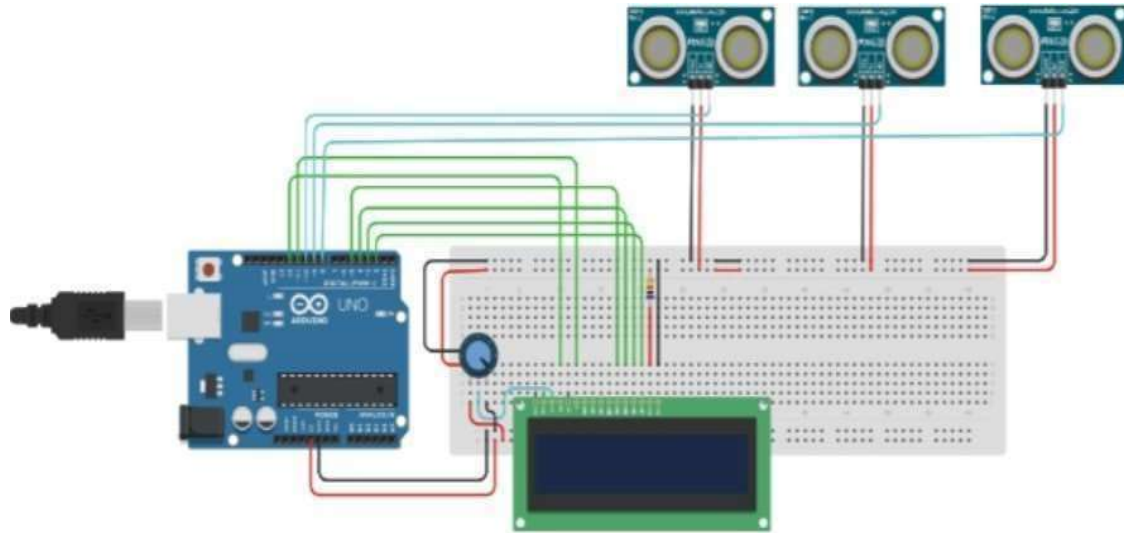


6.3 OPERATION

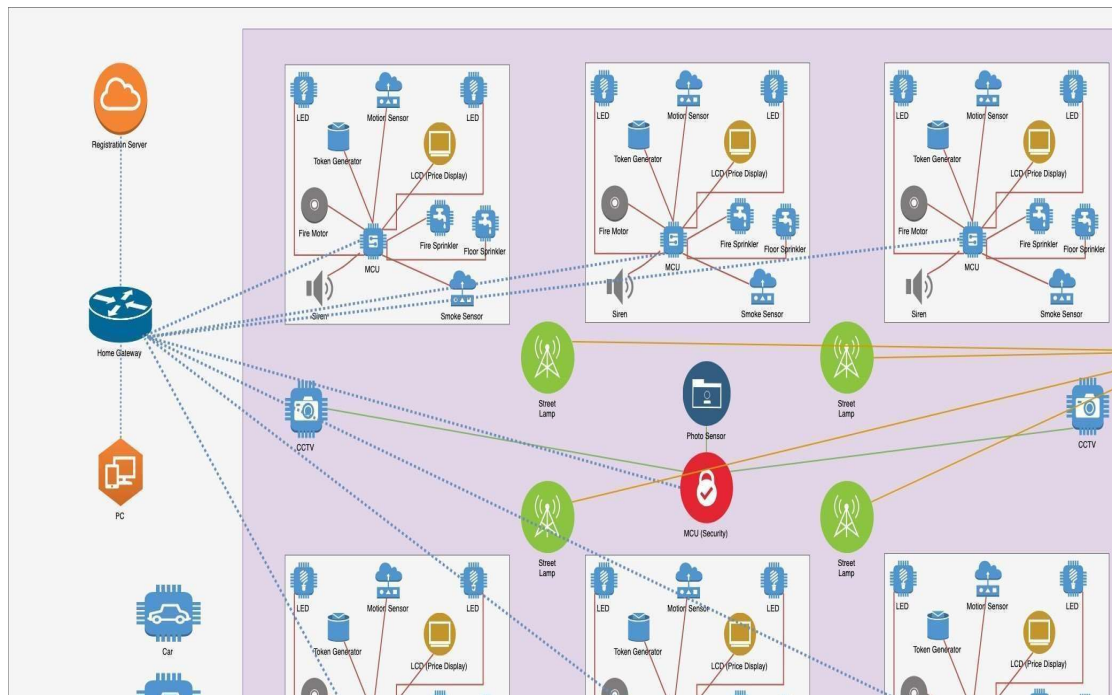


DEPLOYMENT

7.1 Tinker CAD



7.2 Cisco Packet Tracer



CODE

code for smart parking system Arduino

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 15, 16, 17, 18, 19); int ir1 =
2; int ir2 = 3; int ir3 = 4;
int ir4 = 5; int ir5 = 6; #define a 10 #define b 11
void setup()
{
    Serial.begin(9600);    lcd.begin(16,  2);
    lcd.clear();    pinMode(ir1, INPUT);    pinMode(ir2,
INPUT);    pinMode(ir3, INPUT);    pinMode(ir4, INPUT);
    pinMode(ir5, INPUT);

    pinMode(a, OUTPUT);    pinMode(b, OUTPUT);
}
void loop()
{
    lcd.setCursor(0, 0);    lcd.print("Slot1:");
    lcd.print(digitalRead(ir1));    lcd.setCursor(7, 0);
    lcd.print("  Slot2:");    lcd.print(digitalRead(ir2));
    lcd.setCursor(0, 1);    lcd.print("Slot3:");
    lcd.print(digitalRead(ir3));    lcd.setCursor(7, 1);
    lcd.print("  Slot4:");    lcd.print(digitalRead(ir4));
    if ((digitalRead (ir1) == 1) && ( digitalRead (ir2)
== 1) && ( digitalRead (ir3) == 1) && ( digitalRead
(ir4) == 1))
    {

        lcd.clear();    lcd.print("parking full");
        delay(1000);    digitalWrite(a, LOW);
        digitalWrite(b, LOW);
    }
    else if ( digitalRead (ir5) == 1)
    {
        digitalWrite(a, HIGH);digitalWrite(b, LOW);
        delay(280);    digitalWrite(a, LOW);
        digitalWrite(b, LOW);    delay(5000);
        digitalWrite(a, LOW);    digitalWrite(b, HIGH);
        delay(280);    digitalWrite(a, LOW);
        digitalWrite(b, LOW);    }
        digitalWrite(a, LOW);    digitalWrite(b, LOW); }
```

CONCLUSION AND FUTURE ENHANCEMENT

The system benefits of smart parking go well beyond avoiding the needless circling of mall blocks. It also enables malls to develop fully integrated multimodal intelligent transportation systems that do not rely on cars in the first place.

In future, the system can be extended which is not only specific to a private parking like Malls, Company parking, etc. but also can be implemented over various multiple platforms such as public parking also extending the feature by giving parking information based on cost in real time. This will make the management of the parking spaces more efficient, by purging the need of human labour.

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