PARK_IN – SMART PARKING SYSTEM

MINI PROJECT REPORT

Submitted By

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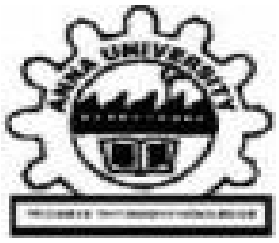
in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING



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RAJALAKSHMI ENGINEERING COLLEGE

CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled " PARK_IN – SMART PARKING SYSTEM " is the bonafide work of PRIYA DHARSHINI (210701197) and SAJAY PRAKASH K (210701222), who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis 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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Internal Examiner **External Examiner**

ABSTRACT

The Smart IoT Car Parking Project is another potential system that includes an IoT application for efficiently managing parking spaces. Here the IoT is used by connecting devices such as sensors and microcontrollers to a cloud platform to continuously collect and analyze the parking occupancy information in real time. Parkers can see availability via a web or mobile app, and this will help to ease traffic as well as enhance the parking experience. The smart characteristics of the system are around advanced analytics and cashless payments with reservations, which make it a good solution for cities and businesses to develop more sustainable cities. Our solution fulfils all these requirements since it integrates IoT technologies into the overall smart car parking system that not only controls parking space supply in real-time and automatically but also ensures drivers have faster access to available parking places through a mobile application – and thereby saves precious time. Some of the alternative suggestions to deal with parking issues which form part of this programme include cost effective and economic methods of dynamic pricing as well as parking through online transactions and elimination of the paper ticket. This innovative and environmentally friendly structure is the future of urban parking because it utilizes urban spaces to address issues such as affordability, efficiency, and overall urban mobility. Moving forward in the future technology like the smart vehicle parking system will continuously drive urban change. They are capable of enhancing the means of urban mobility regarding their nature, efficiency, and convenience. While simply being convenient, these developments can already be seen as the epitome of turning cities into thriving, vibrant, and alive settings where technology serves the society while at the same time enhancing the quality of life in the city.

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CHAPTER 1

INTRODUCTION

Overview

An innovative step in the connectedness of services for urban traffic is the Smart Car Parking System with the use of solutions based on the Internet of Things. This solution employs the IoT to facilitate the efficient management of parking slots through transforming the intricate data architecture of parking into navigable models. The tendency of people to feel secure in their everyday surroundings has become obvious over the past few years and it became apparent that technically advanced solutions are a much sought-after commodity. This system is crucial to the general public because it focuses on safety by reducing pollution and traffic jams and also on convenience through providing the information about parking lots in real time via cell phones. Smart parking solutions involve deployment of IoT technologies that adjust the price of parking depending on demand and supply to make parking cheaper while also managing surface space and enabling online payments for parking. These features enable a parking operator to transform traditional parking into a highly innovative experience that focuses on the customer. In conclusion, let us say that the Smart Car Parking System, which combines the use of high-quality materials and IoT, can be characterized as the embodiment of non-verbal communication, the possibility of affordable cars for the city, increased security, ensuring the comfort of moving, which contributes to the further development of the urban transport industry.

Motivation for the project

The need for such smart car parking systems with the Internet of Things and advanced materials arises from the need to solve urbanization problems and the current shortage of relevant solutions in the urban transport sphere. We propose a solution that aims to revolutionize the parking experience with the issues of cost, safety, and convenience. Our motivation comes from the ability to reduce pollutants, congestion, and hours spent seeking parking, which might increase the well-being of city-dwellers. In addition, it is

our primary objective to facilitate the nonverbal interaction and perception of people to and from their cars through the utilization of gesture recognition and car biometric security in order to establish interaction between individuals and their cars.

Problem Definition and Scenarios

Problem Definition:

Congestion and inefficient parking remains another cardinal issue in the urban landscape that is adversely affecting the people in cities and therefore the need to address these issues cannot be overemphasized. Some drivers circle the entire parking lot looking for a spot; this is a lot of time since the conventional parking systems are often unable to provide real-time statistics about the empty spots. This inefficiency has a number of negative impacts toward the environment and the quality of life of people in metropolitan areas – worsened traffic jams, longer trips, and higher emissions. For example, safety issues arise due to poor nonverbal communication between drivers and their cars.

Scenarios:

Traffic Congestion and Emissions: In congested urban regions, the reason that there is no parking management system causes cars to engage in constant rounds trying to get parking spaces. This condition does not only cause people to experience inconvenience and the longer traveling time but also higher traffic congestion and emissions happen which affect the environment and public health factors.

Ineffective Traditional Parking Systems: Conventional parking lots typically make use of people-based systems and do not provide current information about open parking spaces. They also conclude that there is insufficient parking resource utilization and a lack of decision-making aided by analytics tools, which makes it difficult for drivers to find quality parking options.

Safety and security: The absence of both cutting-edge security systems along with the absence of the indication between the drivers and their cars contributes to safety concerns. A contemporary city does not only require effective car parking but also more security related interventions to protect both cars and individuals using them.

User-Centric Needs: Due to the overall increase in the populations of both cities and towns, there is a corresponding increase in the demand for more people-friendly and easily accessible modes of urban transport. Drivers wish to have systems that are comfortable and are suitably technologically advanced, focus on safety, time and cost effectiveness, address the altered interaction patterns between people and automobiles which do not involve verbal communication.

CHAPTER 2

LITERATURE SURVEY

Introduction

This chapter examines the numerous papers that have been published up to this point., as well as the project details that are supplied and addressed in length in the analysis of the article.

Literature Review

Android -based Smart Parking System (2018, Pallavi M, Radha De, Samika Na, Subhangi, Shraddha)

Pallavi M, Radha De, Samiksha Na, Subhangi, Shraddha published a paper titled "Android- based Smart Parking System" in the International Journal of Innovative Research in Computer Engineering in May 2018. The authors of the research suggest a parking system model intended to effectively oversee the distribution of parking spots in assigned parking zones. To help operators find their designated parking place within the parking zone, they promote the usage of an Android application. Additionally, the system uses real-time monitoring to improve security by enabling prompt identification of any unauthorised parking or incidents within the parking lot.

Smart Car Parking System (2021, Aashish, Arni, Hariram , Vishal , Mubashir)

Aashish, Arni, Hariram, Vishal, and Mubashir, researchers from the Mechanical department at New Horizon College, published a paper titled "Smart Car Parking System" in the International Journal of Engineering Research and Technology (IJERT) in September 2021. The potential of Internet of Things (IoT) technology to optimise parking management is investigated in this study. They stress how crucial it is to have

access to real-time data via sensor networks about parking place availability. By drastically cutting down on the amount of time cars spend looking for parking spots, this method helps to minimise pollution and

traffic jams. Their study also emphasises the IoT-based system's scalability, which can be extended to accommodate bigger parking lots and even connected with citywide traffic control systems for an all-encompassing solution.

Parking System along with Android (2022, Pranjali. D, Sejal. R)

In this study article, Pranjali and Sejal.R. from Yashwantrao College in Maharashtra's information technology department discuss their findings from the International study Journal of Modernization in Engineering. In their work, they describe a parking system that is operated by an Android application and functions as a scale replica of a parking system for cars. This method effectively controls and oversees the distribution of parking spots according to the availability of spots at any particular moment. Sensors are used to enable automated parking, and an Android application is used to control entrance and leave procedures. In addition, the authors investigate the possibility of incorporating payment channels within the Android application, providing users with a smooth and cashless parking experience and thereby increasing convenience.

ASPS using Internet of Things (IoT) (2019, Mr. Basavaraju S.R)

"Internet of Things-Based Smart Car Parking System," a work written by Mr. Basavaraju S. R., was published in the International Journal of Scientific and Research Publications (IJSRP) in December 2019. The Internet of Things (IoT) is explained by this author along with how it connects environmental kits to the parking arrangement. The study recommends using Internet of Things components for network transmission, data processing, and data detection. They suggest a plan that makes use of technology that is compatible with the Internet of Things, including the Arduino UNO microcontroller, which is renowned for running on less energy. The author also explores the possibility of integrating predictive analytics into the Internet of Things parking system, which would enable predicted parking availability data and improve user experience by cutting down on the amount of time spent looking for parking.

2.1 EXISTING SYSTEM

In terms of today's modern and dynamic city life, there are various smart auto parking systems which are now introduced and these are unique and innovative multi-solution mechanisms that have been developed with much effort in order to overcome the many difficulties that should be connected with the parking dynamics encountered in typical cities. These systems are the most current, and cutting-edge technologies manufactured today; they use a host of modern technologies that allow for ease of use in parking. In essence, the aforementioned intelligent parking systems involve significant use of features offered by several technical frameworks. This momentous infrastructure is based on sensor- based technologies which are very adept in real- time vehicle detecting capabilities. At the same time, camera-based alternatives introduce a new degree of parking convenience and provide increased accuracy due to the advanced automation and precision functionalities. Furthermore, drivers can quickly locate parking spots with dedicated mobile applications, not only securing a transaction, but also offering payment platforms based on a mobile device.

These systems are really miraculous because they use the Internet of Things (IoT) to function in a rather seamless manner. This connection plays the role of a mediator – it helps establish the connection between various devices and promotes interaction between the devices and information. Due to this level of interactivity, customers obtain a comprehensive and timely overview of parking stalls and their availability, thus transforming the time-consuming task of searching for an open parking stall into an effortless and fast process. Among these systems, some of their high-end varieties take automation to the highest level, allowing robotics to take over the car and ensure optimal use of available parking spaces, even in the most confined places within the densest of cities. But these aren't its only modern benefits – the development doesn't stop at parking spots. These systems can connect seamlessly with other modes of transportation and are thus suitable for intermodal projects. Consequently, they: support the cause of sustainability, encourage the use of sustainable modes of transport and commutation, and even further improve the experience of the users.

Of course, security is essential nowadays when people follow the principles of the information society. However, the advances don't end with parking spots. These systems can easily interface with other forms of transportation, making them ideal for multi-modal integration. As a result, they contribute to the cause of sustainability, promoting the use of eco-friendly transportation alternatives and further enhancing the overall user experience.

Naturally, security is crucial in this age of data-driven technology. User safety is guaranteed by access control and surveillance systems, allaying worries about the security of cars and personal property when parked in these smart facilities.

The outcomes in the actual world serve as evidence of their effectiveness. Several thriving case studies attest to these systems' transformational potential. These systems have emerged as the hidden heroes of contemporary urban environments, offering noticeable improvements in urban mobility as well as a palpable reduction in traffic congestion.

Yet, difficulties and restrictions still exist, just like with every technical advancement. Potential privacy issues and implementation costs are still problems that need further research and development. These represent the boundaries of the continuous development of intelligent vehicle parking systems as we move towards a more effective and convenient urban future.

CHAPTER 3

PROJECT DESCRIPTION

Module 1: Vehicle Detection

The Smart Car Parking System's core element is the Vehicle Detection module. It is based on a network of sensors that are positioned carefully at the parking facility's entrance and exit. These sensors oversee identifying the presence of automobiles and can be camera-based, infrared, or ultrasonic in nature.

These sensors detect a car's approach to the entry and alert the system to begin the allocation procedure. They also assist in keeping an eye on car exits, updating the availability of parking spaces, and computing parking times for invoicing.

Vehicle Detection guarantees precise and up-to-date data on parking spot occupancy, facilitating effective administration and distribution.

Module 2: Gate Lifting

In this module, the physical obstacles (gates or barriers) at the parking facility's entry and exit are under the control of the Gate Lifting module.

The Gate Lifting module is turned on when a car is allowed to drive into or out of the parking lot (typically following slot assignment and payment verification). It improves security by limiting unauthorized entry and ensuring that only authorized vehicles may enter or depart.

Furthermore, this module may be coupled with the payment system to enable access upon reservation validation or successful payment.

Module 3: Slot Allotment

In this module, For the purpose of effectively allocating parking spots to arriving automobiles, the Slot Allotment module is essential. The Vehicle Detection module's real-time data is used to calculate the number of parking spaces that are available.

This module locates and reserves a parking place for a car as soon as it arrives at the entry. The method of allocating parking spaces considers many criteria, including the size of the car, the kind of spot (normal, disabled, electric vehicle charging), and any slots that have been reserved in advance.

By ensuring that parking is optimized and cutting down on the amount of time cars spend looking for a place, slot allocation improves customer experience and lessens traffic congestion inside the parking complex.

Module 4: Display Module for Availability Status

The Availability Status Display module is in charge of giving drivers up-to-date information about the parking facility's occupancy status.

Drivers approaching the parking facility can be informed of this information via smartphone applications, electronic signage, or LED displays. This module shows how many spaces are available for various car classes, showing which spaces are occupied and which are available for parking.

By assisting drivers in making well-informed judgements, it lessens traffic and annoyance as they approach the parking spot. It also helps consumers have a smooth parking experience.

Module 5: Android Applications

In this module, the Smart Car Parking System's user interface is the Android Application module.

The software offers a dashboard to operators so they can keep an eye on the general health of the system, occupancy levels, and security warnings. If necessary, it also enables them to manually operate gates.

The software allows car owners to do things like reserve parking spaces ahead of time, pay for them, and get directions to their designated places.

The Android Application module adds more functionality to the user's experience and can incorporate features like feedback choices, loyalty programmers, and promotions.

IoT Device specifications

Some of the IoT devices are discussed below which are used or required for the model.

Arduino UNO:

The Arduino Uno microcontroller board is built around the ATmega328P, serving as a versatile foundation for various DIY projects. It plays a crucial role in programming and controlling a wide array of electronic components. In addition to its core functionalities, the Arduino Uno is renowned for its extensive support from the open-source community, making it a go-to choice for prototyping and development.

20x4 LCD Display:

This liquid crystal display boasts four rows and twenty columns, offering the capability to display alphanumeric characters. Its utility extends to applications requiring visual output and the presentation of messages. Beyond its basic features, the 20x4 LCD Display allows for customizable contrast and backlight settings, enhancing visibility in diverse lighting conditions.

I2C LCD Module:

Utilizing the I2C communication protocol, the I2C LCD Module establishes a connection between the Arduino and an LCD display. This communication method reduces the number of pins required on the Arduino and simplifies the wiring, streamlining the control of the display. Moreover, the I2C module simplifies the management of multiple I2C devices within a single project.

IR Sensor:

Infrared (IR) sensors, known for their ability to detect infrared radiation, find applications in proximity sensing, object detection, and remote control. The incorporation of eight infrared sensors hints at the system's ability to sense objects or motion from various angles. Beyond their versatility, IR sensors are favored for their low power consumption.

Mini Servo Motor:

The mini servo motor, characterized by its rotational angle, excels in applications requiring precise movement control, such as robotics and remote-controlled systems. Compact in size, it is an ideal choice for projects with limited space constraints.

Female DC Power Jack:

The female DC power jack provides a means for connecting an external power source to a device. This feature is frequently employed to supply power to projects, reducing reliance on the Arduino's USB connection. Notably, it serves as a reliable and standard method for powering various electronic devices and affords greater flexibility in selecting power sources.

3.1 PROPOSED SYSTEM

We begin this section by briefly outlining the proposed IoT based algorithm Section 5 discusses the current scenario In the dynamically evolving field of urban mobility with ever growing cities and car populations the question of parking has turned into one of the main sources of frustration for both municipalities and passengers. Even to find a place to park one's car may take some time in such a densely populated place as a large city, turning a routine trip into a hassle. The time taken and frustration of trying to find a parking area may spoil a wonderful journey with cars jostling for a handful of places available and resulting in increased traffic and road rage. This situation characterises millions of people who stay in cities and could explain why this issue has become an implication of critical concern that requires a creative solution.

To alleviate these constantly increasing challenges, a radical idea has been put forward—an intelligent car parking system. An altogether revolutionary system, this is a result of several hours of attention to detail in the design of a platform that uses the latest technological advancements to implement a series of components that provide a truly new, and liberating, approach to the subject of parking. It uses the ground sensors, the multi functional Arduino Uno, a series of connected IoT devices and a user friendly Android app to bring in radical changes in the way we deal with parking in the urban spaces.

The objective of this proposed system will be to mitigate the current scenario of managing in the parking lots and take a step forward from conventional thinking to build a highly efficient and effective system that is the basic nature of the parking lots in urban areas. As one continues to read and learn more about this fascinating system, it becomes evident that the smart car parking system is, in fact, a vehicle for change capable of not only solving the issue of subjective frustration related to the lack of available parking spots in overcrowded cities but also of becoming a key enabler for

urban mobility transformation beyond what has ever been realistically considered possible before.

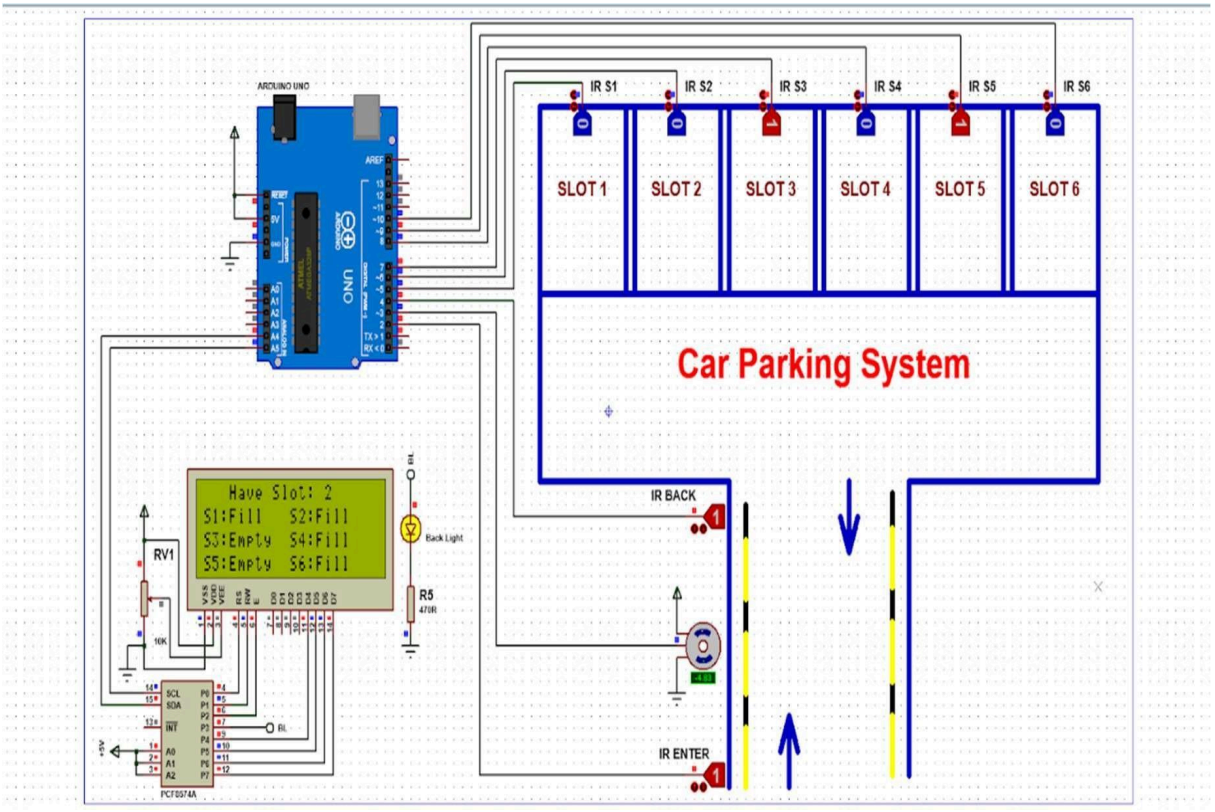
3.1.1 HARDWARE REQUIREMENTS

- ARDUINO UNO
- 20x4 LCD Display
- I2C MODULE
- IR SENSORS (Entrance and Exit)
- SERVO MOTOR
- Multiple Slots with IR Sensors
- Power Source (220V to 5V, 2A adapter)

3.1.2 SOFTWARE REQUIREMENTS

Arduino IDE

3.2 ARCHITECTURE DIAGRAM



The above diagram explains the architecture of the system This circuit diagram also acts as a visual representation of our Smart Car Parking System, a powerful solution to the parking issues in an urban environment. The board at the centre of it all is the Arduino Uno which is the main controller which coordinates the movement of the data, motors and sensors. The ultrasonic sensors on proper position enables the vehicle presence and the availability of space in real-time; moreover, the vehicle motor control circuit ensures gate, barrier, and platform movement optimization for vehicle space allocation.

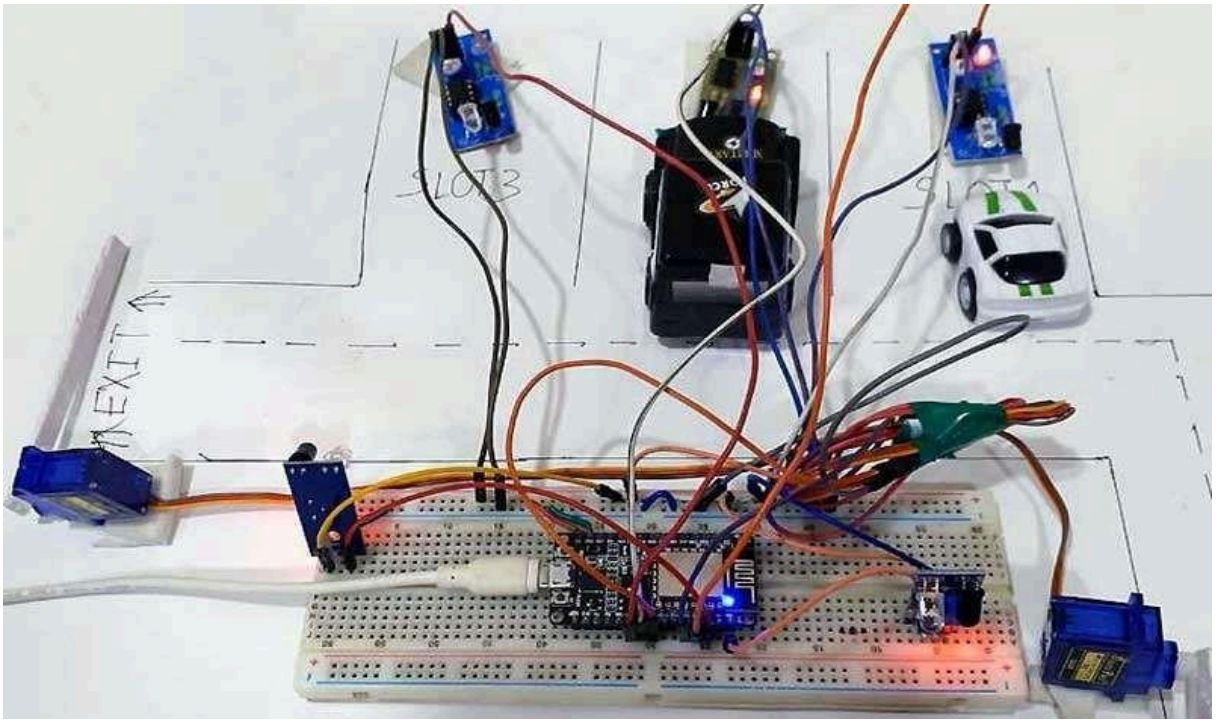
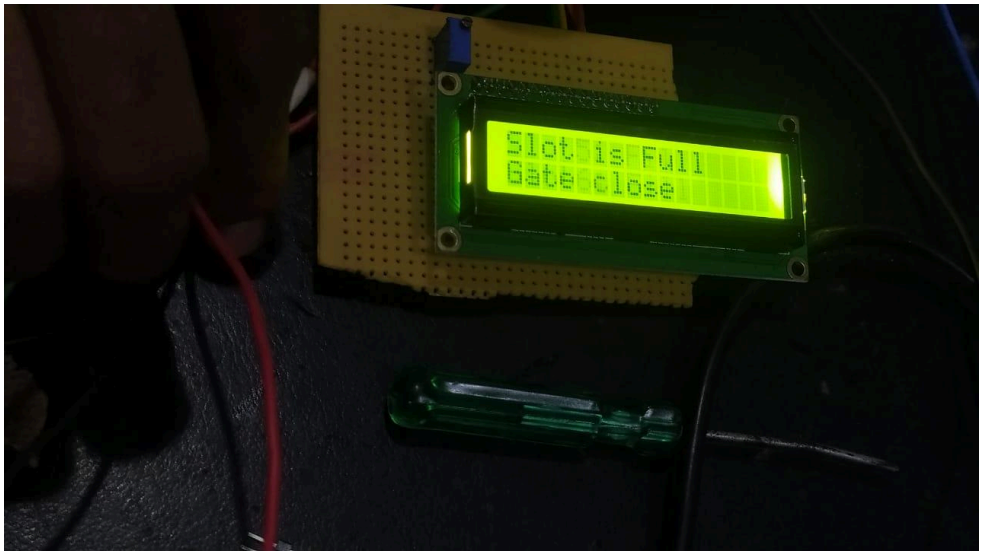
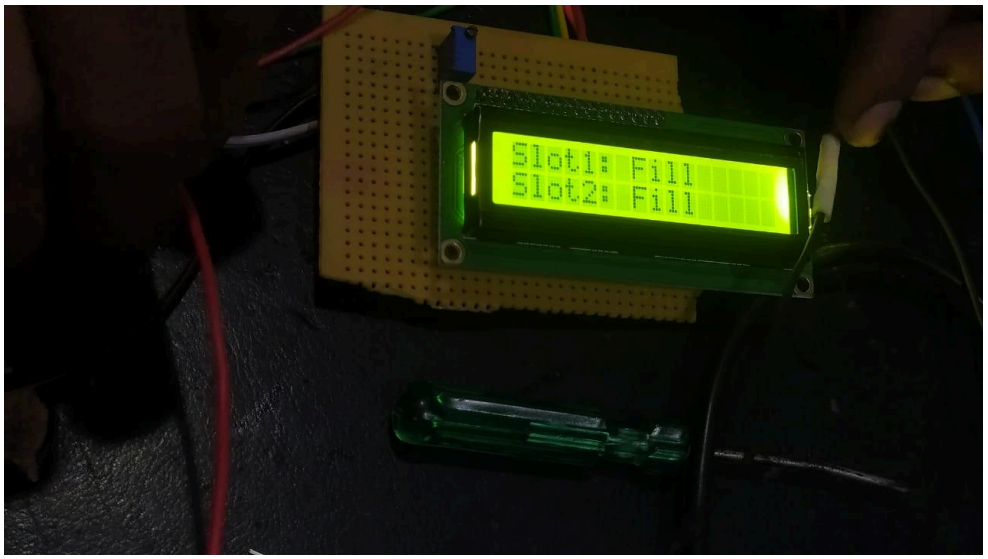


Fig. Prototype Image

While the power supply guarantees continuous system functioning, LED indications provide visible assistance. In order to enable data interchange with the Android application and the central server, the system depends on both wired and wireless communication. This thorough illustration shows how various hardware elements are easily integrated by our Smart Car Parking System to automate parking management, improve security, and expedite urban travel.

3.4 OUTPUT





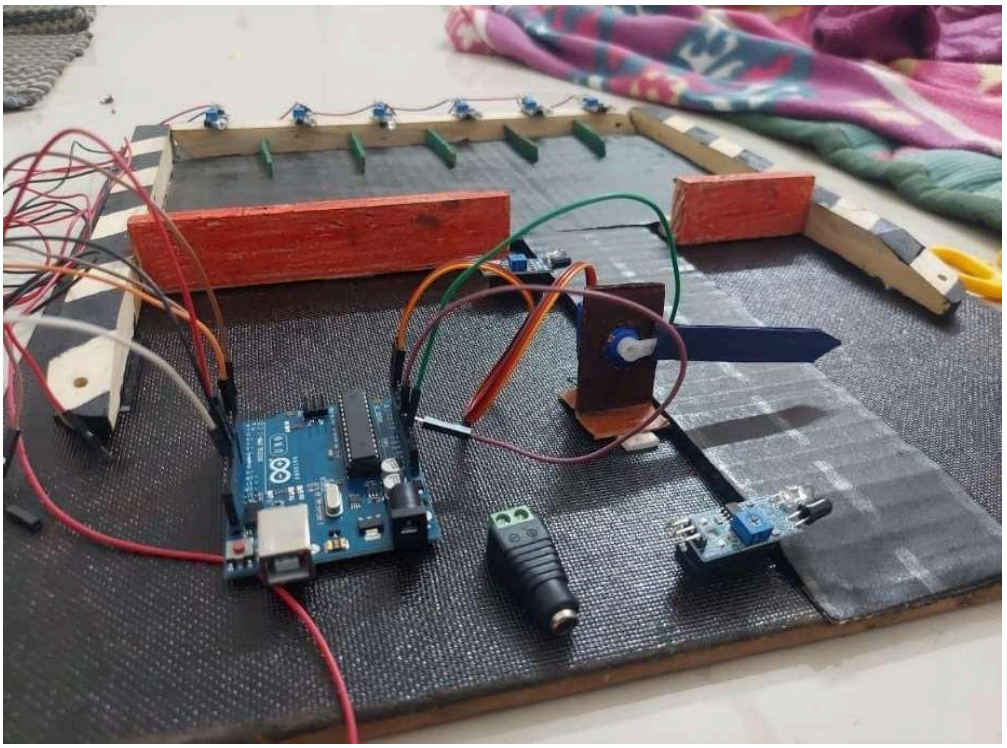


Figure 3.4.3 Arduino Uno connection

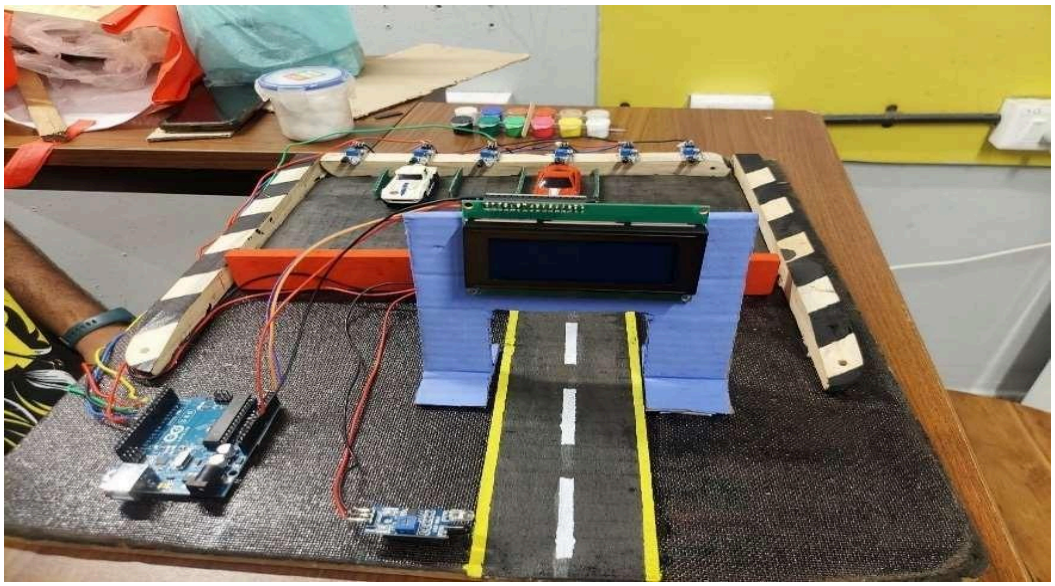


Fig 3.4.4 Overall project connection from top

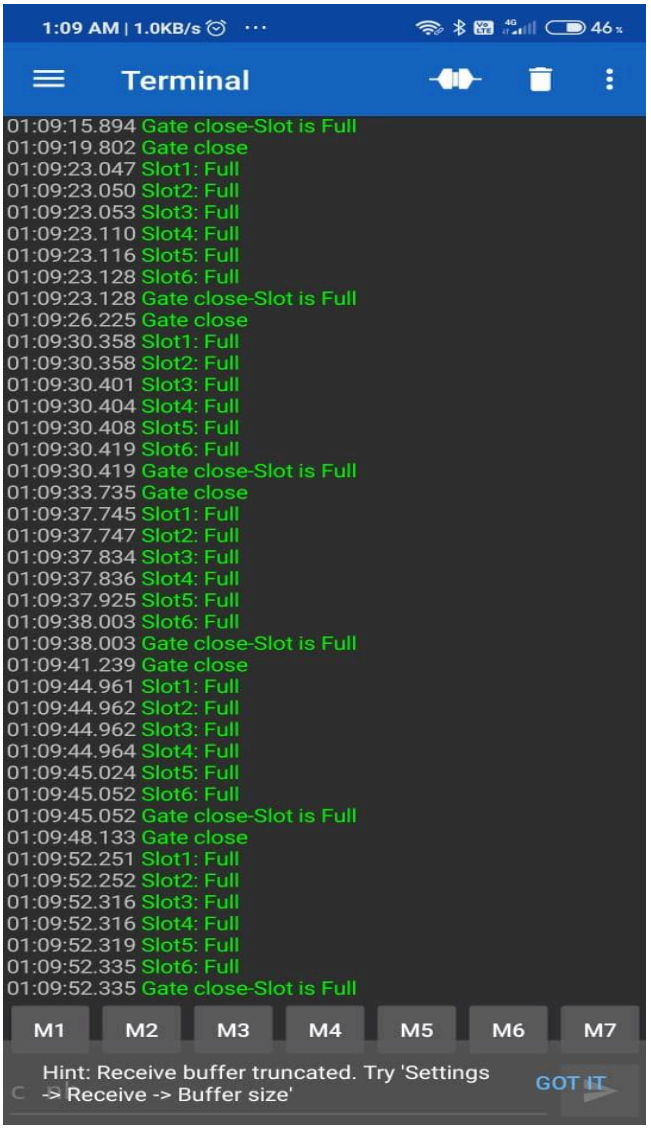

1:09 AM | 1.0KB/s
Terminal
01:09:15.894 Gate close-Slot is Full
01:09:19.802 Gate close
01:09:23.047 Slot1: Full
01:09:23.050 Slot2: Full
01:09:23.053 Slot3: Full
01:09:23.110 Slot4: Full
01:09:23.116 Slot5: Full
01:09:23.128 Slot6: Full
01:09:23.128 Gate close-Slot is Full
01:09:26.225 Gate close
01:09:30.358 Slot1: Full
01:09:30.358 Slot2: Full
01:09:30.401 Slot3: Full
01:09:30.404 Slot4: Full
01:09:30.408 Slot5: Full
01:09:30.419 Slot6: Full
01:09:30.419 Gate close-Slot is Full
01:09:33.735 Gate close
01:09:37.745 Slot1: Full
01:09:37.747 Slot2: Full
01:09:37.834 Slot3: Full
01:09:37.836 Slot4: Full
01:09:37.925 Slot5: Full
01:09:38.003 Slot6: Full
01:09:38.003 Gate close-Slot is Full
01:09:41.239 Gate close
01:09:44.961 Slot1: Full
01:09:44.962 Slot2: Full
01:09:44.962 Slot3: Full
01:09:44.964 Slot4: Full
01:09:45.024 Slot5: Full
01:09:45.052 Slot6: Full
01:09:45.052 Gate close-Slot is Full
01:09:48.133 Gate close
01:09:52.251 Slot1: Full
01:09:52.252 Slot2: Full
01:09:52.316 Slot3: Full
01:09:52.316 Slot4: Full
01:09:52.319 Slot5: Full
01:09:52.335 Slot6: Full
01:09:52.335 Gate close-Slot is Full
M1
M2
M3
M4
M5
M6
M7
Hint: Receive buffer truncated. Try 'Settings -> Receive -> Buffer size'
GOT IT

Fig 3.4.5 UI

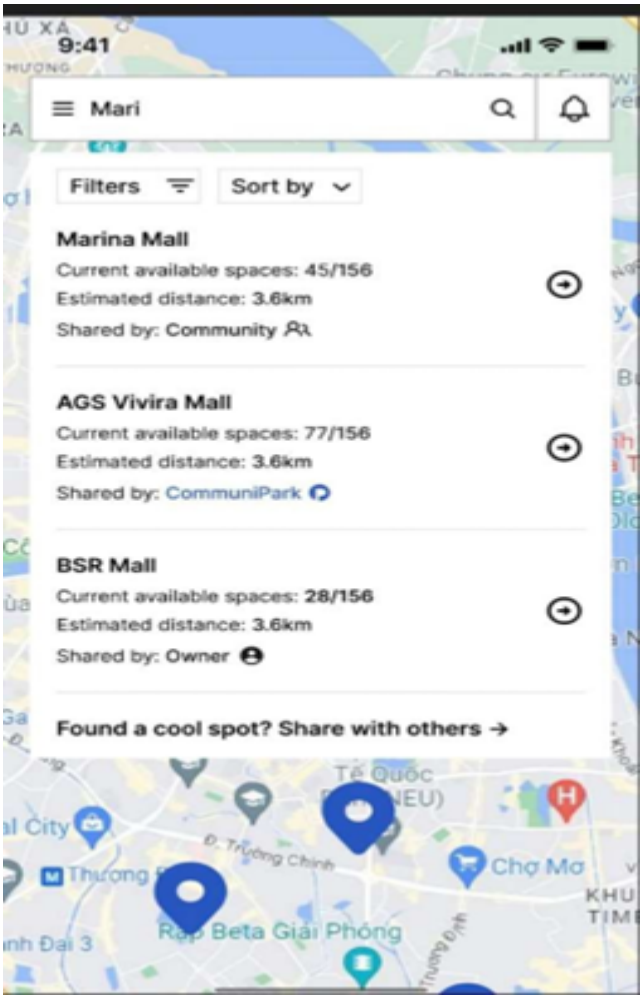

9:41
Mari
Filters
Sort by
Marina Mall
Current available spaces: 45/156
Estimated distance: 3.6km
Shared by: Community
AGS Vivira Mall
Current available spaces: 77/156
Estimated distance: 3.6km
Shared by: CommuniPark
BSR Mall
Current available spaces: 28/156
Estimated distance: 3.6km
Shared by: Owner
Found a cool spot? Share with others →
Chợ Mơ
Rạp Beta Giải Phóng

Fig 3.4.6 UI

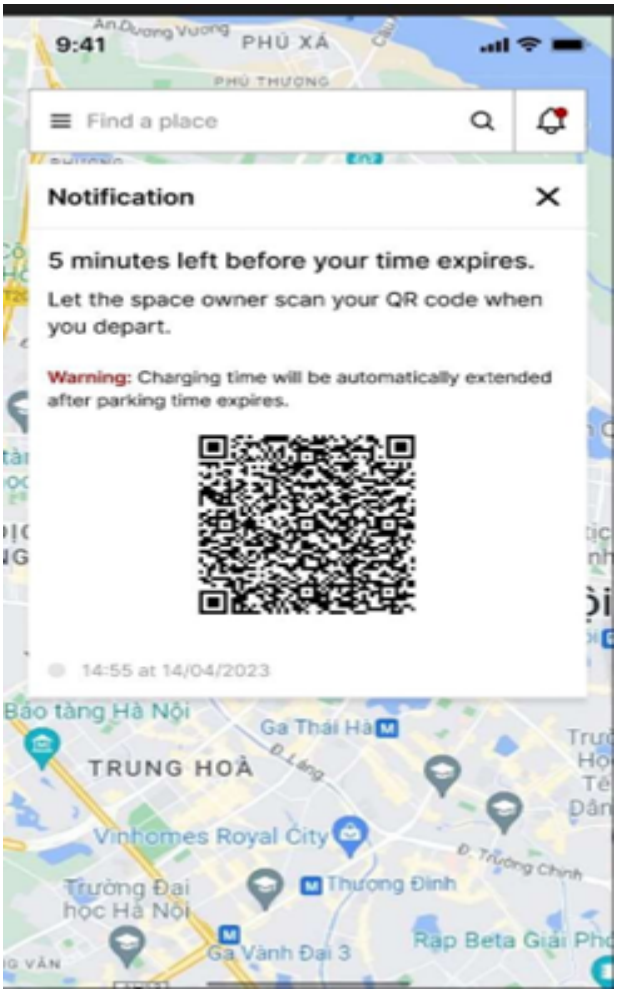

9:41
PHÚ XÁ
PHÚ THƯỢNG
Find a place
Notification
5 minutes left before your time expires.
Let the space owner scan your QR code when you depart.
Warning: Charging time will be automatically extended after parking time expires.
14:55 at 14/04/2023
Bảo tàng Hà Nội
Ga Thái Hà
TRUNG HOÀ
Vinhomes Royal City
Trường Đại học Hà Nội
Thượng Đình
Ga Vành Đai 3
Rạp Beta Giải Phó

Fig 3.4.6 UI

CHAPTER 4

CONCLUSION AND FUTURE WORK

Conclusion

A forward-thinking approach to ease the difficulties of urban parking, the suggested smart auto parking system comes at a time of both technical growth and urbanization. This system has the ability to completely change how we park in cities, increasing productivity, easing traffic, and boosting the urban experience all around thanks to its utilization of ground sensors, Arduino Uno, Internet of Things devices, and the Android application. With the help of technologies like this smart auto parking system, urban mobility promises to become more sustainable, efficient, and easy in the future.

Future Work

With the knowledge we have gained by developing this project, we are confident that in the future we can make the application more effective by adding these services.

- Integration of Autonomous Vehicles: For effective navigation and parking, self-driving automobiles can communicate with parking facilities.
- Sustainable Practices: Including electric car charging stations and using solar energy to power parking structures are examples of renewable energy sources.
- Augmented reality and virtual reality: users may locate open parking spots with the help of AR glasses or VR simulators.

APPENDIX I

```
#include <Servo.h> //includes the servo library
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 20, 4);

Servo myservo;

#define ir_enter 2
#define ir_back  4

#define ir_car1 5
#define ir_car2 6
#define ir_car3 7
#define ir_car4 8
#define ir_car5 9
#define ir_car6 10

int S1=0, S2=0, S3=0, S4=0, S5=0, S6=0;
int flag1=0, flag2=0;
int slot = 6;

void setup(){
Serial.begin(9600);

pinMode(ir_car1, INPUT);
pinMode(ir_car2, INPUT);
pinMode(ir_car3, INPUT);
```

```
pinMode(ir_car4, INPUT);
pinMode(ir_car5, INPUT);
pinMode(ir_car6, INPUT);

pinMode(ir_enter, INPUT);
pinMode(ir_back, INPUT);

myservo.attach(3);
myservo.write(90);

lcd.begin(20, 4);
lcd.setCursor (0,1);
lcd.print("    Car  parking  ");
lcd.setCursor (0,2);
lcd.print("       System     ");
delay (2000);
lcd.clear();

Read_Sensor();

int total = S1+S2+S3+S4+S5+S6;
slot = slot-total;
}

void loop(){

Read_Sensor();

lcd.setCursor (0,0);
lcd.print("   Have Slot: ");
lcd.print(slot);
```

```
lcd.print("    ");

lcd.setCursor (0,1);
if(S1==1){lcd.print("S1:Fill ");}
    else{lcd.print("S1:Empty");}

lcd.setCursor (10,1);
if(S2==1){lcd.print("S2:Fill ");}
    else{lcd.print("S2:Empty");}

lcd.setCursor (0,2);
if(S3==1){lcd.print("S3:Fill ");}
    else{lcd.print("S3:Empty");}

lcd.setCursor (10,2);
if(S4==1){lcd.print("S4:Fill ");}
    else{lcd.print("S4:Empty");}

 lcd.setCursor (0,3);
if(S5==1){lcd.print("S5:Fill ");}
    else{lcd.print("S5:Empty");}

lcd.setCursor (10,3);
if(S6==1){lcd.print("S6:Fill ");}
    else{lcd.print("S6:Empty");}

if(digitalRead (ir_enter) == 0 && flag1==0){
if(slot>0){flag1=1;
if(flag2==0){myservo.write(180); slot = slot-1;}
}else{
lcd.setCursor (0,0);
```

```
lcd.print(" Sorry Parking Full ");
delay(1500);
}
}

if(digitalRead (ir_back) == 0 && flag2==0){flag2=1;
if(flag1==0){myservo.write(180); slot = slot+1;}
}

if(flag1==1 && flag2==1){
delay (1000);
myservo.write(90);
flag1=0, flag2=0;
}

delay(1);
}

void Read_Sensor(){
S1=0, S2=0, S3=0, S4=0, S5=0, S6=0;

if(digitalRead(ir_car1) == 0){S1=1;}
if(digitalRead(ir_car2) == 0){S2=1;}
if(digitalRead(ir_car3) == 0){S3=1;}
if(digitalRead(ir_car4) == 0){S4=1;}
if(digitalRead(ir_car5) == 0){S5=1;}
if(digitalRead(ir_car6) == 0){S6=1;}



}
```

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