AISSMS
INSTITUTE OF INFORMATION TECHNOLOGY
ADDING VALUE TO ENGINEERING
An Autonomous Institute Affiliated to Savitribai Phule Pune University
Approved by AICTE, New Delhi and Recognised by Govt. of Maharashtra
Accredited by NAAC with 'A+' Grade

A

PROJECT STAGE-1 REPORT ON

Parking Detection and Obstacle Notification System

(SDG 11 – Sustainable Cities and Communities)

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE IN

THE PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE OF

BACHELOR OF ENGINEERING IN

ELECTRONICS AND TELECOMMUNICATION

BY

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UNDER THE GUIDANCE OF

Dr. V. Philip

ACADEMIC YEAR:
2024 - 2025

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CERTIFICATE

This is to certify that Project
Report entitled

"Parking Detection and Obstacle Notification System"

Submitted by

Pranjali Gangarde – 72288871G

Sakshi Gudade – 72288882B

is the record of bonafide work carried out by them in partial fulfillment of the requirement for the award of the Degree of **Bachelor of Engineering (Electronics and Telecommunication),** as prescribed by the Savitribai Phule Pune University in the Academic Year 2024 -2025.

This project report has not been earlier submitted to any other Institute or University for the award ofany degree.

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Acknowledgement

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We take this opportunity to thank the Head of the Department **Dr. M. P. Sardey** and Project coordinator (Name of your Project coordinator) and all staff members of department of Electronics& Telecommunication Engineering AISSMS IOIT, Pune, for cooperation provided by them in many ways.

The motivation factor for this work was the inspiration given by our honorable principal **Dr. P. B. Mane.**

Lastly, I am thankful to those who have directly or indirectly supported our work.

Sign

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ABSTRACT

The expansion of the economy has led to an increase in the number of automobiles that are currently on the road, which has in turn led to parking that is both illegal and unstructured in public places, private buildings, educational and corporate campuses, and other analogous locations across the world. As we continue forward with this project, one of our primary goals is to create an intelligent parking system that will be able to address the issue of disorganized parking in a manner that is timely. This is the most essential objective that we must achieve.

For the purpose of this inquiry, the parking system will be conceived of as a queue, and the theory that underpins queueing will be utilized to develop assessment criteria such as wait durations for consumers. It is vital to follow best practices when searching for the parking place that is closest to being available.

These best practices include adopting a multi-server queuing system and enhancing the existing system to deliver a better user experience. If you are searching for the parking spot that is closest to being available, it is important to follow these best practices. These are two of the guiding principles that ought to be followed at all times.

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CHAPTER 1

INTRODUCTION

1.1 General Introduction

Nowadays, smart parking guidance system is crucial research for people's convenience. The primary purpose of this study is to design and conduct an investigation on a smart parking guidance system, with the intention of contrasting the previously available system with the one that is being offered here. Limited parking space has become serious issue since the number of Malaysia's populations who are using car keep increasing. A few of the larger corporations, shopping malls, and other public institutions have already installed an intelligent parking system on their own buildings. However, there are still a great number of buildings that do not own it because the system required a great deal of investment, and the enormous parking areas require a greater cost to put sensors on each parking lot that is available. The research that was conducted relied on a smart parking guidance system that was dependent on a 360-degree camera that was modified using a raspberry pi camera module, a 360-degree lens, and a Haar-Cascade classifier. Open CV and a Python programme were used to process the images and videos in order to detect the available parking spaces. Cloud firebase was utilised in order to refresh the data, and users may check the availability of parking spaces using their android mobile phones, in particular while they are in a locked parking spot. The traditional smart parking system was upgraded with the addition of a single 360-degree camera, which replaced the multiple sensors and cameras that were previously used. An evaluation of the performance of the system revealed that it is able to determine the availability of parking spaces with an accuracy of 99.74%. This is a significant improvement over the performance of conventional systems in terms of both dependability and cost for the parking space guiding system.

These are only two examples of the many studies and researches that have been carried out about smart parking systems that have already been put into place all over the world. The majority of the studies have advocated for an update and enhancement to the traditional system, and they have done so in accordance with the circumstances of parking spaces, which can differ from place to place. The ever-increasing number of studies on intelligent parking systems that

have been carried out up until this point remind us that communities and industry are still looking for an improvement in the system. Numerous smart parking system
have today that are mostly using sensors to detect parking lots
availability which is costly and lower in accuracy and
reliability offered by the system. Some of the more advanced parking management systems that are now on the market and ready for installation. Both systems, either magnetic sensor or ultrasonic sensor are not
very effective in term of cost. The reason for this is that both of these systems require the sensors to be installed on each and every parking lot. Therefore, the implementation of it can be expensive. As a result, there has been progress made in this research with regard to the precision, cost of implementation, and dependability of the system.

1.2 Related Work

Past few years, smart parking system have been demanded by the communities across the globe and it can be seen in almost every developed country nowadays. Research on intelligent parking systems is carried out in a substantial quantity on an annual basis. Since that time, this particular form of high-tech system has seen significant development and refinement. It all started with wired

sensors being used and installed on every available parking slots just to detect the presence of a vehicles. In their research report, did state that Siemens Si Park was home to one of the most well-known research projects taking place at the time. After then, individuals started to come to the conclusion that the outdated system required improvements to be made regarding detecting accuracy, reliability, installation cost, power consumption, communication protocols, communication efficiency, the amount of time required to locate a parking space, signal latency, and a great deal of other aspects.

Many researchers, such as have used sensor technology for the purpose of detecting the parking system. The sensor-based parking guidance system that they built is intended for use in indoor

parking. Because it requires wirings to interface the LED and the sensors, the implementation of this system is more difficult developed a vision-based smart parking system that uses the Internet of Things. The system makes use of a 5-megapixel camera that is attached to a Raspberry pi 3 model B camera module, and the canny edge detection approach was utilised as the method for detection. The image quality has been vastly enhanced, and the system is now capable of reliably identifying vacant parking spots in real time 98% of the time. The precision of this method, on the other hand, might be improved by employing a more advanced camera and method.

A study on Automatic Parking Space Detection System was conducted. The images of the parking area are obtained using a web camera, and then image processing techniques are used to determine whether cars are present or absent in order to count and locate available parking spaces. This method achieved an average performance of 99.5%, which is very high when compared to other applications that detect parking lots. The findings demonstrate that when the acquired photos of the parking lot are not clear as a result of insufficient lighting or occlusions, both the efficiency and accuracy of the detections suffer. have work on A novel dual microwave Doppler Radar based vehicle detection sensor for parking IoT occupancy detection. A motion recognition method was provided to recognise the vehicle behaviour and generate the parking space occupancy. A Doppler radar transceiver module was utilised in order to detect the movement of a parking car. Doppler radar sensor successfully recognised the vehicle's clear movement, and the detection accuracy was greater than 98%.

However, the system design is more complicated. According to, an Embedded System Design of a Real-time Parking Guidance System was developed. Arduino is the central component of this system, together with an ultrasonic sensor and a temperature sensor. After conducting the initial tests and analyzing the findings, detection logic was subsequently created in order to identify a car.

This logic was expanded to cause a camera to take a picture of the vehicle for the sake of validation. The proposed system will make achieving their goal more difficult. However, the installation of an ultrasonic sensor can be quite pricey due to the fact that it requires a sensor

to be placed in each park, as well as its sensitivity to changes in temperature and the severe turbulence of the surrounding air.

1.3 Motivation

The number of people living in metropolitan areas led to an increase in the number of cars and trucks on the road. When we visit the various public places like shopping malls, multiplex cinema halls and hotels during the festival time or weekends, it creates more parking problems which leads to traffic congestion, driver's frustration and time consuming. In the parking systems that are now in place, looking for empty spots has always been a tough and time-consuming procedure.

Car drivers have a difficult time determining which parking spot is empty and which ones are not. For drivers to make the most efficient use of their time in multi-story parking garages, they need to be aware of the number of available parking spots on each level. They won't have to worry about finding a parking spot because they'll already be aware of those that are open before they get there.

The intelligent parking system will figure out where the available spaces are for parking vehicles in parking lots. A recent study found that during rush hour, the amount of traffic generated by vehicles hunting for available parking places occupies up to 40% of the total traffic in major urban areas. A handful of the available options concentrate on parking lot applications and use sensor technologies including magnetometers, ultrasonic sensors, and video cameras as their primary means of data collection.

Magnetometers are extremely sensitive to the effects of the surrounding environment, which is one of the reasons why the directions they provide are not always precise. Video camera sensors are
expensive which is used to collect parking information in vehicle parking field can generate a large amount of data that can be difficult to transmit in wireless network.

Ultrasonic sensors examine and determine the state of a parking place by making use of the energy that is reflected back to them. There are a few drawbacks associated with ultrasonic sensors, despite the fact that they are relatively inexpensive and simple to set up. They are very sensitive to

temperature changes and extreme air turbulence. Therefore, an infrared (IR) sensor is not only an inexpensive sensor in comparison to other types of sensors, but it is also an appropriate sensor for the suggested system.

The remaining parts of this work are structured in the following manner. In section II, we present the block diagram of the proposed system and hardware requirements for this proposed system. In Section III, we cover the operational ideas underlying the controllers. The analysis of the results is discussed in section IV.

In the fifth and final segment, we draw a conclusion. At long last, a discussion of future scope can be found in section VI.

The expansion and development of cities in India are hampered by the absence of an appropriate architectural design for parking spaces.

If there were adequate parking space architecture, we would get the result that a growth in vehicles is inversely proportionate to the number of parking spots available.

Parking in areas where it is not permitted might result in monetary fines in addition to other workplace consequences.

The proposed architecture in this study monitors the real-time availability of parking spaces and presents users with information on neighboring spaces once the users' locations have been verified.

They eventually wind up having to pay fines since they parked their automobiles in locations that were not designated for parking.

The provision of a system that informs visitors from out of town of the location and availability of parking spots would be of significant service to the community.

In addition to that, it enables customers to make reservations for the parking spot, and it also shows drivers the way to arrive to the reserved parking area.

- As a result, we put forth and created a prototype for a smart parking system that attempts to address the aforementioned issues.
- The application, cloud, and interface are the three primary parts of this system's design.
- The application first assists us in locating the closest parking space, which is indicated in red and green.
- Green denotes at least one open parking space, while red means that all available spaces are taken.
- Real-time data from the cloud database provides accurate information to users. The parking slot marker provides information on the parking spot, including name, address, and quantity of free vehicle and bike spaces. The writers' main contributions are:
- A revolutionary Smart Parking System mobile app design is proposed.
- The desired research proposes and implements parking space use-cases.
- Parking space allocation in a smart city can be implemented in two ways. Initially, for high parking spaces, we can use parking lots for parking more vehicles with proper identification
- The vehicle's identification number is scanned using the RFID reader at the gate as soon as the user enters the parking area, and it is then saved in the database.
- The firebase values are updated when the sensors at the slots notice this change.
- The database contains information on the duration, vehicle type, etc.
- This study suggests a low-cost smart system that can decrease the time spent looking for parked cars in a mall garage or a parking lot and also assist in finding the already parked car.

1.4 Aim

"To design an automated system that detects unauthorized parking in non-parking zones, issues real-time notifications, and reduces manual intervention using IR sensors, RFID, and the Blynk application."

1.5 Objectives

1. Detect Unauthorized Parking: Identify vehicles parked in restricted (non-parking) areas using sensors.

2.Trigger Alerts: Provide immediate alerts via a buzzer to notify about violations.

3.Automate Challan Generation: Use RFID to identify vehicles and generate challans automatically.

4.Notify Vehicle Owners: Send real-time notifications to owners through the Blynk application.

5.Reduce Manual Effort: Minimize human intervention in monitoring and managing parking violations.

6.Improve Compliance: Encourage adherence to parking rules through efficient detection and notification.

7.Develop a Scalable Prototype: Create a system that can be expanded for broader implementation.

1.6 Problem Statement

Unauthorized parking in restricted areas leads to traffic disruptions and inconvenience due to inefficient monitoring systems. The reliance on manual enforcement is time-consuming, prone to errors, and resource-intensive. Additionally, the absence of a real-time notification system delays communication with vehicle owners, while manual challan generation can cause discrepancies. This results in poor compliance with parking rules, necessitating an automated solution to address these challenges effectively.

CHAPTER 2

LITERATURE SURVEY

Smart occupancy detection for road traffic parking using deep extreme learning machine, (Shahan Yamin Siddiqui. et.al, Journal of King Saud University – Computer and Information Sciences, 2022)

This article utilizes artificial neural networks to forecast parking locations, assisting vehicles in choosing a suitable area for stopping. This strategy improves traffic familiarity and reduces turbulence. The Deep Extreme Learning Machine (DELM) technique achieves reliability with minimal error rates, lowering skepticism. The suggested DELM has the greatest precision rate recorded at 91.25%. Simulation findings confirm the DELM strategy's prediction effectiveness.

Performance Analysis of Proximity and Light Sensors for Smart Parking, (Mamta Bachania, Umair Mujtaba, International Conference on Ambient Systems, Networks and Technologies, 2018)

This study examines smart parking system design variables such sensor selection and optimal deployment places for accurate detection. We start with two common sensors: LDR for shadow detection and IR for object detection. The study tests car and parking space detection accuracy in diverse settings. The study demonstrated that IR sensors identified vacant parking spaces and automobiles better than LDR sensors in varied environmental conditions.

An IoT assisted Intelligent Parking System (IPS) for Smart Cities, (Shahina Anwarula, Et.al, International Conference of Machine Learning & Data Mining, 2023)

This article explores various driver use-cases for discovering and parking in the correct location. The suggested system utilizes Raspberry Pi, NodeMCU, RFID, and IR sensors. The results in later sections demonstrate the usefulness of this IPS.

A low cost IoT-based Arabic license plate recognition model for smart parking systems, (Mohammad M. Abdellatif, Et. Al, Ain Shams Engineering Journal, Science Direct 2023)

The experiment in this research employed 200 photos to recognize Egyptian automobile plates. The model accurately identified Arabic license plates with 93% accuracy. A prototype is created utilizing ESP32 Cameras and Raspberry-Pi to evaluate system performance. Additionally, the RPi hosts a database and website allowing users to locate their car in the parking lot using their license plate, which is kept in the database upon detection.

Parking Information Guidance Systems and Smart Technologies Application Used in Urban Areas and Multi-storey Car Parks, (Jiri HanzL, Horizons of Autonomous Mobility in Europe, 2020 Science Direct)

The benefits that these technologies bring to both transport and logistics areas are summarized and the benefits that these technologies bring to both transport and logistics processes are evaluated.

Research Gap

- Parking problems are common and dangerous in every major city. The sizable use of Android generation with current advances in wi-fi programs exhibits that virtual facts penetration may be important in fixing rising parking problems.
- Currently the quantity of humans the usage of Android cellular telephones is regularly increasing. Customers waste time looking for available parking slots.
- This is a waste of time, leading to congestion and also causing traffic.
- People coming from far and wide are coming to waste time searching for vacant space and sometimes not even finding a parking space.
- Users have to spend quite a few time for fee processing and there are probabilities for people to leave the parking space without doing the payment.
- DIS-ADVANTAGES: There is no proper parking facilities at all time.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Work

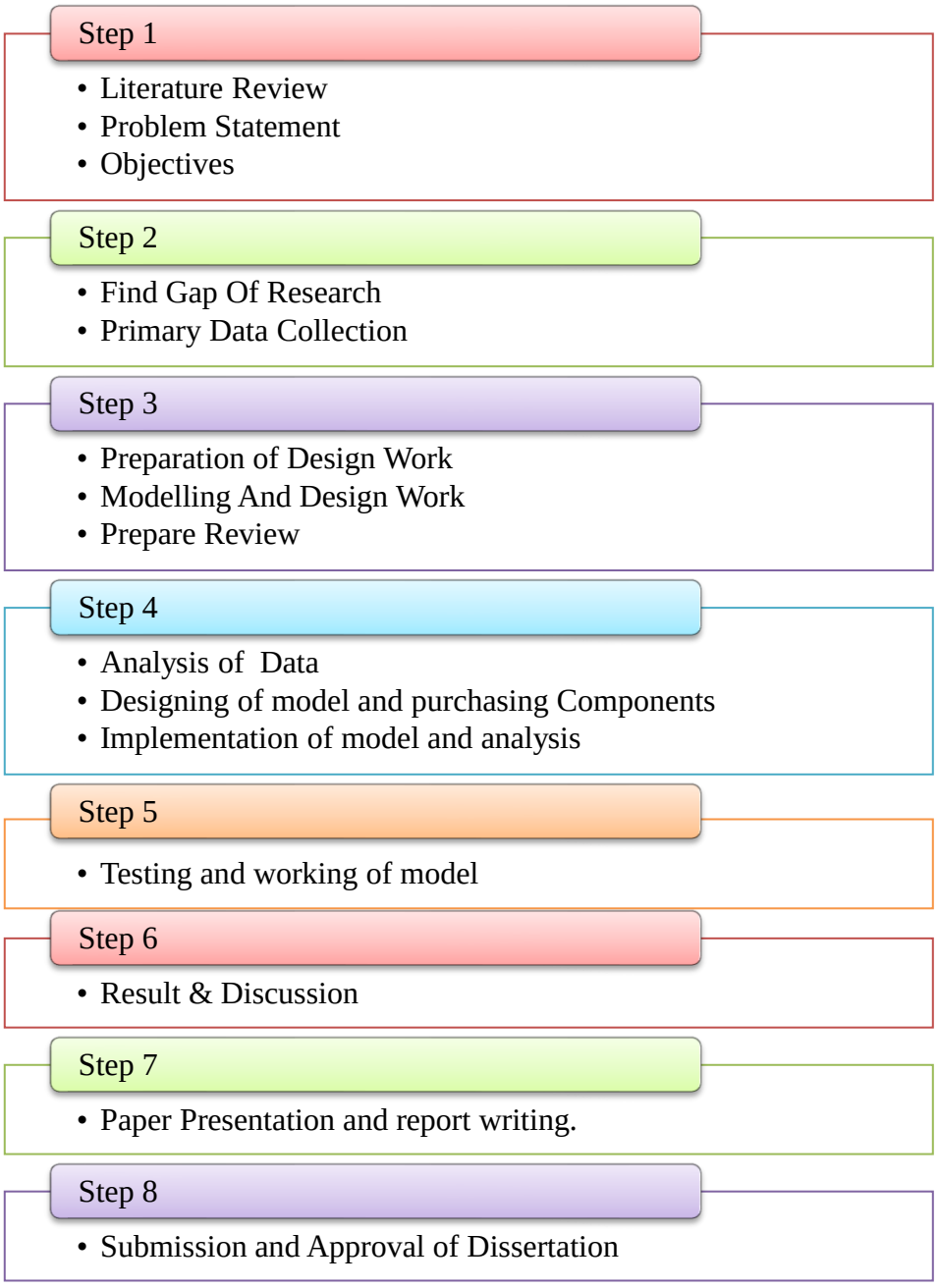


Figure3.1 Methodology Flow

- Which is to review the existing smart parking solutions to find the adopted approaches, sensors, and network technologies used to develop the SPSs
- to identify keywords such as; "smart," "parking", "system", "solution", "sensors", "networks", "methods".
- After that, primary search strings are developed to identify the initial literature findings from the previously mentioned online scientific databases and web searches.
- This section describes the research methods used to review prior studies and provide a broad overview of the SPS idea. This research gathered SPS information from reputable publishers including IEEE Xplore, ScienceDirect, Springer Link, MDPI, ACM Digital Library, and Hindawi. This work used the research method outlined.
- The planning phase establishes standards for searching for review resources. In the review step, rigorous standards are used to create search terms to find relevant review materials across various repositories.
- Pre-processing: Enhancing the licence plate image for optimal performance and model correctness.
- Segmenting the changed image into sub-images of recognisable items (characters or integers) helps the detect licence plate characters.

3.2 Vehicle Tracking

- Track the vehicle location with GPS
- Monitoring: Monitor all aspects of vehicle with Real Time Digital View in mobile app and laptop
- Report Generation: Generate different reports like Statistical, Day Wise Summary, Fuel level with Graph, Vehicle Trips, Temperature Level with Graph, Speed with Graph and Satellite Count with Graph
- Alert Services: Get alerts for Fuel Theft, High Engine Temp, Over Speed, Fuel Leakage, Fuel Feeling, Trip Completion, Wrong Root

3.3 Features

- Accurate & Remote Fuel Level Monitoring
- Fuel Theft Detection & Alert
- Vehicle Location & Speed Monitoring
- Automated Fuel Filling Accounting and Reporting
- Fuel Consumption Recording
- Leak detection alert
- Remote Data Accessibility from Anywhere
- User Friendly Accessibility through Mobile App
- Driver Performance Optimisation
- Trip Assignment Settings (Geo Tagging)
- Engine Temperature Monitoring on Demand
- Vehicle Speed and Location related SMS alerts

3.4 Advantages

- Smart: Web based tools enable remote accessibility and smart reporting
- Economical: Control the fuel use and its consumption using FLMS saves money
- Easy to use: Suits any type of fuel tanks.
- Simple to Install: Compact and light weight models.
- Alert: Alerts on refuel & drain by SMS/ Mobile/ e-mail
- User Friendly: User friendly interactive software design with mobile app & laptop view
- Convenient: Online access enables inventory monitoring and maintenance through comprehensive reporting
- Up gradation: With simple up gradation process, FLMS can grow with your operations.

A variety of federal, state, county, and public sector organizations and their counterparts in other countries are establishing or planning to use networks of GPS reference stations, utilizing both differential and carrier phase tracking techniques, for either real-time navigation or post-processed positioning. The use of GPS networks for research in the Earth and oceanic sciences has been well established for a number of years.

For example, the National Aeronautics and Space Administration (NASA) and other organizations from various nations have established the International GPS Service for Geodynamics, a network of more than 140 continuously operating reference stations, data centers, and analysis centers that collectively support geophysical and geodetic research, such as the measurement of active tectonic processes, ice sheet movements, changes in sea level, and variations in the Earth's rotation.

Almost every GPS tracking system for fleet management offers vehicle location and real-time mapping, but there are several other features that you need to know about. Many of these GPS tracking features give you more insight into how well your commercial vehicle fleet is optimized so you can make decisions about how to change or improve operations for your business.

3.5 Functional Requirement

- **Web Application for parking admin**

1. Selecting parking areas and which slot to choose, as well as how much it will cost to park there, how much it will cost per minute and how long a vehicle can stay there will be included.
2. The admin is constantly updating the data for the parking area. Doing so will ensure that customers do not face any problems.

- **Android Application for end users**

1. Vehicle details and customer details need to be registered here. The first task of the end user is to collect evidence and store it in the system. Find the parking area from the list of areas registered by the parking operator.

2. View details such as selected parking area name, price per minute, total number of available spaces. Reserve the available parking space and specify the reservation period.

- **Back End Management System**

1. When editing or deleting a data, it is important to properly consult the user and then edit or delete that data.
2. When giving a booking slot the admin must properly collect the user credentials. An Id should be assigned to each slot.
3. Customers must contact the parking operator to modify the parking slot. The parking area allows the customer to cancel the slot if it is not comfortable.

3.6 Non-Functional Requirement

- The information we provide must be separate, only then can the website retain the information or the data will not be stored.
- The server collects and resolves user requests only in those cases where it must be properly from separate users.
- Consumers should take due care as before when any problems arise.
- For example, when your device is stolen, the user should see to it that the data is connected to a different system.
- We have made this Android application very secure. If you use it you can keep your data very secure.

CHAPTER 4

SYSTEM DESIGN

4.1 Block Diagram

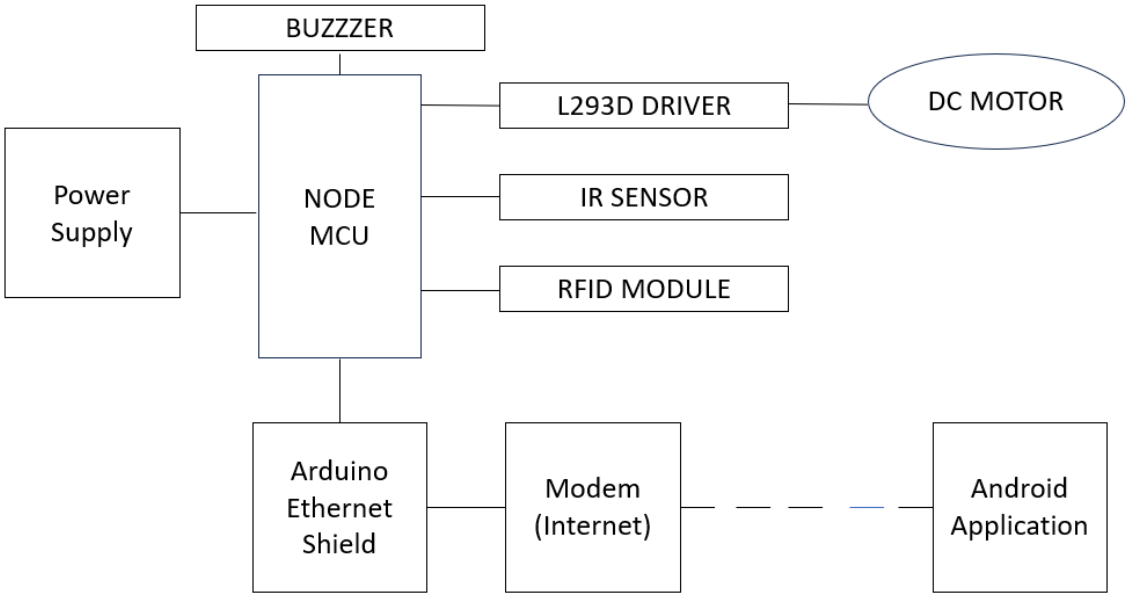


Figure4.1: Block Diagram

4.2 Components Description

4.2.1 ESP32 Node MCU:

Figure4.2: ESP32 Node MCU

- **Wi-Fi Connectivity:**

  Connects to a Wi-Fi network to send data to the Blynk app.

- **Sensor Integration:**

  Interfaces with IR sensors to detect vehicle presence.

  Works with RFID reader to scan for vehicle identification.

- **Control Components:**

  Controls buzzer to alert vehicle owners.

  Uses LED indicators for status updates.

- **Data Processing:**

  Processes sensor data to detect occupied/non-parking areas.

  Generates challan when RFID card is detected.

- **Communication with Blynk:**

  Sends notifications and challan details to the vehicle owner via Blynk app.

4.2.2 RFID CARD:

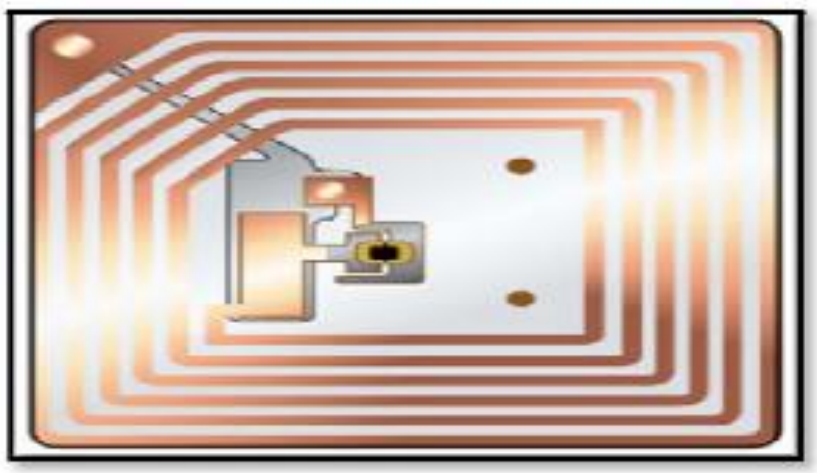


Figure4.3: RFID Card

- **Vehicle Identification:**

  Each vehicle gets a unique RFID card linked to its details.

  RFID reader detects the vehicle's card when it enters a restricted area.

- **Unauthorized Parking Detection:**

  Sensors detect if a vehicle is parked in a non-parking area.

  If no RFID card is detected, a warning buzzer sounds.

- **Challan Generation:**

  When the RFID card is detected, the system retrieves the vehicle details.

  Challan is automatically generated for unauthorized parking.

- **Notification:**

  Challan details are sent to the vehicle owner via the Blynk application.

- **Benefits:**

  Automates vehicle identification and challan generation.

  Reduces human effort and manual intervention.

  Real-time notifications to vehicle owners.

4.2.3 IR SENSOR:

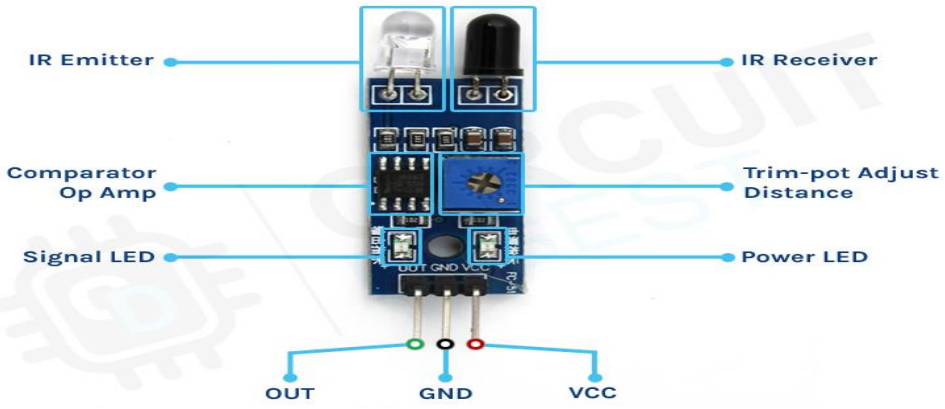


Figure4.4: IR Sensor

- **Vehicle Detection:**

  IR sensors detect when a vehicle enters or parks in a restricted area (non-parking zone).

- **Parking Slot Monitoring:**

  IR sensors monitor parking slots to determine if they are occupied or empty.

- **Obstacle Notification:**

  If a vehicle is detected in a restricted area, a buzzer sounds to notify of the violation.

- **Integration with RFID:**

  IR sensors work with RFID for accurate vehicle detection and to trigger challan generation.

- **Benefits:**

  Cost-effective and simple detection.

  Provides real-time status of parking slots.

  Accurate vehicle presence detection.

4.2.4 Buzzer:

Figure4.5: Buzzer

- **Unauthorized Parking Alert:**

  Buzzer sounds when a vehicle is parked in a non-parking area.

- **Immediate Warning:**

  Provides an instant audio warning for quick response.

- **Works with Other Components:**

  Works alongside IR sensors (vehicle detection) and RFID (vehicle identification).

- **Initial Alert Before Challan:**

  Alerts the driver before the challan generation process starts.

- **Reduces Manual Monitoring:**

  Helps automate violation detection and reduces manual intervention.

4.2.5 Ethernet Shield:

Figure4.6: Ethernet Shield

- **Remote Communication:**

  Connects the system to the internet for remote access.

- **Data Transmission:**

  Sends challan details to the Blynk app or a remote server.

- **Real-time Notifications:**

  Sends real-time alerts to the vehicle owner or admin.

- **Monitoring and Control:**

  Enables remote monitoring and system status updates.

- **Integration with Web Server:**

  Interfaces with a web server for data management.

- **Reduces Manual Effort:**

  Automates data sharing and notification processes.

4.2.6 L293D DRIVER:

Figure4.7: L293D DIVER

- **Motor Control:**

  Controls motors for tasks like gate movement.

- **Bidirectional Control:**

  Allows motors to move in both directions (e.g., open/close gate).

- **Microcontroller Protection:**

  Isolates the microcontroller from high-power motors.

- **Control via Arduino:**

  Sends signals from Arduino to control motor movements.

- **Efficient Power Management:**

  Ensures adequate power for motors without overloading.

4.2.8 DC Motor:

Figure4.9: DC Motor

- **Gate Control:**

  Opens/closes the barrier gate.

- **Bidirectional Movement:**

  Moves in both directions (open/close).

- **Controlled via L293D:**

  Uses the L293D motor driver for precise control.

- **Automated Entry/Exit:**

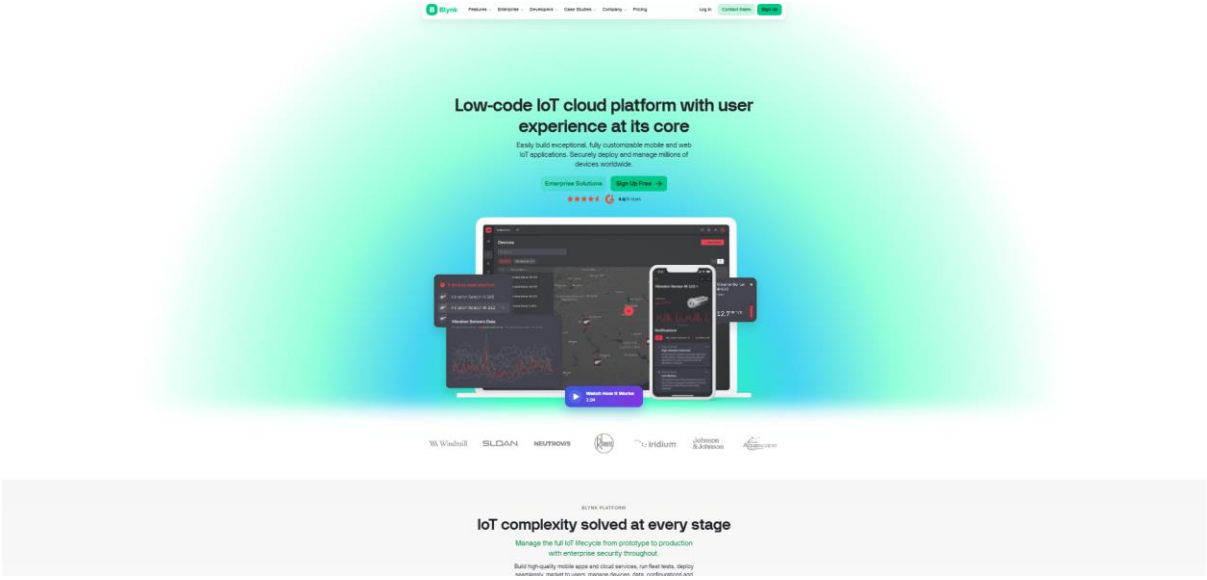
  Opens/closes the gate based on vehicle detection.

- **Energy-efficient:**

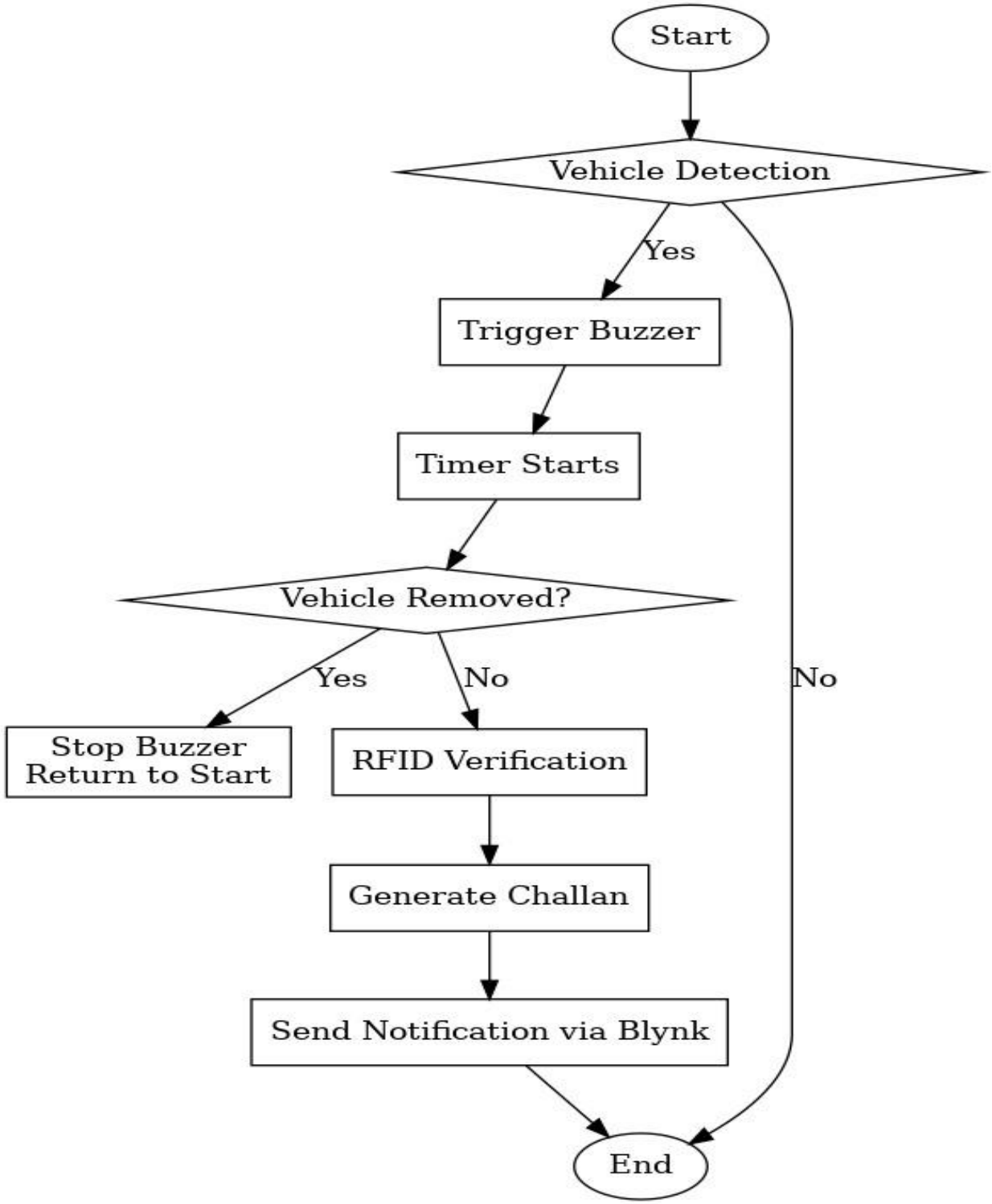
  Power-efficient and easy to control for gate operations.

Software Used:

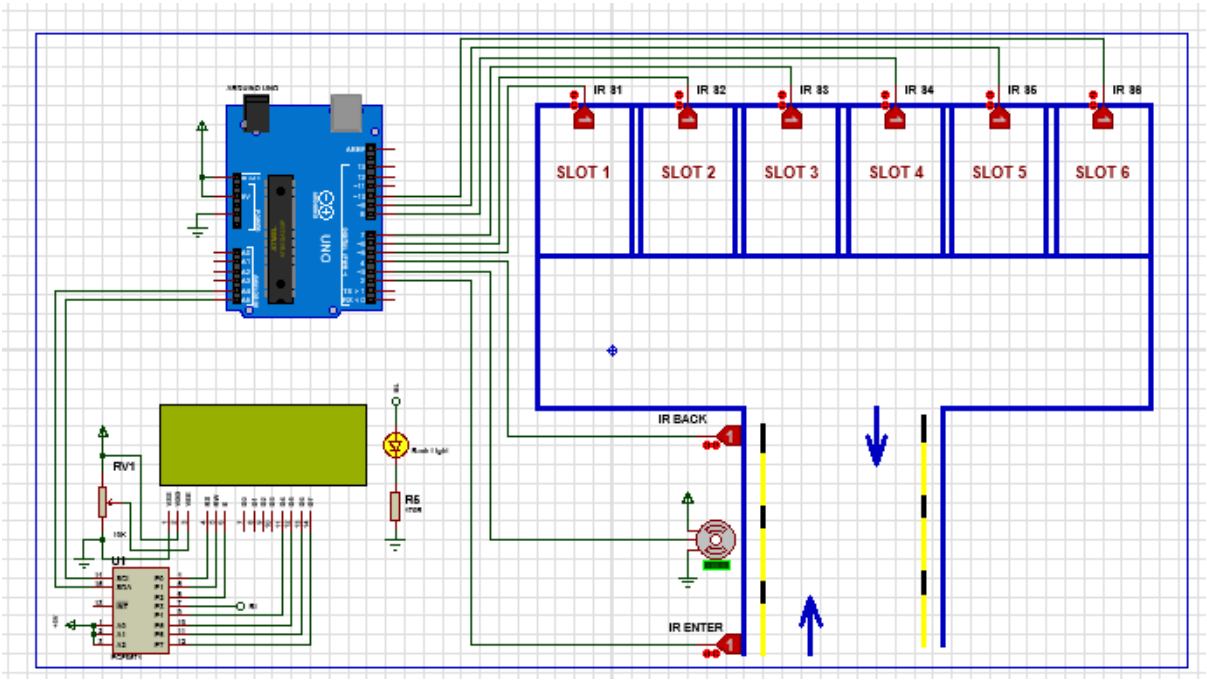
Android Application (Blynk App):



FLOWCHART:


Start
Vehicle Detection
Yes
No
Trigger Buzzer
Timer Starts
Vehicle Removed?
Yes
No
Stop Buzzer
Return to Start
RFID Verification
Generate Challan
Send Notification via Blynk
End

Simulation:


IR S1
IR S2
IR S3
IR S4
IR S5
IR S6
SLOT 1
SLOT 2
SLOT 3
SLOT 4
SLOT 5
SLOT 6
IR BACK
IR ENTER
RV1
R5
U1

CHAPTER 5

EXPECTED OUTCOMES

1. Automated Parking Violation Detection:

Efficient identification of vehicles parked in restricted areas.

2. Reduced Manual Effort:

Automation minimizes the need for human intervention in monitoring and penalizing violations.

3. Real-time Alerts:

Instant notifications to vehicle owners via the Blynk application for violations.

4. Efficient Challan Generation:

Automatic issuance of challans using the RFID system without delays.

5. Improved Parking Management:

Enhanced monitoring of non-parking zones to maintain order.

6. Cost-effective Solution:

Low-cost implementation using components like IR sensors, RFID, and buzzer.

7. Enhanced Public Compliance:

Audible alerts (buzzer) and challans encourage adherence to parking rules.

8. Scalability:

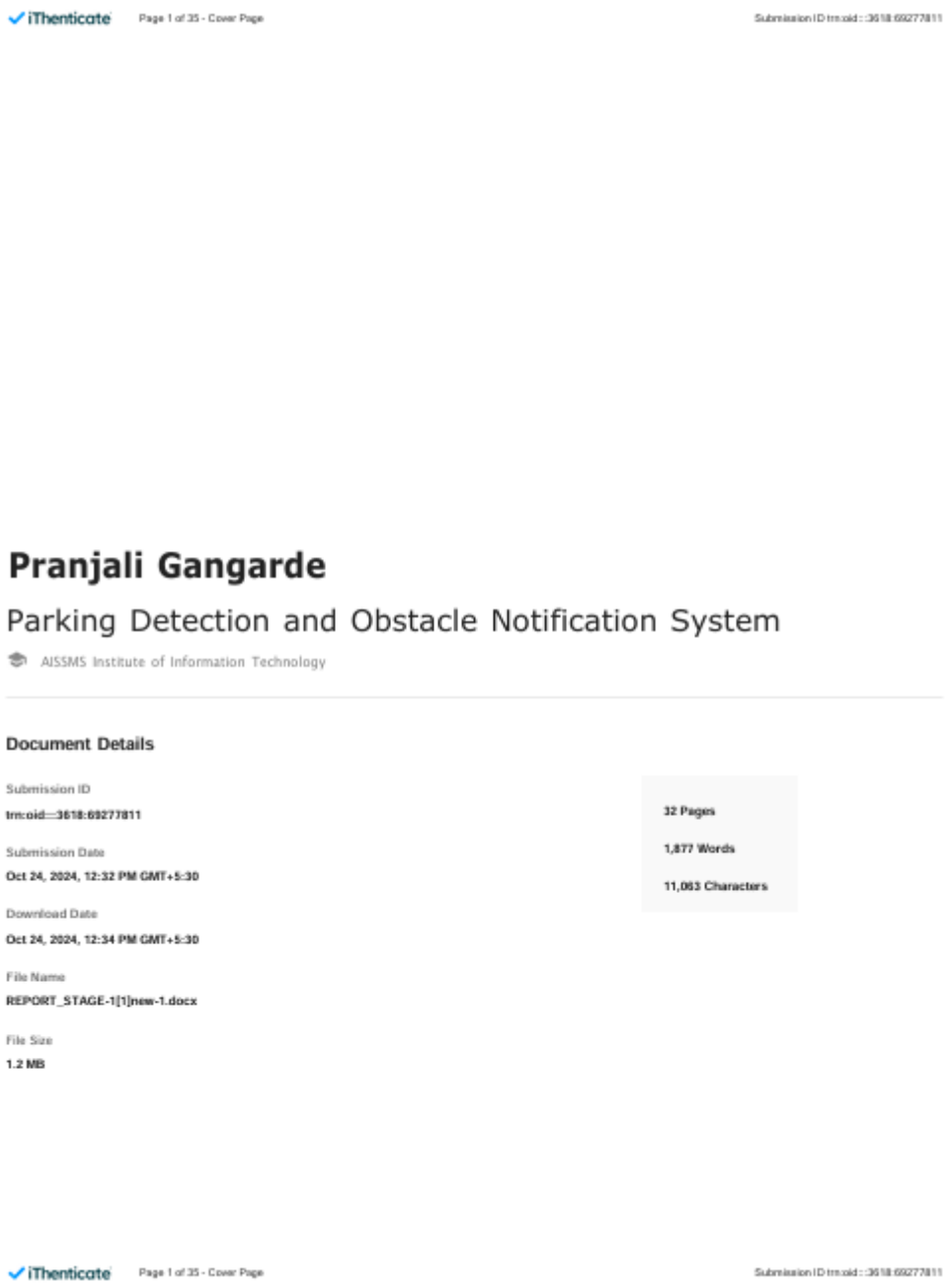
Prototype can be expanded to larger systems for broader non-parking area monitoring.

REFERENCES

- IoT-Based Parking Management System – IEEE Research Paper.
- Arduino and Sensor Documentation (www.arduino.cc).
- Blynk Development Resources (www.blynk.io).
- RFID Overview – Electronics Hub (www.electronicshub.org).
- Ultrasonic Sensor Applications – SparkFun (www.sparkfun.com).

CHAPTER 5

Plagiarism Report



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Pranjali Gangarde

Parking Detection and Obstacle Notification System

AISSMS Institute of Information Technology

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Appendix

Project Title Mapping with POs and PSOs

Project Title:

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