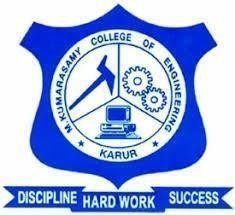
## A Minor Project I Report on

**SMART VEHICLE PARKING SYSTEM**

## Submitted by

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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**M. KUMARASAMY COLLEGE OF ENGINEERING**

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## DECEMBER 2023

**M.KUMARASAMY COLLEGE OF ENGINEERING**

(Autonomous Institution, Affiliated to Anna University, Chennai)

# BONAFIDE CERTIFICATE

Certified that this Report titled **“SMART VEHICLE PARKING SYSTEM”** is the bonafide work of **ABINAYA DEVI.N (927622BEE001), AYYAPPAN.A (927622BEE010), HARIHARAN.S (927622BEE037), JANARATHINABABU.A**

**(927622BEE304)** who carried out the work during the academic year (2023-2024) under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report.

**SIGNATURE SIGNATURE**

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Submitted for Minor Project I (18EEP201L) viva-voce Examination held at

M. Kumarasamy College of Engineering, Karur-639113 on ………………..

#### DECLARATION

We affirm that the Minor Project I report titled “**SMART VEHICLE PARKING SYSTEM”** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** is the original work carried out by us.

|  |  |  |
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* To emerge as a leader among the top institutions in the field of technical education

#### MISSION

* Produce smart technocrats with empirical knowledge who can surmount theglobal Challenges.
* Create a diverse, fully-engaged, learner - centric campus environment to provide Quality education to the students.
* Maintain mutually beneficial partnerships with our alumni, industry, and Professional associations.

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**VISION**

To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

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* **PEO4:** Graduates will practice ethics and have habit of continuous learning fortheir success in the chosen career.

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**PO2: Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

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* **PSO2:** Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.
* **PSO3:** Design, Develop and implement methods and concepts to facilitate solutions forelectrical and electronics engineering related real- world problems.

|  |  |
| --- | --- |
| **Abstract (Key Words)** | **Mapping of POs and PSOs** |
| Vehicle, Smart parking system, IR sensors, LED Lights, LCD Display | PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO9,PO10,PO12,PSO1,PSO2, PSO3 |

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We offer our wholehearted thanks to our Minor project coordinator **Mr.P.Maniraj M.E., Assistant Professor, Department of Electrical and Electronics Engineering,** for his constant encouragement, kind co-operation and valuable suggestions for making our project a success.

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#### ABSTRACT

With the increase in vehicle production and world population, more and more parking spaces and facilities are required. In this project a new parking system called Smart Parking System (SPS) is proposed to assist drivers to find vacant spaces in a car park in a shorter time. The new system uses IR sensors to detect either car park occupancy or improper parking actions. Different detection technologies are reviewed and compared to determine the best technology for developing SPS. Features of SPS include vacant parking space detection, detection of improper parking, display of available parking spaces, and directional indicators toward vacant parking spaces, payment facilities and different types of parking spaces (vacant, occupied, reserved and handicapped) through the use of specific LEDs. This project also describes the use of an SPS system from the entrance into a parking lot until the finding of a vacant parking space. The system architecture defines the essential design features such as location of sensors, required number of sensors and LEDs for each level, and indoor and outdoor display boards.

**SURVEY FORM (SAMPLE)**

#### CHAPTER 1 SURVEY FORM ANALYSIS

**NAME AND ADDRESS OF THE COMMUNITY:**

**Name:** Ms.S. Priya

**Address:** Elango Nagar, Karur.

**Name:** Mr.V.Gopal

**Address:** 1/85 North Street, Karur.

**Name:**Mr.S. Siva

**Address:** 1/88 Kovil Street, Velayuthampalayam

**Name:** Mr.V.Sakthivel

**Address:** Thirukkampuliyur, Sithalavai

**Name:** Mr.K.Sankar

**Address:** Thirukkampuliyur, Sithalavai

#### PROBLEM IDENTIFICATION:

Finding a parking space in most metropolitan areas especially during the rush hours is difficult for drivers. Difficulty arises from not knowing where the available spaces may be at that time traffic congestion may occur .Also identifying and addressing challenges in vehicle parking involves tackling various issues. One primary concern is the lack of real-time space availability monitoring, leading to congestion and inefficiencies. Additionally, traffic flow management poses difficulties, with a need for a systematic approach to guide vehicles efficiently. Problems in security measures further contribute to a suboptimal parking experience. Accessibility issues for individuals with disabilities, environmental impact considerations, and subpar user experiences due to inadequate signage also need attention. Regulatory compliance, maintenance issues, and effective data management for strategic improvements round out the multifaceted challenges in the realm of vehicle parking. Addressing these aspects comprehensively is crucial for optimizing parking systems and enhancing user satisfaction.

#### Paper 1:

**CHAPTER 2 LITERATURE REVIEW**

#### Title: Smart Parking System

**Author:** Anusha, Anushri, Arshitha M S, Geetanjali Bishtannavar.

**Year:** 2019

#### Inference:

The project entitled “THE SMART PARKING SYSTEM” presents an IOT based smart parking system which provides an optimal solution for the parking problem in metropolitan cities. Due to rapid increase in vehicle density especially during the peak hours of the day it is difficult task for the users to find the parking space to park their vehicles. This study proposes a smart parking system based on Arduino components and mobile application. The proposed smart parking system consists of an onsite deployment of an slot module that is used to monitor and signalize the state of availability of each single parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly. Smart parking can increase the economy by reducing fuel consumption and pollution in urban cities.

#### Paper 2

**Title: Smart Vehicle Parking System Using IOT**

**Author:** Lingaswamy Vuyyala, Kalyan Kumar Reddy Geereddy

**Year:**2021 **Inference**:

Car parking is a major issue in many malls and cities. Efficient and smart way to automate the management of the parking system that allocates an efficient parking space using internet of things technology. To avoid that problem, we developed a

project on smart parking system User can find the slot availability, we use IR sensor to find the parking slot on the vacancy position. The project aims at designing an advanced smart parking system. In this system we use IR obstacle sensors as vehicle presence detection and these sensors are connected to Arduino Microcontroller. All 3 IR sensors detect the 3 parking positions corresponding dzta will be post on LCD. Entry IR Sensor used to control dc motor to access the vehicle into parking area for security purpose. Microcontroller sends the status of all IR sensors to LCD modules to display the available slots as well as telnet IOT server. Microcontroller reads the data display over LCD this will reduce waiting time at parking area and by this system we can effectively use parking zone smartly. This proposed system implemented using embedded ‘C’ programming language.

#### Paper 3

**Title: Smart-parking management algorithms in smart city**

**Author**: [Mahdi Jemmali, Loai Kayed B. Melhim,](https://www.nature.com/articles/s41598-022-10076-4#auth-Mahdi-Jemmali-Aff2-Aff3-Aff4) [Mafawez T. Alharbi,](https://www.nature.com/articles/s41598-022-10076-4#auth-Mafawez_T_-Alharbi-Aff5) [Abdullah](https://www.nature.com/articles/s41598-022-10076-4#auth-Abdullah-Bajahzar-Aff2) [Bajahzar](https://www.nature.com/articles/s41598-022-10076-4#auth-Abdullah-Bajahzar-Aff2) & [Mohamed Nazih Omri](https://www.nature.com/articles/s41598-022-10076-4#auth-Mohamed_Nazih-Omri-Aff3) .

**Year:**2022 **Inference:**

Recently, various advanced technologies have been employed to build smart cities. Smart cities aim at improving the quality of life through the delivery of better services. One of the current services that are essential for any smart city, is the availability of enough parking spaces to ensure smooth and easy traffic flow. This research proposes a new framework for solving the problem of parking lot allocation, which emphasizes the equitable allocation of people based on the overall count of people in each parking space. The allocation process is performed while considering the available parking lots in each parking space. To accomplish the desired goal, this research will develop a set of seven algorithms to reduce the gap in the number of people between parking spaces. Many experiments carried out on 2430 different cases to cover several aspects such as

the execution time and the gap calculations, were used to explore the performance of the developed algorithm. Analyzing the obtained results indicates a good performance behavior of the developed algorithms. Also, it shows that the developed algorithms can solve the studied problem in terms of gap and time calculations. The MR algorithm gained excellent performance results compared to one of the best algorithms in the literature. The MR algorithm has a percentage of 96.1 %, an average gap of 0.02, and a good execution time of 0.007 s.

#### Paper 4

**Title: Smart City Parking System**

**Author:** Ahteshamul huq osmani, Ashwini Gawade, Minal Nikam, Swati Wavare

**Year:**2016 **Inference:**

Parking in the city has been a major problem these days. An efficient way to manage the parking system is using Internet of Things (IOT). Traditional parking system commonly uses security ultrasonic sensors, camera or infrared ray sensors to manage the parking areas. However, these systems are not only expensive but time consuming. So it is necessary to have a smart parking system. So, in this system we are using RFID tag to each of the car and also assigning a sensor to each parking slot. Using an android application user may able to see the available parking slot so that it will require less time than previous system. Also, we will provide information to the user about nearest places that is hospitals, hotels, school etc. So, to implement this idea we are using sensors and RFID — Smart city parking, sensors, RFID, Internet of Things (IOT)

#### Paper 5

**Title: Smart Vehicle Parking system using RFID**

**Author:** Adithya V Kumar, Merin Mani, Nafeesathul Nasriya K1 , Rohith C1.

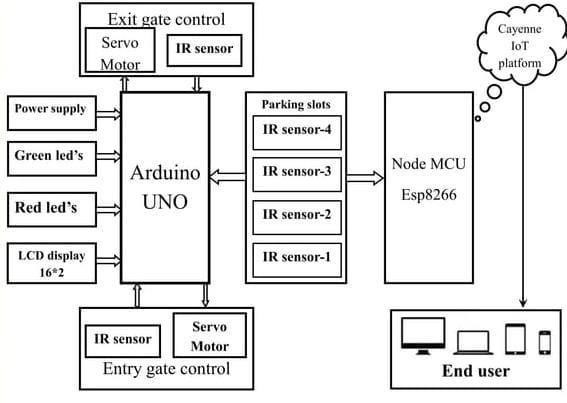
**Year:**2022 **Inference:**

The increasing number of vehicles on road has led to the emergence of a major problem in cities in the form of lack of adequate parking space. Parking is also a major challenge in crowded areas like shopping malls, hospitals, and institutes. Hence this work aims to present an automatic real-time system for automated vehicle parking. This system has been implemented with the help of the internet of things (IoTs) which exchanges information or data between the physical devices. The proposed system has been implemented with the help of ESP32 Node MCU to connect parking area with web or internet. The proposed system incorporated an infrared sensor in each slot for getting information about the vacancy position of the parking slot and an amount will be displayed based on the time taken by vehicle. Every user has a registered RFID tag which helps to manage parking space and a smart car parking app to find parking slots in less time.

#### CHAPTER 3 PROPOSED METHODOLOGY

**BLOCK DIAGRAM**

A smart vehicle parking system's block diagram typically includes components like sensors (such as ultrasonic or infrared), a microcontroller or processor, a communication module (like Wi-Fi or Bluetooth), a database or storage system, and a user interface (could be a mobile app or display). Sensors detect available parking spaces, sending data to the microcontroller. The microcontroller processes this information, relaying it to the database for storage and analysis. The communication module facilitates interaction with users, conveying parking space availability through the user interface. Users can then access this information to find and reserve parking spots efficiently.



#### Fig 3.1 Block Diagram

**DESCRIPTION**

A smart vehicle parking system utilizes advanced technologies such as sensors, cameras, and connectivity to streamline and optimize the parking process. It enables real-time monitoring and management of parking spaces, providing users with information on available spots and guiding them to the nearest open space. The system may incorporate mobile apps for convenient booking, payments, and navigation. Additionally, data analytics can be employed to analyse parking patterns, improving overall efficiency and reducing congestion. With automated features, such as license plate recognition and automated payments, it enhances the user experience while promoting efficient use of parking resources.

#### COST ESTIMATION

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO** | **COMPONENTS DESCRIPTION** | **QUANTITY** | **COST (Rs)** |
| 1 | Arduino uno | 1 | 504 |
| 2 | IR sensor module | 4 | 500 |
| 3 | Servo motor | 1 | 235 |
| 4 | 16\*2 LCD(I2C) | 1 | 345 |
| 5 | Jumper wire | 20 | 184 |
| 6 | Perf Board | 1 | 210 |
| 7 | Card Board | 1 | 212 |
| **TOTAL** | | | **2190** |

**Table 3.1 Cost Estimation**

#### CHAPTER 4

**FUTURE SCOPE & ITS IMPLEMENTATION PLAN**

### The Smart parking system based on Slot booking is implemented, using the Android application. Using the slot allocation method, we can book our own cheapest parking slot. It is an efficient one for solving parking problems, which overcomes the traffic congestion also provides automated billing process. This work could be further extended as a fully automated system using multilayer parking method. Safety measures such as tracing the vehicle number face recognition of the drivers so as to avoid theft & automatic billing process can also be designed. We plan to expand the tests on the real time environment where the users can have the "Smart Parking" system in their handheld devices.

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