

Smart Parking System Using IOT

Prof. Ankita Patil¹, Gayatri Abhang², Vaishnavi Ahirrao³, Anuja Waghmare⁴, Vaibhav Wani⁵

Assistant Professor, Department of Information Technology¹

Student, Department of Information Technology^{2,3,4,5}

SPPU's Zeal College of Engineering & Research, Pune, Maharashtra, India

Abstract: People having vehicles face parking problems in most metropolitan cities, especially during peak hours. The difficulty roots from not knowing where the parking spaces are available at the given time, even if this is known; many vehicles may pursue a small number of parking spaces which in turn leads to serious traffic congestion. This paper focuses on different smart parking techniques developed to overcome said problem using various wireless sensor network and providing real-time data analysis from the sensors, some papers include system based on resource allocation and reservation of parking lot which have various problems in efficiently achieving the goals. The given paper would be useful for new researchers for study of various guided parking and information techniques and algorithms which are covered in this paper.

Keywords: Smart Parking, guided parking, sensors, techniques, algorithm

I. INTRODUCTION

The internet of Things (IoT) is regarded as a technology and economic wave in the Global information industry after the Internet. It has variety of applications ranging from home and industrial automation, healthcare, agriculture, smart grid etc. Moving towards the smart city concept Smart parking system is one of the important applications of IoT. Also, this application of the IoT concept to the urban scenario is becoming more and more interesting as it responds to the strong requirements of public services in order to realize the so-called Smart Cities. In this regard, the IoT can significantly contribute to the design of a smart ability able to answer to user requests in terms of transport network efficiency and social sustainability.

On average, 30 percent of traffic is caused by drivers wandering around for parking spaces. Enabling a sustainable mobility is one of the most challenging goals of the Smart City vision, and within it, the efficient management of parking areas and the development of intelligent parking systems represents a fundamental aspect. This not only causes waste of time and fuel for drivers looking or parking, but also increases air pollution and driver frustration.

So, it is necessary to develop a Smart parking system that overcomes the problems of traditional parking system and that provides drivers with the information about on street parking spot availability and allows driver to reserve the parking spot at destination with minimum time and lesser cost..

II. LITERATURE SURVEY

1. IoT based Smart Parking System is published by Mehela Chandran in 2019 which helps to know about how smart parking system works and also give a proper flow of breakdown and installation of system. The author proposes robotic garage (RG) using Bluetooth which would be used to fully automate the placement of a car in the slot without the aid of the driver. The system automatically checks the unique registration number stored in the Bluetooth chip to check if the new vehicle needs to be parked. This system is a vertical parking arrangement for the vehicles with sensors that confirm placement of the car. Various other sensors are used to confirm that there are no passengers left in the vehicles and then the system moves the vehicle to storage area employing rack and pinion (RaP) mechanism [19]. The author proposes upgraded system to the above, which is deployed with radio frequency identification (RFID) to authenticate at the gate management service (GMS) to assign a definitive slot. The system provides an additional feature to monitor parking lot over the internet.

2. Wireless Sensor Network and RFID for Smart Parking System is published by 1. Manjusha Patil 2. Vasant N. Bhonge in 2013 year. In which we studied about various sensor and its importance as well as working. Also, it helps us to know about how actually RFID tags works in system. Main disadvantage we found that Node-to-node implementation consume more time.

3. New “Smart Parking” System based on Resource Allocation and Reservation which is published in year 2013 by 1. Yanfeng Geng and 2. Christo G. Cassandras. This system found out how actually reserved slot is detected and how it informs to user. While studying this paper we found driver parks his vehicle but forgets to confirm, the system request confirmation until driver says Yes.

4. Intelligent Parking Management System Based on Image Processing published by 1. Hilal Al-Kharushi 2. Ibrahim Al-Bahadly. In this system captured and processes the rounded image drawn at parking lot and produces the information of the empty car parking spaces. A camera is used as a sensor to take photos to show the occupancy of car parking slot. System may affect in weather condition i.e., in terms of visibility. The camera should be in a where it can see all the car parks and not be obstructed by any object.

5. Arduino Smart Parking System based on Ultrasonic Internet of Things (IoT) Technologies which is published in year 2018 by 1. Mahir Hassan Kadhim Ultrasonic sensors technology is used to observe car parking. The Ultrasonic is installed above each parking lot to check the state of the available lot in each park, the use of ultrasonic sensors facilitates the implementation of the high-scale system at low cost. The system provides a mechanism to stop disputes in the car park and manages to minimize wasted time in looking for a parking space

III. EXISTING SYSTEM

As we studied and research IoT based system for car parking there was use of camera to detect object, but in that system may be due to bad weather their possibilities of not capture well image. Due to bad image process, it consumes more time and system may not able to get proper detect information.

2.1 System Architecture and Flowchart

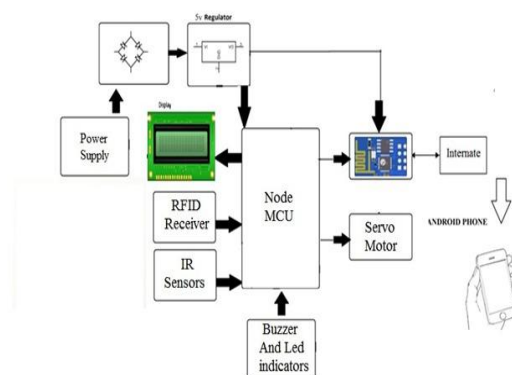


Figure 1: Contains how architecture is design.

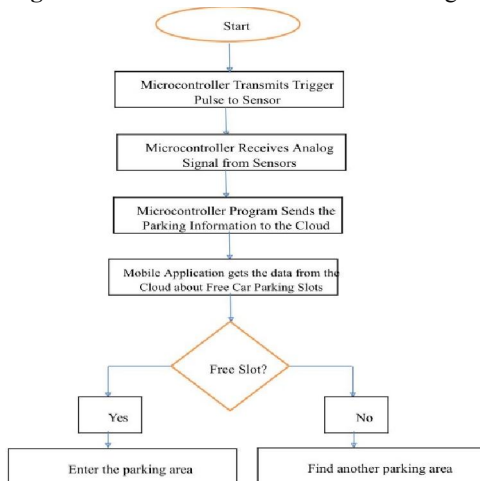


Figure 2: Contains how system is design stepwise.

III. COMPONENTS

Software:

1. **Arduino IDE** the Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the writing project, which provides many common input and output procedures.
2. **Blynk** Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

Hardware:

Node MCU

NodeMCU stands for **Node Microcontroller Unit**. It is an open-source Lua-based firmware that is designed for IoT (Internet of Things) applications. The Node Mcu is an open-source firmware and development kit that helps you to Prototype your IOT product within a few Lua script lines.

IR sensors

The IR Sensor-Single is a general-purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The high precision IR receiver always detects an IR signal

Servo Motors

Tiny and lightweight with high output power, this tiny servo i Helicopter, Quadcopter or Robot. durability. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially si (arms) and hardware.

LED Lights

A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting.

LCD Display

This LCD2004 is a great I2C interface for 2x16 and 4x20 LCD displays. With the limited pin resources, your project may be out of resources using normal LCD shield. With this I2C interface LCD module, you only need 2 lines (I2C) to display the Discription: information. If you already have I2C devices in your project, this LCD module actually cost no more resources at all.

RFID Cards

Radio Frequency Identification The ISO Smart Card is a contact less 125 kHz read- only RFID (Radio Frequency Identification) card developed by Elan group for access and time control applications. The cards, are optionally available with HICO/LOCO magnetic strip and high-quality double sided print.

RFID Reader

The EM-18 RFID Reader module operating at 125kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a Weigand output.

Buzzer

A tiny speaker that you can connect directly to an Arduino. You can make it sound a tone at a frequency you set. The buzzer produces sound based on reverse of the piezoelectric effect.

USB Cable

The NodeMCU and the micro: bit are both powered by a 3.3VDC voltage source obtained from a USB cable. The USB cable provides +5VDC to the embedded boards which steps down the main source voltage to +3.3VDC.

IV. METHODOLOGY

Stage-1: When car enters the parking area RFID reader that is present at entry IN gate will read the card details of user and vehicle and the gate will be opened after verifying record. If record is not match gate will remain closed.

Stage-2: The car will enter into the parking area at that time person doesn't know which slot is empty, for this there will be an indication of LEDs for every slot when the light doesn't glow then slot is empty. When the red-light glows, the slot was filled. By this the person easily know which slot is empty.

Stage-3: The operation of exit side will be same as that of the entrance. When the car is leaving the parking area, the RFID sensor that is present before the OUT gate will detect the passing vehicle through its card and the gate will be opened automatically.

Stage-4: In front of the parking area, there will be an LCD display that is used to show the status of ongoing process like data verification, park your car etc. Also on web it shows time and remaining balance of card holder.

V. DESIGN MODEL AND RESULT

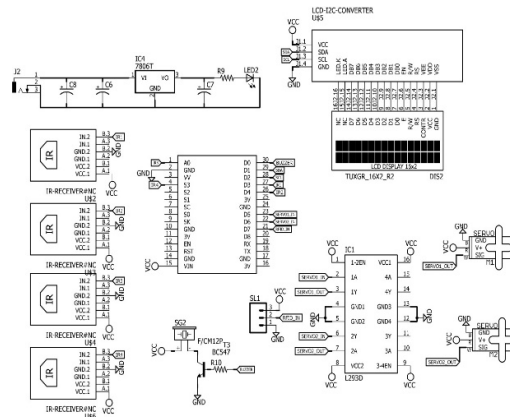


Fig 3. Circuit Diagram of Model



Fig 4. Design Model and Result

VI. CONCLUSION

- The System Benefit of Smart Parking Go Well Beyond Avoiding Time Wasting
- This Project Focuses on Implementation of Cars Parking Place Detection Using Internet of Things
- The System Can Be More Enhanced by Providing the Route to The Selected Parking Location with The Help of Global Position Search System.
- Developing A Smart Parking Solution with a City Solves the Population and Pollution Problem

FUTURE SCOPE

The future scope of IoT is paving its way to make the world a smarter place to live in. In this blog on the future scope of IoT, we will see various areas of the application of Internet of Things. System may help students to learn about various unction and working. The Arduino is going to reduce the minimum volume necessary to include a control and sensing system with a product. Instead of spending large amounts of money to build hundreds of inflexible circuit boards, the Arduino will allow businesses to bring many more unique devices to market at lower breakeven volumes. We'll see a lot lower-volume customized product.

REFERENCES

- [1] Rico, J., Sancho J., Cendon, B., & Camus, M. (2013, March). Parking easier by using context information of a smart city: Enabling fast search and management of parking resources. In Advanced Information Networking and Applications Workshops (WAINA), 2013 27th International Conference on (pp. 1380-1385). IEEE.
- [2] Zheng, Y., Rajasegarar, S., & Leckie, C. (2015, April). Parking availability prediction for sensor-enabled car parks in smart cities. In Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), 2015 IEEE Tenth International Conference on (pp. 1-6). IEEE.
- [3] Zhou, F., & Li, Q. (2014, November). Parking Guidance System Based on ZigBee and Geomagnetic Sensor Technology. In Distributed Computing and Applications to Business, Engineering and Science (DCABES), 2014 13th International Symposium on (pp. 268-271). IEEE.
- [4] International Parking Institute, "2012 Emerging Trends in Parking".
- [5] T. N. A. M. Pham, M. Tsai, and D. U. C. B. Nguyen, "A Cloud-Based Smart-Parking System Based on Internet-of-Things Technologies," pp. 1581–1591, 2015.
- [6] S. A. El-seoud, H. El-sofany, and I. Taj-eddine, "Towards the Development of Smart Parking System using Arduino and Web Technologies," no. 978, pp. 10–16, 2016.
- [7] R. H. Giva Andriana, Anak Agung, "Sensor Comparison for Smart Parking System," pp. 4–9, 2012.
- [8] N. Hazrin, H. Mohamad, M. H. Badiozaman, and H. Daud, "Smart Parking Reservation System using Short Message Services (SMS)," 2008.
- [9] M. N. M. Yasin and S. K. Khamas, "Measurements and Analysis of a Probe-Fed Circularly Polarized Loop Antenna Printed on a Layered Dielectric Sphere," in IEEE Transactions on Antennas and Propagation, vol. 60, no. 4, pp. 2096-2100, April 2012.