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# Smart Vehicle Parking Slot Booking System with Automatic Billing Using Android Application

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**ABSTRACT:** In recent years the number of vehicles increased drastically and many times the car owners struggle to find the proper parking space within the city. IOT has great potential in implementing many of the smart city infrastructure requirements. Traffic congestion and the scarcity of car parking space have given a lot of opportunity for the research scholars to work in this field. In this paper we have proposed a smart car parking and reservation system. The proposed system is being controlled by an android app so as to reduce human intervention. This system reduces the traffic congestion and hence fuel consumption. Booking of free slot for parking in advance is being done with the help of mobile application either using PC or mobile phone. This system can be used to book a free car parking slot within the city.

**KEYWORDS:** IR Sensor, RFID Reader, RFID Tag, Servomotor, LCD, Buzzer, WSN, UART, Smart parking technology.

## I. INTRODUCTION

In addition to the population, the number of vehicles is also increasing day by day. However, the parking infrastructure of the country is yet to be developed in an efficient way. Usually, people park their vehicles by violating traffic rules, resulting in mismanagement of the overall traffic systems of a city. The Smart Parking System can be used to handle such situations. Using a smart parking system, drivers can quickly find and secure an empty parking lot in any car park, which they find suitable. Also, entry and exit points are made available to them by introducing a trouble-free payment system. In this modern age, the need for a smart parking allotment system is now a popular topic. Because the world is densely populated, and people often buy vehicles and other facilities for automobiles. Even as those things, get more and more day -by-day. This can also be helpful for those who have places that can be used as parking lots and can earn revenue from this type of system in which both car owners and landowners can benefit. A parking system is a system used to help control cars in another's parking lot to prevent congestion and to park cars in a designated area. The system also helps to track how many cars are passing through the gate and how long it takes. Then it calculates how much the car has to pay when it exits. The main aim is to connect the car owner to the property owner. The sensor reduces the fears of people who need to park their cars. The users will be provided with specific information on vehicles and parking lots so that they can access the data from the car or car parking area.

## II. LITERATURE SURVEY

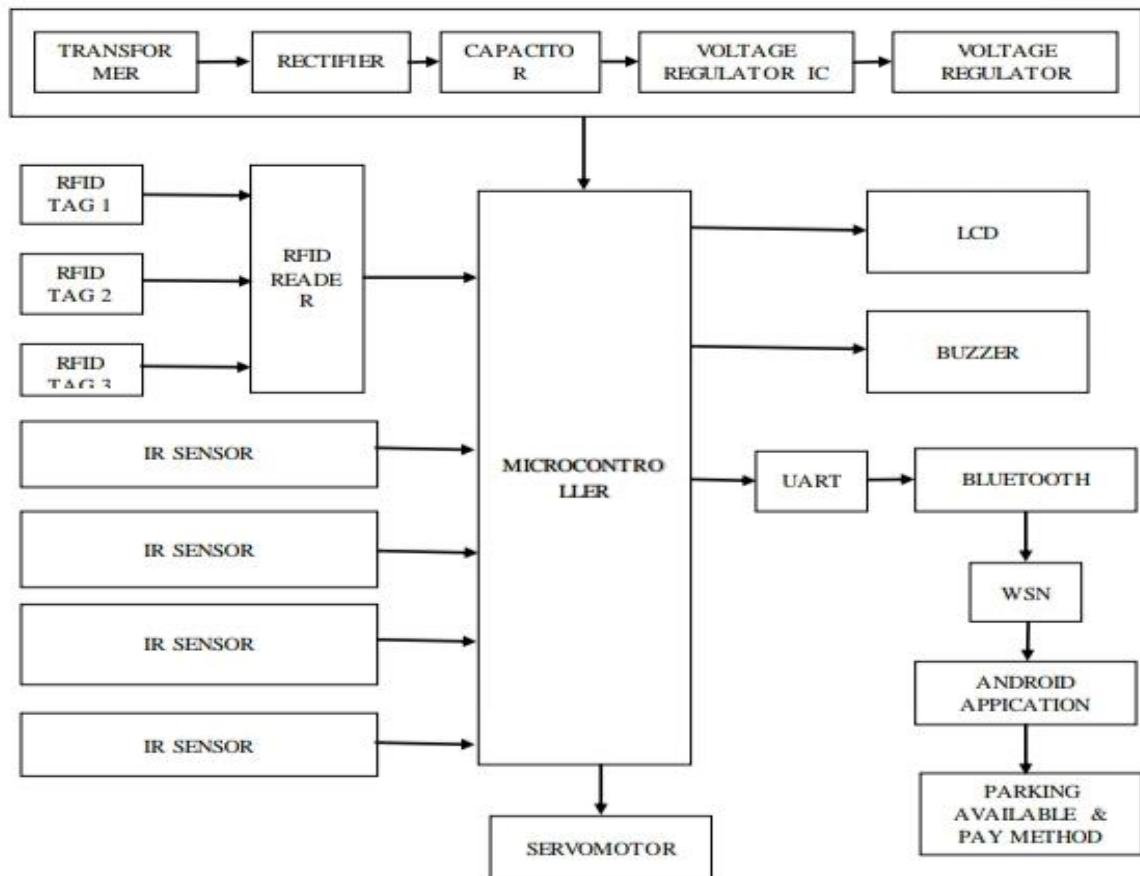
Many nations are adopting smart city applications, which boost residents' satisfaction with their living conditions and reduce pollution by better-using people's time and resources. Multi-Location parking garages are standard in smart cities because they allow for better access control and space allocation to avoid traffic and delay in complex business areas. The Internet of Things (IOT) has the potential to link billions of devices and services worldwide, at any time, and for a wide range of uses. Smart parking is currently one of the most talked-about subjects in IOT research. More than a million cars are on the roadways of a contemporary major city, but more parking spots are needed to accommodate them. The main idea of the research is to link multiple parking stations as a single unit using IOT and to design a shared parking system to avoid delays in parking. An intelligent parking system is proposed in this research to help users overcome the challenge of locating parking and reduce the time spent searching for the closest accessible parking

spot. In order to ensure the safety of highly restricted places such as residential areas, military bases, and government buildings, the system has developed to serve as the centralized automatic vehicle identifier for owner identification. When a vehicle enters the parking station, the slot number will display with the vehicle number and capture the Driver’s image to maintain vehicle security. If the slots are unavailable, the model displays the corresponding parking station slot number to avoid delay. The image processing technique is applied to recognize the driver/owner of a vehicle while leaving the parking station to avoid the theft of vehicles and to enhance vehicle security. Suppose a driver is allowed or denied access to a particular parking station. In that case, they can see this information clearly on the user interface installed at the exit gate. The proposed algorithm is an Intelligent Face Recognition based Multi-Location Linked IOT-based for secure car parking that reduces parking delay with better efficiency levels. The proposed system also reduces traffic congestion, saves drivers valuable time and money, innovative natural resource usage, lowers pollution, wastage of fuel, and improves vehicle security. The proposed model exhibits better performance when contrasted with traditional models.

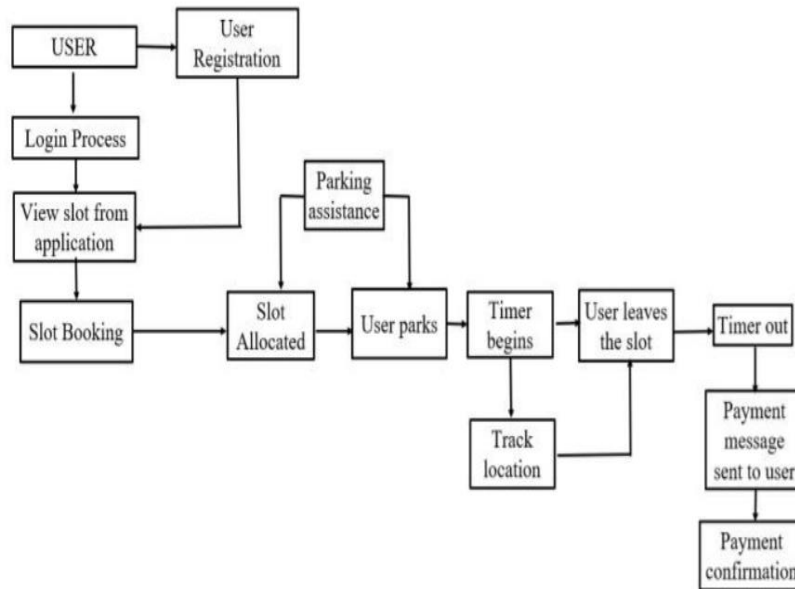
### III. PROPOSED SYSTEM

In this proposed system we using a IR sensor, RFID reader, RFID tag, Servomotor, LCD, BUZZER, WSN, Bluetooth. It deploy a IR sensors to monitor parking spaces in real-time. Allow users to check real-time parking availability, reserve parking spots, and make electronic payments through the app. It allow users to pay for parking electronically using the mobile app, reducing the reliance on physical payment methods. Minimize vehicle emissions and fuel consumption by reducing the time spent searching for parking through guidance systems.

### IV. BLOCK DIAGRAM



V. FLOW CHART



VI. HARDWARE DESCRIPTION

SMPS

SMPS (switch mode power supply) is the power source of the whole IoT device. **WIFI MODULE** In this project, we have used Node MCU (Micro Controller Unit) ESP8266-12E. The Node MCU contains Wi-Fi module. Node Microcontroller has ROM which can be used to upload a program.

IR Proximity Sensor

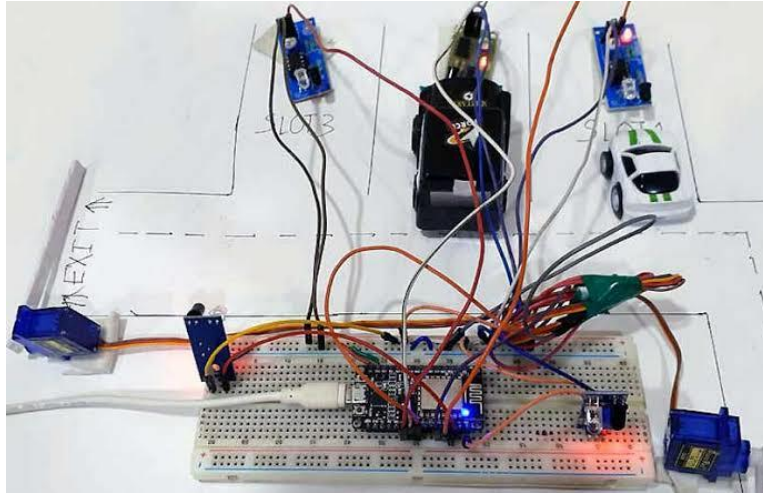
IR or Infrared Obstacle Sensor Module has two part IR transmitter and IR receiver that sends out IR energy and looks for reflected IR energy to detect presence of any obstacle in front of the sensor module. The sensor has very good and stable response even in ambient light or in complete darkness. An IR sensor consists of an IR LED and an IR Photodiode. Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations. Hence, they are called IR LED's. Based on the intensity of the reception by the IR receiver, the output of the sensor is defined.

Bluetooth Beacon

HM-10 Bluetooth is used as BLE beacon for navigation. Beacons are small, wireless transmitters that use low-energy Bluetooth technology to send signals to other smart devices nearby. They are one of the latest developments in location technology and proximity marketing. They connect and transmit information to smart devices making location-based searching and interaction easier and more accurate. Setting up Bluetooth module as BLE beacon to navigate the location.

RFID

Radio Frequency Identification or RFID comprises of two components: reader and tag. Reader is a device which emits radio waves and accepts the signal from tags. Tags are used to store information of data. There are two types of tags: Passive and Active tags. EM-18 RFID reader and 125KHz RFID tags are used for payment.



## VII. SOFTWARE DESCRIPTION

### ARDUINO IDE



The **IDE** connects to the **Arduino hardware**, allowing you to upload programs and communicate with the boards. Embedded C language is used to develop microcontroller-based applications. Embedded C is an extension to the C programming language including different features such as addressing I/O, fixed-point arithmetic, multiple-memory addressing, etc. In embedded C language, specific compilers are used.

## VIII. CONCLUSION

The implementation of real-time parking space monitoring, smart guidance systems, and automated payment processes significantly optimizes the utilization of parking spaces. This results in reduced traffic congestion, time savings for drivers, and a positive environmental impact by minimizing fuel consumption and emissions associated with searching for parking. The "Smart Car Parking System" is not only a technological upgrade to parking management but also aligns with broader smart city initiatives. Its integration with smart city infrastructure contributes to connected urban environments, efficient traffic management, and data-driven planning for optimized parking infrastructure.

## IX. FUTURE SCOPE

- [1] As cities worldwide move towards becoming smarter and more connected, integrating this parking system with broader smart city initiatives could be advantageous. This could involve collaboration with local governments or private organizations working on smart city projects.
- [2] Expanding the system to other platforms such as iOS or web applications can broaden its reach and accessibility to a larger user base.
- [3] Offering customization options and white-label solutions for businesses or organizations interested in deploying the parking system can create additional revenue streams and market opportunities.

## REFERENCES

- [1] Y. Saleem, P. Sotres, S. Fricker, C. L. de la Torre, N. Crespi, G. M. Lee, R. Minerva, and L. SÁnchez, “IoTRec: The IoT recommender for smart parking system,” *IEEE Trans. Emerg. Topics Comput.*, vol. 10, no. 1, pp. 280–296, Jan.2022.
- [2] J. Zheng, R. Ranjan, C.-H. Chen, J.-C. Chen, C. D. Castillo, and R. Chellappa, “An automatic system for unconstrained video-based face recognition,” *IEEE Trans. Biometrics, Behav., Identity Sci.*, vol. 2, no. 3, pp. 194–209, Jul. 2020.
- [3] M. Zhaofeng, M. Jialin, W. Jihui, and S. Zhiguang, “Blockchainbased decentralized authentication modelling scheme in edge and IoT environment,” *IEEE Internet Things J.*, vol. 8, no. 4, pp. 2116–2123, Feb. 2021.
- [4] X. Liu, J. Yang, C. Zou, Q. Chen, X. Yan, Y. Chen, and C. Cai, “Collaborative edge computing with FPGA-based CNN accelerators for energy-efficient and time-aware face tracking system,” *IEEE Trans. Computat. Social Syst.*, vol. 9, no. 1, pp. 252–266, Feb. 2022.
- [4] T. Friedrich et al., “Routing for on-street parking search using probabilistic data,” *AI Commun.*, vol. 32, no. 2, pp. 113–124, 2020, doi: 10.3233/AIC-180574.
- [4] K. Gkolias and E. I. Vlahogianni, “Convolutional neural networks for on-street parking space detection in urban networks,” *IEEE Trans. Intell. Transp. Syst.*, vol. 20, no. 12, pp. 4318–4327, Dec. 2019, doi:10.1109/TITS.2018.2882439.
- [5] H. S. Jomaa, J. Grabocka, and L. Schmidt-Thieme, “A hybrid convolutional approach for parking availability prediction,” in *Proc. Int. Joint Conf. Neural Netw. (IJCNN)*, 2019, pp. 1–8, doi: 10.1109/IJCNN.2019.8852400.



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