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Smart Parking Using Android

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Abstract

The Smart Parking System using Android helps solve urban parking problems by providing real-time slot availability. Sensors detect whether parking spaces are occupied or vacant and send data to a server. A web application allows users to check and book parking easily. The system reduces traffic, saves time and fuel, but depends on internet connectivity and has initial setup costs. It improves parking management efficiency and enhances user convenience. Future improvements can include mobile app integration, GPS navigation, and online payment features.

Keywords: Smart Parking System; Android Application; IoT; Cloud Database; GPS Navigation; Real-Time Data Processing; Digital Payment; Parking Reservation.

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Introduction

The Smart Parking System using IoT is developed to address the increasing difficulty of finding parking spaces in urban areas. As the number of vehicles grows rapidly, traditional parking methods become inefficient, leading to traffic congestion, time wastage, and frustration among drivers. This system provides a smart and automated solution using Internet of Things (IoT) technology. In this system, sensors such as ultrasonic or infrared are installed in each parking slot to detect whether it is occupied or available. The collected data is sent to a microcontroller and then transmitted to a server through the internet. The backend processes this data and updates it in real time. A web-based application allows users to view available parking slots, book spaces in advance, and manage their bookings easily. Additionally, the system helps in better utilization of parking spaces and reduces unnecessary vehicle movement. It also supports real-time monitoring, making parking management more efficient and reliable. This solution is highly useful for smart cities, where efficient traffic and parking management are essential for sustainable urban development.

Literature Review

Dheeven Kumar,R.,et al. (2023) The paper depicts an IoT-based smart parking system for efficient space management. It uses ultrasonic sensors to detect whether parking slots are occupied or vacant and updates the data in real time. The system provides a web-based interface where users can check parking availability easily.

Nooripour, M., et al. (2024) The paper presents a comprehensive review of smart parking systems based on different technologies such as IoT, cloud computing, and wireless communication. It explains how real-time data collection and processing improve parking efficiency.

Sharma, R., et al. (2024) The paper depicts an IoT-based parking system using NodeMCU and sensors to monitor parking availability. It provides real-time updates through a web application and allows users to check available slots remotely. The system reduces manual effort and improves convenience. However, it depends heavily on continuous internet connectivity for proper functioning.

Patel, S., et al. (2025) 3 The paper depicts a smart parking system integrated with IoT and machine learning. It predicts parking availability based on previous data and user patterns. The system improves decision-making and reduces congestion

K. Reddy et al (2025): it focused on enhancing user convenience through location-based services. The system uses GPS to guide users to the nearest available parking space and allows advance booking through a mobile application. This approach significantly reduces the time spent searching for parking and minimizes fuel consumption. However, the system depends heavily on internet connectivity and accurate location tracking, which can affect performance in certain environments.

Proposed methodology

The block diagram illustrates the overall working of the Smart Parking System using IoT in a clear and systematic way. The system is designed using multiple hardware components that work together to automate the parking process and improve efficiency. At the entrance and exit points, IR sensors are installed to detect the movement of vehicles. Whenever a vehicle enters or exits, these sensors send signals to the ESP32 microcontroller, which acts as the central processing unit of the system. It continuously receives and processes data from all connected sensors. Inside the parking area, each parking slot is equipped with a sensor (such as ultrasonic or IR sensor) to detect whether the slot is occupied or vacant. These sensors provide real-time updates to the ESP32, allowing the system to maintain accurate information about parking availability.The processed data is then displayed on an LCD screen, which shows the number of available parking slots. This helps drivers quickly understand the parking status without manually checking each slot, saving both time and effort.

Block diagram:

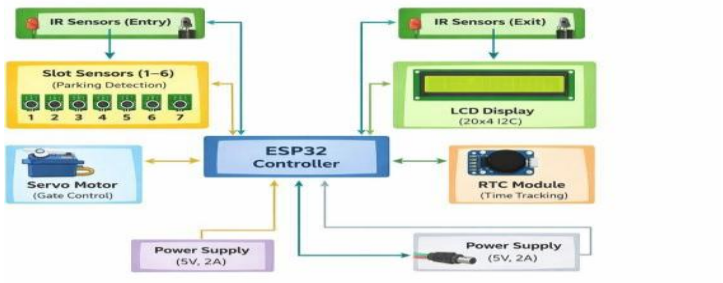

Fig.1. *Block Diagram*

A servo motor is connected to control the entry gate. When a vehicle is detected and parking space is available, the ESP32 sends a signal to the servo motor to open the gate automatically. If no parking space is available, the gate remains closed, preventing unnecessary entry.The RTC (Real-Time Clock) module is used to maintain accurate time records. It helps in tracking vehicle entry and exit time, which can be useful for billing, monitoring, and future analysis of parking usage. All components in the system are powered by a regulated 5V power supply to ensure stable and continuous operation. The system can also be connected to the internet to enable real-time data monitoring and integration with web or mobile applications. Overall, the Smart Parking System improves parking management by reducing manual effort, minimizing traffic congestion, saving time, and providing a smooth and automated experience for users. It is a scalable and efficient solution suitable for modern smart city infrastructure.

Product hardware description

Servo Motor

Fig.2 *Servo Motor*

A servo motor is a rotary actuator used for precise control of angular position. It includes a motor, gear train, control circuit, and feedback sensor. The motor is controlled using PWM signals and can typically rotate from 0° to 180°. Servo motors provide high torque relative to their size and are widely used in robotics

ESP32

Fig.3 *ESP32*

The ESP32 is a low-cost and low-power System-on-Chip (SoC) microcontroller with built-in Wi-Fi and Bluetooth capabilities. It is developed by Espressif Systems and is widely used in Internet of Things (IoT) applications due to its high performance and versatility.

The ESP32 is an advanced version of the ESP8266, offering better processing power, faster speed, and more features. It comes with a dual-core processor, multiple GPIO pins, and supports various communication protocols such as UART, SPI, and I2C.

IR Sensor

Fig.4 *IRSensor*

An IR sensor is used to detect objects or measure distance using infrared light. It consists of an IR LED that emits light and a photodiode or phototransistor that detects the reflected light. The sensor provides a digital or analog output depending on the detected object. It is commonly used in smart parking systems to detect whether a parking spot is occupied or vacant. IR sensors are compact, low- cost, and easy to interface with microcontrollers like ESP32.

Circuit Diagram

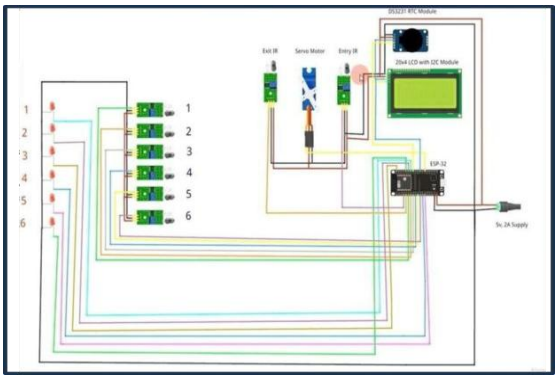

***Fig 4**: Circuit Diagram*

The circuit diagram shows how all the components of the Smart Parking System are connected and work together in a simple and smart way. At the center of the system is the ESP32, which acts like the brain and controls everything. Each parking slot has an IR sensor placed in it. These sensors continuously check whether a slot is empty or occupied. Whenever a car parks or leaves, the sensor detects the change

and sends that information to the ESP32. This helps the system always know the real-time status of all parking spaces. There are also two IR sensors placed at the entry and exit points. These sensors detect when a vehicle enters or leaves the parking area. Based on this, the system updates the number of available slots automatically.

Results and Discussions

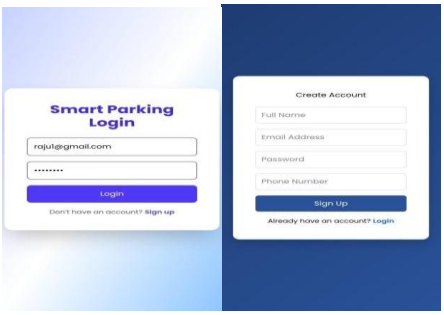

***Fig 5**: Login & Signup Page*

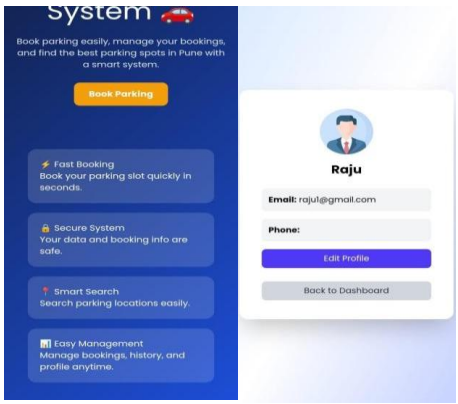

***Fig 6**: Home & profile Page*

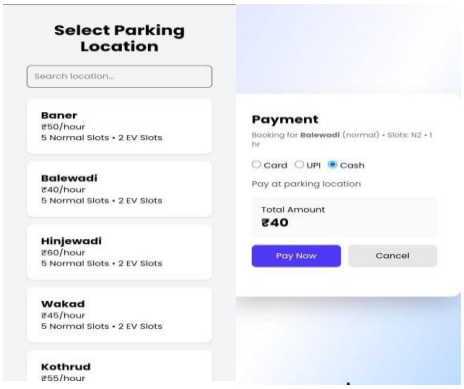

Fig 7: *location & payment Page*

Conclusion

The Smart Parking System using IoT offers a practical and efficient solution to the increasing parking problems in urban areas. As the number of vehicles continues to grow, traditional parking systems are becoming less effective, leading to traffic congestion, time loss, and inconvenience for users. This system uses sensors, a microcontroller like ESP32, and a web-based interface to provide real-time information about parking availability. It helps users easily find and book parking spaces without the need for manual searching. The automated gate control and live updates make the system user-friendly and efficient. By reducing the time spent searching for parking, the system also helps in saving fuel and minimizing traffic congestion. It improves overall parking management and provides a better experience for users. Although the system has some limitations, such as dependency on internet connectivity and hardware setup costs, it still proves to be a valuable solution. In the future, with the integration of mobile apps, AI, and smart city technologies, the system can become even more advanced.

References

1. Idris, M. Y. I., Leng, Y. Y., Tamil, E. M., Noor, N. M., Razak, Z., & Fong, K. W. (2009). Parking guidance system utilizing wireless sensor network and ultrasonic sensor. Information Technology Journal, 8(2), 138–146. https://doi.org/10.3923/itj.2009.138.146
2. Geng, Y., & Cassandras, C. G. (2013). A new “smart parking” system infrastructure and implementation. Procedia - Social and Behavioral Sciences, 54, 1278–1287. https://doi.org/10.1016/j.sbspro.2012.09.839
3. Lin, T., Rivano, H., & Le Mouël, F. (2017). A survey of smart parking solutions. IEEE Transactions on Intelligent Transportation Systems, 18(12), 3229–3253. https://doi.org/10.1109/TITS.2017.2685143
4. Kotb, A. O., Shen, Y. C., Huang, Y., & Zhu, H. (2017). Smart parking guidance, monitoring and reservations: A review. IEEE Intelligent Transportation Systems Magazine, 9(2), 6–16. https://doi.org/10.1109/MITS.2017.2666586
5. Revathi, G., & Dhulipala, V. S. (2019). Android based smart parking system using IoT. International Journal of Innovative Technology and Exploring Engineering, 8(6), 1550–1554. https://doi.org/10.35940/ijitee.F3871.048619
6. Khanna, A., & Anand, R. (2016). IoT based smart parking system. 2016 International Conference on Internet of Things and Applications (IOTA), 266–270. https://doi.org/10.1109/IOTA.2016.7562735
7. Perković, T., Šolić, P., Zargariasl, H., Čoko, D., & Rodrigues, J. J. P. C. (2020). Smart parking sensors: State of the art and performance evaluation. Journal of Cleaner Production, 262, 121181. https://doi.org/10.1016/j.jclepro.2020.121181
8. Barone, R. E., Giuffrè, T., Siniscalchi, S. M., Morgano, M. A., & Tesoriere, G. (2014). Architecture for parking management in smart cities. IET Intelligent Transport Systems, 8(5), 445–452. https://doi.org/10.1049/iet-its.2013.0189
9. Bock, F., Di Martino, S., & Origlia, A. (2021). Smart parking: Using machine learning and mobile applications for urban mobility optimization. Future Generation Computer Systems, 114, 760–772. https://doi.org/10.1016/j.future.2020.08.021
10. Shaikh, S., & Bhalerao, S. (2022). Android application-based intelligent parking management system using cloud and IoT. Wireless Personal Communications, 123(4), 3107–3125. https://doi.org/10.1007/s11277-021-09176-y