E-TOKEN GENERATING PARKING SYSTEM USING IOT

PriyaDharshini R[1], Visali S [2], Dr.R. Lavanya [3]

[1,2]UG Scholar, Department Of Information Technology, Aalim Muhammed Salegh College Of Engineering, Tamilnadu, India

[3] Assistant Professor, Department Of Information Technology, Aalim Muhammed Salegh College Of Engineering, Tamilnadu, India

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Abstract – *The E-Token Generating Parking System using IoT revolutionizes traditional parking management by integrating Internet of Things (IoT) technology to enhance efficiency and user experience. This system employs IoT sensors installed at parking spots to detect vehicle presence and vacancy status in real-time. When a vehicle enters, the sensor triggers an electronic token generation mechanism linked to a centralized server. The server assigns a unique token to the vehicle, facilitating automated entry and exit management*

Key components include IoT sensors, a centralized server, and a mobile application or web interface for users to request tokens and monitor availability remotely. The system optimizes parking space utilization by providing real-time updates on available spots, reducing congestion and wait times. Users benefit from a seamless experience where they can effortlessly locate and reserve parking, minimizing stress associated with urban parking challenges.

Moreover, the system enhances security through automated monitoring and alerts, ensuring safety for both vehicles and users. By leveraging IoT's capabilities, this innovative parking solution offers a scalable, efficient, and user-friendly alternative to traditional parking management systems, catering to the growing demands of modern urban environments.

Key Words: FCFS, PR, RR, DGP, LCD, IR, QR code

1. INTRODUCTION

The project endeavors to develop an e-token generating parking system using iot through the integration of Arduino and E-token technology. Arduino's real-time monitoring and allocation of parking space are complemented by E-token's secure reservation management. This amalgamation optimizes space utilization, elevates user experience, and offers adaptability to fluctuating demands. Additionally, it enhances security by mitigating risks of unauthorized access. Furthermore, the system contributes to environmental sustainability by reducing congestion and carbon emission, fostering an eco-friendly urban environment. Arduino's versatility empowers the system to dynamically adjust parking allocations, ensuring efficiency even during peak periods or special events. Meanwhile, E-Token technology provides users with unique tokens containing reservation details, simplifying entry and facilitating effective tracking. This fusion of simplicity and innovation epitomizes the project's sophistication, offering a comprehensive solution to contemporary parking challenges. In summary, the integration of Arduino and E-Token technology in the e-token generating parking system using iot signifies a substantial leap in modernizing parking infrastructure. It addresses various aspects of parking management while promoting efficiency, security, and environmental consciousness. By streamlining operations and enhancing user convenience, the system sets a precedent for future developments in urban mobility and smart city initiatives.

2. Existing System

The current system employs parking cameras and image processing for real-time detection of available parking slots, facilitated by fog nodes connecting to the cloud. While this setup enables efficient processing of parking requests and real-times information dissemination, a not able drawback is the absence of information regarding the shortest path to available slots. This limitation may result in increased fuel consumption for users navigating parking lots, highlighting a potential area for improvement in user experience and environmental impact mitigation.

2.1 Disadvantages

The existing system will send the information from the cameras to fog nodes and it takes higher time for processing of these image.

The user will not be aware of the shortest available parking slot in the parking space and also the user will not know if there are any available parking slots in the parking space before entering.

Resources such as fuel and time are wasted in search of the parking slot. The search for the parking slot will also lead to accidents because the user will be focused on the road while searching.

3. Proposed system

The paper advocates for the integration of IR sensors to ensure continuous processing,enabling users to register via a dedicated webpage and receive E-Tokens. An LCD display promptly communicates parking slot availability, while a servo motor facilitates gate access upon registration

completion. Utilizing IR sensors, the system accurately detects vehicles forefficient slot allocation. This streamlined approach enhances user convenience by providing real-time updates and automating gate operations. By combining web-based registration, sensor-driven monitoring, and servo-controlled mechanisms, the system optimizes the parking experience while minimizing human intervention. Such integration not only improves operational efficiency but also enhances usersatisfaction by offering a seamless and hassle-free parking process. The proposed system stands poised to revolutionize parking management through its innovative utilization of IR sensors and web technology, promising to address contemporary challenges in urban parking environments.

3.1 Advantages

The main advantage of this paper is, the user can easily find the nearest availableparking slot with the help of shortest path detection.

Resources such as fuel and time of the user can be saved. The display will display if there are any parking slots available even before the user enters the parking space.
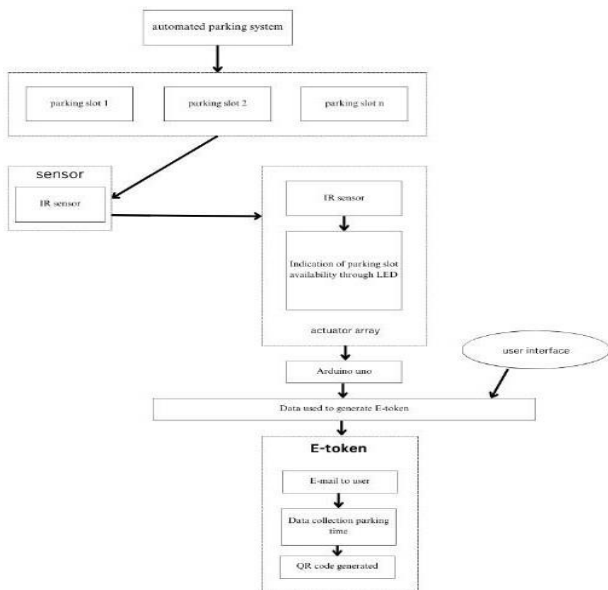
4. Architecture

Figure -1: Architecture of e-token generating parking system using iotusing iot

Different Algorithms & Sensors used in Automated parking system

In e-token generating parking system using iotusing IOT, the algorithms play a very vital role for giving the nearest empty parking lot, traffic management at a time of entry and exit, Load balancing at each entrance of very large and complex parking area.

There are many algorithms are used in E-TOKEN GENERATING PARKING SYSTEM USING IOT using IOT are :

   I.   ALGORITHMS :

- FCFS (Queue Allocation for car)

- PR (Priority based allocation of car in queue)

- RR (Round Robin for Load Balancing)

- SSEA (for optimal parking lot allocation)

- DGP (Use for finding exact location of car in space)

- Dijkstra and ACO (finding Shortest path) Etc…

   II.   SENSORS :

- LED

- IR Sensors

5. Results obtained

The following pictures show the result obtained for the paper and each one of the pictures are described.
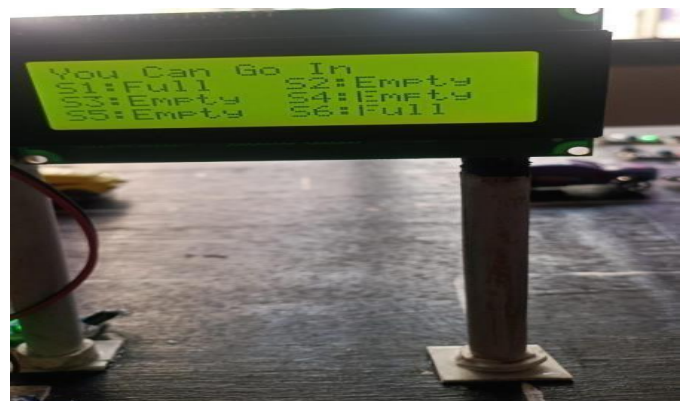

Figure-2 Implementation of Automated parking system.

Figure-3 Implementation of slots in Automated parking system

Figure-4 registration page.
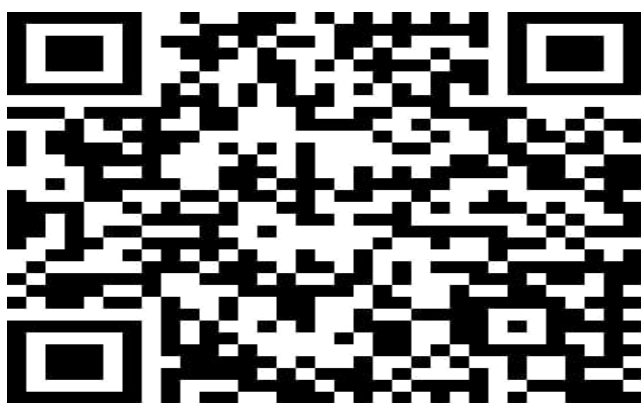

Figure 5- E-token for user

Figure 6- finally user get the qr code vai email

6. CONCLUSIONS

Integrating camera imagery with sensor data to rectify fog drawbacks represents a significant advancement in overcoming visibility challenges in foggy conditions. By combining the strengths of both technologies, this enhancement promises to improve safety, efficiency and reliability in a wide range of application.

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