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AUTOMATIC SMART PARKING SYSTEM

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Abstract— In modern era of rapid growth and development, the demand for cars has increased gradually. With the demand, the problem of finding the appropriate parking space is now a key challenge. To remember the place where one has parked the car in the crowd of 500-600 cars is a troublesome situation for anyone. Unwanted use of parking space because of the lack of the lack of feasibility and payment method leads to a huge loss for the vendors of parking space. Finding an appropriate parking space needs a lot of time. The advanced developed parking ecosystem can solve much of the problem mentioned above. A hassle-free system will help both vendor and user to overcome most of problem as well as it eases the payment method and saves time. The use of QR (Quick Response) code and a dedicated app can overcome the problems of the existing system. And its purpose is to enable the municipalities to manage and reduce the parking traffic on streets and this type of parking was invented by AUGUSTE PERRET in 1905 Paris. And we have different types of systems such as Ground sensor, Counter, Overhead technologies are using in this system. In this System features are included like google maps to find a car park, live information around hours and availability and directions and distance and also for smart parking System magnetometer ultrasonic sensors are used in this System this parking strategy human innovation effort to as few resources as possible time and space to achieve faster easier and denser parking they remain idle.

Keywords—QR code Generator, Mobile scanner, Parking spot, space allocation.

1. INTRODUCTION

Use of automobiles is increasing day by day which leads to various parking issues. The main problem is to manage parking in congested areas. One of the congested areas is college campus. However, improving parking on campus is important. As the population increases day by day the rate of utilization also increases and coping up with the numbers becomes a task. A smart car parking system gives a visual output indicating an available parking space rather than driving aimlessly. The driver looks up to the row of LED lights and their color to deduct a

result of determining the parking space availability. There is always computation for parking space a good Parking solution to overcome parking crises smart parking can be use as advance technologies for efficient operation, monitoring and management of within a urban mobility Strategy. The global market for smart parking System reaches 3.5 million, with the United States representing 46% market share, and offering a strong growth opportunity for companies offering services in the United States and Overseas. In the 21ST Century finding a free car slot becoming a mind-numbering process. Especially for people who travel in the morning are they daily routine they find difficult to get a parking slot for their cars.

2. EXISTING METHODOLOGY

Automatic smart parking system (APS) this method was actually adopted in year 1905 This smart parking system involves the use of sensors to detect sensors to detect the presence of a vehicle in a parking spot and reserve the spot if it is available. The system then guides the driver to the reserved spot using a navigation system and assists the driver in parking the vehicle through visual or audible instructions. The system also calculates parking fees and facilitates payment through a payment gateway. Upon departure, the system updates the availability status of the parking spot. The Overall aim of a smart parking system is to reduce the time and effort required for drivers to find parking spots while improving the efficiency of parking facility.

3. PROPOSED METHODOLOGY

When a vehicle enters the parkin slot then QR CODE Scanner will scan the QR CODE on the parking ticket and register time. Then the microcontroller will check the availability of parking spots by analysing the data collected by the parking sensors If parking spot is available the microcontroller will assign the spot to the vehicle and send a signal to the parking sensor to indicate that spot is occupied. When User returns their vehicle, they van use the mobile app to pay for their parking and the microcontroller will release the parking spot.

4. SYSTEM ARCHITECTURE

5. ADVANTAGES

- Less cost
- Accurate allocation
- Ease of use
- Less maintenances

6. DISADVANTAGES

- More data required
- More internet
- Requires internet connection

7. MODULES

- **QR Code Generator:** This module generates unique QR codes that are used to identify each vehicle and parking space. The codes can be scanned by users with their smartphones or other devices to gain access to the parking lot.
- **Parking Management System:** This module manages the parking lot and ensures that each vehicle is assigned to the correct parking space. It tracks the availability of parking spaces and helps to optimize the use of the available space.
- **Mobile App:** This module allows users to easily find and reserve parking spaces, make payments, and receive notifications about their parking status. It can also provide directions to the parking lot and other useful information.
- **CCTV Cameras:** This module provides security surveillance of the parking lot to deter theft and vandalism. It can also be used to monitor traffic flow and detect any issues that may arise
- **Analytics and Reporting**: This module collects data on parking usage, revenue, and other key metrics. It can generate reports and insights that can be used to improve the efficiency and profitability of the parking system.

8. SYSTEM IMPLEMENTATION

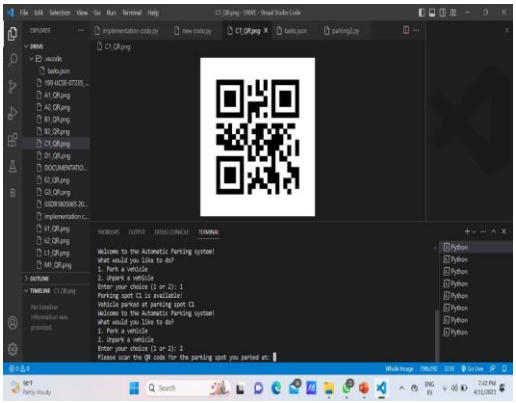
System Design: Determine the requirements and objectives of the parking system, including the number of parking spaces, payment options, user interface, and integration with existing systems.

Hardware Setup: Install the necessary hardware components, such as parking sensors, CCTV cameras, and QR code scanners, at appropriate locations within the parking lot. Ensure that the hardware is properly connected and configured.

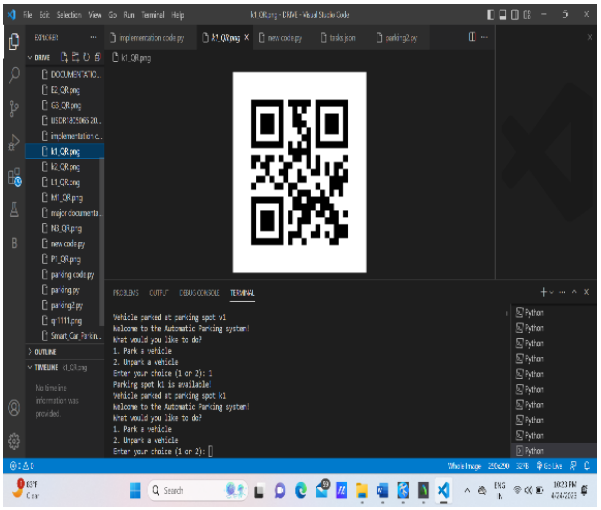
Software Development: Develop or acquire the software modules required for the QR parking system, including the QR code generator, parking management system, payment gateway, mobile app, and analytics/reporting tools. Customize the software to match the specific needs of the parking lot.

Integration: Integrate the different software modules with each other and with external systems, if required. For example, integrate the payment gateway with the parking management system to enable seamless payment processing.

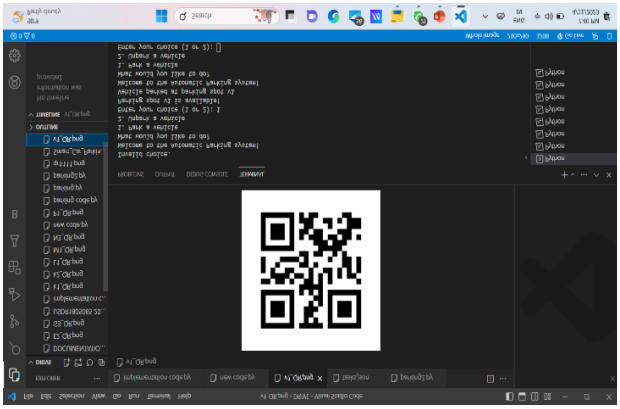
9. RESULT ANALYSIS



9.1 OUTPUT sample image1



9.2 OUTPUT sample image2



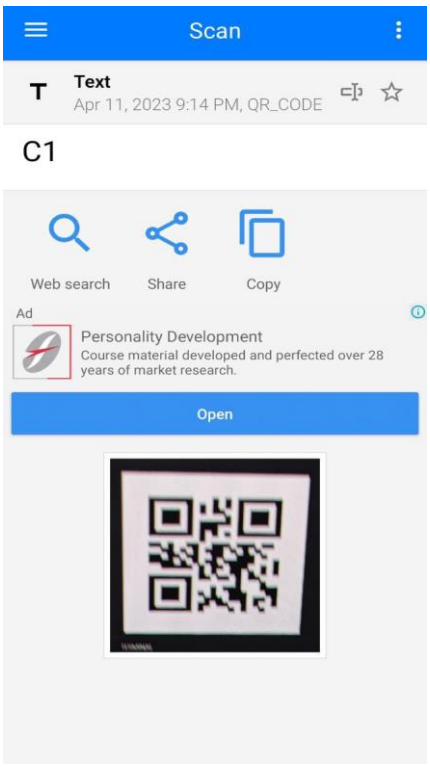
9.3 Output sample image 3

The driver would approach the parking space while enters the parking spot V1 entrance then scan QR code on parking sign.

The system would recognize the QR code and assign the driver a parking spot

- A QR code V1 is placed at that parking spot.
- Drivers can scan the QR code using smart phone's camera.
- The system will display on map of available parking sports area.
- The driver can select V1 parking spot and reserve using smart phone.
- Once the drivers can select a spot, they can scan the QR code again to conform arrival.

- The system will automatically open the gate and allow driver to park.
- When driver leaves, they can scan the QR code again to conform their departure and system will automatically calculate the parking fee.



9.4 Output sample image 4

10.CONCLUSION

- Automatic smart parking system provides several benefits, such as reducing the time and effort required to park a vehicle, improving the efficiency of parking lot management, and providing real-time information on parking lot occupancy. Additionally, this system can integrate with payment gateways and databases to store payment and parking lot information, making it easier to manage and analyse data.

10. FUTURE SCOPE

Smart parking systems will be able to collect and analyze real time data to optimize parking availability and pricing in future smart parking systems will be designed as user-friendly for customers, like mobile payments and real time availability and also self-driving cars become more prevalent, smart parking systems will need to communicate with these vehicles to optimize the parking experience,

Finally automatic smart parking system looks bright, with continued advancements in technology and growing demand for innovative transportation solutions.

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