

QR Based Smart Parking System

Ashmitha H A¹, Manaswini B C¹, Meghana Arun¹, Navya N C¹, Roopashree H R²

¹Student, Department of Computer Science and Engineering, GSSS Institute of Engineering and Technology for Women, Mysuru, Karnataka, India.

²Associate Professor, Department of Computer Science and Engineering, GSSS Institute of Engineering and Technology for Women, Mysuru, Karnataka, India.

Corresponding author: navyachandramouli29@gmail.com

Abstract: - In this project, we present an IoT based GUI integrated smart parking system. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to signalize the state of availability of each single parking space. By using ultrasonic sensors, if the parking space is available then the vehicle is provided the parking slot. That is known by Led lights which glows when the parking space is available. Before entering the parking space, the vehicle owner should have been already registered by giving the details like name, vehicle number and phone number. When the user enters the parking space should enter his phone number and his details will appear on the screen and is directed to park where ever there is led light on. After sometime while leaving the parking area the user need to pay the parking fee by scanning the QR code at the exit of the parking area. If they fail to do so, the camera present in the premises will inform the concerned authority with the vehicle details.

Key Words: — IOT, Smart vehicle parking, GUI Display, Ultrasonic Sensor, Raspberry Pi, QR code Scanning.

I. INTRODUCTION

The recent growth in economy and due to the availability of low price cars in the market, an average middle-class individual can afford a car, which is a good thing. However, the consequences of heavy traffic jam, pollution, less availability of roads and spot to drive the motor car. One of the important concerns, which is to be taken in accounting, is that problem of parking those vehicles. Though, if there is space for parking the vehicle but so much time is squandered in finding that exact parking slot resulting in more fuel intake and not also environment friendly. It will be great deal if in some way we find out that the parking itself can provide the precise vacant position of parking slot then it'll be helpful not limited to the drivers also for the environment. Therefore, many innovations are created to find solution.

A. Proposed System

The proposed system is being designed to overcome all the problems that have been identified in the existing system and to create a proper mechanism to handle the public issues addressed by the citizens. The system also proposes an idea to build an application that connects local people to the higher authorities in the Administration Office. "SPS" is the proposed Smart Parking System which uses GUI as its main component in order to avoid the manual operation. Using this system there will be no congestion in traffic or waiting for too long in queues to find an empty parking space. Need not to

depend on just cash for the payment as this system is cashless and need not to worry about the change. The GUI Display is fixed at the parking slot where user enters his details. The system verifies the user and it also allows users to register if he is not registered before parking his vehicle in the parking space. After registering it instructs the user where to park his vehicle in the GUI display. With the help of ultrasonic sensors and led lights one can know where to park very easily. QR code will be available at the exit of the parking area, when the user scans it the default amount will be deducted

B. Advantages of Proposed System

- Drivers are directed straight to an available parking spot. Therefore, they waste fewer kilometres driving around in circles looking for vacant parking space.
- Obviously, by driving more efficient when in search of parking space, you will save on fuel waste. Resulting in spending less money on petrol.
- Additionally, by driving fewer kilometres when in search of parking space, you will save valuable time which can be spent on work, fun or hobbies. Resulting in spending less money on petrol.
- Drivers are less distracted looking around for a spot because they know where they can park their car. They will have their full attention on the road. By

having their eyes on the road, accidents will decrease and safety will increase for themselves, other drivers and pedestrians.

- Driving through the same street over and over again, cars breathing down your neck and no parking spot to be seen. Having uncertainty and pressure to find a parking spot near your destination can be very stressful. With the use of smart parking, you know where the available parking space is located. You can drive straight to an open parking spot, stress-free.

II. SYSTEM ARCHITECTURE

System architecture is a conceptual model that defines the structure, behavior and more views of a system.

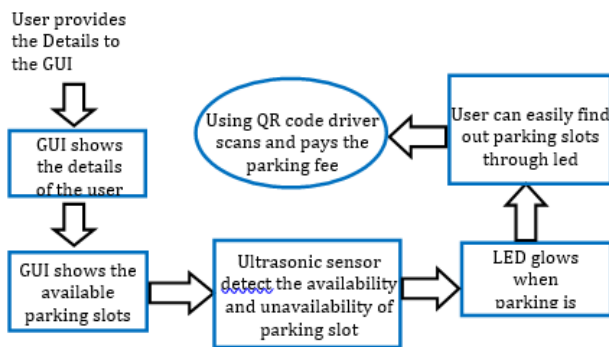


Fig.1. System architecture

The smart car parking system architecture consists of Ultrasonic sensors, Raspberry pi, red and green LEDs, GUI Display. The block diagram for the proposed system is shown in Fig.1.

Ultrasonic sensor: The ultrasonic sensor is used to detect the availability and the non-availability of the vehicle parked or not. Then the parking slot is allotted to the driver to park his vehicle.

LED: When the ultrasonic sensor detects the available parking space the led glows and when the parking space is not available the led does not glow.

GUI display: GUI is used to identify the vehicle unique number of an already registered or a new vehicle owner. It forms a database so that the admin can identify the vehicle

and allot the parking space easily. The GUI will have the details of the registered vehicles only and will only allow those vehicles for parking slot.

QR Code Scanning: QR code will be available at the exit of the parking area, when the user scans it the default amount will be deducted.

III. EXPERIMENTAL RESULT

The parking vacancies are listed on the webpage which can be accessed by phone, tablet, and laptop before entering into car parking system. The empty slot is indicated by a green LED.

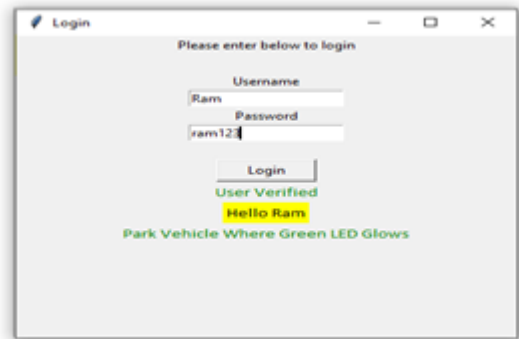


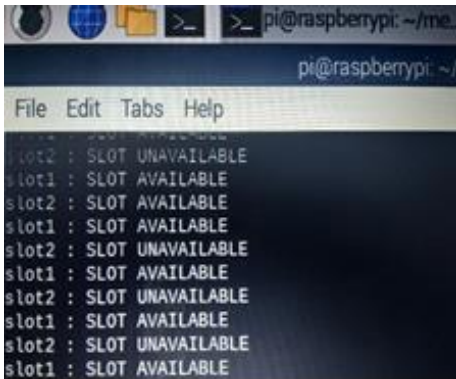
Fig.2. Login page for the Registered and Verified Vehicle

In Fig 2, After the registration, user can login and park the car wherever the led glows.



Fig.3. Registration of the Vehicle

In Fig 3, The user will register by giving the details like name, vehicle number and password.



```

pi@raspberrypi: ~/me
pi@raspberrypi: ~
File Edit Tabs Help
slot2 : SLOT UNAVAILABLE
slot1 : SLOT AVAILABLE
slot2 : SLOT AVAILABLE
slot1 : SLOT AVAILABLE
slot2 : SLOT UNAVAILABLE
slot1 : SLOT AVAILABLE
slot2 : SLOT UNAVAILABLE
slot1 : SLOT AVAILABLE
slot2 : SLOT UNAVAILABLE
slot1 : SLOT AVAILABLE
slot2 : SLOT UNAVAILABLE
slot1 : SLOT AVAILABLE

```

Fig.4. Availability of slots are shown on the terminal

In Fig 4, This is the output that is shown on the terminal when the ultrasonic sensor detects the vehicle as slot available and when it does not detect the vehicle it shows slot unavailable.



Fig.5. Hardware part where the ultrasonic sensors and led lights

In Fig 5, when ultrasonic sensor detects the vehicle, led glows and if there is no vehicle detected then led does not glow at all.

IV. FUTURE ENHANCEMENTS

The system proposed by various authors help us effectively in reserving as well as eliminates the need for the searching of the parking space in private parking lot. Many researchers have implemented systems which have dynamic arrangements scheme for satisfying the different needs of drivers and service providers, which is based on real time parking information. Hence, we conclude that this paper is very useful for new researchers for innovation of new techniques to manage the problem faced by the drivers on day to day basis. The table contains the advantage and disadvantage of various systems implemented by researchers. In future work, we innovate this system which is not only used

in a particular parking area available, but can be extended and also be implemented on various other platforms such as railway stations, airports etc. This will make the parking spaces efficiently, by eliminating the need of the manual labour work.

V. CONCLUSIONS

Our project has achieved the goals of an optimized parking fee structure where user find the best spot available, saving time, resources and effort. The parking lot fills up efficiently and the space can be utilized by commercial and corporate entities, also avoids the traffic queues. This does the job of reduced traffic, where traffic flow increases have fewer cars are required to drive around in search of an open parking space. It reduces pollution where an optimal parking solution will significantly be driving time, thus lowering the amount of daily vehicles emission and ultimately reducing the environmental footprints. It provides enhance user experience and also increase safety of this system.

The main intension of this prototype is to develop a parking system using internet of things. Since IOT is the trending area on the internet to access information remotely and the world is moving towards digitalization, our prototype provides a provision to register through GUI and views the toll transactions, promoting the cashless transactions and highlighting visibility on webpage the entrance of the system. Ultrasonic sensor is present at every slot and monitors to detect the presence of the vehicles and update to the cloud database. These features collectively alleviate traffic congestion, reduce fuel consumption and provide user friendly interface to access the parking and toll facility under one roof.

REFERENCES

- [1]. KARMA T shteen Dorjee, "RFID-Based Automatic vehicle parking system using microcontroller ", 'IJETT', feb 2016, volume 32 number, ISSN:2231-5381, page-192-194, south Sikkim, India.
- [2]. R. Yusnita, Fariza Norbaya, and Nora winawati Bashuruddin, "intelligent parking space detection system based on the image processing", 'international journal of innovation, management and technology', june 2012, volume 3 number, paper no 3, page no 232-235, university Malaysia perlis, Malaysia.
- [3]. Mr. john nair, based on innovative smart car parking system with NFC access, IJETR, april 2015, volume 3 number, Issn: 2321-0861, page- 476-478, India.
- [4]. Sarika Barambe, "Automated Toll Collection System Using NFC and Theft Vehicle Detection", 'IJECS', April 2016,

volume 05 no, paper no 05, page number 16107-16110,
Bharathi vidyapeeth engineering college Pune, India.

- [5]. Jhanvi Nimble based “Automated smart car parking system”, IJAES march 2010, volume-3 number, ISSN-2394:2835, page 49-51, Talegaon Dabhade Pune.
- [6]. A Cloud-Based Smart-Parking System based on internet of things technologies, 2169-3536.
- [7]. Alberto Carini and Silvia Malatini., “Automated Toll plaza System using RFID”, IEEE Transactions on Signal Processing, vol.16, pp.1558-1563, 2008.
- [8]. International journal of computer science and mobile computing a monthly journal of computer science and information technology ISSN 2320-088x IJCSMC, vol. 4, issue. 2nd February 2015, pg.216-224 2010.
- [9]. L. Wenghong, X. Fanghua, L. Fasheng Design of inner intelligent car parking system international conference on information management, innovation management and industrial engineering (2008).