



IOT Makes Importance in Parking of Vehicles with Security and Time Management

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ABSTRACT

Now a days the urban areas phasing more problem of car parking. Parking a vehicle at appropriate place is becomes big issue with lack of parking facilities and increased amount of vehicle day to day. Due to this the driver searching for parking space they were roaming around the city in peak hours. This causes traffic, waste of time and money. In the existing system there is a facility to book park area through online. When vehicle enters in the gate of parking then it will check the information of the owner by using RFID. But there may be the more possibility that the car may run by any person. If any mischief happen during parking then car owner will held responsible rather than driver. So in this paper we used IOT based smart parking system. The proposed smart parking that allow people to reserve parking in advance by booking online through the driver adhar card number who drives the car. So that the IOT system keeps the track of information of particular vehicle owner information and its driver information at the time of parking.[1],[3]

Index Terms— Biometric Machine , Internet of Things, IR Sensor, Mobile, Parking Management System , RFID, Ultrasonic Sensor,

I. INTRODUCTION

In urban areas finding parking space is difficult in rush hours. The world tending towards giving more importance to the education, most of the people in the world are leaving sin the city. Because of this the cities have reached full rush. There is very less open area. This becomes major drawback of parking area. People completely depend on vehicle for their convenience to move around their area. Situation becomes more difficult to park vehicles in less space. They spend their precise time on searching parking slots to park their vehicles. Thus congestion occurs in the traffic it leads to a hectic job to find the parking space to park their vehicle.

In this paper we not only reserve park area but we take authentication from the driver who drives particular vehicle by taking adhar number which is very unique during booking time. Also we take his/her finger prints on biometric during parking. No matter who is the owner of the vehicle, only it counts the vehicle number, its registration number and driver information who is very much responsible person during the full time of parking.

The smart parking system that we propose is implemented using a Raspberry pi based parking sensor it detects the empty parking spaces by using pi camera[4]. It takes the responsibilities of sending data to server to store the data. This enhances the user to check the status/availability of parking spaces before setting their journey.

We use Radio-frequency identification (**RFID**) for getting the information about the vehicle and which connects directly to the data base of adhar card information through Raspberry pi. We use biometric machine to identify the driver information which gives inputs to the raspberry Pi.



Fig 1.RFID- Radio-Frequency Identification.[1][5]

II. EXISTING SYSTEM

Recently, there are quite a few proposals for IOT based Parking systems. In the literature survey most of which are based on arduino, RIFD based proposals. But there is no authentication of the drivers. So it may cause any type of misbehavior.

In this paper we proposed the ADHAR NUMBER which is very much unique and also cost of the parking hours also calculated.

III .PROPOSED SYSTEM

We refer in proposed system IOT technology. Which is the Internet of Things (IoT). It is a system of interrelated computing devices, mechanical and digital machines, objects, people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

The proposed system is the combination of the hardware and software to form a complete module. In this System we are using to exchanging of all the information or data between mobile or laptop and sensor circuitry by biometric machine with raspberry system.

In the proposed system we are giving most importance to the ADHAR NUMBER which is very much unique number.

Also we have taken importance to calculate the amount to be paid for parking from online while booking.

Even we maintained the time slot period for booking.

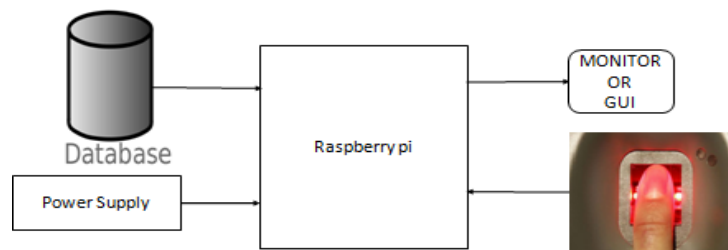


Fig. 2 Connecting Biometric with Raspberry[6]

3.1 BIOMETRIC

The biometric scanner is very important device that is used is a fingerprint scanner. This fingerprint scanner system has two basic jobs -- it needs to get an image of your finger, and it needs to determine whether the pattern of ridges and valleys in this image matches the pattern of ridges and valleys in pre-scanned images. Only specific characteristics, which are unique to every finger print.

3.2 Raspberry pi

The Raspberry Pi is credit-card sized computer and is a low cost, that can connect to computer monitor or TV for output operation, and uses a standard keyboard and mouse for input. It is a small device having capable of enables people of all ages to discover computing, and to learn how to program in languages like scratch and Python.

An SD card inserted into the slot on the board acts as the hard drive for the **Raspberry Pi**. It is powered by USB and the video output can be hooked up to a traditional RCA TV set, a more modern monitor, or even a TV using the HDMI port. The raspberry pi comes with a set of open source technologies, i.e. communication and multimedia web technologies. The raspberry pi board comprises a program memory (RAM), processor and graphics chip, CPU, GPU, Ethernet port, GPIO pins, Xbee socket, UART, power source connector. And various interfaces for other external devices.

3.3 Ultrasonic Sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

The following is an algorithm showing working:

- Initially selection of area & checking for car parking is made from mobile or computer using Wi-Fi Or LAN network
- Checks for availability for parking slots.
- If parking is full, try continuous
- If parking slot is free, then book by giving Adhar number .
- The detail timing of reserving parking has to mention in your booking.

- The cost per hour also has to pay while booking.
- After reserve the parking area, than the driver should visit parking area on reserved time. If he did not turn up the allotted time, then the allotted time will be automatically cancelled.
- If some time misses his current timing then he may extend if there is free slot at that extended time. Otherwise he will cancel that reservation.
- If the cancellation is done before $\frac{1}{2}$ an hrs. then his paid amount will be not refunded..
- If he comes to know before that he could not reach than he can put a note for requesting to extend the booking time.
- The system may or may not except because extended time may be booked by other people
- While entering parking gate he has to give his finger print through biometric for matching with the Adhar Number
- If it does not match with the adhar number then the particular information of that vehicle is checked through RFID which senses the vehicle when it enters the gate and catches all the information of vehicle belongs to that person.
- The parking has to be done in parking area according to the parking management.

IV. STRUCTURE

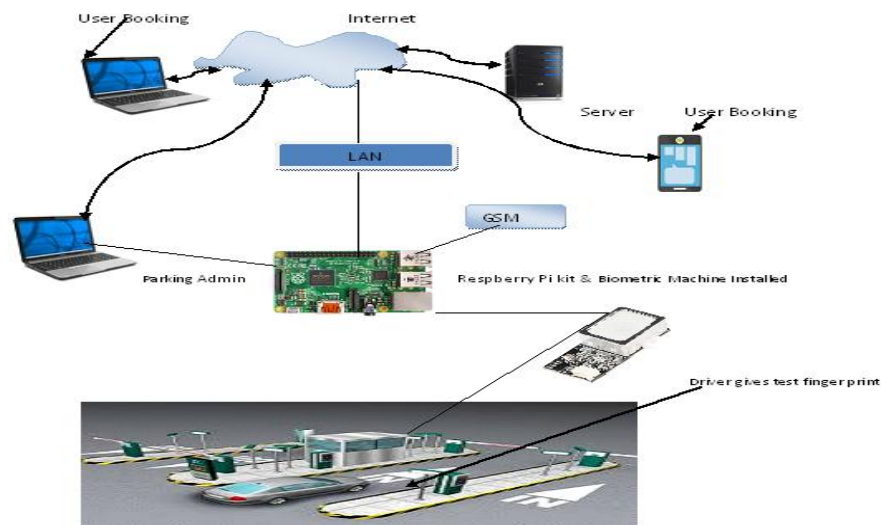


Fig 3. Showing Structure of online booking and parking [1]

A prototype is developed for parking a car shown by making a frame work that is shown in Figure. This proposed architecture having a Raspberry pi board, this board is small sized but it works like a computer. This Raspberry Pi is directly connected to the internet. From this the user can directly connect to the database of the Addhar also the information connected to the RTO which gives the information of the vehicle and the vehicle holder. The Python Software is used in the Raspberry pi to work out all the function. It includes from booking to exit of the vehicle. The biometric machine is connected to this machine for verify the finger print and RFID is also connected to this Raspberry pi for vehicle

information. The ultrasonic sensors give the input to this raspberry pi about the vehicle in and exit information in the parking. So, that the raspberry pi updates its database in time.

V. METHODOLOGY

There are different modules we used in this system:

1. Online Booking
2. Parking Entrance System
3. Parking Management System
4. Exit System

5.1 Online System

Urban area now a day called as big cities which are very much crowdie area. The parking of vehicles is a big problem facing by the people who live in these cities. Not only parking it also better to see the proper place to avoid misused by the unauthorized persons.

So, in this paper we use smart parking through IOT based internet facility for booking online. The user can use his/her own laptop or mobile to book required area near his/her work area through internet facility. The database provides the user clear picture about the parking area with availability of vacant slots.

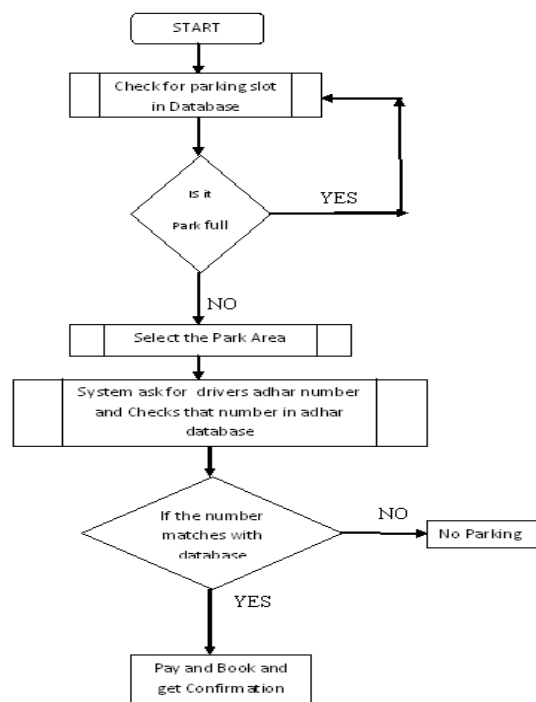


Fig 4. Flow Chart Showing Online Booking

If there is a vacant slot, user who drives the vehicle should register by giving only adhar card number. Now the system verifies the process of adhar number in the adhar database if it matches than it allow proceeding to book a park.

He has to agree for some agreement about the overtime extra bill and fine if he has misbehaved.

1. Select proper place
2. Mention time slot period
3. Give Phone number and email address
4. Pay the amount on hour basis
4. Get information the confirmation

After booking , the message will reflect on the mobile about the booking

5.2 Parking Entrance System

When the vehicle enters into the parking gate the IR sensor is used to know the presence of vehicle for parking. The RFID card installed in the vehicle is scanned though the RFID card reader at the gate. The card reader will extract the vehicle registration number and its owner information. This extracted information stored in the scanner is checked through the raspberry pi computer which is connected to the internet.

The vehicle driver has to check his finger print on biometric machine to cross check the adhar number which is booked online. Biometric information has to pass to raspberry pi to verify from the database of adhar card.[6] .

If it matches that's fine. But possibility occurs when booked person and driving person is different. Then there should be any one match whether it should match with RFID else Addhar No. If both are not matched then it may be informed to police for enquiry. May be theft by someone.

If it matches then it display on the LCD monitor the allotted parking slot and parking status according to the online booking. Then the parking gate will open the vehicle moves to parking area

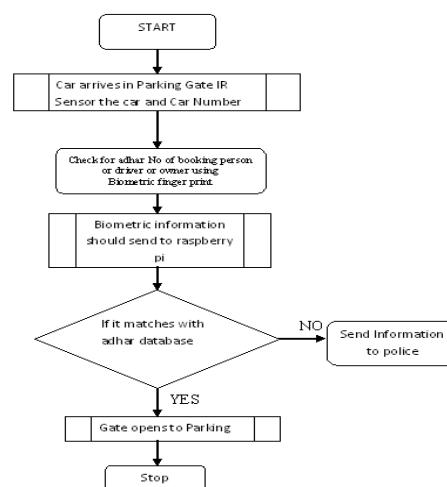


Fig 5. Flow Chart Showing parking system

5.3 Parking Management System

The vehicle now moves towards parking area. Here each slot allotted by one Ultrasonic Sensors. These sensors sense the parking area and determine whether a parking slot is vacant or not.

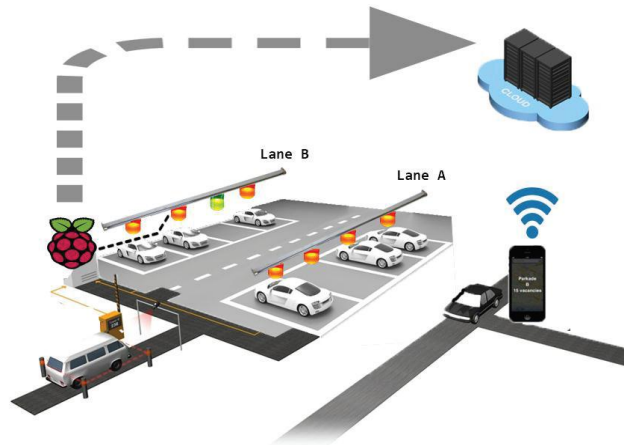


Fig 6: Showing parking System [2]

Each slot of the parking area is The ultrasonic sensors are wirelessly connected to raspberry pi using the chip. These chips allow accessing a Wifi network and send the information to raspberry pi through raspberry pi camera. Not only have these Ultrasonic Sensors determined the vacant place but also it indicate overtime of parking time of particular vehicle and informs system. The vehicle person gets the message of time up on his mobile in case when the new user booked in next time slot. If the vehicle person did not turn back after intimating then it will consider for over time charges. The new user has been given to another location and intimates in his mobile about change in the slot. In case of no vacant place then the vehicle person gets messages to remove the vehicle from parking area at any condition. If also he did not come then he has to pay fine. In all these process each and every parking and exit the vehicle information of the data will be fed in to the Raspberry pi so, that the vacant seat will be booked by another person's. So there will be always update in the database system.

5.4 Parking Exit System

This parking exit system contains peripherals similar to parking entrance system. If, the vehicle left from the parking space than the Ultrasonic Sensors senses the left vehicle area and sends the information to the raspberry chip and there will be a raspberry pi camera.[4] The raspberry pi updates the database so that the vacant space can be booked by user. When the vehicle comes to the exit gate, There will be checked the paid amount, if it over time than he has to pay for the same or if he abide the rules then he has to pay the fine including the overtime pay. If he is in time then the vehicle will exit without any question.

VI . CONCLUSION

The main intention of this proposed system is to build a vehicle parking management system using Internet of Things. IoT is the present trending area in internet, used to access the information remotely. Taking the advantages of smart phone we tried to develop vehicle parking by using RFID. This technology is used to detect the car identity. We used ADHAR NUMBER



and biometric machine to verify the person who holds that vehicle. We also tried to calculate the amount for parking also maintained the time slot period of parking. This all will be done in fraction of second thro the raspberry pi. And we can detect unauthorized or theft of that vehicle.

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