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IoT Based Smart Car Parking System for the IEEE SSC 2019/Pune, India

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ABSTRACT: Intelligent intelligent systems often obtain information on parking spaces available in a particular geographical area and process them in real time to facilitate parking in vacant positions. One of the main problems related to smart cities is parking and traffic management systems. The Internet of Things (IoT) enables connectivity between the environment and the environment to the Internet and facilitates access to these things from any remote location. The effective use of IoT technology can facilitate human life in many ways. The proposed work is one of the applications of IoT.

The aim of this paper is to design, analyze and implement a "sensor technology based on IoT technology", which allows the user to reserve a parking slot in advance from a remote location with the help of a mobile application. Authentication of the current reservation is included for the benefit of the current user. This system is implemented with the use of cheap IR sensors for real-time data collection, the mobile application E-Parking. The E - mobile parking application was developed using an Android studio with the Android 4.3 version in the pool.

KEYWORDS: IoT, IR sensors, E-parking application, User authentication.

I.INTRODUCTION

Anyone who has ever felt frustrated travel through urban areas in search of a wanted parking solution that can quickly take them to a place that can not be described. This concern has attracted strategic investments from dedicated industrial sectors to increase parking revenues through technology-enabled solutions. The parking industry is in a revolution by new technologies that allow cities to reduce traffic congestion and carbon emissions. The Internet of Things (IoT) penetrates the parking world to streamline processes that provide smart parking solutions that expand and manage the inventory parking. In this context, IoT uses built-in wireless networks to connect physical parking infrastructure with information and communication technologies that provide cloud-based management services. This change in connectivity is also driving socioeconomic changes when data released from physical infrastructure leads to productivity gains through new applications and new business models.

The proposed solution in this process transforms the unutilized parking to redemption, allowing all parking owners, from every person to business entities, to market their assets through a parking service provider (PSP). Drivers are enabled with this service to get to the street and street parking through better use of parking spaces. Both consumers and parking providers maximize their mutual benefits in this business model. The process is automated using significant data that measures demand and delivery across dynamic pricing models and parking plans based on real-time information that includes special events, holidays, and traffic considerations. Smart cities need smarter information and parking guidance systems, which run mutual services in the interconnectedness of parking spaces and vehicles.

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II.PROBLEM STATEMENT AND OBJECTIVE

Problem Statement:

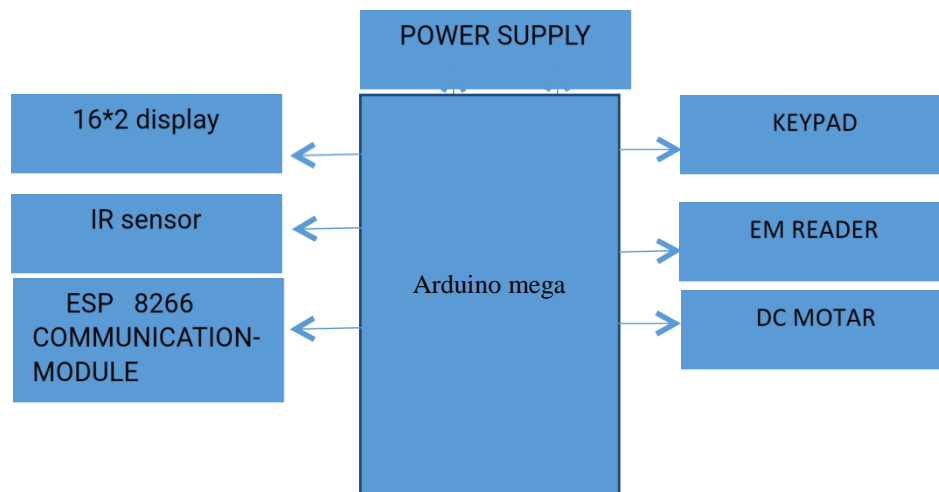
Parking management affects the search time of the driver and the cost of parking.

- It can also cause traffic congestion.
 - Finding parking space in most metropolitan areas, especially during peak hours, is difficult for drivers.
- The difficulty stems from not knowing where to find the spaces available at that time, and there may be congestion

Objective:

- Parking reservation can help drivers to reduce search time significantly.
- With real-time reservation service, drivers can quickly find and book empty parking spots. Therefore, the time is reduced in search of gasoline and vacant vacancies.
- Reduced time in search of empty parking spaces to reduce traffic congestion due to this reason.

III.BLOCK DIAGRAM



- **Power Supply:**

Power supply gives 5v supply to the PIC microcontroller and other block also work on 5v DC.

- **IR Sensor:**

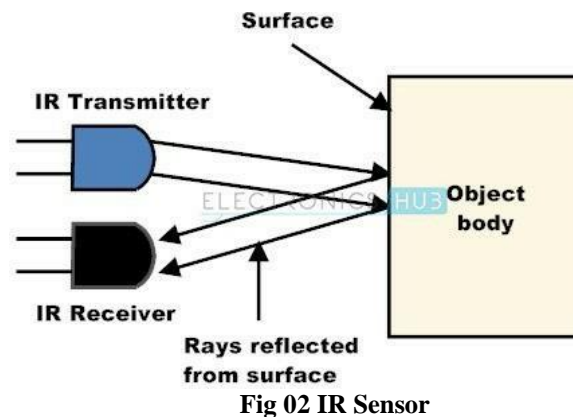
The IR sensor used to detect the car in parking. If car is present then it shows on cloud as that parking slot is allowed if not allowed then it will shows that parking slot empty.

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- **Reservation:**

If you booked parking then from booking time then it will booked for next 5 minutes and countdown start at timer.

- **LED:**

On LED we will show the indication of booked slot.

- **LCD:**

LCD part is used in security area for check out the parking is allotted or free.

IV.FLOW OF PROPOSED SYSTEM

On any system, wired or wireless connectivity is important to establish a connection. The proposed system used the WiFi module ESP8266-01 to send data to the cloud. There are several network layers in connection with software and hardware. The protocol used in each layer is a specific task, as shown in the figure. The mechanical and electrical support is related to the physical layer system. Every system has a unique MAC address. This system dynamically provides IP address to each node and users. Therefore, a DHCP-enabled connection can be used. In combination with TCP (wired connection), a secure, fast connection protocol is used. This protocol works in the Pub / Sab (publishing and subscribe) base. Pub / Sub allows communication to many people and these customers are unknown to each other. The proposed system flow is shown in the picture.

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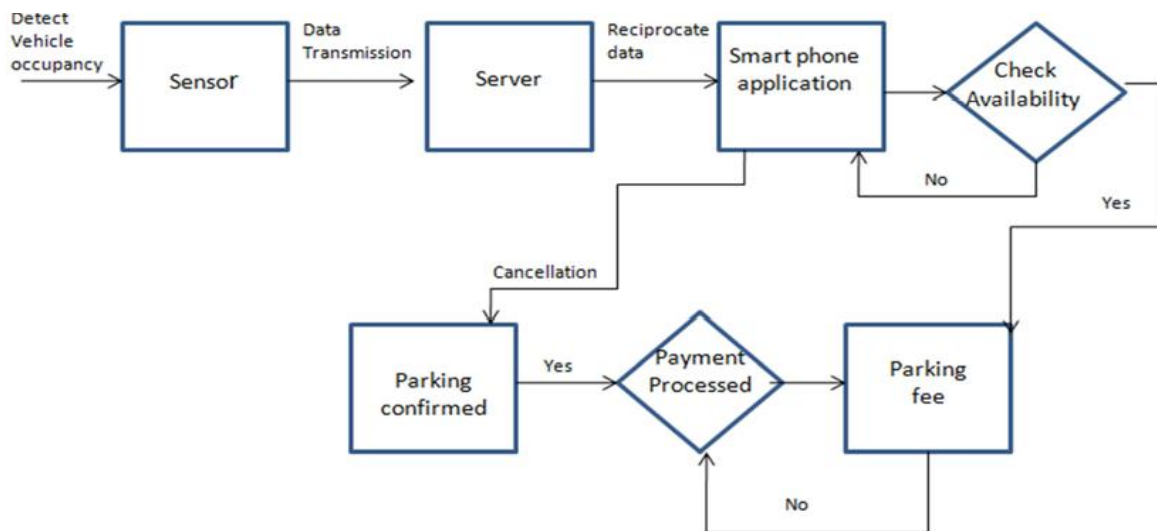


Fig 03 Flow of the system

V.IMPLEMENTATION AND WORKING

In the previous part, we discussed the architecture and technical heap related to the intelligent parking system. In this section, we talk about the implementation and operation of the system in the real world scenario. The entire process to reserve parking space, park the car at that place and leave the parking area, is explained with the help of the following flow chart.

We used an experiment to describe the operation of our system at all stages, which included checking the car from the availability of parking spaces to the parking space. This is done by applying intelligent parking system in the parking area of a mall. Below are the steps that a driver needs to follow to park his car using our parking system.

- Step 1: Add a smart parking app on your mobile device.
- Step 2: Find the parking area near your destination with the Mobile App.
- Step 3: Select a special parking area.
- Step 4: Browse the different campers and parking is available in the parking area.
- Step 5: Select a special parking slot.
- Step 6: Select the time (hours) for which you want to park your car.
- Step 7: Pay the parking fee with your avallet or with your credit card.
- Step 8: Once you successfully park your car in the selected parking slot, then confirm your business using the mobile app. The above process is explained with the help of the following screenshot to store parking spaces and park the car in the same space.

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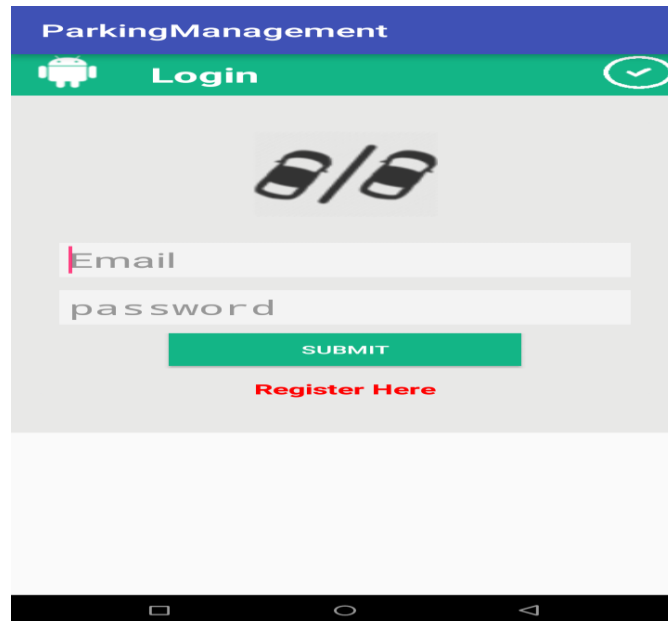


Fig 04: Registration

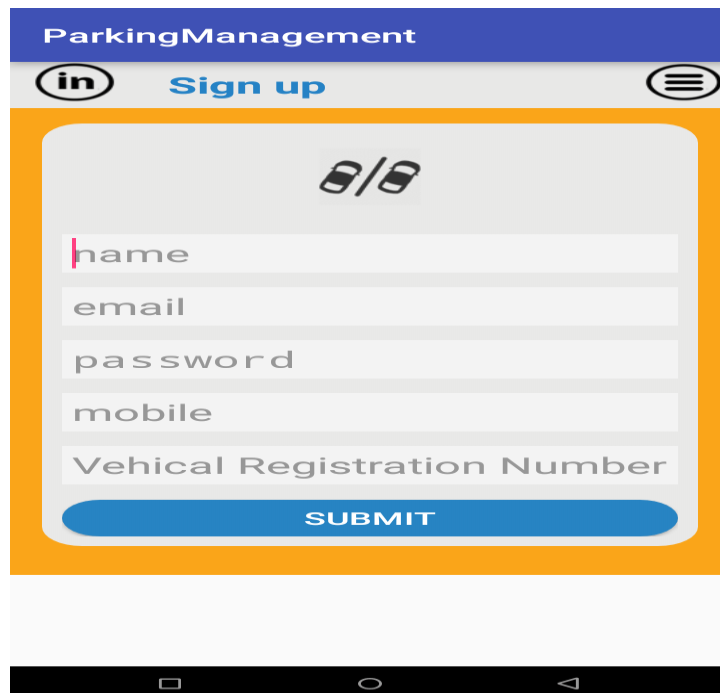


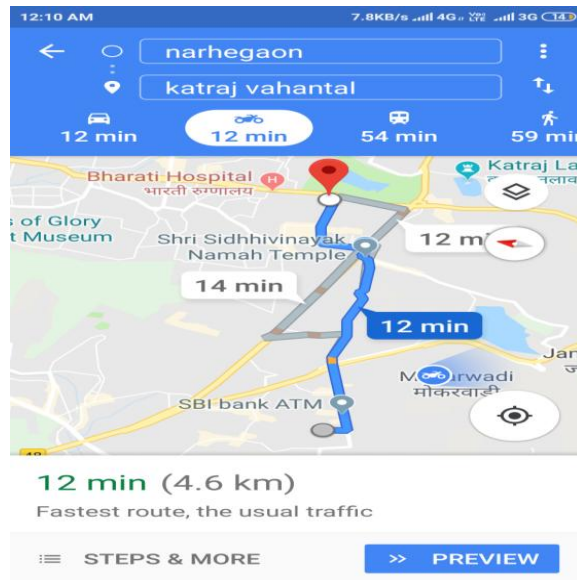
Fig 05: Sign Up

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Working Principle:

Algorithm:

- Start.
- Turn on the power supply.
- IR sensor will get activated.
- Search online for empty parking slot from android application.
- Space detection will start.
- If space is detected data sends and stored on cloud by sending system status by GSM.
- LED will start showing the number of parking slots.
- Display on front LCD that the slot is booked.
- Else go to step 5.
- Shows space on cloud.
- We can now book empty parking slot online.
- LED indication will get off.
- IR sensor will open a gate
- End

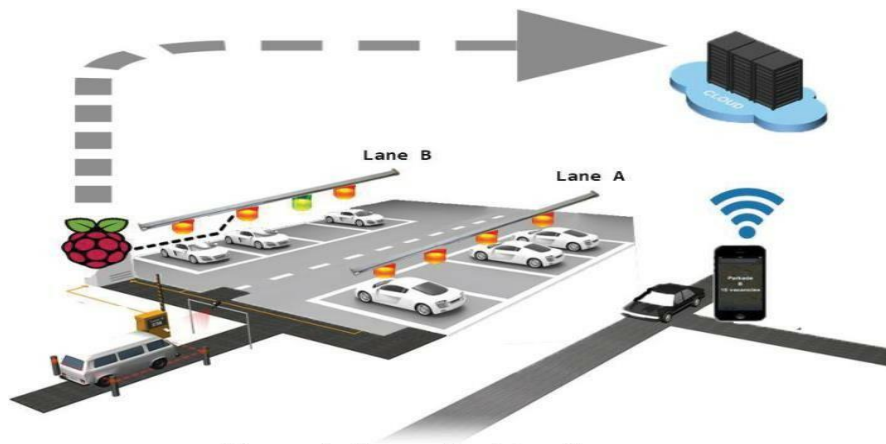


Figure 1: Smart Parking System

VI.FUTURE SCOPE

The smart parking management system can be widely applied to many applications in the future. In addition to the basic role of car parking management, it can also be applied to the management of aircraft and ships and fleets. With the growing field of Internet Things, many concepts can be interconnected with our system. Intelligent parking systems can be modified in the fleet management of ships and planes with little change in external hardware and almost the same software only replaces car or ship interface sources for better graphic interfaces and application-based visual displays from the real world.

VII.CONCLUSION

Intelligent parking facilitates problems with city living, transportation mobility and environmental sustainability. Smart Parking technology is used to increase productivity and service levels in operations. This is also advantageous in terms of reducing operating costs and increasing the revenue and value of the installation [11]. The proposed system was developed from traditional service channels such as toll gates and parking officers. It involves the use of ultrasonic

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sensors, Arduino Uno, ESP8266-01 WiFi module, cloud server. The Internet of Things integrates hardware, software, and network connectivity that allows objects to be detected and controlled remotely through existing networks. This integration allows users to monitor available and unavailable parking spaces, which leads to greater efficiency, accuracy and economic benefits.

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