SMART CAR PARKING

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ABSTRACT

Due to increase in the number of vehicles on road there are many chances of mismanagement of available parking space as well as congestion of traffic. Our project Smart Car Parking provides parking availability information and parking lot reservation system. Problems such as, traffic congestion, limited car parking spaces, road safety etc are being addressed by IoT. Drivers searching for parking spaces are thought to be responsible for about 40% of traffic congestion in cities. It has become clear, that simply creating more parking spaces is not sufficient to address the problem of traffic congestion. New approaches using smart parking systems look to provide a more balanced view of parking that better manages the relationship between supply and demand. A number of technologies and tools provide the basis for smart parking solutions, including vehicle sensors, wireless communications and data.

Keywords- *IOT(Internet of things), Microcontrollers, Arduino-uno , Sensors.*

I. INTRODUCTION

Parking space is becoming a serious problem due to the day-by-day increase in number of vehicles on the road. Particularly, in cities with large population, or in places such as shopping malls,movie theatres looking for parking space is a major problem and finding a parking space can be a bad experience. In order to combat this problem, some parking lots have introduced sensors to detect when a car enters or leaves a parking lot in order to track capacity and alert drivers if they are full or empty. Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of single parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly whenever he/she is going to visit that place. This also limits the chances of traffic congestion on roads.

II. PROBLEM STATEMENT

Parking space is becoming a serious problem due to the day-by-day increase in number of vehicles on the road.Drivers searching for parking spaces are thought to be responsible for about 40% of traffic congestion in cities.

1. On weekends and public holidays, there is a chance of difficulty in finding parking or vacant spaces due to much more traffic on roads than usual.

2. Sometimes a car is parked in such a way that it occupies two parking slots, such an improper parking happens when a driver is not careful about another driver's rights. This can be tackled using using automated car parking system.

III. PROPOSED SYSTEM

Our project mainly focuses on developing an Andriod app which will automatically find vacant spaces in parking slot. Also different sensors can be added to improve this system to detect object and guide the drivers fastest. This will help a lot in reducing the parking spaces problem as well as traffic congestion.

Advantages:-

1.It ensures quick and automated parking and easy retrieval of vehicles.

2. Most suitable for parking in offices, malls and similar places.

3. Sensors used have high sensitivity and are easy to handle.

IV. RELATED WORK

The existing parking systems like multilevel/multistore car parking systems (generally non-automated), automated multilevel car parking systems etc. has been implemented on a very large scale. But all these systems have a major disadvantage like very large space consumption.[1] The challenges that we all are facing in our life is parking of the car. When we generally visit various places such as office, mall, cinema etc it is very hard to search the availability of parking area. This situation calls for the need for a smart car parking system which is equipped with sensors (Infrared) and microcontrollers (arduino-uno) to automatically count the cars parked in the lot.[2]

With extensive development of ICT Infrastructure and IoT, the goal of building 100 Indian Smart Cities can easily be achieved. However, one of the prominent problem experienced by people in smart cities is the scarcity of car parking amenities and traffic supervision. Smart Parking system is an Internet of Things based parking system wherein which drivers can identify vacant parking slots easily with the help of their Smart Phone or a Computer.[4]

The system developed here is an integration of internet of things (IoT), cloud technology, android application and user authentication for ADAS system. The system not only provides ease to user for car parking but also reduces traffic which occurs due to dead locking of cars while parking and also saves fuel consumption of car by avoiding unnecessary traveling through filled parking lots which in turn reduces carbon dioxide emission in atmosphere.[3]

Various methods are prevalent for the development of autonomous parking systems. Study of all these systems shows us that these require a little or more human intervention for the functioning. One of the intelligent systems for car parking has been proposed by making use of Image processing. In this system, a brown rounded image on the parking slot is captured and processed to detect the free parking slot. The information of currently available parking slots are displayed on the 7-segment display.[1] The objective of this work is to design, analyze and implement "IoT based sensor enabled car parking system", this enables the user to pre reserve parking slot from remote place with the help of mobile application. The system defines four parking states which are Available parking space, Reserved parking space, In use parking space, load/unload parking space. The NFC technology is used here for wireless payment.[3]

When we visited various public places like Shopping malls, multiplex cinema hall & hotels during festivals or weekends it creates more parking problem. In the recent research found that a driver takes nearly 8 minutes to park his vehicle because he spend more time in searching the parking lot.[2] Smart parking system also accounts for online booking of a parking slot. The drivers tend to move around in search of parking slots which indirectly leads to traffic jams and traffic congestion. The proposed system helps user to book their parking slots online, by monitoring the parking spaces on a real-time basis for their availability. In many cities, people would appreciate their luck if they could find a parking slot smoothly. People keep roaming around in search of vacant parking slots, and after a lot of struggle, they

find one. Due to lack of a proper mechanism to identify free parking slots, they move randomly in search of parking space wasting a lot of time.[4]

Slot Allocation method with the help of Android application reduce parking problem. RFID application is used for debit the amount for parking charges through the RFID tag.[2] Geomagnetic sensors are used for detecting presence of car. Intelligent parking lot application using wireless sensor networks proposed the use of a combination of magnetic and ultrasonic sensors for accurate and reliable detection of vehicles in a parking lot. Work proposed in this system addresses an issue of parking in smart cities. The system is implemented using low cost IR sensors. The developed system provides real time information of availability of parking slots in parking area and allows users to book parking slot from remote locations by using mobile application and also provides user authentication.[3] The user queries for the availability of vacant slots and the system checks the Database for the existence of free slots. The system displays the number of free slots and the user is prompted to select a slot and proceed for payment to book the desired slot. Each parking slot is fitted with an ultrasonic sensor which checks the status of the parking slot.[4]

As the number of vehicles are increased day by day in rapid manner. People keep roaming around in search of vacant parking slots, and after a lot of struggle, they find one. It causes the problem of traffic congestion, pollution (noise & air). To overcome this problem smart parking system has been proposed. [1]
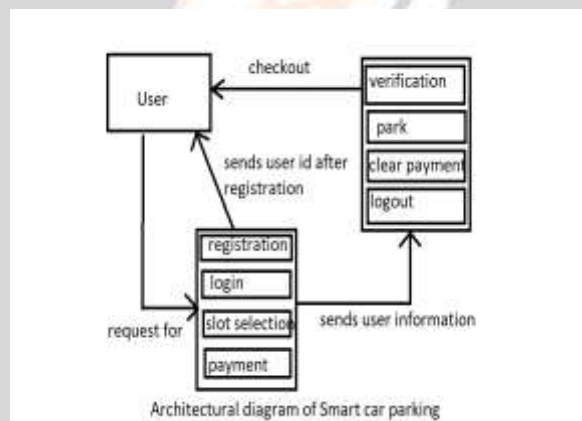
V. SYSTEM ARCHITECTURE

Fig 5.1:- architectural diagram of smart car parking

Smart car parking system mainly consist of three modules.

[1] User Module

[2] Administrator Module

[3] Booking Module

1.USER MODULE

This module of the application deals with the user interface/user experience. User can register, log in, book and make the payment. If the user is new to the application then, the user must register in the application by providing the user's details. Once the user logs in, then the user browses the parking slot then books that parking slot followed by the making the online payment.

2.ADMINISTRATOR MODULE

This is the operative module of the application. It works in the backend for managing the database. The administrator stores all the user's data in the database as soon as he gets registered with the app. Administrator maintains the details of all parking slots their price for booking. The administrator also provides the payment method to the user.

3. BOOKING MODULE

This is the main module of the application and it deals with the booking of the parking slot. When the user is ready for booking then the\booking module comes in the scenario. The available slot, cost to book the slot and the necessary processing in regards to these,are done by this booking module.

VI. CONCLUSION

Smart car parking aims at developing a traffic free city with very less amount of pollution (air/noise) which requires appropriate parking spaces to avoid traffic congestion.The present growth in IoT and Cloud Computing makes data accessible anywhere and on any device. The users can book parking slot at anytime and from any location with their Mobile Phone or with a Computer. Thus, smart car parking provides easy aprking facilities with the help of iot.

VII. FUTURE ENHANCEMENT

The future of the smart parking market is expected to be significantly influenced by the arrival of automated vehicles (AVs). While the deployment of sensor technologies continues to be core to the development of smart parking, a wide variety of other technology innovations are also enabling more adaptable systems—including cameras, wireless communications, data analytic, induction loops, smart parking meters, and advanced algorithms. With connected metering systems and the embedded ground sensors in parking spaces, cities can, in real time, know which streets are packed with parked cars and which streets have plenty of empty spaces.

REFERENCES

[1] Ankita Tidake, Neha Doijad, Priyanka Yelbhar, Sneh Koul, Priti Murkute of "THE SMART CAR PARKING SYSTEM BASED ON INTERNET OF THINGS" in International Engineering Reserach Journal 2016 in vol 2, issue 1, ISSN:2395-1621.

[2] D.Vakula and Yeshwanth Krishna Kolli of "LOW COST SMART PARKING SYSTEM FOR SMART CITIES" in International Conference on Intelligent Sustainable Systems (ICISS 2017) in vol 5, issue no 2, ISSN:2248-2748.

 [3] Janhvi Nimble, Priyanka Bhegade, Snehal Surve, Priya Chaugule of "AUTOMATIC SMART CAR PARKING SYSTEM" in International Journal of Advances in Electronics and Computer Science 2016 in vol 3, issue 3, ISSN:2393-2835.

[4] Mahendra BM, Dr Savita Sonoli, Nagaraj Bhat, Raju, Raghu T of "IOT BASED SENSOR ENABLED SMART CAR PARKING FOR ADVANCED DRIVER ASSISTANCE SYSTEM" in 2nd IEEE International Conference on recent trends in Electronic Information & Communication 2017 in vol 3, issue no 2, ISSN: 2456-2789.