IOT BASED SMART PARKING SYSTEM

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ABSTRACT

Driving on Indian roads is difficult and even worse is the struggle to get a parking space. This problem increases with the growing population of vehicle owners in the country.The aim of this paper to propose a design of an automated car parking system with the help of Raspberry Pi ,QR code and android application that regulates the number of car to be parked on parking area by automating the parking and un- parking of the car. Our system aims to reduce human intervention and reduce the time required for searching empty slots. This system runs on mobile phone platform and provides real-time parking status of specific area so that user can reserve a slot. QR code is use for authentication purpose. The user needs to scan the QR code while parking the vehicle. The action of user is then stored in database. Server Database is updated periodically. This system provides parking facilities such that it leads to increase security and enhances user's experiences The slot allocation system aims at developing a self-operating machine, which can be of use in many real world applications.

We have seen how in the past decade the amount of vehicles on Indian roads has increased many folds, as a result of the progressive growth of our economy. The no. of people making a shift from 2 wheelers to 4 wheelers has been increasing steadily for the past ten years and is expected to do so for quite some time in the future, on top of that, increasing is the number of people who have just entered this already "jammed" sector. So more cars implicitly calls for more space to park them! Surely there isn't a technology to stuff them in a bag! Not at least for a long and distant future. So the needs for a system that can optimize space constraints and at the same time ease the process of parking.

KEYWORDS:The designed system includes the following The user can find a vacant slot with the help of an Android App, also the user can reserve the desired slot for parking . A systematic monitoring system including sensors, Raspberry Pi and server database to check for occupied or available slot. The server database is periodically updated for handling real time data and the status is available to the user on the Android App.

1. INTRODUCTION

Often when we visit various public places like shopping malls, restaurants, multiplex cinema halls, etc. the difficulty one faces at these places is finding the availability of parking space. In cities with massive amount of traffic searching for parking space becomes difficult. It wastes fuel, time and leads to increase in traffic. The problem becomes even worse when all available parking slots are occupied and one is unable to find a vacant slot. There are various navigational solutions based on GPS devices that can find empty slots. But the system proposed in this paper provides additional information and dynamic updates as parking slots becomes available or occupied. Also provides reservation option for slot booking. This readily solves the parking management issues and helps in smooth functioning. The parking systems deployed include multiple technologies such as Digital Image Processing, Ultra sonic sensor's technology and other. The major setback of these detection systems are Image processing has low accuracy and high dependency to light and weather conditions. While the ultrasonic sensor technology is more sensitive to variations in temperature, expensive for large area of parking system. and also it has more difficulties in reading reflections from different surfaces. Now a days smart phones have become an integral part of people's life and has become a device which serves user with facilities that make life easier and comfortable. The system proposed in the paper has been designed and developed to monitor real time information and can be used in all types of parking zones as open or multilevel parking zone.

LITERATURE REVIEW

Car parking these days is really hectic and consumes time. Car parking in campus is managed by improving the efficiency of the use of efficient parking space, by informing user about available parking spaces and guiding them accordingly. Quick Response code is a type of matrix barcode which contains information about the item to which it is attached. QR code is made up of black squares arranged in a square grid on a white background, which can be read by QR code scanner[1]. There were various sensors available to detect occupied and unoccupied slots like ultrasonic sensors and IR sensors. This paper uses IR sensor for its accuracy and reliability in any drastic environmental conditions.IR sensors are connected to Raspberry pi to detect occupancy of slots [2]. The Mobile App is an interface for the end users to communicate with the system using Internet. Mobile application is connected with the server through a secure channel using the internet. Mobile application provide real time information. Data is transferred between the server and the mobile application . For the proper communication between the Raspberry pi and mobile application ,there must be proper connection to a particular channel on the server using.

2. BLOCK DIAGRAM

The block diagram consists of sensors which will sense the signals and will give the signals to thecomparator module. The signal coming from sensors are weak signals, now the Amplifier will amplify the signals. The amplified signals now will go to the microcontroller, microcontroller manipulates and processes the data and give the manipulated signals to the Ir transmitter which gives the signal to the receiver then the signal

goes to microcontroller 2 from there on to the driver IC and then to the motor.

Fig 1: Block Diagram
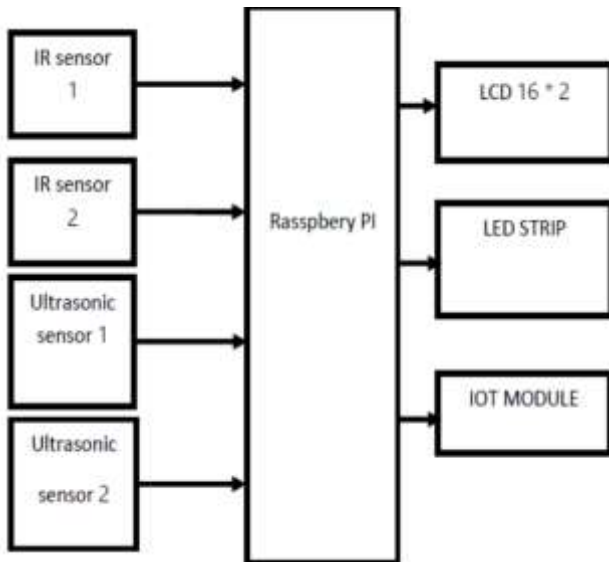
3. HARDWARE DESIGN

The initiators of the working of the circuit diagram are the sensors mounted in the slots. The sensors used are the IR link sensors these sensors continuously provide a high input to the microcontroller as long as there is no object placed between them as soon as an object is placed in between these links they give a low signal to the microcontroller. A low signal on the microcontroller indicates that the slot has been filled with a vehicle when this happens then the microcontroller responds to either one of the key presses corresponding to PARK and RETREIVE keys, If the motor is to be rotated the microcontroller sends out a high on P3.0 and the transmitter connected to it is turned off then the inverter circuit comes into place and runs gives high to l293d which in turn runs the

motor for the time duration for which the signal stays low. When the parking is filled completely no action takes place if the PARK key is further pressed and the motor rotates ones each time the retrieve key is pressed.
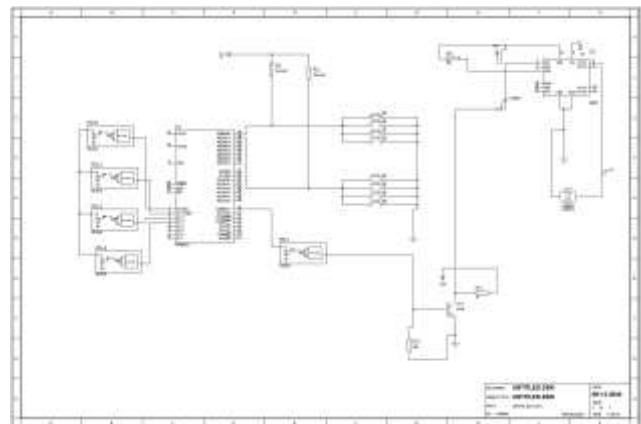

Fig.2: Connection of components

4. SYSTEM DESIGN AND IMPLEMENTATION

Fig 3:Implementation of system

The demand of smart parking system is increasing significantly. This allows user to involve real time access of the availability of

the parking space. The existing system in today's world doesn't contains the facilities of parking reservation and parking slot availability checker. The existing system was vision-based monitoring system which estimates the number of the parking slots available in the area by counting the number of incoming and outing cars which consumes lot of time and efforts. The next existing system was sensor-based system which uses ultrasonic sound waves for detecting the presence ofvehicles and then two-tier parking came into existence which used the concept of parking cars one above another. The result of the paper is to make the parking area connected with the world as well as reduces time and can be cost effective for the user. The result of this paper is to reduce car theft. This paper reduces overall fuel energy of the vehicle which is consumed in the search of the car.

5. SOFTWARE IMPLEMENTATION

PYTHON

Python is a widely used high-level programming language for general-purpose programming, created by Guido van Rossum and first released in 1991. An interpreted language, Python has a design philosophy which emphasizes code readability (notably using whitespace indentation to delimit code blocks rather than curly braces or keywords), and a syntax which allows programmers to express concepts in fewer lines of code than possible in languages such as C++ or Java. The language provides constructs intended to enable writing clear programs on both a small and large scale.

Python features a dynamic type system and automatic memory management and supports multiple programming paradigms, including object-oriented, imperative, functional programming, and procedural styles. It has a large and comprehensive standard library.

RESULT

The demand of smart parking system is increasing significantly. This allows user to involve real time access of the availability of the parking space. The existing system in today's world doesn't contains the facilities of parking reservation and parking slot availability checker. The existing system was vision-based monitoring system which estimates the number of the parking slots available in the area by counting the number of incoming and outing cars which consumes lot of time and efforts. The next existing system was sensor-based system which uses ultrasonic sound waves for detecting the presence ofvehicles and then two-tier parking came into existence which used the concept of parking cars one above another. The result of the paper is to make the parking area connected with the world as well as reduces time and can be cost effective for the user. The result of this paper is to reduce car theft. This paper reduces overall fuel energy of the vehicle which is consumed in the search of the car.

FUTURE SCOPE

The project can be enhanced to include the following features. House more vehicles. Make the structure a multilevel one. Enhance the system with tagging and security systems.

CONCLUSION

Hunting for parking area in peak hours is a tough job. It increases traffic congestion and results in wastage of fuel and time. This

wandering ultimately frustrates the driver. The proposed design in the paper is alleviating theses difficulties of the driver by improvising the parking policy with inclusion of reservation option with security feature such as use of QR Code. The designed system also provides online information to the requested user of whether the parking area is occupied or vacant. The user can pre-book the desired slot, on reaching the parking area, with the help of DC motor the stop bar will open, once the QR code is scanned. The user will get a notification 15 minutes prior he/she reaches the parking area. The user is provided with options such as extended time or cancelled on the android app. On reaching the intended parking area the user is navigated from the gate to the slot. This data is simultaneously updated on the server. This makes the parking process smoother and much easier.

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