IOT BASED INTELLIGENT VEHICLE PARKING SYSTEM IN SMART CITIES

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I.   ABSTRACT

Proliferation in the number of vehicles is leading to problems of vehicles parking at an appropriate place especially the car parking. This indirectly leads to traffic congestion. This is because of the fact that current transportation infrastructure and car park facility are unable to cope with the arrival of large number of vehicles on the road. With the exponential increase in the number of vehicles and world population day by day, vehicle availability and usage on the road in recent years, finding a space for parking the bike is becoming more and more difficult with resulting in the number of conflicts such as traffic problems. This is about creating a reliable system that takes over the task of identifying free slots in a parking area and keeping the record of vehicles parked very systematic manner. This project lessens human effort at the parking area to a great extent such as in case of searching of free slots by the driver and calculating the payment for each vehicle using parking area. The various steps involved in this operation are vehicle identification using RFID tags, free slot detection using IR sensors and payment calculation is done on the basis of period of parking and this is done with the help of real time clock.

Keywords: Microcontroller, RFID, IR sensor, GPRS etc.

II.   INTRODUCTION

Generally in this modern world the usage of area on the earth is much more and the place provided is very less. Normally in big apartments there will be much consisted place not reaching our requirements such as, if you take example of parking place provided at apartments the families living there will be more and there is no enough place to park their vehicles. Here is a project which deals with how to use such a small place to park all their vehicles in a sequential order and indicate the numbering system for the parking.

In this project by when the user arrives at the car park, he must be authorized to enter. This authorization is achieved via the RFID technology or by scanning the user card. Providing RFID to our microcontroller we can provide security. Actually here the concept is

providing a slot for the vehicle to park and it will be given a number. The numbering will be depending upon the number of vehicles present in the apartment to park, if we assume it in a real time. But here for the demo purpose we have three slots for the three vehicles. When a user wants to find a parking slot he must access his vehicle card to our system. After successful access, a request message is sent to search for a free parking slot. Then, the system will send back a response message containing the nearest parking free slot information. The fare of the car parking is based on the vehicle type. This mechanism is simple but economical. If the information is correct, the user is allowed to park. So that the drivers can enter the parking lots and spends less time on looking for the parking space.
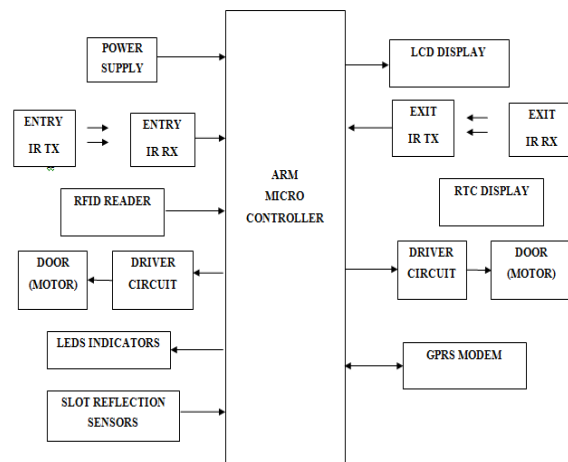
III.   EXISTING SYSTEM

In earlier systems presence of a system was necessary for management of parking slots i.e for checking available parking slots, occupied parking slots, allotment of slots for new coming vehicles etc. As this is done manually this may sometimes be erroneous and time consuming process. There are many problems faced by the customers. Some of them had to wait for a long time for the allotment of slots, when parking traffic increases manifold. This may increase outside traffic as well. The other problem is no proper charges. Details of number of vehicles entering and leaving the parking place may or may not be available with the parking staff. This

causes inconvenience to the customers as well as staff managing the system.

IV.   PROPOSED SYSTEM

In this paper, the aim is to achieve proper parking system by using the concept of Internet of Things (IoT), wherein an IOT is created for the customer, whose details are constantly updated by the hardware/server at the location. The features include unique identification for each vehicle, display of available parking slots on web server, possibility of making reservations for the same, maintenance of a database.

V.   BLOCK DIAGRAM

Fig(5.1) System block diagram

SYSTEM OVERVIEW

Microcontroller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

Internet of Things:

Internet of things was formally proposed on World Summit on Information Society WSIS held in as early as in 2005. [5] Internet of Things is the Internet connecting things together, which can be understood as a network adding a variety of information sensor devices to the traditional Internet to actualize intelligent identification, positioning, tracking, monitoring and management of objects according to agreed protocols. It is an important component to the new-generation information technology. [6] The present communication network mainly addresses the communication among people. Internet is for the man-man communication, while the future Internet of things focuses on the man-man, man-machine, man-object, and object-object communication and dialog. [7] Information technology development contributes to great improvement in man-man communication, information storage and processing, and reconstructs the methods and

forms of human relation generation. Internet of Things actualized the integration of human society and physical system, and real-time read and control of man, machines, devices and infrastructures in the integrated network, sense information gathering to cloud computation-based data storage, process and integration platform, accordingly supports to better development of traffic intelligent management and control.

RFID:

Radio Frequency Identification (abbr. as RFID), also known as electronic label, is a communication technology that can identify certain targets and read and write relevant data without establishing mechanical or optical contact with certain objects through identification system, also a non-contact auto-identification technology with the greatest potential and fastest developing speed that is widely applied to Internet of things. The main operating frequency including low-frequency 125 KHZ, high-frequency 13.56 MHZ, UHF 433 MHZ, UHF 915 MHZ; non-powered RFID labels are no equipped with batteries and acquire power from the reader emittor, featuring small size, low price and long life cycle, reading distance 10mm to 5 m, widely applied to public vehicle cards, diner cars and bank cards, work frequencies including low frequency 125 KHZ, high frequency 13.56 MHZ, UHF 433 MHZ, UHF 915 MHZ, a kind of close-- distance identification; half powered RFID draws the advantages of the two forms, and

displays the advantages of the microwave 2.45 G triggered by the low frequency 125KHZ.

IR Sensor:

The IR LED is used as the IR transmitter, which is connected by using the resistor logic as shown in the schematic. The IR receiver is connected by using the transistor logic whose collector is connected to the base of the transistor. The base of the transistor is connected to the photo diode through the resistor.

Driver circuit:

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

VI.   CONCLUSION

This paper introduces a Internet of Things (IoT)-based intelligent parking management system which make full use of new generation information technology such as Internet of things and cloud computation to actualize modern, intelligent, high-efficient management of internal and external vehicle entrance & exit with advantages of convenience, speediness, accurate charging, confidentiality, sensitivity, long life cycle, flexibility and multiple functions.

VII.   REFERENCES

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