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Iot Based Smart Parking System

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Abstract: In modern days concepts of smart cities have gained grater popularity. Problems like limited car parking services and road safety are being addressed by IoT. In this thesis an IoT based cloud integrated smart parking system is presented. The planned Smart system consists of an on-site use of an IoT module that is used to check and signalize the state of availability of each single parking space. The information regarding whether the parking space in the parking system is available are not and also booking of that particular space can be obtained by using mobile application.
Keywords: Internet of Things(IoT),Arduino pro mini,ESP8266,IR proximity sensor.

I. INTRODUCTION

The idea of Internet of Things (IoT) begun with things with character specialized gadgets. The gadgets could be followed, controlled or observed utilizing remote PCs associated through Internet. IoT augments the utilization of Internet giving the correspondence, and consequently between system of the gadgets and physical articles, or Things. The two unmistakable words in IoT are internet and things. internet implies a huge worldwide system of associated servers, PCs, tablets and mobiles utilizing the universally utilized conventions and interfacing frameworks. Internet empowers sending, accepting, or conveying of data. Thing in English has number of employments and implications.

IoT in general comprises of between system of the gadgets and physical objects, number of items can accumulate the information at remote areas and convey to units overseeing, procuring, sorting out and breaking down the information in the procedures and administrations. It gives a dream where things (wearable, watch, caution clock, home gadgets, encompassing items with) wind up noticeably savvy also, act alive through detecting, figuring and conveying by installed little gadgets which interface with remote articles or people through network. The perfect of making a Smart City is currently getting to be plainly conceivable with the rise of the Internet of Things. One of the key issues that keen urban areas identify with are auto stopping offices and activity administration frameworks. In present day urban areas finding an accessible parking space is constantly troublesome for drivers, and it has a tendency to wind up plainly harder with steadily expanding number of private auto clients.

This circumstance can be viewed as an open door for shrewd urban areas to attempt activities all together improve the productivity their stopping assets along these lines prompting lessening in seeking times, movement blockage and street mishaps. Issues relating to stopping and activity clog can be illuminated if the drivers can be educated ahead of time about the accessibility of parking spots at and around their planned destination. Recent progresses in making minimal effort, low-control installed frameworks are helping engineers to construct new applications for Internet of Things. Taken after by the advancements in sensor innovation, numerous present day urban communities have picked conveying different IoT based frameworks in and around the urban areas with the end goal of checking.

A current study performed by the International Parking Institute mirrors an expansion in number of imaginative thoughts identified with stopping frameworks. At present there are sure stopping systems that claim to subjects of conveying continuous data about accessible parking spots. Such frameworks require proficient sensors to be sent in the stopping regions for checking the inhabitance and in addition brisk information handling units keeping in mind the end goal to increase down to earth bits of knowledge from information gathered over different sources.

II. PROPOSED METHOD

The smart parking system is the above figure shows and it contains the IR Proximity sensor to sense the presence of car in the parking slot and ESP8266 wifi chip is used to communicate between Arduino pro mini board and the cloud and to check the availability of the parking slot and book the parking slot anywhere at anytime with the help of mobile application.

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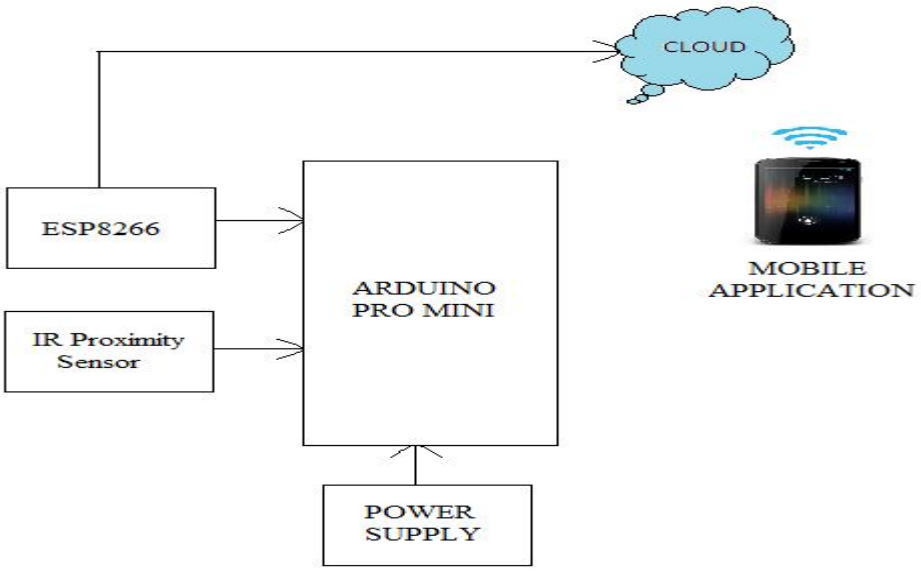

Fig. 1 Block Diagram of smart parking syatem

A. *Arduino Pro mini:* Act as a microcontroller, the central controller for the whole unit of smart cart. Arduino pro mini based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, and a reset button. The board can be programmed with Arduino Software (IDE). The board can operate on an external supply from 6 to 20 volts. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts. The ATmega328 has 32 KB flash memory. It also has 2 KB of SRAM and 1 KB of EEPROM.

B. *ESP8266*: An esp8266 is a microcontroller made by Espressif. It is loaded with features. The most important being wifi. The best part is that they are dirt cheap and more powerful than an arduino. There is a variety of programming resources for these chips. It can operate at a supply voltage of 3.3volts. It is a chip with which manufactures make wireless microcontroller modules. It is a low cost,networkable foundation for facilitating IoT development. ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V board. It can be simply hook up to arduino and can get about as much wifi connectivity as a wifi shield offers. The ESP8266 is a low-cost Wi-Fi chip with full TCP/IP stack. It has 1MB Flash Memory. It has Integrated low power 32-bit CPU could be used as application processor.

C. *IR proximity sensor*: An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. Infrared waves are not visible to the human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave regions. The sensor has a 3-stick header which interfaces with the microcontroller board or Arduino board through female to female or female to male jumper wires. A mounting gap for effectively associate at least one sensor to the front or back of your robot frame. The Multipurpose Infrared Sensor is an extra for your line supporter robot and deterrent maintaining a strategic distance from robot that gives your robot the capacity to distinguish lines or close-by articles. The sensor works by distinguishing reflected light originating from its own infrared LED. By measuring the measure of reflected infrared light, it can distinguish light or dim (lines) or even protests straightforwardly before it. A locally available RED LED is utilized to show the nearness of a question or identify line. Detecting reach is customizable with inbuilt variable resistor.

D. *Cloud:* The Amazon server is hosted on cloud. Cloud acts as a data base to store all the records related to parking areas and end users that have access to the system. It keeps a track of every user connected to the system and maintains information such as time at which the car was parked. It is due to the flexible nature of cloud which permits the system to add any number of users at any time of the day. Continuous backup is made of the data stored on cloud in order to ensure easy and quick recovery of data in case of any kind of system failure.

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III. RESULTS

Fig.2 booking a parking slot

In the above figure shows that the two slots are available to book car parking slot and parking space2 is not available as indicate is someone already booked that slot. Hence parking space1 and parking space3 can book now. The working of this system at every stage from checking the availability of parking space to actually park a car in a vacant parking slot. This is done by implementing the smart parking system in the parking area of a shopping mall.

In recent research found that a driver need to take about 8 minute to park his vehicle which need to 30-40 percent in the traffic congestion if the public place like cinema hall, shopping mall, multiplex and hotels are to be visited in testing time in what in vehicle the problem can be look at back the problem then is a in needed lead of designing smart parks system which keeps the availability of the empty parking slot in a particular parking slot.

IV. CONCLUSIONS

The ideas of Smart Cities have dependably been a fantasy for humankind. Since the recent years huge headways have been made in making shrewd urban areas a reality. The development of Internet of Things and Cloud advancements have offer ascent to new conceivable outcomes as far as savvy urban areas. Savvy stopping offices and activity administration frameworks have dependably been at the center of building shrewd urban communities. In this paper, we address the issue of stopping and present an IoT based Cloud coordinated brilliant stopping framework. The framework that we propose gives constant data with respect to accessibility of stopping openings in a stopping zone. Clients from remote areas could book a stopping opening for them by the utilization of our versatile application. The endeavors made in this paper are indented to enhance the stopping offices of a city and in this way planning to improve the personal satisfaction of its kin.

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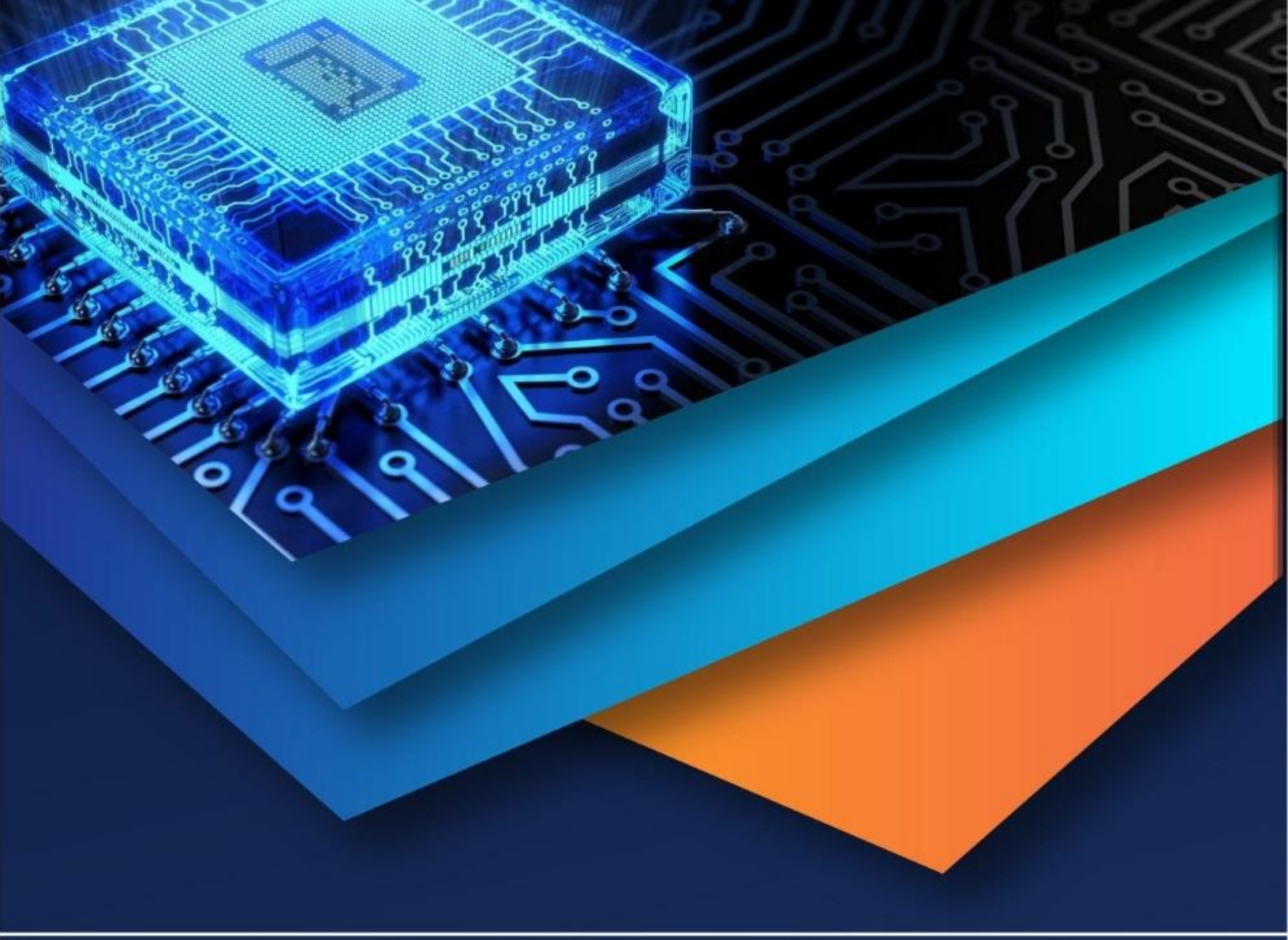

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