CONTROL SYSTEM FOR AUTOMATED PARKING SYSTEM USING IOT

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ABSTRACT

Efficient and smart way to automate the management of the parking system that allocates an efficient parking space using internet of things technology The IOT provides a wireless access to the system and the user can keep a track of the availability of the parking area. With increase in the population of the vehicles in metropolitan cities, road congestion is the major problem that is being faced. The aim of this paper is to resolve this issue. The user usually wastes his time and efforts in search of the availability of the free space in a specified parking area. The parking information is sent to the user via notification. Thus, the waiting time for the user in search of parking space is minimized.

Keywords: GPS, Wi-Fi, BT/BTLE, RFID, IOT

INTRODUCTION

Internet of things was first introduced in 1999 at auto ID center and first used by Kevin ash ton. As evolving this latest burning technology, it promises to connect all our surrounding things to a network and communicating with each other with less human involvement. Still internet of things is in beginning stage and there is no common architecture exists till today. There is lot of researches and implementations are currently being going on in all the respective areas. Thus there are no guidelines or boundaries exist to define the definition of internet of things. So depending on the context, application the internet of things has different definitions. Shortly it is defined as the things present in the physical world or in an environment are attached with sensors or with any embedded systems and made connected to network via wired or wireless connections. IOT technology grows in various fields of

smart applications but we have not yet found boundary constraints of this technology. Some smart applications which it has implementing currently such as on smart grids, smart lighting, smart energy, smart city, smart health etc. this is broadly classified into three categories such as sensing, processing and connectivity. Whereas sensing includes sensing the speed of vehicles and humans or any objects (accelerometer), sensing of temperature, pressure etc. And these can be processing by using some processors such as network processor, hybrid processor MCU/MPU etc. And the devices are connected by using some technologies called GPS, Wi-Fi, BT/BTLE, RFID etc.

RELATED STUDY

Nowadays in many public places such as malls, multiplex systems, hospitals, offices, market areas there is a crucial problem of car parking. The car-parking [1-3] area has many lanes/slots for car parking. So to park a car one has to look for all the lanes. Moreover, this involves a lot of manual labor and investment. So, there is a need to develop an automated parking system that indicates directly the availability of vacant parking slots in any lane right at the entrance. It involves a system including infrared transmitter- receiver pair in each lane and a display outside the car parking gate. So the person desirous to park his vehicle is well informed about the status of availability of parking slot. Conventional parking systems do not have any intelligent monitoring system and the parking lots are monitored by security guards. A lot of time is wasted in searching vacant slot for parking and many a times it creates jams. Conditions become worse when there are multiple parking lanes and each lane with multiple parking slots.

LITERATURE SERVEY

Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. It's inevitable for the people to update with the growing technology. And generally people are facing problems on parking vehicles in parking slots in a city. In this study we design a Smart Parking System which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly focus on reducing the time in finding the parking lots and also it avoids the unnecessary travelling through filled parking lots in a parking area. Thus it reduces the fuel

consumption which in turn reduces carbon footprints in an atmosphere.

EXISTING SYSTEM

In existing system Current parking systems are all manually operated systems with personnel deployed to handle the parking process. Here we propose a fully automated parking management system. Here we use a combination of IR and RF technology in order to provide an advanced fully automated parking management system. The system keeps track of vehicles entering and exiting the system. Also keeps track of the balance amount of the vehicle, deducts a particular amount when vehicle enters the parking premises. Our system first takes user id through his RF notification. It then tallies the RF code to check for user balance in account. If user has sufficient balance then the system waits for him to arrive at the parking gate. The gate uses IR sensors to detect a car arrival. Once the IR sensor pair detects it gives intimation to the system that the vehicle has arrived. The system then deducts balance from that particular account and increments the number of vehicles entered in the facility. It does not open the gate if user has insufficient balance. The system also continuously scans for number of vehicle exiting the gate through exit gate. An IR sensor pair at the exit gate is used for this purpose. When the sensor detects a car at exit gate it signals the system to decrease the count of parked vehicles by one. Thus we provide a fully automated parking management system that successfully parking space along with account balance management with ease

PROPOSED SYSTEM

Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. It's inevitable for the people to update with the growing technology. And generally people are facing problems on parking vehicles in parking slots in a city. In this study we design a IOT based Parking System which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly focus on reducing the time in finding the parking lots and also it avoids the unnecessary travelling through filled parking lots in a parking area. Thus it reduces the fuel

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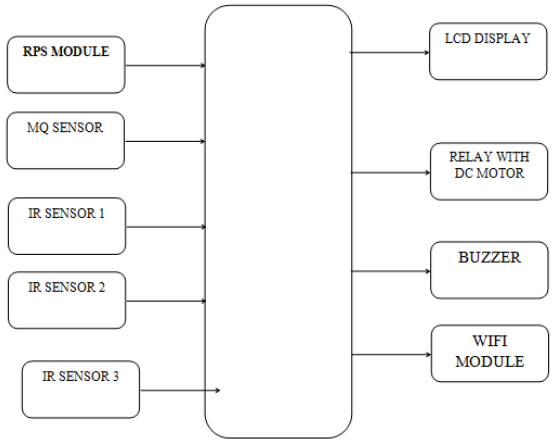
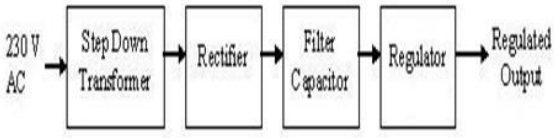
BLOCK DIAGRAM OVERVIEW



POWER SUPPLY

All digital circuits require regulated power supply. In this article we are going to learn how to get a regulated positive supply from the mains supply**.**

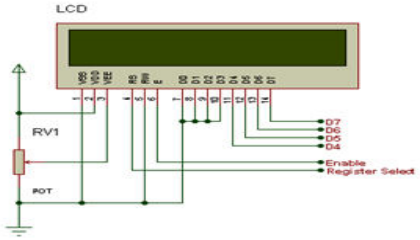


FILTER CAPACITOR

Even though half wave & full wave rectifier give DC output, none of them provides a constant output voltage. For this we require to smoothen the waveform received from the rectifier. This can be done by using a capacitor at the output of the rectifier this capacitor is also called as “FILTER even after using this capacitor a small amount of ripple will remain. We place the Filter Capacitor at the output of the rectifier the capacitor will charge to the peak voltage during each half cycle then will discharge its stored energy slowly through the load while the rectified voltage drops to zero, thus trying to keep the voltage as constant as possible.

LCD DISPLAY

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD’s connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

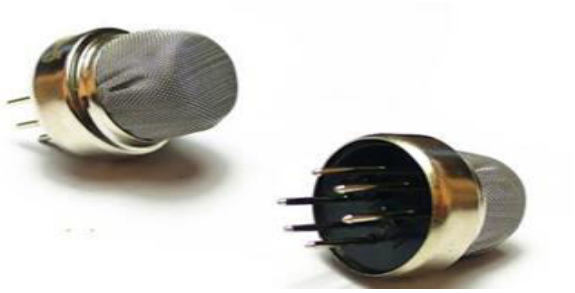


Circuit Description

Above is the quite simple schematic. The LCD panel's Enable and Register Select is connected to the Control Port. The Control Port is an open collector / open drain output. While most Parallel Ports have internal pull-up resistors, there is a few which don't. Therefore by incorporating the two 10K external pull up resistors, the circuit is more portable for a wider range of computers, some of which may have no internal pull up resistors. We make no effort to place the Data bus into reverse direction. Therefore we hard wire the R/W line of the LCD panel, into write mode. This will cause no bus conflicts on the data lines. As a result we cannot read back the LCD's internal Busy Flag which tells us if the LCD has accepted and finished processing the last instruction. This problem is overcome by inserting known delays into our program.

IR SENSOR: Basics of IR transmitter and receiver transmitter and receiver are commonly used in engineering projects for remote control of objects. In particularly, in Robotic system uses transmitter and receiver. Here i would like to describe the basics if IR transmitter and receiver

Gas Sensor: Gas sensors need to be calibrated and periodically checked to ensure sensor accuracy and system integrity. It is important to install stationary sensors in locations where the calibration can be performed easily. The intervals between calibrations can be different from sensor to sensor. Generally, the manufacturer of the sensor will recommend a time interval between calibrations. However, it is good general practice to check the sensor more closely during the first 30 days after installation. During this period, it is possible to observe how well the sensor is adapting to its new environment. Also, factors that were not accounted for in the design of the system might surface and can affect the sensor’s performance.



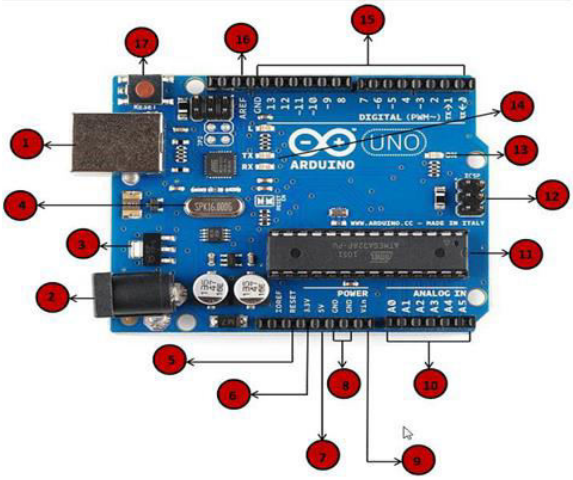
ARDUINO CONTROLLER

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and

microcontroller kits for building digital devices and interactive objects that can sense and control both physically and digitally. Its products are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form or as do-it-yourself (DIY) kits. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers

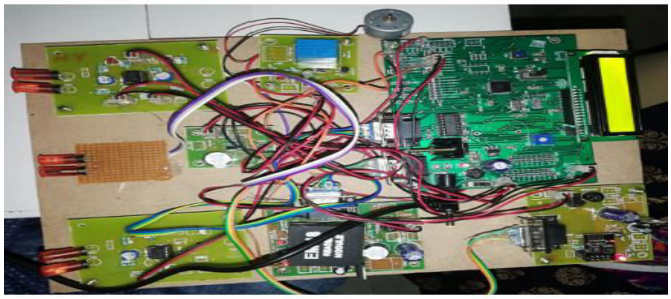
OPERATION WITH PINS: Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available.

Although the hardware and software designs are freely available under copy left licenses, the developers have requested the name Arduino to be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several Arduino-compatible products commercially released have avoided the project name by using various names ending in -duino.

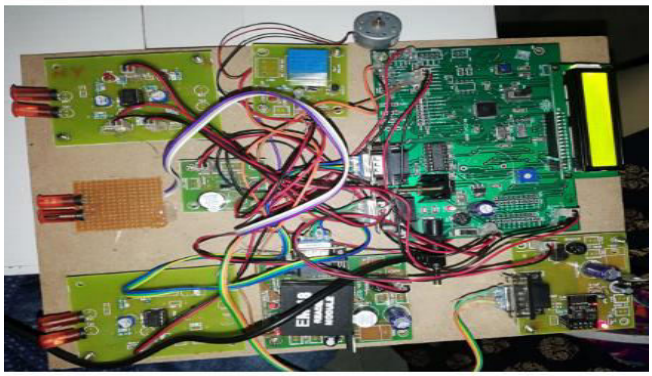


METHODOLOGY WITH WORKING

The Overall Engineering Design is described in the figure 2. The hardware comprises of IR Sensors, Raspberry pi and RFID Sensors which communicates with the Google App Engine and is rendered on various Applications such as the Website, Twitter bot and the Mobile Application. This detailed architecture explains about the entire working system of the efficient car parking model with various personalized features. The sensor used in this project is an infrared sensor which determines whether the slot is occupied or unoccupied. These sensors are connected to the raspberry pi. The output of these sensors is sent to the database through the raspberry pi . Once the database is updated the result is displayed on the video monitor at the entrances of the parking level. This result is displayed using the website url which is updated every 5 seconds. The other module of CPMS is the payment gateway using RFID. There will be an RFID Tag attached to every vehicle. As soon as the vehicle passes through the entry gate the RFID Reader reads the tag and gets the Unique ID and then logs an entry into the database and upon exit another RFID Reader reads the tag and deducts money from the users. Account based on the time spent in the parking lot and hence completes the transaction



WIFI CONNECTED TIME



CONCLUSION

Internet of Things stands out to be the indispensable technology implemented along with Cloud Computing. To be a smart city, Smart Parking facility is an essential service. Previous technologies were exploited which proved to be either not efficient or too expensive. The sensors used to detect the vehicle are the essential components. Here, we have employed Raspberry-pi which seemed to be cost efficient with easy installation and maintenance. The components used for the implementation of the system

provide efficient output at various stages of implementation. The interfaces established between various components provide an effective communication across the overall working of the system. Thus, the system functioning is efficient and is recommended for commercial implementation.

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