Smart Parking

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Abstract— The paper describes the development of automated parking system which is used to people to park their vehicles without facing any problems in high public and traffic areas. This project avoids traffic jams in the underground parking areas and also saves fuel and time. It also adds advance feature in to our country and creates positive impression to other countries and company investors which employment opportunities increases. This p is designed in such a way that it results in low cost in equipment, easy to use and repairable. Using technology in parking add more advantage. Because parking in every country is very important, day to day the amount and percentage of automobiles vehicles increasing. By this theory we can say the need of a good parking system also increases. The ultrasonic sensors are connected to Arduino. The Arduino is programmed in such a way that it sends data to the web server. The output is shown in a web page whether the parking lot is empty or occupies. A country is said to be developed when technology is used in each and every platform

Keywords—Ultrasonic Sensors; Arduino; Buzzer; Vibrator; Battrey **.**

I. INTRODUCTION

This project smart parking using domain internet of thing IOT) web applications and embedded systems used mainly in the public areas to park the vehicles systematically without traffic congestion, problems such as traffic congestion and insufficient parking space inevitably crops up. In Asia, the situation are made worse by the fact that the roads are significantly narrower compared to the West. Various measures have been taken in the attempt to overcome the traffic problems. Although, the problem can be addressed via many methods, the paper focuses on the car park management system introduced, which is the smart parking system. This study will review the evolution of vehicle detection technologies as well as the detection systems developed over the years.

Scope of the project:

We can know the availability of the parking slots in shopping malls and public places where parking plays an important role. The sensors senses the availability of the car and displays vacant or occupied.

Overview:

Car parking problem is a major contributor and has been, still a major problem with increasing vehicle size in the luxurious segment and confined parking spaces in urban cities. Searching for a parking space is a routine (and often frustrating) activity for many people in cities around the world. This search burns about one million barrels of the world's oil every day. As the global population continues to urbanize, without a well-planned, convenience-driven retreat from the car these problems will worsen. According to a report, Smart Parking could result in 2, 20,000 gallons of fuels saving till 2030 and approx. 3, 00,000 gallons of fuels saved by 2050, if implemented successfully. 3 Introduction. Smart Parking systems typically obtains information about available parking spaces in a particular geographic area and process is real-time to place vehicles at available positions .It involves using low-cost sensors, real-time data collection, and mobile-phone-enabled automated payment systems that allow people to reserve parking in advance or very accurately predict where they will likely find a spot. When deployed as a system, smart parking thus reduces car emissions in urban centers by reducing the need for people to needlessly circle city blocks searching for parking. It also permits cities to carefully manage their parking supply Smart parking helps one of the biggest problems on driving in urban areas; finding empty parking spaces and controlling illegal parking
. • Optimize Parking Space Usage • Simplifies the parking experience and adds value for parking stakeholders, such as drivers and merchants • Help traffic in the city flow more freely leveraging IoT technology. • Enables intelligent decisions using data, including real–time status applications and historical analytics reports • Smart Parking plays a major role in creating better urban environment by reducing the

emission of CO2 and other pollutants • Smart Parking enables better and real time monitoring and managing of available parking space, resulting in significant revenue generation • Provides tools to optimize workforce management Need and benefits analysis of smart parking Smart parking work flow analysis . Data base Internet The central control can get real time analytics about parking bays occupancy per areas and times of the day When a car parks over the sensor, it is detected and the sensor relays that information wirelessly- to the gateway. .

Send current parking availability (fully occupied)
Check other parking lots
Recommend parking space
Start parking
Parked

The rapid growth in the number of vehicles worldwide is intensifying the problem of the scarcity of parking space. Again according to industry data, 30% of traffic congestion occurs due to vehicle drivers struggling to find parking space. These in turn are magnifying the necessity of smart and efficient parking systems. Today's intelligent parking management systems are capable of providing extreme level of convenience to the drivers, as well as simplifying and automating the business operation and administrate functions of the parking site owners. Emerging Trends in Parking Following are the trends having the
E solutions deployed, Smart parking does not really provide much solution to two wheelers as yet in India. • Various Security issues and threats to the installed on-site parking meter. • The IoT enabled Parking System shall support mechanisms to correlate charging data/records from different IoT Application Service Providers.

Advantages of smart parking system implementation:

The smart parking system is considered beneficial for the car park operators, car park patrons as well as in environment conservation. For the car park operators, the information gathered via the implementation of the Smart Parking System can be exploited to predict future parking patterns. Pricing strategies can also be manipulated according to the information obtained to increase the company's profit. In terms of environment conservation, the level of pollution can be reduced by decreasing vehicle emission (air pollutant) in the air.

LITERATURE SURVEY

Car parking system is a system that is used to help managing cars in parking area in other to avoid congestion and arrange cars in an allocated position. The system also helps to track how many cars pass through the gate and the duration taken by each, and then it will calculate the amount of money a car should pay when exiting. Car parking system is being used in many congested area or location where there are many meeting point of people like where there are more than one shopping complex near to each other or where there is megamall or stadium. For example like Sunway pyramid, Lowy at and Timeshare, and Midvale megamall all in Malaysia

II. EXISTING SYSTEM

Over the years, car parking systems and the accompanying technologies have increased and diversified. Presently we have traditional parking system where the people search for the parking slots in the Parking areas which leads to problems such as traffic jam, time waste and fuel consumption.

III. PROPOSED SYSTEM

Smart parking system using ultrasonic sensor Arduinos, web applications. Smart parking system involves in three domains internet of things, embedded systems and web applications.The ultrasonic sensors are placed in all parking slots. when a car is parked in front of the sensor the sensor senses the car and sends to Arduino .the output the status of the car parking is shown in the display of a web page whether the car is parked or not. It displays red light besides parking where parked.

General features of Car Parking System

Enable the driver to collect ticket upon entrance: car Parking system should be able to allow the driver to get his ticket after he press the button of the gate barrier.

The system should record the entire cars that pass through the entrance.

The system should allow the gate to open whenever a driver has press the button and take his ticket.

Allow the drivers to make payment: if it's of commercial use, the system should enable the drivers to make payment of their charges before exiting.

Allow the driver to exit: if the driver has paid his charges and require exiting, the system should open the gate to allow him exiting.
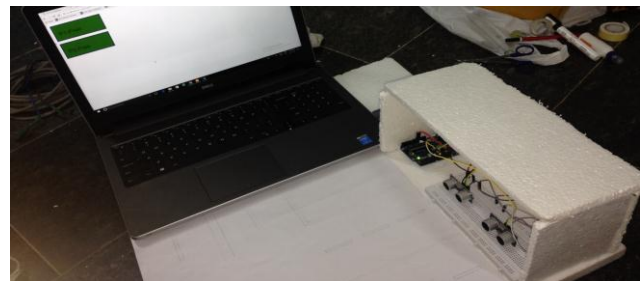

Fig 2 working of smartparking.

IV REQUIREMENT ANALYSIS

After observing the project certain requirements have been analyzed. The next step is to analyze the existing system requirements. Understanding and analyzing the requirements is difficult. Requirements which are analyzed includes both hardware and software requirements.

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a) Hardware Requirements

- Arduino
- Ultrasonic Sensor
- Power

b) Software Requirements

- Arduino 1.6.9
- Long-awaited new arduino-Builder
- Pluggable USB core
- Serial plotter

V SYSTEM DESIGN

From the research conducted, the author can state that, there is not much direct interaction between the system and the user. Though some parking systems have different procedures.

Arduino: The Arduino version is 1.0.5 used to send the information about the parking status with the help of sensors. It consists of the Arduino code in c programming. The system should contain certain software to run and accept the code

Front end: ultra-sonic sensors connected to Arduino

Back end: the my sql database (tomcat server)

Arduino software: Arduino software is different from windows to windows. The software should be downloaded the code of Arduino is encrypted as shown in the fig 1.1. The task that should be done is given to the Arduino software. The code is in c program. The ip address, ssid and password should be entered and saved according to the internet source we using. The saved changes should be uploaded.
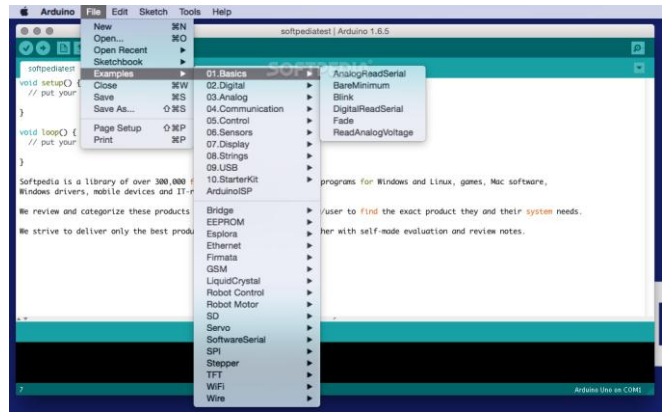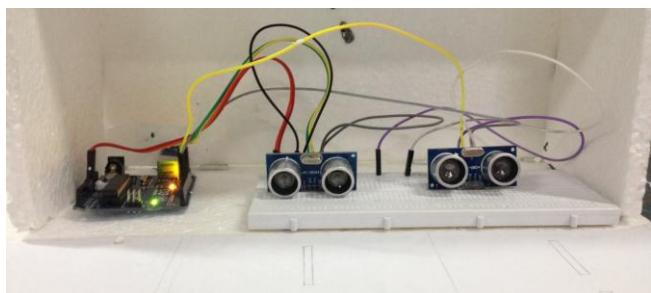

Fig 1 image of the kit

Ultrasonic sensor is placed on the bread board. Sensor has 4 pins they are trig, vcc, echo, gnd. Vcc is connected to the 5V on the power side. Trig is connected to the pin 13 on the digital side. Echo is connected to the pin 12 on the digital side. GND is connected to GND on power side. Buzzer is connected to the arduino, black wire is connected to the GND on the digital side and the red wire is connected to the pin 6 on the digital side. Vibrator is connected to the arduino. There are two wires one is connected to ground another is connected to pin 7 on the digital side.

Fig 1.1 is the screenshot of arduino software

V SOURCE CODE

5.1 Aurdino Code

```
#include <NewPing.h>
#define TRIGGER_PIN1 13
#define ECHO_PIN1 12
#define TRIGGER_PIN2 8
#define ECHO_PIN2 7
#define MAX_DISTANCE 400
NewPing     sonar1(TRIGGER_PIN1,     ECHO_PIN1,
MAX_DISTANCE);
NewPing     sonar2(TRIGGER_PIN2,     ECHO_PIN2,
MAX_DISTANCE);
void setup() {
  Serial.begin(9600);
}
void loop() {
   delay(500);
   unsigned int uS = sonar1.ping();
   unsigned int uS1 = sonar2.ping();
   pinMode(ECHO_PIN1,OUTPUT);
   digitalWrite(ECHO_PIN1,LOW);
   pinMode(ECHO_PIN1,INPUT);
   if(uS>200)
   {
     Serial.print("0");
   }
   else
   {
     Serial.print("1");
   }
   pinMode(ECHO_PIN2,OUTPUT);
   digitalWrite(ECHO_PIN2,LOW);
   pinMode(ECHO_PIN2,INPUT);
   if(uS1>200)
   {
     Serial.println("0");
   }
   else
   {
     Serial.println("1");
   }
}
```

5.2 Main Code

```
import serial
import MySQLdb
```

```
#establish connection to MySQL. You'll have to change this
for your database.
dbConn                                       =
MySQLdb.connect("localhost","root","test123","parkingsyste
m") or die ("could not connect to database")
#open a cursor to the database
cursor = dbConn.cursor()
device = 'COM3' #this will have to be changed to the serial
port you are using
try:
  print "Trying...",device
  arduino = serial.Serial(device, 9600)
except:
  print "Failed to connect on",device
while(1):
  try:
    data = arduino.readline()  #read the data from the arduino
    set1 = (data[0])
    set2 = (data[1])
  # pieces = data.split("\t")  #split the data by the tab
   #Here we are going to insert the data into the Database
   try:
     cursor.execute("update   parkingSystem.parkingdata   set
status=%s where id='1'",(set1))
     print ("Inserted for sensor 1",data[0])
     dbConn.commit() #commit the insert
     cursor.execute("update   parkingSystem.parkingdata   set
status=%s where id='2'",(set2))
     print ("Inserted for sensor 2",data[1])
     dbConn.commit() #commit the insert
   except MySQLdb.IntegrityError:
     print "failed to insert data"
  except Exception as e:
    print "Failed to get data from Arduino!\n",e
arduino.close()
}
```

VI FUTURE EXTENSION

It is not possible to develop a system that makes all the requirements of the user. User requirements keep changing as the system is being used. Some of the future enhancements that can be done to this system are;

- Many modules and advance options can be added

- Can be used in the mobile app

- All parking places can be linked to each other

- Can develop the alliance system

VII CONCLUSION

In this study, the various types of smart parking system and has been presented. From the various examples of the implementation of the smart parking system being presented, its efficiency in alleviating the traffic problem that arises especially in the city area where traffic congestion and the insufficient parking spaces are undeniable. It does so by directing patrons and optimizing the use of parking spaces.

With the study on all the sensor technologies used in detecting vehicles, which are one of the most crucial parts of the smart parking system, the pros and cons of each sensor technologies can be analysed. Although, there are certain disadvantages in the implementation of visual based system in vehicle detect

Work done:

This is the web and mobile enabled project. This project offers user to check whether the parking lot is empty or vacant at the starting point of the parking place that is reception. No need of searching of parking slot which reduces time consumption and fuel consumption.

Goals

- Reduces searching work

- Reduces fuel and time consumption

- Adds advance feature to country and state

- Avoids traffics jams and minor accidents

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