GSM BASED CAR PARKING SYSTEM USING IOT

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Abstract- GSM (Global System for Mobile Communication) is used to reduce the traffic in the parking place. Using GSM, Servo and stepper motors, vehicular parking is proposed. The system that helps users to automatically find the vacant available space in the parking area through the infrared sensors which are located in each parking space and the user can find the vacant parking slots. IR sensors are used in identifying the empty parking slots. The proposed system will provide safe and security and solve the parking issues, with the advanced parking slot. In other terms we can say that it is a new way of communication between the humans and the things. These all things are done with the help of latest technology based on IoT (Internet of Things). IoT refers as any physical thing that is connected to internet or exchanging information or data between internet and physical device.

1. INTRODUCTION

Working towards smart city application, smart parking is a good example for a common citizen of how the Internet of Things will be effectively and efficiently used in our daily living environments to provide different services to different users. Any user may use his mobile device or computer having Internet to access the smart city application from anywhere in the world to find a free parking slot in the city and get to know the which parking slot is available. It provide efficient car parking management through remote parking slot localization and fast car retrieval. The management system can be grouped into multi parking management which can be used to manage both outdoor and indoor parking area and single parking management which usually targets indoor parking slots. The focus and objective of this project work lies on single parking management architectural system which works on real time basis.

2. LITERATURE SURVEY

Different methods are prevalent for development of autonomous or intelligent parking systems. Study of these systems shows that these require a little or more human intervention for the functioning. One of the intelligent systems for car parking has been proposed by making use

of Image processing. Primarily, the image of parking slots with brown-rounded image is taken. The image is segmented to create binary images. Consequently, the free parking space is allocated. A vision based car parking system is developed which uses two types of images are to detect free parking slot. In this technique, the object classifier detects the required object within the input. Positive images contain the images of cars from various angles. Negative images do not contain specified input to detect the presence of cars in the region. Infrared sensors are used to detect free parking slots. Then the current timing is noted so as to calculate the parking fees. The LCD displays full sign to indicate that a parking spot is not available. However, some limitations with the system include background colour being compulsorily black and character colour white. Also, analysis is limited to number plates with just one row. Smart Parking system designed proposed a mechanical model with an image processing facility. The car would be parked with the use of lift at multiple levels.

3. EXISTING SYSTEM

Current increase in the growth of automotive industry tied with the continuous demand for users that leads to the need for better and smarter parking mechanisms. Studies have estimated that on a daily basis 30% of traffic in the downward area of major cities is due to cruise for parking slots and result in traffic congestion. Most of the existing parking management systems not frequently address the issues of parking space management, vehicle guidance, parking slot reservation etc. The major parking slot problems is difficulty in finding vacant spaces quickly, finding a vacant space in a multilevel parking slot is difficult if not impossible, especially on weekends or holidays. Finding spaces during weekends or holidays can take more than 10 minutes for about 66% of visitors. If a car is parked in such a way that it occupies two parking slots rather than one, this is called improper parking. Improper parking can happen when a driver is not careful about another drivers rights and there is a chances of revenue leakage and results in loss to parking lot owners.

4. PROPOSED SYSTEM

The proposed system is the combination of the hardware and software to form a complete module. Exchanging of all the information or data between mobile and sensor circuitry is done by using wired connection. The algorithm defining the parking slot allotment is as follows: Initially selection & checking is done for car parking area. It checks for availability for car parking slots S1, S2, S3, S4. If parking slot is free, the particular slot will be Green light. If all car parking are full, all the slots will be RED light and a pop up will be generated "Parking Full". For temperature of parking area, if it is greater than threshold, then pop will be "Temperature to high". For Light of parking area, if it is less than threshold, then pop up message will be "Turn on Light".

4.1 PROJECT OVERVIEW

An embedded system is a combination of software and hardware to perform a dedicated task. It interfaces the data with various devices, controls the data and thus finally gives the result. **"GSM based car Parking system using IoT"** was designed such that the status of parking slots.
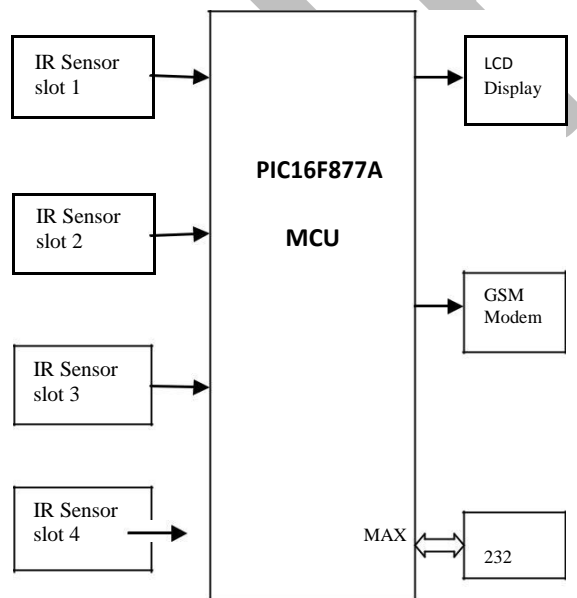
5. BLOCK DIAGRAM

Figure.5.1 GSM Based Car Parking

6. HARDWARE DESCRIPTION

6.1 GSM Modem Sim900A

GSM stands for Global Systems for Mobile Communication. Purpose of using GSM module is for sending and receiving of SMS from Parking Control Unit. Data is transferred to and from the GSM in synchronized. Before working on the SMS, it is important to check for the initialization and network status. The GSM has 2 pins –Tx and Rx, which are in turn connected to the pins Rx and Tx respectively of the microcontroller.

6.2 IR Sensor

An IR sensor is an electronic device that emits to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only IR radiation rather than emitting it, that is called as a passive IR sensor.

6.3 Power Supply

A regulated power supply is very much essential for several electronic devices due to the semiconductor material employed in them have a fixed rate of current as well as voltage. The device may get damaged if there is any deviation from the fixed rate. The AC power supply gets converted into stable DC by this circuit. By the help of a voltage regulator DC, unregulated output will be fixed to a stable voltage. The circuit is made up of linear voltage regulator 7805 along with capacitors and resistors with bridge rectifier made up from diodes. From giving an unchanging voltage supply to building confident that output reaches unbroken to the appliance, the diodes along with capacitors handle elevated efficient signal.

6.4 LCD

The Liquid Crystal Display (LCD) System Display the technology called electro-optical of the modulation. It uses the electricity to change how much light passes through it. In this work it is used to display required information like available slots, filled slots, total number of slots etc.

7. MODULES AND ITS DESCRIPTION

Module in this project:
  7.1 PIC16F877A Microcontroller
  7.2 Multipurpose Infrared Sensors
  7.3 GSM connectivity
  7.4 Liquid Crystal Display (LCD)

7.1 PIC16F877A Microcontroller

A micro controller is a true computer on a chip. The design incorporates all the features found in a microprocessor such as CPU, ALU,PC,SP and registers. It also has some added features needed to make a complete computer ROM, RAM, parallel I/o, serial I/o, counters and clock circuit. The prime use of a micro controller is to control the operation of a machine using a fixed program that is stored in ROM and that does not change over the life time of the system. The architecture and instruction set of the micro controller are optimized to handled data in bit and byte size. The areas if applications of micro controllers include control process, manufacturing process, medicine, instrumentation etc.

7.2 Multipurpose Infrared Sensors

The infrared sensors are used to detect the object or any obstacle. These sensor work on a simple logic and principle in order to detect the obstacle. These sensors are very cheap and easily

available in market. It uses 555 comparator IC which has a voltage of about 0.5 volts-0.25 volts. It reduces program complexity and can be used. Whenever any vehicle is detected at that time the IR sensors senses the output is red and when there is no vehicle at that time its output is green.

7.3 GSM Connectivity

GSM modem just accepts certain commands through a serial interface and acknowledged these commands are called AT commands. There is a list of AT commands to instruct the modem to perform its functions. Every command starts with "AT" that is why they are called as AT commands. Our proposed system is used to GSM modem to register the user phone number. Using GSM modem the alert message will be transmit to that particular person phone number.

7.4 Liquid Crystal Display (LCD)

We study an intelligent LCD display of two lines, 16 characters per line that is interfaced to the 8051. The display contains two internal byte-wide registers, one for commands instructions (RS=0) and the second for characters data to be displayed (RS=1). It also contains a user-programmed RAM area that can be programmed to create any desired character that can be formed using a dot matrix. To differentiate between these two data areas, the hex command byte 80 will be used to signify that the display RAM address 00h will be chosen Port1 is used to furnish the command or data type. The display takes varying amounts of time to accomplish the functions as listed. If a car is parked in such a way that it occupies two parking slots rather than one, this is called improper parking.

CONCLUSION

The smart parking system based on IoT concept has been implemented using various sensor circuitry. It is an efficient system for car parking which reduce traffic congestion. The smart parking system has been presented from various examples of the implementation. It is

efficiently used in alleviating the traffic problem that arises especially in the city area. 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 analyzed. Although, there are certain disadvantages in the implementation of visual based system in vehicle detection as described earlier, the advantages far outweigh its disadvantages. This work is added to extend the smart car parking system with automatic booking system and also with automated system using multilayer parking method.

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