

PARKING AVAILABILITY INDICATION SYSTEM USING INTERNET OF THINGS (IOT)

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Abstract:

IOT stands for internet of things .To easily find an unoccupied parking space in the larger car park is a problem for many drivers. During the last four-decade, there are many parking models are developed. But, the models still cannot solve the parking problem. The car parking indicator system could be used for residential buildings, hotels, offices, shopping centre and show rooms, universities, government buildings, airports, hospitals, and stadium. The advantages of the parking availability indication system are efficient usage of spaces, slots, proper direction Automatically , allotment of slots, display of empty and filled parking slots .Ultrasonic sensors are mounted in the road, to provide exact direction to the car on the lane. As soon as car enters, driver gets information of the filled slots and empty slots on LCD board . When all slots are full, No slots available message displays on the display board.

Keywords:ultrasonic sensors,wifi,

I.INTRODUCTION

The advantages of automated car parking are efficient usage of spaces; decreasing the land space and increasing the number of parked vehicles, saving time by taking and delivering car in a few seconds; providing security and safety for the car from theft and damages while parking.

As multinational cities are suffering from the lack of available parking spots and expensive land prices, especially in vital areas, we were inspired to create an automated car parking system that can counter such a daily basis problem to make life easier. The main objective of this report is to build a prototype of the automated car parking system to park and retrieve cars automatically in an easy and sufficient way. To easily find an unoccupied parking space in the large car park is a problem for drivers. It is because the car on the road increases every year especially in town. On the other hand, it is more difficult to find the parking space during peak time and holidays because this is the time people want to release their stress and to spend time with family. There are not many existing solutions attempting to address the problem. Thus, it is useful to have some technical solutions that can provide information on parking space occupancy. The efficient parking monitoring system must be designed to overcome the problem.

II. PROJECT OVERVIEW

An embedded system is combination of software and hardware to perform a user defined task .some of the main components used in embedded products are Arduino-uno and ESP8266NodeMCU.

ATMega328 Microcontroller is inbuilt in the Arduino-uno. A Microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices ,control the data and thus finally gives the result.

The project “PARKING AVAILABILITY INDICATION SYSTEM USING IOT” was designed such that the status of parking slots can be known from anywhere in the users webpage.

III. BLOCK DIAGRAM

In this chapter the block diagram of the project and design aspect of independent modules are considered.

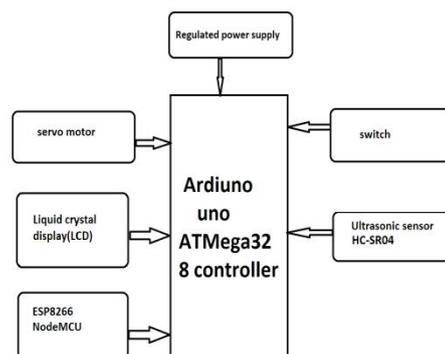


Fig 1. Block diagram of IOT based parking availability indication system

IV. ARDUINO UNO(ATMEGA328)

The Arduino Uno is one of the most common and widely used Arduino processor boards . The Arduino board makes it very easy to use the ATmega328 processor by providing easy access to most of the pins via the headers, in addition, it

provides:

5 VDC regulated power from the 6 – 20 VDC input jack

3.3 VDC regulated power available for other electronics

The crystal oscillator

TX and RX are serial UART pins used for RS-232 and USB

communications .A/D in Analogue to Digital this input

converts an analogue voltage in to a digital representation

PWM (Pulse Width Modulator) is used to create a square wave with a specific duty cycle (high time vs low time)

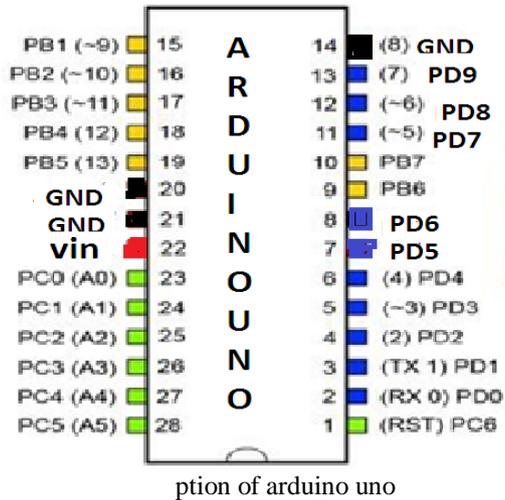
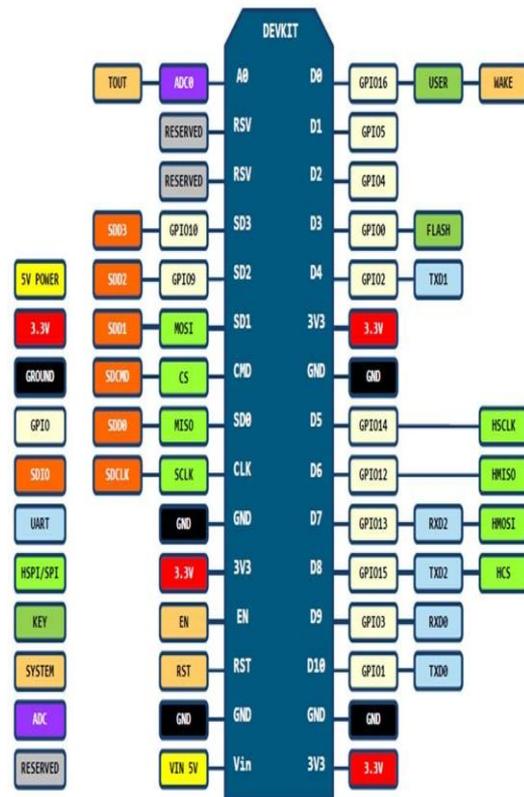


Fig 2. pin description of arduino uno

V. ESP8266 NODEMCU

The ESP8266 is the name of a micro controller designed by Espressif Systems. The ESP8266 itself is a self-contained WiFi networking solution offering as a bridge from existing micro controller to WiFi and is also capable of running self-contained applications.

This module comes with a built in USB connector and a rich assortment of pin-outs. With a micro USB cable, you can connect NodeMCUdevkit to your laptop and flash it without any trouble, just like Arduino.



D0(GPI016) can only be used as gpio read/write, no interrupt supported, no pwm/i2c/iow supported.

Fig 3. Pin description of ESP8266NodeMCU

VI. ULTRASONIC SENSOR(HC-SR04)

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules include ultrasonic transmitters, receiver and control circuit.

Basic Principle Of Work:

- (1) Using IO trigger for at least 10us high level signal.
 - (2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.
 - (3) IF the signal back, through high level time of high output IO duration is the time from sending ultrasonic to returning.
- Test distance = (high level time*velocity of sound (340M/S) / 2.

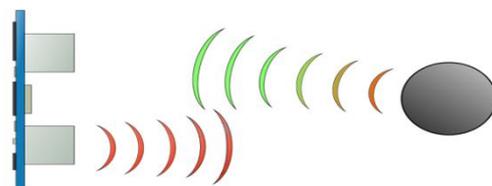


Fig 4. Transmission of signals between sensor and object

The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. The Ground and the VCC pins of the module needs to be connected to the Ground and the 5 volts pins on the Arduino Board respectively and the trig and echo pins into any Digital I/O pin on the Arduino Board

VII.LIQUID CRYSTAL DISPLAY

The JHD16x2 LCD module has 16 pins and can be operated in 4-bit mode or 8-bit mode.let’s have a look at the JHD162A LCD module. The LCD can work in two different modes, namely the 4-bit mode and the 8-bit mode. In **4-bit mode**, we send the data nibble by nibble, first upper nibble and then lower nibble. For those of you who don’t know what a nibble is: a nibble is a group of four bits, so the lower four bits (D0-D3) of a byte form the lower nibble while the upper four bits (D4-D7) of a byte form the higher nibble. This enables us to send 8-bit data. Whereas in **8-bit mode** we can send the 8-bit data directly in one stroke since we use all the 8 data lines.

Now you must have guessed it, yes 8-bit mode is faster and flawless than 4-bit mode. But the major drawback is that it needs 8 data lines connected to the microcontroller. This will make us run out of I/O pins on our MCU, so 4-bit mode is widely used. No control pins are used to set these modes. It's just the way of programming that change.

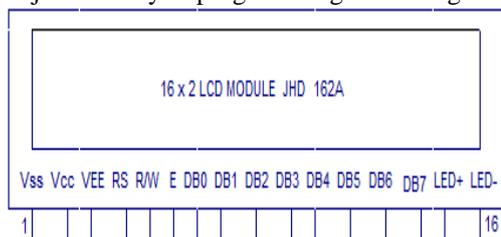


Fig 5. 16x2 LCD pin diagram

VIII.SOFTWARE DESCRIPTION

This project is implemented using following software’s

- 1)Arduino
- 2)HTML

IX.WORKING

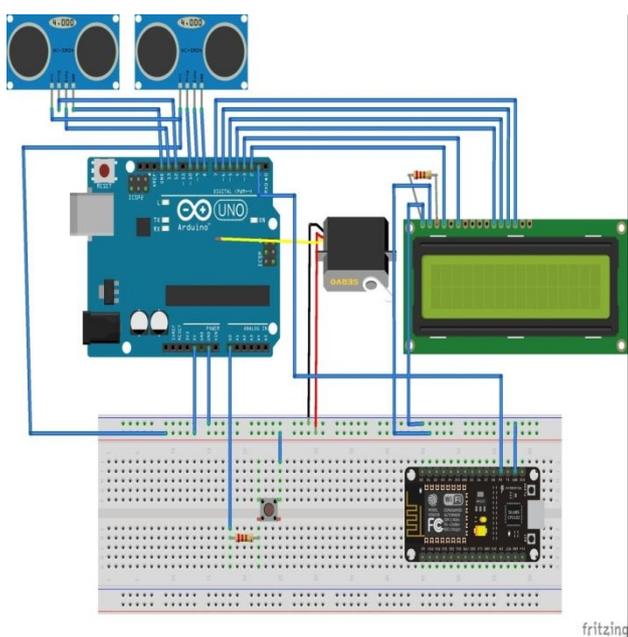


Fig 6. Schematic diagram

Our project “parking availability indication system using IOT”is mainly intended to monitor the status of the devices through ip address.

The controlling device of the whole system is a Arduino uno.NodeMCU ,ultrasonic sensors are interfaced to the Arduino uno. Ultrasonic sensors are fed as input to the Arduino uno.this Arduino processes this data and transmit over NodeMCU ,which will be received from the web page .In acheveing the task the Arduino uno is loaded with a program written using Embedded “c” language. The user who wants to park the vehicle is connected to the web page using ip address .the ultrasonic sensor sends the status to the arduino uno where the data processing is done.the Arduino sends the information to the web page and the lcd board about the status of the slot to the user using IOT.This way the user can easily find a parking slot without any difficulties and in less time.

X.RESULTS

The project “parking availability indicaton system using IOT”was designed such that the sttus of parking slots can be known from anywhere in the users web page.This is acheived using WIFI communication.

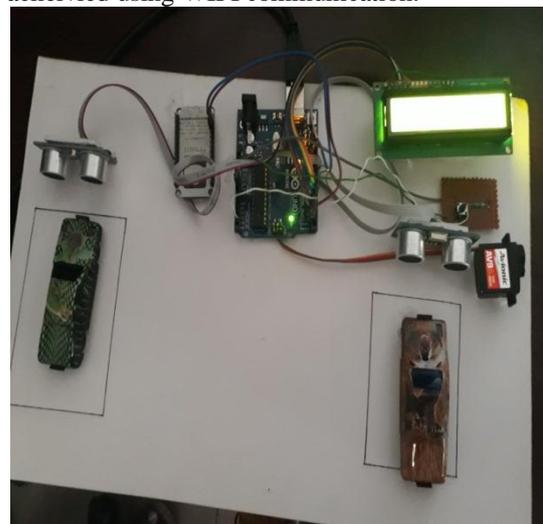


Fig 7. Practical implementation of project

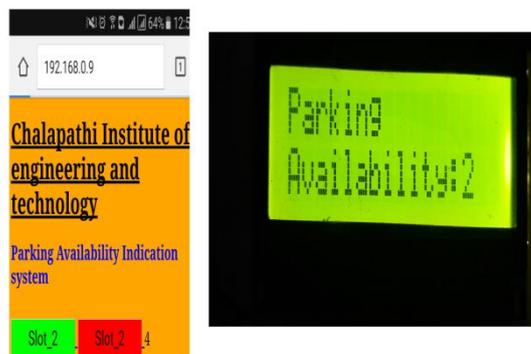


Fig 8. Availability of slots in LCD and in web page

XI. CONCLUSION

This designed automatic smart parking system which is simple, economic and provides effective solution to reduce carbon footprints in the atmosphere.

It is well managed to access and map the status of parking slots from any remote location through web browser.

Thus it reduces the risk of finding the parking slots in any parking area and also it eliminates unnecessary travelling of vehicles across the filled parking slots in a city. So it reduces time and it is cost effective also.

XII. FUTURE SCOPE

This project can be extended by adding an application of booking this car parking slot before reaching the destination. The can be achieved by using GSM and RFID COMMUNICATION. And also enhance to send some notifications to users smartphone when vehicle enters to particular shopping places and some streets in a city etc.

XIII. REFERNCES

- [1] M Childs, "Parking Spaces; A Design, Implementation and Use Manual for Architects Planners and Engineers" McGraw-Hill, 2009.
- [2] D Y Park, "Vertical Rotary Parking" <http://www.freepatentsonline.com/y2004/0156699.html> (accessed on 11November, 2010).
- [3] H Hwang, S Lee, "Expected Service Time Model for A Rotary Parking System", Computer Industrial Engineering, vol35, pp 559-562, 1998. (Pubitemid 128674778).
- [4] F. B. Beer, E. R. Johnston Jr., "Mechanics of Material, Second Edition", McGraw-Hill, pp 701, s1992.
- [5] R. Cabrera-Cosetl, M. Z. Mora-Alvarez, and R. Alejos-Palomares , "Self-Parking System Based in a Fuzzy LogicApproach," in Electrical, Communications, and Computers, Conielectcomp 2009. International Conference on, 2009, pp. 119- 124.
- [6] Z. L. Wang, C. H. Yang, and T. Y. Guo, "The design of an autonomous parallel parking neuro-fuzzy controller for a car-like mobile robot," in Proceedings of the SICE Annual Conference, Taipei, 2010, pp. 2593-2599.
- [7] Norazwinawati Basharuddin by R.K.Jain, R. Yusnita Fariza Norbaya, "Intelligent Parking space detection system based on image Processing", International Journal of Innovation, Management and Technology, vol. 3, no. 3, pp. 232-253.
- [8] M.A.R. Sarkar, A.A. Rokoni, M.O. Reza, M.F. Ismail, "Smart Parking system with image processing facility", IJ Intelligent Systems and Applications, 2012, vol. 3, pp. 41-47.
- [9] International Symposium on V.W. S. Tang, Y. Zheng, Sensor Networks," Proceedings of the 1st and J. Cao, "An Intelligent Car Park Management System based on Wireless Pervasive Computing and Applications, pp. 65-70, Aug 2017.