

AUTOMATIC CAR PARKING SYSTEM

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Abstract - This project mainly aims in automating the system of car parking with less human interference. This busy world has brought people to state of no patience and advancement in technology. Fortunately, is favoring the need to save time and energy. The area fitted with sensors provides efficient way to park the vehicles automatically knowing details of the available slot, which is the target of this project.

Key Words: sensors, car parking, automatic, human interference

1.INTRODUCTION

In this 21st century, with all the increasing population, it has become a tedious job to find a parking slot for the cars. People who go for work everyday need a slot near their office parking systems and people who go shopping on weekends need a slot to park at malls, theatres, hotels etc. But in their busy schedule searching for a parking place should not become tiresome. Moreover, the parking slots are never user-friendly and provide no logical data about the availability of the slot unless the user visits it manually.

These kind of problems are faced regularly by every individual because the factor of uncertainty is very high and there are not many possible solutions in existence for solving the issue that may benefit the users by saving their time or keeping their mental state happy and carefree. Under all this, increasing traffic results as drivers have to go back and forth desperately looking for parking spaces, wasting their valuable time, fuel consumption, with increased likelihood of causing accidents.

Therefore, to solve all these issues to some extent we propose an automatic car parking system. This exciting design of parking system allows the driver to look for

available slots through the display and park accordingly. Once the parking is full the gate does not open to any next cars until any spot gets free.

2. Project Overview

Our project the automatic car parking system is designed in order to make the parking process easy and have less man hand. We are implementing IR sensors near the gate to detect the car presence and which intern rotates the servo motor and opens the gate. The display[20x4 LCD] shows us the total number of slots and the details of their occupancies.

Once a car enters and takes a slot, that slot is displayed to be filled. In this fashion the system of car parking is automated.

3. MOTIVATION TO USE THIS DESIGN

This idea of our project has a few benefits in real life which has been a great motivation in modelling it.

Optimized parking- Users find the best spot available, saving time, resources and effort. The parking lot fills up efficiently and space can be utilized properly by commercial and corporate entities.

Reduced traffic- Traffic flow decreases as fewer car are required to drive around in search of an open car parking space .

Reduced pollution- Searching for parking burns around one million barrels of oil a day. And optimal parking solution will significantly decrease driving time, thus lowering the amount of daily vehicle emissions and ultimately reducing the global environmental footprint.

Decreased management costs- More automation and less manual activity saves on labour cost and resource exhaustion.

4. Proposed Model

The entire idea of our project is divided into three levels. They are as follows,

Sensor level module:

Here we are implementing infrared sensors for the conception of detecting the presence of the car in the parking slot. We also use these sensors to detect the cars during entrance and exit which is responsible in opening and closing of the gates.

Program level module:

In programming level we process the received signal with arduino to find the free parking slots and obtain results.

Display level module:

The display using LCD shows the slot availability. It is responsible of directing the drivers for whether the parking is full or empty.

5. Block Diagram of our proposed work is as shown in fig-a

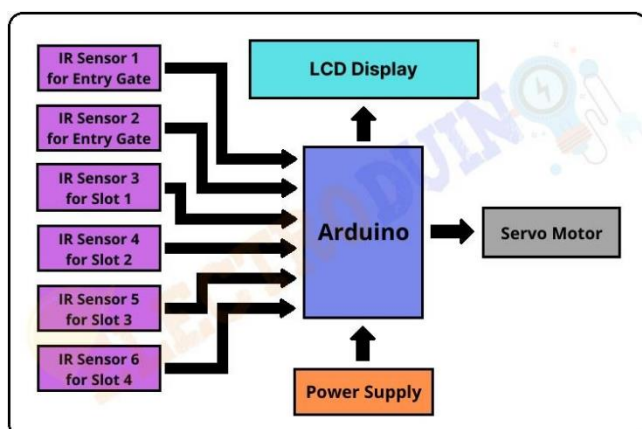


Fig-a

The above block diagram is the depiction of how automated car parking system works. As mentioned in the three levels of our project modelling, we have used IR sensors for the detection of vehicles and a 20x4 LCD for displaying the status of the parking slot. Further servo motor is used as gate or barrier for entering or exiting of vehicles and all of the operation is controlled by Arduino UNO where the power supply is the driving force of the project.

Design

In order to get a efficient design of our project, following components are being used.

ARDUINO UNO

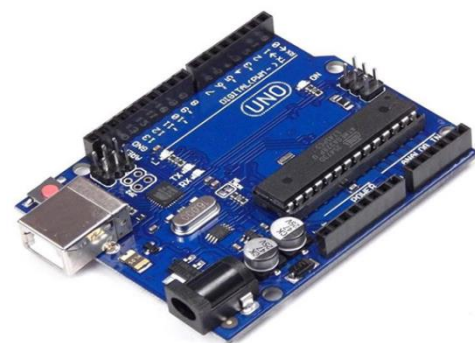


Fig-b.1

The Arduino uno is an open source microcontroller board based on the microchip ATmeg328p microcontroller. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and others circuits. It is used in the programming level module and communicates with display.

20X4 LCD



Fig-b.2

The LCD stands for Liquid Crystal Display. In a 20x4 LCD module, there are four rows in display and in one row twenty characters can be displayed and in one display eighty characters can be shown. This liquid crystal module uses HDD44780 parallel interfacing. It is used in our display level module to exhibit the required data.

Pin Headers



Fig-b.3

Pin headers are stiff metallic connectors that are soldered to a circuit board and stick up to receive a connection from a female socket. While pin headers are male by definition, female equivalents are also quite common and we refer them as female headers or header connectors.

IR Sensors

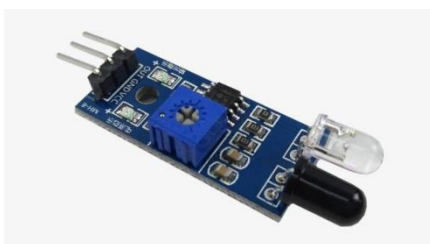


Fig-b.4

An infrared sensor is a radiation sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780nm to 50μm. It is used in our sensor level module to detect the existence of car in the slot as well as near the gate.

Mini Servo Motor SG90



Fig-b.5

Mini servo motor SG90 is a tiny and light weight server motor with high output power. Servo can rotate approximate 180°. We use it in opening and closing of gates for cars after the sensing process.

Female DC Power Jack



Fig-b.6

Female DC power jack is used to connect adapters to our circuit boards. A typical DC connector/plug/jack is an electrical connector for supplying direct current DC power type of jack varies from small co-axial connectors used for automotive accessories and for battery packs in portable equipment.

6.Circuit Diagram

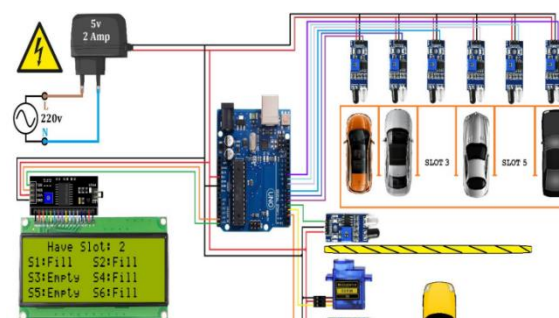


Fig-c

This is a automatic car parking system using Arduino UNO. For detecting the movement of vehicles, we are using IR sensors and to display the parking status we are using a 20x4 LCD. This system is capable of finding the empty slots that are available for parking automatically. If the slot is empty in the automated car parking the new vehicles are allowed to enter the parking else the entrance is blocked by using the servo barrier in case no empty slot is found by the system. The visitors can see the status for availability of the free space outside the parking on a 20x4 LCD.

7.Result



Fig-d



Fig-d.1



fig-d.2

8. Outcome

The benefit of our project is, that it is cost effective in comparison with the other work(reference 12). The use of IR sensors instead of ultrasonic sensors adds on a cost reduction to us. Ultrasonic sensors have a coverage of 30 degrees angle and 10m straight, whereas IR sensors detect only along the straight line, and the requirement of sensing the vehicles is best served with IR sensors at reliable cost.

9. CONCLUSION

The car parking system automation is successfully modeled. The mind-numbing process of today, is made simple with our project design.

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10. International Research Journal of Modernization in Engineering Technology and Science(Peer-Reviewed, Open Access, Fully Refereed International Journal) Volume:04/Issue:03/March-2022 Impact Factor- 6.752 www.irjmets.com @International Research Journal of Modernization in Engineering, Technology and Science [80] SMART PARKING ASSISTANCE USING ARDUINO S.K.Satyanarayana*1, A.Akhil*2, G.Padmini*3 *1Assistant Professor, ECE Department, SNIST, Hyderabad, India. *2,3UG Scholar, ECE Department, SNIST, Hyderabad, India.
11. International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429 Volume 9 Issue VI June 2021- Available at www.ijraset.com ©IJRAS 4389 ET: All Rights are Reserved Car Parking System using Arduino

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