

Ultrasonic based easy parking system based on Microcontroller

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ABSTRACT

The prime objective of this research is to avoid collision and reliable vehicle parking system. Ultrasonic sensor plays a vital role in grain level filling in a container because fill level is calculated by measuring the distance information. Parking sensor system use either electromagnetic or ultrasonic sensor which alert the driver about the obstacles in the path while parking. Basically, the sensor detects the nearby objects. It will be help in terms of unplanned parking, also one kind of wasting time and wasting fuel. So, in a short time one could easily find a parking slot with low consuming fuel. Principally, drivers are frustrated while waiting for the parking for a longer time. Therefore, this challenge can be possible through the ultrasonic sensor.

Keywords: Microcontroller; ultrasonic sensor; distance; parking system; led indicator.

1. INTRODUCTION

Day to day huge no of vehicles usage and for this reason it is quite difficult to find a vacant place for parking a four-wheeler. Development and research being done on this parking management system.

This study covers only the basic low cost as well as design suitable also prefer choice able for this ultrasonic based parking system. There are different existing of vehicle detection sensor technology are available like microwave, radar, active infrared sensor, RFID also passive infrared sensor. The ultrasonic sensors are used for many applications like level, distance, position and diameter. Basically, the sensor emits acoustic waves each time through a control unit it measures the reflected signal and calculated the distance through that control unit. As per the setting in the microcontroller coding, alarm can be toned when distance is less between the target. Both receiving and sending signal can be handled in the control unit. As IR and Ultrasonic are low cost so maximum preference goes to that sensor.

2. LITERATURE REVIEW

GP2Y0A21YKOF IR sensor used for distance measurement, it is interfacing to microcontroller [1]. An ultrasonic sensor uses sonar to determine distance and it is basically used in Security, Garage, Pumping System, Corridor, Lift [2].

Table 1. Technical specification.

Parameters	IR sensor GP2Y0A21YKOF	Ultrasonic sensor (HC SR-04)
Range	10 cm to 80 cm	2cm to 10 m
Beam Pattern	Narrow	conical
Beam width	75deg	30deg
Frequency	353 THZ	40KHZ
Unit Cost	750 INR	130 INR

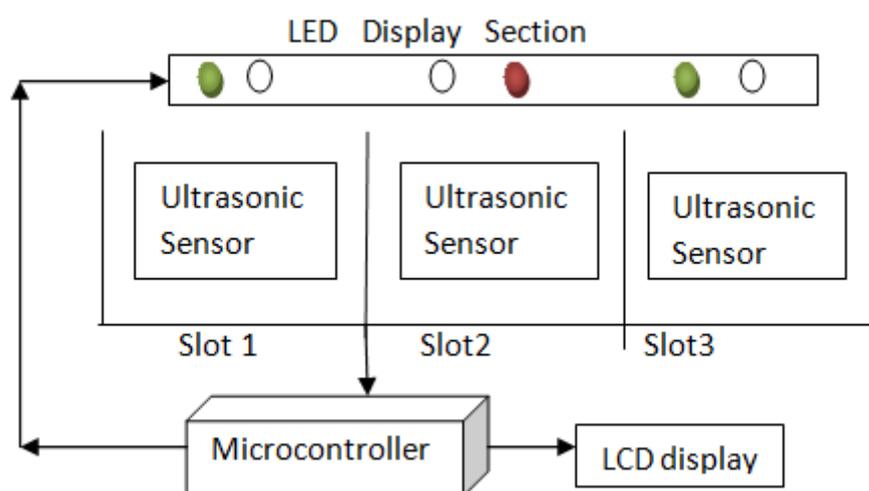


Figure 1. Basic block diagram for parking system

Many public places specially in metropolitan like hospita, offices, malls and in different market areas four wheller parking is a crucial problem. Even in industry the importance of ultrasonic sensor is more [3]. Single chip through circuit connection can easily calculate distance by using sensor [4].

Particularly in rush hours it is quite difficult to the driver to find a suitable space for parking the vehicle. No doubt human eyes play a vital role for the finding of parking space. The driver must have to know two things one as availability second one is the space. Figure 1 describes the basic block diagram for proposed low cost system.

3. DESCRIPTION

Now a days through video and image as well as RFID based systems are used. But due to expensive and high cost for maintenance and installation, ultrasonic sensor is highly preferable by looking to the cost effective, reliable and accurate result. Basically, ultrasonic sensor-based parking monitoring process is easiest. No doubt IOT platform will may give great potential to the parking system. Due to rapid increase of private vehicular parking stand in most cities. To reduce traffic congestion, they normally preferred the low cost so that they can make a good earn with less investment.

Real time implementation can be delivered when there will be target near to the ultrasonic sensor. the microcontroller-based distance measure by the ultrasonic sensor will help this challenging task like finding space for parking in busy and crowded cities. Improper parking making bad situation a lot and to reduce these factors as well as conformation of object nearby can be shot out by ultrasonic sensor.

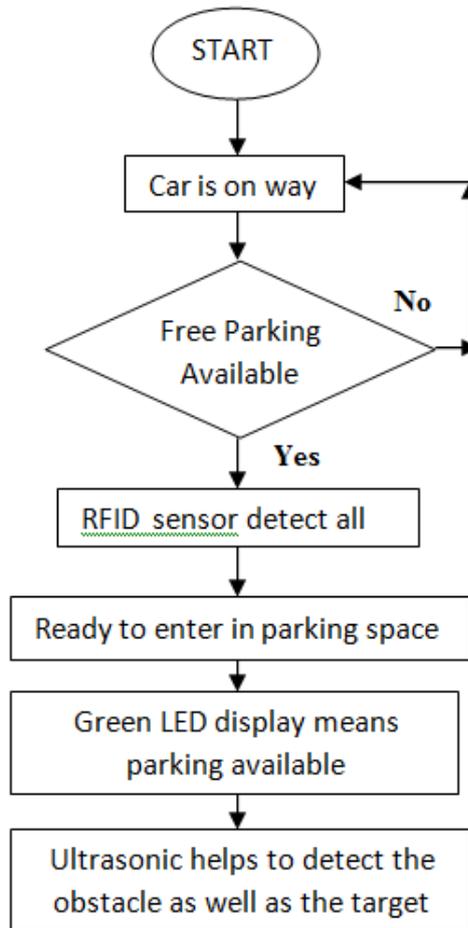


Figure 2. Flow chart for parking system

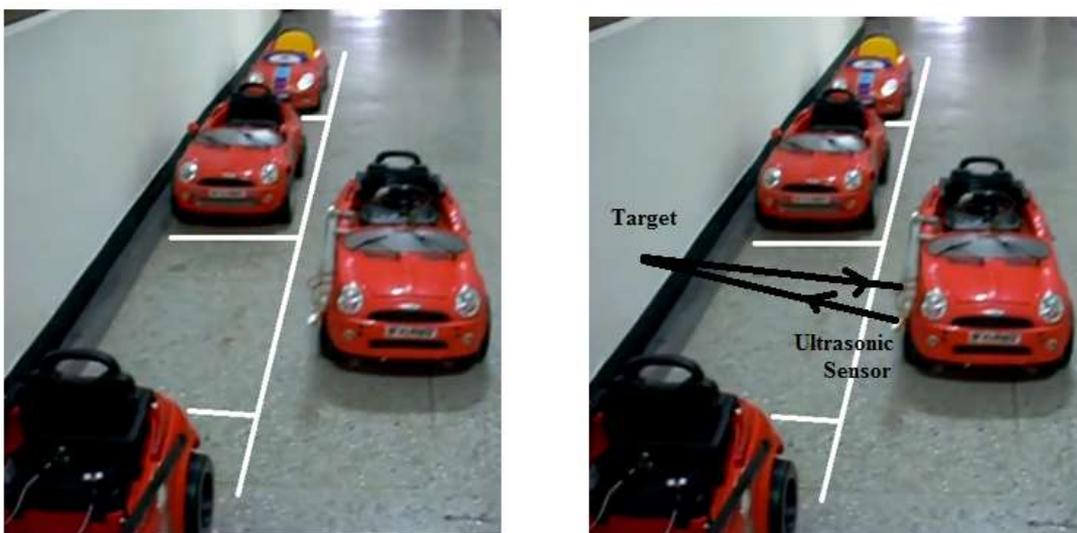


Figure 3. Simple toy parking in horizontal manner

Figure 2 describe flowchart in normal parking system. Figure 3 describes the roadside parking system, where there is no guidance will be there.

3.1 Parking Model

Many cases drivers are frustrated, and they might not know initially whether there is a spot free or not for the parking of vehicle. Due to some time consuming, they even will make interest to leave that place and searching another space.

3.1.1 Parking spaces

Weekends or public holidays, shopping complexes have given more emphasis on parking vehicles [5]. Microcontroller based ultrasonic distance measurement is best method and works satisfactory [6]. Parking on garages or it's in road microcontroller will help a lot to the users [7]. Without involving manual efforts and with reduce in time efforts, one can easily finding out the vacant parking slot in the parking zone. ultrasonic used parking system has advantages like it is very cheapest and one can make use in the vehicle for obstacle detection.

3.1.2 ultrasonic transmitter and receiver

It offers basically the parking system as in terms of time savings and reliability which convince the users and for all time [8]. By looking to the speed of the crowd due to increase in population the basic ultrasonic sensor is required for easy parking system [9].As for the entire world pollution make a major issue, so to reduce waste time this ultrasonic based system is more preferable [10]. Sometimes it's important of vehicle speed and the turning radius [11]. Ultrasonic wave to travel from the place used i.e. transmitter to the actual target after that the reflection, back to the receiver located near the origin of the transmitter.

3.1.3 Display style

Microcontroller basically designed for low power consuming [12] and provides, communication with high speed with addition to this ultrasonic sensor calculating the time interval from this the distance can be marked [13] and basically it helps monitoring the estimated distances [14]. Figure 4 indicates the logic of free space.

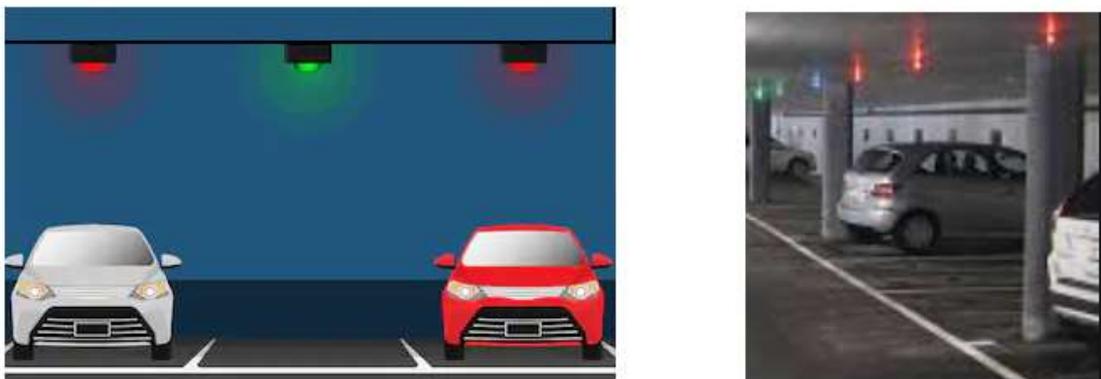


Figure 4. Simple logic behind the indication of LED in parking place

For the marked value will be displaced in the LCD. In LCD of 16x2 means it have two rows and 16 columns, so that total 32 characters can display.

In this we address the display issues by indicating LED like red and green colour for clarity of the space. Green LED indicates vacancy i.e. one can park his /her vehicle and red indicates occupancy So parking will be made easy and fast. This will also help to environment by reducing carbon dioxide emissions from vehicles.

3.2 Circuit Connection

Figure 5 describe the use of proteus software before making any connection to hardware. It gives the conformation about the model working condition. Here we simply connect the ultrasonic sensor with microcontroller and LCD for the displacement.

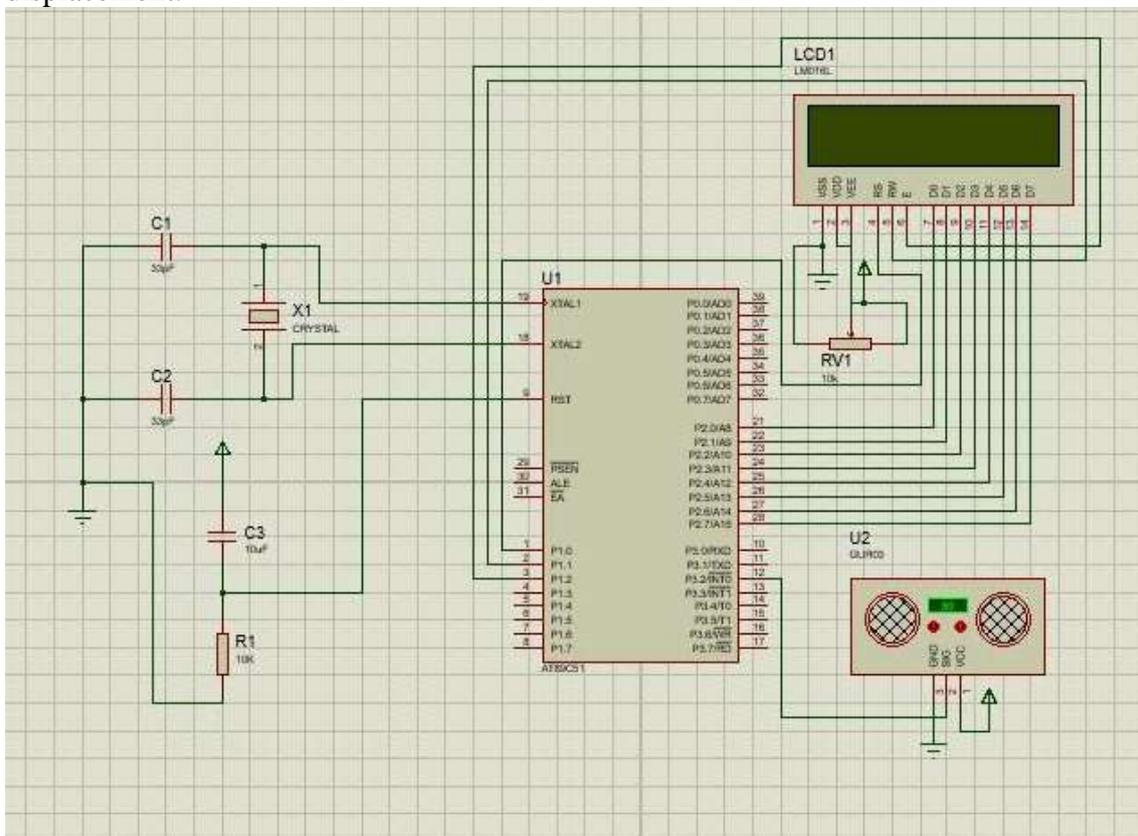


Figure 5. Simple proteus simulation for LCD display parking system

4. CONCLUSION

Normally this low cost ultrasonic based parking system can be installed in big malls, underground parking areas of flats, commercial buildings also in parking lots of offices. Space reservation can be conformed through LED light. So this light system can be helped for the space availability. Once the driver is arrived to the required spot then he/she can easily make visible about the LED indication and from this they can ensure about the free space. If the overall system is connected to the gate for parking system. It is easily make one to find their choice for the parking.

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