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SMART CAR PARKING SYSTEM USING ARDUINO

NEMALI MEGHANA, RAIKINDI SAI KUMAR

Students of Embedded systems, Department of Electronics and Communication Engineering
Jawaharlal Nehru Technological University, Hyderabad

ABSTRACT

Convenient parking management issues will get worse according to some studies, smart parking might save 220,000 gallons of fuel by 2030 gallons of fuel if effectively introduced by 2050. The wastage of time in searching for parking space will be reduced and environment is also affected by the emission of damaging and terrible car gases. This emission by combustion of petrol adulterates the atmosphere with CO2 and other gases. So, it has become a necessity to implement smart parking System at least in low air quality and densely polluted areas. Whenever a car enters the parking space, the sensor recognizes the vehicle and servo motor rotate its shaft the gate open then vehicle goes in to parking slot so we can reduce the man power and disturbances in parking areas and Sensor detects which slot is available and which slot is full by measuring the distance so that the driver can find the slot and park the car in parking zone which is displayed on the monitor. By using this smart car parking system we can reduce waiting time, traffic congestion, pollution etc.

Keywords: Arduino, Servo motor, ultrasonic sensor, LED.

INTRODUCTION

Embedded systems

Computer is an electronic device which consists of CPU, MU, and I/O peripheral devices make up an embedded system. It's a part of a bigger gadget that might involve both electrical and electronic technologies as well as mechanical components. Real-time computing usually a constraint for embedded systems since they frequently control the actual operations of the machine that are embedded. The embedded system is the combination of both hardware and software which performs particular task at a time. These systems manage a wide range of current

gadgets. Microcontrollers (microprocessors with built-in memory and peripheral interfaces) are commonly used in these systems, but standard microprocessors can also be used (using external chips for memory and interface circuits). Also frequent, especially in increasingly complicated systems is the peripheral interface. The processor employed various sorts, ranging from general-purpose to specialize for a certain type of calculations and to design applications.

The processor may be a microcontroller and microprocessor. The controllers are simply processors with peripheral interfaces and integrated memory as included. They use separate integrated circuits for memory and peripherals instead of including them on the chip both can be used but microprocessors require more support circuitry than microcontrollers because there is less integrated into the processor. They are often used for high volume embedded systems. These embedded systems are used in real time operating environments and use a real time operating system to communicate with the higher level of chips. Embedded systems use the communication ports to transmit data between processor and peripheral devices. The area where embedded systems and development environment of other large scale computers is in the area of debugging. The developers working with desktop computer environments have systems that can run both the code being developed and separate debugger application that can monitor the embedded system programmers. Some programming languages run with high efficiency that rudimentary interactive debugging is available directly on chip.

Working with Arduino Uno

Arduino uses different languages to write the program like c, python, c++ etc. Software column on the home page, as indicated in the picture.

Fig 1: Installation of Arduino UNO

From the above Fig 2.5 the installation of arduino is done after installation of arduino from the menu download the software. After downloading arduino the software will be displayed on windows. In the below Fig 2.6 the arduino IDE is installed. Then the software can be downloaded after downloading the arduino IDE the editor will be opened. In editor we can write and run the code after verification we can upload the code to board.

Fig 2: Installation of Arduino IDE

From the above Fig 2.6 the installation of arduino IDE is done then select software editor and run the IDE in your window

METHODOLOGY

Problem statement

Lot of time will be wasted for resources while waiting for parking in parking area. It increases the pollution. Automobile usage has significantly grown. Going to work, home, and other places.is a routine activity and people find it difficult to park their vehicles efficiently and there is wastage of time. So, a smart parking system that will help users to check about empty slots has been proposed.

Method

This method is easy to use and reliable for the user`s needs. The main purpose of a system is obstacle detection. Smart parking is currently one of the fields of research.

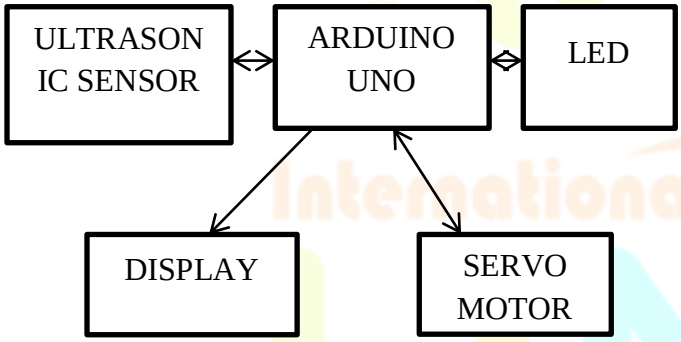

Fig 3: block diagram

The system is designed with ultrasonic sensor and led is connected to the arduino board the inputs of ultrasonic sensor and led is given to arduino board pins. The arduino Uno controls the input and output operations.

Parking areas will be equipped with ultrasonic sensors that will detect any object time and by using this we can send the data to the board. By using servo motor the gate opens automatically when the vehicle came into parking zone and displays output on the screen. This paper gives us different approaches to develop smart parking system using different components All of the equipment utilized are accessible over the internet,

RESULTS AND DISCUSSION

The user can park the vehicle at the empty slot.so there will be no wastage of time. The pollution can be reduced. The person can know that which slot is full and which slot is empty. The vehicle occurs in front of the sensor. The sensor measures the distance and allows the person to park by viewing the screen which shows available slots.

Arduino connected to sensor and LED

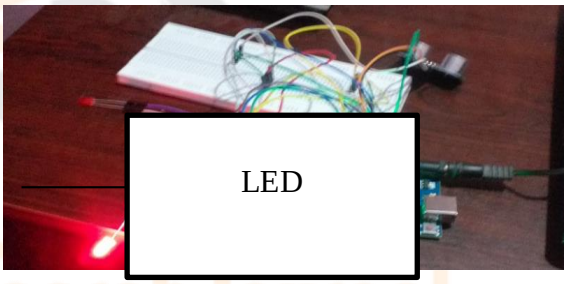

Fig 4: Slot one is occupied

From the above Figure 4 whenever the object occurs in front of the sensor LED glows whenever the slot is full **LED**1 will be in ON and another **LED2** will be OFF

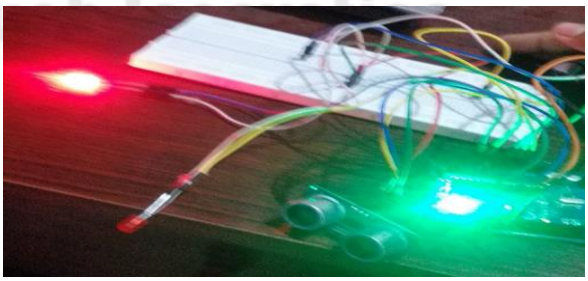

Fig 5: Second slot is full

Now first slot is free so we can park the vehicle at first slot. From the above Figure 5 **LED2** will be in on position and another **LED1** will be in off position.

Servo motor and sensor connected to Arduino

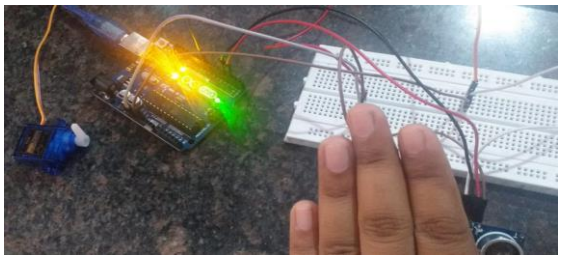

Fig 6: Opening and closing of gate

From the above Fig 5.3 when the object is detected by sensor the servo motor rotates its shaft to 90 degrees if the object goes away from the sensor it goes back to its initial position.

Result of screen in serial monitor

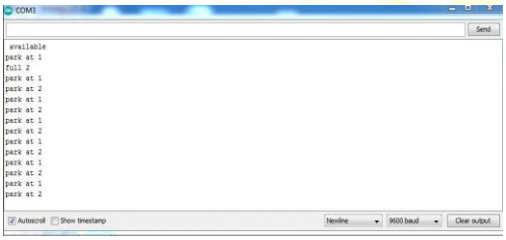

Fig 7: Empty slots

Serial monitor displays available slots so that the person can park the vehicle at any slot. The person can know there is no vehicle in the parking area there will be no disturbance in the parking zone.

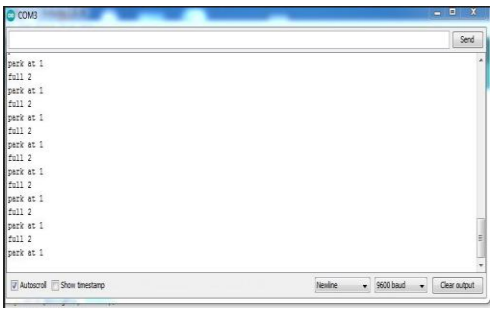

Figure 8: shows slot2 is full

From the above Figure7 the person can identify that the slot2 is full through the screen and parks the vehicle at empty slot. Whenever the object is identified the sensor measures the distance and displays which slot is full and the screen show which slot is free by viewing screen the person can know the available slot.

Conclusion and Future Scope

It is Simple and safe smart parking. All connections are made very easily. The components used in this paper are easily available on the internet and is cost-effective. LED will be in ON position for those slots which are already occupied and OFF for those which are empty. we can conclude that driver can park at their desired location and as soon as vehicle will be parked. So that pollution and wastage of fuel can be reduced. There will be no disturbance in parking area. By linking it to app we can easily access the slot by logon into the site the person does not need waste the time.

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