Automatic Car Parking System using IR Sensors

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Abstract:
In this paper we have designed for vehicle parking and the main aim of this paper is to atomize the vehicle park for allowing the vehicles into the park. It can provide the exact location of the free space where the vehicles have to be parked. Here we use the microcontroller AT89C52 and the IR Sensors to identify the vehicles entering in to the park. LCD is provided to display the information about the total no of vehicles can be parked and the place free for parking by using Embedded C language. This can provide the exact location of the free space where the vehicles have to be parked. Whenever a car comes in front of the gate, the IR signal gets disturbed and the microcontroller will open the gate by rotating the stepper motor. The gate will be closed only after the car leaves the second IR pair since the microcontroller should know whether the car left the gate or not. Now the microcontroller decrements the value of the count and displays it on LCD. In this way, the microcontroller decrements the count whenever the car leaves the park and displays it on LCD. If the count reaches '0', i.e. if the park is completely filled, the microcontroller will display "NO SPACE FOR PARKING" on LCD.

Key words: Micro Controller AT89C52, IR Sensors, LCD Display.

I. INTRODUCTION

Due to rapid increase in the vehicles there exists a problem for parking of vehicles. It leads to traffic congestion and also pollution. So we have a need to maintain the vehicle park management in order to reduce the wastage of time. If we see in the larger cities when we visit the shopping malls or tourist places or any other commercial areas there arises a problem for parking of our vehicle. We have so many methods of parking systems such as using WSN, RFID methods. But the major drawback of those systems is they help us to find the available spaces for parking but not the exact location of those spaces. It can be overcome by using Automatic Car Parking System using IR Sensors.
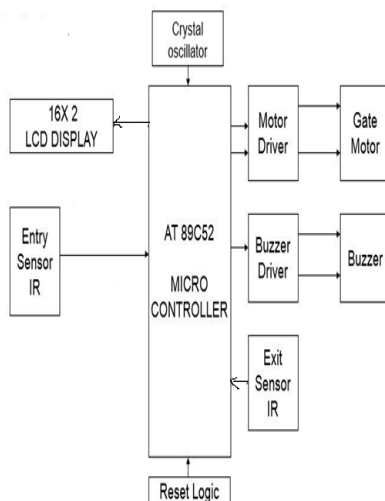
II. BLOCK DIAGRAM

Figure.1.Block Diagram

III. DESCRIPTION

Micro Controller AT89C52: Micro controller is used for reading data from the sensors. It contains 8K bytes of in-system reprogrammable flash memory, 256×8 bit internal RAM and 32 Programmable I/O lines.

IR Sensors: The basic idea of IR Sensor is to send infrared light through IR-LEDs, which is then reflected by any object in front of the sensor. Here it is used to detect the vehicle that comes in front of the gate, the IR signal gets disturbed and the micro controller will open the gate by rotating the stepper motor.

Crystal Oscillator: A Crystal Oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezo electronic material to create an electrical signal with a precise frequency. This frequency is commonly used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

Stepper Motor: Here we use the stepper motor in order to open and close the gate. A stepper motor is an electro-mechanical device which converts electrical pulses into discrete mechanical movements. The shaft or spindle of a stepper motor rotates in discrete step increments when electrical command pulses are applied to it in the proper sequence. The motors rotation has several direct relationships to these applied input pulses. The sequence of the applied pulses is directly related to the direction of motor shafts rotation. The speed of the motor shafts rotation is directly related to the frequency of the input pulses and the

length of rotation is directly related to the number of input pulses applied.

L293 Motor Driver: The L293 is an integrated circuit motor driver that can be used for simultaneous, bi-directional control of two small motors. The L293 is limited to 600 mA, but in reality can only handle much small currents unless you have done some serious heat sinking to keep the case temperature down.

Buzzer: A **Buzzer** or **Beeper** is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

Buzzer Driver: The buzzer ON and OFF is controlled by the pair of switching transistors (BC 547). The buzzer is connected in the Q2 transistor collector terminal. When high pulse signal is given to base of the Q1 transistors, the transistor is conducting and close the collector and emitter terminal so zero signals is given to base of the Q2 transistor. Hence Q2 transistor and buzzer is turned OFF state. When low pulse is given to base of transistor Q1, the transistor is turned OFF. Now 12V is given to base of Q2 transistor so the transistor is conducting and buzzer is energized and produces the sound signal.

Power Supply: The Power Supply is a Primary requirement for the project work. The required DC power supply for the base unit as well as for the recharging unit is derived from the mains line. For this purpose center tapped secondary of 12V- 0 -12V transformer is used. From this transformer we getting 5V power supply. In is +5V output is a regulated output and it is designed using 7805 positive voltage regulator. This is a 3 Pin voltage regulator, can deliver current up to 800 milliamps. Rectification is a process of rendering an alternating current or voltage into a unidirectional one. The component used for rectification is called 'Rectifier'. A rectifier permits current to flow only during positive half cycles of the applied AC voltage. Thus, pulsating DC is obtained to obtain smooth DC power additional filter circuits required. A diode can be used as rectifier. There are various types of diodes. However, semiconductor diodes are very popularly used as rectifiers.

A semiconductor diode is a solid-state device consisting of two elements is being an electron emitter or cathode, the other an electron collector or anode. Since electrons in a semiconductor diode can flow in one direction only-form emitter to collector-the diode provides the unilateral conduction necessary for rectification. The rectified Output is filtered for smoothening the DC, for this purpose capacitor is used in the filter circuit.

The filter capacitors are usually connected in parallel with the rectifier output and the load. The AC can pass through a capacitor but DC cannot, the ripples are thus limited and the output becomes smoothed. When the voltage across the capacitor plates tends to rise, it stores up energy back into voltage and current. Thus, the fluctuation in the output voltage is reduced considerable.
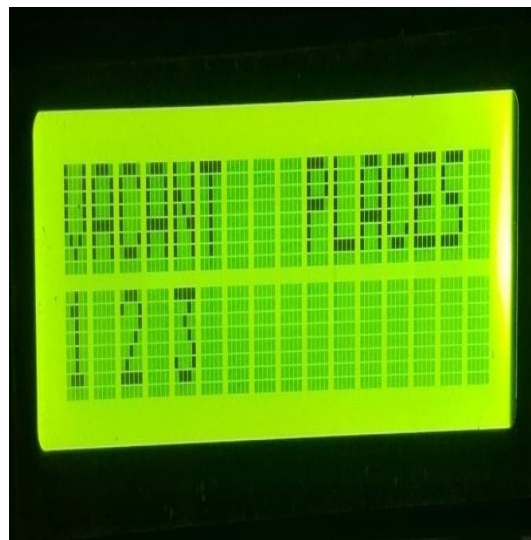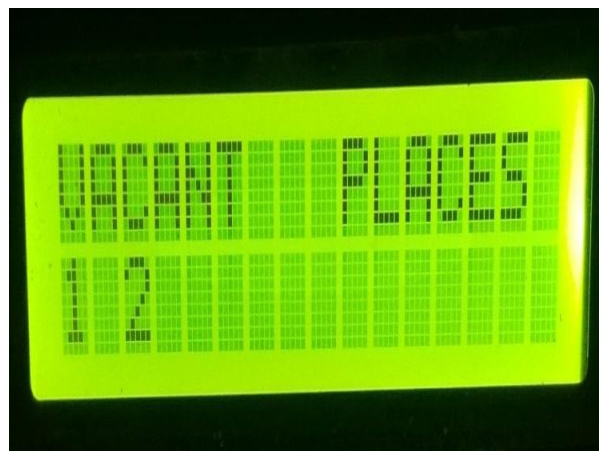
HARDWARE KIT

Figure.2.Hardware Kit
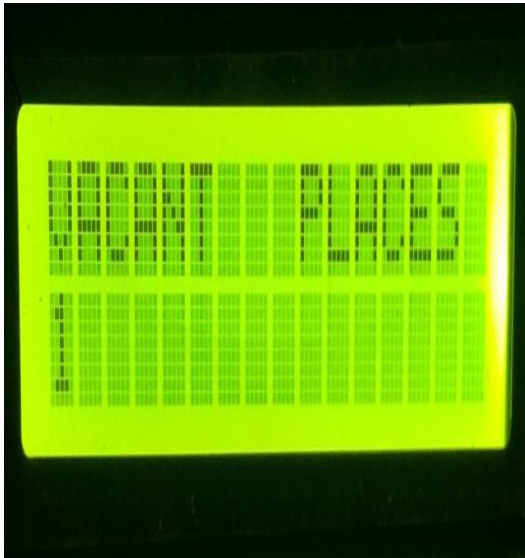
IV. RESULTS AND DISCUSSION

Case-1: The figure below represents that all the three spaces are vacant. So we can park our vehicle wherever we want in those spaces.
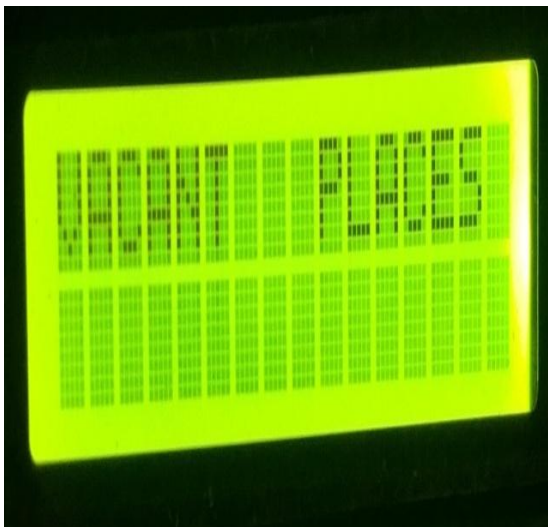

Case-2: It represents that third space is filled and first two places are empty. so the next vehicle will go to either first or second.

Case-3: It represents that first place is vacant and other two are filled.

Case-4: It represents that all the places are filled and there are no vacant places.

V. CONCLUSIONS

Automatic car parking system is very important factor in the traffic areas. It can be automated without human being. It reduces the time consumption. So by implementing our automatic car parking system using IR Sensors we can manage our time and vehicles can be parked easily.

VI. FUTUREWORK

In our project there may have a problem of lack of sensors. It can be further implemented by using mechanical car parking system and the parking area can also be reduced by using it.

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