Automatic Parking Light Controller with Space Detector

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ABSTRACT:
Electricity is a product mainly obtained by using non-renewable sources of energy. We should try to efficiently utilize it. Instead wastage of electricity is a major concern now days in the whole world. Electricity is being used in an inefficient way by people most of the time, like leaving electric appliances switched on even when they are not in-use by anyone. Several attempts are made at both small and high levels to save the most amount of electricity as possible. One module of this project has the objective to do the same in the various parking areas available. Usually all lights are being switched on every time even if there is no one in the parking area. We are attempting to design a system where the lights of the parking area will be switched on for a specific amount of time when the car is being parked in the available slot or when the car is going out from the parking area. This seems to be a small step but considering the parking lanes in the whole world it can produce a significant impact in our attempt of saving electricity.

The second part of the project is concerned about human ease, the ease by which a person can use any object or service provided to them. Now days in many multiplex systems there is a severe problem for car parking systems. There are many lanes for car parking, so to park a car one has to look for the all lanes. Moreover there is a lot of men labour involved for this process for which there is lot of investment. So the need is to develop a system which indicates directly which parking slot is vacant in any lane

INTRODUCTION:
This paper proposes a system with two concerns: Automatic controlling of light in a parking area and providing the vacant parking slot. Lights of the parking system will switched on only when the car is being parked or being vacated from the parking space. Conventionally, car parking systems does not have any intelligent monitoring system. Parking lots are monitored by human beings. All vehicles enter into the parking and waste time for searching for parking slot. Sometimes it makes a person frustrated. Conditions become worsen when there are multiple parking lanes and each lane have multiple parking slots. Use of automated system for car parking monitoring will reduce the human efforts.

We will use a microcontroller PIC16F877A due to its advanced features to control the light system. A motor driver is used to rotate the motor of the entrance gate which will open when the car will enter or going out from the parking area. The project involves a system including infrared transmitter and receiver in every lane and a LCD display outside the car parking gate. So the person entering parking area can view the LED display and can decide which lane to enter so as to park the car. Display unit is installed on entrance of parking lot which will show available Parking slot and for all parking lanes.

COMPONENTS OF LIGHT CONTROLLER:
1. MICROCONTROLLER PIC16F877A:
a) 40pin DIP
b) Operating speed : DC – 20MHz clock input
c) High performance RISC CPU
d) 8 kB Flash program memory + 368 byte RAM memory
e) Has EEPROM which stores some data permanently

f)   Used in-circuit serial programming
g)   Can be write-erase as many times as possible
h)   Used in Digital Electronics and circuits

2. INFRARED SENSOR:
a)   An electronic device used to detect objects in the surroundings
b)   Consists of Transmitter-Receiver pair
c)   Consists of resistors of variable KΩs.

3. MOTOR DRIVER L239D:
a)   Dual H-Bridge motor driver integrated circuit
b)   Acts as current amplifiers
c)   Used to drive the motor

4. DC MOTOR:
a)   Converts electrical power into mechanical power.
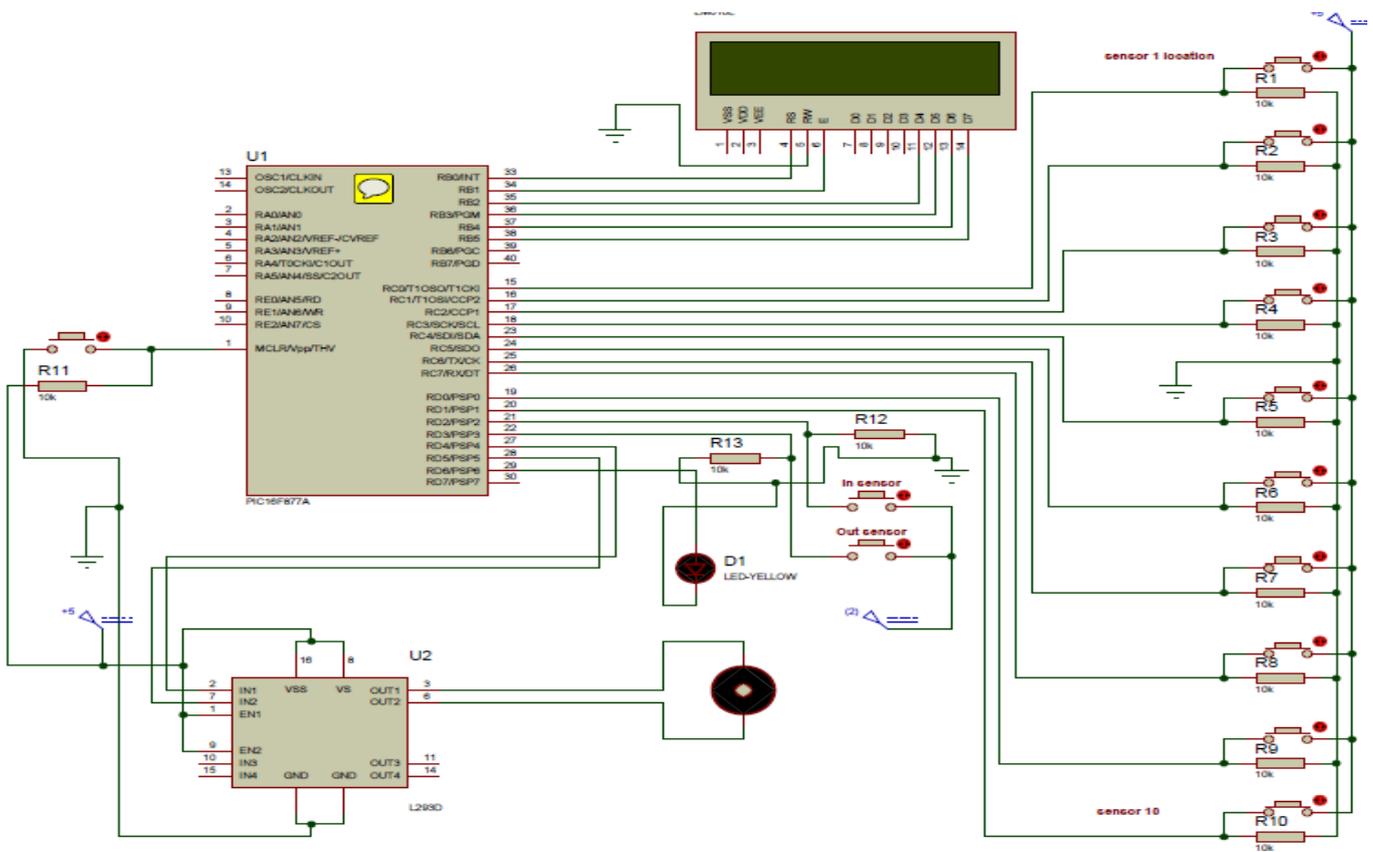b)   Used to provide mechanical movement of the gate.

5. CAPACITOR:
a)   Capacitor is a passive component used to store charge.

6. RESISTOR:
a) Resistor is a passive component used to control current in a circuit.
➢   LCD PLATE
➢   CONNECTING WIRES

WORKING OF CONTROLLER:

This is the circuit diagram of this project. There are two parts of this paper, first one is called as "Automatic parking light controllers" and second part is known as "Digital space detector". Firstly, a function is implemented using a pair of low cost Infrared sensors and a motor driver and a dc motor situated at the entrance gate of the parking area. The motor is connected to the motor driver which in turn is connected to the microcontroller. Second function is implemented by using several infrared sensors at various parking slots connected to the microcontroller. An LCD plate is used at the entrance to show the empty parking slot available. So it becomes to analyse the empty slot available which saves time and reduces complexity.

We use a microcontroller (PIC16F877A), which is connected to all the infrared sensors situated in all the parking slots. It is also connected to the driver motor which in turn is connected to the DC motor. The motor is used for the mechanical movements of the entrance gate in the area. It can't be directly connected to the microcontroller as it requires more current than the microcontroller. Two infrared sensors situated at the entrance gate are connected to the microcontroller for detecting the incoming and outgoing vehicles Lights of the parking area are also connected to the microcontroller which is only switched on when a car enters the gate. An LCD display is used to display the available parking slot, which can be detected with the help of infrared sensors.

FUTURE SCOPE:

Various types of enhancements can be done in the future in this project like introduction of a security at the entrance of the parking gate. The person will also have the feature to select his/her parking slot among the available parking slot.

CONCLUSION:

The proposed system will help significantly to reduce wastage of electricity and will also provide human ease by providing the frustration during the analysis of the available parking slot among a huge area of parking.

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