

# Microcontroller Based Car Parking Automation

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**Abstract**— The importance of automachine is increasing day by day lives. In this paper, an automatic car parking system is proposed. It uses IR sensor which automatically senses the entry and exit of car through the gate and displays the number of cars in parking lot. LED's are connected to sensors which specifies whether parking lot is full or not where red colour indicates filled and green color indicates empty. A buzzer connected to microcontroller is activated when parking lot is full. It displays the available space in the parking lot on LCD. Hence the time taken to check the available space is reduced. The system can be installed at entrance and exit.

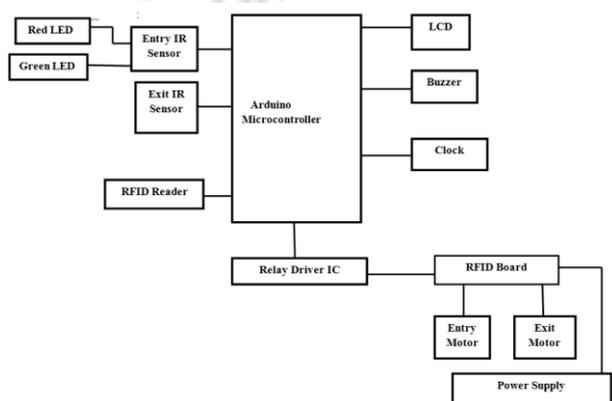
**Index Terms**— IR sensor, LCD, microcontroller, automation, car parking.

## INTRODUCTION

Automated car parking is a method of automatically parking and retrieving cars that typically uses a system of pallets and lifts .The intention is to compact more cars in the same space, reduce the space needed to park the same number of cars. Automated car park can be situated above or below ground or combination of both. The issue of car parking has problems like with how to control the number of the car inside it, how to monitor the movement in/out side of the parking lot, how to check whether there is a place inside for more cars or not and the safety to park. We aim to solve these problems by designing a system to control the parking area using a microcontroller. An Automatic car parking system is a smart parking system which will play an important role to reduce traffic in the city. Cars parked callously on the streets limit the space. So with a smart parking system this problems can be solved. Moreover, this kind of system will reduce the manual work and save time.

In the project “Car Parking System” we have shown the concept of an automatic car parking system. As in the modern world everything is going automatic, we have built a system which will automatically sense the entry and exit of cars through the gate and then display the number of cars in the parking lot. Even we can set a maximum capacity of cars by the help of user interface given in the hardware in the form of switches so that there is no congestion. We have deployed a microcontroller used to sense the movement of cars and check whether there is a capacity for cars to park, then decide the gate either opens or not. It is also possible to open a gate when any car enters in the parking lot or close the door when a car exits from it. There are two sets of sensors: one is installed on the first gate (entry gate) and the other is installed on another gate (exit gate). when a car arrives at the door, the microcontroller receives the signal from the entry sensors and then checks whether there is a space for the car to be accommodated. Simultaneously, it will display the number of cars present in the parking lot on a LCD screen and opens the gate if there is a space for the car to park. When a car moves out of the parking area, the microcontroller reduces the count displayed on the LCD accordingly and then closes the gate. The sensing of entry and exit of cars is done through infrared transmitters and receivers. Before the door the infrared transmitter is mounted on one side and the receiver is placed directly against the transmitter across the door. when a car arrives, the infrared beam is blocked by the car and the receiver is devoid of infrared rays and its output changes. This change message is sent to the microcontroller and accordingly it increases the count and opens the door if there is some empty position. The procedure for the exit of cars is much similar to that of entry. At the beginning of the program, event counter

## 2.PROPOSED SYSTEM:



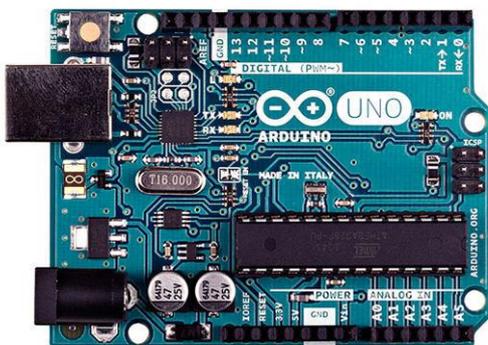
variable Cnt is cleared to zero and the program checks the value of Cnt. If  $Cnt \geq 100$ , then 256 the car parking is assumed to be full and message "FULL" is displayed. If  $Cnt < 100$ , then it is assumed that there are spaces in the parking and message "SPCS" is displayed. The program then checks the ENTRY switch and Cnt is incremented by one when a car enters into the parking lot. Similarly, Cnt is decremented by one when a car leaves. When the parking lot is full, the lock mechanism is activated which stops The ENTRY barrier to open even if a car approaches it. The lock mechanism is disabled so long as spaces are available in the car parking..

**3. HARDWARE DETAILS:**

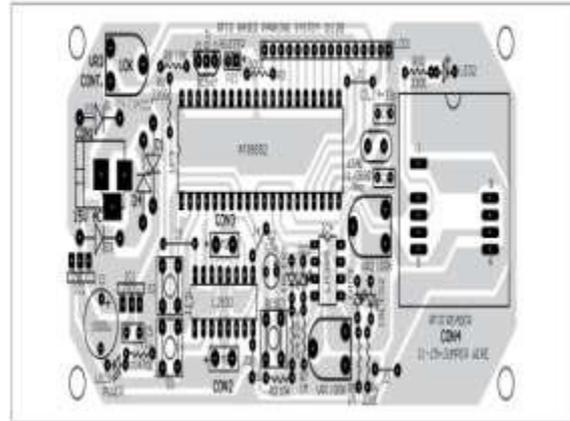
**Arduino UNO-R3:**

It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs

An Arduino is a tiny computer that you can program to process inputs and outputs going to and from the chip. It is connected to PC using the USB cable. It is an open source electronics prototyping platform based on flexible, easy to use hardware and software. It's intended for artists, designers, hobbyist and engineers. Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motor and other actuators. The microcontroller on the board is programmed using the Arduino programming language.



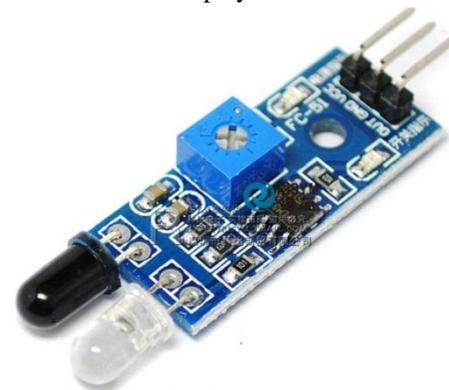
**RFID :** Radio-frequency identification (RFID) is an automatic identification method wherein the data stored on RFID tags or transponder is remotely retrieved. Radio-Frequency Identification uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information.



**Working:** To get started with RFID-based automatic vehicle parking system, the vehicle owner has to first register the vehicle with the parking owner and get the RFID tag. When the car has to be parked, the RFID tag is placed near the RFID reader, which is installed near the entry gate of the parking lot. As soon as the RFID tag is read by the reader, the system automatically deducts the specified amount from the RFID tag and the entry gate boomer opens to allow the car inside the parking area[9][8]. At the same time, the parking counters increments by one. Similarly, the door is opened at the exit gate and the parking counter decremented. The system also offers the facility to recharge the amount for each RFID tag. No manual processing is involved. In addition, the system provides security.

**IR Sensors:** Infrared sensors are type of light sensors they functions in the infrared part of the frequency spectrum. They can be used for the following purpose:

1. Detecting the presence of an vehicle.
  2. Measuring the distance to a nearby vehicle.
- The IR sensors are used to detect the vehicles. IR sensors consists of an IR transmitter and IR receiver . IR Sensors are used to check the availability of the slot. If the slot is occupied the IR sensor will give a high signal to the microcontroller .Also at the entry gate a pair of IR sensor is used to detect the Display unit.



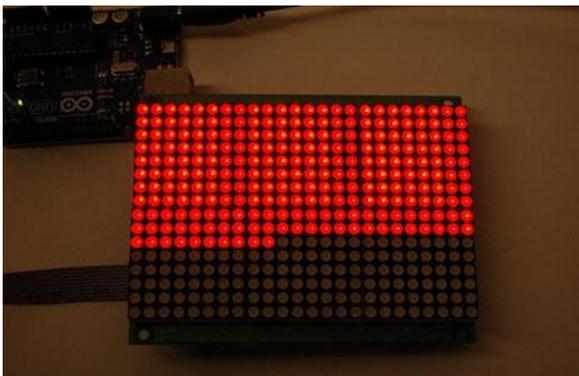
**Relay driver IC:** It is Electro-magnetic switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF which is connected to 220V main supply.

**LCD:**

LCD makes this instrument user interface friendly by displaying everything on the display. It is an intelligent LCD module, as it has inbuilt controller which convert the alphabet and digit into its ASCII code and then display, this LCD will display the number of total cars and available car and the time. Presence of a vehicle.

**LED Display:**

LED or light-emitting diode (LED) is a semiconductor light source LEDs are used as indicator lamps in many devices and are increasingly used for other lighting Light-emitting diodes are used in applications as diverse as aviation lighting, automotive lighting, advertising, general lighting, and traffic signals.



**Stepper Motor:**

Stepper motor is used to open and close the door. It is interfaced with microcontroller and takes command from the microcontroller to rotate some particular specified angle.



**BUZZER:** A buzzer or beeper is an audio signaling device which may be mechanical, electromechanical, or piezoelectric. Uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as mouse click or keystroke.



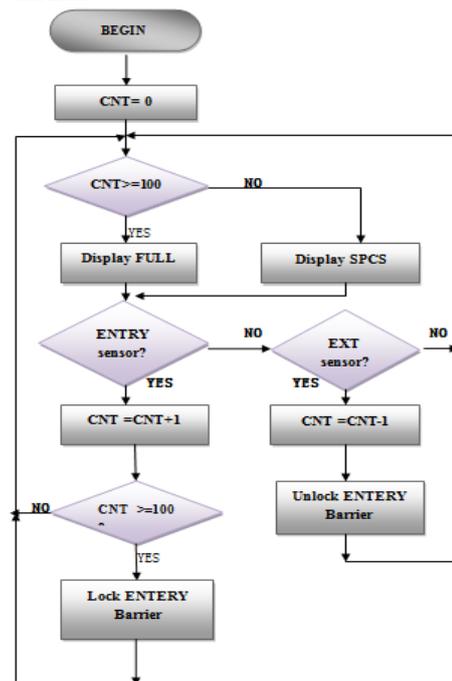
**Power supply:**

Power supplies are designed to convert high voltage AC main to a suitable low voltage supply for electronic circuits and other devices. A power supply can be divided into a series of blocks, each of which executes a specific function.

**Clock:** Most integrated circuits of sufficient complexity use a clock signal in order to synchronize different parts of the circuits cycling at a rate less than the worst case internal propagations delays.



**FLOWCHART:**



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**CONCLUSION:**

The system can be used at all places starting from domestic to the industrial sectors. The simplicity in the usage of circuit helps it to be used by a large number of people, because people with less knowledge of hardware can also use it without facing any problem. This Automated car parking system enables the parking of vehicles and thus reduces the time taken to check the space to be used by displaying the spot where the space for parking is available on an LCD display by using IR sensors at the entrance.

**REFERENCE:**

- [1] Ramakant Gayakwad, Operational Amplifiers Linear Integrated Circuits, Prentice Hall of India, 3rd Edition.
- [2] Journal of Management and Sustainability; Vol. 2, No. 2; 2012, ISSN 1925-4725 E-ISSN 1925-4733, Published by Canadian Center of Science and Education.
- [3] Karma Tsheten Dorjee, Deepak Rasaily , Bishal Cintury-IJETT february 2016.
- [4] P. Pradeep, M. Prabhakaran, B. Prakash, P. Arun Kumar, and G. Gopu, "Advanced Design for Robot in Mars Exploration," presented at 2010 International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, January 9 – 10, 2010.
- [5] Das, S., Toya, L., Green, Perez, B., and Murphy, M. M. , "Detecting User Activities using the Accelerometer on the Smartphone", Team for Research in Ubiquitous Secure Technology REU Research Program, July 2010.
- [6] P Joshi, M.R Khan and L Motiwalla, —Global Review of Parking Management System and Strategies!.
- [7] Aseem Shukla, Basu Jain, Anshul Saraf, Ankit Tiwari,—Automated Vehicle Parking System using RFID!, International Journal of Engineering and Technical Research ISSN: 2321-0869, Special Issue.