# B.Sc. Engg. Project

A Project on Arduino Car Parking System


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# Abstract

Now a days, finding an available parking space can be considered as time and fuel consuming. Therefore, it may cause drivers to be frustrated; which will lead to inappropriate parking. This will lead to bad traffic around the parking space and may also lead to accident. That is why this project proposes an Intelligent Parking System that uses various interface to help book or view available spaces.This project will help solve problems mentioned by allowing users to view and select available space in the parking; which will prevent users from driving around the parking for long. This project will help in reducing the amount of time a driver has to spend around the parking just to find an available spot, reducing the amount of traffic around the parking and also reducing the bad parking around the parking space.

# Arduino Car Parking System

We hereby declare that the Project on Arduino Car Parking System studies on project submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering of Bangladesh University of Business and Technology (BUBT),under the guidance of our supervisor Nourin Khandaker, Lecturer, department of Computer Science and Engineering, is our own work and that it contains no material which has been accepted for the award to the candidate(s) of any other degree or diploma, except where due reference is made in the text of the project. To the best of our knowledge, it contains no materials previously published or written by any other person except where due reference is made in the project.


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# Approval

A Project on "Arduino Car Parking System" is submitted by MD. Imran Nazir (ID: 19202103248), Tunazzinur Rahman Kabbo (ID: 19202103268), Md. Zobayer Hasan Nayem (ID: 19202103274), Afrina Akter Mim(ID:19202103310) and Rizvia Razzak Abani(ID: 19202103528) to the Department of Computer Science and Engineering, Bangladesh University of Business and Technology under the supervision of Nourin Khandaker, Lecturer, Department of Computer Science and Engineering, has been acknowledged as palatable for the partial fulfillment of the necessity for the degree of Bachelor of Science in Computer Science and Engineering and endorsed as to its style and substance.

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# Chapter 1

# Introduction

The present era is very advanced in terms of technology and this progress is increasing day by day. Jobs that were done by human labor even a few years ago are now controlled by robots and automation. Almost everything that comes to us is becoming automated now. So we thought of using our little knowledge to create a Arduino Car Parking System.

## 1.1 Project Description

Our project will basically be done on a very small scale where we will know how many cars are currently parked in a parking zone and we will know even if the parking space is over. We will put a tracker here to count the number of cars in the parking zone and when the limit is over we will see it on a monitor.

# Chapter 2

# Background and Objectives

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on computer, used to write and upload computer code to the physical board. So we wanted to use Arduino along with other necessary materials to build this Car Parking System.

## 2.1 Objectives

- To make a automated car parking system.
- To count the cars parked in a parking zone.
- To show a message if the parking zone is filled out.
- To control a car's entry and exit with automated barrier

# Chapter 3

# Methodology

To complete the project, the methodology we used are:

- Used Arduino to upload code and make the system automated.
- Used sensor to count the cars entering the parking zone.
- Used monitor to show messages that is needed.
- Used motor to create the barrier to let cars in and out.

# Chapter 4

# Implementation

To implement the Arduino Car Parking System we required to connect all the components related to it in the right way and then uploaded the code in the Arduino to make it run properly.

## 4.1 Software

### 4.1.1 Tinkercad website

Tinkercad is a free-of-charge, online 3D modeling program that runs in a web browser. It is a free online computer-aided design (CAD) program enabling users to design, experiment with circuits, explore, connect, and code virtual projects with a bottomless toolbox of simulated components.


Figure 4.1: Tinkercad Logo

### 4.1.2 Arduino IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.


Figure 4.2: Arduino IDE Logo

## 4.2 Materials

### 4.2.1 Arduino Uno

The board of Arduino which is used in this project is Arduino UNO. The Arduino Uno is a micro handler board based on the ATmega328. It has 14 digital ip/op pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and again set button. It includes everything require to support the micro handler; simply attach it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

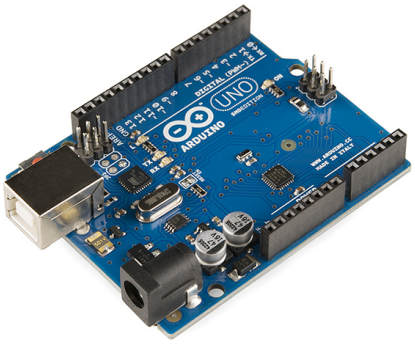

Figure 4.3: Arduino UNO R3

### 4.2.2 IR Proximity Sensor

An IR (Infrared) sensor is an electronic device which can be used to sense certain parameters of its surroundings by either emitting or detecting radiations. It can also measure heat of an object and detect motion. It uses the infrared light to sense objects in front of them and map or guess their distance.

Figure 4.4: IR Proximity Sensor

### 4.2.3 Servo Motor

A servomotor (or servo motor) is a rotary or linear actuator that allows precise control of angular or linear position, velocity, and acceleration. It consists of a suitable motor coupled to a position feedback sensor. Servo motors are used in applications such as robotics, CNC machinery, or automated manufacturing.


Figure 4.5: Servo Motor

### 4.2.4 LCD Display 16x2

The term LCD stands for liquid crystal display. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

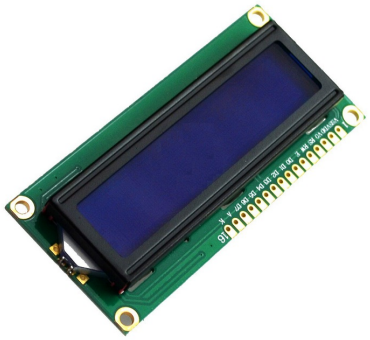

Figure 4.6: LCD Display 16x2

### 4.2.5 Jumper

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

Figure 4.7: Jumper

### 4.2.6 Bread Board

A breadboard (sometimes called a plug-block) is used for building temporary circuits. It is useful to designers because it allows components to be removed and replaced easily. It is useful to the person who wants to build a circuit to demonstrate its action, then to reuse the components in another circuit.

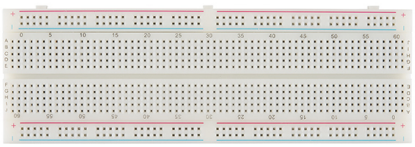

Figure 4.8: Bread Board

## 4.3 Circuit Design

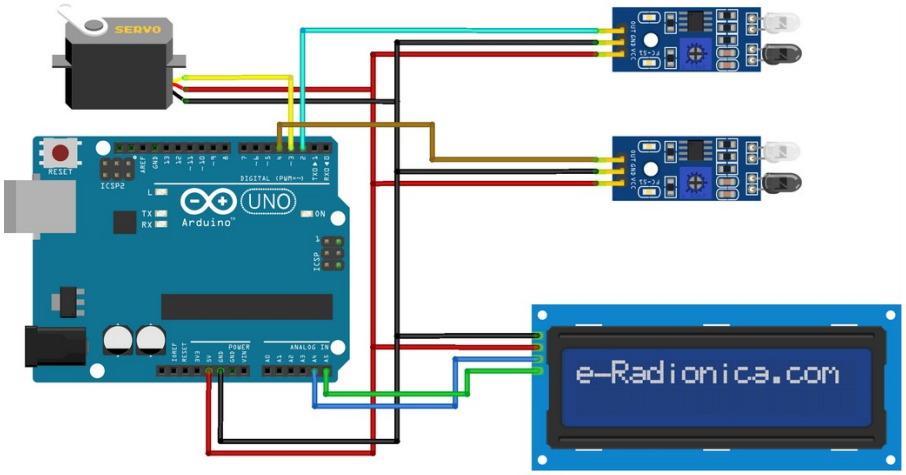


Figure 4.9: Circuit Design

## 4.4 Code

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <Servo.h>
LiquidCrystal_I2C lcd(0x27,16,2);
Servo myservo1;
int IR1 = 2;
int IR2 = 4;
int Slot = 4;
int flag1 = 0;
int flag2 = 0;
void setup()
{
    lcd.begin(16, 2);
    lcd.backlight();
    pinMode(IR1, INPUT);
    pinMode(IR2, INPUT);
    myservo1.attach(3);
    myservo1.write(100);
    lcd.setCursor (0,0);
    lcd.print("     ARDUINO    ");
    lcd.setCursor (0,1);
    lcd.print(" PARKING SYSTEM ");
    delay (2000);
    lcd.clear();
}
void loop()
{
    if(digitalRead (IR1) == LOW && flag1 == 0)
    {
        if(Slot>0)
        {
            flag1=1;
            if(flag2==0)
            {
                myservo1.write(0);
                Slot = Slot-1;
            }
        }
         else
         {
             lcd.setCursor (0,0);
             lcd.print("    SORRY :(    ");
             lcd.setCursor (0,1);
             lcd.print("  Parking Full  ");
             delay (3000);
             lcd.clear();
         }
    }
    if(digitalRead (IR2) == LOW && flag2 == 0)
    {
        flag2=1;
        if(flag1==0)
        {
            myservo1.write(0);
            Slot = Slot+1;
        }
    }
    if(flag1 == 1 && flag2 == 1)
    {
        delay (1000);
        myservo1.write(100);
        flag1=0, flag2=0;
    }
    lcd.setCursor (0,0);
    lcd.print("    WELCOME!    ");
    lcd.setCursor (0,1);
    lcd.print("Slot Left: ");
    lcd.print(Slot);
}
```

Figure 4.10: Code

# Chapter 5

# Result and Discussion


# Chapter 6

# Conclusion

## 6.1 Advantages

Advantages of our project are:

- It ensures quick and automated parking and easy retrieval of vehicles.
- Most suitable for parking in offices, malls and similar places.
- Low maintenance levels are required by the system.
- Sensors used have high sensitivity and are easy to handle.
- Low cost system, providing maximum automation.
- Friendly reorientation of cars for driving in and out.
- Safety of vehicle is maintained.

## 6.2 Conclusion

To conclude,

- This system will reduce the amount of time a driver has to spend around in the parking to find available spot.
- It will reducing the traffic around the parking area.
- It will reduce the bad parking around the parking space.
- On a large scale, this can be adopted as a unpaid car parking system anywhere.