

# **Final Report on Micro Controller Project**

Group 13

CSE - 20 (Section A)

Team Members

202014012 - Ellora Yasi

202014049 - Sheikh Easin Arafat

202014058 - Tariq Hasan Rizu

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# 1 Parking Management System

## 1.1 Introduction

Over the years, technology has revolutionized our world and daily lives. Present day parking space in urban areas is very difficult during peak hours due to the lack of parking spaces. Nowadays automated systems are rapidly used in developed countries. We have designed an intelligent parking system that has the count of free slots for automobiles in the parking area on the list of them. The system can direct them to one of the free slots. Smart parking solutions enable the municipalities to manage and reduce parking search traffic on the streets. This technology also ensures parking safety, but its major contribution to traffic congestion is the factor of making the parking experience faster, more convenient, and hassle-free.

## 1.2 Objective

1. To identify the presence or absence of a vehicle at the gate.
2. To show the free slot- where the vehicle is expected to go.
3. Make the parking system automated and smooth.

## 2 Project Implementation

### 2.1 Component List

No.	Name	Specification	Unit Price	Qty	Total Cost
1	Breadboard (Medium Size)	Distribution Holes: 200 Terminal Holes: 630	90.00	1	90.00
2	Arduino Uno R3	Microcontroller: ATmega328 Operating Voltage: 5 V Input Voltage: 6-20 V I/O Pins: 20 DC Current I/O Pin: 40 mA Clock Speed: 16 MHz	1070.00	1	1070.00
3	IR Obstacle Avoidance Sensor Module	Operating Voltage: 3.6 - 5 V Average Current: 0.06 mA Detection Angle: 35° Measuring Range: 2 - 30 cm	89.00	7	623.00
4	Servo Motor	Operating Mini Servo SG90 Operating Voltage: 3.0 - 7.2 V Operating Speed: 0.10sec/60° Operating Temp.: -30 to 60 °C Rotational Angle: 180°	195.00	1	195.00
5	LCD Display	16x2 Serial LCD Module Display for Arduino Assembled 1602A	395.00	1	395.00
6	Jumper Wires	Jumper Wire 40 Pcs Set Type: Male to Male and Female to male	95.00	2	190.00
7	Battery Holder	Battery Holder 2pcs for 18650 Battery	55.00	1	55.00
8	18650 Battery	18650 Li-ion Rechargeable Battery	65.00	2	130.00
9	Switch	On-Off Switch(Mini)	6.00	1	6.00
Grand Total					<b>2754.00</b>

### 3 Methodology

#### 3.1 Circuit Diagram

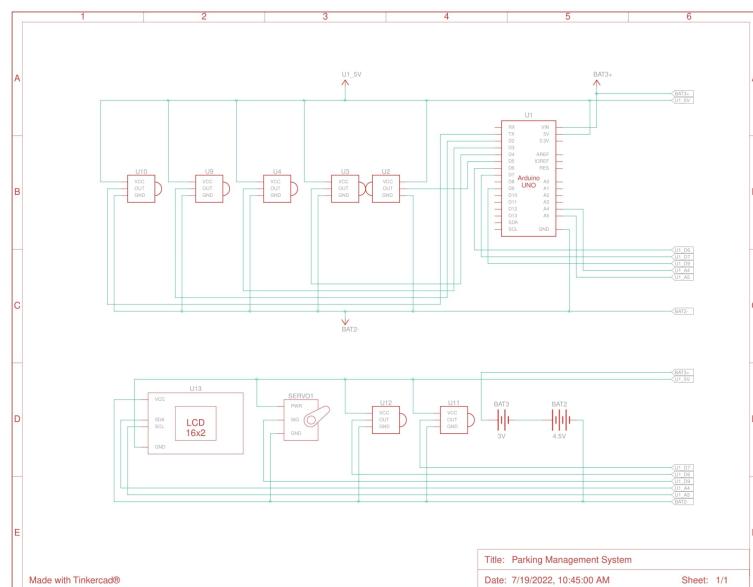


Figure 1: Diagram of Parking Management System

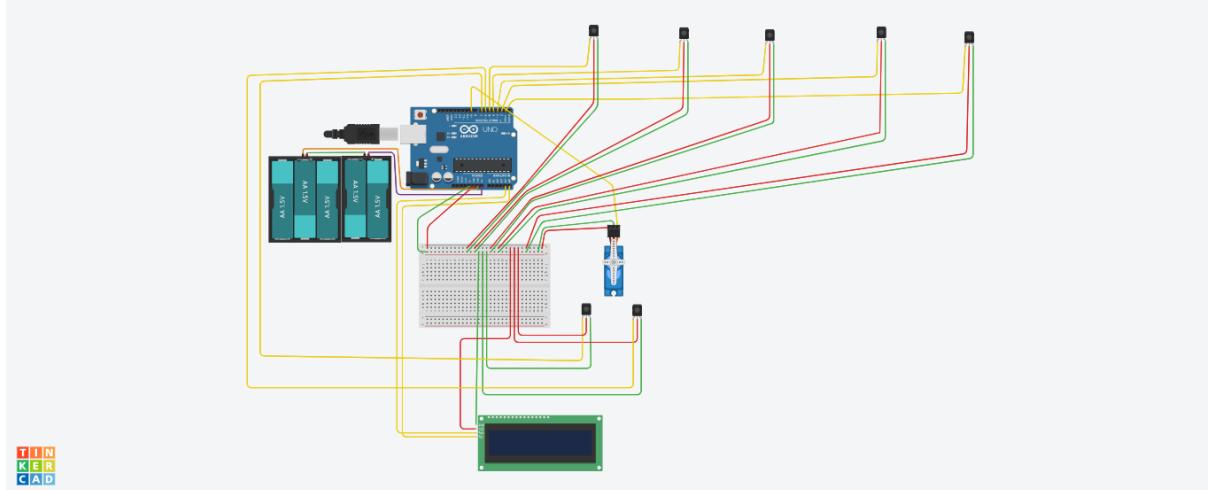


Figure 2: Simulation of Parking Management System

### 3.2 Flow Chart

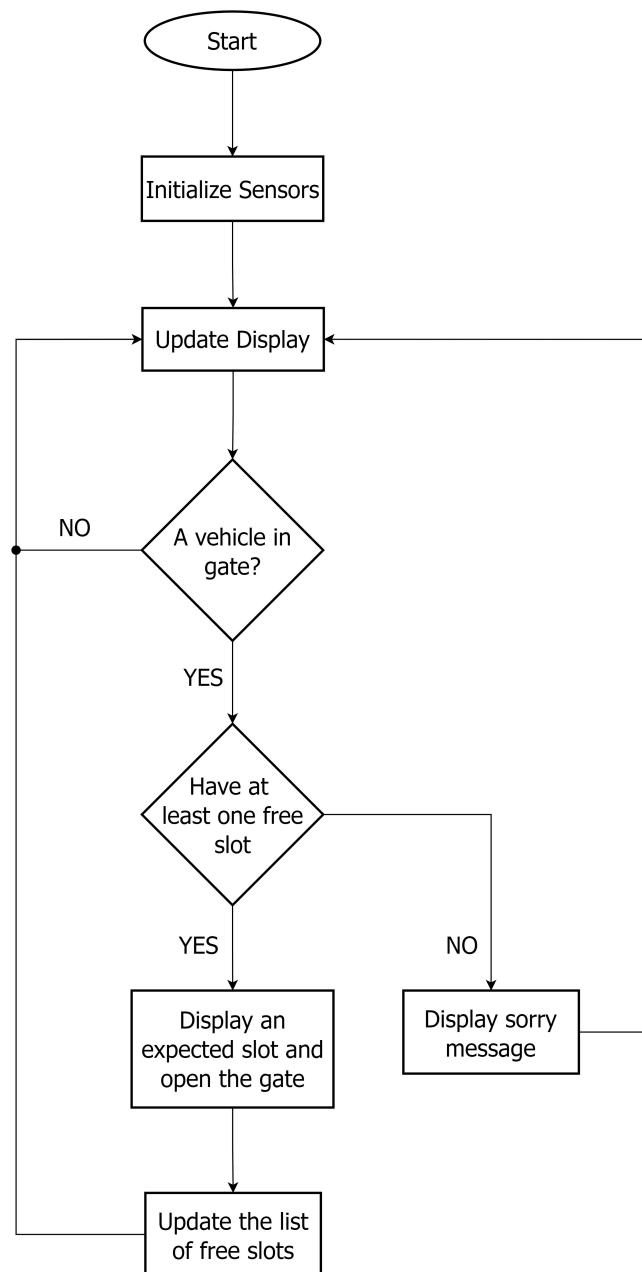


Figure 3: Flow Chart of Parking Management System

### 3.3 Working Principle

1. A switch is used to start the automated car parking system.
2. There is a gate that will be open when there is at least one free slot in the parking lot.
3. In this project, we use IR sensors to identify the presence or absence of a vehicle at the gate.
4. The gate will be directed by a servo motor.
5. The Servo motor will move  $0^\circ$  to  $90^\circ$  to open the gate and  $90^\circ$  to  $0^\circ$  to close.
6. Each of the parking slots will contain an IR sensor that will detect whether the slot is free or not.
7. The number of free slots will be displayed on the LCD Display.
8. In the presence of a vehicle on the outside of the parking area's gate, the LCD Display will show the number of free slots- in one of which the vehicle is expected to park.
9. When a car leaves the parking lot the IR sensor will identify and update the LCD display.
10. Two batteries of 3.7V will work as the power source and an Arduino Uno Microcontroller will control the whole system.

## 4 Outcome

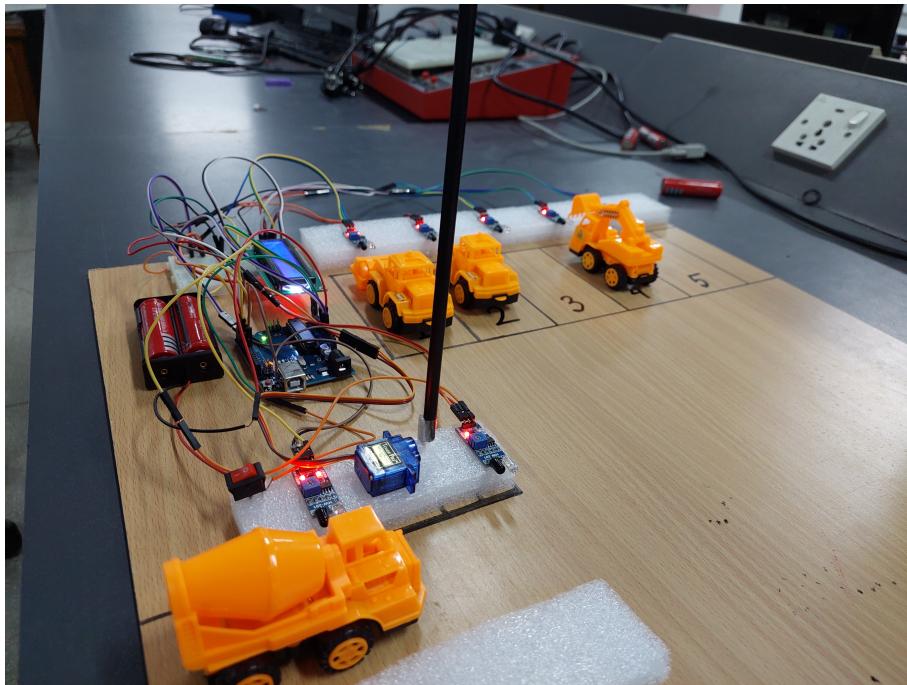


Figure 4: A vehicle entering inside the parking lot

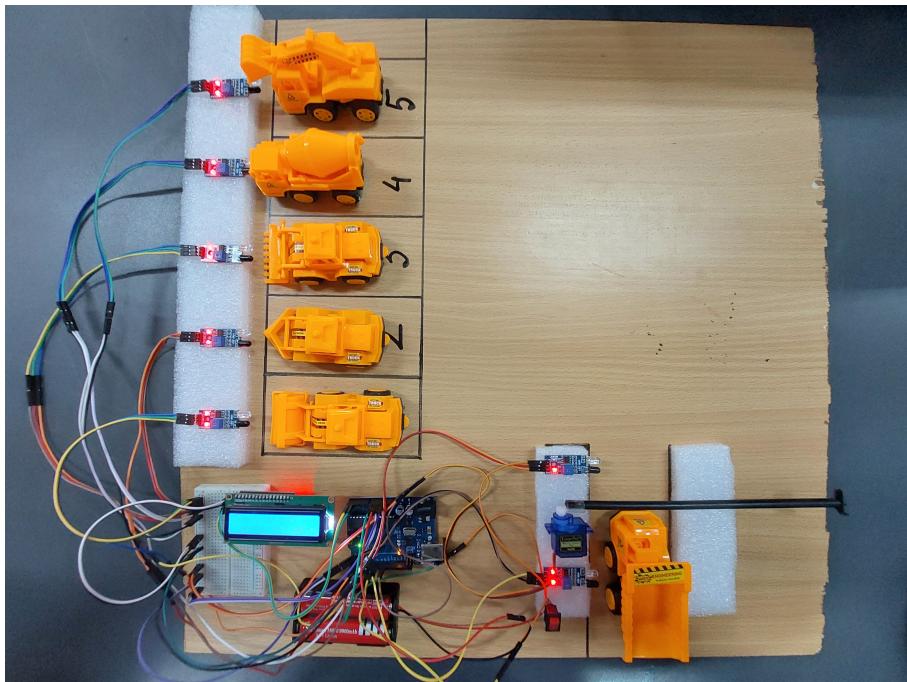


Figure 5: Sorry! No slots are free

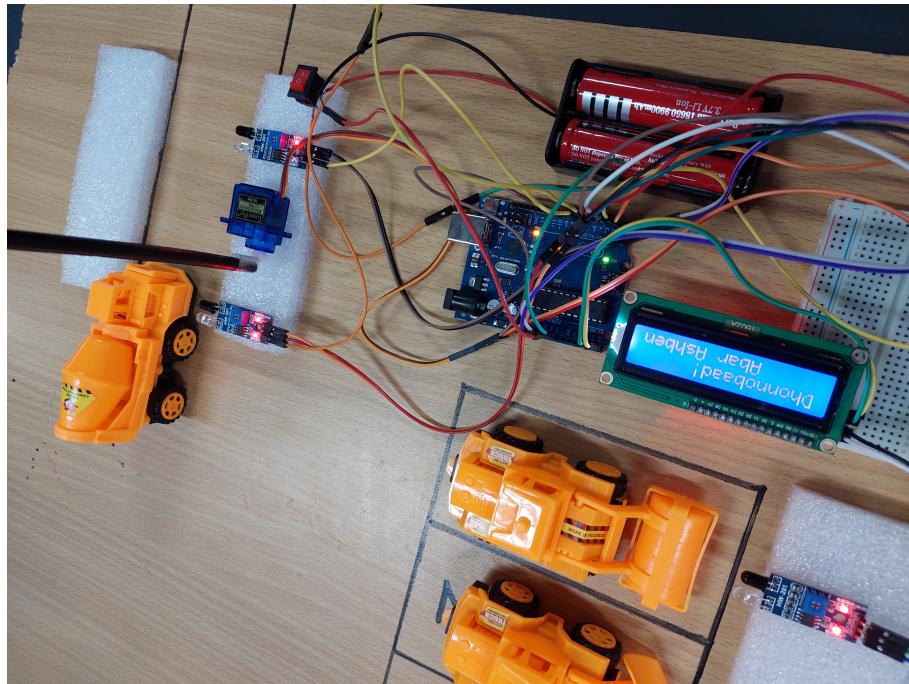


Figure 6: A vehicle leaving the parking lot

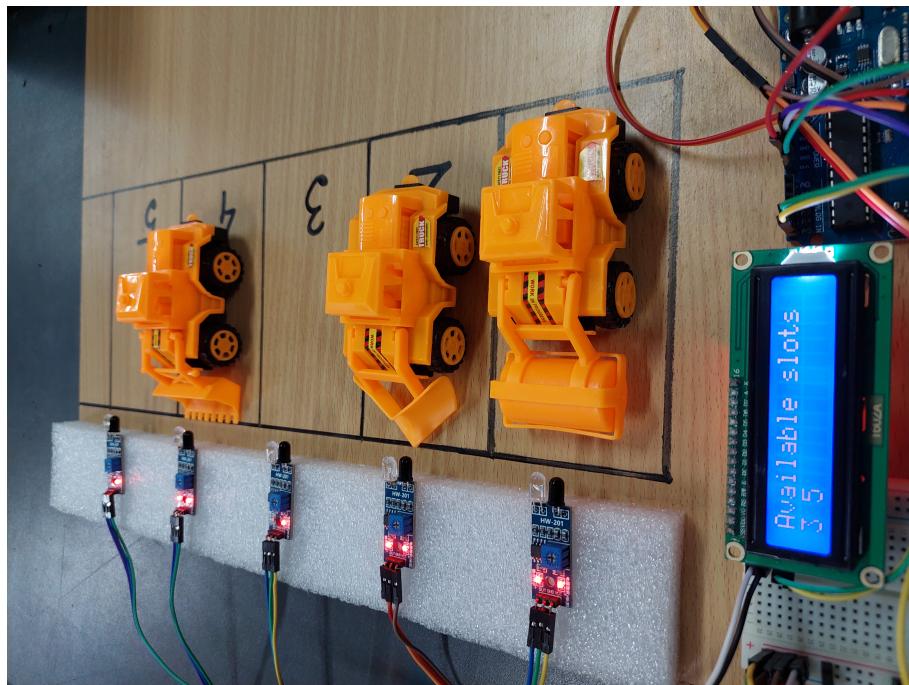


Figure 7: Displaying the number of free slots

## 5 Contribution

- Ellora Yasi (202014012)
  - Writing Project Proposal
  - Circuit Diagram
  - Online Simulation
  - Circuit Connection
  - Arduino Code
  - Writing Project Report
- Sheikh Easin Arafat (202014049)
  - Writing Project Proposal
  - Circuit Diagram
  - Component Selection
  - Circuit Connection
  - Arduino Code
  - Writing Project Report
- Tariq Hasan Rizu (202014058)
  - Writing Project Proposal
  - Circuit Diagram
  - Flow Chart
  - Circuit Connection
  - Arduino Code
  - Writing Project Report

## 6 Conclusion

The parking management provided a solution to the perfect parking and reduces manpower. This system is employed in airports, multiplexes, and corporate offices. Still, it has consequences, if the number of slots increases controller cannot handle for that wireless sensor networks need to be replaced in order to make this system more convenient, and we can develop an android application and collect all other parking spaces information in urban areas we can include that into the application.