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AUTOMATIC VEHICLE IDENTIFICATION FOR ACCESS TO PARKING AREA IN OFFICES

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ABSTRACT

A prototype of a novel automatic car parking system is reported. The designed system comprised of QR code scanner, Arduino, microcontroller, Bluetooth module and sensors. Here, first the verification of the vehicle is done; availability of the parking space is checked and then access to parking is provided only to the verified vehicles. Automatic identification can not only reduce required man force but also minimize the verification time.

Keyword*: Arduino, Bluetooth, microcontroller, sensor, QR code.*

I. INTRODUCTION

In today's world, there are hundreds of cars in the country and little space for parking these cars. Adding to the problems there are many security issues faced due to unidentified vehicles parked in the parking area. Hence, providing quick and secured parking in office area is important issue. Literature reports various techniques, systems and methods implemented for automatic car parking [1], [2], [3], [4], [5].

This is a project that will allow only some specific employees' vehicles to enter 4 parking area of an office who work in that office. The database of the employees will be checked in the system and the driver will be guided whether the parking space is available or not. The system will also show how many 4 spaces are available in the parking area. The unidentified vehicles or the vehicles with wrong QR code will be denied access. Eventually, this project will reduce man work, time and will also increase the security of the area. Also, the vehicle will be secured in the parking.

II. PROPOSED METHOD

Traditional parking systems in offices commonly use a security guard at the entry who opens the gate after identifying the driver. However, these systems are time-consuming. So, we have designed a project which will save time and also increases the security of the parking area. Here, the scanner scans the QR code and verify if the vehicle has access. As soon as the scanning takes place the servo gives high output and the vehicle gets

unobstructed. While exit the IR sensor senses the vehicle and gives high input to the microcontroller and further the counter is put down by one. If the parking slot is full then screen displays "FULL PARKING".

III. DESCRIPTION

1.1 Power supply: The Arduino board is powered using FTDI port or external power source. The functioning of the project requires a power supply. In this case, the board is powered using a DC supply of 5V by the system connected.

1.2 IR Sensor: The function of IR sensor is to send infrared light through the IR LEDs that interface with the objects to be detected. Here, it is used to detect the vehicles that pass through the exit gate, IR sensor gets disturbed and the number of vehicles leaving and thus the total number of vehicles is counted,[6].

1.4 Arduino UNO: The board is based on ATmega328P datasheet. A 5V supply is given to the board and ground is provided to one of the pins.

1.5 Micro Controller ATmega328P: It is 8-bit RISC based module that combines 32 KB ISP flash memories, 2KB SRAM and 23 general purpose I/O lines. It is used to read data from the sensors.

1.6 QR code scanner: The QR code can be read by an imaging device and processes until the image can be appropriately interpreted, the required data is then extracted from the pattern. Here the data from the QR code is read by the scanner and the data is sent to the microcontroller for further verification.

IV. BLOCK DIAGRAM AND DESIGN

The Fig1.represents the flow diagram of the prototype proposed

The Fig2.represents the picture of the microcontroller and arduino board used with the connections.

The Fig3.represents the design of the mechanical model.

Table I depicts the preset values of time to complete the operation given to servo motor through micro controller

ACTION	TIME taken (IN MILLI SECONDS)
To move the obstructer bar up	1000
Delay to let vehicle in	200
Obstructing the vehicle	500

Table I Action and preset time values.

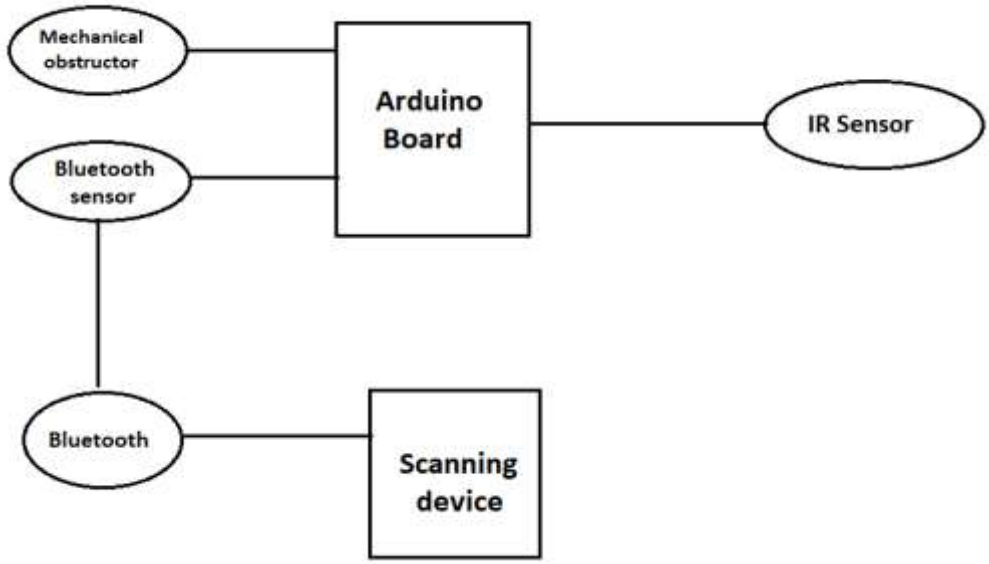

Fig1. Block diagram

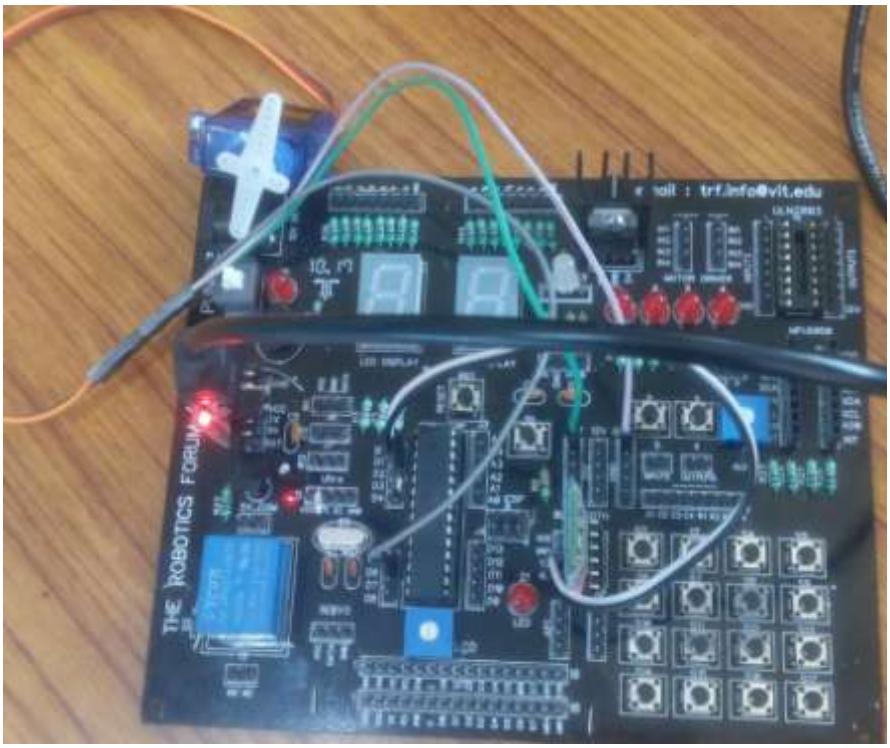

Fig2.ArduinoUno

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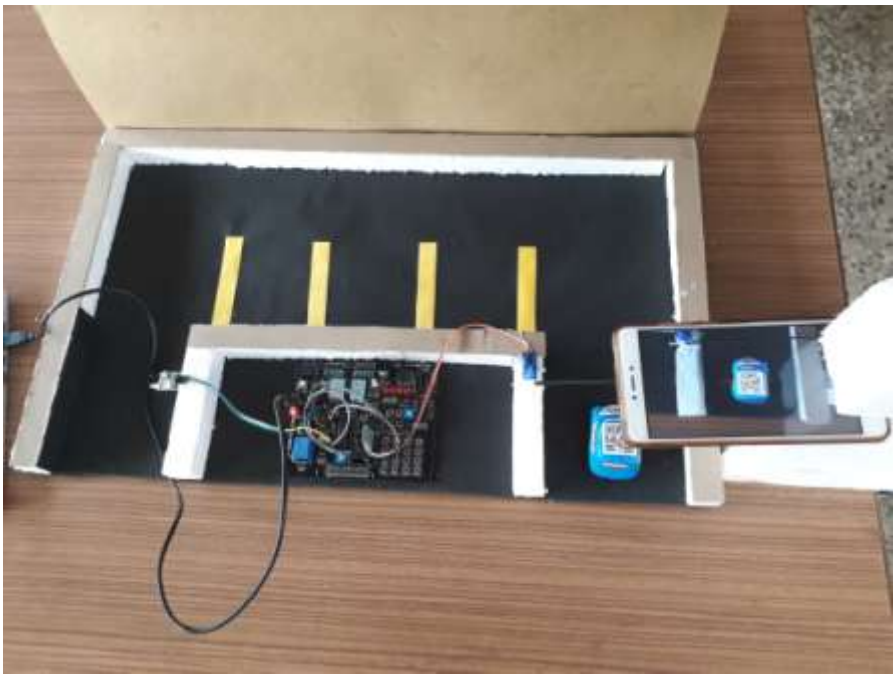
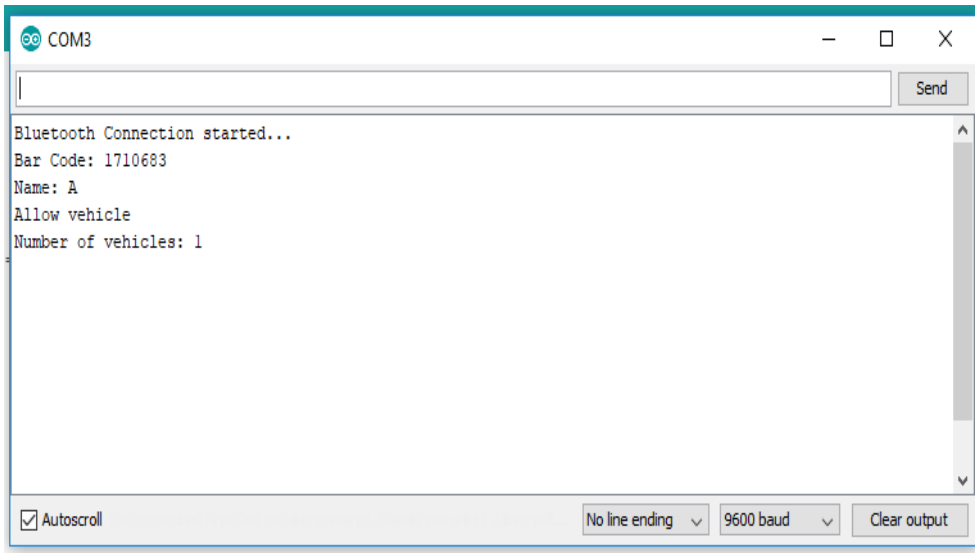
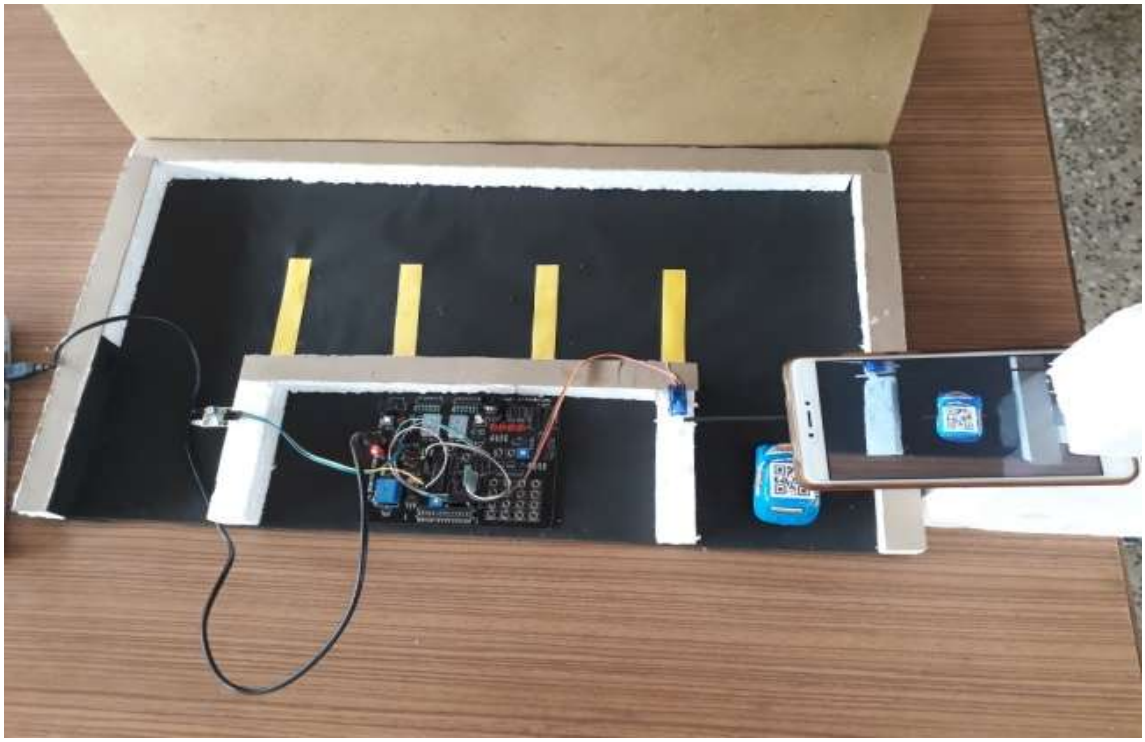


Fig3.Design

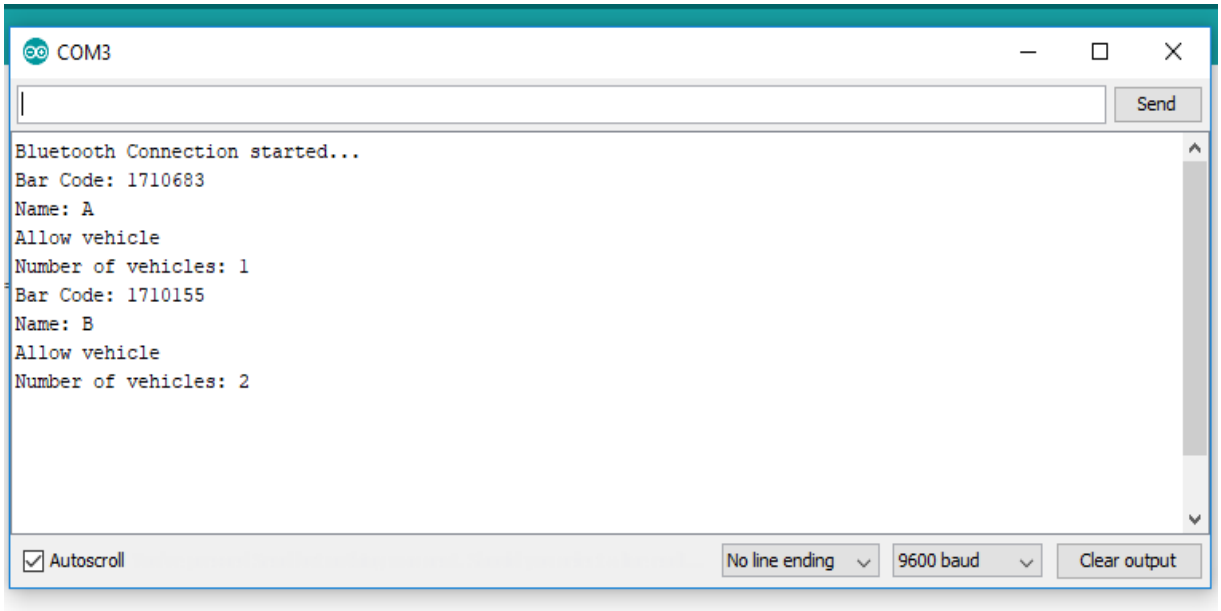
V. RESULTS AND DISCUSSION

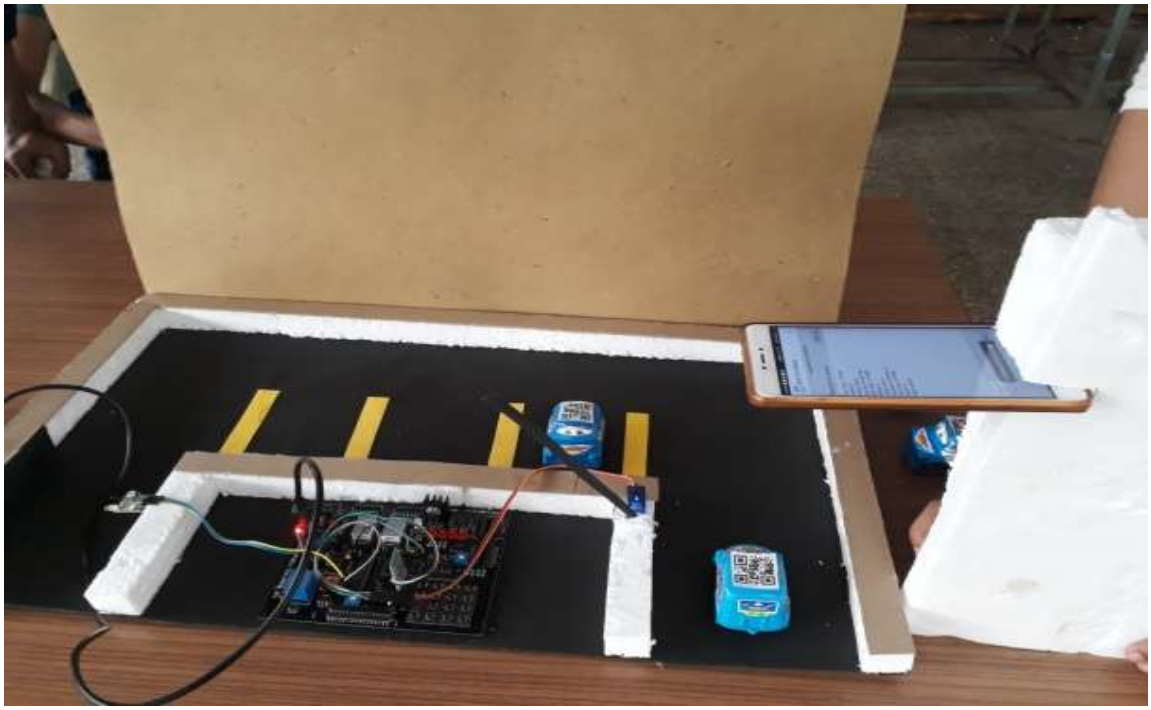


Case-1: The figure represents that the first vehicle is identified and allowed to enter the parking area and one space is filled.

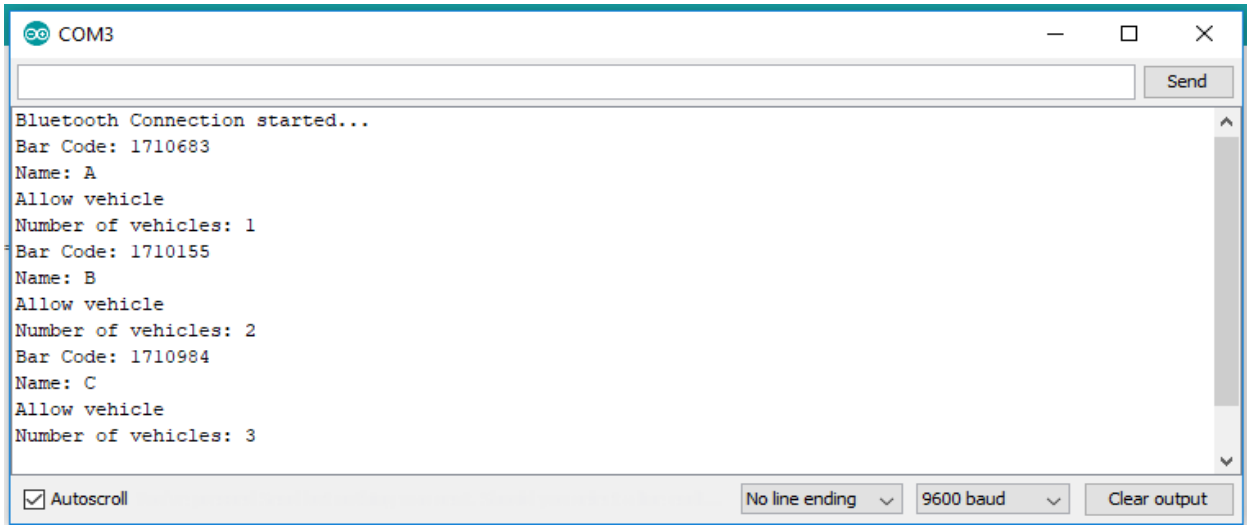


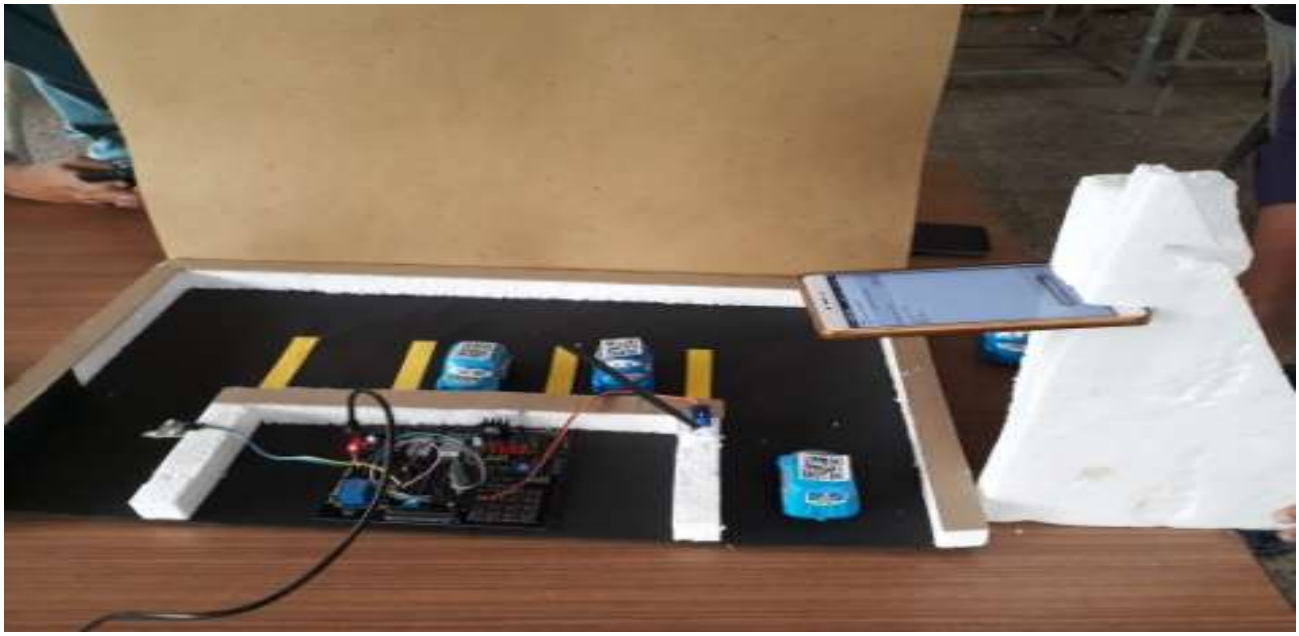
Case-2: It represents that second vehicle is also identified and is allowed to enter the parking and second space is also filled.



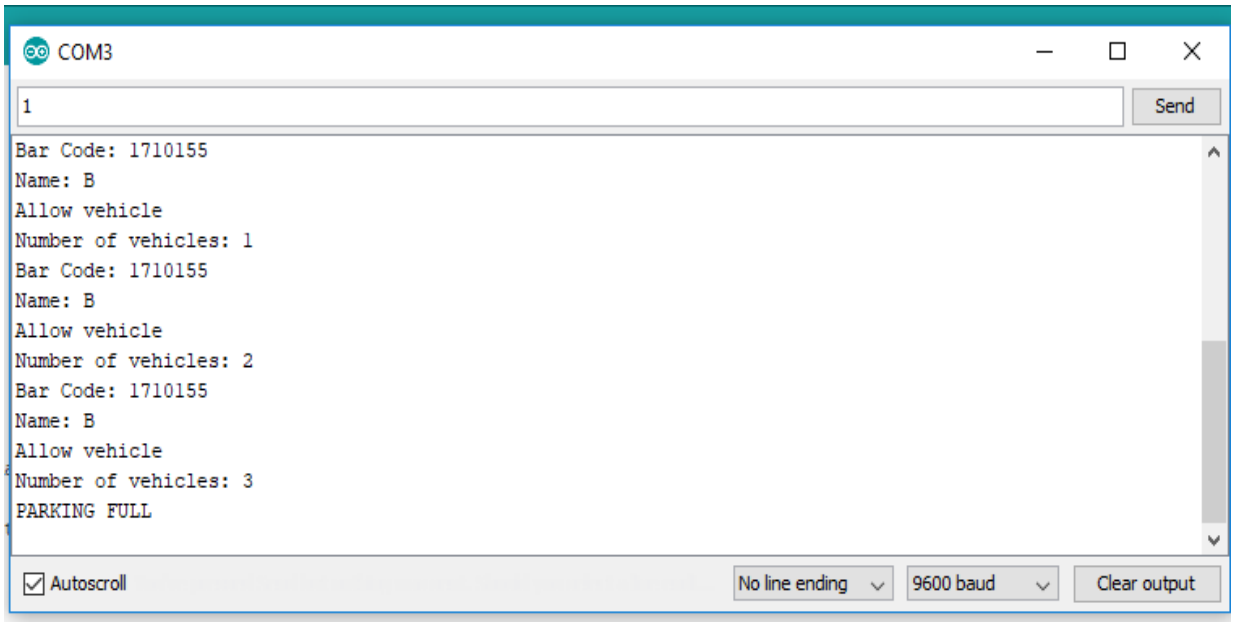


Case-3: It represents that third vehicle is also identified and is allowed to enter the parking and third space is also filled.





Case-4: It represents that the parking area is full i.e., no space for vehicle parking.



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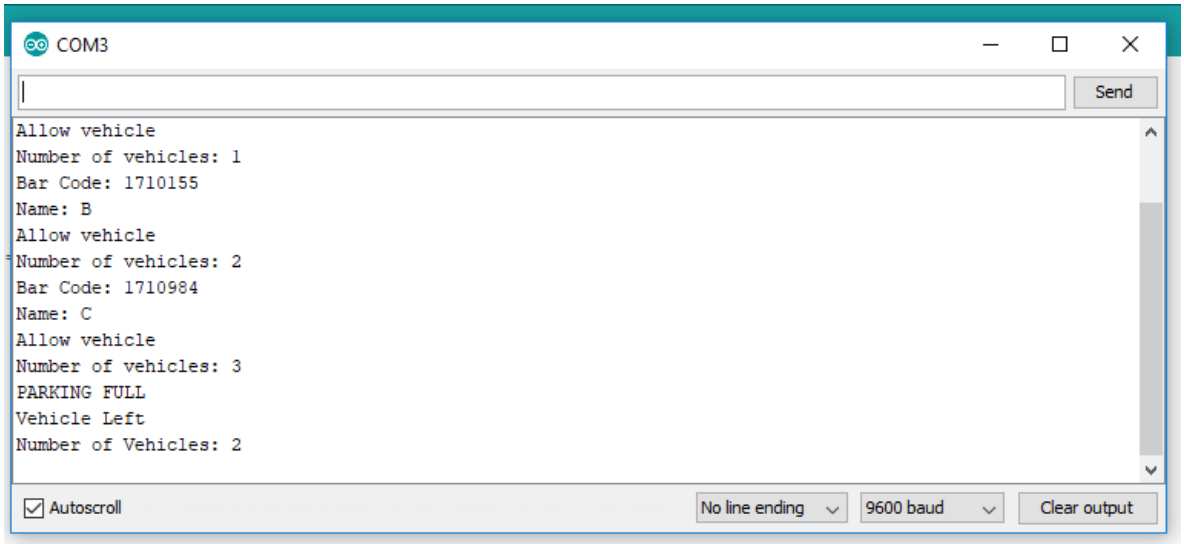
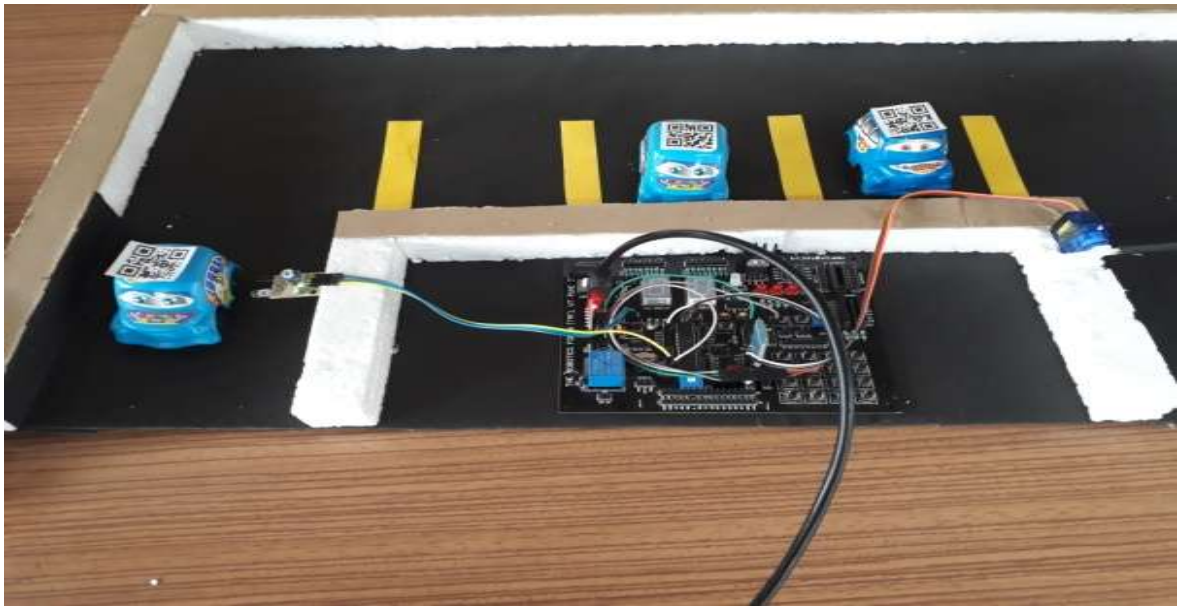
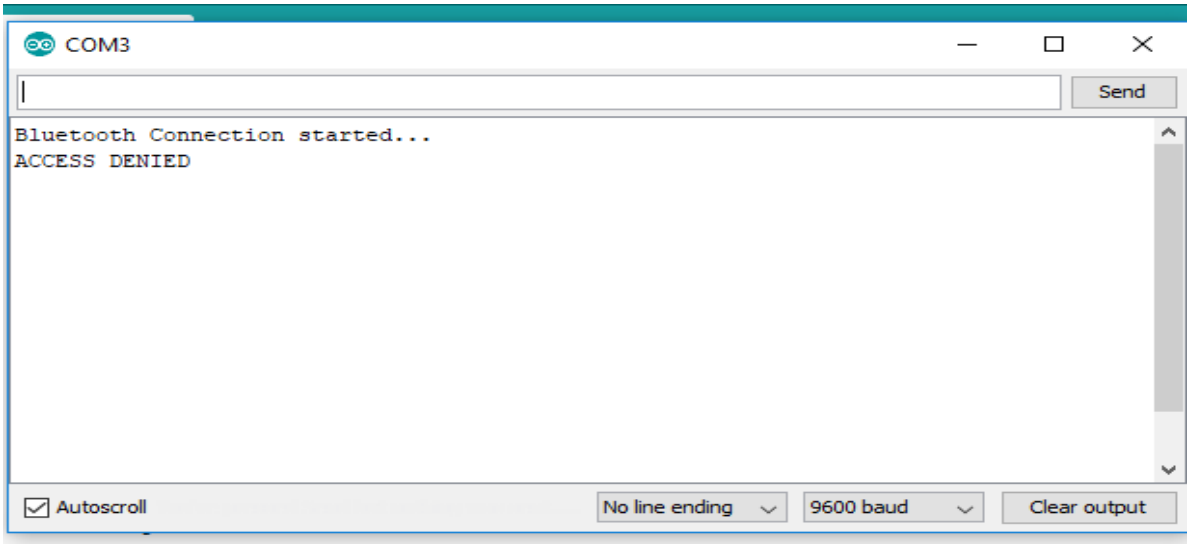
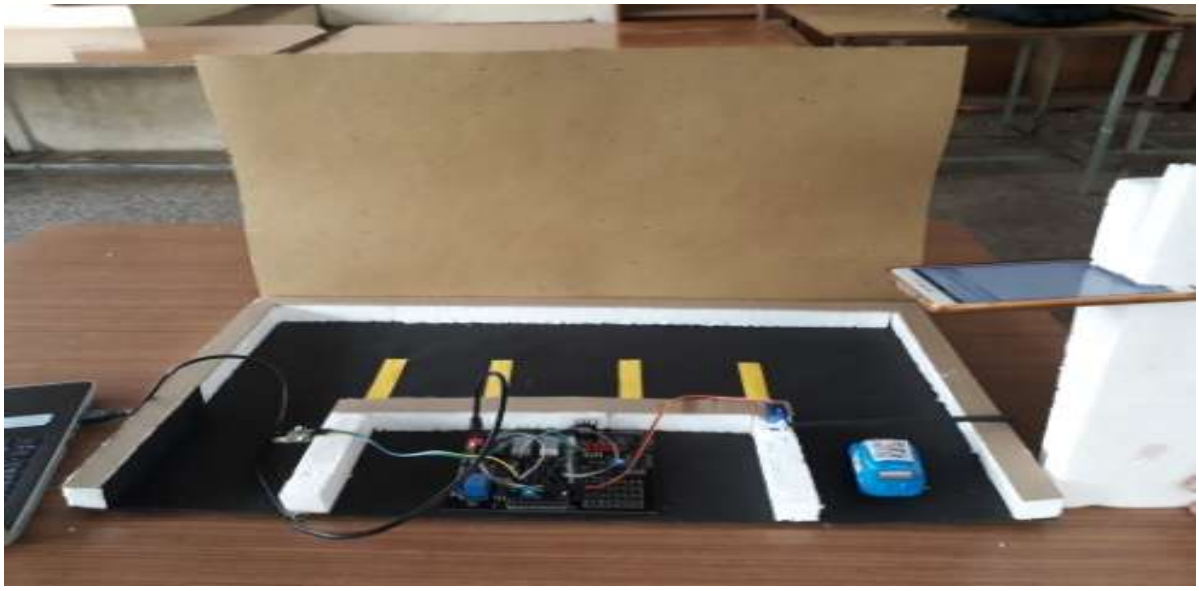
Case-5: It represents that the IR sensor has sensed that the car has left the parking area and thus there are two slots empty





Case-6: It represents that vehicle is not identified and thus it is not allowed to enter the parking area.





VI. CONCLUSION AND FUTURE SCOPE

For a vehicle the QR code on it has been scanned and interfaced with Arduino which control the mechanical obstructer rod. The obstructer rod had opened for a verified vehicle, provided there was an empty parking slot available else it would have displayed "Parking Full". It can be applied in such workplace where the employee database is available like in corporate offices MNCs, schools. It can be further modified by building an application which will direct the driver to the available parking slot. It can also be modified by directly reading the number from the nameplate of the vehicle by using image processing. These modifications will eventually help in saving time, energy. With atomization, it will eventually reduce errors and save a lot of man work.

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