PIR SENSOR

Acknowledgement

We were very satisfied with this report, the project called "Development of intelligent parking systems". With the support of various books, online resources, and our group members, we were able to complete this proposal. Mr. Sugat Man Shakya, Cloud Computing and IoT Module Leader, Mr. Kshetraphal Bohara, Module Tutor, thank you for allowing us to present our results. I'd like to thank Islington College (London Metropolitan University) for their assistance in making this project successful.

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Abstract

An efficient and intelligent way to automate management of parking systems, using Internet of Things technology to allocate efficient parking spaces. The IoT provides wireless access to the system and allows the user to track the availability of his parking lot. Users typically waste time and effort looking for an empty space in a particular parking lot. Therefore, the waiting time for a user looking for parking spaces is minimized. A simple and hassle-free process like parking has turned into a tedious and time-consuming operation due to mismanagement of the parking system. Current parking systems are inefficient, forcing users to look for parking spaces on every floor. Traditional technology consumes more power and consumes more user time. This study introduces an intelligent parking energy management system for a structured environment like a multi-story office parking lot. To build a user-friendly parking system, the 's design proposes merging cutting-edge Internet of Things (IoT) technology with the latest Honeywell sensors and controls.

As the technological development progresses steadily, the requirement for their use has also expanded, for which this "intelligent parking system" was generally carried out. Devices like Arduino, IR proximity sensors, servo motor, jumper cables, 16*2 I2c breadboard and display, and decent working code were used to detect objects that are in the way and can cause harm to humans. The complete system development has been carried out into intelligent parking systems, which can be used for hospitals, banks, universities, etc. Besides the development, an overview of the main goal of this project, its working goals, problems and solutions, the general design pattern and working mechanism, as well as the end result of the project and how it can be updated in the future has also been covered. easier and a complete overview of the specific project, I.e. intelligent parking system.

Table of Contents

Table of Figure

List of Table

Introduction

Internet of Things (IoT) initiatives is created to solve issues and make life easier, safer, and more comfortable. Sensors, software, microcontrollers, and other technologies are merged and managed to create new technologies or concepts; the creation of such technology is classified as an IoT.

Smart parking is a parking strategy that leverages technology and human ingenuity Park your vehicle faster, easier and more closely together most of the idle time. Intelligent parking and its technology, intelligent transportation, are based on basic ecology. The concept is that we are all connected. For the movement of people and goods, both parking and transit. Smart parking and intelligent traffic will be introduced gradually integrating their visions and overlapping technologies into one stream. The Internet of Things, or IoT, are an interconnected network of mechanical and digital computing devices. Machines, goods, animals and people with unique identifiers (UIDs) and the ability to do so Transfer data without requiring human-to-human or human-to-computer interaction.

(Johnson, 2022)

Smart Parking is a system that monitors the availability of parking spaces in real-time. It is both time efficient and cost-effective. Sensors and other devices detect the presence and Guide parking spaces and drivers to the most convenient locations with the help of digital signage LED indicator. Smart parking solutions reduce search traffic and reduce the city's congested traffic. Finding a free parking space over a chaotic company parking increases customer satisfaction and profits. At the same time, parking space operators and municipalities can collect extensive data about parking, parking lots, and customer patterns to guide future infrastructure development.

(Clever City, 2022)

According to recent research for drivers, free parking spaces are always hard to find. As the number of private vehicle users increases, it becomes more and more demanding. This issue has attracted strategic investments from various industry sectors to enhance the course Reduced search time, Less congested traffic and fewer traffic accidents.

Current Scenario

As we all know the population of the world reached more than 8 billion now. With increasement of the population the number of vehicle user also increasing day by day. As a result, there are fewer available parking spaces which means the demand for parking is ever-growing and here comes smart parking which helps the problem of finding an available spot by providing drivers with information about available sports near them. These systems help drivers to find an available spot faster and more easily than traditional methods like circling around or waiting for someone to leave. By leveraging this technology, drivers can avoid wasting time looking for a space.

Problem Statement

Recent studies conducted in Kathmandu metropolitan areas examined parking management from various angles. highways with a lot of traffic. This is problematic for drivers because it's difficult to find a parking space. Usually, when hunting for a parking space, drivers squander time and energy and end up parking on the street. In the worst-case scenario, it becomes impossible for individuals to find a parking spot, especially during busy times and around holidays.

Project as a solution

Common parking problems include a lack of available parking, high parking costs, and traffic jams brought on by individuals searching for a spot. A system powered by the Internet of Things that uses a web or mobile application to transmit information about vacant and occupied parking spaces is referred to as a "smart parking development." The Internet of Things is there in every parking spot. The customer has the opportunity to choose the best parking spot after receiving a real-time update on all of the available spots. gadget, which consists of microcontrollers and sensors. The customer has the opportunity to choose the best parking spot after receiving a real-time update on all of the available spots.

Aims and Objectives

Aim

The aims of the project are to reduce the time and difficulty that takes to find the parking spot

Objective

The main objectives of this project are listed below: -

- To become familiar with IOT functionalities and prototypes.
- To satisfy the needs of smart parking systems and their workings.
- To link the physical and digital worlds together and combine them.
- To properly inform people about our prototypes.

Background

The project is a smart parking system demonstration. Urban mobility choices are starting to be provided through smart parking systems. This system provides real-time information regarding parking availability both inside and outside, as well as traffic and road conditions. It does this by using the Internet of Things and sensor technologies. Smart cities can be viewed as including smart parking and its smart parking sensors. The most effective parking location may be found using smart technology, which allows businesses or municipalities to maximize their parking areas. The intelligent parking system relies on sensors to locate available spaces and direct vehicles to the most practical area using digital signage like LED displays.

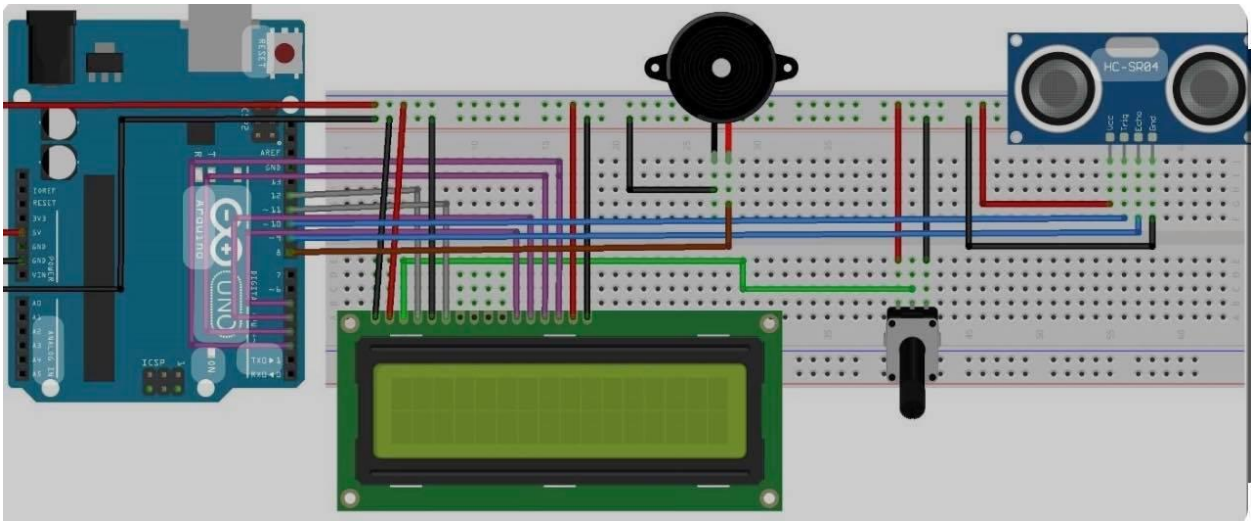

Figure 1 System Architecture

Required Analysis

A smart parking has been developed using an Arduino UNO, Ultrasonic Sensor, Resistor, Jumper wire, IR sensor, I2C LCD display, Servo motor, Bread Boards, IR Receiver, IR Transmitter, Resistor Lok ohm.

The device that are used on our listed are described below: -

- Arduino UNO

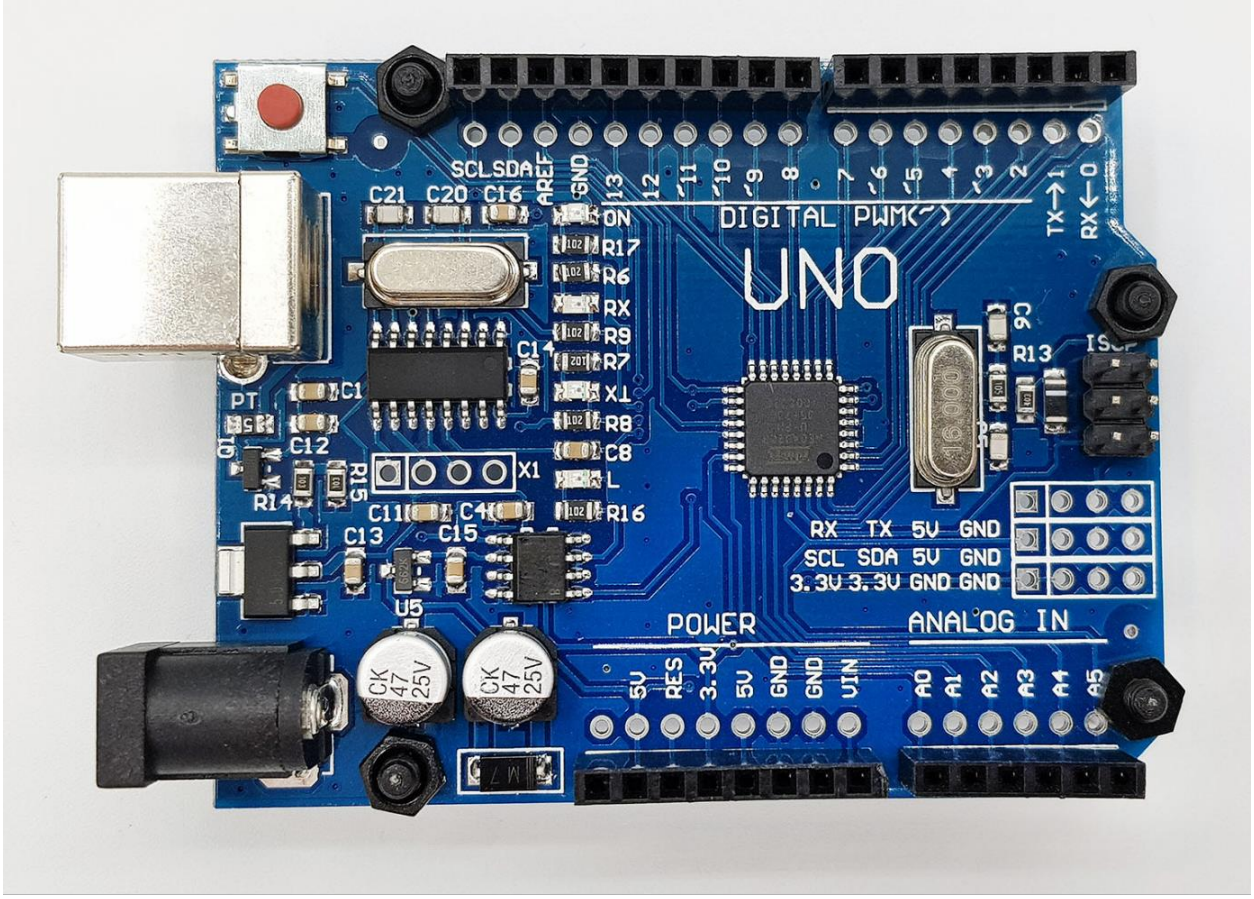

Figure 2 Arduino UNO

An open-source, free hardware and software electronics platform is called Arduino. An LED can be turned on, a motor can be started, or anything can be posted online when an Arduino board detects an input like light on a sensor, a finger on a button, or a tweet. The board's microcontroller can be given instructions to accomplish something. The

Arduino Software (IDE) and the Wiring-based Arduino programming language are used to achieve this (based on Processing).

- Ultrasonic Sensor

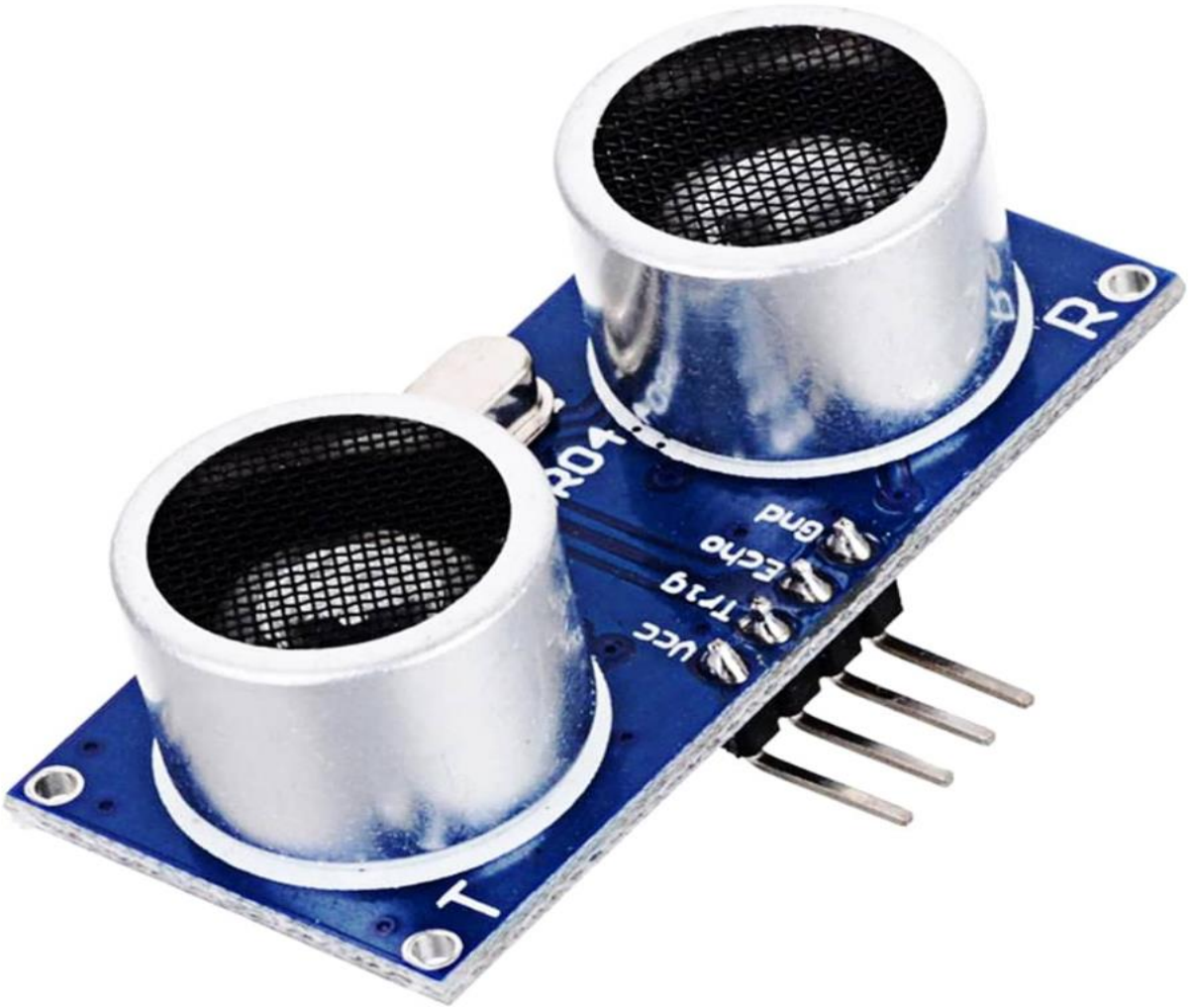

Figure 3 Ultrasonic senser

An ultrasonic sensor is a piece of technology that uses ultrasonic sound waves to measure a target object's distance and then turns the sound that is reflected back into an electrical signal. The speed of audible sound is greater than the speed of ultrasonic waves.

To detect things and gauge their distance from obstacles, ultrasonic sensors send out ultrasonic waves that are picked up by receivers. In the past, systems warned drivers to help prevent collisions with barriers and other vehicles, but now automatic parking systems that manage the steering are becoming more and more popular. The autonomous driving and parking systems will continue to rely heavily on ultrasonic parking assistance.

- Resistor

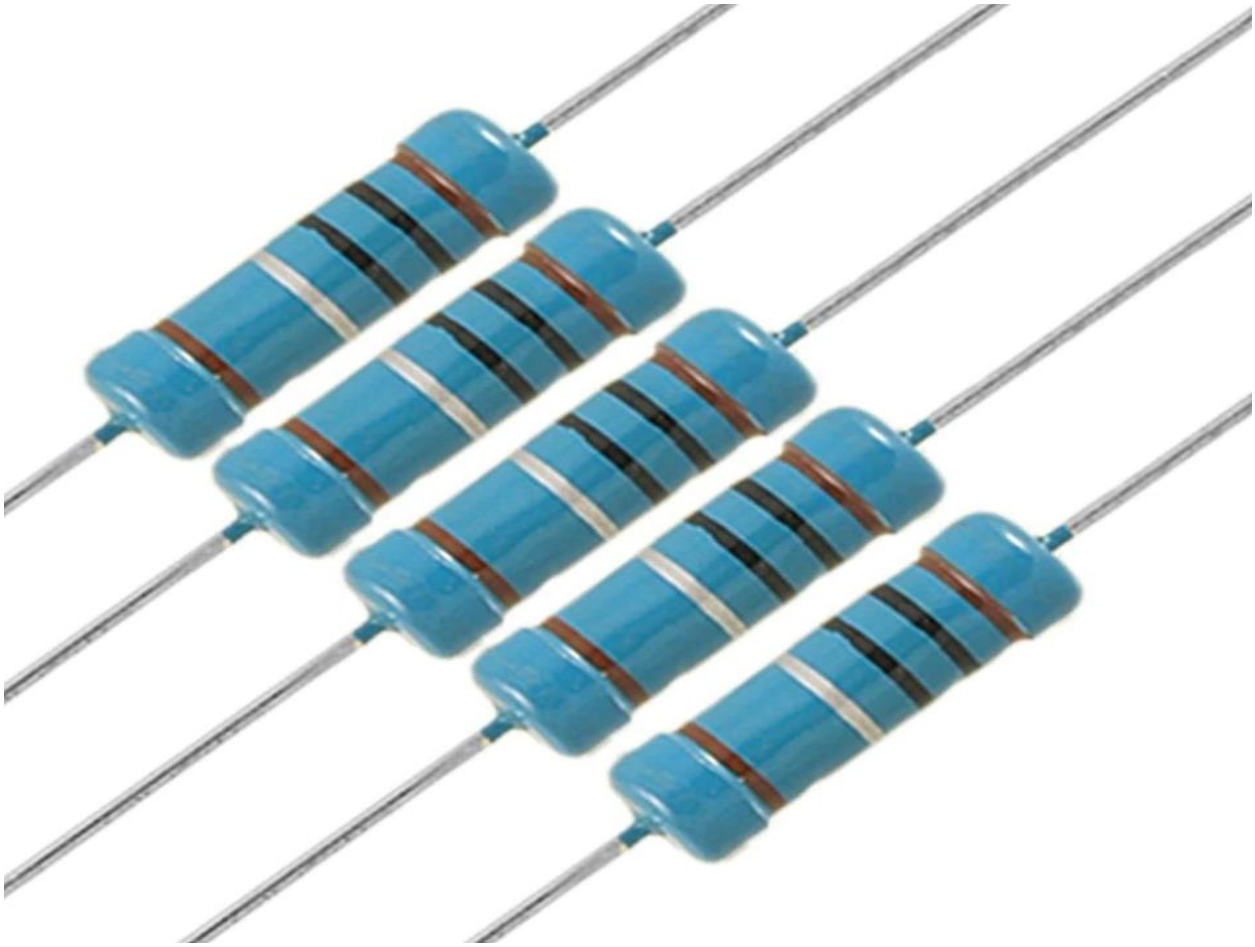

Figure 4 Resistor

A resistor is a passive two-terminal electrical component used in circuits to implement electrical resistance. Resistors have a variety of purposes in electronic circuits, including lowering current flow, adjusting signal levels, dividing voltages, biasing active components, and terminating transmission lines.

- Jumper wire

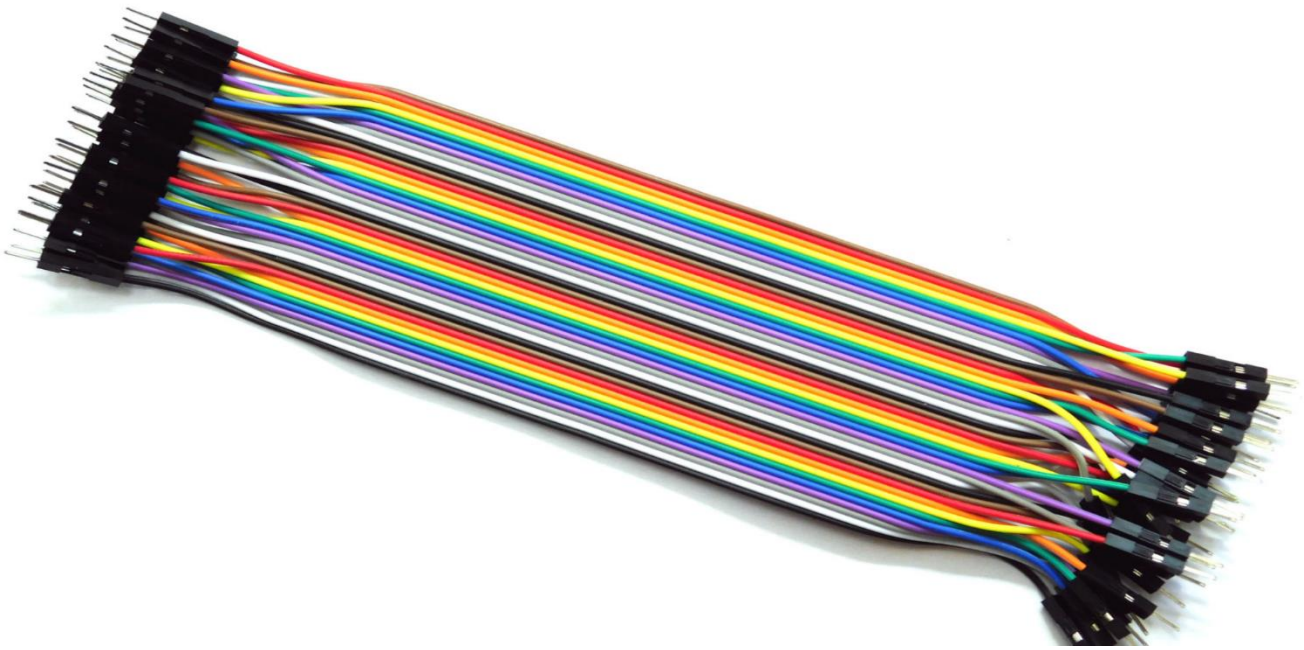

Figure 5 Jumper wire

Jumper wires are straightforward cables with connector pins on both ends that can be used to join two locations without soldering. With breadboards and other prototype tools, jumper wires are frequently utilized to make it simple to swap out components. circuits when necessary.

- IR Sensor

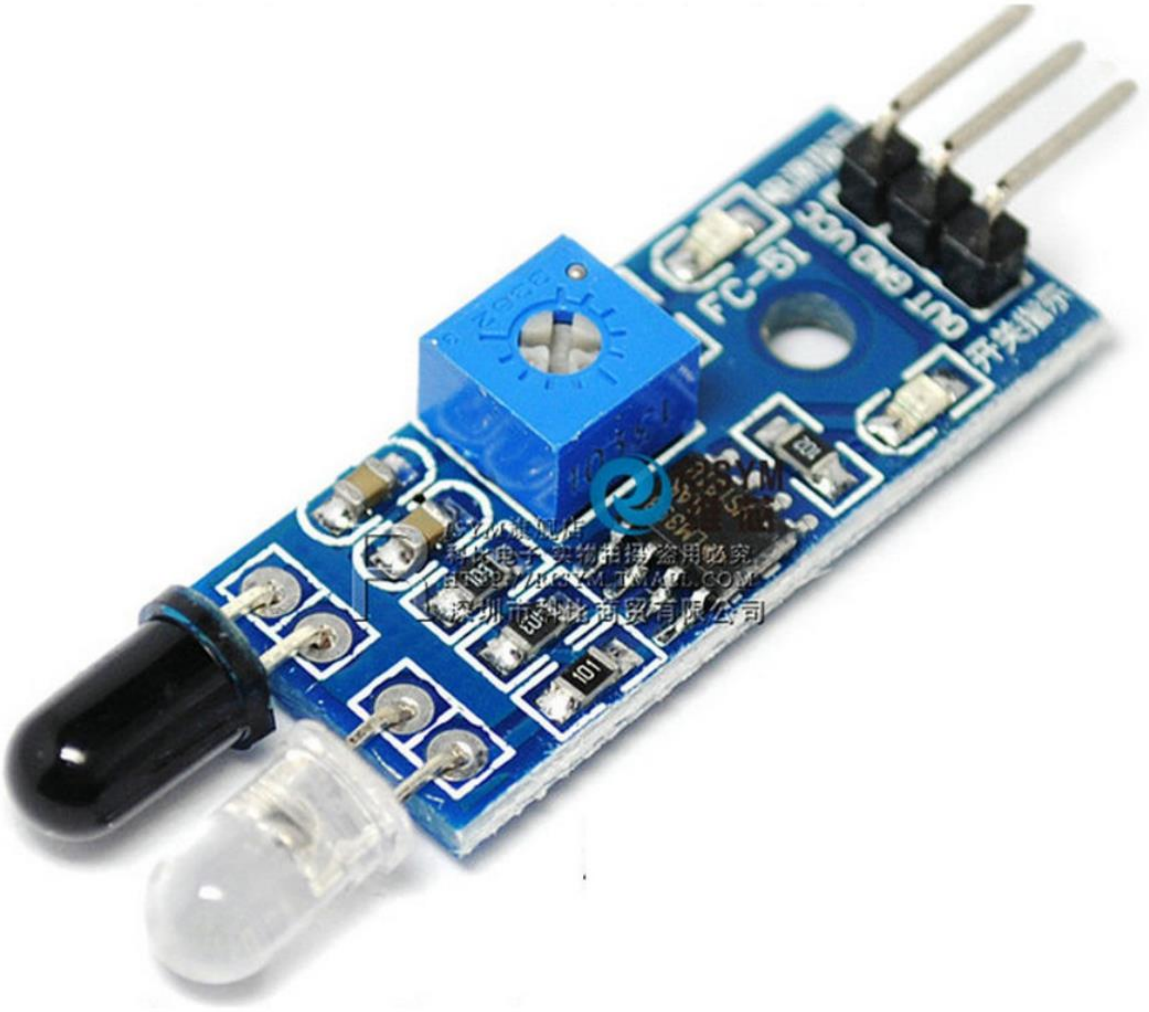

Figure 6 IR sensor

An electrical device that emits light and detects objects in the environment is known as an IR (infrared) sensor. Both motion and an object's heat can be measured using an infrared sensor. Infrared heat radiation is emitted by almost everything. The naked eye cannot see these kinds of radiations, but an infrared sensor can pick them up. An electrical device called an infrared (IR) sensor is used in smart parking systems to detect cars and open parking spaces and to identify objects.

- I2C LCD display 16*2

Figure 7 I2C LCD display

The I2C 162 Arduino LCD Screen makes use of an I2C communication interface. It can display 162 characters across two lines in white on a blue background. The shortcoming of the LCD 1602 Parallel LCD Display, which starts up with about 8 pins on your Arduino, is addressed with this display. And the LCD is employed in the proposed system to display the available spots so that users can locate a parking place.

- Servo motor

Figure 8 Servo motor

A control circuit, servo motor, shaft, potentiometer, driving gears, amplifier, and either an encoder or resolver are some of the parts that make up a closed-loop system. A servo motor is an independent electrical apparatus that spins machine parts effectively When an automobile is recognized by a senser, it is used as a barrier in smart parking systems and opens and closes.

- Bread Boards

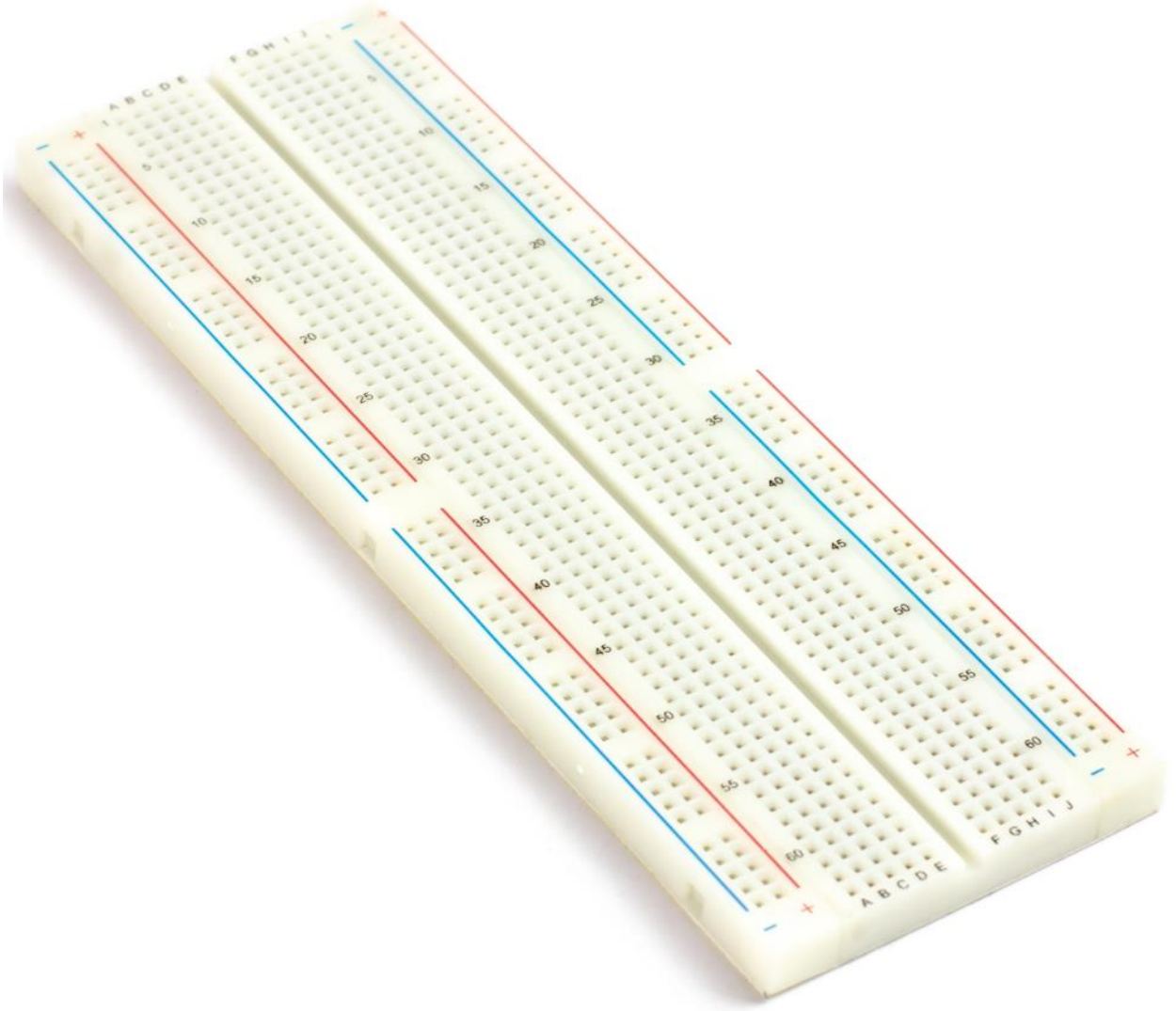

Figure 9 Bread Boards

A rectangular circuit board with several mounting holes is called a breadboard. They connect electronic parts to single-board computers and microcontrollers like the Raspberry Pi and Arduino. The connections are passing ones. and can be uninstalled and installed again.

- IR Receiver and IR Transmitter

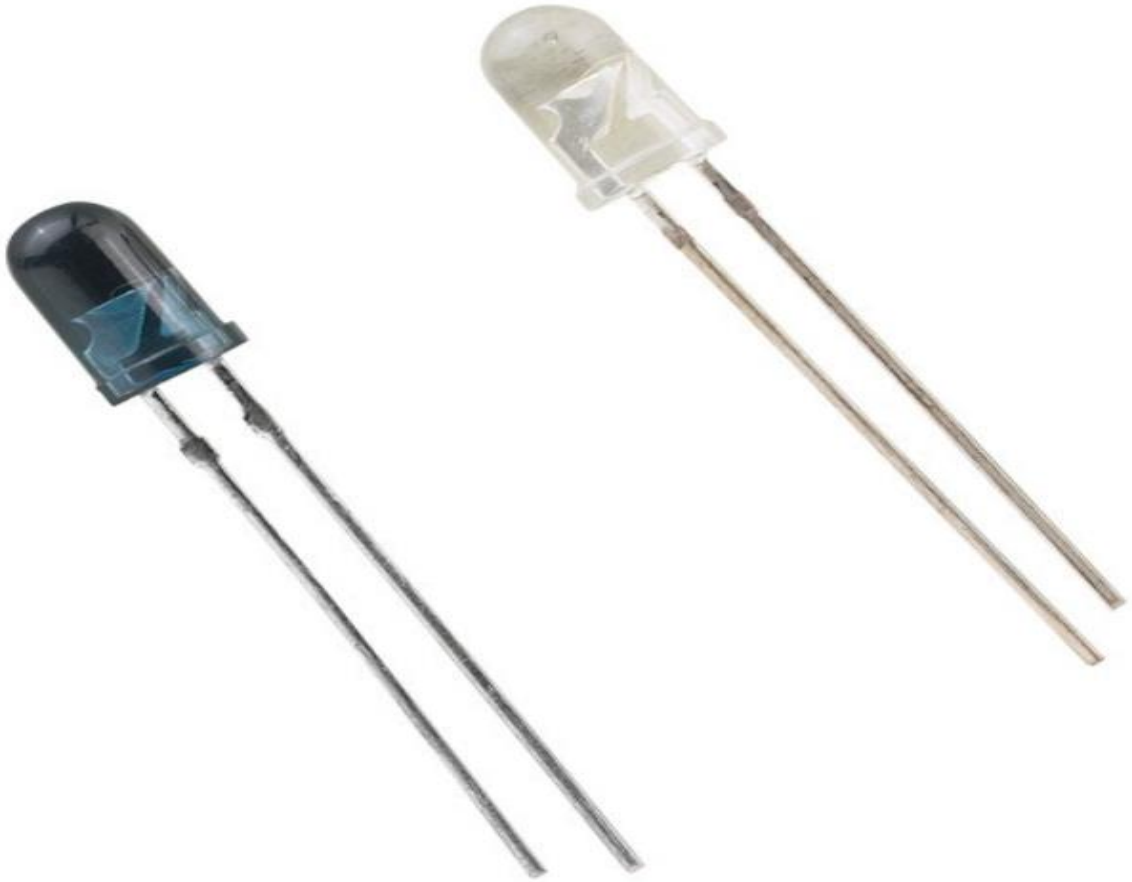

Figure 10 IR Receiver and Transmitter

Although they can be used in a wide range of gadgets, infrared (IR) transmitters and receivers are most frequently seen in consumer electronics. The way this technology operates is that one component emits a specific sequence of flashes of infrared light, which another component can detect and interpret as a command. Remote controls and a wide range of gadgets, including TVs and DVD players, contain these transmitters and receivers. A computer may be able to manage a variety of different consumer products using peripheral devices that incorporate this technology. Some items can be used to extend the signals over a landline line or radio frequency (RF) broadcasts since infrared remotes can only operate within line of sight.

- Arduino IDE

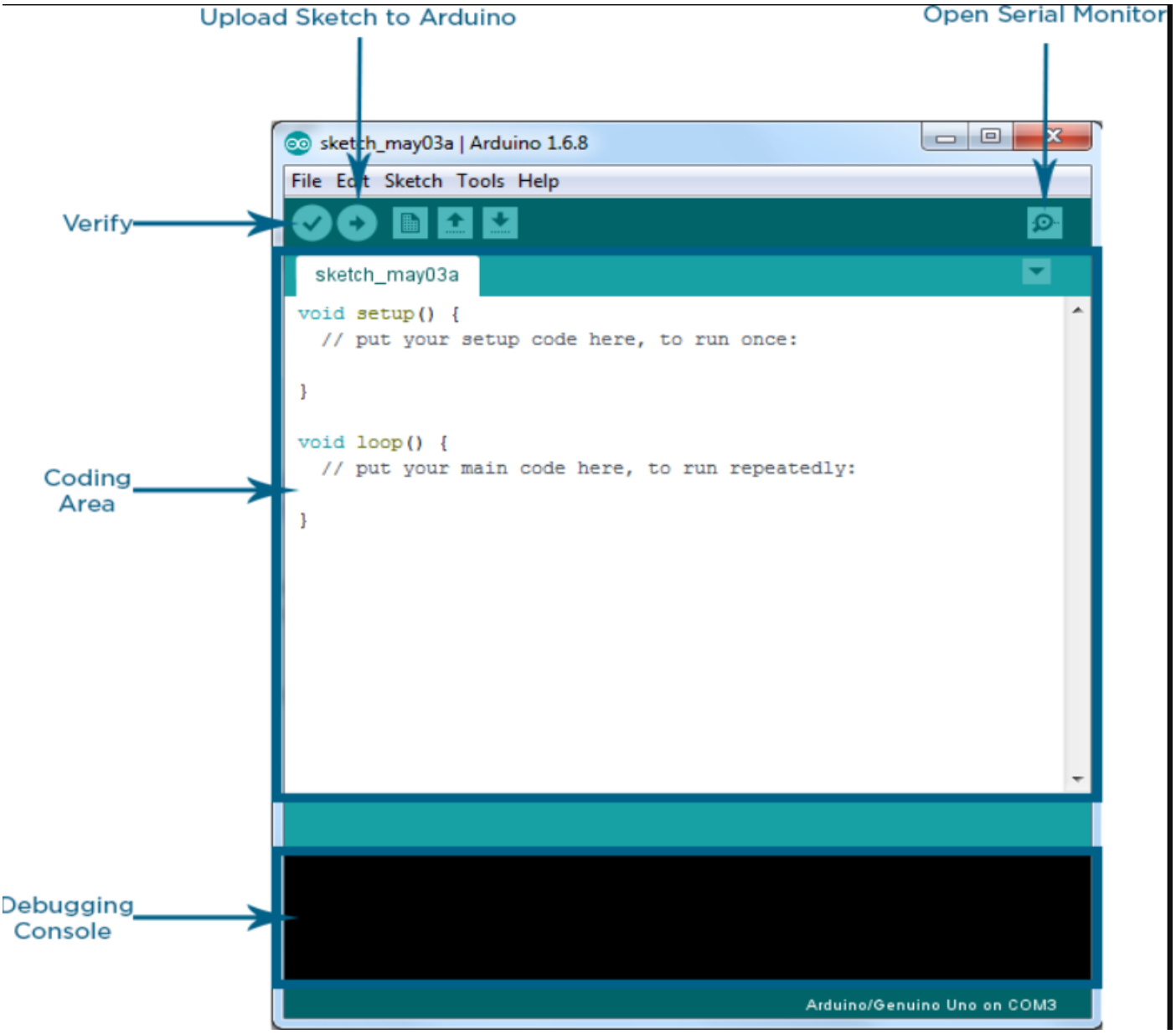

Figure 11 Arduino IDE

Arduino is an open-supply electronics platform primarily based totally on smooth-to-use hardware and software. Arduino forums are capable of examine inputs - mild on a sensor, a finger on a button, or a Twitter message - and flip it into an output - activating a motor, turning on an LED, publishing something online. You can inform your board what to do with the aid of using sending a fixed of commands to the microcontroller at the board. To do so that you use the Arduino programming language (primarily based totally on Wiring), and the Arduino Software (IDE), primarily based totally on Processing. Over

the years Arduino has been the mind of hundreds of projects, from ordinary gadgets to complicated clinical instruments. A international network of makers - college students, hobbyists, artists, programmers, and professionals - has accumulated round this open-supply platform, their contributions have introduced as much as an exceptional quantity of reachable information that may be of remarkable assist to beginners and professionals alike. Arduino became born on the Ivrea Interaction Design Institute as an smooth device for immediate prototyping, aimed toward college students without a heritage in electronics and programming. As quickly because it reached a much broader network, the Arduino board began out converting to evolve to new wishes and challenges, differentiating its provide from easy 8-bit forums to merchandise for IoT applications, wearable, 3-d printing, and embedded environments.

Individual Contribution plan

We have five people in our team for this project.

Student Name	Role	Contribution
	Overall Research Required materials, their implementation And Presentation	
	Proposal Writing, Report Writing and Presentation	
	Hardware Research, coding and Presentation	

Table 1: Individual Contribution Table

Conclusion

As is well known, parking is a problem in smart cities because everyone owns a vehicle, yet they all need a safe place to park so they can get where they need to go. In this situation, a smart parking system may be implemented, enabling car owners to leave their vehicles there.

Only two sensors, which recognize the vehicle, open the barrier, count the number of automobiles in the parking space, and update all the data on the LCD display, are employed in our smart parking system. In order to make it more effective in the future, we may make it accessible by developing a mobile app that will assist users in finding the parking system close to their chosen destination using Google Maps and the Gaps app.

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