SMART DUSTBIN

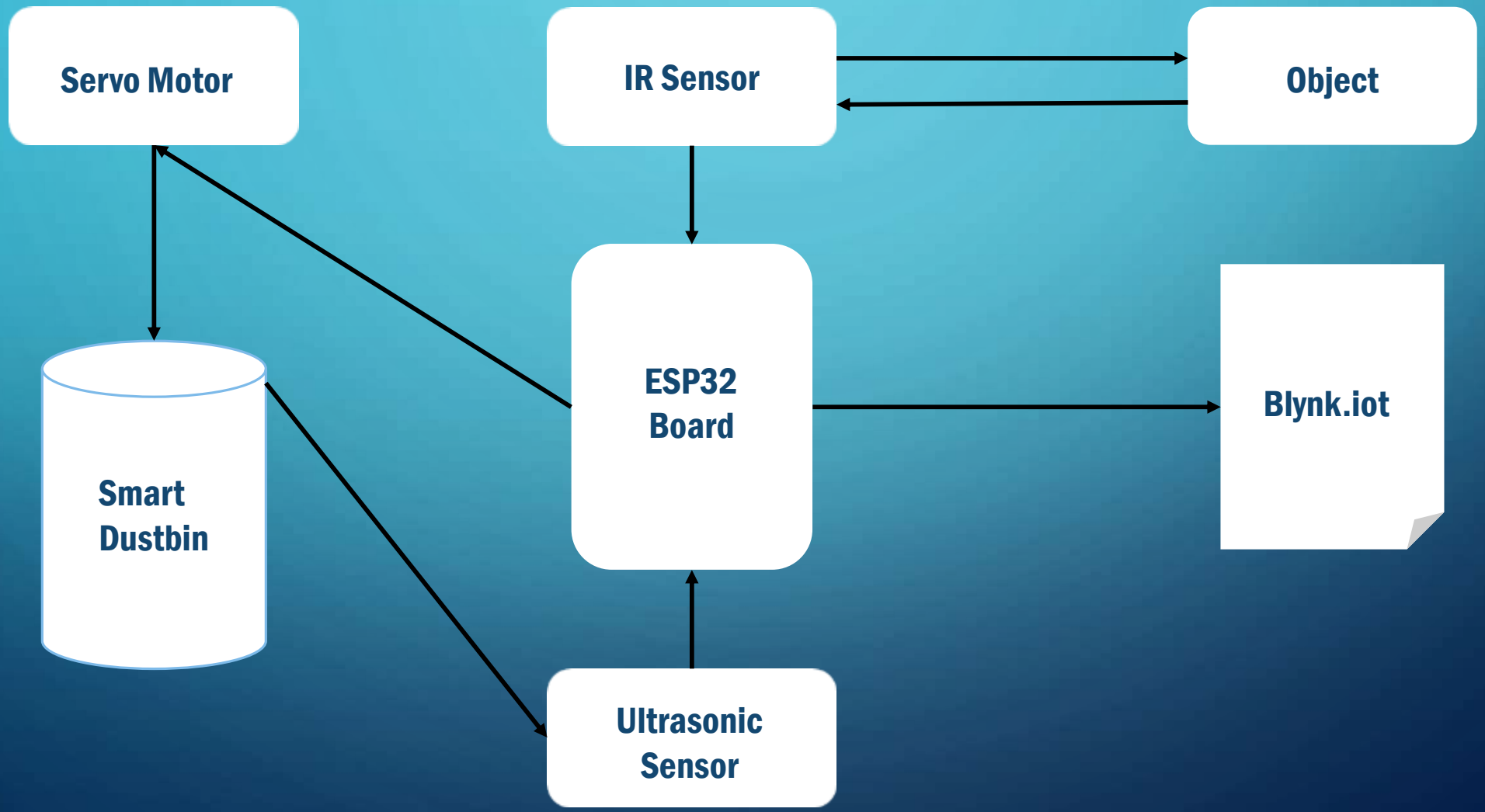
A IOT PROJECT

INTRODUCTION

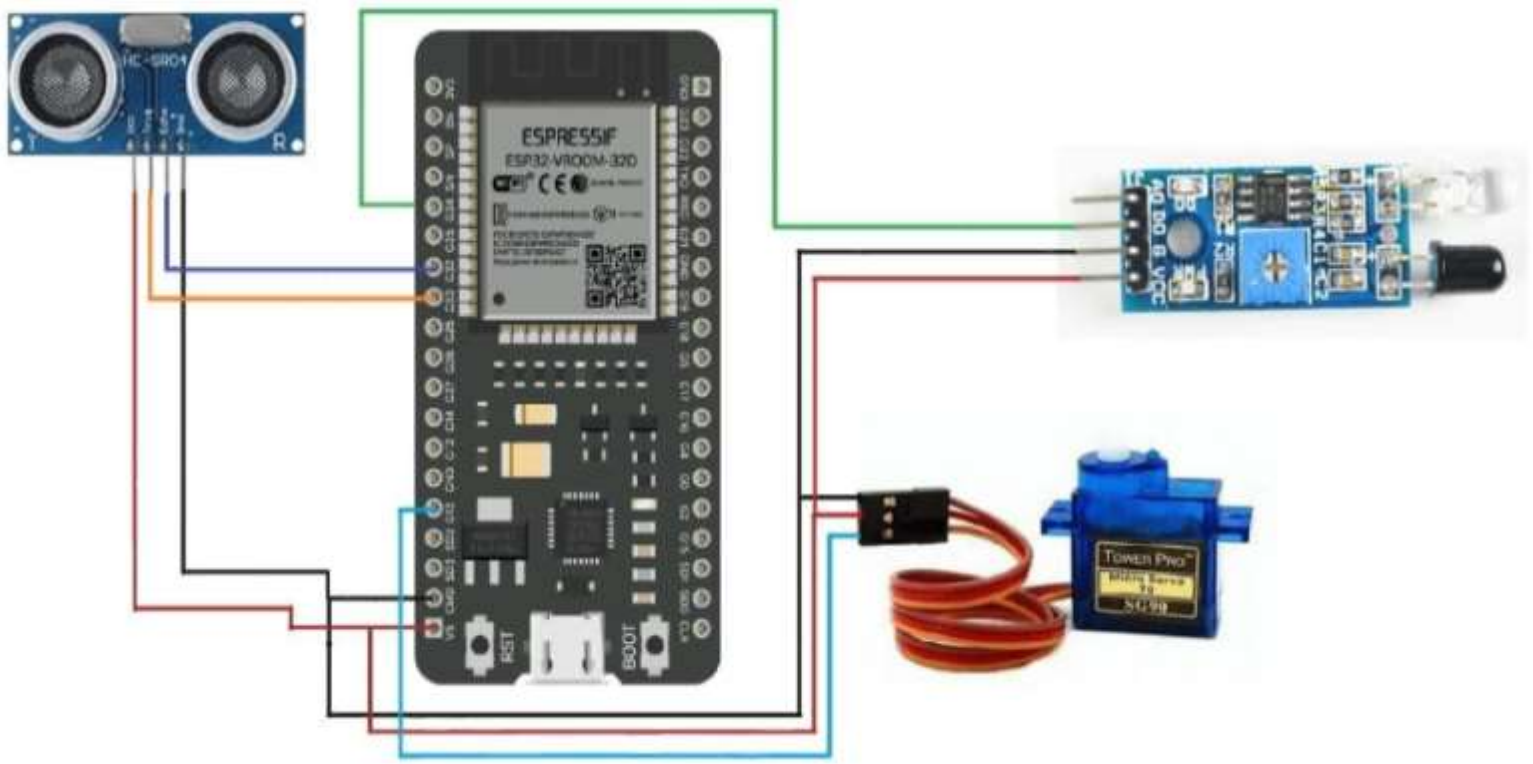
Dustbins (or Garbage bins, Trash Cans, whatever you call them) are small plastic (or metal) containers that are used to store trash (or waste) on a temporary basis. They are often used in homes, offices, streets, parks etc. to collect the waste. In some places, littering is a serious offence and hence public waste containers are the only way to dispose small waste.

In this project, I have designed a simple system called Smart Dustbin using ESP32 board, IR sensor Ultrasonic Sensor and Servo Motor, where the lid of the dustbin will automatically open itself upon detection of human hand also we can understand the the dustbin has how much percentage of waste by using ultrasonic sensor The smart dustbin is a carefully designed solution that solves the social issue of waste disposal.

PROCESS DIAGRAM



CIRCUIT DIAGRAM

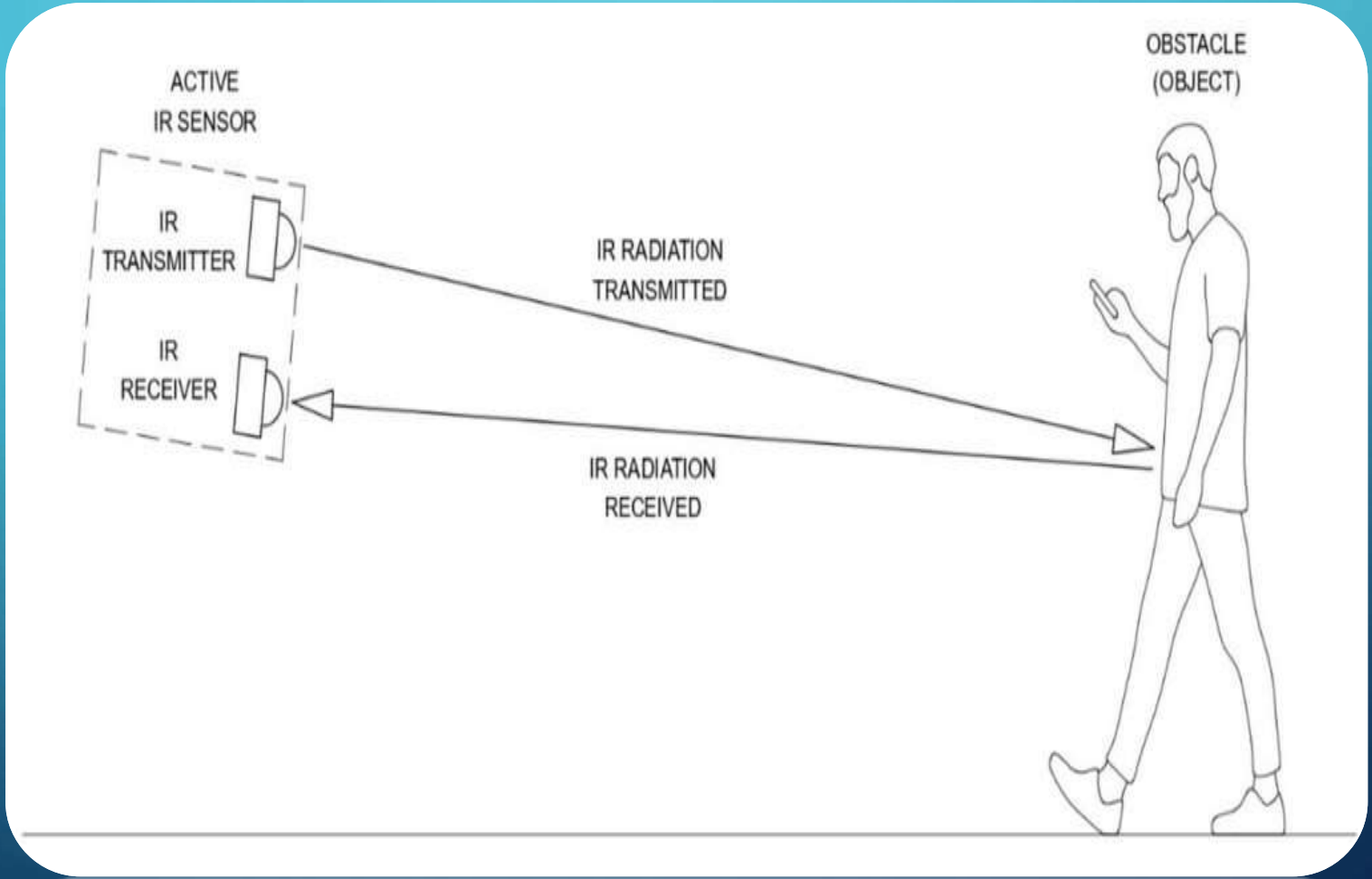


OVERVIEW OF COMPONENTS

IR Sensor

In a smart dustbin, an infrared (IR) sensor serves as a crucial component for detecting the presence of objects or waste being deposited into the bin.IR sensors emit infrared radiation and detect any reflected radiation. When an object enters the detection zone of the sensor, it reflects the emitted IR radiation back to the sensor. The sensor detects this reflection, indicating the presence of an object. The IR sensor is typically positioned at an appropriate location within the dustbin to cover the opening or entry point where waste is deposited. This ensures accurate detection of objects as they are inserted into the bin.

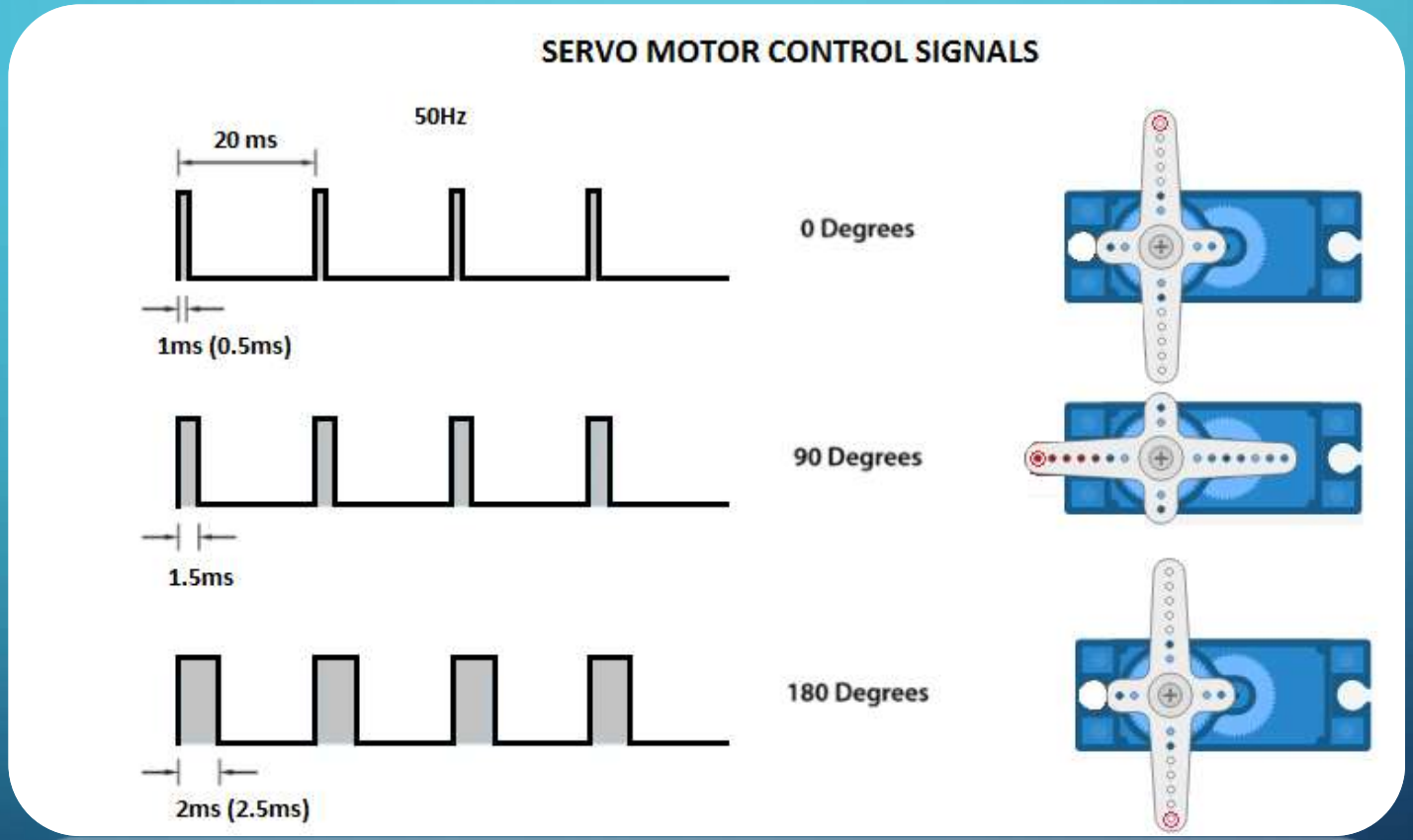
Detected The Object



Servo Motor

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use servo motor It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Due to these features they are being used in many applications like toy cars, RC helicopters and planes, Robotics, Machine etc.

Opening The Bin Top



ESP32 BOARD

The ESP32 BOARD is one of the more popular boards in the Arduino family and a great choice for beginners. The ESP32 BOARD hardware and software was designed for artists, designers, hobbyists, hackers, newbies, and anyone interested in creating interactive objects or environments. ESP32 BOARD can interact with buttons, LEDs, motors, speakers, GPS units, cameras, the internet, and even your smart-phone or you're TV!

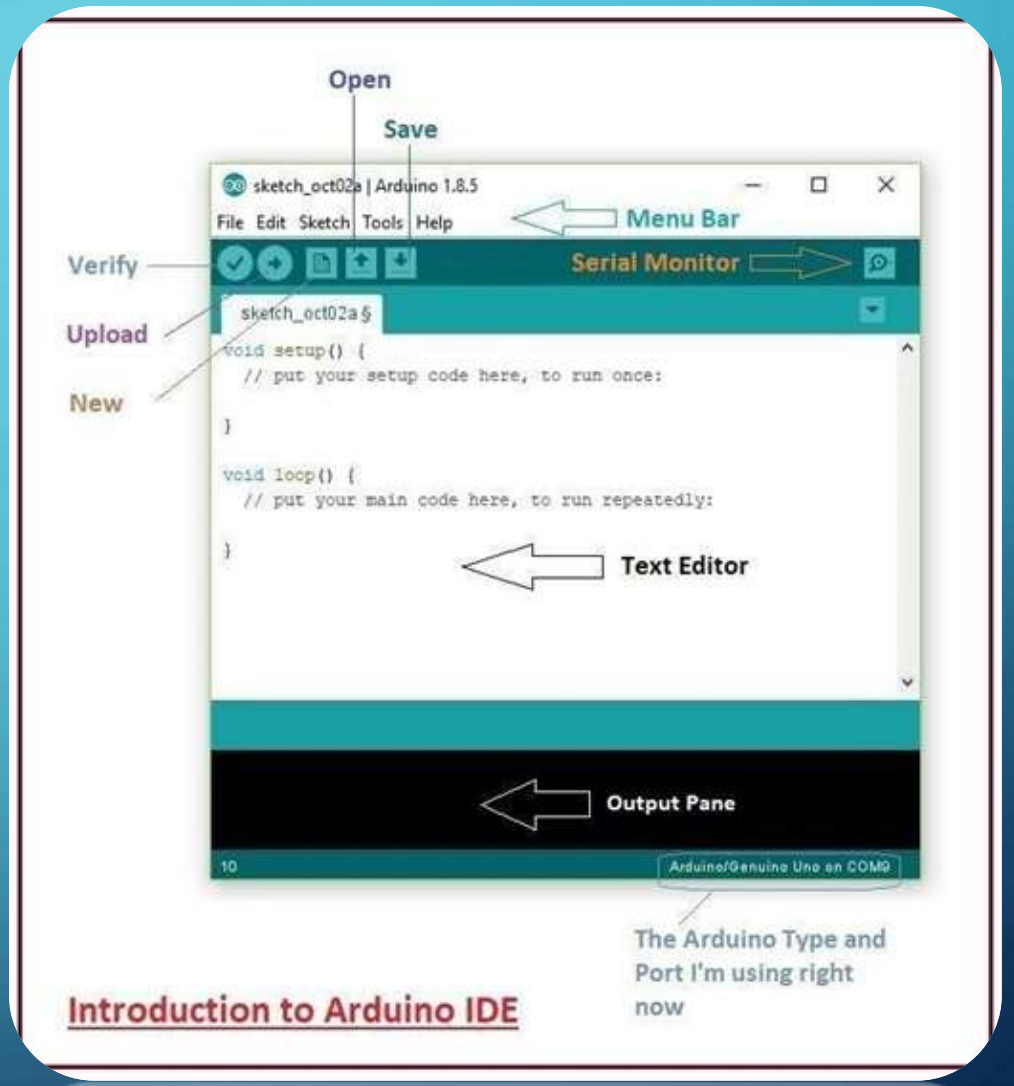
This flexibility combined with the fact that the Blynk software is free, the hardware boards are pretty cheap, and both the software and hardware are easy to learn has led to a large community of users who have contributed code and released instructions for a huge variety of ESP32 chip-based projects.

Code Writing & Uploading Software

Arduino IDE

Used Programing Language

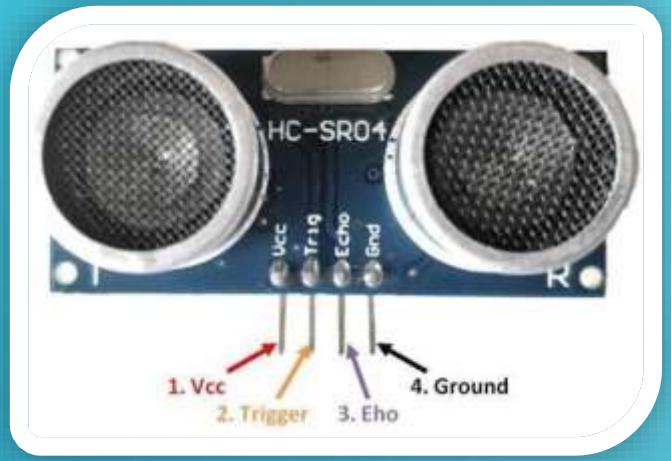
C++



Jumper Wires

It is used to connect electrical signals between ESP36 board and sensors. Jumper wires are essential components in electronics and prototyping, commonly used to establish connections between different points on a breadboard, electronic components, or between various modules in a circuit. One end of these wires has a pin or connector, while the other end has a socket or receptacle, making them suitable for connecting between male headers and components.

Ultrasonic Sensor

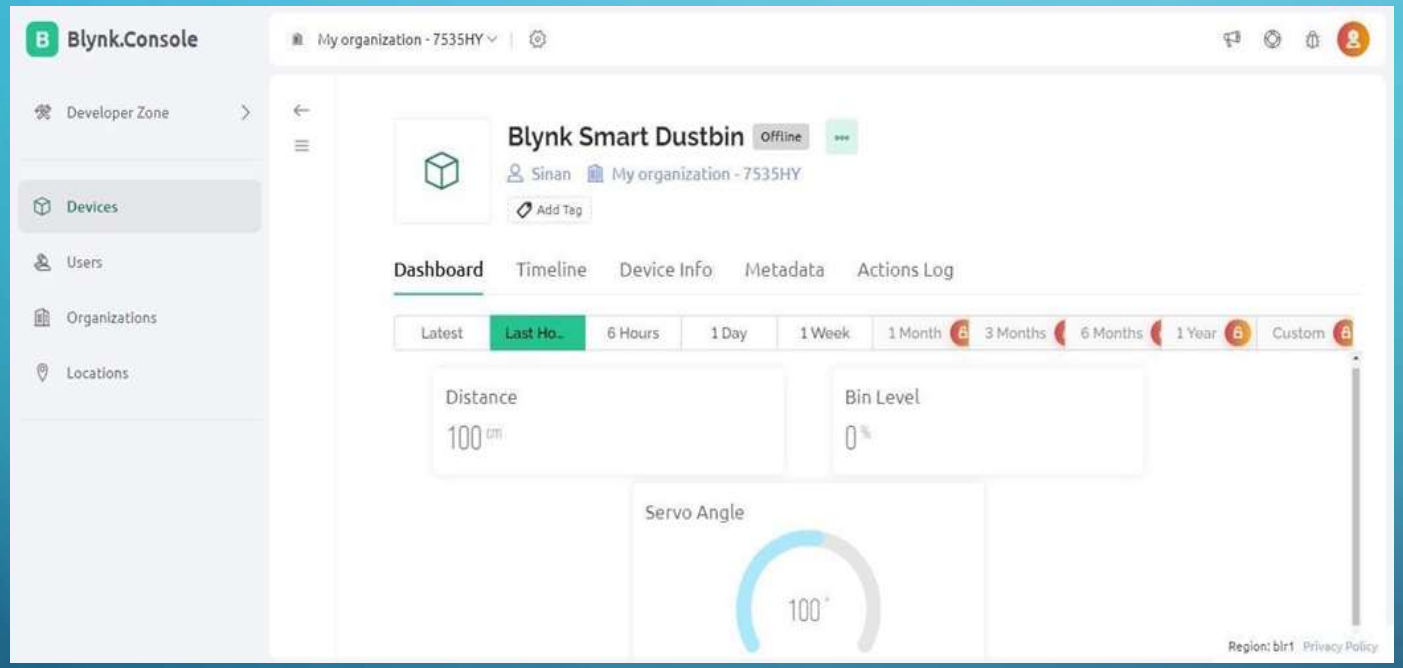


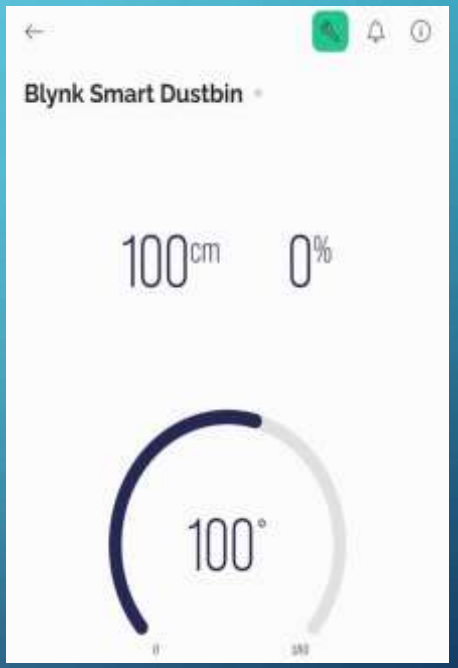
Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensor, like many others, use a single transducer to send a pulse and to receive the echo.

The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse. The figure pin configuration for ultrasonic sensor module (HC-SRO4) which includes The sensor continuously monitors the fill level of the dustbin, providing real-time data on the percentage of waste filled. This information can be relayed to users or waste management systems for timely action, such as scheduling emptying or optimizing collection routes.

Measuring The Bin Level

SCREEN SHORTS





BENEFITS SMART DUSTBIN

Prevention of Overflow: Monitoring the fill level of dustbins helps prevent them from overflowing. Overflowing bins are unsightly, pose health hazards, and can attract pests. Smart dustbins can send alerts when they reach a certain capacity, allowing for timely emptying to avoid overflow

Easy To Collect Bin Waste