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Lake Cleaning System Using IOT

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Abstract – This research project is designing a lake cleaning System using IOT. The tourist destinations is polluted irresponsible human behaviour. Although the local government institutions have cleaned up the coast, some areas are neglected for various reasons.The amount of waste has been increasing due to the increase in human population and urbanization. In cities, the overflowed bin creates an unhygienic environment. Thus degrades the environment developed to reduce to work for the ragpickers the wastes are segregated by the human beings which leads to health problems to the workers.The main reason is that cleaning it is difficult. It requires a considerable amount of time and resources. The rubbish must be picked up by hand by the workers. Sewage sedimentation caused by coastal breezes has become a significant issue. That makes identifying the contamination challenges. It is difficult for workers to clean up as they dig the beach to collect.

***Key Words*:** Home Automation System, Internet of Things (IOT), Sensors, Actuators, Remote Monitoring

1. INTRODUCTION

Maintaining a healthy and clean environment is essential to sustaining the ecosystem. Every healthy environment, including the rivers and lakes, should be limited and less exposed to the hazardous chemicals and pollution that may adversely affect human health. Thus, by definition, the concept of this project is being able to help clean the lakes and filled with human waste such as garbage and plastics. The waste can be segregated as a wet and dry waste. If the leaves is collected it can be analysed whether It is useful or not by using ml. The model is powered entirely by, including full sealed lead-acid batteries and a voltage regulator.

2. METHODOLOGY

The whole project has builded into 3 sections, Lake cleaning System module ,Segregation module, Detection module. The first module includes to build a helpful lake cleaning robot, this project aim is to start by connecting the motors, motor driver to the ESP32.This helps the robot to move around. then add with a Bluetooth module (HC-05) for remote control, allowing people to guide the robot without wires.For keeping an eye on the lake's health ,the robot include a water temperature sensor (DS18B20). Using a special tools called libraries, the Arduino reads the temperature data. To make things even cooler and set up a basic web page using a module like ESP32.To make the robot even handier for cleaning, In addition to add a system to collect garbage, like a scoop or conveyor belt. The robot is smart enough to tell if the trash is wet or dry and puts each type in its own container for organized cleaning. The second module will includes a Aurdino, Servomotor, Moisture Sensor used for segregation. The third deals with the analysis detection whether the collected leaves are waste or useful can be performed as by using Deep learning algorithms.

3. MODELING AND ANALYSIS

1. Lake Cleaning Module

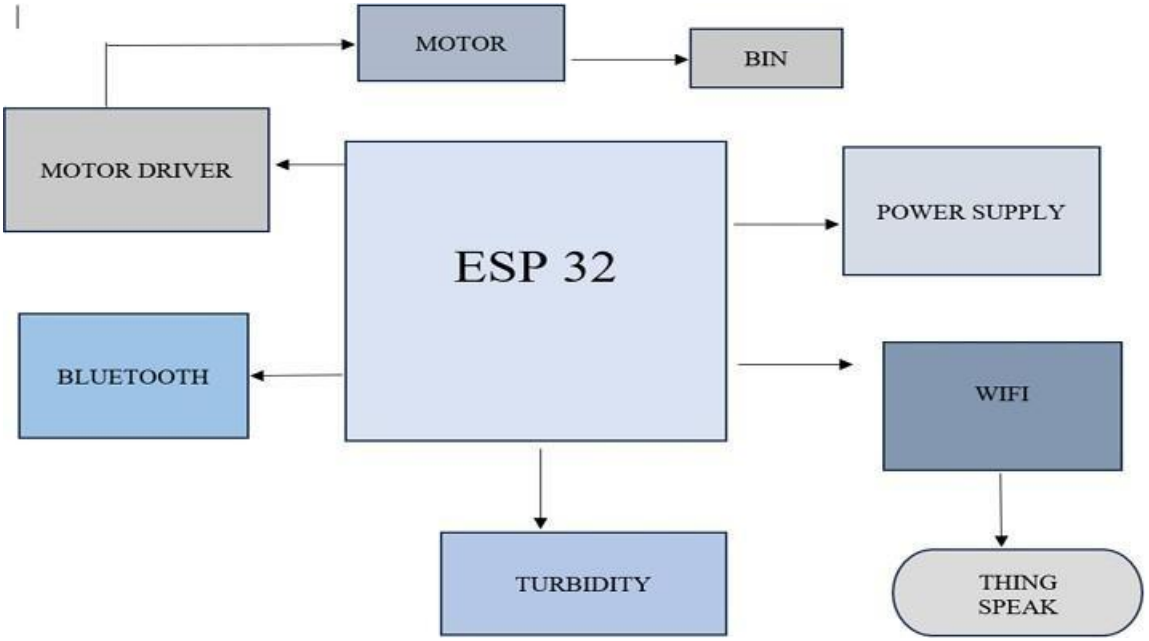


Fig: Model Lake Cleaning System

2. Segregation Module

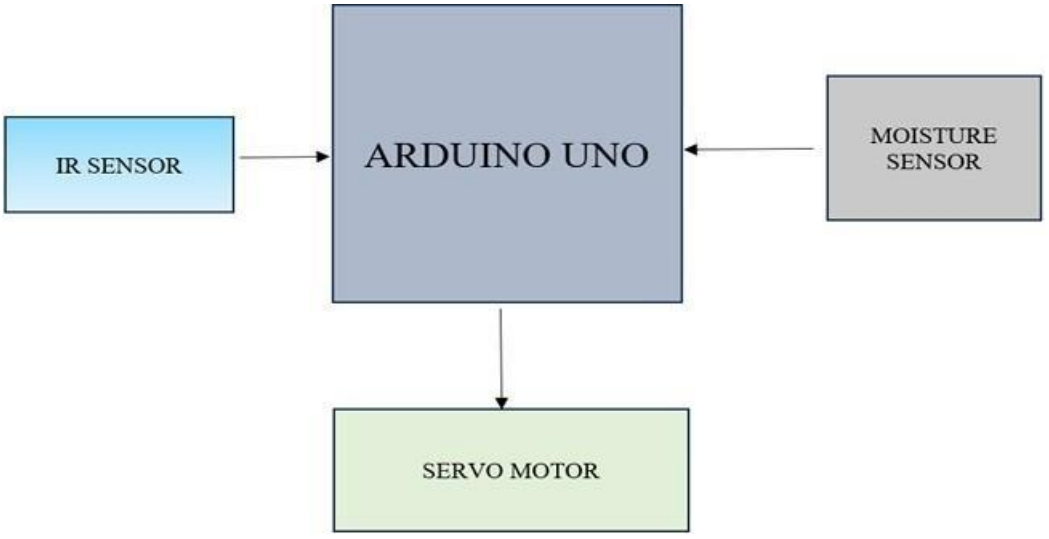


Fig: Segregation Model

3. Detection Module

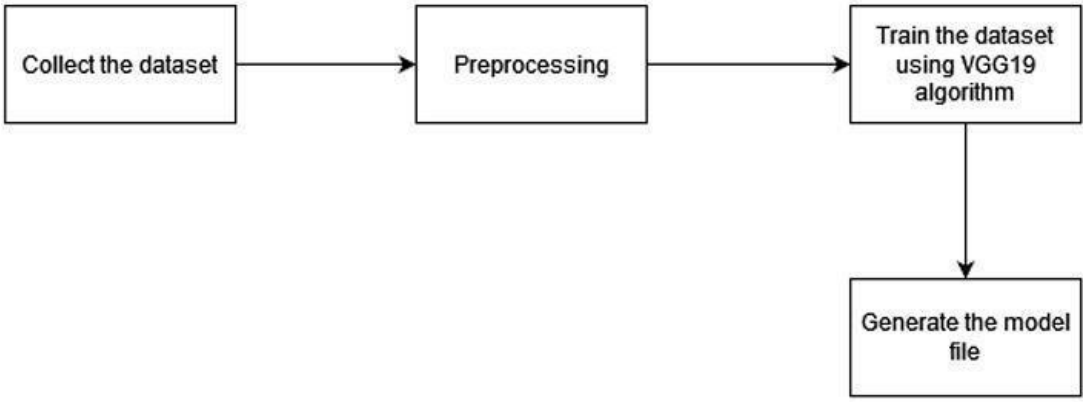


Fig :Training Phase

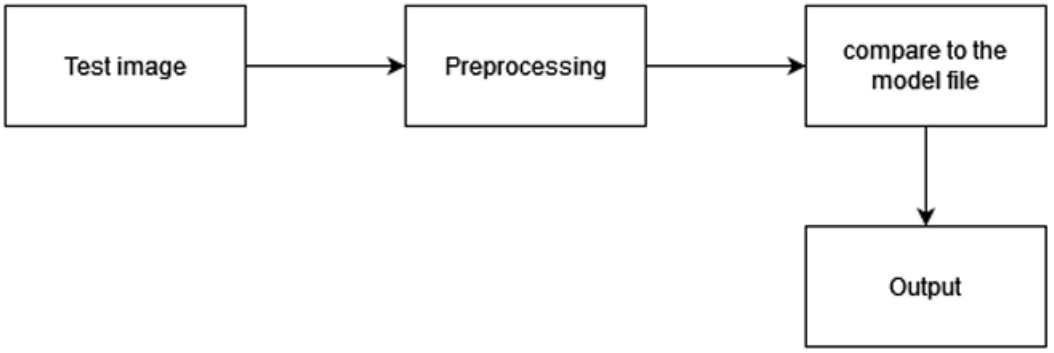


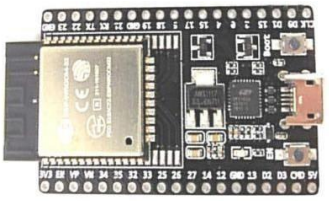
Fig :Testing Phase

Hardware Components

The required hardware components are Esp32 Microcontroller, Motor Driver, Bluetooth Module, Motor, Li-ion Battery, Arduino Uno, Moisture sensor, IR Sensor, Servo Motor, LCD.

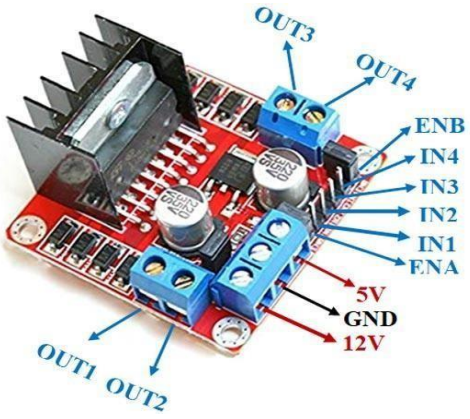
1. Esp32 Microcontroller

ESP32 is a low-cost System on Chip (SoC) Microcontroller from Espress if Systems, the developers of the ESP8266 SoC. It is a successor to ESP8266 SoC and comes in both single-core and dual-core variations of Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth.



ESP32 has a lot more features than ESP8266 and it is difficult to include all the specifications in this Getting Started with ESP32 guide. So, I made a list of some of the important specifications of ESP32 here. Single or Dual-Core 32-bit LX6 Microprocessor with clock frequency up to 240 MHz.

2. Motor Driver



The L298N chip contains two standard H-bridges capable of driving a pair of DC motors, making it ideal for building a two-wheeled robotic platform.The L298N motor driver has a supply range of 5V to 35V and is capable of 2A continuous current per channel, so it works very well with most of our DC motors.

3. Bluetooth Module

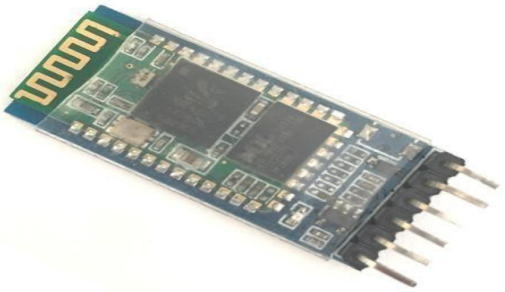


Figure: HC-05 Bluetooth Module

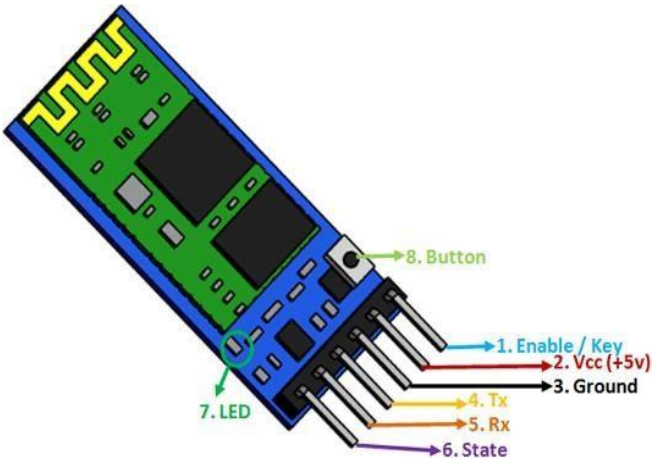


Fig : HC-05 Bluetooth Module Pinout

The HC-05 is a popular bluetooth module which can add two-way (full-duplex) wireless functionality to your

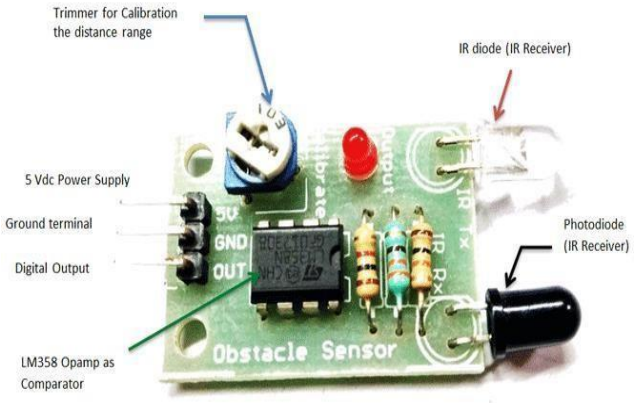
projects.

4. Arduino Uno

Figure: Arduino Uno

Arduino is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller. Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

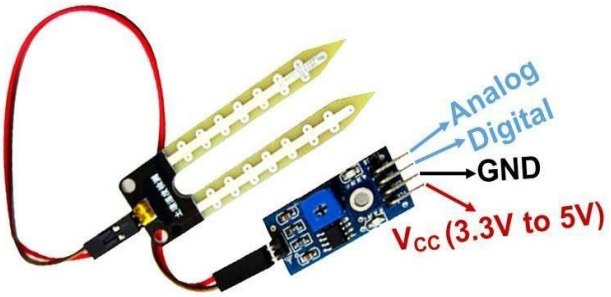
5. IR Sensor



IR Sensor

The IR sensor module consists mainly of the IR Transmitter and Receiver, Op-amp, Variable Resistor (Trimmer pot), output LED along with few resistors.

6. Moisture Sensor



This soil moisture sensor module is used to detect the moisture of the soil. It measures the volumetric content of water inside the soil and gives us the moisture level as output. The module has both digital and analog outputs and a potentiometer to adjust the threshold level.

7. Turbidity

Turbidity sensor

Turbidity is a measure of the cloudiness of water. Turbidity has indicated the degree at which the water loses its transparency. It is considered as a good measure of the quality of water. Turbidity blocks out the light needed by submerged aquatic vegetation. It also can raise surface water temperatures above normal because suspended particles near the surface facilitate the absorption of heat from sunlight.

4. RESULTS AND DISCUSSION

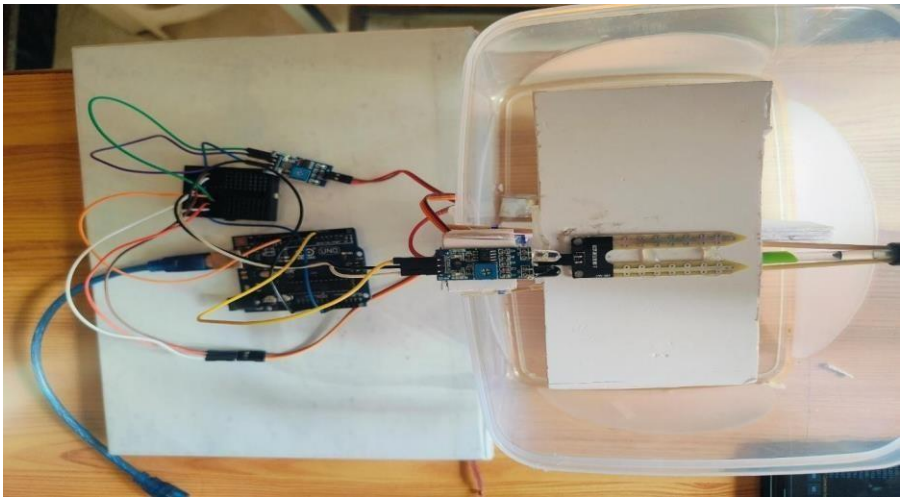
1. Lake Cleaning System

Lake Cleanig system is designed using Embeded C code and for we are connected with mobile Bluetooth for movement

The above snapshots will be the output which for movement of system forward and backward.

2. Segregation Part

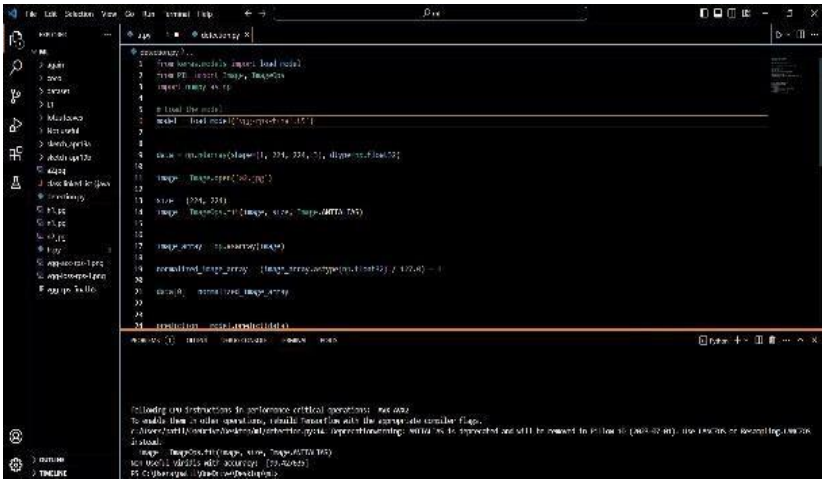
This part is designed using Embedded C code in Arduino IDE platform



The above snapshots is an segregation module which generally classify wet and dry waste

3. Detection Module

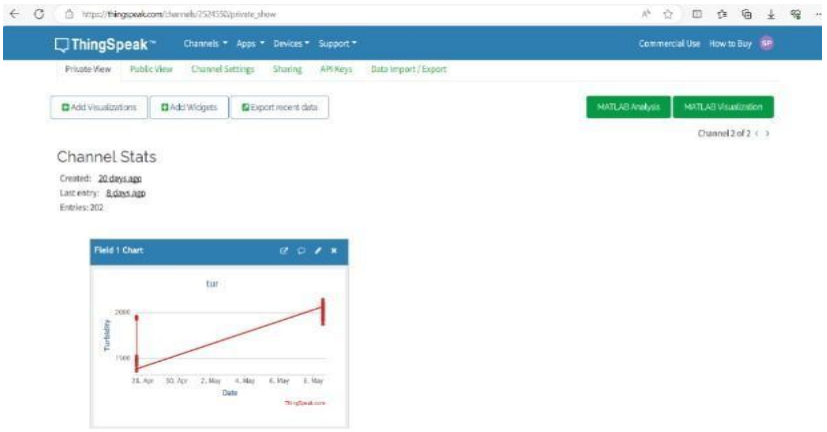
This module is designed using python& it s libraries,where the images is given as dataset and it analyze its useful or not



The above snapshots is the output of detection module where its has been showing the output of detecting that inout is image is not useful.

4. Water Quality Checking

The turbidity sensor will detect the water parameter and update the result to cloud in things peak, hence the updated values can be seen in graph.



5. CONCLUSION

The enhancements accomplished by the new design and features that make the lake cleaning system with IoT technology was more competitive. Moreover, the proposed design is going to be an effective and user-friendly which can boost the rubbish collecting process which directs to pick up a wide variety of flotsam with high quality by reducing time taken since it has the potential to replace manual labor steps. Besides, it can also prevent humans from direct contact and risk of injuries with infectious microbes during manual process. The collected wastes will be segregated as wet and dry waste and detection can be performed whether the collected waste is useful or not.The integrated system incorporates the usage of IoT technology that has the ability to monitor and control the entire process.

6. REFERENCES

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