ARTIFICIAL INTELLIGENCE ENABLED ROBOTIC TRASH BOAT TO DRIVE AND HARVEST FLOATING TRASH FROM URBAN DRAIN

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ABSTRACT - This paper emphasis on design and fabrication of the Trash Boat. The work has done looking at the current situation of our national rivers which are dump with crore litters of sewage and loaded with pollutants, toxic materials, debris etc., If look at current status of our national river it is quite frightening, we discharge around 29 crore gallons of sewage in Ganga is filled with pollution, poisons. Tons of municipal solid garbage are also dumped by us. The majority of water bodies become polluted as a result of human consumption of plastics. to get rid of water body plastic trash. India's government assumes responsibility for cleaning the waterways. Waste that is floating on the water's surface is collected by the device .The main aim of the project is to reduce the man power, time consumption for cleaning the river. Thus, the proposed device can serve as a good assistance to relieve dustman's physical labor on garbage cleaning tasks.

Index terms – Sensor, Wire study, robot.

1. INTRODUCTION

The "Trash Boat" is utilised in locations where waste debris needs to be removed from a water body. T his device has a conveyer mechanism powered by waterwheel that collects and removes waste, trash, and plast ic waste from water bodies. This also lessens the challenges we encounter during waste collecting.   The waste surface debris will be removed by a machine from the water bodies. This will ultimately result in reduction of water pollution and lastly the aquatic animal's death to these problems will be reduced. It consists of belt drive mechanism which lifts the debris from the water. The use of this project will be made in rivers, ponds, lakes and other water bodies for to clean the surface water debris from bodies. The use of this project will be made in rivers, ponds, lakes and other water bodies to clean the surface water debris from bodies. Similarly, they are lots of problems of water pollution under Godavari River Waste water is defined as the flow of used water from homes, business industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes. The biggest impact of cleaning the chemical wastes can cause respiratory diseases and it plays a challenging issue for the municipality officers. Water damage is classified as three types of contaminated water. They are clean water, grey water and black water. Clean water is from a broken water supply line or leaking faucet.

II. METHODOLOGY

A boat is created and designed in this system to be passed via the drainage streams. The boat will be equipped with a camera to find   trash and pick it up. The majority of the time, there will be enormous floating rubbish in drainages, such as bottles and plastic waste, which will merely obstruct the flow of the drain water. Hence, when it notices floating rubbish, the robotic arm will be opened, collecting the trash.

2.1 OBJECTIVE

To design and develop a Trash Boat which serves the following objectives:
1.   Automatic trash identification.
2.   Automatic trash collection.
3.   Trash Level indication using IoT.

2.2 BLOCK DIAGRAM
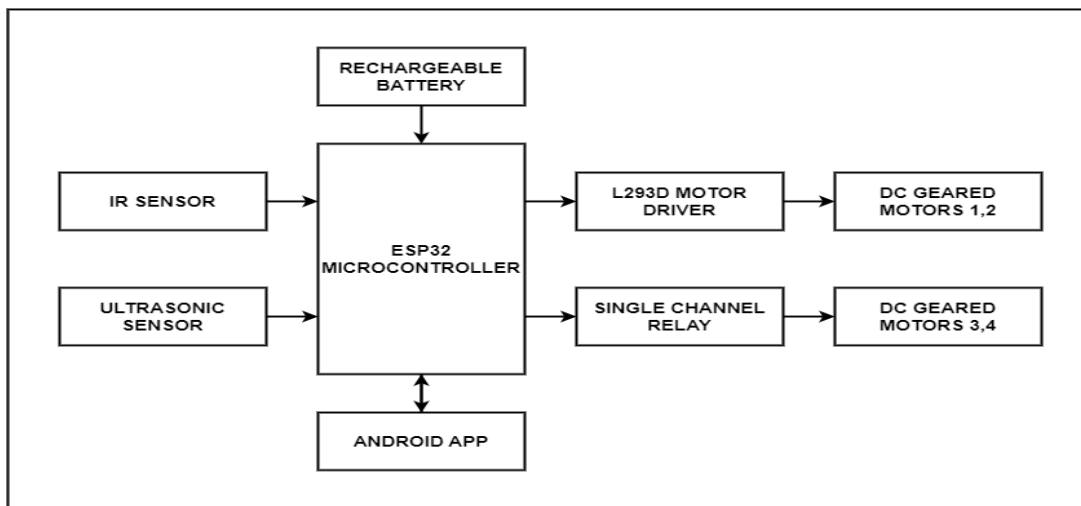
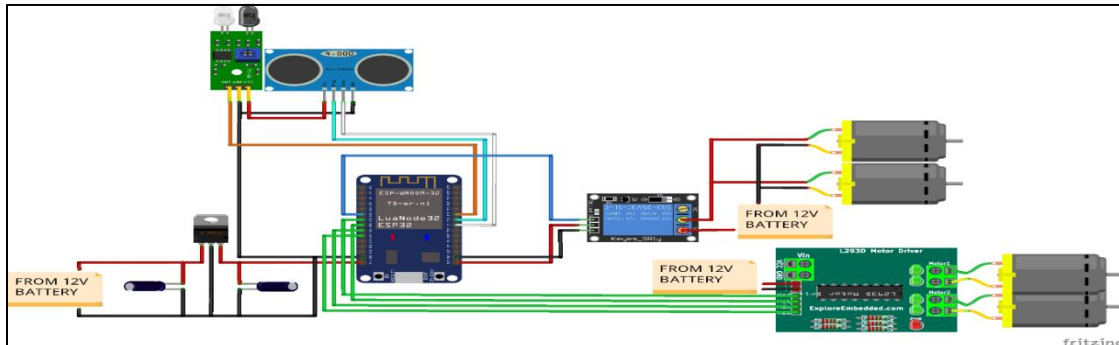

Fig. 1 - Block Diagram

2.3 CIRCUIT DIAGRAM

Fig. 2 - Circuit Diagram

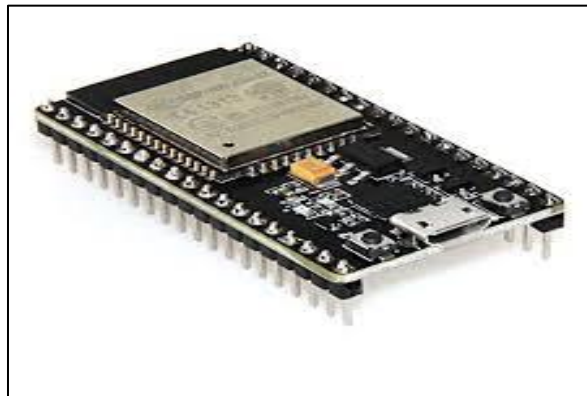## 2.4 HARDWARE REQUIREMENT

1. ESP32 Microcontroller Board

Fig. 3 - ESP32 Microcontroller Board

ESP32 is a line of inexpensive, low-power system on a chip microcontrollers that include built-in dual-mode Bluetooth and Wi-Fi.

Espressif Systems, a Chinese business with its headquarters in Shanghai, designed and developed the ESP32, which is produced by TSMC. ESP32 can function as a full standalone system or as a slave device to a host MC U, which lessens the burden on the primary application CPU caused by communication stack overhead. Using its SPI/SDIO or I2C/UART interfaces, ESP32 may connect to other systems to provide WiFi and Bluetooth capability.
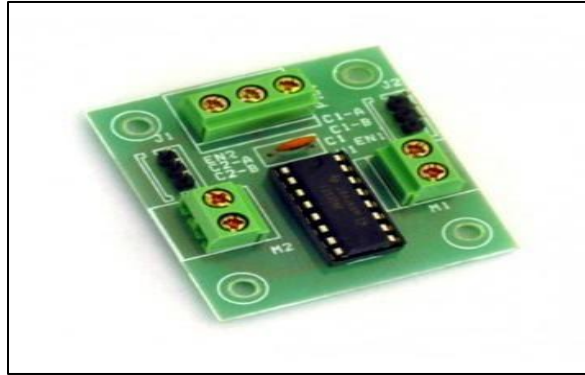
2. L293D Motor Driver

Fig. 4 - L293D Motor Driver

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control four DC motor with a single L293D IC.
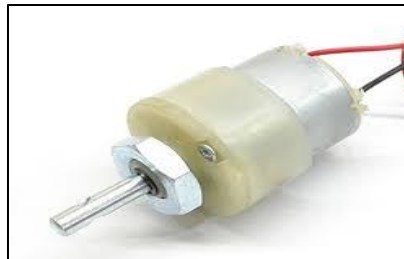
3. 12V DC Geared Motor

Fig. 5 - 12V DC Geared Motor

DC Motor – 200RPM – 12Volts geared motors are generally a simple DC motor with a gearbox attached to it. This can be used in all-terrain robots and variety of robotic applications. These motors have a 3 mm threaded drill hole in the middle of the shaft thus making it simple to connect it to the wheels or any other mechanical assembly.200 RPM 12V DC geared motors widely used for robotics applications. Very easy to use and available in standard size. Also, you don't have to spend a lot of money to control motors with an Arduino or compatible board. The most popular L298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC or you can choose the most precise motor diver module from the wide range available in our Motor drivers' category as per your specific requirements.

4.   Wheels
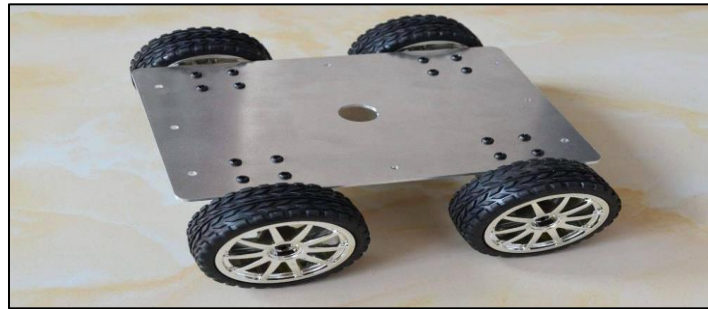

Fig. 6 - Wheels

5.   Chassis

Fig. 7- Chassis

Powder coated Metal chassis for robots. Easy to mount the motors on place by using normal motor mount nut. It can either be used in skid steel configuration (4 motors).
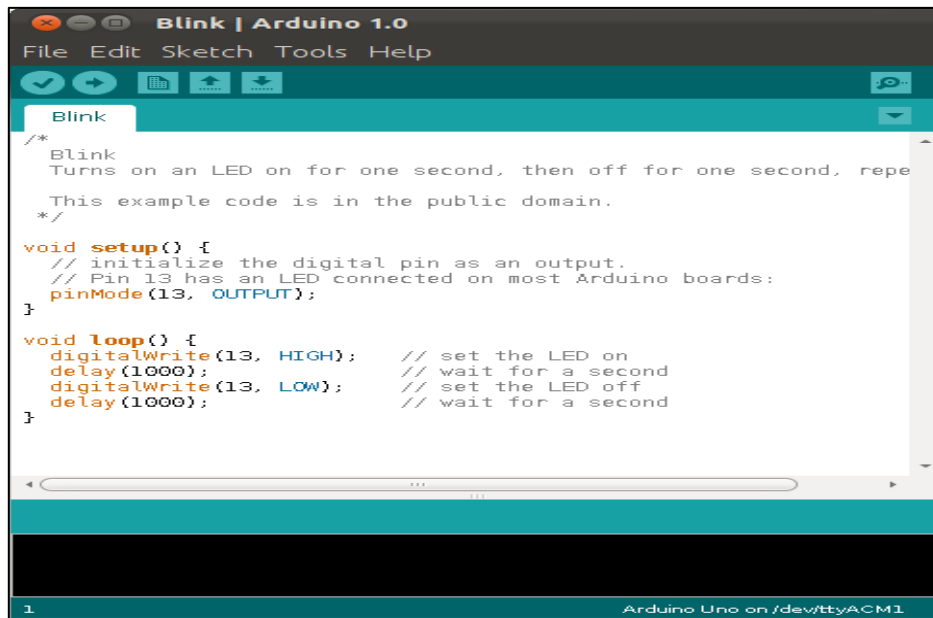
8. Ultrasonic Sensor

Fig. 8 -Ultrasonic Sensor

An acoustic sensor known as ultrasonic transducer can be broken down into three main categories: transmitters receivers, and transceivers. Transceivers can transmit and receive ultrasound, whereas transmitters transform electrical signals into ultrasound and receivers into electrical signals. Ultrasonic transducers are employed in systems that assess targets by deciphering the reflected signals, much like radar and sonar.

III. SOFTWARE USED

3.1 ARDUINO IDE

Fig. 9- Arduino Ide

Java was used to create the crossplatform Arduino integrated development environment (IDE), which is available for Windows, macOS, and Linux. Writing and uploading programmes to an Arduino board are done using it.The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.
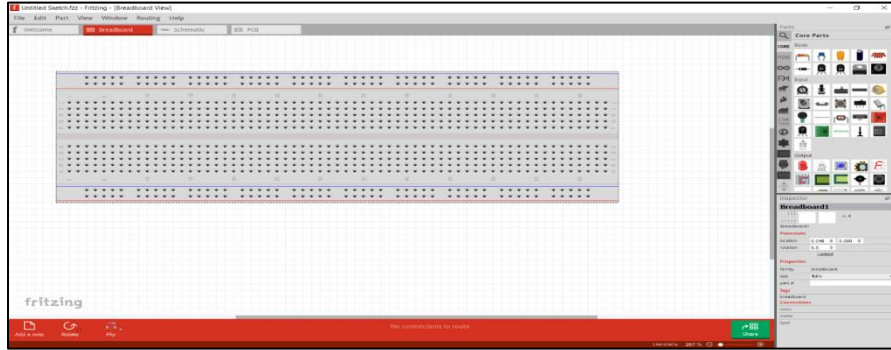
3.2 FRTIZING

Fig. 10 -Frtizing

Fritzing is an open-source hardware initiative that makes electronics accessible as a creative material for anyone. We offer a software tool, a community website and services in the spirit of Processing and Arduino, fostering a creative ecosystem that allows users to document their prototypes, share them with others, teach electronics in a classroom, and layout and manufacture professional PCBS.
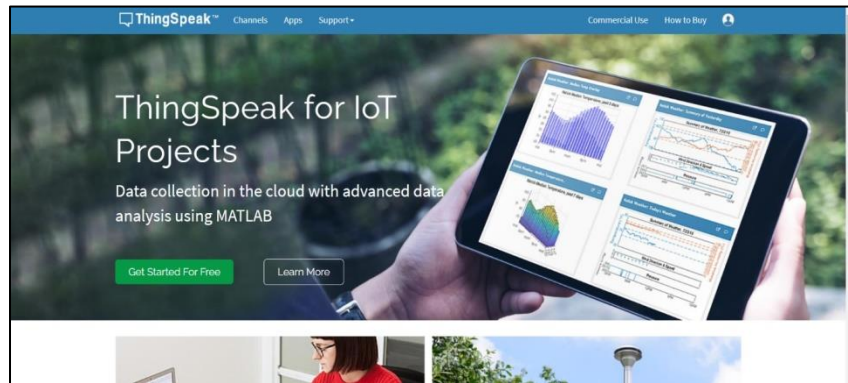
3.3 THINGSPEAK CLOUD

Fig. 11- Thingspeak Cloud

According to its developers, "Thing Speak is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP and MQTT protocol over the Internet or via a Local Area Network. Thing Speak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates". Thing Speak was originally launched by Io Bridge in 2010 as a service in support of IoT applications. Thing Speak has integrated support from the numerical computing

software MATLAB from MathWorks, allowing Thing Speak users to analyze and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from MathWorks. Thing Speak has a close relationship with MathWorks, Inc.
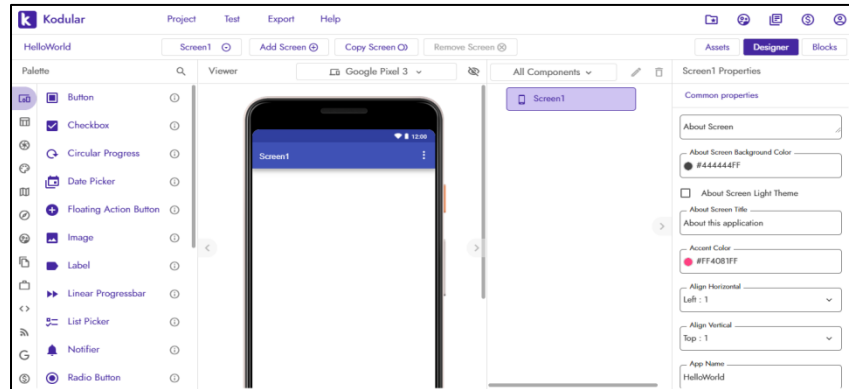
3.4 KODULAR

Fig. 12 -Kodular

Kodular (formerly Makeroid) is an open-source online suite for mobile app development. It has an innovative component and block design which provides a free drag-and-drop Android app creator without coding, based on MIT App Inventor.

IV.   RESULT

The problem of floating rubbish is especially prevalent in urban areas. Due to the rubbish clogging up the area, there would likely be a overflow of drainage water in that area. Also, this standing water will breed additional mosquito larvae. These drainage waters will have a significant negative impact on people's health. Hence, due of these vital causes these trash must be cleaned out.

V.   CONCLUSION

The study's goal was to identify the primary source of plastic pollution. It was discovered that large rub bish dumps and the byproduct of tourism operations were the primary sources of plastic pollution. The "Trash Boat" paper was created in the belief that would be very costeffective and useful for cleaning ponds and rivers. Based on its design, cost estimation, and availability, it is relatively affordable and extremely beneficial to society. Even said, this technology can also be used by people to remove trash from lakes. The use of this trash collection boat can lessen water pollution in tiny streams and the problem of clogged drains in a user- and environmentally-friendly way.

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