

Design and Implementation of Garbage Boat

B.Dheenadhayal, S.Balasankaran, N.Yuvarani, S.Preetha UG Students, Department of EEE,
Knowledge Institute of Technology, Salem
Mr.M.Jagadeeshraja, M.E, Assistant Professor / EEE, Knowledge Institute of Technology, Salem.

ABSTRACT

This project prominence on design and implementation of cleaning the ocean or lake or river using the machine called "Garbage Boat". This Garbage Boat is a machine which involves collecting debris from water surface. Clean water is a basic need for all living beings but water gets polluted due to many reasons like sewage waste, industry waste and garbage waste. The lakes in many villages in India are not used for any day to day usage because of garbage stagnant. This is the reason which motivates to design and implement this project. In this project we use the Blynk app to control the Raspberry pi in a boat structure to reduce the man power and we use the load cell to determine the total weight of the garbage.

Keywords: Garbage Boat, Raspberry pi, Blynk app, Load cell.

1. INTRODUCTION

The past strategies of grouping detritus on the water surface square measure manual basis by means that of boat trash skimmer. The higher than strategies square measure pricey and risky and large time overwhelming. To eradicate these issues the remote-controlled water improvement machine was designed that helps in improving water surface with efficiency and Eco-friendly. Some wastes have the capability to float at the water for extended periods of it slow and can accumulate at intervals the areas of the world's water surface and plastic is one in each of the foremost wastes in these. Plastics square measure progressively used worldwide exceptionally in a terribly very big selection of applications with world production exceeding three hundred million tons annually since 2014. On account of their sturdiness, low rate of recycling, poor management of waste and seagoing use an enormous portion of the plastics made it to enters world wide and persists in marine column and ocean surface environments of the world's oceans. The over two-third of a layer is roofed by water however a third is obsessed with the land. The continuous growth o earth population and individuals square measure put enormous increasing in the pressure on the planet's water resource. In a sence our ocen, river and alternative upcountry waters square measure being "squeezed" by the activities of human therefore their quality is decreased. Pollution is the means of poor water quality. This inovation relates to boats that removes the floating rigid grabage materials in ponds, lakes and waterways. The Blynk app act as a result of the transmitter for movement commands to the machine therefore it will do the specified task like moving forward-backward and left-right movements and stop. At the receiving the raspberry pi 3 b acts as a receiving control of the machnies through Wi-Fi module that is in-built in the raspberry pi 3 b model. Its partially measured usual program, scaled up in any size and it would possible to remotely operated with the help of mobile phone. The system is automaton and economical to tack watercourse improvement cause.

2.LITERATURE SURVEY

[1] Soumya, H.M. Preeti, BaswarajGadgay, M.Tech Scholar, Dept. of VLSI Design & Embedded System
Pond Cleaning Robot

In this projected system, the machine is operated with remote to scrub the lake. The lake cleansing mechanism works on Bluetooth to extract wastewater dust, plastics & garbage. The mechanism is management by cell phone application Microcontroller used is AT89S51 from 8051 family to figure during a serial communication UART mode the communication is designed on 9800bps to speak it with the Bluetooth module. The controller acts consequently on the DC motor of the mechanism. The mechanism within the project are often created to maneuver altogether the four directions mistreatment the cell phone.

[2] Sheikh Md, Shahid Md, Rafiquel, Dr. Akash Ihagde, Deparment of Mechanical Engineering
Design And Fabrication Of River Cleaning Machine

In this project, the most scope of this device is to carry the debris rubble from the lake surface and get rid of them within the receptacle. Here we tend to ar fabricating the remotely operated watercourse improvement device. The grouping plate and chain drives ar rotating unendingly done by the stepper motor. The grouping plate is connected between the 2 chain drives to collect the waste materials from the watercourse. The collected debris are thrown on the grouping receptacle with the assistance of the conveyor. Our project has a propellor that is employed to drive the machine on the watercourse. The propellor is run with the assistance of 2 PMDC motors. the entire device is controlled by RF transmitter and receiver that use to regulate the machine remotely.

[3] Saifai sayyad, sneha Ratnaparkhi, Adarsh Dorlikar, Tanvi Bhagat, Nikhil Tonge, Prof. Mahesh N. Buradkar, Department of Mechanical Engineering
Design and Fabrication of Debris Cleaning Machine

The main aim of the project is to scale back personnel, time consumption of the cleansing the stream to the scale back to the impurities in the water surface. Facility for removing waste particulate floating on the water surface. to take care of the automation throughout operating towards the cleansing stream. To perform the quick & reliable operation throughout the cleansing stream. Improve the water quality. to figure for society to scrub up to the vicinity of a stream. To the record of the number of garbage produced from the waterway & provide solutions to native the produce a higher surrounding to aquatic animals and human life.

[4]R. Raghavi, K .Varshini, L. Kemba Devi
Dept. of Electrical and Electronics Engineering
Water Surface Cleaning Robot

This project consists of an RF transmitter and receiver DC motor battery pH sensor, bucket collector are attached to it for collecting the waste and monitoring the water. To perform the quick & reliable operation throughout the cleansing stream. The main objective of this paper is to develop a surface vehicle equipped with water quality monitoring sensors. The main drawback of this system is that it is very costly and manufacturing becomes complex It can monitor the water quality.

[5] Raj VaibhavTiwari, AdityaMaheshwari, Dr. M.C. Srivastava and Ashwini SharmaMechanical and Automation Department
Design and Fabrication of Project on Water Bodies Cleaning Robot

This proposed method consisted of a motor operating water wheel to operate the machine movements. It has four DC motor of 9V, 7.6 Ampere. The device that is running the project is a chain drive conveyor in addition to having a grouping plate. The elements square measure rest on frame function main body of the project. The project consists of 2 main shafts equalization and hoisting the sprocket of the chain drive. The elements square measure rest on frame function main body of the project. The steel pipe with pressurizing air generates a pressure head to run the project on the water surface. The unreal vessel is employed to store the waste fulfilling the aim of the project.

3. BLOCK DIAGRAM

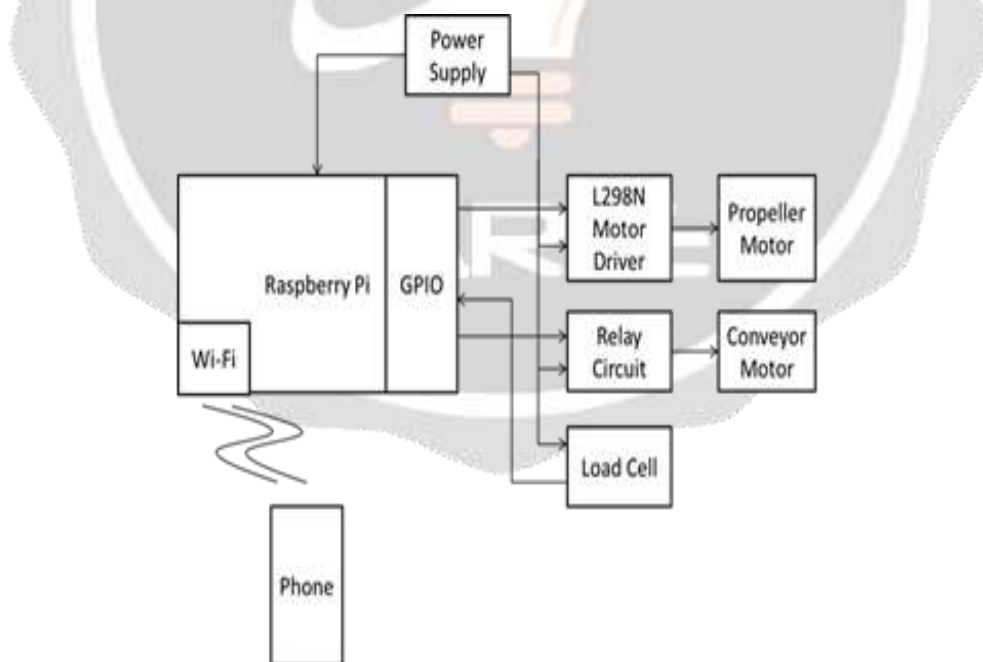
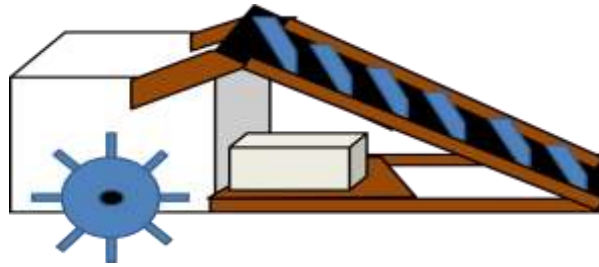


Figure No.1. -

4. DESCRIPTION OF PROPOSED METHOD

The Garbage collecting boat is controlled by using pushbuttons designed in the Blynk app which is connected to raspberry pi 3b module. In raspberry pi 3b the node.js library files and Blynk files have to be installed. The Blynk acts as the transmitter for movement commands to the machine so that the tas such as moving forward–backward and left–right movements are accomplished. All these tasks are performed using four push-button designed in the Blynk app. The Blynk app command should be set with the respective GPIO of raspberry which is connected to the motor drive.



At the receiving end, raspberry pi 3b acts as the receiver through the Wi-Fi module which is in-built in it. The motor driver has two channels for motors which are responsible for movement control. According to the data received by the raspberry pi 3b, the machine will move by using motors that are connected to the side frame.

The motor used in the machine DC motor with gearbox and the motor driver used in the machine L298N which have a wide operating voltage range 5 volts to 12 volts. The separate relay is used to control the conveyor motor where the command for conveyor motor is from the button designed in the Blynk app. The load cell is used to view the real-time weight of the garbage collected by the machine.

Raspberry pi:

Here we use the latest version raspberry pi3 which is small in size that might be used inside the PC or laptop instead of CPU. Once all the cable is plugged in it becomes the easiest way for the user to run after downloading the NOOBS (New-Out-Of-Box Software) installer. After downloading it also guide or instruct how to install the OS on the pi. The quad-core Raspberry Pi 3 is both faster and more capable than Raspberry Pi 2. This board can also booted directly from a USB connected hard drive or pen drive, other than this it can also support booting from network-attached file system, with PXE, that is useful for updating and for sharing an OS image between multiple machines.



Relay:

It is an electrically operated switch and consists of any number of contiguity in various forms of contact i.e. make contacts, breach contacts etc., Relay is an independent low power signal to control a circuit. The traditional relay uses electromagnet in order to open and close the contact and the solid state relay uses a semiconductor properties without moving parts. It automatically cut or connect the supply power to conveyor motor.



Conveyor belt:

The conveyor belt is managed by raspberry pi 3b system with the help of relay circuit. The will have holes in it so that water will be filtered. The conveyor collects the floating debris from water surface and collects it to the garbage bin.



Motors:

The Blynk app send signal to the raspberry pi 3b which controls all the Dc motor using relay and motor driver circuit. There are four motor used in the machine with gear box. These motors are responsible for movements and conveyor of the machine.



L298n Motor Driver Module:

The L298n primarily based motor module drive might be high in power motor driver which is sensible for driving stepper motor and DC motors. It uses the favoured L298 series motor driver IC associated with the onboard 5V regulator that it will provide to associate voltage to external circuit. It'll manage up to four DC motors, or a trio of DC motors with directional and speed management.



Load cell:

A load cell may be a kind of electrical device, specifically a force electrical device. It converts a force like tension, compression, pressure, or force into an electrical signal which will be measured and standardized. Because the force applied to the load cell will increase, the electrical signal changes proportionately.



HX711 Load Cell Amplifier Module:

It uses 24 ADC device chip hx711 with high-precision, is meant for high-accuracy digital electronic scale and elegance, with a pair of inputs of analog channels, the inside programmable gain equipment integrated variety 128. The HX711 uses a two-wire interface for communication.



RESULTS:

The project scaled up to collect 1 kg of waste in the lake where the connecting distance between the mobile phone and garbage boat is approximately 300m-400m. Weight calculation is done by L298n weight sensor which is scaled digitally in the Raspberry Pi and visualized in the mobile phone.

CONCLUSION:

This project is designed and developed on the basis of reports and study on different journals and papers are materially available and developed in agreement with flexibility in operation. This project is less costly and innovation where a lot of developments can be implemented and has a lot of space in the path of innovation. The "Design and Implementation of Garbage Boat" developed with the hope of economically helpful to river and lake cleaning. Construction materials are easily available and simple to construct. This project is very useful for the environmental waste management.

FUTURE SCOPE:

In the future, this project can be upgraded in many more categories of waste managements. We can use a different conveyor products and system in order to increase the collecting efficiency of the 'Garbage Boat'. Solar panel can be used for the purpose of providing power to the boat alternative to battery operation and camera increases the coherence of the system. The size of the boat can also be modified to increase the waste-collecting capacity of the system. This project can be used in the lake as well as river by modification of the size of the machine.

REFERENCE

- [1] POND CLEANING ROBOT - International Research Journal of Engineering and Technology (IRJET) /Volume 5, Issue 10. e-ISSN: 2395-0056, Oct 2018.
- [2] Design And Fabrication Of River Cleaning Machine-International Journal for Science and Advance Research in Technology (IJSART) / Volume 3, Issue 11, ISSN: 2395-1052, November 2017.
- [3] Design and Fabrication of Debris Cleaning Machine - International Research Journal of Engineering and Technology (IRJET) / Volume 6, Issue 5, ISSN:2395-0056, May 2019.
- [4] Water Surface Cleaning Robot -International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering / volume 8 Issue 3 ISSN:2278-8875, March 2019.
- [5] Design and Fabrication of Project on Water Bodies Cleaning Robot -International Journal of Engineering and Management Research/ Volume 8, Issue 3, ISSN:2250-0758, June 2018.
- [6] Marine Debris Polymers on Main Hawaiian Island Beaches, Sea Surface, and Seafloor – Environmental Science & Technology / Article no.:12218-12226, October 9, 2019.
- [7] Seasonality of riverine macroplastic Transport – Scientific Reports / Article no.:13549, September 2019.
- [8] Future scenarios of global plastic waste generation and disposal– Palgrave Communication (Humanities | Social Science | Business) / DOI :s41599-018-0212-7 January-2019.

