International Journal of Scientific Research & Engineering Trends
Volume 5, Issue 2, Mar-Apr-2019, ISSN (Online): 2395-566X

Pond Maintaining Bot

Nagarjun J Ragavi N Shunmitha K P.Vidhyalakshmi
Department of Electronics and Instrumentation Engineering
Kongu Engineering College
Perundurai, India
vidhyalakshmi@kongu.ac.in

Abstract **- Water is a basic need for all living being. Hence, it is important to maintain the cleanliness and hygiene of water. The work has been carried out by considering the current situation of our national rivers which are dump with crore litres of sewage and loaded with pollutants, toxic materials, debris etc. The Government of India has taken charge to clean rivers and invest huge capital in many river cleaning projects. There is a need to incorporate technology such that cleaning work is done efficiently and effectively. Mechanisms used for design is such a way that it collects the waste which floats on water bodies and the collected waste can be easily disposed. This design cleans wastes found such as plastic wastes, garlands, bottles and other wastes found floating on water. In this project, a bot is used which will float on the water bodies. RF Transmitter and Receiver are used to move the bot and to collect the waste. The collected waste is stored in the storage unit. Design calculations are made to float the bot in water. The bot is made up of Poly Vinyl Chloride in order to have light weight and consists of Direct Current motor, Fish pump and Arduino.**

Keywords- **Power factor, reactive power, capacitor bank, arduino.**

I. INTRODUCTION

Ponds are an important feature of the Earth's landscape. Lakes have a very special significance in India. For the last two decades, there has been an explosive increase in the urban population without corresponding expansion of civic facilities such as adequate infrastructure for the disposal of waste. In developing countries, accumulation of floating waste such as plastic scraps, foam scraps or tree leaves on City Rivers or ponds can block water channel and also cause pollutions.

In spite of creating lot of awareness, people use to throw the wastes into the ponds which in turn decomposes day-by-day and causes lot of diseases. Although, there is a plethora of policies and acts for the protection and restoration of urban lakes and wetlands, urban water bodies are in extremely poor condition. Waste cleaning is usually done manually with a lot of risk. Manual cleaning of such ponds involves lot of risks, as the person can get infected. Also there is a huge risk for endangered aquatic species.

Almost all urban water bodies in India are suffering because of pollution and are used for disposing untreated local sewage and solid waste. The numbers are declining rapidly. Thus cleaning of floating wastages from rivers or ponds is important to make sure that water is cleaned and maintained for the healthy environment. A clear vision regarding the level of rejuvenation of water bodies is recommended. In order to make a productive use of limited available resources, it is important to determine an acceptable level of restoration of lakes. Inspired by a lake cleaning project in India, this project is a compact manually operated waste collecting machine from stagnant water, ponds etc. such that it is designed suitably to clean wide range from medium size pond to average size lake.

II. LITERATURE SURVEY

1. Existing Method

The existing method is a robotic system of aquatic vehicles that can be used for cleaning of lakes and maintenance of fisheries. The traditional method of removing the weeds manually and collecting them along with other surface wastes is highly inefficient and labour intensive. A novel algorithm for navigation and waste removal strategy of the robot aquatic system, inspired by insects such as ants and bees, referred to as 'recruitment algorithm', has been proposed. (Pranay Agrawal and Bishakh Bhattacharya (2013).With the help of virtual simulation, supplemented by real environment testing, it has been demonstrated that by the use of a robot system with this strategy, an effective and rapid cleaning is feasible.

The important issues for designing the aquatic robots are: cost effective solution along with robustness and durability. Due to the nature of the cleaning work, the vehicle structure is designed such that it can provide high stability, great maneuverability and can easily collect all the waste flowing in between. A pontoon

© 2019 IJSRET

shaped hull works best for this case and fulfills all the hydrostatic, sea-keeping and structural stability criteria.

For the purpose of removal and collection of surface waste, a motor driven track-belt system has been designed that can collect the wastes in a section covered with a net. The bot consists of conveyor like arrangements for collection of waste floating on the water bodies. The lower section of the belt is placed below the water level to easily take out the floating weeds.

III. PROPOSED METHOD

The aim of the project is to clean and maintain the water bodies by collecting the floating wastes such as plastics. In the existing method conveyor belt like arrangement can able to collect only small weight wastes such as plastic paper. In our project, waste is collected with the arm movement. Hence it can able to collect large waste like bottles. The design is made up of PVC pipe and it is made to float in the water bodies. The bot is designed such that it is operated by using remote module.

The remote module consists of 5 buttons which made the bot to move and activate arm movement. Signal from the remote is transmitted through Radio Frequency (RF) transmitter and it is received by the receiver. RF has a frequency of 433MHz and it covers a range of about 2km. The bot consists of water pump, storage unit, arm movement, electronic box and Direct Current (DC) Motor. The fish pump is fixed at the back of the bot which provide force to move the bot. The fish pump requires voltage of 12V.

Remote module has forward, right, left, arm forward and arm up buttons. The signal is transmitted through RF transmitter and the receiver is fixed in the bot. The receiver output is fed into Arduino. Depending upon the input to arduino the bot will move. The output from the arduino is given to relay circuit which splits voltage and gives to motor and pump depending on input. The movement of waste collector arm movement is made possible with the help of two DC motors. Collector arm is made with a frame and the net is fixed within the frame. It is used to collect the waste from the water bodies.

When the arm forward button is pressed, the DC motor attached with the arm gets activated and if arm up button is pressed, the arm will move upward and make rotation. If a waste is seen, then the bot is operated manually and the arm collects the waste and stores the waste in the storage unit. This storage unit is fixed on the top of PVC pipe. The storage unit is in square shape in order to provide the balance and has small holes to filter the water from waste. The arduino output is given to relay circuit. The relay circuit is used to give the voltage to fish pumps and DC motors.

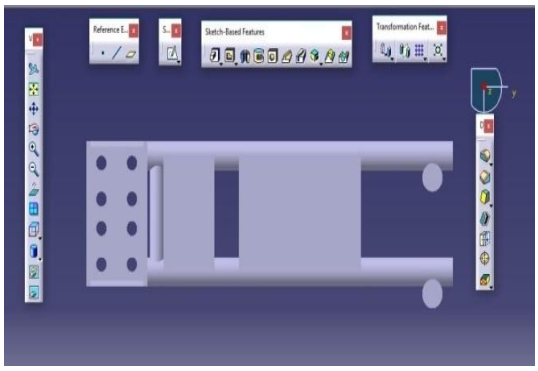

Fig.1 Isometric View of Pond Maintaining Bot.

1. Circuit Diagram

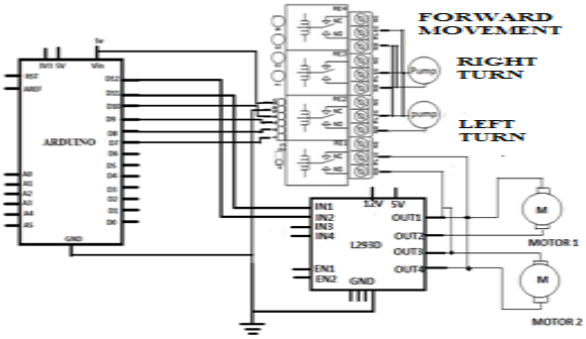

Fig.2 Block Diagram of Pond Maintaining Bot.

2. Block Diagram

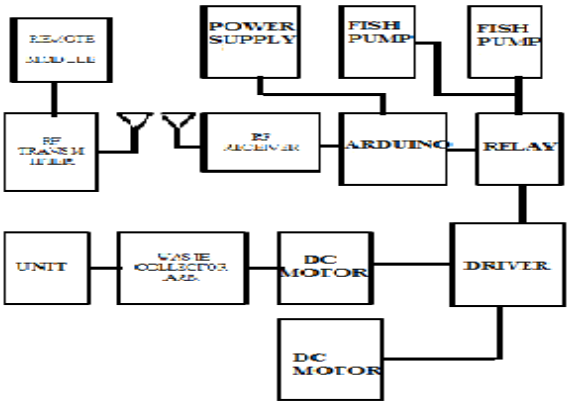

Fig.3 Block Diagram of Pond Maintaining Bot.

3. Advantages

- Water bodies are cleaned effectively.
- Manual work is reduced.
- Efficiency in cleaning has been increased.
- The bot is eco-friendly.
- The bot is cost efficient.

© 2019 IJSRET

- No need of skilled person because it is easy to manipulate.

IV. RESULT

Thus a design of pond maintaining bot was made in a efficient manner. Though the bot did not have a very high speed, they produced a great amount of thrust, which was needed to overcome a large amount of drag acting on the system. These robots have been designed in such a way that they require the least amount of maintenance and human interference. Now-a-days, most of the fishes are died due to the lack of oxygen in water bodies. This lack is due to dumping of wastes in the water. The bot not only maintains the pond, but also helps in fishery growth. Thus the pond maintaining bot helps to maintain the pond in multiple ways.

V. CONCLUSION

About 71 percent of the Earth's surface is water-covered and only about 0.3 percent is fresh water in the form of lakes, rivers, and swamps etc,. In developing countries, 70 percent of untreated industrial wastes are dumped into waters, polluting the usable water supply. Pond maintaining bot was designed with an intention of cleaning the water debris floating on the lake. By using the bot, many floating wastes like plastic bottles, bags, flowers are collected without any human interference and then dispose off the waste easily. Hence, this bot helps in reducing the water pollutants to a certain extent. The major advantage is the safety provided by the bot that is one need not risk one's life while cleaning the pond and a person is needs to control the bot. The bot is socially helpful for the labours who clean the lake and economically viable.

REFERENCE

[1]. Pranay Agrawal and Bishakh Bhattacharya (2013), "Aquatic Multi-Robot System for Lake Cleaning", 16th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines, pp.1-4

[2]. Y.Altshuler, A.M.Bruckstein, I.A.Wagner (2005), "Swarm Robotics for a Dynamic Cleaning Problem", IEEE Swarm Intelligence Symposium, pp.37-45

[3]. Houssam Albitar, Anani Ananiev, Ivan Kalaykoy (2014), "In-Water Surface Cleaning Robot: Concept, Locomotion and Stability", International Conference on Mechatronics and Automation, Vol. 4, pp.104-115

© 2019 IJSRET