

Automatic Solar Operated Lake Cleaning Floating Machine

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Abstract: This paper presents theory on “river cleaning Mechanism” The system is successfully able to clean the floating solid waste over the river surface more efficiently. This system works towards its social aim of cleaning the rivers & other water bodies. It simulates the conventionally used mechanisms of using conveyors in its working principles but have an intimidating modification of Air Tube Piping Guide mechanism for improving its efficiency. The conventional & generally used method of cleaning or more precisely collecting the floating waste are manual or by means of boat etc. and are deposited near the shore of river. But these methods are risky, costly, time consuming and required major workforce. By considering all the parameters of river surface cleaning systems and eliminating the drawback of all the methods mentioned earlier, the remote operated river cleaning machine has been designed and constructed which helps in river surface cleaning effectively, efficiently and ecofriendly. The main aim of the project is to reduce the manpower, time consumption and thereby increasing the efficiency of the machine for cleaning the river. In this project, we have remotely controlled the operation of river cleaning with the help of motor, coupling & R/C arrangement.

Keywords: Renewable Energy, Generator, Inverter Circuit, Horizontal Axis Wind Turbine, Wind Energy, Solar Panel

I. INTRODUCTION

The “River clean-up machine” used in that places where there is waste debris in the water body which are to be removed. This machine consists of waterwheel driven conveyor mechanism which collect & remove the wastage, garbage & plastic wastages from water bodies. This also reduces the difficulties which we face when collection of debris takes place. A machine will lift the waste surface debris 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. Similarly there are lots of problems of water pollution under Godavari River, Nasik which affect the acoustic, human life & beauty of Godavari River. The some photo graphs are shown the water pollution near Godavari River Nasik. 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, gray water and black water. Clean water is from a broken water supply line or leaking faucet. If not treated quickly, this water can turn into black water or gray water, depending on length of time, temperature, and contact with surrounding contaminants. A drainage ditch is a narrow channel that is dug at the side of a road or field to carry away the water. Nowadays, even though automation plays a vital role in all industrial applications in the proper disposal of sewage from industries and sewage cleaning is still a challenging task. Drainage pipes are used for the disposal of sewage and unfortunately sometimes there may be loss of human life while cleaning the blockages in the drainage pipes. The municipality workers are only responsible to ensure that the sewage is clean or not. Though they clean the ditches at the side of buildings, they can't clean in very wide sewage. The municipality workers need to get down into the sewage sludge to clean the wide sewage.

II. LITERATURE SURVEY

For our project we are surveying some reports and references which are helping us to make it easy and simplest and they are as follows

M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arunkumar, DESIGN AND FABRICATION OF REMOTE CONTROLLED SEWAGE CLEANING MACHINE [1] the motive of the project is to automate the sewage cleaning process in drainage, to reduce the spreading of diseases to human. The black water cleaning process helps to prevent pest infestations by reducing the residues that can attract and support pests. It also improves the shelf life and sensory quality of food products. In the proposed system, the machine is operated with remote control to clean the sewage. Hence, this system avoids the impacts from the sewage waste and its harmful gases.

Mr.Abhijeet. M.Ballade, Mr. Vishal.S.Garde, Mr.Akash.S.Lahane and Mr.Pranav.V.Boob Design & Fabrication of river cleaning system [2] India is holy country & during lots of festival like ganeshvisarjan, navratridurga puja & mainly Siahnsthkumbhmela there is lots of water pollution of Godavari River at Nashik. The water pollution is very important problem in rivers, ponds and water bodies near Godavari River at Nashik. Due to increase in water pollution in the form to waste debris; it is hampering the life of aquatic animal and make their life in danger. Similarly sometimes the aquatic animal tends to eats surface waste debris considering it as a food; which ultimately cause the death of animals. Due to polluted water many skin diseases to human kind are observed. So that to reduce the water pollution we are trying to make river cleanupmachine. "Rivercleanup machine" a machine which involves the removing the waste debris from water surface and safely dispose from the water body. The river cleanup machine works on hydropower to extract waste water debris, plastics & garbage from Godavari river at Nashik.

Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P.T. Date Design and fabrication of River Waste Cleaning Machine [3] this paper emphasis on design and fabrication details of the river waste cleaning machine. The work has done looking at the current situation of our national rivers which are dump with crore liters 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 like "NamamiGange", "Narmada Bachao" and many major and medium projects in various cities like Ahmadabad, Varanasi etc. By takingthis into consideration, this machine has designed to clean river water surface. Conventional methods used for collection of floating waste are manual basis or by means of boat, thrash skimmers etc. and deposited near the shore of rivers.

Pankaj Singh Sirohi, Rahul Dev, ShubhamGautam, Vinay Kumar Singh, Saroj Kumar Review on Advance River Cleaner [4] River water is used for irrigation which in return gives food to the people. They also maintain the ecology of region and bring prosperity. We made this project to clean the river. After implementing this project we can control the pollution of river it is very beneficial for our society. In this project turbine rotates by flow of river water and through the mechanical gear arrangement we arrange two conveyor belts. The first conveyor belt is used to pick solid waste from river and the second conveyor belt is used to draw solid waste out of river for solid waste management. Water is the source of life. It covers 70% of the Earth. But only a small portion of this precious natural resource is fit for human consumption.

III. METHOD OF DISEASE DETECTION

In this project the main aim of this machine is to lift the waste debris from the water surface and dispose them in the tray. Here we are fabricating the remote operated river cleaning machine. The collecting plate and chain drives are rotating continuously by the motor. The collecting plate is coupled between the two chain drives for collect the waste materials from river. The collected wastages are thrown on the collecting tray with the help of conveyer. Our project is having propeller which is used to drive the machine on the river. The propeller is run with the help of two PMDC motor. The total electrical device is controlled by Bluetooth module which uses to control the machine remotely.

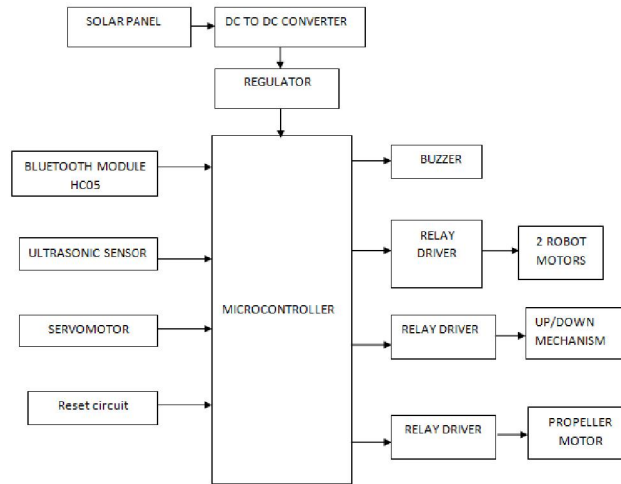


Fig. 1. Block Diagram

PIC18f4520 Microcontroller

The PIC18F4520 is a 28/40/44-Pin, High-Performance, Enhanced Flash, USB Microcontrollers with nanoWatt Technology. The following are the features:-

- High-Current Sink/Source: 25 mA/25 mA
- Three External Interrupts
- Four Timer modules (Timer0 to Timer3)
- Up to 2 Capture/Compare/PWM (CCP) modules:
 - Capture is 16-bit, max. resolution 5.2 ns (TCY/16)
 - Compare is 16-bit, max. resolution 83.3 ns (TCY)
 - PWM output: PWM resolution is 1 to 10-bit
- Enhanced Capture/Compare/PWM (ECCP) module:
 - Multiple output modes
 - Selectable polarity
 - Programmable dead time
 - Auto-shutdown and auto-restart
- Enhanced USART module: LIN bus support



Fig. 2. PIC 18f4520

DC Motor

A DC motor is an electrical machine which converts electrical energy into mechanical energy. The basic working principle of the DC motor is that whenever a current carrying conductor places in the magnetic field, it experiences a mechanical force these motors are simple DC Motors featuring gears for the shaft for obtaining the optimal performance characteristics. They are known as Center Shaft DC Geared Motors because their shaft extends through the center of their gear box assembly



Fig. 3.DC Motor

Solar Panel

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged, connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications.



Fig. 4.Solar Panel

Ultrasonic Sensor

Ultrasonic ranging module HC -SR04 provides 2cm -400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:(1) Using IO trigger for at least 10us high level signal.(2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.(3) IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning. Test distance = (high level time) * (velocity of sound (340M/S) / 2.

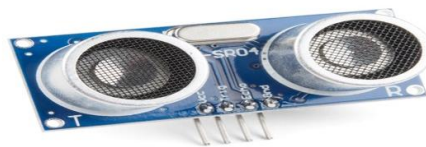


Fig -5: Ultrasonic Sensor

L293D Motor Driver IC

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between controller and the motors. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.The L293D is a 16 pin IC, with eight pins, on each side, dedicated to the controlling of a motor. There are 2 INPUT pins, 2 OUTPUT pins and 1 ENABLE pin for each motor. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor

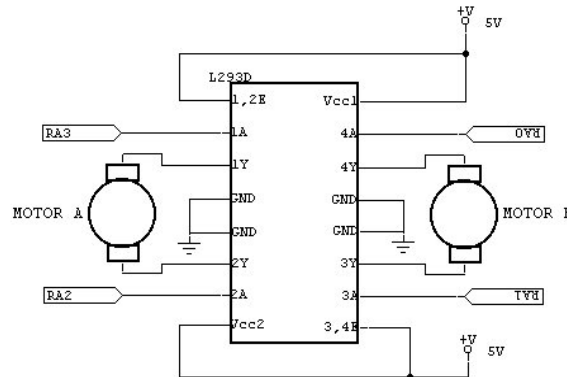


Fig. 6.L293D Motor Driver IC

Bluetooth Module

For the communication of the robot with the cell phone or a mobile we are using the Bluetooth device. The Bluetooth device (HC-06) is attached to the robot that receives the data from the mobile and also it can transmit the data. It is used for converting serial port to Bluetooth. It has two modes: Master and Slave. Bluetooth is a wireless communication protocol running at the speed of 2.4 GHz with the architecture of client-server and which is suitable for forming personal area networks.

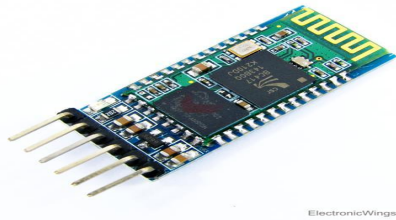


Fig. 7. Bluetooth Module

IV. CONCLUSION

This project design and analysis of river water cleaning machine is fabricated on the basis of literature and research on different journal and paper relevantly available and fabricated in accordance so it can provide flexibility in operation. This innovation is easy and less costly and has lot of room to grow more economical. This project “River water Cleaning Machine” is designed with the hope that it is very much economical and helpful to river and Pond cleaning. On the basis of it design and estimating cost and availability it is very cheap and very useful for the society

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REFERENCES

- [1]M. Mohamed Idhris, M.Elamparthi,C. Manoj Kumar, Dr.N.Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arunkumar, “Design and fabrication of remote controlled sewage cleaning Machine”, IJETT – Volume-45 Number2 -March 2017
- [2] Mr.Abhijeet.M. Ballade, Mr. Vishal.S.Garde, Mr.Akash.S. Lahane and Mr.Pranav.V.Boob, “Design & fabrication of river cleaning system”, IJMTER Volume 04, Issue 2, [February– 2017] ISSN (Online):2349–9745.
- [3] Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P. T. Date, “Design and fabrication of River Waste Cleaning Machine”, IJCMES 2017 Special Issue-1 ISSN: 2455-5304

- [4] Pankaj Singh Sirohi, Rahul Dev, ShubhamGautam, Vinay Kumar Singh, SarojKumar, "Review on Advance River Cleaner", IJIR Vol-3, Issue-4, 2017 ISSN: 2454- 1362.
- [5] Ndubuisi c. Daniels, "Drainage System Cleaner A Solution to Environmental Hazards", IRJES) ISSN (Online) 2319- 183X, Volume3, Issue 3(March 2014)
- [6] OsianyNurlansa, DewiAnisaIstiqomah, and MahendraAstuSangghaPawitra, "AGATOR (Automatic Garbage Collector) as Automatic Garbage Collector Robot Model" International Journal of Future Computer and Communication, Vol. 3, No. 5, October 2014.
- [7] Basant Rai, "Polltution and Conservation of ganga river in modern India", International Journal of Scientific and Research Publications, Volume 3, Issue 4, April 2013 1 ISSN 2250-315