Bluetooth based Garbage Collection Robot using Aurduino Microcontroller

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Abstract-

This project emphasis on design and fabrication 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 "Namami Gange", ''Narmada Bachao'' and many major and medium projects in various cities like Ahmadabad, Varanasi etc. By taking this into consideration, this machine has designed to clean river water surface.

Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate. Automation plays an important role in mass production. In this project we have fabricated the remote operated river cleaning machine. The main aim of the project is to reduce the man power, time consumption for cleaning the river. In this project we have automated the operation of river cleaning with help of a motor and chain drive arrangement. Some needs of automation are described below. Here using RF transmitter and receiver are to control the cleaning machine. Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation

Index terms - Motor, chain drive, propeller, Conveyor, Bluetooth, Aurduino micro controller**.**

I. INTRODUCTION

The "River cleanup machine" used in that places where there is waste debris in the water body which are to be removed. This machine is consists of waterwheel driven conveyer mechanism which collect & remove the wastage, garbage & plastic wastages from water bodies. This also reduce the difficulties which we face when collection of debris take 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 cleaning upper water waste debris.

From this project we hope to clean the surface water debris from bodies. Similarly they are lots of problems of water pollution under Godavari River, Nashik which affect the acoustic, human life & beauty of Godavari River. The some photo graphs are shows the water pollution near Godavari River, Nashik.

Garbage is a major problem worldwide attention. It can be seen from organizations that support and fix this problem, such as Ocean Conservancy [1] that is a non-profit environmental advocacy group based in Washington, D.C., United States. The organization reports on 23 August 2013 that over the past 27 years, over 9.5 million volunteers have removed 163 million pounds of trash from more than 330,000 miles of coastline and waterways in 153 countries and locations. At the present, more than 10 million pounds of trash along nearly 20,000 miles of coastlines were picked up by more than 550,000 people. In Thailand, this problem affects to the destruction of the beautiful scenery and attractions. Moreover, it causes the problem about the sea animal death. For example, the death of the whale on the beach, Patong, Phuket [2] because it eats the plastic waste. Although, some organizations [3] try to clean the beach but the amount of the trash on the beach is still increasing at all time. Therefore, the development of the technology such as robot for collecting the garbage is the one aspect that is interested.

Until now, the service robots about cleaning robot for the swimming pools [4], the house [5], the wall [6] and the domestic stairs [7]) are interested and developed continually but the cleaning robot for the beach does not be much interested. Therefore, this paper presents the development of a prototype garbage collection robot on the beach. This robot uses the Bluetooth for communication between the user and the robot. Moreover, IP camera with added pan/tilt capabilities can send the image data to the user via the Adhoc system.

This paper is organized in five sections. After this introduction, in Section II literature survey discussed of the paper, Section III about Implementation of the project explained, as well as the novel feature of the proposed method. Finally, Sections IV and V provide the experimental results and the conclusions, respectively.

II. RELATED WORK

M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arun kumar, 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. This helps to prevent the mosquito generation from the wastage. The system has a wiper motor that starts running as soon as the set-up is switched on. Two power window motors are connected to the wheel and it is driven with the help of the remote control set-up. The process starts collecting the sewage wastes by using the arm and it throws back the waste into the bin fixed in the machine at the bottom. An arm is used to lift the sewage and in turn a bucket is used to collect them. The set-up runs even in sewage area with water (limited to a particular amount) so that the wastages which floats on the water surface also gets collected.

Mr.Abhijeet. M.Ballade, Mr. Vishal.S.Garde, Mr.Akash.S.Lahane and Mr.Pranav.V.Boob India is holy country & during lots of festival like ganesh visarjan, navratri durga puja & mainly Siahnsth kumbhmela 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 cleanup machine."River cleanup 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 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 "Namami Gange", ''Narmada Bachao'' and many major and medium projects in various cities like Ahmadabad, Varanasi etc. By taking this 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. These methods are risky, costly and time consuming.

Pankaj Singh Sirohi, Rahul Dev, Shubham Gautam, Vinay Kumar Singh, Saroj Kumar 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.

Ndubuisi c. Daniels The Drainage system cleaner is a machine which helps to protect the environment from different kinds of environmental hazards through the promotion waste management by the removal of garbage from the drainage system. These wastes when not removed end up settling in residential places where these wastes are burnt thereby causing climate change otherwise these wastes block the drainage systems thereby causing flooding. The machine is designed in such a way that it generates motion for its functions by itself through the action of running water thereby cutting out the dangers of the powering the machine by other sources of power because of the harshness of the rain on these other sources. The drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all make up for its effective functioning. The Drainage system cleaner was tested on three different days in the first day it rained in the months of September, October and November 2012 respectively. Based on the findings made after the test the Drainage system functioned well when there is maximum load.

Osiany Nurlansa, Dewi Anisa Istiqomah, and Mahendra Astu Sanggha Pawitra Nowadays, the environment problems arise in many towns in Indonesia. These problems come along by developing activities such as construction of houses, offices, and other business areas. The Environment problems occur due to several reasons; they are the low budget allocation on environment management and public awareness in protecting the environment. The Environment issue which comes up from year to year and still cannot be solved is about garbage and waste from various places dispose into rivers. Those garbages can clog water flow, induce the water become dirty, smelly, and often over flow so then give effect floods. This research aims to design and make AGATOR(Automatic Garbage Collector), a rotor robot model as automatic garbage collector to counter accumulation of garbage in the river which has no flow effectively and efficiently.

III.IMPLEMENTATION OF PROJECT

The main aim of the project is to collect all the wastes which are found floating on water bodies and to minimize labor work, we can use our product for few other purposes such as we can attach a life jacket to it and send it for rescue and if there is any oil spilled we can collect the oil through our product. We have tried to meet all the objectives to this product successful such that our product gets launched in the market. In this section, we provide a detailed description about proposed approaches to outlier detection. Methodology & steps to solve the problem given below flow chart shows the sequential operation/steps that will be performed during the project process. In this project can be improved to sort more categories of waste. In this system we can use advance conveyor system and conveyor material for increasing the efficiency of collection of garbage. To modify the size of boat according to its waste collecting capacity is increases. Collected waste can be further divided into natural waste and artificial waste. Natural waste can be recycling for organic waste for cultivation where as synthetic waste for recycling for reused. Different sensors with scanners are needed to identify natural and artificial waste.

A. Methodology

Methodology shows systematic way to do work. It is standard process of describing process, how it is done in simplest manner. Design consists of application of scientific principle, technical information, and imagination for development of new mechanism to perform specific function the total design work has been split into two parts. 1. System design 2. Mechanical design.

In system design use aurduino microcontroller to control the robot and Bluetooth is used to control the robot movement.

Figure 1: Proposed block diagram

In mechanical design two 6 RPM motors connected to the conveyer belt and two 10 RPM motors connected to the robot movement. In robot the function of the conveyor is mounted on the two shafts such a way that it collects the waste debris to be lifted upwards and collect inside the machine.
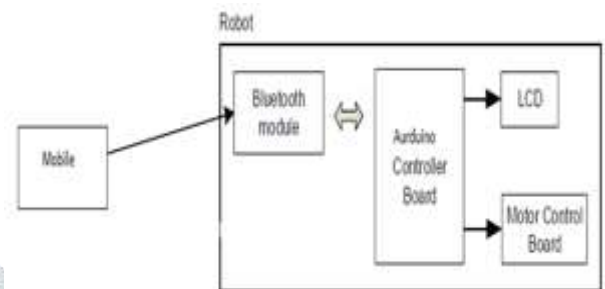
B. Material and Methods

Figure 2: Hardware architecture of garbage collection robot

The complete system of garbage collection robot can be shown in Fig. 5.1. The complete system of garbage collection robot is divided into 5 major parts: (1) power consumption, (2) structure and configuration of the robot, (3) aurduino microcontroller, (4) wireless communication module (Bluetooth).

• **Power consumption**

The primary source of power for the robot is the sealed lead acid battery (12V 30Ah). The voltage regulator (LM7805) is used to reduce the 12 Vdc from battery to 5 Vdc for supplying the microcontroller and IP wireless camera. Optoisolator is used to pass the signal from the microcontroller to drive the gate of the RFP50N that is used to drive the motor at 12Vdc. Forty watts of solar cell is used to charge the battery. In this paper, we will not explain the detail of the solar cell design.
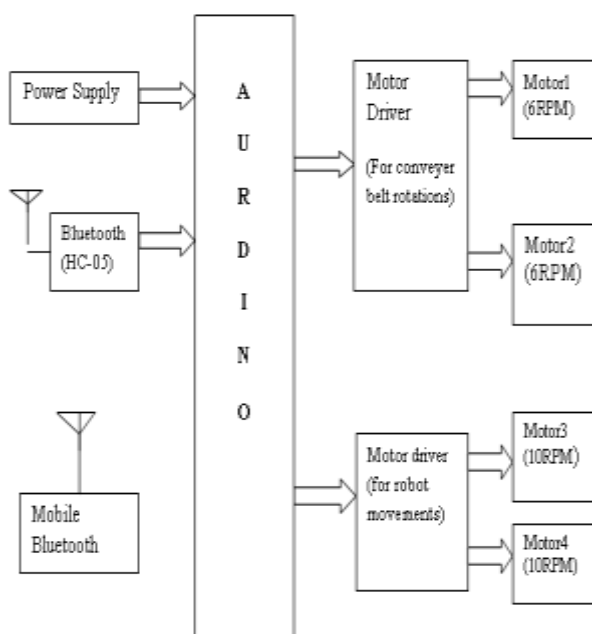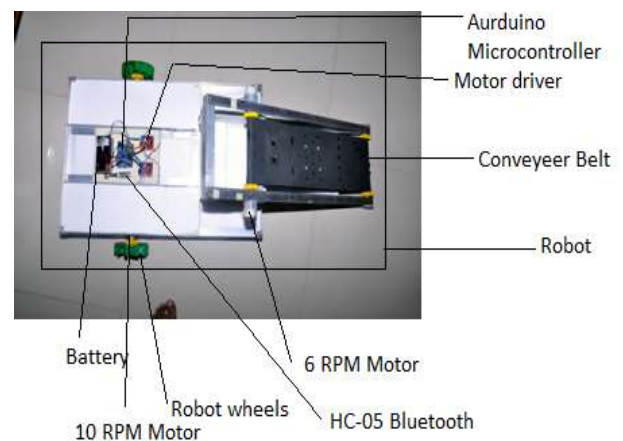
• **Configuration of the robot**

Figure 3: Robot structure

The structure of the robot is made of aluminums sizes 1.5 centimeters. The shovel of the robot width is 49 centimeters and the trash box in the robot sizes 35x36x40 centimeters.

- **Microcontroller**

The Arduino Uno is a microcontroller board in perspective of the ATmega328. It has 14 electronic information/yield pins (of which 6 can be used as PWM yields), 6 straightforward information sources, a 16 MHz aesthetic resonator, a USB affiliation, a power jack, an ICSP header, and a reset get. It contains everything anticipated that would help the microcontroller; just interface it to a PC with a USB connection or power it with an AC-to-DC connector or battery to start.
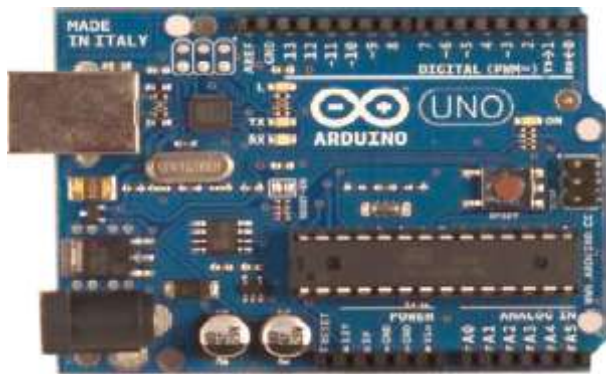
Figure 4: Aurduino Microcontroller

- **Wireless communication module**

Bluetooth device class-2 USB dongles with a range of 10m and maximum output power as 25mW/4dBm is used to communicate between microcontroller and computer. Bluestrick on the robot is a Bluetooth Serial Port Profile device for wireless serial data communications via the Bluetooth radio system. It is a low cost, compact and easy to use this module. It can connect to the microcontroller via RS232 serial port.

Figure 5: Bluetooth module

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate)

3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

IV. EXPERIMENTAL RESULTS

In below figure shows the experimental setup of the garbage cleaning in water.

Figure 6: Experimental setup robot

Figure 7: Top view of Robot

In the above figure show the top view of the robot. Natural waste can be recycling for organic waste for cultivation where as synthetic waste for recycling for reused. Different sensors with scanners are needed to identify natural and artificial waste.
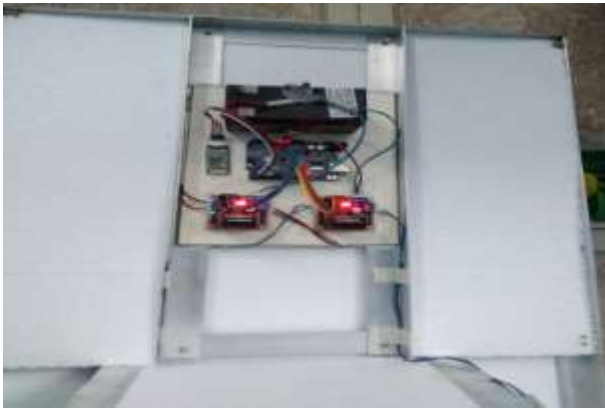
Figure 8: Electronic setup for robot

The above figure shows the electronic setup to control the robot to collect the garbage in water. This electronic setup is operated in mobile through the Bluetooth.

In the above robot has many advantages that to reduce the pollution in water bodies, To overcome the difficulty of removing waste particulate floating on water surface, To maintain the automation during working towards cleaning River, To perform the fast & reliable operation during cleaning River, Improve the water quality of a Godavari stream or river, To work for society for clean up a section of a stream or river.

V. CONCLUSION

The project "River Waste Cleaning Machine" has designed which is very much economical, easy to operate and helpful for water cleaning and it can be modified with more cleaning capacity and efficiency. Although the design criterions with problems definitions which, however were overcome by using references & teachers guidelines. The choice of raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. It is very useful for society.

FUTURE SCOPE

1) The machine can be designed for deep cleaning.
2) Solar panel can be used for providing power to the machine.
3) Capacity of the machine can be increased for cleaning big rivers and lakes.

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