

Review Paper on Design and Development of River Water Garbage Cleanup Machine

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Abstract This study mainly focuses on the development of the river water garbage cleaning machine, which is capable of floating on water and remove the solid waste such as plastic, debris, more precisely waste debris in efficient and effective manner. As we know that water is the most basic and important need of human body and all human and aquatic life. About 100% of the total earth surface, 71% is covered with water and ocean holds about 96.5%. And from which only 2.5% of water is fresh, drinkable. Mainly the fresh water we get for the drinking purpose comes from ground water which is only 1.2%, remaining is in the form of glaciers, ice, or deep inside the ground. Also 0.3% of fresh water is available in rivers and lakes. But if we look after today's scenario, the rivers and water bodies which supply fresh drinking water are being polluted by the waste debris, solid and liquid waste which spread the toxic chemical. Due to all this pollutants present in the water, the water is being polluted which is dangerous for human and aquatic life. So considering all the above problems we thereby designed this project. The main motive of this project is to clean this small/big solid wastes from the water bodies like lakes and rivers, by "River water garbage cleaning machine. The main mechanism of this project is that it will be working on RF module(Radio Frequency), which is a remote control arrangement along with some other components like conveyor belt, waste collector, chain drive mechanism, battery, propeller, floating pipes, etc. assembled together. As the motor runs, the conveyor belt also runs collecting the waste onto it and further transfer it to waste collector. So the main aim is that with less human efforts, with reducing time and man power, cleaning the water body.

Key Words: Motor, chain drive, propeller, conveyor, collector, RF transmitter and receiver

1. Introduction Water is the basic need of human as well as aquatic life. Human requires approximately 7-8 liter of water per day. But the aquatic depends wholly on water. About 71% of the total earth is covered with water of which 97% is saline and of 3% is fresh (2/3 in glacier form and remaining in liquid form). Water is also used by the plants. Plant has the special tissue namely xylem which carrier water from the stem to the upward part of the plant. We get water from many sources like rivers, lakes, dams, reservoirs etc. We can say that rivers, lakes and plants are the important sources of water. Human also use water for many more purpose such as drinking, washing utensils and cloths, washing cars, etc. But the most important purpose of water for the human or any other living life is for drinking. But

what if the water is not fresh? What if we get polluted water to drink, cook, etc. ?

Yes, the same is the condition in today's and day by day scenario. The main problem of the human and living organism is pollution, more clearly water pollution. Water pollution is harmful to the living organisms in different ways. Due to the water pollution many aquatic life is in danger situation. The fishes and all the aquatic animals as well as plants are suffering hazardous situation. In polluted water, due to the abundant growth of algae, the oxygen content become lesser, causing the death of fishes and other organisms. It is estimated that during the last twenty years, there is a decrease of about 40% in aquatic life. Algae are responsible for imparting peculiar taste and odour to many of the water supplies and also are cause of gastroenteritis. There are many cases on record of the destruction of marine life by polluted water. Not only aquatic organism but also human are also affected by the water pollution, the water pollution supplies is probably responsible for more environmental influence. The main reason of the water pollution is the solid waste, waste from factories, plastic wastes, beverage cans, food wrapping plastic, etc. Due to this there is adverse effect on environment and also the biodiversity.

Thus taking in consideration all the problems in the day to day life we have designed a small project, i.e. "River Water Cleanup Machine". Our project is basically a model that can help reducing the pollution caused due to the waste in the water. Waste materials/substances such as waste debris, plastic bags, bottles, cans etc. which are floating on the water surface. Our project can be used in those places where the water debris are found and which needs to be removed. In our project we are mainly using the chain drive mechanism or we can say that motor driven conveyor mechanism which is efficient of collecting the solid waste floating on the water bodies. Further the conveyor mechanism consists of the belt on which fins are attached. These fins collect the waste and transfer it further on the conveyor belt and lastly to the collecting tray/box. This will be reducing the water pollution and also will help to reduce the death rate of aquatic animals. This project will be used to collect the waste from rivers, lakes, ponds, etc. The mechanism of the model is driven by using batteries. These project also collect the impurities present in drainage water like empty bottles, polythene bags, wrapping plastics, etc. So this can help the society to reduce the pollution. In this way our project will be able to fulfill the main objective of reducing man power and less human intervention.



have done the study and explained their work on achieving eco-friendly and less human intervention efficient technology.

3] They explained the present condition of the National sacred rivers which are infected by large amount of waste and loaded with pollutants, toxic chemicals, debris, etc. due to such situation and also because of the multiplying water pollution in the form of waste debris the aquatic life is in danger. They designed the machine that will be collecting all the waste debris from the water. This will be resulting into reduction of water pollution and also reduce the rate of aquatic animals death. Also their other aim was to reduce the man efforts and reduces the time for cleaning the water bodies. In their project (Design and Fabrication of River Cleaning Machine) they stored the energy in the battery and used the same for the purpose of cleaning using motor and chain drive arrangement.

4] They emphasized on the basic need of the human body i.e. water. They studied about how the pollution is affecting the peoples and society. They explained that the environmental problems occurs due to many reasons such as the no public awareness in protecting the environment i.e. peoples are not aware about the cleanliness. Another problem is low budget allocation on environment management. All the environmental issues prevailing day by day, year by year are coming up and still then they are not yet solved. This environmental issues are due to the waste and garbage which comes from various places and thus results in affecting the water bodies causing water pollution. Because of the garbage, the water flow can be clogged, at the same time making the water dirty, smelly. Sometimes it may results in immense flood due the over flow of water. Thus considering all this problems they made the design namely AGATOR which is Automatic Garbage Collector. AGATOR is a rotor robot model as automatic garbage collector. The main aim of their project was to collect the garbage from the river which no no effect and efficient flow. Their method includes the need to identify, analyse the required components, etc. Also they added the ideas of hardware and software engineering, development of the system and testing. In this design there is a ATmega16 with a voltage of 5 volts, along with 1 ampere current and IC Driver having voltage of 12 volt and current of 1,2 ampere and to control the model they provided the limit switch. Along with this the supportive devices are the robot control system, the sensor system which sense the garbage, mechanical robot which has the robotic arms that collects the garbage and also the actuator robot. They mentioned the limit of the load of the garbage i.e. upto 5kg of the garbage can be collected and after emptying the collector tray the robot has the speed of 0.26 m/s.

Literature review

1] The main motive of the project is to automate the sewage cleaning process in drainage. They worked looking at the current situation of sewage waste so as to reduce the disease caused to humans. They proposed the system where they used the machine which was operated on remote control to clean the sewage. Hence their system reduce the impacts from the sewage waste along with its harmful gases. They used the wiper motor that starts running as the motor is switched on. Their set-up includes two power windows which are connected to the wheel and the wheel is driven with the help of remote control system. The sewage waste is collected by using the arms and thrown back to the bin which is fixed at the bottom of the machine. They used the arm which is used to lift the sewage and also a bucket which starts collecting the waste. They also mentioned that their machine is capable of collecting the sewage which is floating on water. They also proposed that the garbage which affects the drainage is also picked up by the arms and removed. Their system has less human intervention in the process of cleaning the sewage waste and at the same time reduces spreading of disease to mankind.

2] Their model consists of a cage arrangement that is partially submerged into the water and at the same time collecting water floating garbage. They trapped the debris into the collector by moving it around the debris. They included the level sensor into the model so as to identify and manage the amount of garbage in the cage. Along with the level sensors they added the pH sensors and turbidity so as to determine the level of pollution in the water bodies. They added odor sensor for sensing odor and harmful smell of water.

They included the RF transmitters and receivers in order to control all the functions of the model. In the above way they

5] In this project they looked after the rising water pollution and due to the pollution the life of aquatic animals and causing danger to their life. They explained that this rising water pollution is a very severe problem to the society. Also the aquatic animals sometimes eat the water surface debris considering it as a food, which ultimately results in causing death of the aquatic animals. Also due to this polluted water many skin disease to human kind is observed. So looking after this major problem which is hampering the aquatic life and also to reduce the rising water pollution which is mainly caused due to solid waste they proposed the system "River cleanup machine". With this design they claimed that removing the waste debris from the water surface and dispose from the water body can we made effectively. Their project basically works on the hydropower to clean the waste debris, plastics and garbage from Godavari River. They used hydropower energy for rotating the waterwheels, which converts the Kinetic Energy (K.E.) into the mechanical energy from the drive shaft to the conveyor.

Construction and Working Principle

The working of the machine will be based on Chain Drive Mechanism.

There will be 2 gears, one gear will be welded on the pulley shaft and other on motor shaft drive, which will be attached together by Chain Drive.

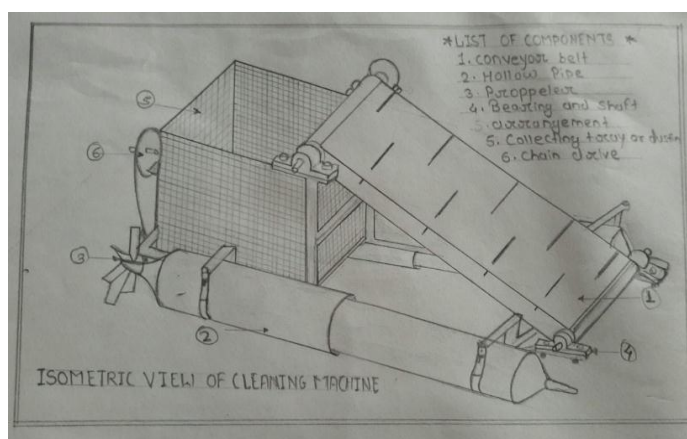
After supplying power to the motor through DC battery, chain drive will transmit the power from Motor to Conveyor Belt pulley.

This way Conveyor belt will rotate. And with the help of fins attached to the conveyor belt, it will pick the garbage floating on water and will pass it to the collecting tray.

At the same time when power is supplied to the motor, the propeller will run and give forward and backward (to and fro) motion to the machine.

The main automation of machine is that, it will operate on remote control system, whose mechanism will be based on radio frequency transmission Module (RF Module).

Block Diagram:-



Conclusion

This project is studied thoroughly from various literatures, research on different journals and papers available and thereafter it is fabricated in accordance to provides flexibility in operation. This innovation "Design and Development Of Robotically Operated River water Cleaning Machine" is designed with the hope that it is very much economical and beneficial for cleaning the rivers, ponds, etc. or more precisely all the water bodies. Keeping in mind all the factors such as design, estimating cost, and availability, it is very cheap and very useful for the society.

Looking at these results thus we can conclude that it is an innovative method of minimizing all the manual stress and thus very much reliably stabilizing. The project designed by us made an influencing task in the environmental purpose and it is very useful for small works. Although the system is able to collect the garbage from the water bodies with human intervention. But still there are certain future scopes in the field which are as follows:-

- By increasing the fineness of conveyor and the material used in conveyor, the efficiency of the project can be increased.
- Assortment system for different category of waste is possible
- Garbage carrying capacity can be increased and deep cleaning capacity can be increased.

Thus we can conclude the objective of the project was successfully achieved.

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