



Research Article

RIVER CLEANING ROBOT

<sup>1</sup>Dibya Kumari, <sup>2</sup>Kotla Anusha, <sup>3</sup>Koppiseti Asrita., <sup>4</sup>M. Jithender Reddy.,  
<sup>5</sup>Tejaswini Vallabhapuraru and <sup>6</sup>Dr Kowdodi Siva Prasad

<sup>1,2,3,4</sup>Graduate Students, Hyderabad Institute of Technology and Management,  
Dept of Electronics and Communication Engineering, Hyderabad, India

<sup>5</sup>Assistant Professor, Dept of Electronics and Communication Engineering,  
Hyderabad Institute of Technology and Management, Hyderabad, India

<sup>6</sup>Professor, Dept of Electronics and Communication Engineering,  
Hyderabad Institute of Technology and Management, Hyderabad, India

ARTICLE INFO

Article History:

Received 26<sup>th</sup> October, 2023

Received in revised form 7<sup>th</sup> November 2023

Accepted 15<sup>th</sup> November, 2023

Published online 28<sup>th</sup> November, 2023

Key words:

River trash cleaning, GSM Module, Motor,  
Reduce time, Conveyor drive setup

ABSTRACT

The emphasis of this project is on the design and manufacture of a river trash cleaning machine. This project's primary goal is to lessen river pollution caused by excessive sewage discharges, industrial waste, etc. In numerous river cleaning programmes, the Indian government has invested significantly. For faster product delivery, most of the manufacturing process is now automated. Production requires automation heavily. Our main goal in creating the remote-operated river cleaning device for this project was to reduce the amount of time and labor required to clean the river. Though there are many robots in the market which are used for cleaning rivers but this bot have other features making it distinct. Utilizing a motor and conveyor drive setup, we have automated the operation of the river waste cleaning system in this instance. Here The cleaning machine can be controlled by a GSM module. Moreover GSM Module can help in fast transformation of messages as we only use a mobile sim for the instructions to be transferred. Also, other components such as micro-controller, motors for the wheels and conveyor belt, a 12v battery are used in this bot. By which it makes it simple to carry and also weighs less.

Copyright© The author(s) 2023. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

In many Indian towns today, environmental issues are a result of development activities including the building of homes, offices, and other commercial areas. Environmental issues arise for several causes, including inadequate funding for environmental management and a lack of public interest in environmental protection. The environmental problem, which resurfaces every year and is still unresolved, is the disposal of garbage and waste into rivers from various locations. That garbage can obstruct water flow, cause the water to grow unclean and odorous, and occasionally overflow, which can result in floods. The traditional methods for collecting floating trash include human labour, waste collection boats, thrash skimmers, etc. and dumped close to riverbanks. The methods discussed above are complicated and expensive. The fact that cleaning up chemical wastes can lead to respiratory conditions and present a difficult challenge for city workers is the main issue. Although we can already observe automation processes in many major industries, applying automation to clear sewage and trash is still a difficult challenge. To clean the broad sewage, the municipal personnel must descend into the sewage sludge. It negatively impacts workers' health and leads to skin conditions

LITERATURE SURVEY

[1] M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arun kumar, Design And Fabrication of Remote-Controlled Sewage Cleaning Machine [2017] The paper gives the idea about the working and positioning of various components in the machine. In the proposed system, the machine is operated using a remote control to take waste. Therefore, the system avoids the harmful impacts from the sewage waste and gases.

When the system is ON wiper motor that starts running. The two power window motors are connected to the wheel, and it is operated with the help of the remote-control setup. The system collects the sewage wastes by using the arm and put it into waste bin fixed in the machine. The set-up runs in the sewage area with water, so it collects the floating waste. The waste which affects the drainage is also taken and removed. This system has less human intervention in cleaning process and in turn reduces wide spreading of diseases.

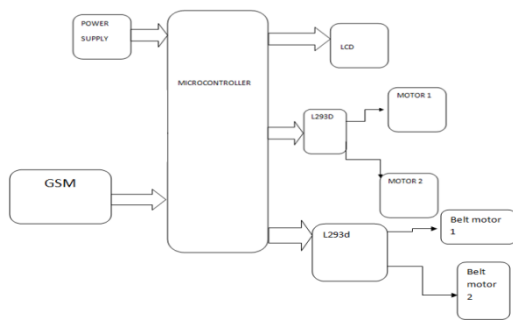
[2] Basant Rai Pollution and Conservation of ganga river In modern India [2017] This study helps the successful analysis of pollution level in various rivers in India especially Ganga river and identification of various pollutants and debris present

\*Corresponding author: Professor, Dr Kowdodi Siva Prasad  
Department of Mechanical Engineering, Hyderabad Institute of Technology and Managemnt,

in river. Considering the World Bank Sponsored Study regarding various pollution level in the rivers in India (State of Environment Report - U.P.) (In: Mallikarjun, 2003), pollution levels in the Ganga River is contributing about 10- 12% of total disease burden in Uttar Pradesh. The level of coliform bacteria present in the water is very high and are in excess of 2 lakh MPN while considering against the national water quality standard of 5000 (Mallikarjun, 2003). The report estimated total health damage caused by water pollution in up to is around 6.4 million dailies (Disability Adjusted Life Year).

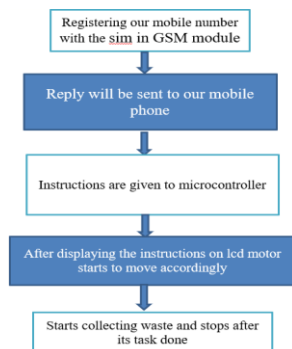
[3] Osiany Nurlansa, Dewi Anisa Istiqomah, and Mahendra Astu Sanggha Pawitra AGATOR (Automatic Garbage Collector) as Automatic Garbage Collector Robot Model [2017] The research paper provides a detailed view about the automation process. The research is done to design and make AGATOR (Automatic Garbage Collector), which is a rotor robot model to make it as a automatic garbage collector to counter accumulation of waste in the river which has no flow efficiently. The method of implementation is construction and design. This method includes the identification of needs, analysis of the components required specifically, software engineering, hardware, developing, and testing.

**Hardware Architecture**



**Figure1** General Description of bot in terms of block diagram

**METHODOLOGY**



**Figure 2** Working process in a flowchart

The flowchart shows mobile number will be registered with the SIM in GSM Module followed by this, the reply will be sent to mobile phone. After this the instructions are given to micro-controller, after displaying the instructions on led motor starts to move accordingly, hence starts collecting waste and stops after the task is done.

**RESULTS AND DISCUSSION**

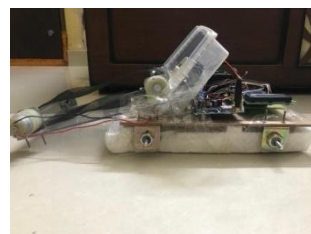
Three sections make up the river cleaning robot. The mechanism's input source, which comprises of GSM and power supply, is discussed in the first section. To use it,

simply insert a functioning SIM card of the SSD variety. A green light that blinks indicates that the device is receiving electricity once power is provided. If not, you can check it while speaking on the phone. The device must then be reset using the option, after which a warning indicating that the user must register their phone number will show, marking it as "registered." If the orders are continuously given without interruption, there has been an interruption. The GSM module tells the controller after receiving a message sent to the sim. The ADC 0808 device is used internally to convert analog signals into digital signals. On-site conversion is done here.

The second component is the micro-controller portion, which is made up of the green board, also referred to as the "Arduino base board," which is used to distribute energy and has an Arduino UNO and an ATMEGA 328p embedded into it. Software. Programming the microcontroller used the Arduino IDE software. The software makes it possible to compile the required commands and source code. The output source for the mechanism is the main topic of the third system segment. The fusion of mechanical segments like L293D serves as the output source. Motors along the LCD interface to display the result. The controller will read the data in accord with the command, present the command on the LCD, and send instructions to the motors. There are two L293D drivers available that control the bot's movement, including forward and backward mobility as well as responding to commands. PWM is utilized to regulate time delays.

The advantages of the present system: Simple Design, Low Cost, Reliable Operation, Easily Found Replacements, Variety of Mounting Styles. The disadvantages of the present system: Expensive to produce, Can't reliably control at lowest speeds, physically larger, High maintenance, Dust

**RESULT**



**Figure-3** Side view of the bot



**Figure-4** Top view of the bot



**Figure 5** Micro-controller connections

Apparently, there are numerous bots on the market right now that have been in use for a long time. For example, the Ocean Cleanup Interceptor is a vital device that has made substantial modifications in the strategy to cleaning rivers or seas. Though its operating philosophy differs greatly from that of our bot, the advantages outweigh the negatives in many ways.

Furthermore, there are numerous other robots that are utilized for environmental cleanup. However, this bot has additional characteristics when compared to the leading competitors, such as being easily transportable to any location given that it weighs less and has a less sophisticated structure.

Another advantage of this bot is that it has an inbuilt battery system and can run for up to 7 hours constantly. Looking at Fig-5, it is evident that the entire bot is simply made up of the battery, microcontroller, motors, and connecting wires. Furthermore, a foaming thermocoal is inserted at the bottom of the bot to make it float balance.

GSM Module as discussed earlier helps to stay connected to the bot just with the mobile signals and also simple instructions such as “ LEFT, RIGHT, UP, DOWN, START, STOP” help us to make the bot work.

**START-** The bot starts with this instruction.

**LEFT-** The bot turns left in the direction and start collecting the trash.

**RIGHT-** The bot moves in right direction..

**UP-** This respective instruction is used for the belt to move in Upward direction.

**DOWN-** This helps the belt to move in downward direction.

As simple it sounds, the working of bot is also that easy because of simple instructions, and also bot responds very accurately whenever the instruction is passed.

## CONCLUSION

Introducing a forward-thinking river trash cleaning machine, this project employs a remote-operated system driven by automation to streamline the mitigation of river pollution from sewage and industrial waste. With a design featuring a GSM module for remote control, the system lays the groundwork for future advancements. Building on existing studies, such as a remote-controlled sewage cleaning machine and pollution analysis of rivers like the Ganga, this project envisions a comprehensive solution.

Comprising three key sections-input source, micro-controller, and output source-the system is designed for simplicity, cost-effectiveness, and reliability. As future prospects, it aims to pioneer efficient, automated approaches for sustainable river pollution management.

## References

1. M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr. N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arun kumar, Design And Fabrication Of Remotecontrolled Sewage Cleaning Machine [2017].
2. Global Statistics. (n.d.). Retrieved from Global Wind Energy Council: <http://www.gwec.net/globalfigures/wind-energy-global-status/>
3. Osiany Nurlansa, Dewi Anisa Istiqomah, and Mahendra Astu Sanggha Pawitra AGATOR (Automatic Garbage Collector) as Automatic Garbage Collector Robot Model [2017]
4. Basant Rai Pollution and Conservation of Ganga River In modern India [2017]
5. Richard G. Budynas, J. K. (2012). Shigley's Mechanical Engineering Design. New York: Mc GrawHill.
6. Rajendra Patil, Rahul Itnare, Sagar Ahirrao, Amol Jadhav, Ajay Dhumal,1,2,3,4B.E. Scholar BVCOE & RI Nashik (Pune University), Assistant Professor BVCOE&RI Nashik,” Study of River Harvesting & Trash Cleaning Machine.” [2019]
7. Jacobs, E. N. (1939). Airfoil Characteristics as Affected by Variations of the Reynolds Number. National Advisory Committee for Aeronautics.

### *How to cite this article:*

Dibya Kumari, Kotla Anusha, Koppiseti Asrita., M. Jithender Reddy., Tejaswini Vallabhapurapu and Kowdodi Siva Prasad., 2023, River Cleaning Robot. *International Journal of Current Advanced Research*.12 (11), pp.2634-2636.

\*\*\*\*\*