

ABSTRACT

This project is designed to monitor water pollution levels. The system uses an Arduino Uno based floating boat equipped with TDS, turbidity and temperature to assess the water quality in real time. Based on predefined thresholds, the system evaluates the relative purity of water. This project demonstrates how a low-cost, portable embedded systems can support environmental monitoring and public health awareness.

FUNCTIONALITY

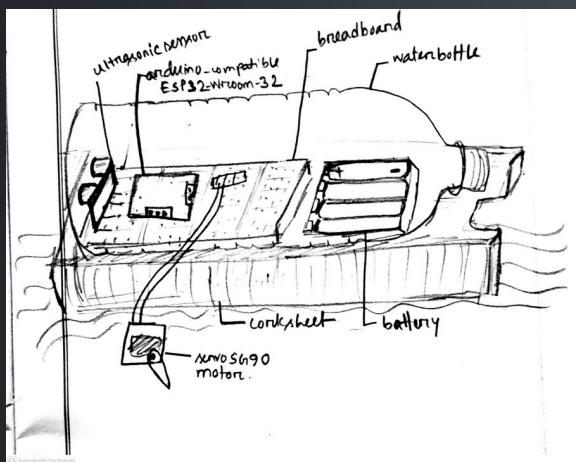


MECHANICAL FUNCTIONALITY:

DC motor as an actuator is used to move forward and backward. Ultrasonic sensor does physical interactions with environment. It stops and sends a notification in mobile when it detects obstacle.

SOFTWARE FUNCTIONALITY:

After a certain time periodically, all three sensors sense data and send them to main controller. Then ESP32 calculates and evaluates pollution levels using those data based on defined thresholds.
Grade- A/B= Good
Grade- C= Moderate
Grade- D= Severe polluted



ADVANTAGES & LIMITATIONS

This project is low cost, affordable, easy to maintain as human intervention is minimum, has wireless communications with real-time monitoring. But the accuracy can be varied as it depends on calibration. Obstacle avoidance is in very basic level.

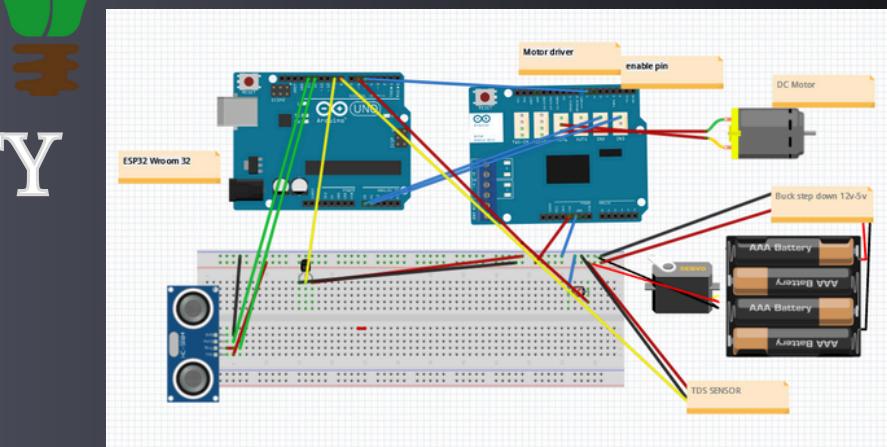
INTRODUCTION

Water pollution poses serious risks to public health and aquatic ecosystems and our country lacks a properly regulated system for it. Existing methods are often costly, time-consuming and rely on manual sampling. There is a lack of smart system for real time water pollution monitoring. Our objective is to develop a smart robotic boat that measures pollution parameters and indicates water quality levels. Our system supports environmental monitoring, easy to build, a great helping hand for making informed decision.

SMART BOAT WATER QUALITY INDICATOR

MAJOR COMPONENTS & IMPLEMENTATION

- ESP32-Wroom-32 (Interfaces with sensors to collect real-time data.)
- TDS, Turbidity, Temperature sensor (for measuring the data)
- DC motor (it is driven through a motor driver enable forward and backward motion)
- Servo motor (assists in directional control and movement)
- Water bottle, battery (gives power supply and structure, stability enough to float)



CSE461- PROJECT DEMONSTRATION
SECTION- 02
GROUP- 01
[UTR, CPTH]

MAGFERAH SULTANA SAMIA-
22101875
ASIF FAYSAL- 22301265
SIAM ABDULLAH- 21301682
AREEA SULTANA-
21201407
TARIFUL ISLAM TALHA-
222013304



COMMUNICATIONS

- GPIO
- ADC for sensors
- PWM for motors
- UART

CONCLUSION

Our key achievements are successfully integrated DC motors, servo steering, sensors, along with floating stability of the robot. Future improvements can be focused on fully autonomous navigation path planning algorithm for this project. Also cloud-based data logging and analytics for further research purpose.

REAL-WORLD APPLICATIONS

- Water quality monitoring in rivers, lakes and ponds of Bangladesh
- Necessary cleaning steps can be taken according to pollution level found by robot.
- Alerts can be sent to authorities or researchers via mobile