Development of Water Pollution Monitoring System

Presented By

- Namrata Thakre
- Shweta Lanjewar
- Natasha Ramtekkar
- Himanshu Saha
- Vijayalaxmi Yelchalwar

Guided By

Ms. Snehal P. Dongre

Department of Information Technology

S. B. JAIN INSTITUTE OF TECHNOLOGY MANAGEMENT AND RESEARCH,NAGPUR

An Autonomous Institute, Affiliated to RTMNU, Nagpur

Contents

Introduction

• The water quality monitoring is very important now a days. As there are various resources available but still no progress. In most cases the water gets contaminated due to different reasons and one of the major reason is industrial waste. This needs to be stopped somewhere.

• Conventional water quality checking methods include sampling and laboratory techniques. These strategies are however not cost effective and time consuming which eventually leads to delayed in detection of impurities and reaction to those contaminants in water. So, there should be more efficient and productive checking strategies to monitor the quality of water.

• To cure this real time monitoring of water quality should be done. So, the RC boat is used for continuously moving on water surface to identify water quality. The different sensors are interfaced to the controller viz. water temperature sensor, air temperature & humidity sensor, Ph sensor, Turbidity sensor.

Literature Survey

Websites / Paper / Article /APP/ Website	Reviews / Findings
Topic: Arduino Based Water Quality Monitoring System Authors: Wong Jun Hong, Norazanita Shamsuddin researchgate.net | January 2021	1. Wireless data transfer required. 2. Proper Data Analysis Required.
Topic: Internet of things enabled real time water quality monitoring system Authors: S. Geeta & S. Gouthami Journal of Springer Open | 2017	1. Stationary System. 2. Geographic data required for mapping of polluted streams.
Topic:-Water Quality Monitoring for Rural Areas Authors: Nikhil Kedia 2015 IEEE	1 . This paper focuses on a sensor-actuator system which later shifts to Sensor-Cloud model.

Websites / Paper / Article /APP/ Website	Reviews / Findings
Topic:-Design and implementation of a cost-effective water quality evaluation system Authors: Md. Omar Faruq, Injamamul Hoque Emu, Md. Nazmul Haque ,Maitry Dey ,N. K. Das , Mrinmoy Dey IEEE (2017)	Water parameter such as temperature, turbidity, and pH displayed on LCD screen.
Article:-Water Pollution: Everything You Need to Know Author: Melissa Denchak | May 2018	Details about water pollution. Its types , causes and ways to prevent water pollution.

Problem Statement & Objectives

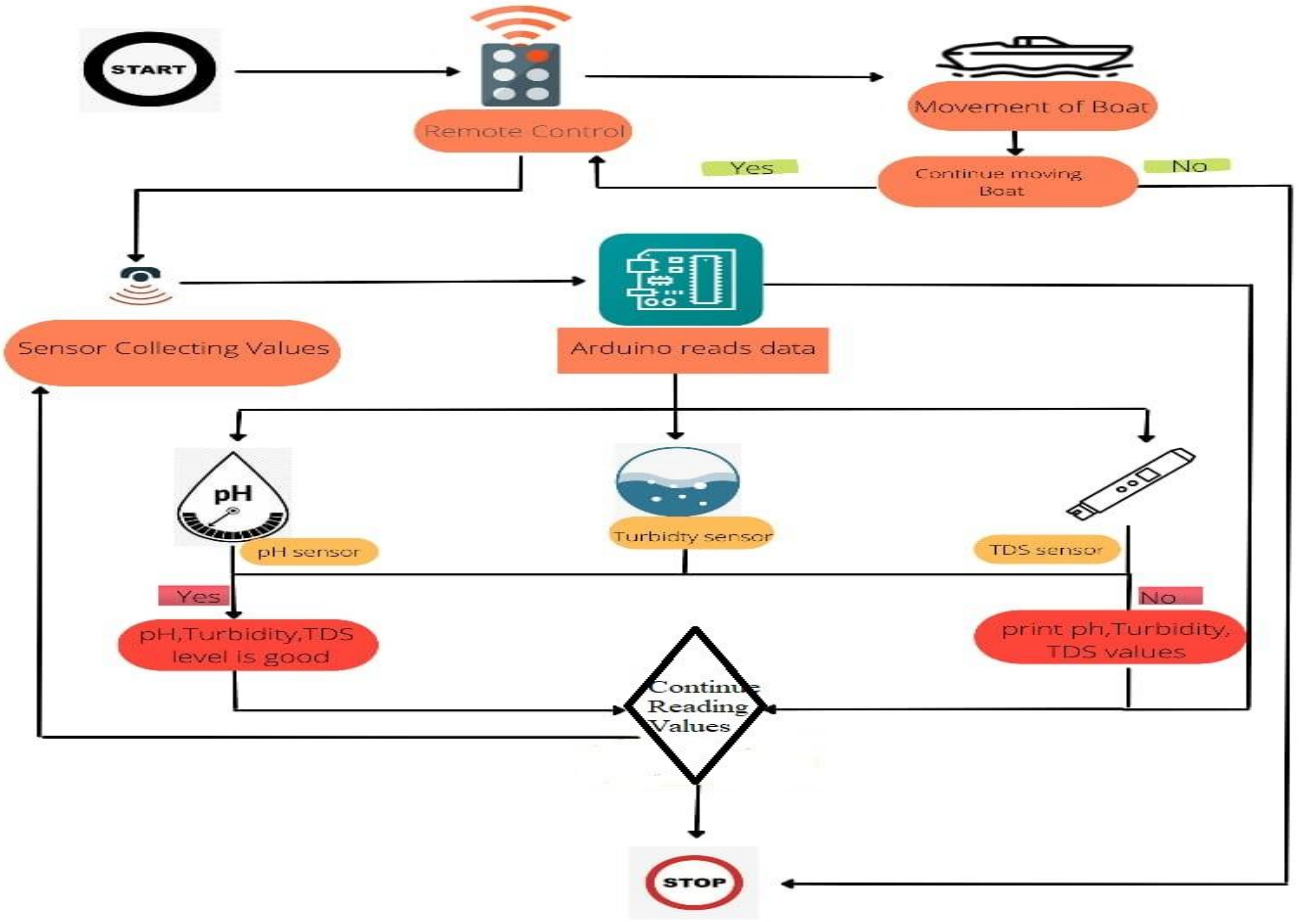
Problem Statement

The quality of drinking water plays a crucial role in the health of animals and human beings. Lakes and reservoirs, canals one of the major sources of drinking water. Water quality monitoring of these water bodies requires a lot of effort as operators need to get in a boat with all sensors and manually check the entire water body. The current manual method for monitoring of the water quality requires Money, Time consuming and labor intensive. So, we are designing a solution for easy water quality checking of vast water bodies with ease.

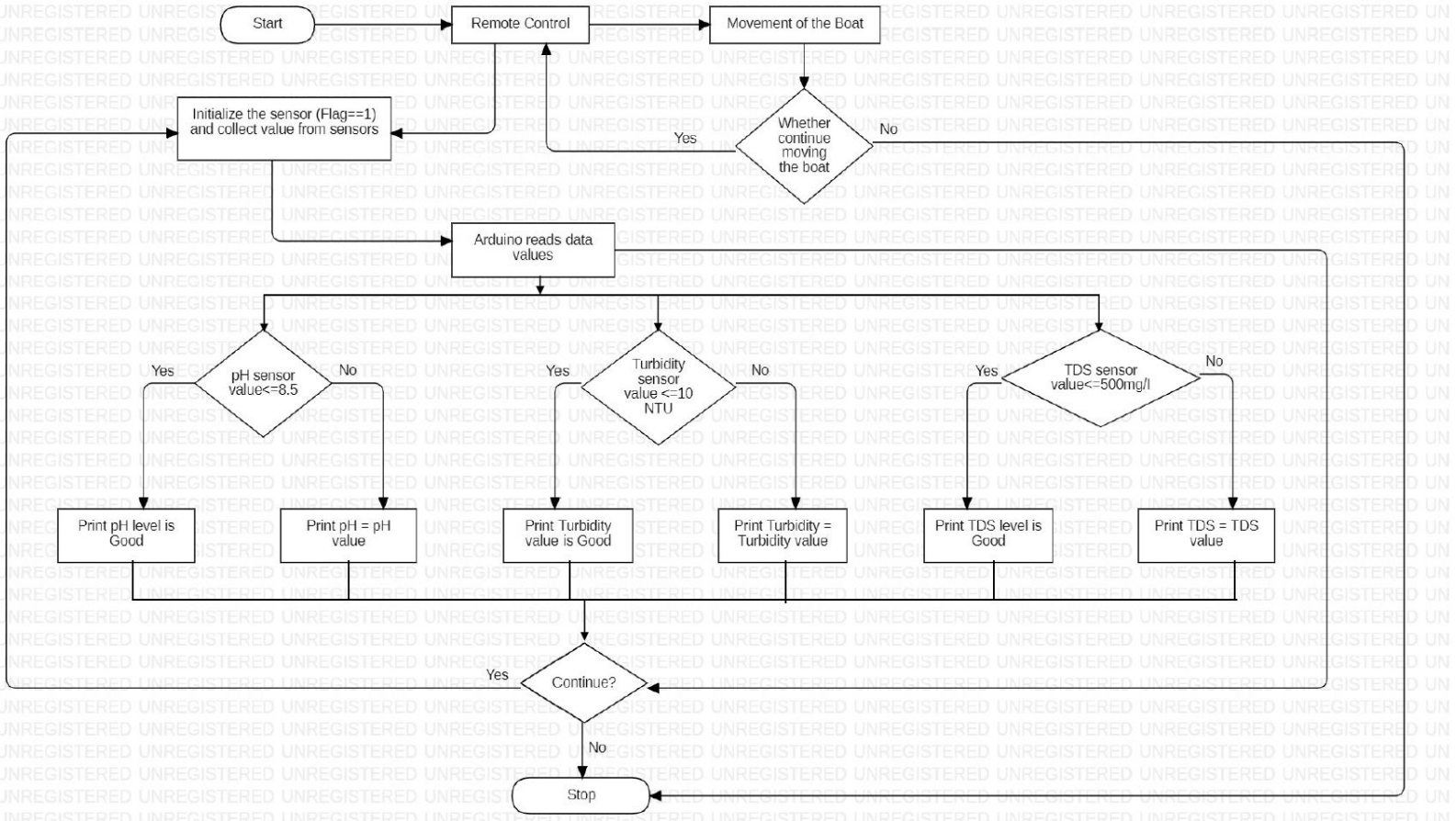
Objectives

- To study, water quality and importance of water quality monitoring.
- To develop a system with Ease and convenience of usage.
- To improve data collection system in survey of water quality for large water bodies

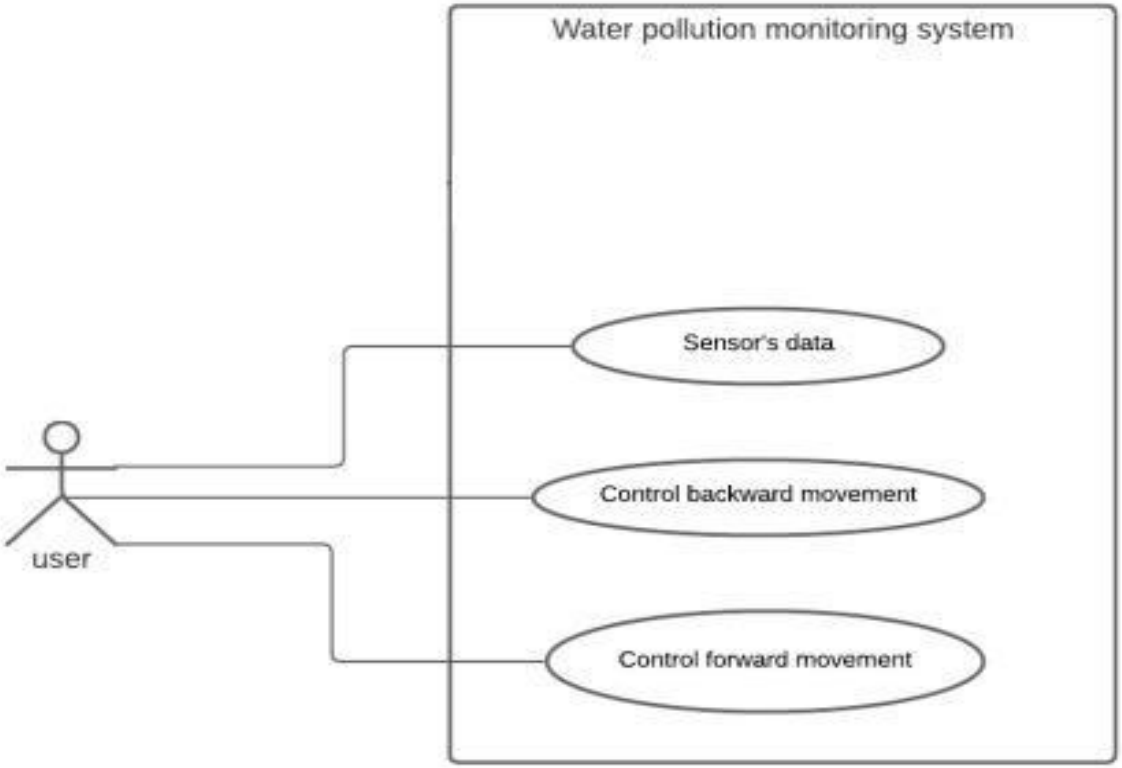
System Architecture



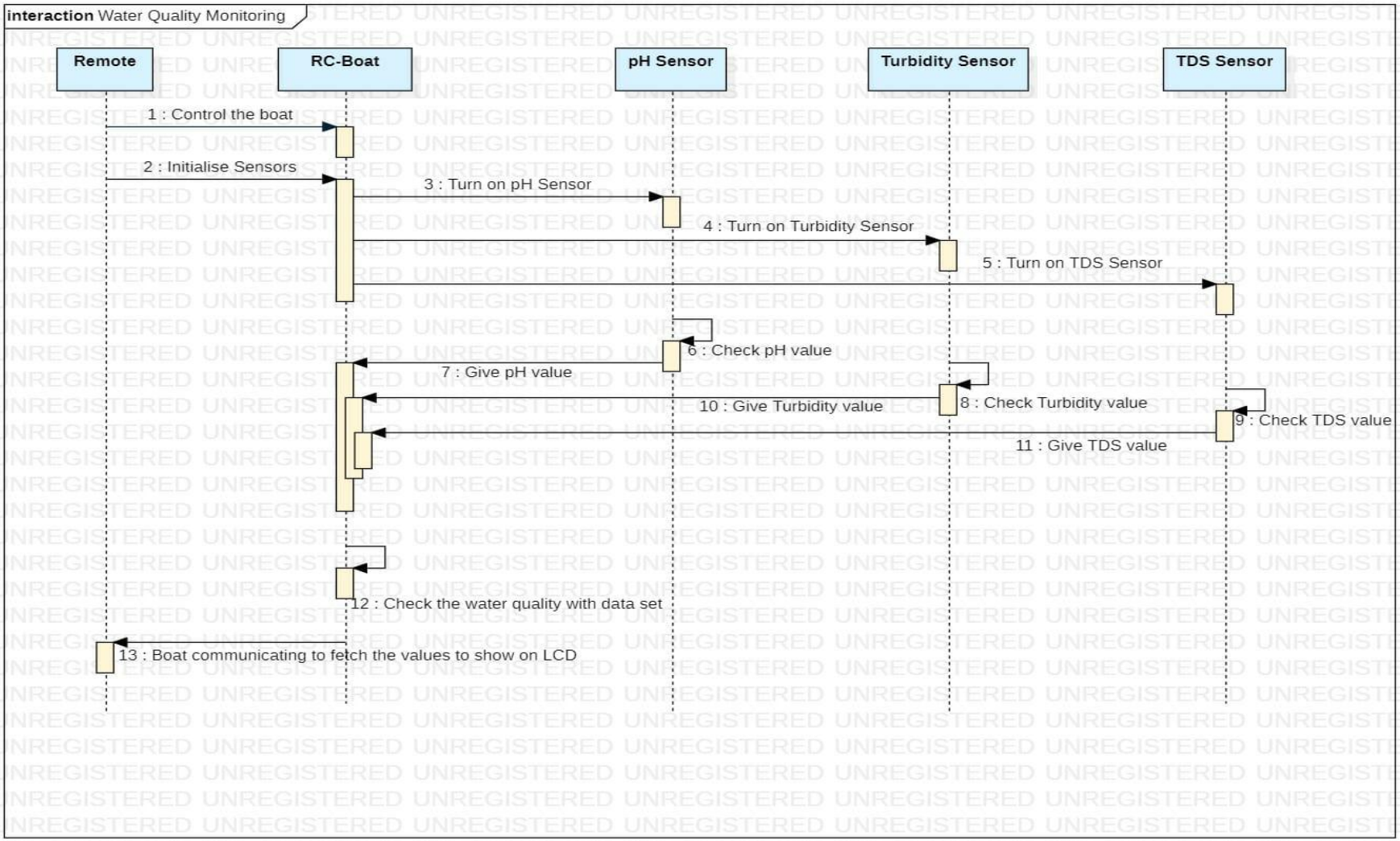
System Design: Flowchart



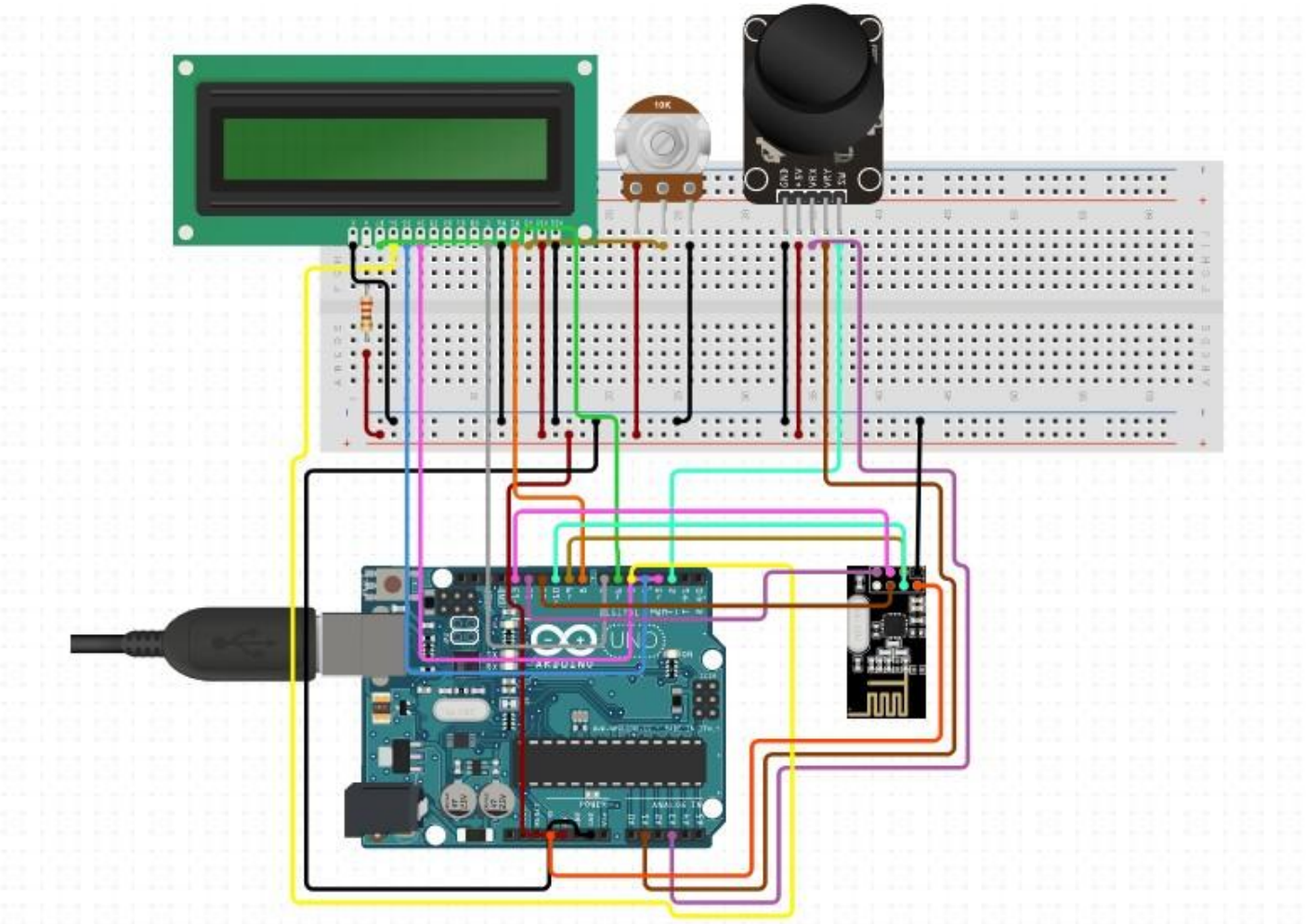
Use case Diagram



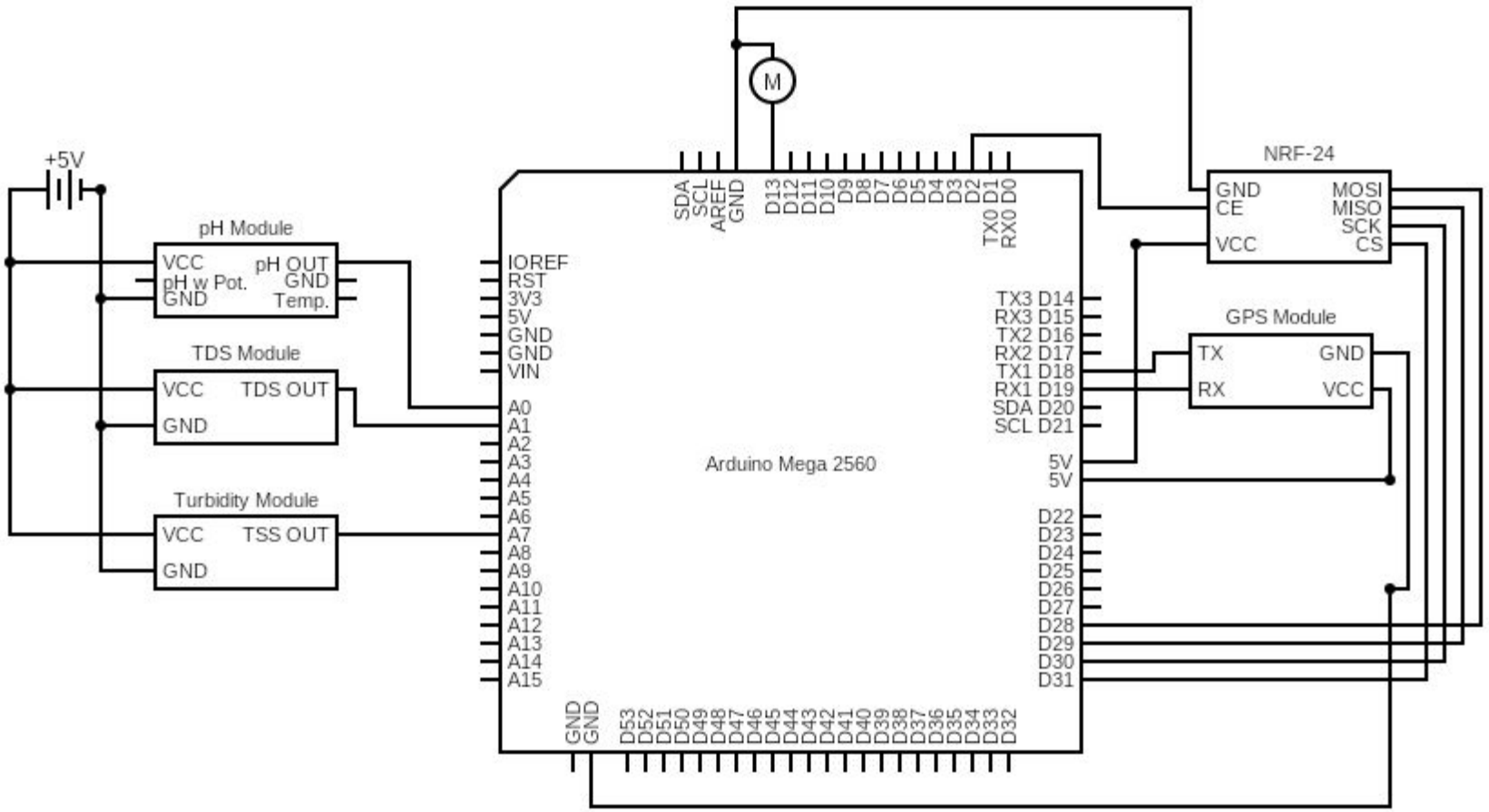
Sequence Diagram



Circuit Diagram



Circuit Diagram



Remote Control Boat Circuit

Technology to be Use

- **Front End:**
  LCD Screen Or Arduino Serial Monitor(while testing & Troubleshooting).

- **Back End:**
  C, C++.

- **Library/API/Framework:**
  TinyGPSPlus.h, SoftwareSerial.h, LiquidCrystal.h, SPI.h, nRF24L01.h, RF24.h.

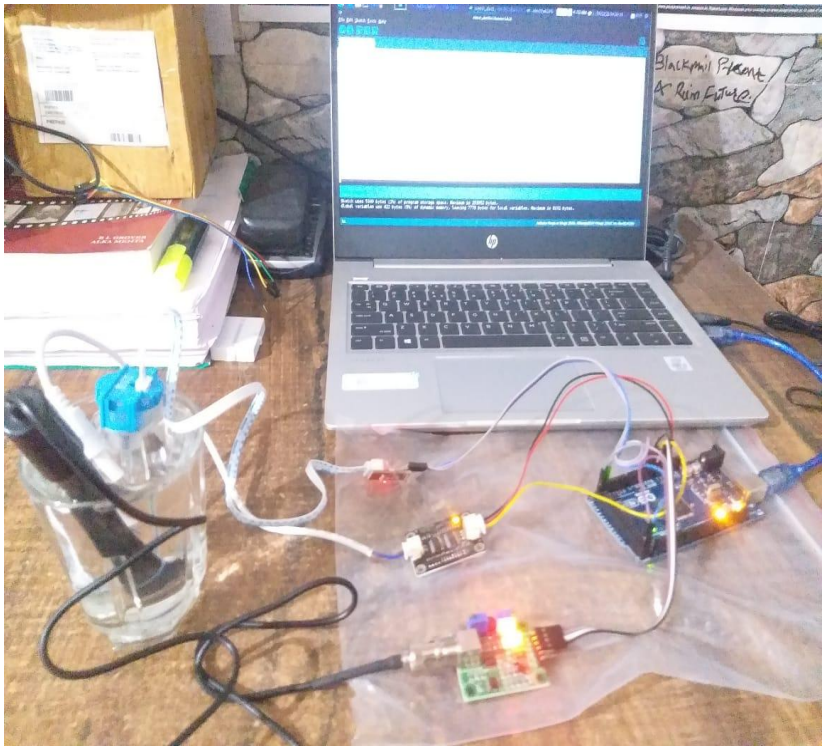
- **Hardware used:**
  NRF24L01, Arduino Mega, NEO-6M GPS, Turbidity Sensor with Module, Analog PH Sensor Kit & TDS Sensor kit.

- **Training Environment:**
  Arduino IDE, GitHub.

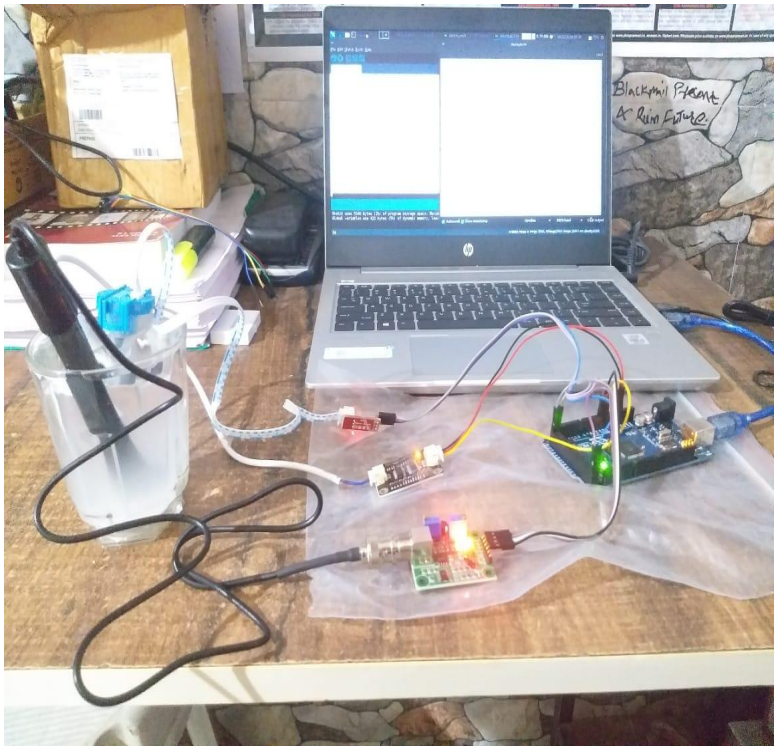
Proposed Work

- Module 1: Sensors Testing & Study.
- Module 2: Integration with Remote Control(RC) System.
- Module 3: Manufacturing RC Boat & Remote Control.

Screenshots
MODULE 1

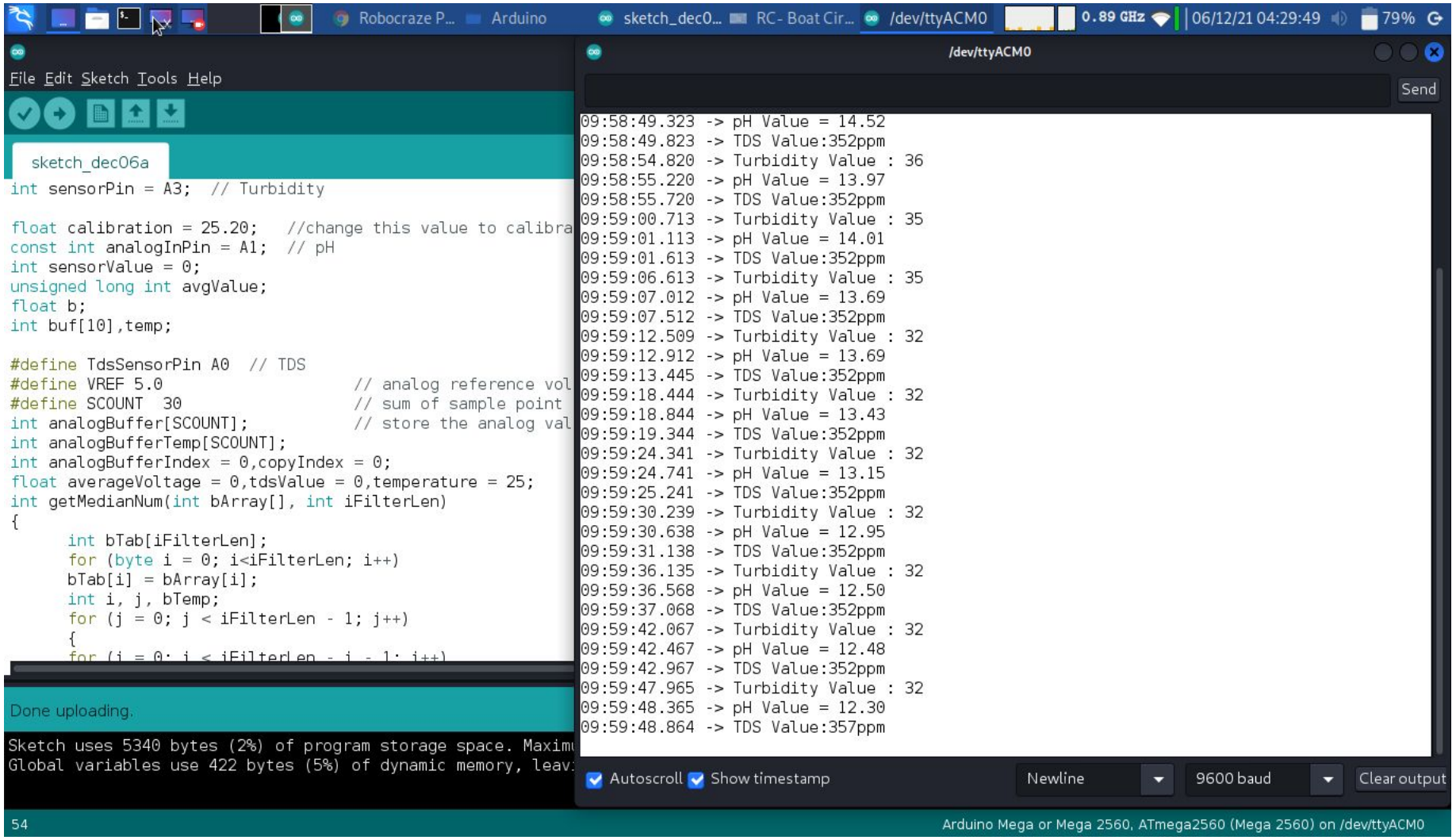


Without impurities



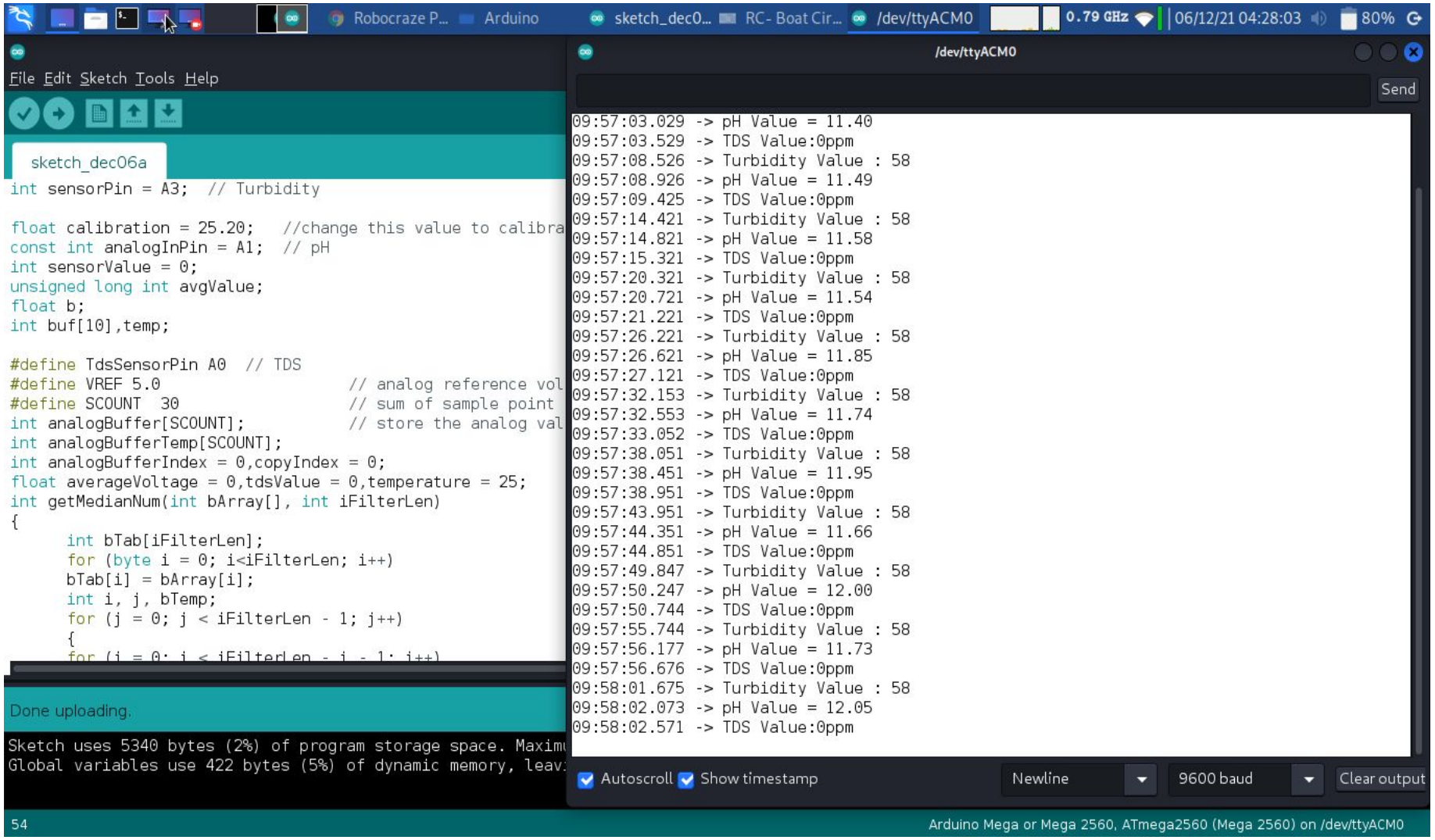
With Impurities

Screenshots



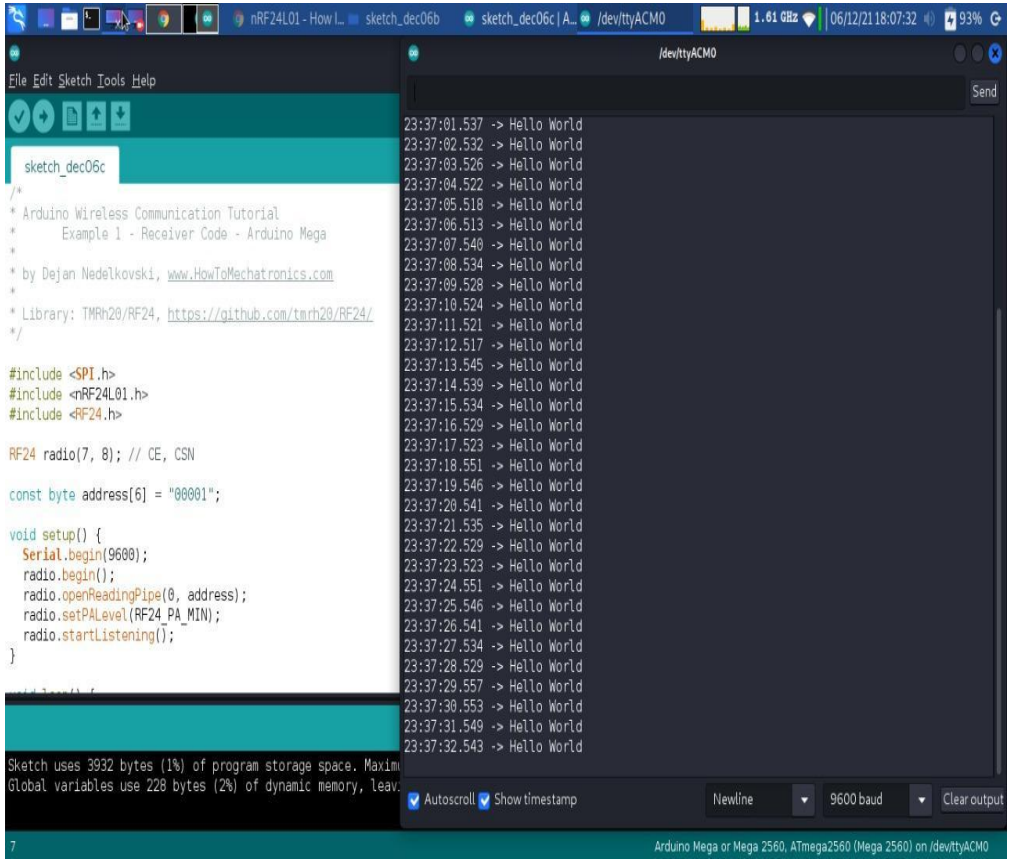
Arduino Serial Monitor (With impurities)

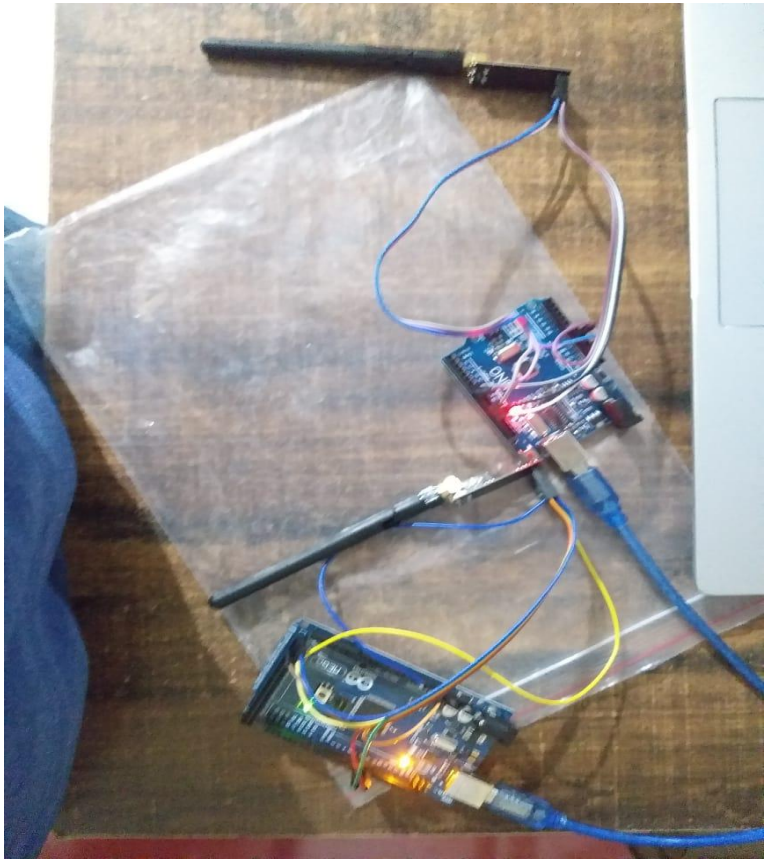
Screenshots



Arduino Serial Monitor (Without impurities)

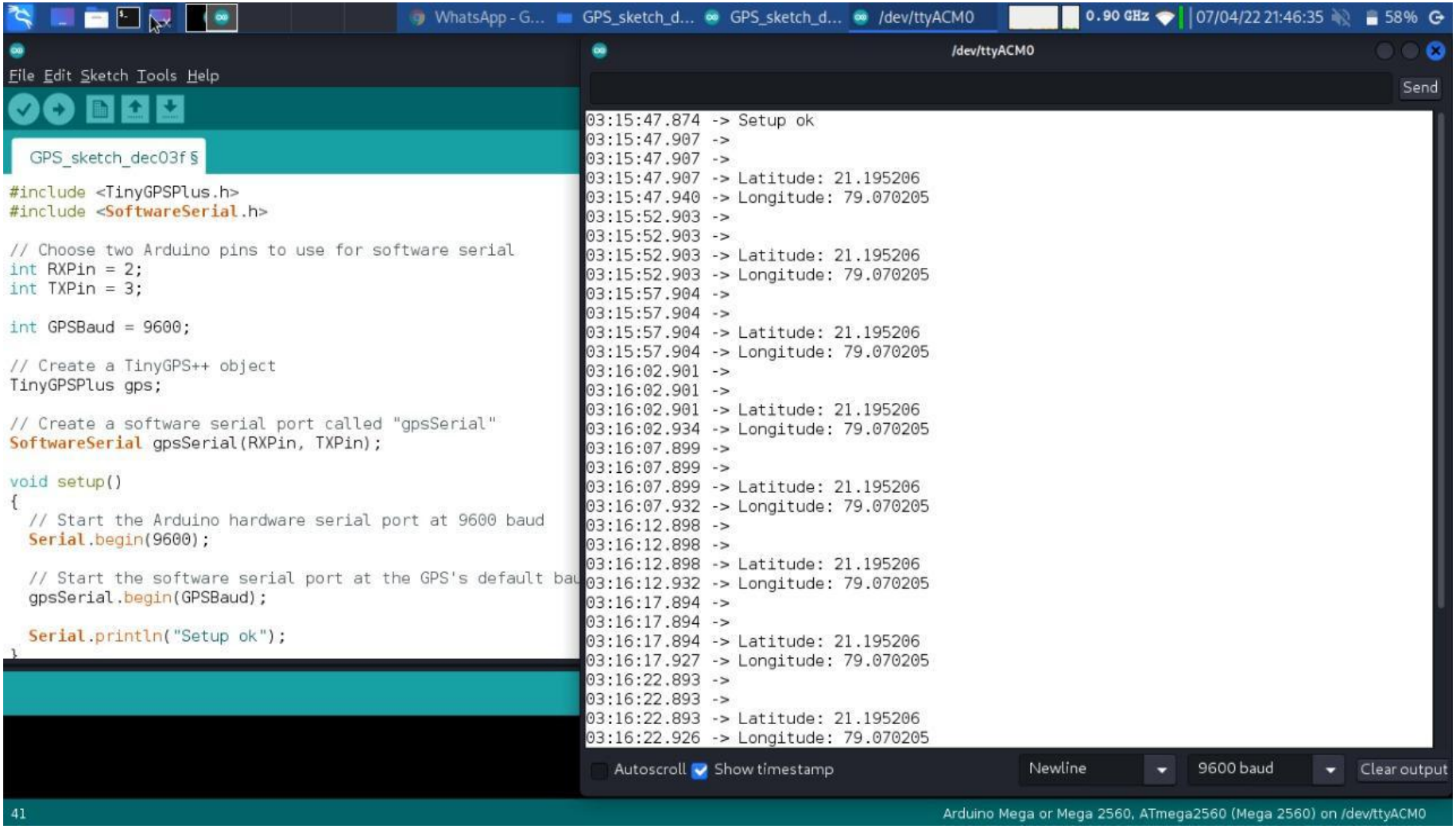
Screenshots
MODULE 2





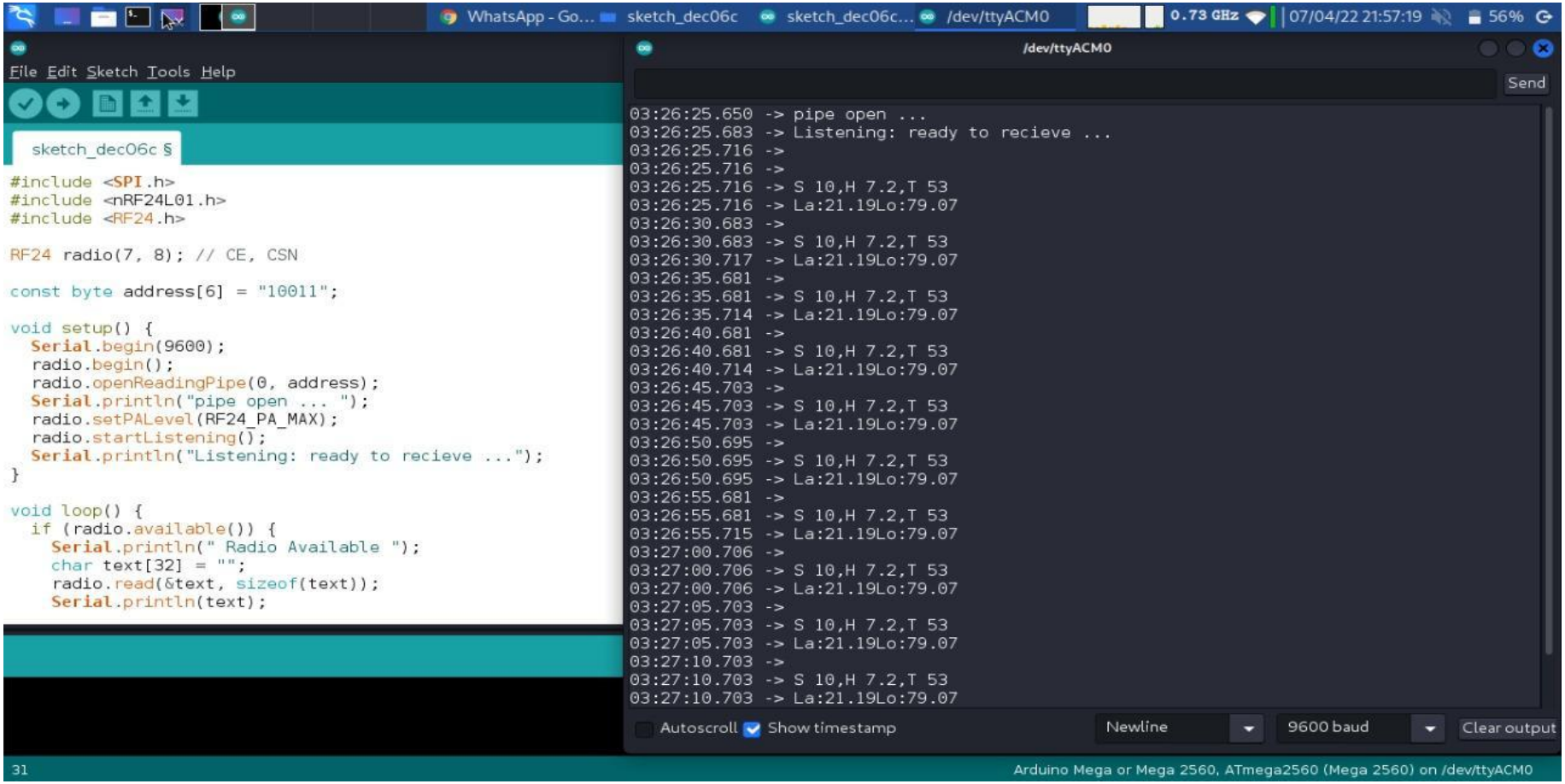
Arduino serial Monitor (Transmitter and Receiver Module)

Screenshots



Arduino serial Monitor (GPS Module)

Screenshots
MODULE 3



Arduino serial Monitor (Receiver Module)

Advantages & Applications

- **Advantages:-**

- Ease and convenience of usage
- Instantaneous data
- Improved accuracy of measurements
- Cost saving

- **Applications:-**

- It can used to survey the pollution levels of Large Water bodies.
- It can be used to enumerate the water pollution levels near the industrial as an alert system for high pollution levels.

Plan of Work

Work	Time (Days)	Status
Requirement Gathering (Project)	10	Done
Analysis (Project)	5	Done
Requirement gathering & Analysis (Module1)	5	Done
Implementation (Module1)	10	Done
Testing (Module1)	2	Done
Requirement gathering & Analysis(Module2)	2	Done
Implementation (Module2)	10	Done
Testing (Module2)	3	Done
Report Generation & Submission	7	Done
Requirement gathering & Analysis(Module3)	3	Done
Implementation (Module3)	20	Done
Testing (Module3)	5	Done
Report Generation & Submission	10	Done

References

- **Papers**:

[1] Hong, Wong J., Norazanita Shamsuddin, Emeroylariffion Abas, Rosyzie A. Apong, Zarifi
Masri, Hazwani Suhaimi, Stefan H. Gödeke, and Muhammad N.A. Noh 2021. "Water Quality Monitoring with Arduino Based Sensors" Environments 8, no. 1: 6.

[2] Geetha, S., Gouthami, S. Internet of things enabled real time water quality monitoring system. Smart Water 2, 1 (2016).

[3] Nikhil Kedia, Water Quality Monitoring for Rural Areas- A Sensor Cloud Based Economical Project, in 1st International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India, 4-5 September 2015. 978-1-4673-6809-4/15/$31.00 ©2015 IEEE

[4] Md. Omar Faruq, Injamamul Hoque Emu, Md. Nazmul Haque1, Maitry Dey, N.K. Das, Mrinmoy Dey Design and implementation of a cost-effective water quality evaluation system IEEE Region 10 Humanitarian Technology Conference, Dhaka, Bangladesh (2017), pp. 860-863

[5] A Catalyst for Water Quality Improvements: (U.S. Environmental Protection Agency [EPA]. National Nonpoint Source Program, 2 Nov , 2020)

- Websites:

[1]https://www.nrdc.org/stories/water-pollution-everything-you-need-know

[2]https://www.epa.gov/sites/production/files/2016-10/documents/nps_program_highlights_report-508.pdf

[3]https://borgenproject.org/water-quality-brunei/

[4]http://water.usgs.gov/edu/turbidity.html

Published Papers/Achievements

LIST OF PUBLICATION/PARTICIPATIONS

Sr. No.	Title	Event Name / JournalName/ Conference	Date	Remark
1	Development of WaterPollution Monitoring System	International Journal Of Advanced Research In Science, CommunicationAnd Technology (IJARSCT)	01/01/22	Participated
2	Development of WaterPollution Monitoring System	International Conference On Tech Trends In Science& Engineering (ICTTSE)	25/02/22	Participated

Links:
GitHub:https://github.com/MasterSaha/Development-of-Water-Pollution-Monitoring-System
Published Paper: https://doi.org/10.48175/IJARSCT-2268

Thank You