# P.S.R ENGINEERING COLLEGE ,SIVAKASI

**PROJECT TITLE: Real time river water quality monitoring and control system**

Done by:


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# 1.Introduction

## a. Project overview

Current water quality monitoring system is a manual system with a monotonous process and is very time-consuming. This paper proposes a sensor-based water quality monitoring system. The system consists of several sensors which is used to measure physical and chemical parameters of the water. The main components of Wireless Sensor Network (WSN) include a microcontroller for processing the system, communication system for inter and intra node communication and several sensors. Real-time data

access can be done by using remote monitoring and Internet of Things (IoT) technology. Data collected at the apart site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through Spark MLlib, Deep learning neural network models, Belief Rule Based (BRB) system and is also compared with standard values. If the acquired value is above the threshold value automated warning SMS alert will be sent to the agent. The uniqueness of our proposed paper is to obtain the water monitoring system with high frequency, high mobility, and low powered. Therefore, our proposed system will immensely help Bangladeshi populations to become conscious against contaminated water as well as to stop polluting the water.

### b. Purpose

The traditional method for monitoring of the water quality is such that the water sample is taken and sent to the laboratory to be tested manually by analytical methods. Although by this method the chemical, physical, and biological agents of the water can be analyzed, it has several drawbacks. Firstly, it is time consuming and labor intensive. Secondly, the cost for this controlled, displayed, and transferred. Compared to the conventional water quality testing techniques, sensor based water quality testing has many advantages such as accurate, high sensitivity, good selectivity, speed, fast response, low cost etc.

## 2.Literature survey

This research paper focuses on Wireless Sensor Network for River Water Quality Monitoring in India This paper introduces a river water quality monitoring system based on wireless sensor network which helps in continuous and remote monitoring of the water quality data in India. The wireless sensor node in the system is designed for monitoring the pH of water, which is one of the main parameters that affect the quality of water. Wireless sensor Network which aids in River Water Quality Monitoring. This paper also proposes a novel technique for the

design of a water quality sensor node which can be used for monitoring the pH of water.

Jayti Bhatt,Jignesh Patoliya entitled “Real Time Water Quality Monitoring

System”.This paper describes to ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. In this paper, we present the design of IOT based water quality monitoring system that monitor the quality of water in real time. This system consists some sensors which measure the water quality parameter such as pH, turbidity,conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by microcontroller and this processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol. Finally, sensors data can view on internet browser application using cloud computing.

## 3.Exisiting problem

Existing system has a mechanisms which are semi-automated or manually controlled devices which are to be handled by a person responsible for monitoring the water quality. There is need to have human intervention in taking various reading of the water parameters.

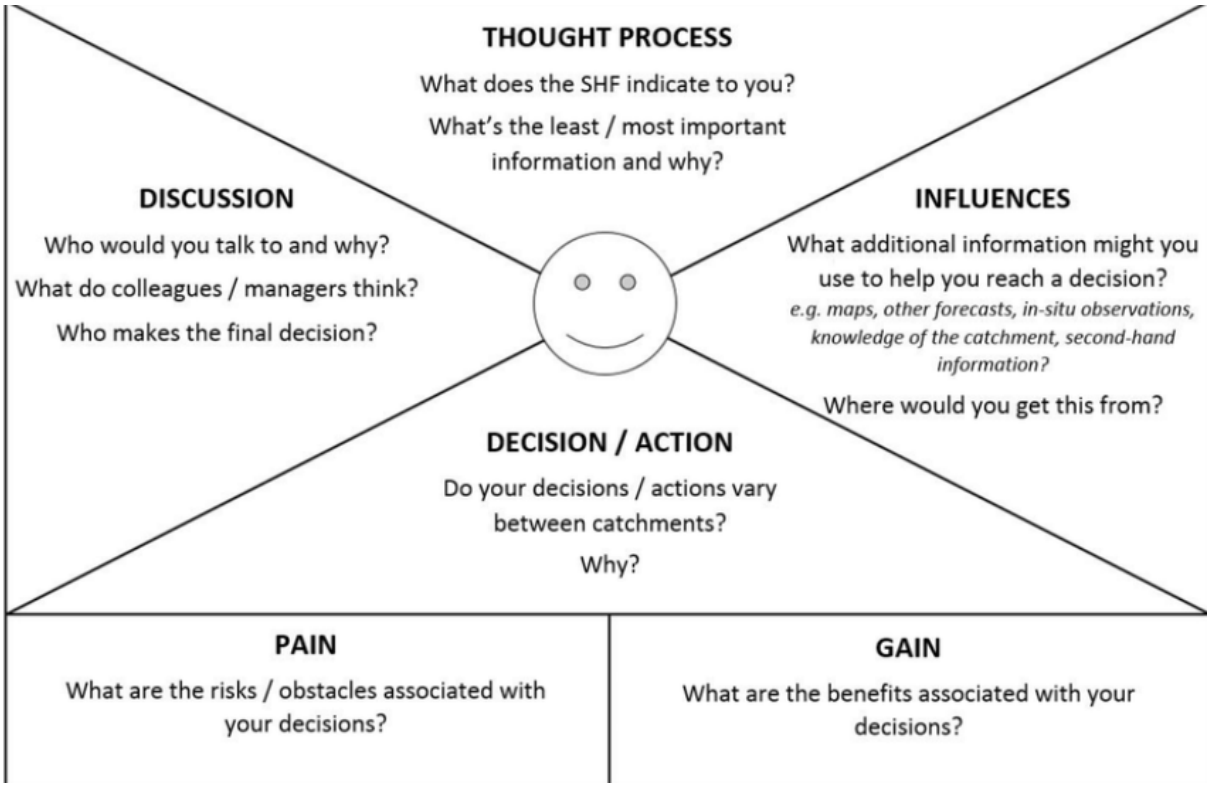
The instruments or tools are used either by putting/inserting a water sensing part into water and seeing the result on small display device or by directly inserting a portable device in water and watching the output on the display. Central Water Commission (CWC) monitors water quality, by collecting

samples from representative locations within the processing and distribution system.

These samples are analyzed at the well-equipped laboratories. At these laboratories, samples of raw water, filter water and treated water are taken for analysis, these analysis can be performed by human intervention which for specific period only. The disadvantage of this system is, water is not monitoring seamlessly, and it always needs a human intervention.

## 4.Ideation and problem solution

a.Empathy map canvas




b.Ideation and brain storming

## 2 Brainstorm

Write down any ideas that come to mind that address your problem statement.

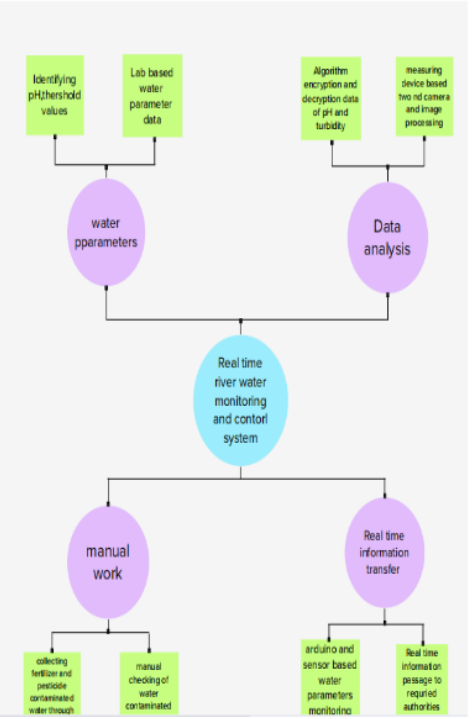
⏱ 10 minutes

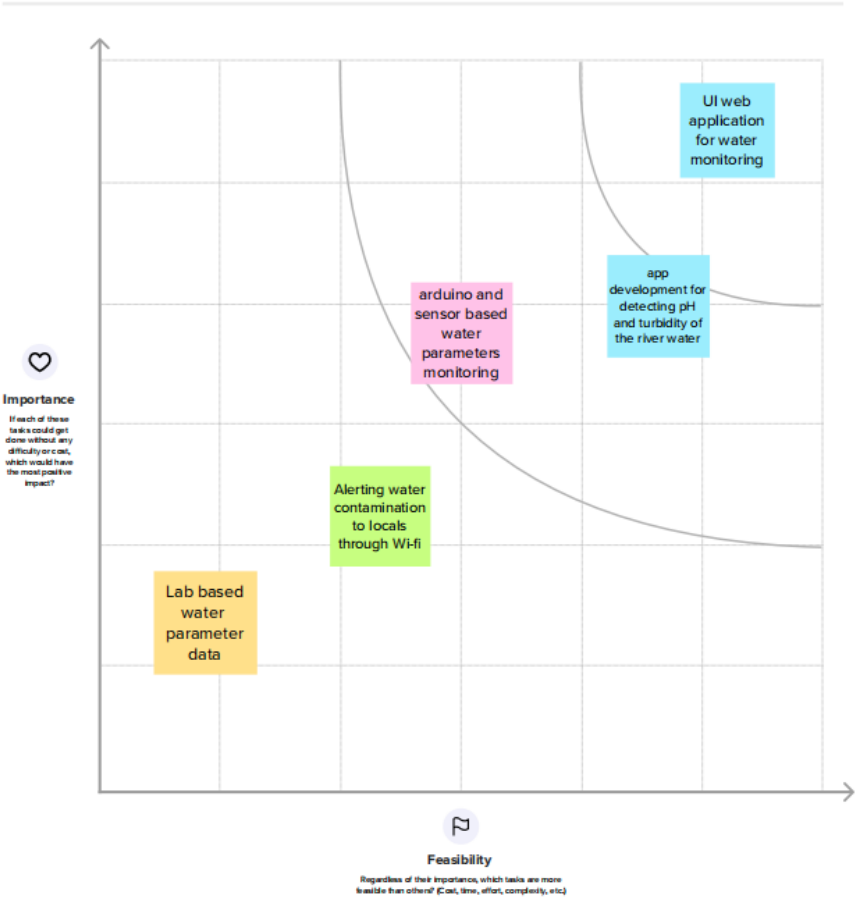
| S.Keerthana | s.bharathi | .R.Deepika | M.Dharshini |
|---|---|---|---|
| using GPRS for tracking the location of highly infected area | UI web application for water monitoring | wireless network based water parameter data collection | app developing for detecting pH ,turbidity and temperature of river water |
| pH ,turbidity ,temperature sensors connected with arudino | Biological and chemical changes identification of water by conventionel methods | collecting fertilizer and pesticide contaminated water through field site ridges | manual checking of water contamination by paper report |

## 3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up in to smaller sub-groups.

⏱ 20 minutes






c.Proposed solution

In our proposed method, an assembled Arduino microcontroller is used as the core controller of the system. Once the code is uploaded to the microcontroller, no PC system, keyboard command, monitor is required to operate the system.The system functions automatically and independently according to the code uploaded to the microcontroller. In this system, three sensors are used to measure the essential water parameters. As it was studied from the previous researches, the most essential water parameters needed to be monitored by the

average users are water pH level, water turbidity (cloudiness) and water temperature which is a measurement of the amount of the water in a container.Therefore, four essential water parameters which are temperature, pH level and turbidity can be measured by this proposed system. Sensors circuits are connected to the microcontroller and the probes of the turbidity, pH, and temperature sensors placed inside the water.

A water proof temperature sensor is used to avoid any damage or electrical shock to the system and the user. An ultrasonic sensor is used to measure the level of the water in thecontainer. The ultrasonic sensor is connected in the system such that it will be placed on the top of the water container.The ultrasonic sensor sends electromagnetic waves to the water surface and receives the wave back after touched the water surface. From the time taken to send and receive the wave by the ultrasonic sensor and the velocity of the electromagnetic waves, the distance which shows the water level in the container is calculated by the microcontroller.

All sensors read the water quality parameters and send the data to the microcontroller in the form of electrical signals.The microcontroller is programmed such that is will analyze the result and compare it with the standard ranges which are predetermined in the code. If any water parameter crossed the standard limit, the alarm system will turn on.

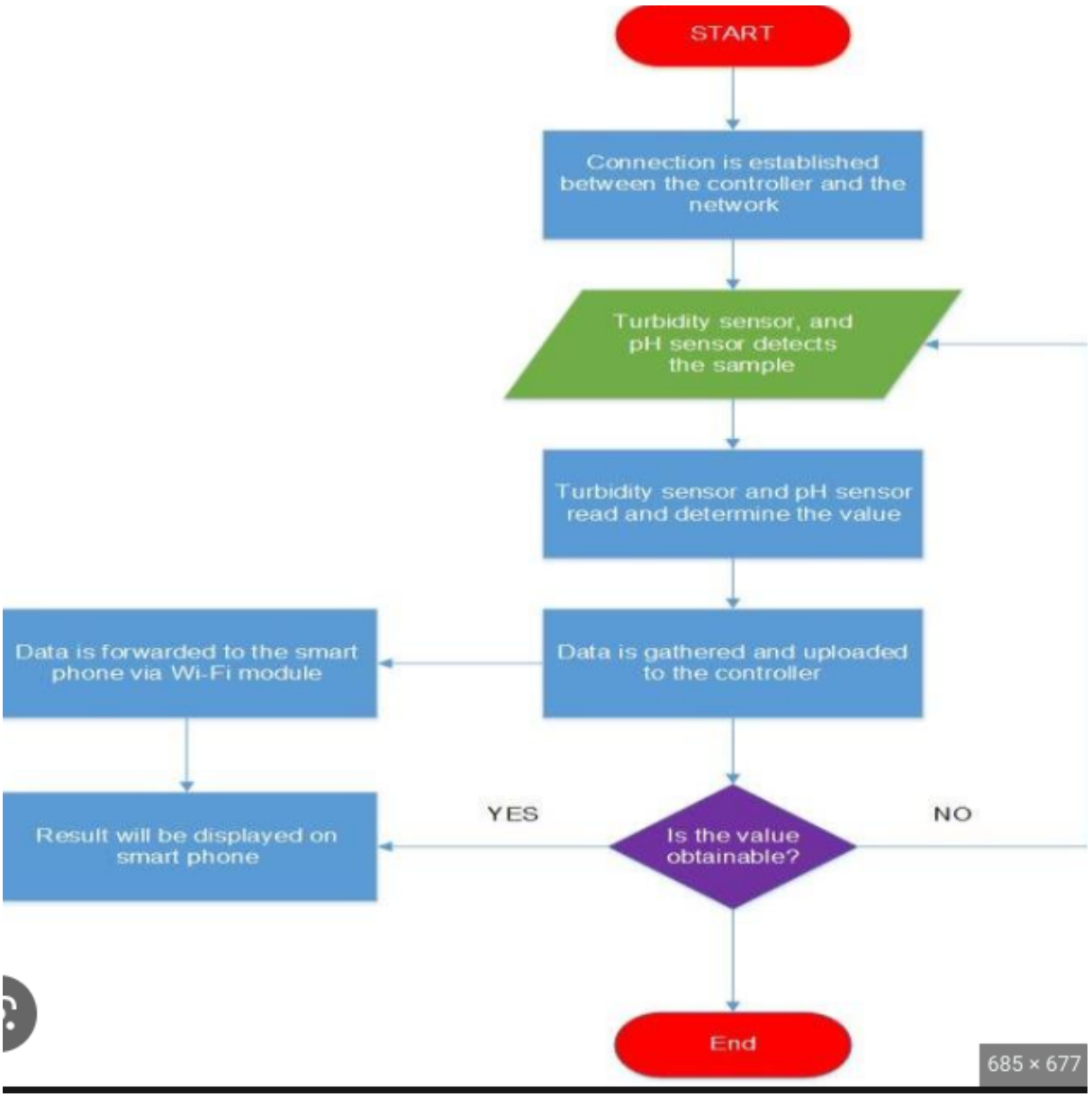
In case of any abnormality in a water parameter detected by the microcontroller, the buzzer will buzz to indicate that the water is not proper for use. To show the sensor readings

(Thewater parameters) on the device itself, an LCD (Liquid Crystal Display) screen is used. The LCD screen is connected to the microcontroller, and through the wired connection, it receives the sensor readings from the microcontroller and displays them accordingly.

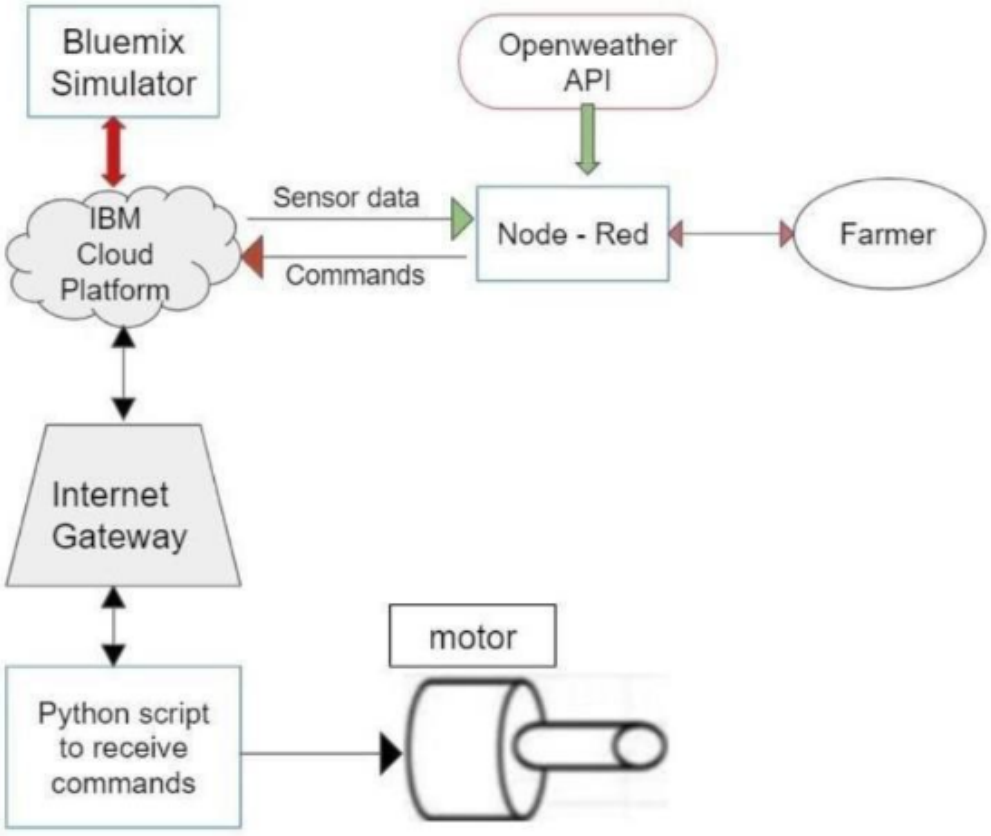
## 4.Project design

a.Data Flow Diagrams

A Data Flow Diagram(DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information and where data is stored.




b.Solution & Technical Architecture




## 6.Project planning and scheduling

a.Sprint Planning & Estimation

| | | | |
|---|---|---|---|
| 1 | Analysis the github platform. | Assign the team members and create repository in the Github, Assign the task to each members and teach how to use and open and class the Github and IBM career education . | 1 WEEK |
| 2 | Initiate the project | Advice students to attend classes of IBM portal create and develop an rough diagram based on project description and gather of information on IOT and IBM project and team<br>leader assign task to each member of the project . | 1 WEEK |
| 3 | Learning<br>- | Team members and team lead must watch and learn from classes provided by IBM and NALAYATHIRAN and must gain access of MIT license for their project. | 4 WEEK<br>- |

| | | | |
|---|---|---|---|
| 4 | Budget and scope of project | Budget and analyze the use of IOT in the project and | 1 WEEK |
| | | discuss with team for budget prediction to predict the favorability for the customer to buy | |

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## 7.Advantages

Using different sensors ,this system can collect various parameter from water such as PH dissolved oxygen,turbidity,conductivity,temperature and so on.It provides a novel approach to real time data acquisition.

## 8.Conclusion

In this work, the design and demonstration of a prototype remote, automatic, portable, real time, and low cost water quality monitoring system is described. In this system, low cost components i.e. microcontroller, LCD screen and other components are used to achieve the objectives of the proposed design with acceptable accuracy.Compared to the previous

related works, the cost of the system prototype is considerably low. Toensure the portability of the device, a self-made, small size Arduino microcontroller is used. The developed system was tested under different conditions, with solution of water with different impurities, and in different periods of time.

The results of the test for all times have been successful. We conclude that all the objectives of the proposed system have been achieved. To test more parameters of the water quality for some applications, other sensors can be included in the system. The system has wide application and it is usable and affordable by all categories of users.

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