Project Design Phase-I
Proposed Solution

Date	24 September 2022
Team ID	PNT2022TMID32972
Project Name	Project – Real Time River Water Quality Monitoring and Control System
Maximum Marks	2 Marks

Proposed Solution :

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Pollution of water is one of the main threats in recent times as drinking water is getting contaminated and polluted. The polluted water can cause various diseases to humans and animals, which in turn affects the life cycle of the ecosystem. If water pollution is detected in an early stage, suitable measures can be taken and critical situations can be avoided. To make certain the supply of pure water, the quality of the water should be examined in real-time. Smart solutions for monitoring of water pollution are getting more and more significant these days with innovation in sensors, communication, and Internet of Things (IoT) technology. In this paper, a detailed review of the latest works that were implemented in the arena of smart water pollution monitoring systems is presented. The paper proposes a cost effective and efficient IoT based smart water quality monitoring system which monitors the quality parameters uninterruptedly. The developed model is tested with three water samples and the parameters are transmitted to the cloud server for further action.
2.	Idea / Solution description	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 (The

		water 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.
3.	Novelty / Uniqueness	• To measure various chemical and physical properties of water like pH, temperature and particle density of water using sensors. • Send the data collected to a Raspberry Pi, show the data in display and send it to a cloud based Database using Wired/Wireless Channel. • Trigger alarm when any discrepancies are found in the water quality. • Data visualization and analysis using cloud based visualization tools.
4.	Social Impact / Customer Satisfaction	The main objectives of this research were to assess the level of customer satisfaction on urban water supply services of Southern Region, Ethiopia, and identify major determinants. Quantitative data were collected from 8,413 customers in seventeen towns, using a questionnaire based on the SERVQUAL model. Qualitative data were collected from customers via focus group discussion, and interviews were used with utility employees and officials. The results showed 47% of customers were satisfied with the water supply enterprise services, while 43% were dissatisfied for various reasons. The customer satisfaction score was below the acceptable level for all service quality dimensions, and understanding of customers, communication, and responsiveness were far below the benchmark. The correlation analysis revealed the existence of a monotonic, positive relationship between customers' total satisfaction and service quality dimensions. The proportional odds model indicated that total customer satisfaction was highly dependent on the nine service quality dimensions used in this research.

5.	Business Model (Revenue Model)	• We can sell this technology to the industries and also to the small scale and large scale industries to develop their industrial security and wellness. • We can also provide it as a service based to earn money out of it. • For example we may offer our services to the company as a contract for a period of time to make revenue.
6.	Scalability of the Solution	The scalability on this model is high as there are involves more demand on safety and security of workers and the companies too.so, the danger the losses caused are get reduced by this system. And we need lesser man power to work with this kind of activities