Project Report

INTRODUCTION

Project Description:

Water is considered as a vital resource that affects various aspects of human health and lives. The quality of water is a major concern for people living in urban areas. The quality of water serves as a powerful environmental determinant and a foundation for the prevention and control of waterborne diseases. However predicting the urban water quality is a challenging task since the water quality varies in urban spaces non-linearly and depends on multiple factors, such as meteorology, water usage patterns, and land uses, so this project aims at building a Machine Learning (ML) model to Predict Water Quality by considering all water quality standard indicators.

Purpose:

- l'o evaluate the quality of wateí and deteímine the safety of wateí.
- l'o monitoí changes in wateí quality.
- l'o deteímine whetheí wateí is suitable foí the health of the natuíal enviíonment.
- l'o deteímine whetheí wateí is suitable foí human consumption and otheí uses.

LITERATURE SURVEY

Problem Statement:

One in nine people worldwide uses drinking water from unimproved and unsafe sources. 2.4 billion people live without any form of sanitation.

- Water is one of the most essential for the existence of life. The safety and accessibility if drinking-water are major concerns throughout the globe.
- Water makes up about 70% of the surface and is one of the most important sources vital to sustaining life.
- Water quality has been conventionally estimated through expensive and time consuming lab and statical analysis.
- This system is proposed to check the water quality and warm the user before water gets contaminated using Machine Learning.

References:

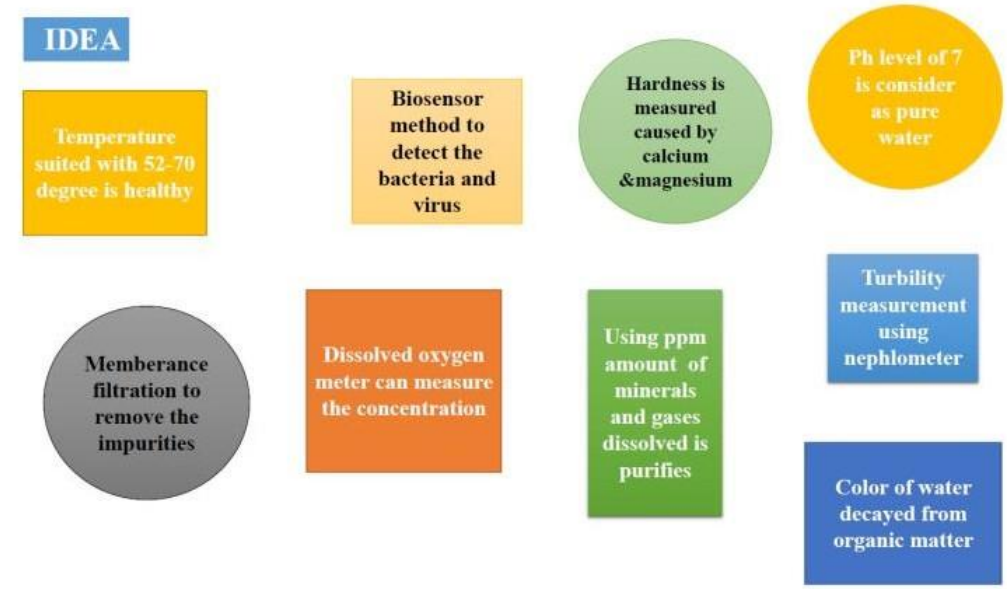
Abobakr Saeed Abobakr Yahya , Ali Najah Ahmed , Faridah Binti Othman , Rusul Khaleel Ibrahim , Haitham Abdulmohsin Afan , Amr El-Shafie , Chow Ming Fai , Md Shabbir Hossain , Mohammad Ehteram and Ahmed Elshafie "**Water Quality Prediction Model Based Support Vector Machine Model for Ungauged River Catchment under Dual Scenarios**"

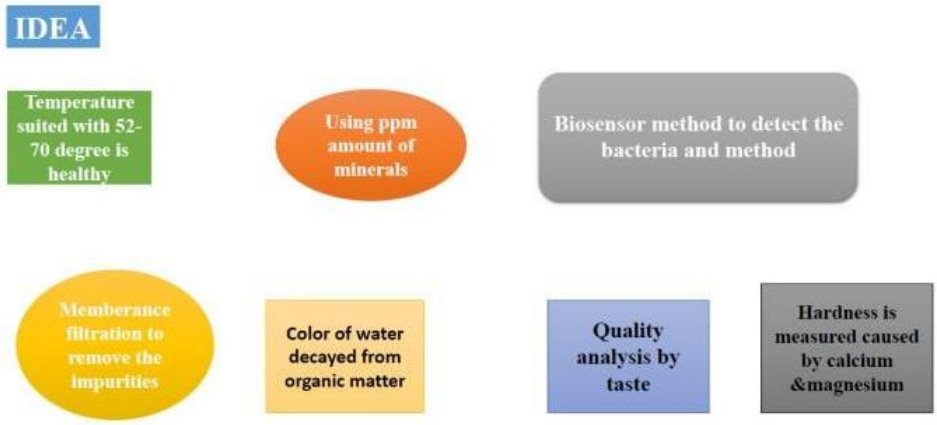
Water | Free Full-Text | Water Quality Prediction Model Based Support Vector Machine Model for Ungauged River Catchment under Dual Scenarios (mdpi.com)

IDEATION AND PROPOSED SOLOUTION

Empathy Map:

Ideation & Brainstorming:

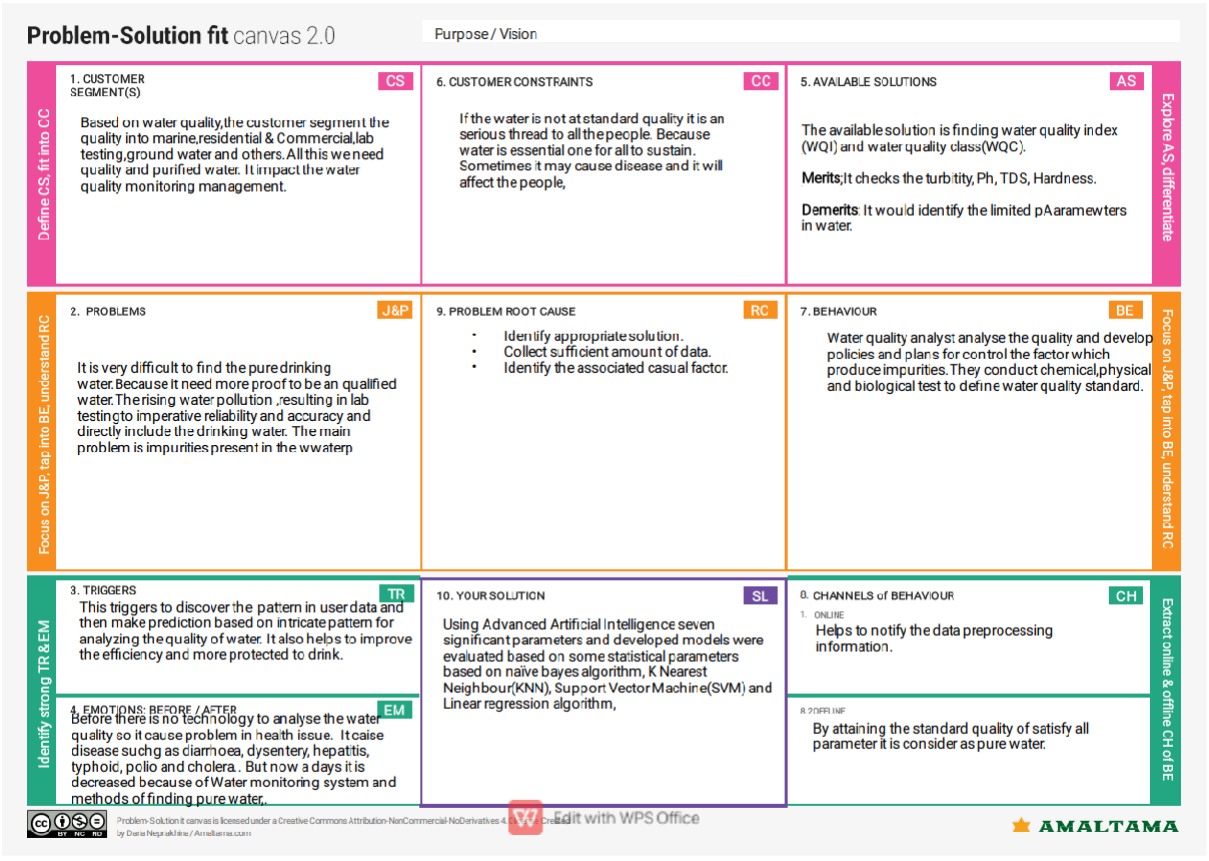




Proposed Solution:

S.No	Parameter	Description
1.	**Problem Statement (Problem to be solved)**	Efficient Water Quality Analysis and Prediction using Machine Learning.
2.	**Idea / Solution description**	For the WQI prediction, artificial neural network models, namely nonlinear autoregressive neural network (NARNET) and long short-term memory (LSTM) deep learning algorithm, have been developed. In addition, three machine learning algorithms, namely, support vector machine (SVM), Knearest neighbour (K-NN), and Naive Bayes, have been used for the WQC forecasting. The used dataset has 7 significant parameters, and the developed models were evaluated based on some statistical parameters
3.	**Novelty / Uniqueness**	In previous they find water quality with help of WQI and WQC. Now the solution is find with help of advanced artificial intelligence and it include seven parameters
4.	**Social Impact / Customer Satisfaction**	During the last years, water quality has been threatened by various pollutants. Therefore, modelling and predicting water quality have become very important in controlling water pollution. In this work, advanced artificial intelligence (AI) algorithms are developed to predict water quality index (WQI) and water
5.	**Business Model (Revenue Model)**	The revenue stream include the Promoted trends and method. Technology and production is improved in business side. It increased the profit and also the logistic way.
6.	**Scalability of the Solution**	Scalability of this solution can handle any amount of data and perform many computations in a cost effective and time saving to instantly serve millions of users residing at global location .

Problem Solution fit:



REQUIREMENT ANALYSIS

Functional requirement:

FR. No.	**Functional Requirement (Epic)**	**Sub Requirement (Story / Sub-Task)**
FR-1	User registration	Registration through Gmail Create an account Follow the instructions
FR-2	User Confirmation	Confirmation via Email and it is predicted by water level sensor
FR-3	Interface sensor	Interface sensor and Water level sensor produces the detection of clean drinking water
FR-4	Accessing datasets	Datasets are collected by data preprocessing method.
FR-5	Mobile application	The efficient of water quality is analyzed, the mobile application is not used ..

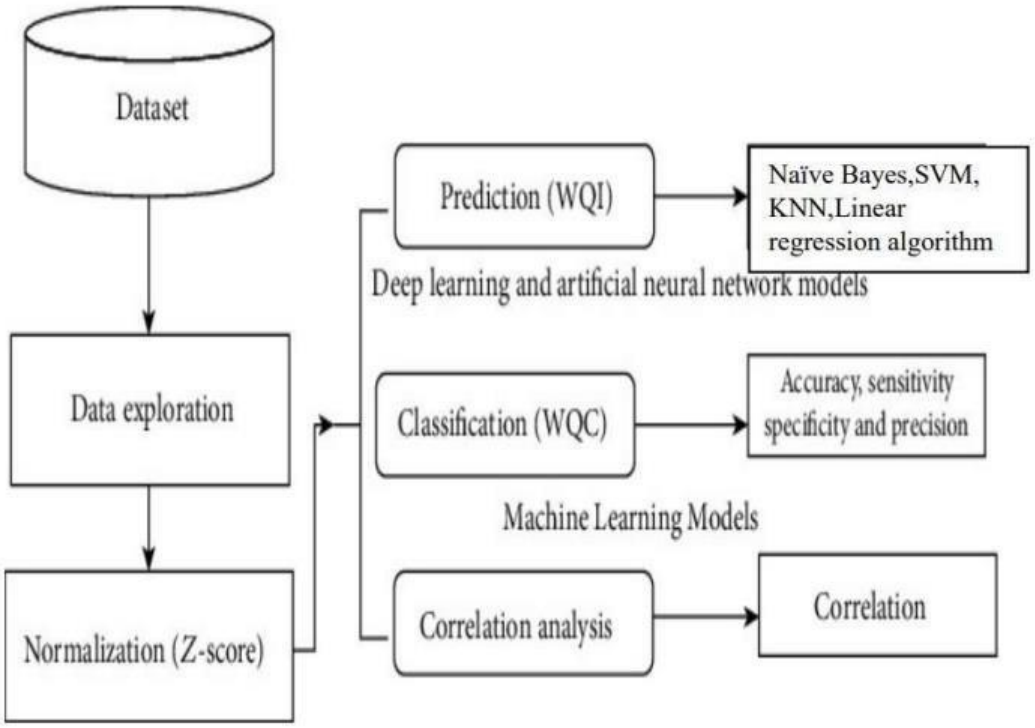
Non-functional Requirements:

FR NO.	**Non-Functional Requirement**	**FR No. Non-Functional Requirement Description**
NFR-1	**Usability**	This project is useful for all human being by predicting a purified water.

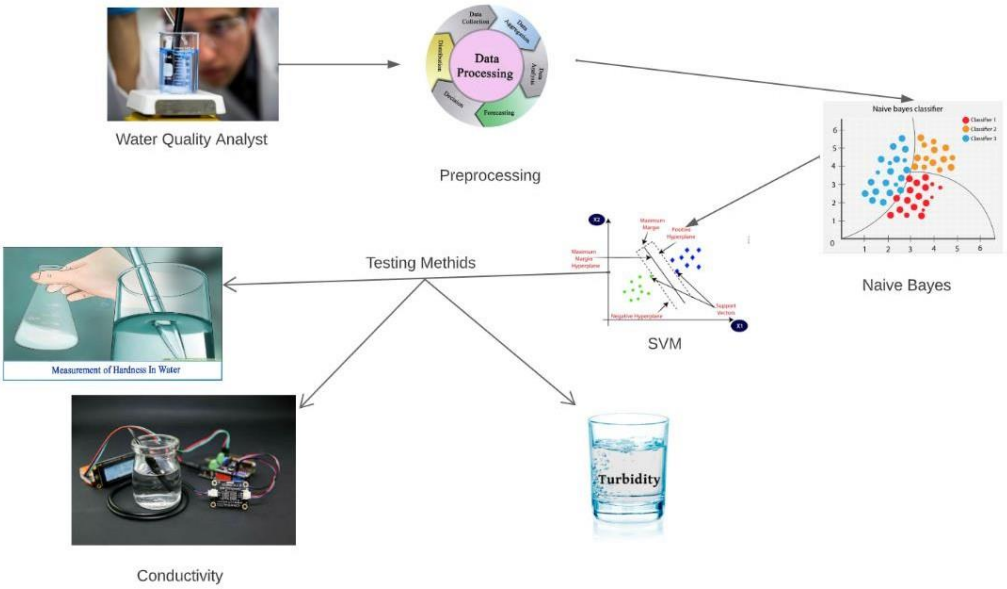
NFR-2	**Security**	We have designed this project to secure the people from drinking the impurity water.
NFR-3	**Reliability**	This project will help everyone in protecting their health. Accurate water quality prediction is the basis of water environment management and is of great significance for water environment protection
NFR-4	**Performance**	This system uses different sensors for monitoring the water quality by determine pH,Turbidity,conductivity and temperature. The data preprocessing access the dataset. With the use of this we predict the quality water.
NFR-5	**Availability**	By developing and deploying resilient hardware and software we can analyze the drinking water .
NFR-6	**Scalability**	This project used to measure and determine the quality of water. This provide pollution free and purified water.

PROJECT DESIGN

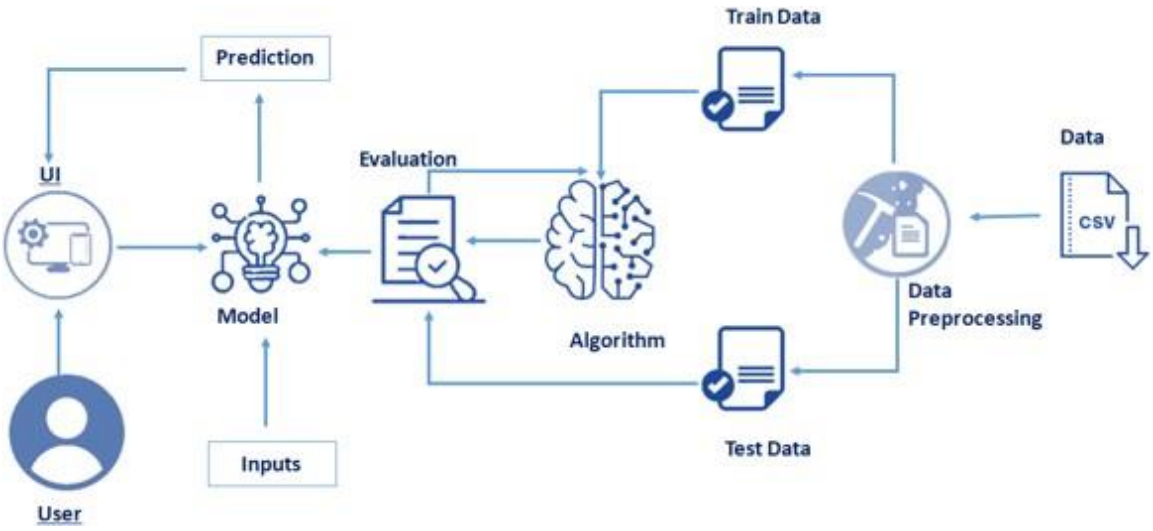
Data Flow Diagrams:



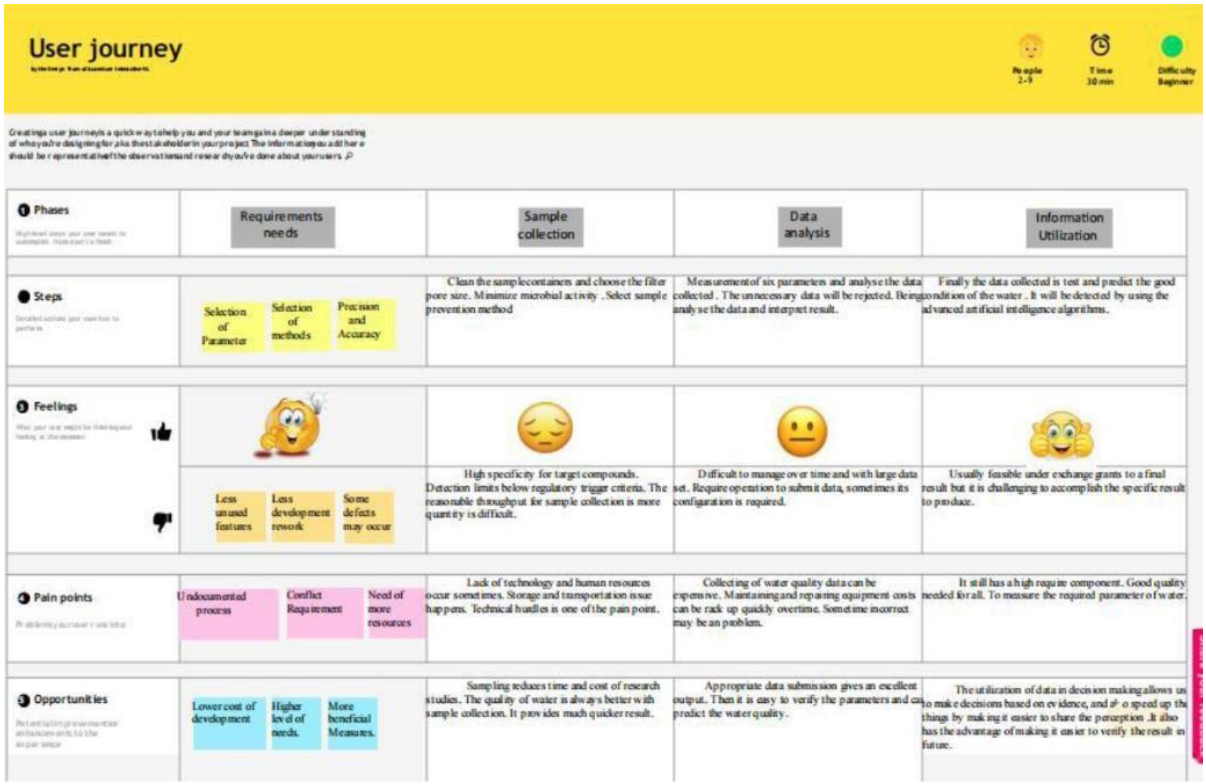
Solution Architecture:



Technical Architecture



User Journey



PROJECT PLANNING & SCHEDULING

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Jaffrin Deno M
Sprint-2	User Confirmation	USN-2	As a user, I will receive confirmation email once I have registered for getting the data set.	1	High	Sharan Gonsalous Johni
Sprint-3	Login	USN-3	As a user, I can login to the application by entering my email and password.	1	High	Manoj A
Sprint-4	Home Page	USN-4	As a user, I can find the data set to analyse waterquality.	2	High	Juan Simon Boris V

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	4 Days	24 Oct 2022	27 Oct 2022	20	29 Oct 2022
Sprint-2	20	5 Days	28 Oct 2022	01 Nov 2022	20	04 Nov 2022
Sprint-3	20	8 Days	02 Nov 2022	09 Nov 2022	20	11 Nov 2022
Sprint-4	20	9 Days	10 Nov 2022	18 Nov 2022	20	19 Nov 2022

S.NO	MILESTONE	DESCRIPTION	DURATION	Working Status
1.	Prerequisites	Prerequisites are all the needs at the requirement level needed for the execution of the different phases of a project.	1 WEEK	Completed
2.	Ideation	Ideation process is where you generate ideas and solutions through sessions such as Sketching, Prototyping, Brainstorming, Worst Possible ideas and wealth of other techniques.	1 WEEK	Completed
3.	Project design phase	Project design is an early phase of a project where the project's key features, structure, criteria for success, and major deliverables are planned out. The	1 WEEK	Completed

		aim is to develop one or more designs that can be used to achieved the desire goals.		
4.	Project Planning Phase	In the Planning Phase, the Project Manager works with the team to create the technical design, task list, resources, communication plan, budget and initial schedule for project.	1 WEEK	Completed
5.	Data Collection and Data pre - processing	A Data collection is a process of gathering and measuring information on variables to ensure accuracy and facilitate analysis. It help to solve the critical workloads.	1 WEEK	Completed
6.	Model Building	Model Building is used for project visualization to provide information about the proposed state. It helps to identify the quality of objectives and it formulate the conceptual model.	4 WEEKS	Completed
7.	Develop Application	A web application is application software that runs in a web browser, unlike software programs that	4 WEEKS	Completed

		run locally and natively on the operating system of the device.		
8.	Project development phase	Project development is the process of planning and allocating resources to fully develop a project or product from concept to go - live.	4 WEEKS	Completed

CONCLUSION:

The prediction of water quality is very vital in monitoring the pollution and in sustaining the availability of potable water resources. Undoubtedly, it can afford early warnings when the water quality changes as well as it can reduce the adverse consequences resulting from the poor water quality. Herein, the SVM approach was introduced to estimate the water quality of Langat River Basin using six parameters. The presented model accurately estimated the water quality factors with relatively minor prediction errors, proving a quite efficient and robust performance. The model also can help in the optimization of water quality monitoring plans by decreasing the frequency, quantity of sampling sites, and water quality factors. Prediction precision with the maximum error was equal to 1% and CC was equal to 0.9987. Even though the outcomes seem to be reasonable, the application of water quality parameters is quite sensitive to the error level. 1% as a maximum error is comparatively on the higher side in such an application which triggers the need to improve it. In this regard, it is suggested to deploy the optimal kernel parameters determined and choose the Nu-RBF model as the optimal model.