

Project Design Phase-II Technology Stack (Architecture & Stack)

Date	14 October 2022
Team ID	PNT2022TMID17967
Project Name	Project - Efficient Water Quality Analysis and Prediction using Machine Learning
Maximum Marks	4 Marks

Technical Architecture:

Efficient Water Quality Analysis and Prediction using Machine Learning

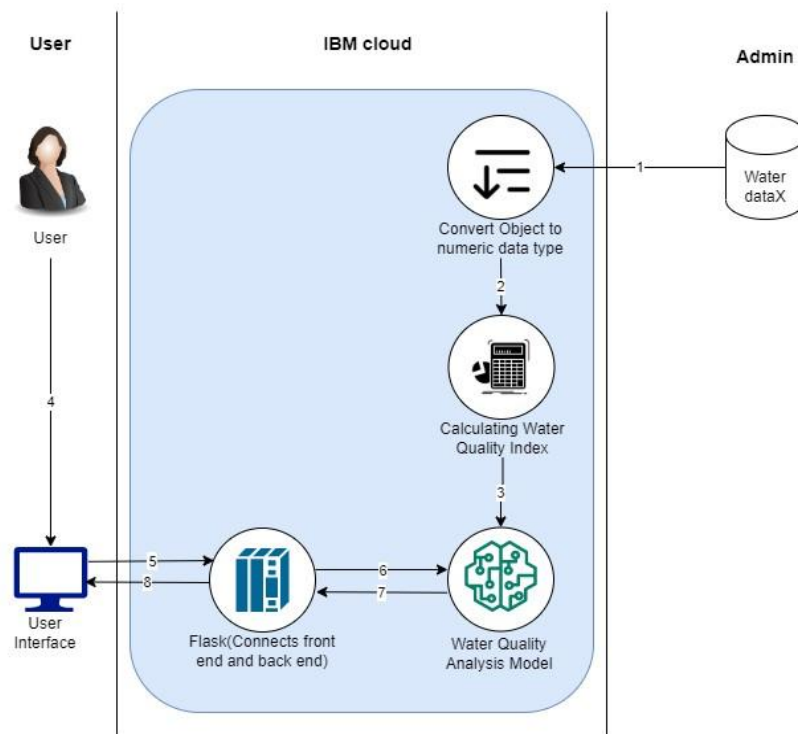


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Variety of frameworks, libraries and supports are required to develop the project.	Java / Python
3.	Application Logic-2	<p>Helps in predicting the Water Quality Index(WQI) using various Regression and Water Quality Classification using various Classification algorithms based on various parameters involved.</p> <p>It also helps in predicting the probability of water samples and also recommends various purification methods based on the impurities present in the water sample.</p>	IBM Watson STT service
4.	Application Logic-3	Provides fast, accurate and consistent results of water quality analysis and interprets the results in a easy understandable manner.	IBM Watson Assistant
5.	Database	It can be numerical, categorical or time series data.	MySQL, NoSQL, etc.
6.	Cloud Database	Enables the user to host the database on his/her own hardware without buying additional hardware.	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage should be highly flexible, scalable, effective and a reliable one.	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Used to access the information in the cloud.	IBM Weather API, etc.
9.	External API-2	Used to access the information for data driven decision making.	Aadhar API, etc.

10.	Machine Learning Model	Machine Learning(ML) model replicates a decision process to enable automation and understanding. ML models are mathematical algorithms that are “trained” using data and human expert input to replicate a decision an expert would make when provided that same information.	Regression and Classification Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration:Install the windows version and execute the installer.	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	<p>Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries.</p> <p>IBM's hybrid multicloud platform is based on open technologies, it allow you to more securely deploy, run and manage your data and applications on the cloud of your choice — without the risk of being locked in.</p> <p>The Jupyter Notebook is a web application that allows you to create and share documents that contain live code, equations, visualizations, and narrative text.</p>	Flask, IBM cloud, Jupyter.
2.	Security Implementations	SHA-512 is a hashing algorithm used to convert text of any length into a fixed-size string. Each output produces a SHA-512 length of 512 bits. This algorithm is commonly used for email addresses hashing, password hashing, and digital record verification.	SHA-512

S.No	Characteristics	Description	Technology
3.	Scalable Architecture	Change the behaviour of a system or model whose components interact in multiple ways and follow local rules, leading to nonlinearity, randomness, collective dynamics, hierarchy, and emergence.	Data, models operate at different sizes, speed, consistency and complexity.
4.	Availability	The availability of application (e.g. use of load balancers, distributed servers etc.)	It can be availed by all kinds of customers who wish to test the quality of water they consume.
5.	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) etc.	Gives correct and effective prediction, easy accessibility to the results using Machine Learning.