Project Report Format

Real-Time River Water Quality Monitoring And Control system

Python IDLE

RAM-Minimum 4GB Processor-Min. Configuration

OS-Windows/Linux/MAC

1.INTRODUCTION

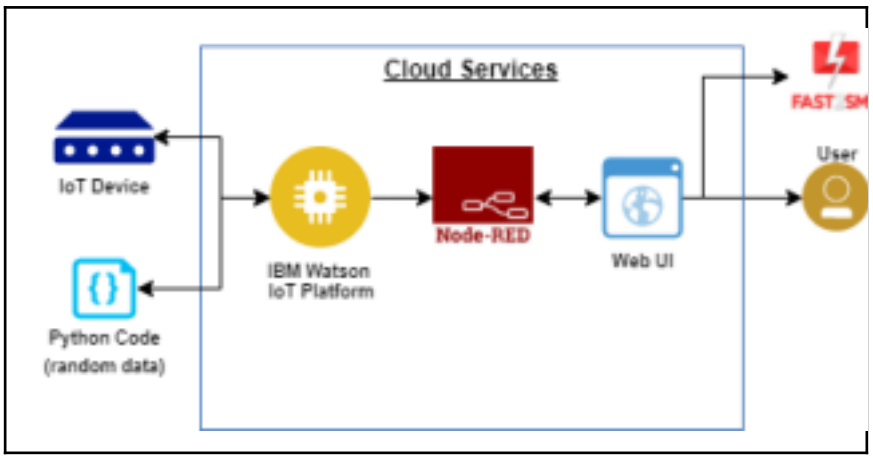
• River water quality can be monitored by the web application. • Can be able to know if there are any dust particles present in the water. • The PH level of the water can be monitored.

• Water temperature can be monitored.

• Alerting the authorities if the water quality is not good so that they can go and announce the localities not to drink that water.

1.1 PROJECT OVERVIEW

Technical Architecture:



1.2 PURPOSE

Note: Use random values in python for sensor data as physical hardware is not available.

2.Prerequisites

To complete this project, you must have knowledge of the following:

You need to have basic knowledge of the following cloud services:

- IBM Watson IoT Platform
- Node-RED Service
- Cloudant DB

You need to create an IBM Cloud Account
Refer to the below video for Account creation:

2.1 IBM Cloud Services

You need to have basic knowledge of the following cloud services:

- IBM Watson IoT Platform
- Node-RED Service

2.2 Software

Install the Python IDE

Watch for the reference video of python installation.
Install the required python libraries:

- Install Watson IoT Python SDK to connect to IBM Watson IoT Platform using python code:

give the following command in command prompt: pip install wiotp-sdk

Download the required files from the link

Create a fast SMS service for sending the messages and getting the API:

3.Project Objectives

By the end of this project you will:

- Gain knowledge of Watson IoT Platform.
- Connecting IoT devices to the Watson IoT platform and exchanging the sensor data.
- Gain knowledge on Cloudant DB
- Creating a Web Application through which the user interacts with the device.

Project Flow:

- Sending random pH values and turbidity values will be sent to the IBM IoT platform
- Sensors values can be viewed in the Web Application
  - Notifies the admin the random values cross the threshold value To

accomplish this, we have to complete all the activities and tasks listed below:

Create and configure IBM Cloud Services
- Create IBM Watson IoT Platform
  - Create a device & configure the IBM IoT Platform
- Create Node-RED service
  - Create a database in Cloudant DB to store location data

Develop a web Application using Node-RED Service.
- Develop the web application using Node-RED

Develop a python script to publish the location details to the IBM IoT platform

4.Create And Configure IBM Cloud Services

In this milestone, create and configure the IBM Cloud services which are being used in completing this project.

4.1 Create IBM Watson IoT Platform And

Device

- IBM Watson IoT platform acts as the mediator to connect the web application to IoT device, so create the IBM Watson IoT platform. ● In order to connect the IoT device to the IBM cloud, create a device in the IBM Watson IoT platform and get the device credentials.
- Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform.

4.2 Create Node-RED Service

To create a web application create a Node-RED service.

Refer to the below video for reference:

5.Develop The Python Script

Develop a python script to publish random sensor data to the IBM IoT platform

5.1 Develop A Python Script

Develop a python code for publishing random sensor data (Water turbidity, pH values, if required temperature) to the IBM IoT Platform.

5.2 Publish Data To The IBM Cloud

Python code is used to send random sensor data to the cloud and also to receive commands from the cloud.

Below is the reference link provided for the python program to publish and subscribe from the IBM Watson IoT Platform.

When the commands are received just print the statements which represent the control of the devices.

6. Develop A Web Application Using

Node-RED Service.

A Web UI should be created in Node-RED using dashboard nodes available in it.

6.1 Develop The Web Application Using Node-RED

Configure the Node-RED flow to receive data from the IBM IoT platform.

And also use Cloudant DB nodes to store the received sensor data in the cloudant DB

(Refer to page no.36 in the below reference document)

6.2 Use Dashboard Nodes For Creating UI(Web App)

Refer to Page No. 28 in the below document to create use dashboard nodes to visualize the data in graphical format.

6.3 Create An HTTP Requests To Communicate With Mobile App

Create an HTTP API for communicating with Mobile applications. Refer to document from Page No. 79

7.Building Mobile App

Here we will build a basic mobile application to show the sensor data.

7.1 Design Your UI To Display The Water Turbidity, PH Values

Design your UI to display the Water Turbidity, and pH values sensor values.

Refer to Page No. 54 in the below reference document.

7.2 Configure The Application To Receive The Data From Cloud.

Configure the application to receive the data from the cloud.

Refer to page no.64 in the below reference document.

7.3 Configure The Mobile App For Controlling Motor Using Buttons.

Configure the mobile app to send commands to users using buttons

Refer to page no.78 in the below reference document

8. Ideation Phase

In this milestone you are expected to get started with the Ideation process.

8.1Literature Survey On The Selected Project & Information Gathering

In this activity you are expected to gather/collect the relevant information on project usecase, refer the existing solutions, technical papers, research publications etc.

8.2 Prepare Empathy Map

In this activity you are expected to prepare the empathy map canvas to capture the user Pains & Gains, Prepare list of problem statements.

8.3 Ideation

In this activity you are expected to list the ideas (atleast 4 per each team member) by

organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.

9. Project Design Phase – I

From this milestone you will be starting the project design phase. You are expected to cover the activities given.

9.1 Proposed Solution

In this activity you are expected to prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.

9.2 Problem Solution Fit

In this activity you are expected to prepare problem - solution fit document and submit for review.

9.3 Solution Architecture

In this activity you are expected to prepare solution architecture document and submit for review.

10. Project Design Phase -II

From this milestone you will be continue working on the project design phase. You are expected to cover the activities given.

10.1 Customer Journey

Prepare the customer journey maps to understand the user interactions & experiences with the application (entry to exit).

10.2 Functional Requirement

In this activity you are expected to prepare the functional requirement

document. **10.3 Data Flow Diagrams**

In this activity you are expected to prepare the data flow diagrams and submit for review. **10.4 Technology Architecture**

In this activity you are expected to draw the technology architecture diagram. **11. Project Planning Phase**

In this milestone you are expected to prepare milestones & tasks, sprint schedules. **11. 1Prepare Milestone & Activity List**

In this activity you are expected to prepare the milestones & activity list of the project. **11.2 Sprint Delivery Plan**

In this activity you are expected to prepare the sprint delivery plan.

12 .Project Development Phase

In this milestone you will start the project development and expected to perform the coding & solutioning, acceptance testing, performance testing based as per the sprint and submit them.

12.1 Project Development - Delivery Of Sprint-1 In

this activity you are expected to develop & submit the developed code by testing it.

12.2 Project Development - Delivery Of Sprint-2 In

this activity you are expected to develop & submit the developed code by testing it.

12.3 Project Development - Delivery Of Sprint-3 In

this activity you are expected to develop & submit the developed code by testing it.

12.4 Project Development - Delivery Of Sprint-4 In

this activity you are expected to develop & submit the developed code by testing it.