

Hydrological Modelling and Software Development

Assignment 2

Task to do:

100 marks

Create a web tool named “River water quality prediction tool” that allows users to select any one of the two modules, such as (1) River water temperature and (2) Saturated Dissolved Oxygen.

River water temperature should contain:

- Draw down button for the user to select the **input data** (Air Temperature) from the given source link/file.
- Another draw-down button beside the above is to select the **observed data** (river water temperature) from the given source link.
- Parallel to the above two buttons, another draw-down button to select the **Machine Learning models** (At least two ML models) for the prediction of the River water temperature.
- Beneath the above three buttons, there must be one more draw-down button to select the **performance measuring parameters** such as Root mean squared error (RMSE), Mean Absolute Error (MAE), and Mean Square Error (MSE).
- Finally, a **submit** button at the bottom, after clicking the submit the background code, should do river water temperature prediction. The prediction should be made by selecting the air temperature and observed river water temperature from the given source link for training and testing the selected ML model. And also to do the model performance evaluation using selected performance measuring parameters (RMSE, MAE, MSE). Give an option to the user to download the output file in Excel/CSV format.

Saturated Dissolved Oxygen should contain:

- The user should have two options, namely (1) **select data** and (2) **simulate data**.
- If a user selects “**select data**”, the user can choose the existing Excel/CSV file in which river water temperature contains. After choosing the file, it should calculate and display the Saturated Dissolved Oxygen based on the relationship equation taught in class.
- If a user selects the “**simulate data**”, it should go to the River water temperature module and the output file should be selected. According to the river water temperature data, it should calculate and display the Saturated Dissolved Oxygen based on the relationship equation taught in class.

Instructions:

- The observed river water temperature data was available in the link (select Water Quality Monitoring→ National Water Monitoring Program Monthly Data) from Jan 2015 to Feb 2023 with station names and codes.
https://pcb.ap.gov.in/UI/quality_monitoring.aspx

- The air temperature can be taken from the IMD source link https://www.imdpune.gov.in/cmpg/Griddata/Max_1_Bin.html
- Each group should work on the given station in the table below. You can use the latitude and longitude of the given station name for air-water temperature.
- Front-end Development can use any languages like HTML, CSS, JavaScript or any other. You can use any of these Python Flask, Django, or any other for back-end development.

Groups	Station name	Station code
Group 1	River Krishna at Veadri	1786
Group 2	River Palleru at Jaggaiahpet (before confluence with Krishna)	1178
Group 3	River Pennar at Siddavatam	30
Group 4	D/s of River Godavari at Rajahmundry (Dhavaleswaram)	1219
Group 5	River Nagavali at Thotapally Regulatory	1448
Group 6	River Vamsadhara at Kalingapatnam	2352
Group 7	River Thungabhadra at Bhavapuram	1174

Deadline: 02/09/2023

Note: Post all the queries related to the assignment in the moodle forum only