**Project 4 Proposal – GROUP 10**

**Project Overview:**

* **Title:** Rain Flow Level Forecast for Weather Stations
* **Duration:** 19/12/2023 to 09/01/2024
* **Team:** Hossein Falsafi, Foluke Daramola, Hieu Lam
* **Objectives:** Forecast rain flow for 7 days and establish a maintenance cluster for efficiency.

**Key Questions:**

* What is the forecasted rainfall for the next 7 days using historical data?
* What is the correlation between rain flow and water level?
* How are rain stations distributed across Perth (North, Metro, South)?
* Which stations provide sufficient data for machine learning and forecasting?
* What are the optimal maintenance routes, geographically close to each other?
* Can station availability be visualized, with red indicating faults?

**Scope:**

* Visualize rainfall flow data across Perth (around 100 stations from North to South).
* Forecast future rainfall.
* Develop maintenance plans.
* Analyze rainfall data from various stations.
* Identify optimal maintenance routes.
* Assess data quality in different stations.

**Limitations:**

* Data sourced specifically from Perth via[**https://weather.agric.wa.gov.au/map**](https://weather.agric.wa.gov.au/map)**.**
* Limited to 7 days of rainfall data.
* Insufficient data from faulty or inactive stations.

**Resources:**

* Data source:[**https://weather.agric.wa.gov.au/map**](https://weather.agric.wa.gov.au/map)**.**

**Steps:**

1. Identify station locations (latitude and longitude coordinates).
2. Extract data from stations using API.
3. Convert data into JSON format.
4. Develop a map using HTML and JavaScript for visualizations (create markers for weather stations).
5. Implement machine learning, specifically KMeans clustering for optimal clusters.
6. Utilize machine learning for rainfall forecasting.
7. Determine the correlation between rain flow and water level.

**Methodology:**

* Collect data from reliable sources, primarily[**https://weather.agric.wa.gov.au/map**](https://weather.agric.wa.gov.au/map)**.**
* Use Python Pandas and Matplotlib for data conversion (ETL) into JavaScript.
* Apply machine learning techniques integrated with mapping.

**Visualization:**

* Include a screenshot of the map in the final presentation.

The proposed project aims to forecast rain flow levels, optimize maintenance strategies, and visualize data across various weather stations in Perth, utilizing a comprehensive methodology that combines data extraction, conversion, machine learning, and mapping techniques.