Team Name: - Data Dynamos

Problem Statement: - Weather Data Analysis and Prediction

Problem Statement Description

Use weather datasets to predict different weather conditions for specific region. This can help in planning for agricultural, travel needs or etc.

Data Collection Methods

1. **Data Source:**
   The weather data was obtained from the *Time and Date* website (https://www.timeanddate.com/weather/uk/london/historic).
   This source provides detailed records of past weather observations.

2. **Method Of Data Collection:**
   The following is the method of data collection:
   - Web scraping from the Time and Date website for weather data.
   - Dynamic URL generation for each month in 2021.
   - Data retrieval using the **Requests** library.
   - HTML parsing with **BeautifulSoup** to extract weather details.
   - Data organized and stored in a structured format using **Pandas**.

3. **Tools Used:**
   The following Python libraries were employed for efficient data collection:
   - **BeautifulSoup:** For web scraping and parsing HTML data.
   - **Requests:** For sending HTTP requests to the data source and retrieving webpage content.
   - **Pandas:** For storing and manipulating collected data.

4. **Process:**
   The data collection process involved programmatically iterating over each month of the year 2021 by dynamically generating URLs corresponding to the dates. The weather data for each month was then scraped and stored. This approach allowed for the systematic collection of weather records across the entire year.

Data Categories

The dataset consists of the following key categories, representing the weather data collected for London over time:

- **Date with Day and Time:** The specific date with day and time when the weather observation was made.
- **Temperature (°F):** The recorded temperature for that particular day.
- **Humidity (%):** The percentage of humidity observed on the given date.
- **Wind Speed (m/s):** The wind speed recorded during the observation.
- **Weather Condition:** A description of the day's weather, such as "cloudy," "sunny," or "rainy."
- **Pressure (baro):** The wind speed and pressure recorded during the observation.

Each of these data categories will contribute to a comprehensive understanding of London's weather throughout the year, allowing for deeper analysis of the climate conditions.

Solution and Usage

The collected weather data can be utilized in several key ways some of them are:

- **Seasonal Trend Analysis**: Identifying patterns in temperature, humidity, and other weather elements across seasons to understand seasonal variations.
- **Weather Forecasting**: Developing machine learning models for predicting future weather using techniques like time series analysis.
- **Climate Change Insights**: Analysing long-term shifts in weather data to understand trends related to global warming and climate change.
- **Urban Planning Support**: Assisting policymakers in preparing for extreme weather, efficient resource management, and infrastructure planning based on seasonal weather changes.

Conclusion

This project uses web scraping with Python to collect and structure London's weather data, enabling analyses like climate change insights, machine learning predictions, seasonal trends or etc.

Attachments

- **Python File:** https://drive.google.com/file/d/1PBJO8Th3bHFnzd311tUfQHMST4kgZ6_O/view?usp=drive_link

- **Csv File:** https://drive.google.com/file/d/1wkjeF7u-OLiI7hIcE-uguNuWF4lhVRhY/view?usp=drive_link