

Synopsis

Title: Weather Analytics

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The dataset for this analysis is obtained using an open-source weather API named “Open-meteo.com” which has a ton of information that you can obtain about the weather for different locations. Some of the parameters which I have chosen to work with are displayed in the table below:

SNo	Parameter Name	Description
1	Temperature	Returns the temperature of a particular location 2 meters above the ground. (°C)
2	Humidity	Returns the relative humidity of a particular location 2 meters above the ground. (%)
3	Sunrise Times	Returns the time of day during which sunrise begins. (Time format)
4	Sunset Times	Returns the time of day during which sunset begins. (Time format)
5	Sunshine Duration	Return the total time for which sunshine lasts in a day in seconds. (seconds)
6	Daylight Duration	Return the total time for which daylight prevails in a day in seconds. (seconds)
7	Maximum Temperature	Returns the maximum temperature recorded in a day. (°C)
8	Minimum Temperature	Returns the minimum temperature recorded in a day. (°C)

Technologies: Python [pandas, matplotlib, numpy], Excel, Power BI

Software Requirements:

- ✓ **OS:** Windows, macOS, Linux
- ✓ **Code Editor:** Visual Studio Code

Hardware Requirements: min 4GB RAM (recommended 8GB), min Intel i5 (recommended i7+), SSD recommended (256GB for faster management)

Problem Statements

1. What are the day-to-day temperature patterns for any selected month in Delhi (2023)?
2. How do the average monthly temperatures in Delhi fluctuate throughout 2023?
3. How do yearly temperature averages compare across various Indian cities for 2023?
4. What is the relationship between temperature and humidity in Delhi for 2023, and how can it be represented using a scatterplot?
5. How can we visualize the correlation between temperature and humidity in Chennai for 2023 using a scatterplot?
6. How do sunshine and daylight hours change over the course of 2023 in Delhi?
7. What are the trends in sunshine and daylight duration in Chennai during 2023?
8. How do sunrise and sunset times shift throughout the year in Delhi (2023)?
9. What seasonal changes are observed in sunrise and sunset timings for Chennai in 2023?
10. What are the highest and lowest temperatures recorded each month in Delhi during 2023?
11. How do the maximum and minimum monthly temperatures in Chennai change over 2023?
12. How can the weather data be exported to an Excel file for further use or analysis?

Data Preprocessing Steps

1. **Data Cleaning:** Ensuring no missing/error values are fetched from the APIs
2. **Normalization:** Resolving complex parameters into simpler ones.
3. **Encoding Categorical Variables:** Converting parameters into relevant types

Implementation Steps

1. **Data Ingestion:** Loading the dataset
2. **Preprocessing:** Cleaning and transforming
3. **Exploratory Data Analysis:** Analyzing raw data to understand problem statements.
4. **Visualization:** Matplotlib, PowerBI to create charts
5. **Reporting:** Summarization valuable insights using dashboards, charts etc.

Dataset Used: [Link](#)

References – [open-meteo documentation](#)