## ClimateScope: Visualizing Global Weather Trends and Extreme Events

## Dataset Information

- Dataset Name: Global Weather Repository
- Source: Kaggle
- Format: CSV (Structured tabular data)
- Total Columns: 41
- Key Attributes:
    - country
    - location_name
    - last_updated
    - temperature_celsius
    - humidity
    - wind_kph
    - precip_mm
    - uv_index
    - air quality parameters

This dataset contains global weather observations from multiple countries and locations.

## Data Understanding

To understand the dataset structure, the following steps were performed:

- Used df.head() to inspect the first 5 rows
- Used df.shape() to check dataset dimensions
- Used df.info() to verify data types and non-null values
- Used df.columns() to review column names

## Data Cleaning & Preprocessing

The following preprocessing steps were performed:

- Checked missing values using df.isnull().sum()
  → No missing values found

- Checked duplicate records using df.duplicated().sum()
  → No duplicate entries found
- Converted the last_updated column into datetime format
- Extracted year and month from the datetime column for time-based analysis

## Aggregation & Analysis

- Calculated **monthly average temperature** using groupby()
- Calculated **monthly average humidity**
- Analyzed statistical distribution using df.describe()

## Data Visualization

The following visualizations were created:

- 📈 Line graph for Monthly Average Temperature
- 📈 Line graph for Monthly Average Humidity
- 🔘 Scatter plot for Temperature vs Humidity

These visualizations help identify seasonal trends and correlation patterns.

## Current Status

The dataset has been successfully cleaned, verified, transformed, and prepared for further statistical analysis and dashboard development.

## Conclusion

The dataset has been successfully cleaned and validated for accuracy.
No missing or duplicate values were found.
The data has been transformed for time-based aggregation and initial visual analysis.

All objectives defined under Milestone 1 have been successfully completed.