
Weather Data Analysis Report

Introduction

This report presents an analysis of a comprehensive weather dataset that includes hourly weather conditions for a specific location over a period of time. The dataset consists of **8784 rows** and **8 columns**, capturing various weather parameters such as **Temperature, Dew Point Temperature, Relative Humidity, Wind Speed, Visibility, Pressure,** and **Weather Conditions**. This analysis aims to identify weather patterns, trends, and provide insights into the weather conditions recorded.

Dataset Overview

The dataset includes the following columns:

- **Date/Time:** Timestamp of the recorded weather data.
- **Temp_C:** Temperature in degrees Celsius.
- **Dew Point Temp_C:** Dew point temperature in degrees Celsius.
- **Rel Hum_%:** Relative humidity percentage.
- **Wind Speed_km/h:** Wind speed in kilometers per hour.
- **Visibility_km:** Visibility in kilometers.
- **Press_kPa:** Atmospheric pressure in kilopascals.
- **Weather Condition:** Descriptive weather conditions (e.g., Clear, Fog, Snow).

Data Types and Unique Values

The data types for each column are as follows:

- **Date/Time:** Object
- **Temp_C:** Float64
- **Dew Point Temp_C:** Float64
- **Rel Hum_%:** Int64
- **Wind Speed_km/h:** Int64

- **Visibility_km:** Float64
- **Press_kPa:** Float64
- **Weather Condition:** Object

The dataset contains unique values ranging from **533** for Temperature to **50** for Weather Conditions, indicating a diverse range of recorded weather phenomena.

Key Findings

Weather Conditions

The most frequently recorded weather conditions include:

- **Mainly Clear:** 2106 instances
- **Fog:** Significant occurrences, particularly in the early hours.
- **Snow:** Recorded multiple times, especially during winter months.

Statistical Analysis

- **Mean Visibility:** The average visibility recorded is approximately **27.66 km**.
- **Standard Deviation of Pressure:** The standard deviation for atmospheric pressure is **0.84 kPa**, indicating variability in pressure readings.
- **Variance of Relative Humidity:** The variance in relative humidity is **286.25**, suggesting fluctuations in humidity levels.

Weather Trends

- **Temperature Trends:** The dataset shows a range of temperatures, with a maximum of **32.8°C** and a minimum of **-23.3°C** recorded under different weather conditions.
- **Wind Speed Analysis:** Wind speeds varied, with a maximum recorded speed of **39 km/h**.

Instances of Specific Weather Conditions

- **Snow:** Instances of snow were recorded multiple times, with specific filtering revealing **583 rows** where snow was noted.
- **Fog:** A total of **150 rows** were identified where fog conditions were present.

Additional Findings from Python Calculations

- **Maximum Temperature:** The highest temperature recorded was **32.8°C**.
- **Minimum Temperature:** The lowest temperature recorded was **-23.3°C**.
- **Average Wind Speed:** The average wind speed was calculated to be **15.4 km/h**.