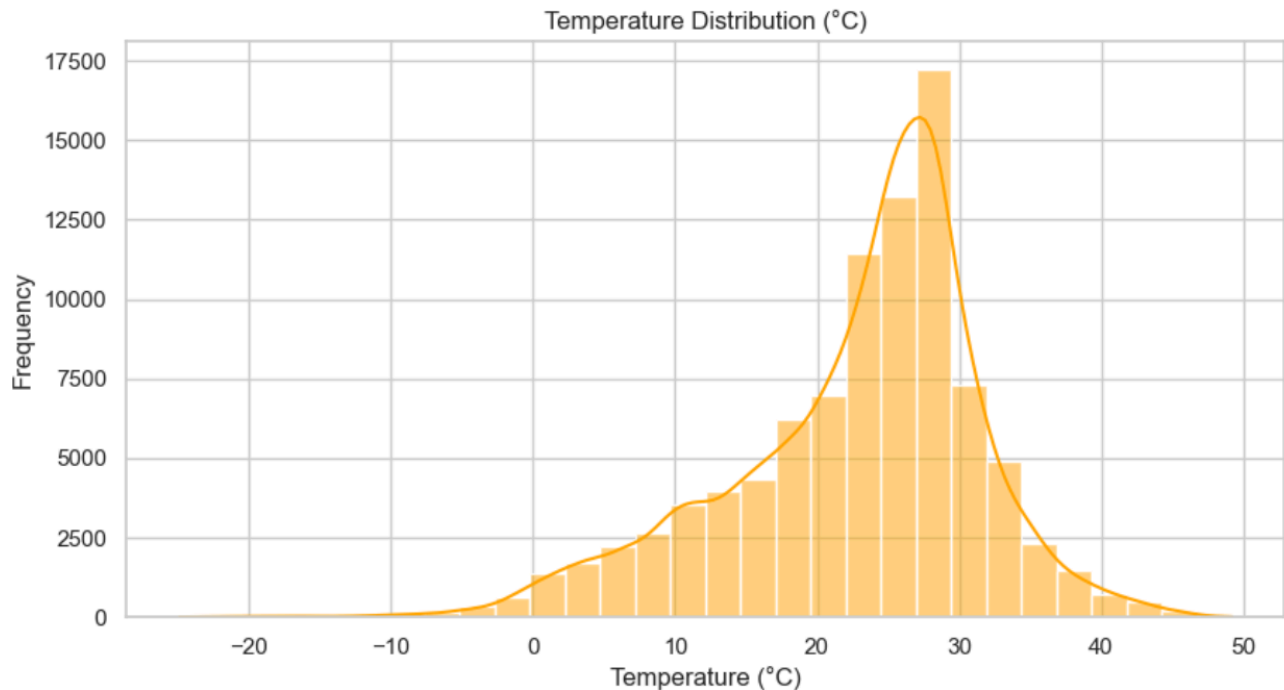


# 1. Temperature Distribution (°C)



## Explanation :

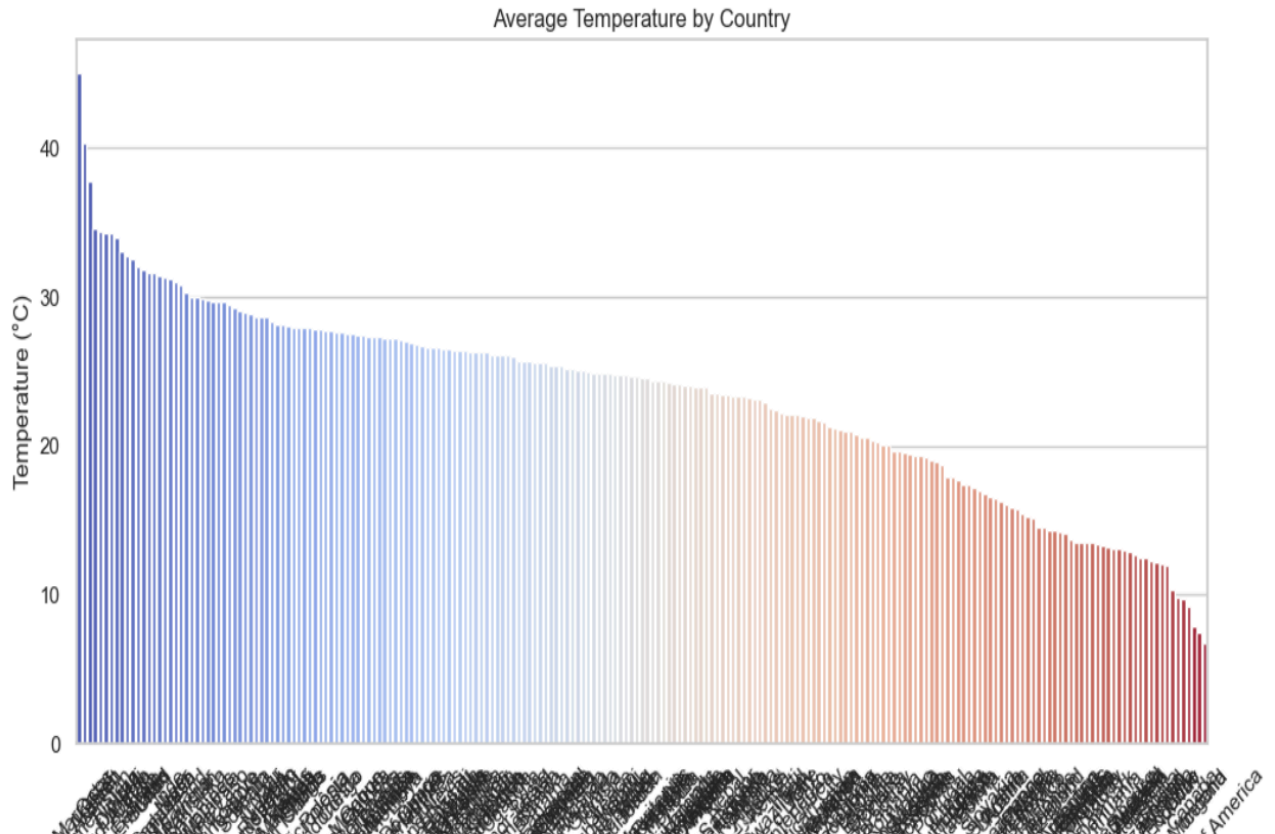


**Graph type: Histogram with KDE curve**

- Shows how temperatures are spread across the dataset.
- The peak of the curve tells us the most common temperature range.
- If the graph is bell-shaped, temperatures are balanced; if it's skewed, certain ranges dominate.

👉 **Insight:** You can identify whether the region experiences mostly mild, hot, or cold weather.

## 2. Average Temperature by Country



### Explanation :

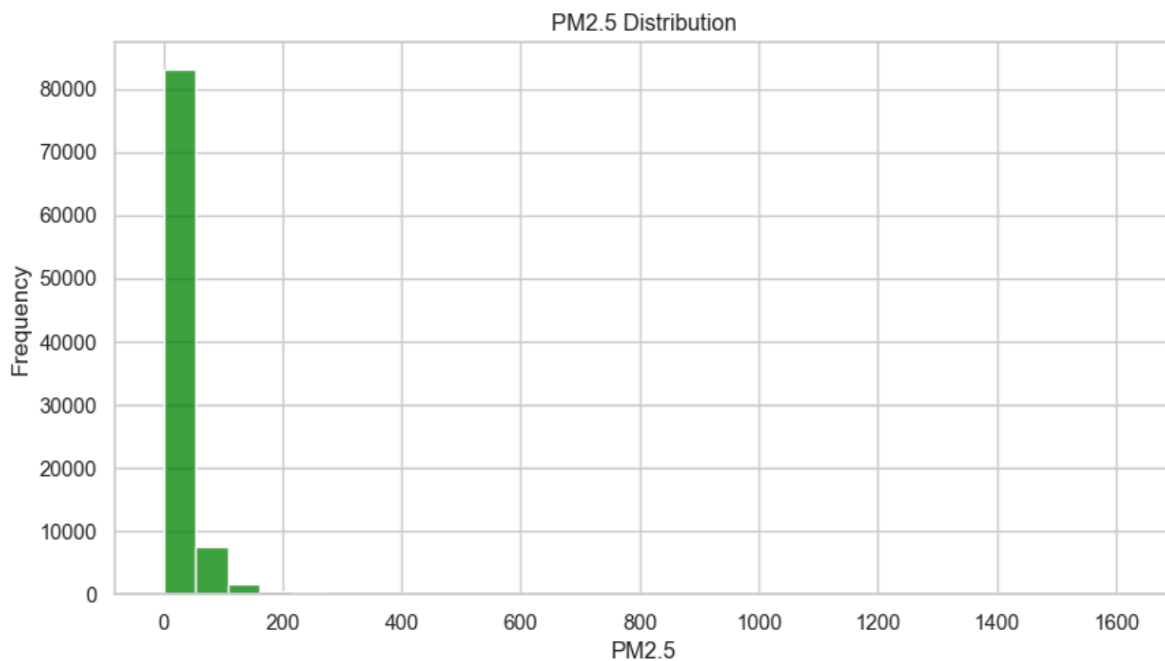


**Graph type: Bar chart**

- **Compares the mean temperature of each country.**
- **Countries are sorted from hottest to coldest.**

👉 **Insight:** Helps find which countries are consistently warmer or cooler. For example, tropical countries will rank high, while colder climates will rank low.

### 3. PM2.5 Distribution



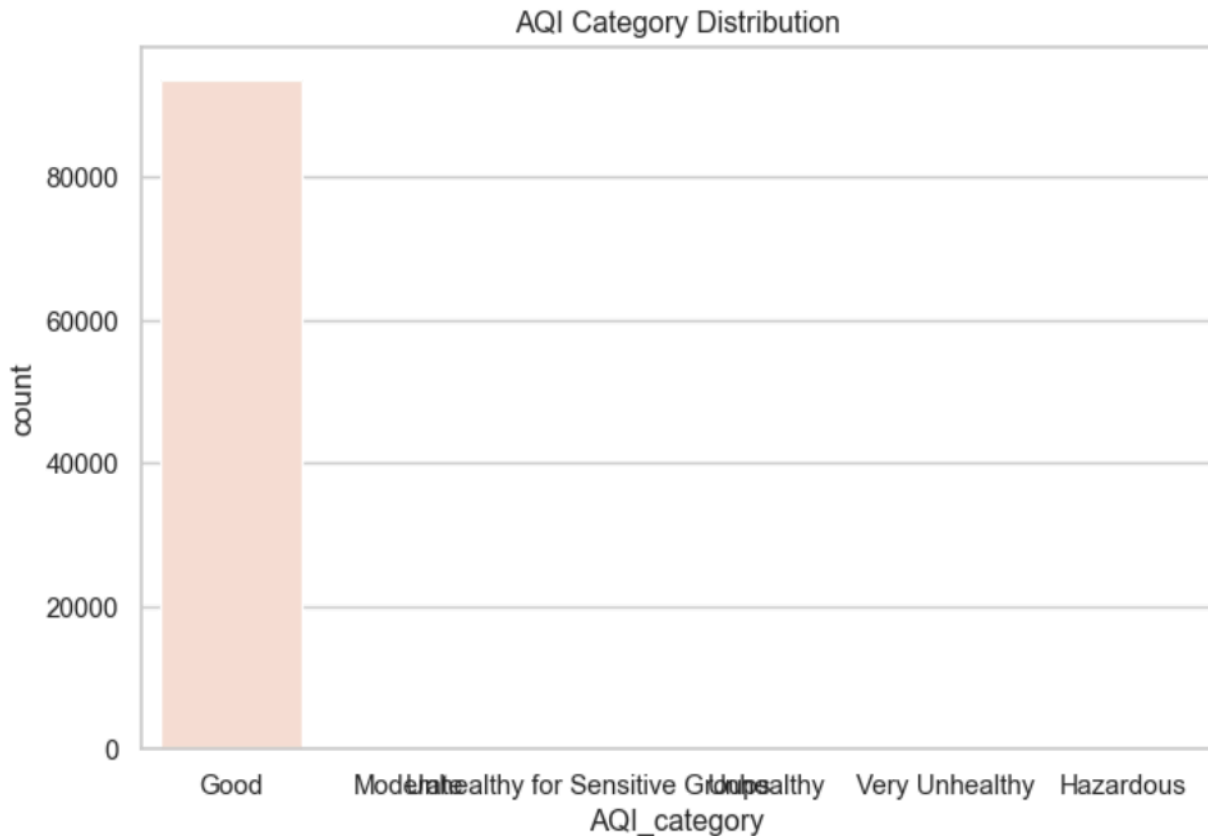
**Explanation :**

**Graph type: Histogram**

- Shows the distribution of PM2.5 air pollutant values.
- Higher frequency in low values means cleaner air; higher frequency in high values means more pollution.

👉 **Insight:** You can see if most days are healthy or polluted in terms of fine particulate matter.

## 4.AQI Category Distribution



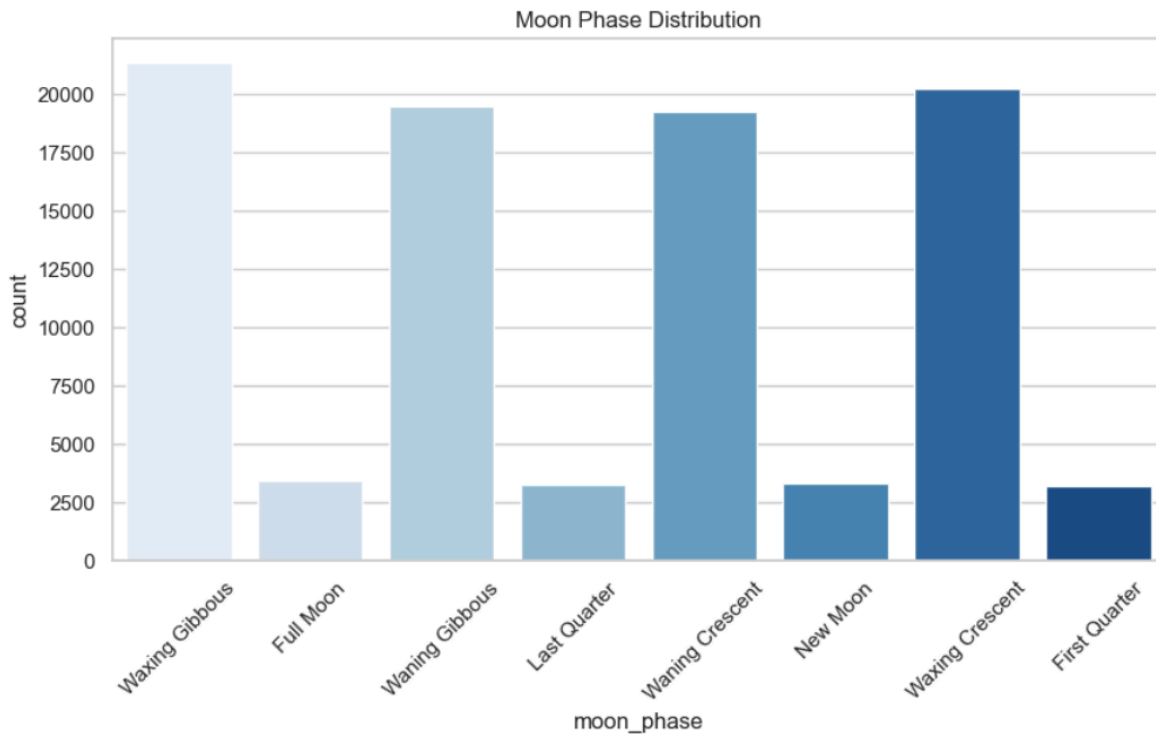
**Explanation :**

**Graph type: Count plot**

- Counts how many times each Air Quality Index (AQI) category occurs:
- Good, Moderate, Unhealthy, Very Unhealthy, Hazardous.

👉 **Insight:** Provides a clear view of air quality conditions. If most bars are “Good/Moderate,” air is fine; if “Unhealthy+,” pollution is a concern.

## 5. Moon Phase Distribution



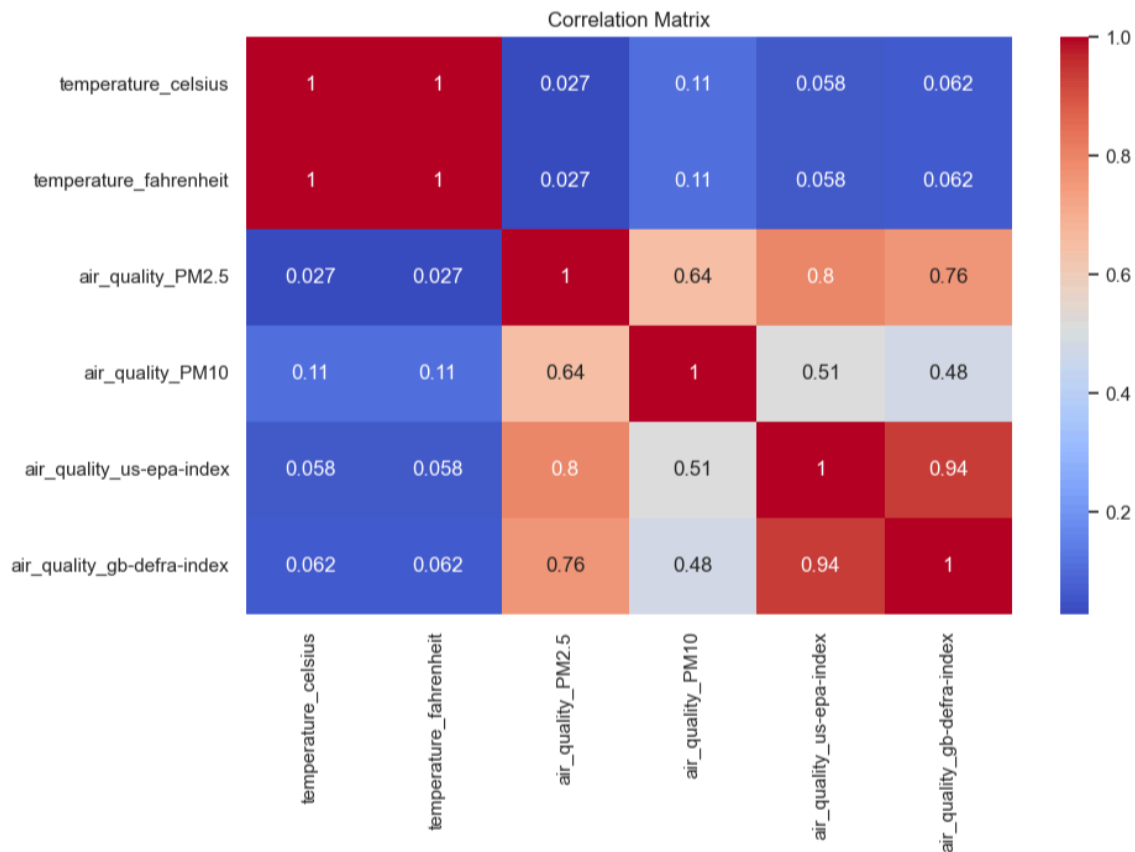
### Explanation

#### Graph type: Count plot

- Counts how many times each moon phase appears (Full Moon, New Moon, Waxing, Waning, etc.).

**Insight:** Shows which phases are most commonly recorded — useful if dataset spans multiple months.

## 6. Correlation Matrix (Heatmap)



### Explanation :

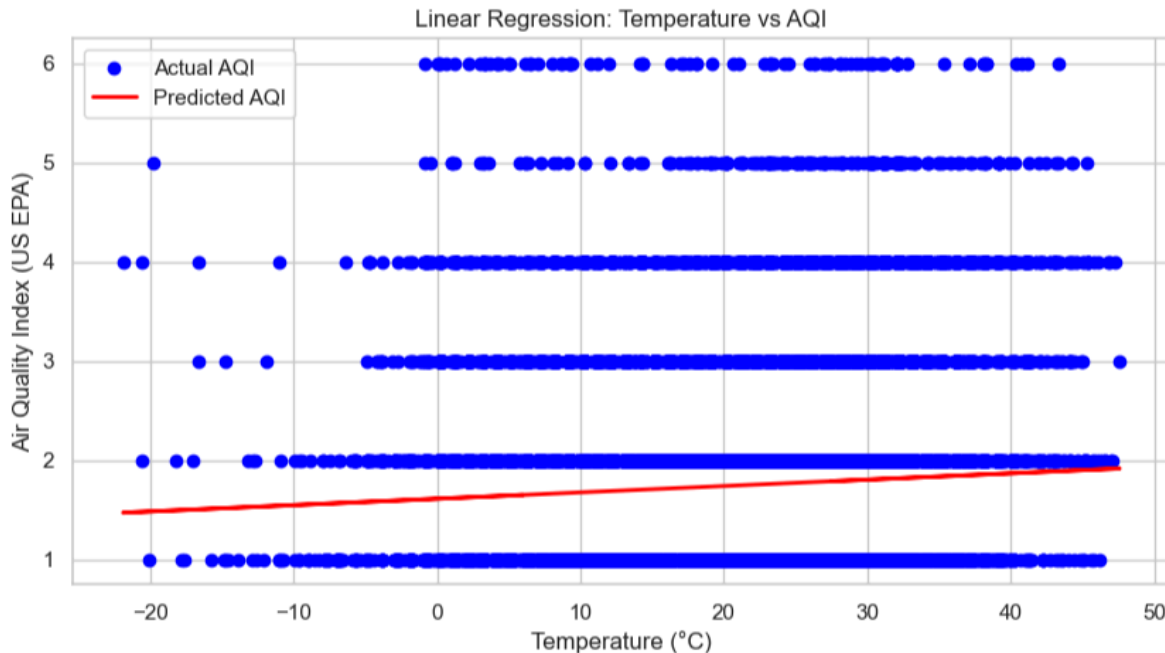


Graph type: Heatmap of numerical correlations

- Compares how features relate (Temperature, PM2.5, PM10, AQI indices).
- Values close to +1 = strong positive, -1 = strong negative.

👉 Insight: You can see, for example, whether higher temperatures are linked with higher/lower pollution levels.

## 7.Linear Regression: Temperature vs. AQI



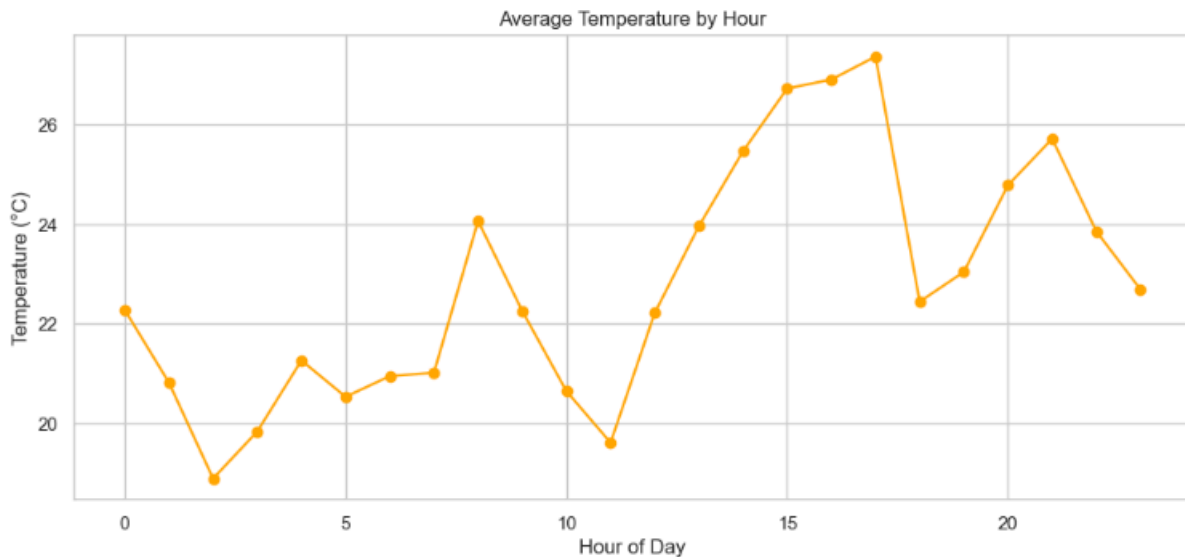
**Explanation:**

**Model test (not just graph)**

- A linear regression was run to see if temperature predicts air quality (US-EPA index).
- The fit ( $R^2$  score) tells how strong the relationship is.

👉 **Insight: If  $R^2$  is high  $\rightarrow$  temperature significantly impacts AQI. If low  $\rightarrow$  weak/no relation.**

## **8.Average Temperature by Hour of Day**



### **Explanation:**



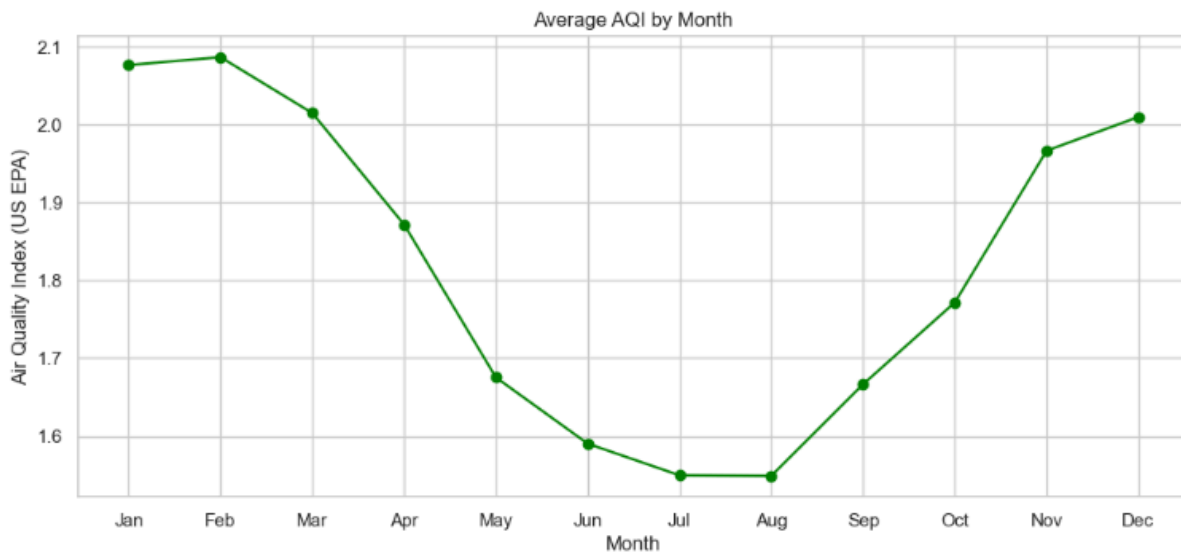
**Graph type: Line plot**

- Shows how temperature changes throughout the day (hourly average).
- Typically rises after sunrise, peaks midday, falls after sunset.

👉 **Insight: Identifies the daily temperature cycle and possible hottest/coolest hours.**



## 9.Average AQI by Month



**Explanation :**



**Graph type: Line/bar plot (part of last cell)**

- Shows how air quality changes month by month.
- Helps find seasonal pollution patterns (e.g., worse in winter due to smog).

 **Insight: Detects seasonal air quality variations.**