INTRODUCTION TO AI

REPORT

Weather Data Analysis

NAME: Manish Kumar

PROGRAM: B.Tech

ROLL NO. : 202401100300149

BRANCH: CSE-AI

SECTION: C

SUBMITTED TO: Mr. Mayank Lakhotia Sir

1.Introduction

This report presents an analysis of weather data, focusing on temperature, rainfall, and humidity trends.
Various data visualization techniques have been used to gain insights into weather patterns over time.

2. Methodology

The weather data was processed using Python and Pandas. Missing values were handled by filling them with the mean. The data was then visualized using Matplotlib and Seaborn to identify trends and correlations.

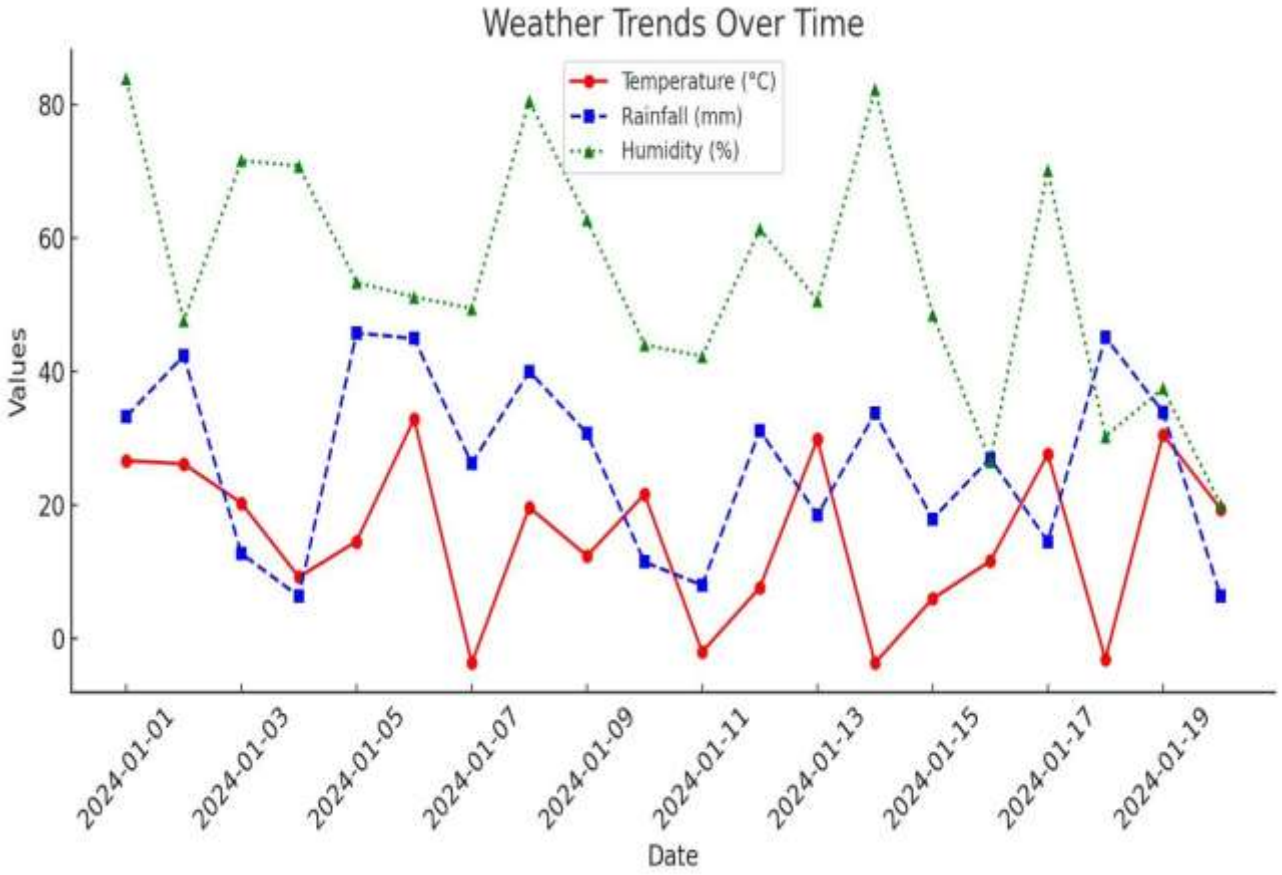
3. Code

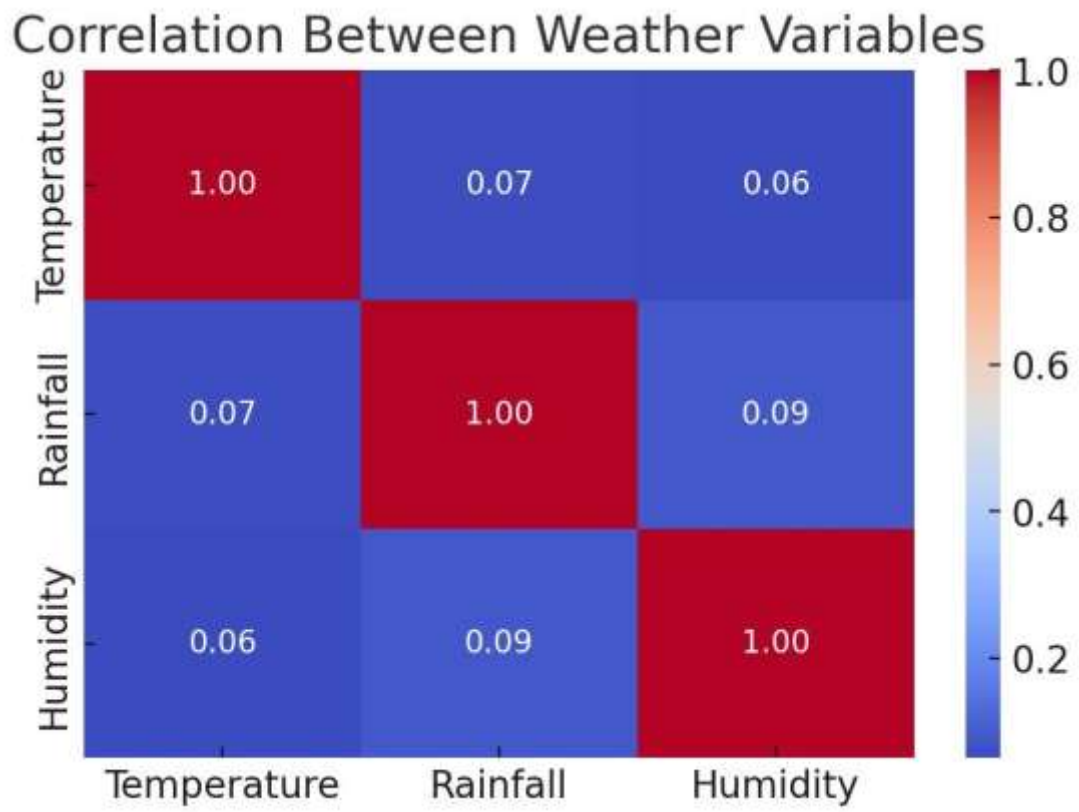
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load Data
df = pd.read_csv("weather_data.csv")

# Convert Date Column
df['Date'] = pd.to_datetime(df['Date'])
df.set_index('Date', inplace=True)

# Fill Missing Values
df.fillna(df.mean(), inplace=True)
```

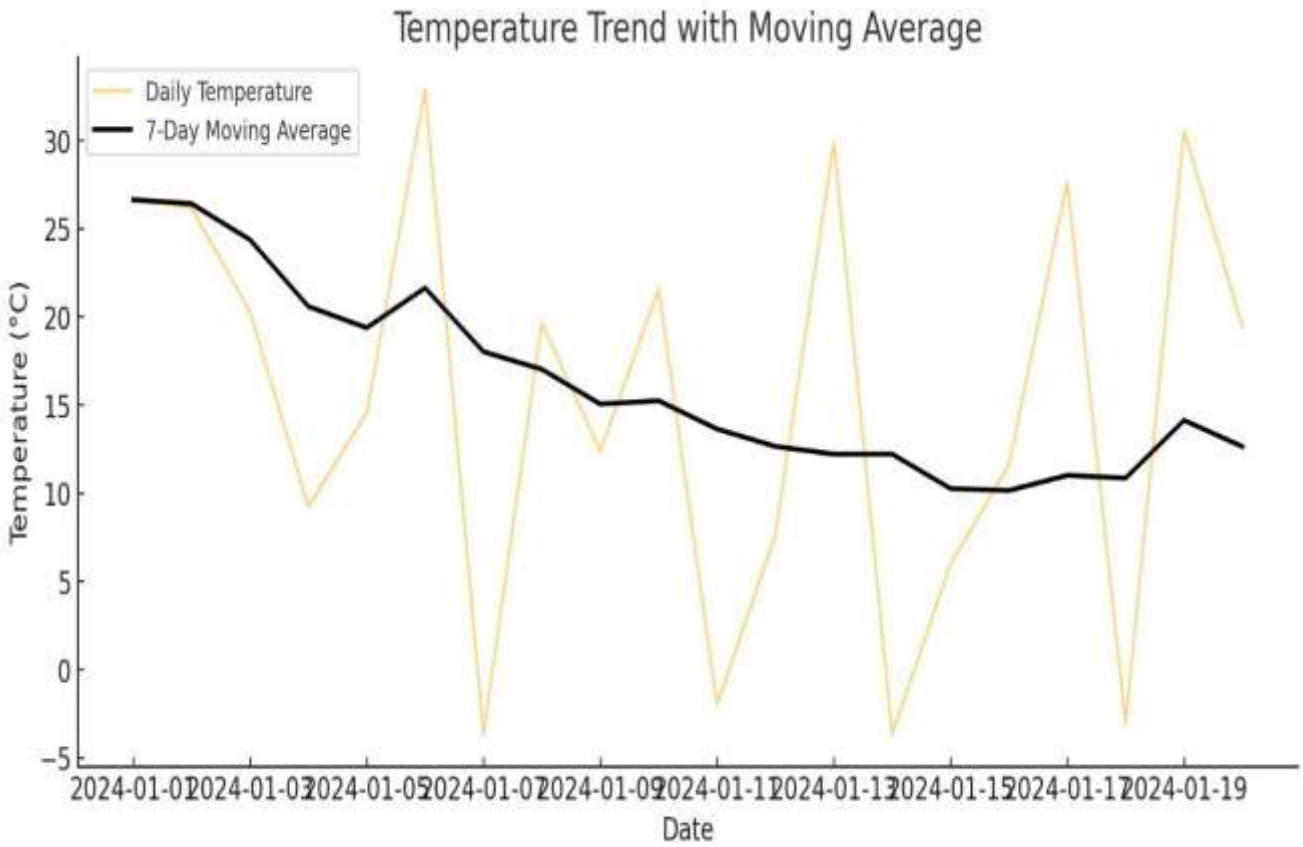
```
# Plot Temperature, Rainfall, and Humidity Trends
plt.figure(figsize=(12,6))
plt.plot(df.index, df['Temperature'], label='Temperature (°C)',
marker='o', linestyle='-')
plt.plot(df.index, df['Rainfall'], label='Rainfall (mm)',
marker='s', linestyle='--')
plt.plot(df.index, df['Humidity'], label='Humidity (%)',
marker='^', linestyle=':')
plt.legend()
plt.xlabel('Date')
plt.ylabel('Values')
plt.title('Weather Trends Over Time')
plt.xticks(rotation=45)
plt.show()
```

4. Screenshots & Outputs

Output Screenshot:




Correlation Between Weather Variables
Temperature
Rainfall
Humidity
1.00
0.07
0.06
0.07
1.00
0.09
0.06
0.09
1.00
Temperature
Rainfall
Humidity
1.0
0.8
0.6
0.4
0.2


Temperature Trend with Moving Average
Daily Temperature
7-Day Moving Average
Temperature (°C)
30
25
20
15
10
5
0
−5
2024-01-01
2024-01-03
2024-01-05
2024-01-07
2024-01-09
2024-01-11
2024-01-13
2024-01-15
2024-01-17
2024-01-19
Date