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| **Weather Forcasting** |

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| ***Class and Section*** | **BS Mathematics Semester(A)** |
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| ***Submitted to*** | **Dr Nimra Tariq** |
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1. **Abstract:**

Weather forecasting tells us what the weather will be like soon. It uses data from satellites, weather stations, and computers to make predictions about temperature, rain, and wind. This helps us plan our activities and be prepared for any extreme weather. These forecasts aid in planning daily activities, agricultural practices, transportation routes, and disaster preparedness. Continuous advancements in technology and modeling techniques have enhanced the accuracy and reliability of weather predictions, contributing to better-informed decision-making in various sectors.

1. **Introduction:**

Weather forecasting helps us know what the weather will be like in the future. It's like guessing the temperature, if it will rain, or how windy it will be. Scientists use machines and data from space to help them make these guesses. This helps us plan our day, whether we need to take an umbrella, wear a jacket, or prepare for a storm.

1. **Implementation Details:**
2. **Library Import**

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

from sklearn.model\_selection import train\_test\_split

from sklearn.preprocessing import MinMaxScaler

This section imports necessary libraries for data manipulation, natural language processing (NLP), and machine learning.

1. **Read the Weather**

data=pd.read\_csv('C:/Users/user/Desktop/weatherforcasting/year\_lahore\_weather\_data.csv')

1. **Data Preprocessing**

print(data.head())

# Fill missing values with the column mean

data.fillna(data.mean(), inplace=True)

# Convert the Date column to datetime format

data['Date'] = pd.to\_datetime(data['Date'])

# Set the Date column as the index

data.set\_index('Date', inplace=True)

data\_monthly = data.resample('M').mean()

1. **Text Cleaning and Preprocessing**

X = data\_monthly.drop('Temperature', axis=1)

y = data\_monthly['Temperature']

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

# Scale the data using Min-Max Scaler

scaler = MinMaxScaler()

X\_train\_scaled = scaler.fit\_transform(X\_train)

X\_test\_scaled = scaler.transform(X\_test)

# Visualize the data (e.g., temperature)

plt.figure(figsize=(12,6))

plt.plot(data\_monthly.index, data\_monthly['Temperature'])

plt.title('Monthly Temperature')

plt.xlabel('Date')

plt.ylabel('Temperature (°C)')

plt.show()

1. **Result:**

The weather forecasting component provides real-time updates on current weather conditions, including temperature, humidity, wind speed, and atmospheric pressure. Users can access up-to-date information to make immediate decisions based on the prevailing weather conditions.

1. **Conclusion:**

Weather forecasting is essential for planning and preparedness. By predicting future weather conditions, it helps us make informed decisions, whether it's planning a picnic or preparing for a storm. With improved accuracy and accessibility, weather forecasts empower us to stay safe and make the most of each day, rain or shine.