**Date:22.10.25**

**TASK:11**

**Implementation of weather prediction.**

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**PROBLEM STATEMENT**

Weather prediction is one of the most important applications of data science and machine learning.

Predicting temperature, humidity, or rain accurately helps in agriculture, disaster management, and

daily planning. This project aims to develop a simple weather prediction system using Python that

predicts future weather conditions based on past data.

**AIM:**

To design and implement a Python program that predicts weather conditions such as temperature or rainfall using machine learning algorithms.

**OBJECTIVE:**

1. To collect and preprocess weather data.
2. To train a machine learning model using past weather records.

3. To predict the temperature (or weather condition) for a given day.

4. To evaluate the performance of the prediction model.

**DESCRIPTION :**

This project uses Python’s pandas, numpy, and scikit-learn libraries to build a weather prediction

model. The dataset contains daily weather details such as temperature, humidity, wind speed, and

pressure. We use a Linear Regression algorithm to predict the temperature based on these

Features

Steps involved:

1. Import dataset and libraries.

2. Preprocess and clean the data.

3. Split the data into training and testing sets.

4. Train the model using Linear Regression.

5. Predict and visualize the results.

**ALGORITHM**

Linear Regression for Weather Prediction

1. Start

2. Import required libraries (pandas, numpy, sklearn)3. Load the dataset

4. Check for missing values and handle them

5. Select independent variables (e.g., humidity, wind speed) and dependent variable (temperature)

6. Split dataset into training (80%) and testing (20%) sets

7. Train model using LinearRegression()

8. Predict temperature for test data

9. Compare predicted values with actual values

10. Display accuracy and prediction results

11. Stop

**PROGRAM**

# Weather Prediction using Linear Regression

import pandas as pd

import numpy as np

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

from sklearn.linear\_model import LinearRegression

from sklearn.metrics import mean\_squared\_error, r2\_score

data = pd.read\_csv("weather.csv")

print("Sample Data:")

print(data.head())

X = data[['Humidity', 'Pressure', 'WindSpeed']]

y = data['Temperature']

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

model = LinearRegression()

model.fit(X\_train, y\_train)

y\_pred = model.predict(X\_test)

mse = mean\_squared\_error(y\_test, y\_pred)

r2 = r2\_score(y\_test, y\_pred)

print("\nModel Performance:")

print("Mean Squared Error:", round(mse, 2))

print("R² Score:", round(r2, 2))

sample = [[70, 1012, 15]]

predicted\_temp = model.predict(sample)

print("\nPredicted Temperature:", round(predicted\_temp[0], 2), "°C")

**OUTPUT**

Sample Data:

Temperature Humidity Pressure WindSpeed

31.2 65 1010 14

29.5 70 1008 1230.0 68 1009 10

Model Performance:

Mean Squared Error: 1.25

R² Score: 0.93

Predicted Temperature: 30.75 °C

**CONCLUSION**

The weather prediction project successfully demonstrates the use of machine learning in predicting temperature based on atmospheric data. The Linear Regression model provides accurate predictions and can be improved further by using larger datasets and advanced algorithms like Random Forest or Neural Networks.