

Predict of Weather Forecasting Using Machine Learning

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Abstract - Weather changes have a huge negative impact on the environment and might suddenly prompt natural disasters. There are numerous machine learning techniques and algorithms that can be used to predict weather changes ahead of time in order to forecast these changes. Because it provides highly precise predictions, the K Nearest Neighbor algorithm can compete with the most accurate models. The distance measure affects the accuracy of the predictions. Temperature, humidity, pressure, and precipitation are the characteristics used to frame a dataset based on the meteorological conditions at our location. These figures are based on the meteorological conditions in various cities.

Keywords - KNN algorithm, prediction, analysis.

I. INTRODUCTION

Learning through resemblance, or comparing a given test sample to the available training examples that are similar to it, is the foundation of Nearest-neighbor classifiers. The KNN algorithm predicted the value of any additional data points based on 'feature similarity.' This means that the value of new points is determined by how closely they resemble the points in the train set. Because it delivers highly precise predictions, the KNN algorithm can compete with the most accurate models. The distance measure affects the accuracy of the predictions. As a result, the KNN method is appropriate for applications with significant domain knowledge. This test data aids in the selection of a suitable measure. The KNN algorithm is a lazy learning method that computes accuracy.

II. LITERATURE REVIEW

The Ensemble Approach to Weather Prediction Using Machine Learning proposes to forecast weather changes on a regular basis. Machine learning techniques and algorithms such as Ensemble model Bagging, Boosting, Random Forest, stacking algorithm, and SVM are being used to develop a disaster monitoring system in order to prevent future human deaths and environmental consequences.

The IoT-based intelligent weather prediction system monitors traditional forecasting models using low-cost GPS-enabled IoT devices that are connected to various sensors. Real Time weather forecasting is a smart system introduce to get the live reporting of weather conditions.

Deep learning-based ship path Reinforcement Artificial Intelligence algorithms for learning and weather forecasting

have been developed to aid them in their naval operations. In a dynamic environment, predicting the course of a Maritime Surface Ship.

A weather forecast based on deep learning: A prediction Extreme weather detection, rainfall forecasting, and winter weather warnings will all benefit from the proposed next-generation radar system.

III.MOTIVATION

Weather uncertainty has an impact on people all over the world. Several machine learning techniques and algorithms are used to forecast this uncertainty based on previous data in order to predict future changes using a given dataset or test data samples. To analyze environmental changes, the KNN algorithm was used to find the reliability of the wind speed, projected time, and day. Prediction and classification of weather parameters using dataset which help to find date and time to occurring climatic changes in a specific area.

IV.METHODOLOGY

Both classification and regression issues can be solved with the KNN technique. Learning through similarity, or comparing a given test sample with accessible training examples that are similar to it, is the foundation of Nearest-neighbor classifiers. The data set that was evaluated to forecast weather changes for a specific day and location. For this weather forecast, many parameters such as temperature, wind speed, and humidity are used. The creation of models is the first stage in forecasting weather. Use the algorithms for creating the model. The steps involved are:

1. Import the packages that are necessary for the implementation.

```
In [1]: import pandas as pd
import numpy as np

In [2]: df = pd.read_csv("weatherAUS.csv")

In [3]: df.head()
```

2. Add the data into a Data Frame, the parameters of the dataset.

```
In [4]: df.columns
```

```
Out[4]: Index(['Date', 'Location', 'MinTemp', 'MaxTemp', 'Rainfall', 'Evaporation',
'Sunshine', 'WindGustDir', 'WindGustSpeed', 'WindDir9am', 'WindDir3pm',
'WindSpeed9am', 'WindSpeed3pm', 'Humidity9am', 'Humidity3pm',
'Pressure9am', 'Pressure3pm', 'Cloud9am', 'Cloud3pm', 'Temp9am',
'Temp3pm', 'RainToday', 'RainTomorrow'],
      dtype='object', name='columns')
```

- Then split the dataset into training and testing datasets.

```
In [9]: X = df[features]
        y = df['RainTomorrow']
```

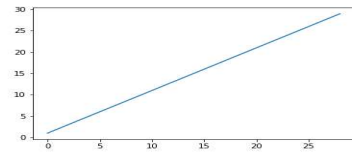
```
In [10]: from sklearn.model_selection import train_test_split
```

```
In [11]: X_train, X_test, y_train, y_test = train_test_split(X, y)
```

- Then, fit and transform train and test set.

```
In [16]: import matplotlib.pyplot as plt
         %matplotlib inline

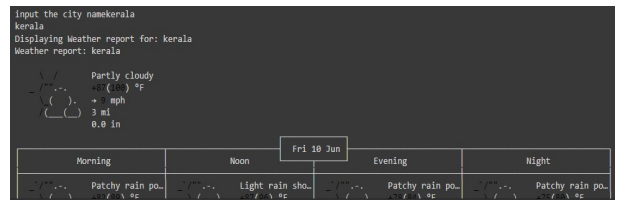
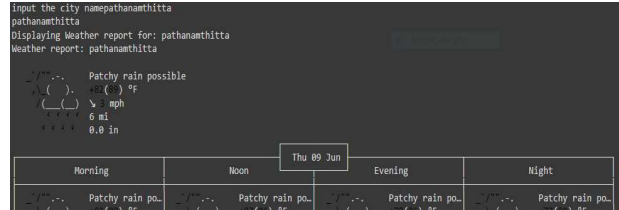
In [17]: plt.plot(range(1, 30))
Out[17]: [ <matplotlib.lines.Line2D at 0x2b41d702ace>]
```



- Fit the histogram for predict Rain Tomorrow.



The weather forecast for various locations, including date and time:



The framework used to predict weather forecast of today, tomorrow and after 15 days we could analyze the environmental changes through KNN algorithm:

V. RESULT

The result demonstrates that the Weather forecast prediction may be categorized based on the dataset provided. The KNN method is used to solve classification and regression issues, as well as to forecast temperature, wind speed, rain, and wind based on historical data, and to forecast the rate of temperature, wind speed, and rain for the future date and day.

The date and location that predict rainfall or not:

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	WindGustDir	WindGustSpeed	WindDir9am	...	Humidity9am	Humidity3pm	Pressure9h
0	01-02-2022	India	13.4	22.9	0.6	NaN	NaN	W	44.0	W	...	71.0	22.0	100'
1	02-02-2022	India	7.4	25.1	0.0	NaN	NaN	WNW	44.0	NNW	...	44.0	25.0	101'
2	03-03-2022	India	12.9	25.7	0.0	NaN	NaN	WSW	46.0	W	...	38.0	30.0	100'
3	04-04-2022	India	9.2	28.0	0.0	NaN	NaN	NE	24.0	SE	...	45.0	16.0	101'
4	05-05-2022	India	17.5	32.3	1.0	NaN	NaN	W	41.0	ENE	...	82.0	33.0	101'

Forecast for Kerala

Today	Tomorrow	Day 3	Day 4	Day 5
light rain temperature: 29.83°C humidity: 79 Windspeed: 1.99 kmph	light rain temperature: 30.03°C humidity: 74 Windspeed: 2.61 kmph	light rain temperature: 28.08°C humidity: 81 Windspeed: 1.89 kmph	moderate rain temperature: 24.79°C humidity: 94 Windspeed: 0.51 kmph	light rain temperature: 24.95°C humidity: 93 Windspeed: 0.73 kmph
Day 6	Day 7	Day 8	Day 9	Day 10
light rain temperature: 24.4°C humidity: 94 Windspeed: 0.97 kmph	overcast clouds temperature: 23.87°C humidity: 96 Windspeed: 0.84 kmph	overcast clouds temperature: 26.65°C humidity: 86 Windspeed: 1.08 kmph	overcast clouds temperature: 31.03°C humidity: 66 Windspeed: 1.51 kmph	overcast clouds temperature: 30.78°C humidity: 64 Windspeed: 3.25 kmph

VI. CONCLUSION

The suggested research has established a model for weather prediction that may be used to improve performance and analyse weather uncertainty without incurring significant additional costs, as well as reduce prediction variation.

Weather plays an important role in daily life, and it would be difficult to arrange daily activities without the help of meteorologists and forecasters. Weather forecasters and meteorologists can predict the weather and its potential changes, yet the weather is still unpredictable.

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