Predict of Weather Forecasting using Machine Learning

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Abstract **- Weather changes have an incredible negative impact on the environment and triggers natural disasters all of a sudden. To forecast these changes, there are several machine learning technique and algorithms through how the weather changes can be predicted earlier. The K Nearest neighbor algorithm can compete with the most accurate models because it makes highly accurate predictions. The quality of the predictions depends on the distance measure. Based on the climatic conditions at our place, the parameters are temperature, humidity, pressure, precipitation considered to a dataset is framed. These values are considered based on various city's weather situations.**

Keywords - KNN algorithm, prediction, analysis

I. INTRODUCTION

The base of Nearest-neighbor classifiers is learning by resemblance, which is by comparing a given test sample with the available training samples which are similar to it. KNN algorithm uses 'feature similarity' to predict the value of any new data points. This means that new points is assigned a value based on how closely it resembles the points in the train set. The KNN algorithm can compete with the most accurate models because it makes highly accurate predictions. The quality of the predictions depends on the distance measure. Therefore, the KNN algorithm is suitable for application for which sufficient domain knowledge is available. This knowledge supports the selection of an appropriate measure. The KNN algorithm is a type of lazy learning, where the computation for the generation of the predictions is deferred until classification. It has been noted that, This approach is based on various parameters are temperature, humidity, wind direction, precipitation. The algorithm used to predict the accuracy of wind speed, forecast time and day to interpret the environmental changes.

II. LITERATURE REVIEW

An Ensemble Approach to predict weather forecast using machine learning, propose to forecast weather changes periodically. several machine learning technique and algorithm such as Ensemble model Bagging, Boosting, Random Forest, stacking algorithm, SVM to implement a proactive disaster recognition system to avoid the future loss of human lives and related environmental effect.

An Intelligent weather prediction system based on IOT introduces conventional forecasting model monitoring using low cost GPS enabled IOT devices, connected with different sensors.

Smart Real Time weather forecasting is a smart system introduce to get the live reporting of weather conditions.

Ship path planning based on Deep learning Reinforcement Learning and weather forecast proposed Artificial Intelligence algorithms could assist them in their naval operations. Predicting the path of a Maritime Surface Ship (MSS) in a dynamic environment.

Deep Learning based weather forecast: A prediction Propose next generation radar system will enhance the extreme weather detection, rainfall forecast and winter weather warnings.

III. MOTIVATION

The uncertainty of the weather condition is affect all over the world. Several machine learning technique and algorithms are used to predict this uncertainty based on past data to predict future changes through given dataset or test data samples. KNN algorithm used to find accuracy of the wind speed, forecast time and day to interpret the environmental changes. Prediction and classification of weather parameters using dataset which help to find date and time to occurring climatic conditions in a specific area.

IV. METHODOLOGY

KNN algorithm can be used for both classification and regression problems. The KNN algorithm uses 'feature similarity' to predict the value of any new data points. This means that new point is assigned a value based on how closely it resembles the points in the train set. The base of Nearest-neighbor classifiers is learning by resemblance, which is by comparing a given test samples with the available training samples which are similar to it. The model building is the main step in the prediction of weather forecast. While building the model user use the algorithms. The steps involved are:

1. Import the packages that are necessary.

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')
```

3. 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)
```
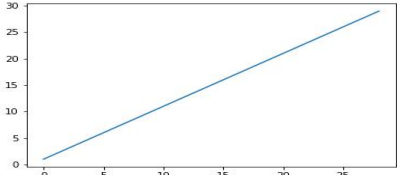
4. Then, fit and transform train and test set.

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

In [17]: plt.plot(range(1, 30))

Out[17]: [<matplotlib.lines.Line2D at 0x2b41d702ac0>]
```


5. Fit the histogram for predict RainTommorrow

V. RESULT

The result shows that the prediction of Weather forecast can be classified based on the dataset given. KNN algorithm is used for both classification and regression problems. The KNN algorithm used to predict the temperature, wind speed, forecast rain and wind based on past data for predict the future date and day to expect the rate of temperature, wind speed, rain.

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	WindGustDir	WindGustSpeed	WindDir9am	...	Humidity9am	Humidity3pm	Pressure9a
0	01-01-2022	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

VI. CONCLUSION

The proposed research has developed a model for weather prediction that can be utilized to provide better performance without much additional cost and also prediction variance can be reduced

Weather plays a major role in our daily life, and without the meteorologist and forecaster, it would have faced difficulty in planning the daily activities. Meteorologist and forecasters predict the weather and its possible changes, but in reality, weather is still unpredictable.

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