

Machine Learning Based Weather Prediction System

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DOI: <https://doi.org/10.26438/ijcse/v7si14.365368> | Available online at: www.ijcseonline.org

Abstract— To forecast the situation of weather at a particular location is a vital application of machine learning. While traditionally this has been done by human experts by identifying patterns in data collected by various measuring instruments, in modern times the machine learning algorithms are used to crunch data and identify patterns which are used for predicting the weather parameters. In this work, we have used neural networks to analyze data from Dark Sky to forecast the climatic conditions.

Keywords—Machine Learning, Weather Monitoring, Weather Prediction, Dark Sky

I. INTRODUCTION

Weather Phenomena causes an abrupt change, weather forecast is an essential process. Weather forecasting is a process of using science and technology for predicting future weather for a given time and location. Accumulation of information, containing barometrical conditions, which records the precipitation, moistness, temperature, wind speed and its heading to anticipate future climate utilizing rapid PCs, wired and remote sensors, meteorological satellites and climate radars. Meteorological division deals with future climate forecast so as to alarm individuals from the climatic perilous cataclysm. Meteorological division records the past climate information as pictures and reports. The information recorded by the satellite spoke to as pictures are made accessible to the general population.

Retrieving data for weather forecasting can be done using two methods, first is image retrieval and second is content retrieval. The image retrieval technology is vital to image database system and whereas content base image retrieval technology is not so effective, especially when the image volume is large.

This paper draws an idea how the Algorithm developed is used to retrieve the information from Dark Sky using Dark Sky API.

Rest of the paper is organized as follows – Section II contains brief literature survey, Section III explains the proposed system, Section IV discusses Results, Section V concludes the paper followed by References.

II. LITERATURE SURVEY

In [1], authors explained the phenomena for time series regression models for forecasting the yield of rice on weekly data using weather parameters. In [2] the authors studied 10 days data to forecast flow and phenomena caused by typhoons and other weather irregularities. In [3] authors compared 6 rainfall runoff modelling approaches to predict rainfall in catchment areas. In [4] authors used statistical analysis to observe changes in weather parameters to predict patterns in it. In [5], authors used continuously varying weather conditions data to predict weather over next year. In [7] authors used Chaotic features in weather phenomena. In [9] authors explained that the modelled weather parameter using some of the random ARIMA with the Case Study.

III. PROPOSED SYSTEM

In past, the parameters of climate were recorded for the present time as it were. By adjusting that procedure some different models were additionally created which gave the data of climate as pictures, diagrams and graphs. After that the improvement in the climate determining process happens and by applying a few calculations, for example, k-closest neighbors, strategies, for example, delicate figuring and picture recovery technique were utilized so as to anticipate the future state of tempest, precipitation and so forth. The present status is watching and putting away of the recorded data about the climate for example it records the Temperature, dampness, precipitation for the present timeframe or greatest for the up and coming 24 hours, and sending those information to the PC for further procedure. It can likewise examine what will be the future climate if there

will be an adjustment in any one parameter with some unit. In future it tends to be reached out to take note of the readings for sea tempest information and furthermore to expand the scope of remote gadgets or sensors utilized for transmitting the information to the PC. It can likewise be stretched out for forecast of vast regions at once.

A. Methodology

In this work, we have arranged and anticipated the climate data from information downloaded from Dark Sky. The Dark Sky gives the data of future expectation by considering a few parameters or likelihood of what will be the impact on different parameters, if there is any adjustment in one parameter after some timeframe. These parameters acquired utilizing sensors for wind, downpour, bottle hygro and so on. In this task, we will foresee the impact of transforming one of the parameters on different parameters.

B. Steps

Data Collection: The recorded information is available as datasheet and afterward pre-handled.

Pre-Processing: Here, undesirable information or In past, the parameters of atmosphere were recorded for the present time so to speak. By altering that technique some unique models were also made which gave the information of atmosphere as pictures, charts and diagrams. After that the improvement in the atmosphere deciding procedure occurs and by applying a couple of counts, for instance, k-nearest neighbors, methodologies, for instance, sensitive figuring and picture recuperation system were used in order to foresee the future condition of storm, precipitation, etc. The present status is watching and securing of the recorded information about the atmosphere for instance it records the Temperature, soddenness, precipitation for the present time span or most prominent for the cutting-edge 24 hours, and sending those data to the PC for further method. It can moreover analyze what will be the future atmosphere if there will be a change in any one parameter with some unit. In future it will in general be connected with observe the readings for ocean whirlwind data and besides to grow the extent of remote contraptions or sensors used for transmitting the data to the PC. It can in like manner be extended for figure of huge areas at once.noise is expelled.

Data Transfer: The recorded information is exchanged to different modules for handling.

Forecast utilizing AI calculations - The AI calculations are utilized to build a model to foresee the impact of transforming one parameters at any given moment on different parameters.

Classification: This progression characterized the climate as radiant, stormy or overcast dependent on estimations of wind speed, stickiness and so fort.

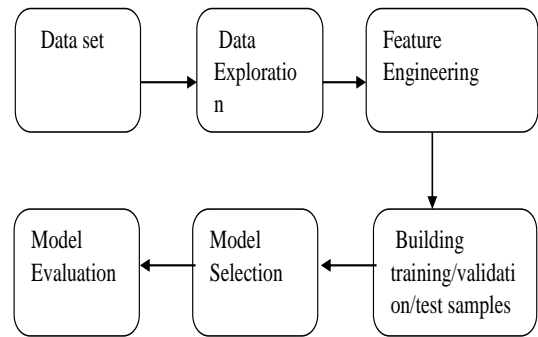


Fig 1. System Architecture

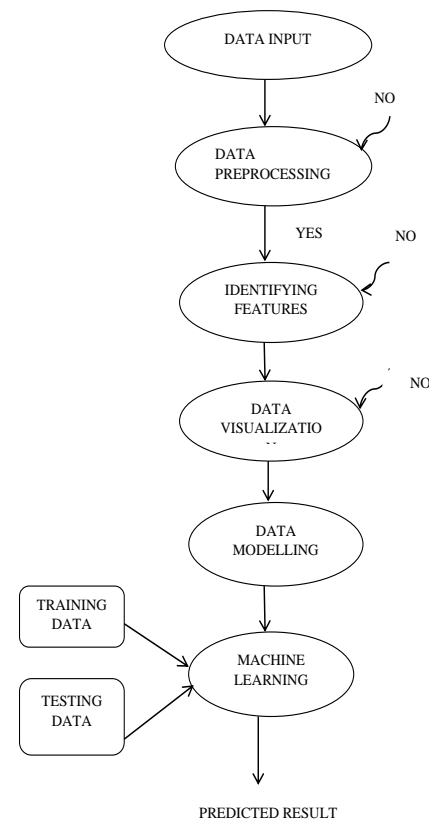


Fig 2. Activity Diagram

IV. RESULTS

Here we show an output instance of the project –

Python-weather-forecast: python forecast.py “Gran Via Street 28, Madrid”

Getting Forecast for: Calle Gran Via
28, 28013 Madrid, Spain

Weekly Summary: No precipitation throughout the week, with high temperature rising to 22C next Tuesday.

19/03/2019(Today): Partly cloudy until evening. 6C – 15C

20/03/2019(Wednesday): Clear throughout the day. 5C - 17C

21/03/2019(Thursday): Partly cloudy in the morning. 5C – 18C.

Dates	Prediction Accuracy	
	Temperature Range Prediction Accuracy (%)	General Climate Prediction Accuracy (%)
Mar 1, 2019 to Mar 5 2019	90	95
Mar 5, 2019 to Mar 10 2019	89	98
Mar 11, 2019 to Mar 15 2019		
Mar 1, 2019 to Mar 5 2019		
Mar 1, 2019 to Mar 5 2019		
25.3.2019		
26.3.2019		
27.3.2019		
28.3.2019		
29.3.2019		

V. CONCLUSION AND FUTURE SCOPE

1) Utilization of new advances like AI, neural systems, delicate processing, information mining has improved the exactness and unwavering quality of forecast about climate. This framework has improved the outcomes in terms of consistency of recognizable proof and translation of climate information. Climate estimating has come an extremely long route since the Babylonians and the Greeks began watching the skies, and it was the spearheading work of Vilhelm Bjerknes and Lewis Fry Richardson toward the start of the twentieth century that commenced the improvement of present day climate gauging. Be that as it may, without the innovation and consequent improvement of PCs, numerical climate expectation would even now be in its earliest stages.

Getting tumult and growing new and better climate perception strategies likewise added to improving figure precision. A six-day gauge these days is currently as exact as a one-day estimate in 1968. Current one-day conjectures are precise in 9 out of 10 cases, and three-day estimates still have a hit rate of 70%. Flow inquire about recommends that these rates will keep on expanding in future. Aside from ordinary climate figures, climate benefits likewise issue specific conjectures for an assortment of areas, for example, agribusiness, flight and sending, which help spare lives and cash. In any case, meteorologists at the ECMWF gauge that the worldwide financial misfortune because of off base climate estimates sums as much as a billion Euros for every year, so meteorologists trust that improved figure quality will decrease this number. We have depicted the way toward gathering, cleaning, and preparing a sensibly decent estimated informational collection to be utilized for forthcoming articles on an AI venture in which we anticipate future climate temperatures. We showed how to utilize the Linear Regression Machine Learning calculation to foresee future mean climate temperatures based off the information gathered in the earlier article. We showed how to utilize the details models library to choose measurably noteworthy indicators dependent on sound factual strategies. We at that point used this data to fit an expectation model based off a preparation subset utilizing Scikit-Learn's Linear Regression class. Utilizing this fitted model we could then foresee the normal qualities dependent on the contributions from a testing subset and a couple of years, 10 years or an age and, with each pro 'enthusiasm posing this equivalent inquiry, it isn't amazing that the Council of the Society ought to have recommended to me a talk on the eventual fate of gauging. Meteorologists might be delegated forecasters or non-forecasters and I am glad to guarantee participation of the previous gathering, a club assess the precision of the expectation, which demonstrates a sensible measure of exactness.

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