
Weather Forecasting Using Machine Learning

Introduction

One of the most important thing for humankind it to plan their day, to plan their day human need to know about the weather forecasting so they can plan their day or even their month accordingly, as said wiki: "Weather forecasting is the application of science and technology to predict the conditions of the atmosphere for a given place and time'. from a long way back weather forecasting always play a big role in humanity. Before to predict the weather we have to measure the weather, to predict tomorrow weather, we must know what is the weather today and what was the weather yesterday, but the knowledge of the average weather in a specific day of the year is also important, to predict the weather we will these data, to predict the weather we have to collect everyday data so we can see the patterns and trends, and we will understand how our atmosphere behave. Those data will help us to predict the weather condition by using machine learning and some of his algorithm to make an accuracy prediction.

Weather change continuously and rapidly (wind speed, temperature, humidity, rain or snow, pressure); an accurate forecasting is important for daily life. For this project we are going to use a Data collected by a GHCND station data democratic Republic of Congo from 2010 to 2015.

DR Congo it's located in the equatorial line, it has an extreme weather and climate variability, that's cause high risk to droughts and floods. Using the data of GHCND station in machine learning to predict the weather so we can avoid more damage than before from a natural cause.

Objectives

The earth it's a very complex place suffering of the climate change, It's significant to predict an accurate weather without any error, to make sure of the security and mobility, as well a safe daily operation.

Weather forecasting it's build by collecting huge amount of data, that's make machine learning an essential tool, by using some backtesting method and some algorithms to make an accurate prediction of weather.

We are going to evaluate the methods with a set of experiments that highlight the performance and value of the methods. With ML add in weather forecasting bring an enormous advantage for the prediction make it more accurate.

Weather forecasting it's a very powerful application of science for the benefits of the society it's can be used for Aerospatiale; agriculture; sport; musical event; marine; renewable energy; aviation and forestry, it's very important to know what's the weather going to be. Finding out the maximum and minimum temperature, it's one of the method of linear regression that's reach a precise result.

- Collecting data;
- Exploring and preparing data;

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- Data preparation- creating random training and test data;
 - Training model on data;
 - Evaluating model performance;
 - Improving model performance.

Tools used for analyses

- Excel
- R x64.3.6.2
- R i386.6.2
- radar
- Data collection
- Microsoft word 2016
- IDLE python

SWOT

Strength

Weather forecasting it's a very important application of science for human, making its more accuracy by using machine learning so we can anticipate some naturel problem floods, hurricanes so on.

Machine learning change the weather forecasting for more accurate result of weather, now we can use big data and rise in climate change patterns by knowing what exactly temperature will be in the future or how the weather it's changing according, it's can help to anticipate a Global warming to the worst.

Weather forecasting in machine learning its growing very fast according to marketstandmarkets.com "weather forecasting system market its projecting to grow from usd 2.3 billion in 2019 to usd 3.3 billion in 2025".

Weaknesses

Weather forecasting it's a very complex science. Not matter how many data we collect or how precise the algorithm is, weather cannot be exact.

Weather forecasting in machine learning need a big amount of dataset so it's can learn from, more data we introduce to the system more accurate the result are, and if the result are different to the weather, the weather forecaster we be blamed. Because it's cause a damage in field like airline for example.

Opportunities

The accuracy is higher than it was century ago, and with billions of smart phone users the forecast can reach everyone around the globe. Using machine learning, Weather model can better have performed for prediction mistakes, such as rainfall and produce more accurate prediction.

With the algorithm of ML to prevent any errors that come from traditional weather forecasting.

Threats

Not control of the climate change not matter how many data collected the result it's not hundred percent sure, that's can cause a lot of damage in certain area as agriculture loss of product cause weather forecasting algorithm predicted a rain, airplane company allowed a plan to take off but the weather change and caused a crash. It's a challenging task to predict a weather because as storm and natural events that can happen on hourly time scale.

The huge amount of data that's request cannot be executed by a normal computer, its require a super computer to execute all the algorithm in a record time, the supercomputer is very costly.

Outcome

In this project we explain how machine learning can improve the accuracy of weather forecasting by introducing some algorithm and historical data so win the future we can prevent any disaster as natural disaster as hurricane, cyclone or floods.

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