

Predicting and Analysing Global Warming using Artificial Intelligence

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ABSTRACT

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Global Warming refers to an increase in average global temperature. Natural Events and human activities are believed to be contributing to increase in average global temperatures. Long Term effects of climate change are frequent wildfires, longer periods of drought in some regions and an increase in the number, duration and intensity of tropical storms. Prediction of Global Warming can be of major importance in agricultural, energy and medical domain. This paper evaluates performance of several algorithms in annual global warming prediction, from previous measured values over the Globe. The first challenge is creating a reliable, efficient and accurate data model on large dataset and capture relationship between the average annual temperatures and potential factors that contributes to global warming such as concentration of Greenhouse gases. The data is predicted and forecasted using linear regression for obtaining the highest accuracy for greenhouse gases and temperature compares to other methods. After observing the analyzed and predicted data, global warming can be reduced comparatively within few years. The reduction of global temperature can help us prevent harmful long-term effects of Global warming and Climate change.

Keywords : Global Warming, Machine Learning, Linear Regression, Multiple Regression , Support Vector Regression

I. INTRODUCTION

Global warming is the increase of average world temperatures as a result of what is known as the greenhouse effect. Certain gases in the atmosphere act like glass in a greenhouse, allowing sunlight through to heat the earth's surface but trapping the heat as it radiates back into space. As the greenhouse gases build up in the atmosphere the Earth gets hotter. This process is leading to a rapid change in climate, also known as climate .This issue is leading

to rapid climatic changes all around the world. The average temperature of earth is 1 °C higher than 100 years ago. Now, many scientists are expecting that within the next 200 years the average temperature will increase by approx. 6 °C than recent temperature. It has been increasing since 1990 caused due to emission of greenhouse gases from the modern industry, vehicle emission, burning of fossil fuels. Etc. If temperature goes on increasing many Forests would be reduced, greenhouse gasses would increase, and Seal Level

would also rise to huge extent thereby submerging many cities.

II. PROPOSED IDEA

The main objective of this research is to analyse and predict the rise of temperature every year in various continents for appx. 100-150 years on the basis of data recorded in Kaggle.

The specific objective of this work are to predict the temperature and greenhouse gases concentration for next decade, and visualise the prediction for ease of understanding

III. PREVIOUS WORK

There are a few researches done about weather prediction, rainfall prediction, temperature prediction. Some of those ideas are taken for the reference purpose.

Machine Learning Applied to Weather Forecasting"[1], "Localized Precipitation Forecasts from a Numeric Weather Prediction Model Using Artificial Neural Networks"[2], "Neural Network Local Forecasting with Weather Ensemble Predictions"[3]. "A hybrid Double Feedforward Neural Network for Suspended Sediment Load Estimation"[4] is a prediction-based paper but they doesn't focus on the temperature or global warming. In this project I mainly focus on predicting the impact of global warming for previous few years

PROPOSED GLOBAL WARMING SYSTEM

There are so many algorithms to predict data like Support Vector Regression, Linear Regression, Multiple Regression etc. We have tried various algorithms to get the highest accuracy. All the

algorithms have different ways of working the algorithm as discussed below:-

A. Multiple Regression

Multiple Regression is a method which give a relationship between a dependent variable and one or more independent variable. The dependent variable is modelled as a function of the different independent variable. Here the basic difference from the linear regression is here the independent variable may or may not be more than one, remaining all other things are same. Here also linear predictor function is used to make an object of that function and used it for further prediction.

B. Linear Regression

Linear Regression is a method which give a relationship between a dependent variable or scalar variable and an independent variable or explanatory variable. In this method the relationships are modelled using linear predictor function. Here the data is trained by this method. Linear predictor function is used to make an object of that function and used it for prediction. After creation of the object, the data is forecasted for future.

C. Support Vector Regression

Support Vector Regression is one part of Support Vector Machine. SVR follows the same principle which is followed by SVM. For support vector regression, the prediction method is difficult comparative to other methods. The algorithm is more complicated. Among all the technologies more accuracy is observed in Linear Regression. For that in this paper Linear Regression is used. The complexity on Linear Regression is also

comparatively much lesser than the other technologies. There are some modules which is required to develop the Global Warming Prediction System. Those modules are briefly explained below:

a. Data Collection:

In this module the raw is collected data from different data set. Then the data set is changed as per need. This raw data cannot be predicted directly. So, it is needed to clean and pre-process

b. Data Pre-processing :

In this module the data is cleaned. After cleaning of the data, the data is grouped as per requirement. This grouping of data is known as data clustering. Then check if there is any missing value in the data set or not. If there is some missing value then change it by any default value. After that if any data need to change its format, it is done. That total process before the prediction is known as data pre- processing. After that the data is used for the prediction and forecasting step.

c. Data Prediction and forecasting:

In this step, the pre-processed data is taken for the prediction. This prediction can be done in any process which are mentioned above. But the Linear Regression algorithm score more prediction accuracy than the other algorithm. So, in this project the linear regression method is used for the prediction. For that, the pre-processed data is splitted for the train and test purpose. Then a predictive object is created to predict the test value which is trained by the trained value. Then the object is used to forecast data for next few years.

d. Visualization:

In this step, the predicted and forecasted data is used to provide a graphical interface separately. At first the predicted data is plotted in a graph separately

with the help of matplotlib library. Then the forecasted data of temperature is plotted in graph with proper scale. Then the greenhouse gases forecasted data are plotted in a single graph with proper scale.

IV. PROPOSED SYSTEM FLOW

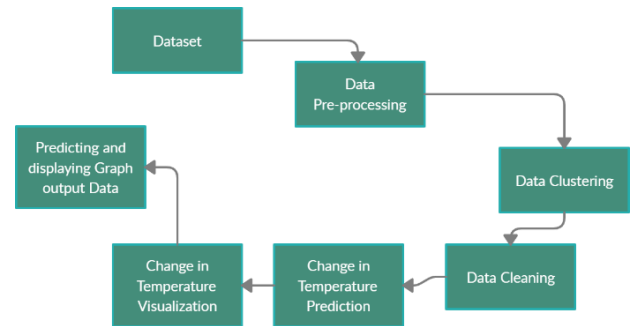


Figure 1. Proposed System Flowchart

V. GRAPHICAL OUTPUT

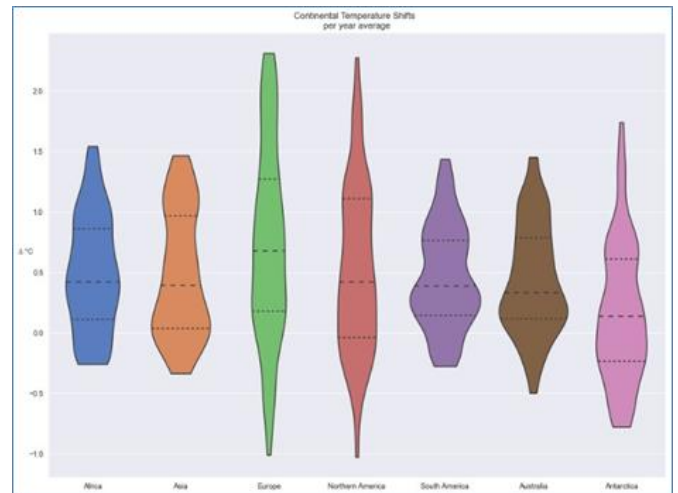


Figure 2. Continent Temperature Shifts Average (Per Year)

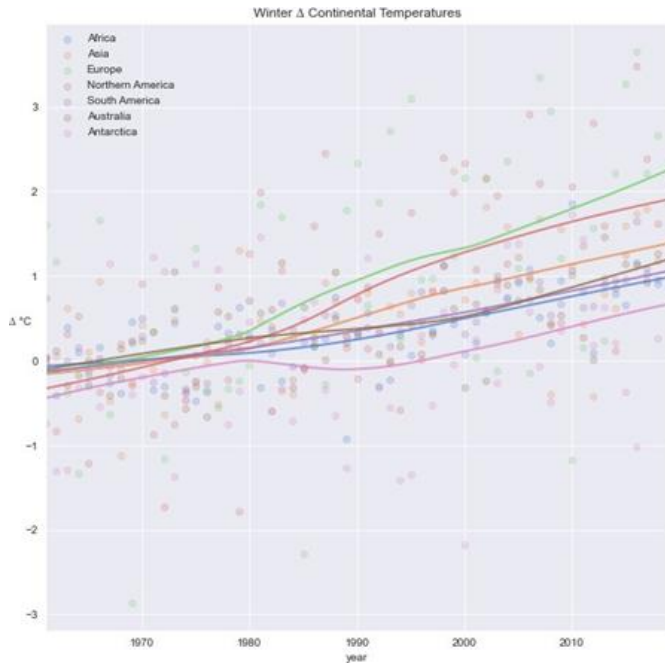


Figure 3. Change in Winter Continental Temperature

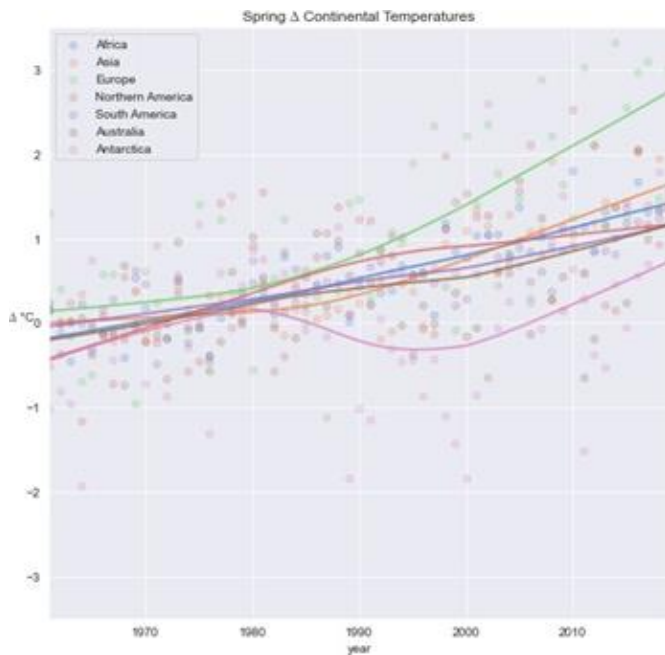


Figure 4. Change in Spring Continental Temperature

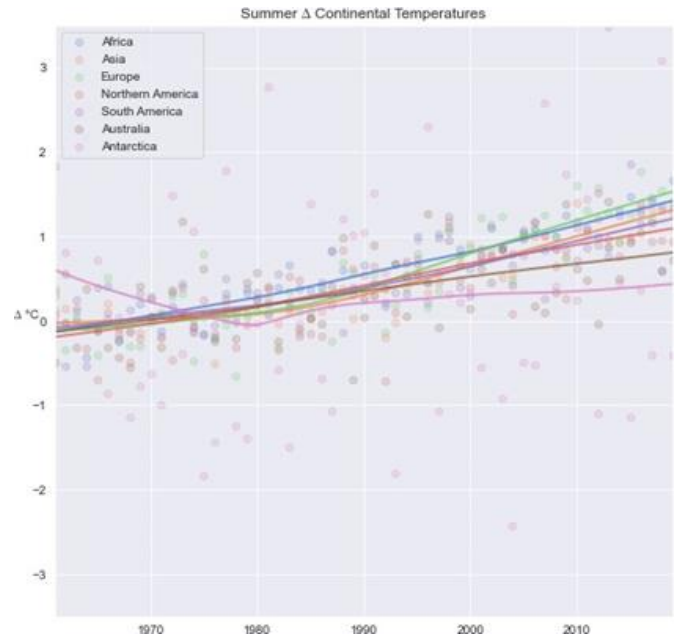


Figure 5. Change in Summer Continental Temperature

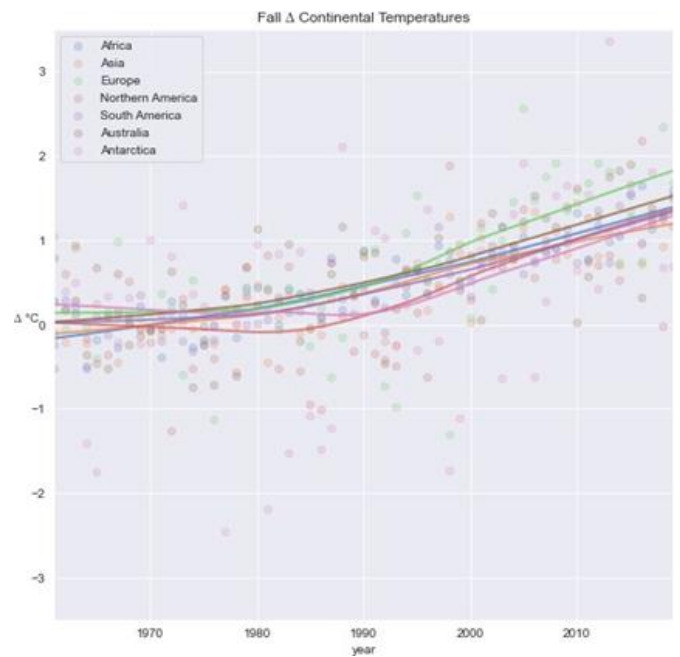


Figure 6. Change in Fall Continental Temperature

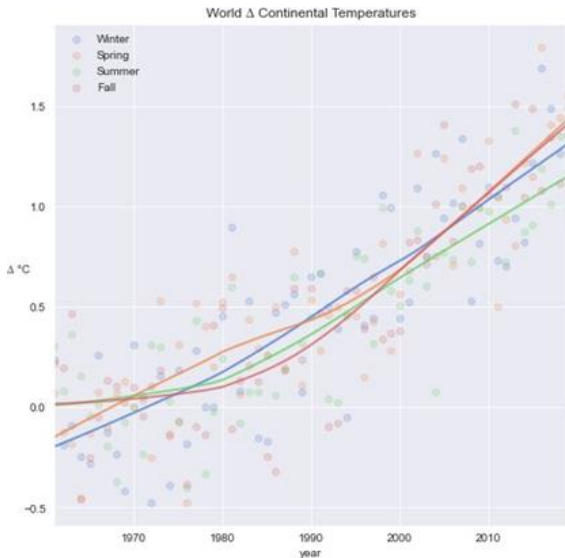


Figure 7. Change in World Continental Temperature

VI. RESULT

After successful analysis of the temperature higher accuracy is obtained for the temperature prediction as well as the greenhouse gases prediction. After the successful analysis of data it can be visualised the change in annual global temperature and how it can affect us . After seeing the graph for the forecasting, it can be said that the temperature and physical factors which are responsible for global warming will increase day by day in a linear pattern and the result of this global warming will become more and more lethal.

VII. CONCLUSION

In this paper, the data of 100-150 years is analyzed. Python is used for analysis and visualization of the temperature and greenhouse gases for the next 10 years in average. The MatPlot library is used to plot the predicted and the forecasted data. On seeing the following data, the temperature keeps on increasing globally and the graphs shows the same change. There by if the temperature goes on increasing at the same rate it can cause a huge impact all around the globe.

VIII. FUTURE WORK

There is some limitation in analysis of this project. This project mainly focuses on the visualizing data of various continents in the world. It doesn't explain each months and each Country's data separately. The data set is used for this for 100 – 150 years. But we analysis will be better if we go more than 200 or 250 years data. In future the prediction and visualization can be better for using a greater number of data. The other factors responsible for global warming can be also predicted. The data can be predicted for each month and each country of World, which will make this appropriate for various countries of the World.

IX. REFERENCES

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