Exploratory Analysis of Rain Fall Data in India for Agriculture

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ABSTRACT

Water should be practiced in the country to minimize the problem of the drought and flood. The main objective of this study is to identify the features that cause rainfall and predict the intensity of daily rainfall using machine learning techniques.

The Pearson correlation technique was used to select relevant environmental variables which Predicting the amount of daily rainfall improves agricultural productivity. Wise use of rainfall was used as an input for the machine learning model. The result of the study revealed that the Extreme Gradient Boosting machine learning algorithm performed better than others.

INTRODUCTION

To predict rainfall which may help in preventing disasters such as destruction of crops and heavy floods. This may help in determining the rainfall for effective use of water resources, crop productivity and pre-planning of water structures. India is an agricultural country and secondary agro based market will be steady with a good monsoon. The economic growth of each year depends on the amount of duration of monsoon rain, bad monsoon can lead to destruction of some crops, which may result in scarcity of some agricultural products which in turn can cause food inflation, insecurity and public unrest. In our analysis we are trying to understand the behavior of rainfall in India over the years, by months and different subdivisions.

Government of India has made a lot of useful data publically available. This includes data for agriculture, infrastructure, technology and so on. And so, we can look at some of this data to see if we can glean something meaningful from them.

In this study here, we look at the agricultural food production for various grains, cereals and oilseeds from the year 2001 to 2017. We have also obtained data for annual rainfall in India for these years as a separate dataset and our goal is to see how strongly agricultural food production depends on annual rainfall.

To do rainfall data analysis of Tamil Nadu subdivision, we have considered the data from year 1901 to 2017. First, we will see the distribution of rainfall over months and we can see in below figure that rainfall is more in October and November compared to other months as Tamilnadu receives rain during retreating monsoon season because of Northeast trade winds. The climate of Tamil Nadu is tropical in nature with less variation in temperature in summer and winter. This is because of its geographical location.

LITERATURE REVIEW

Time Series Analysis and Forecasting of Rainfall for Agricultural Crops in India: An Application of Artificial Neural Network (Debasis Mithiya November 6, 2020)

Indian agriculture depends heavily on rainfall. It not only influences agricultural production but also affects the prices of all agricultural commodities. The study has attempted to forecast monthly rainfall in India with the help of time series analysis using monthly rainfall data. The non-linear model - Artificial Neural Network (ANN) has been chosen instead of linear models to forecast rainfall.

Rainfall Prediction Using Machine Learning Algorithms for the Various Ecological Zones of Ghana (EMMANUEL AHENE December 28, 2021)

Accurate rainfall prediction has become very complicated in recent times due to climate change and variability. This research executed rainfall prediction in Ghana covering all the ecological zones using five classification algorithms. To ensure effective rainfall prediction, input datasets went through the exploratory data analysis by which chained equations algorithm was used to replace missing data, outliers were removed from the datasets and normalized before the classification stage.

Designing a Rule-Based Hourly Rainfall Prediction Model

Rainfall prediction is important in many aspects of our economy and general livelihood by preventing any serious natural disasters. This study has proposed a computer-aided rule-based rainfall prediction model using CART and C4.5. As outcomes, rules for rainfall prediction are provided. The study believes that the generated rules are useful for predicting the chance of rain and quantitatively measuring hourly rainfall. The study identified that the generated reliable rules with decision tree algorithms are important and efficient for future rainfall prediction with maintaining high accuracy.

<u>Heuristic Prediction of Rainfall Using Machine Learning Techniques</u> (Chandrasekar Thirumalai)

A regular rain pattern is playing a vital role for healthy agriculture while too much rainfall or too little rainfall can be harmful for crops. This study measures the different categories of data by linear regression method for effective understanding of agriculture in India.K-Means Clustering helped to predict type of rainfall cloud by analysing the colour and density of the cloud images.

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THANK YOU