Rainfall Prediction Using Machine Learning

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Abstract:

Rainfall prediction is the one of the important technique to predict the climatic conditions in any country. This paper proposes a rainfall prediction model using Linear Regression(LR), Ridge regression ,Lasso regression, Decision Tree Regression ,Random Forest regression for Indian dataset. The input facts is having a couple of meteorological parameters and to expect the rainfall in more in extra unique. The Mean Square Error (MSE), accuracy, correlation are the parameters used to validate the proposed model. From the consequences, the proposed machine learning version provides better effects than the other algorithms in the literature.

Keywords: Linear Regression, Rainfall, Prediction, Machine Learning, Accuracy

1. INTRODUCTION

Rainfall prediction is important in Indian civilization and it plays major role in human life to a great extent. It is demanding responsibility of meteorological department to predict the frequency of rainfall with uncertainty. It is complicated to predict the rainfall accurately with changing climatic conditions. It is challenging to forecast the rainfall for both summer and rainy seasons. Researchers in everywhere in the global have advanced diverese fashions to are expecting the rain fall mostly the use of random numbers and they are much like the climate records. The proposed model is developed using multiple linear regression. The proposed method uses Indian meteorological date to predict the rain fall. Usually machine learning algorithms are classified into two major categories: (i) unsupervised learning (ii) supervised learning. All the clustering algorithms come under supervised machine learning. Represents the different classification of machine learning algorithms. Describe the rainfall prediction research based on neural network for Indian scenario. Even though many models have developed, but it is necessary for doing research using machine learning algorithms to get rate prediction. The error free prediction provides better planning in the agriculture and other industries. This paper is organized as follows: Section II discuses the various related methods in the literature, Section III explains the proposed method MLR based Rain Fall Prediction. Results are elaborated in section IV and Section V concludes the paper.

2. LITERATURE SURVEY

[1] **Minghui Qiu, Peilin Zhao, Ke Zhang, Jun Huang, Xing Shi, Xiaoguang Wang, Wei Chu, "A Short-Term Rainfall Prediction Model using Multi-Task Convolutional Neural Networks", IEEE International Conference on Data Mining, pp. 395-400, 2017, DOI 10.1109/ICDM.2017.49**

Precipitation prediction, such as short-term rainfall prediction, is a very important problem in the field of meteorological service. In practice, most of recent studies consciousness on leveraging radar facts or satellite pics to make predictions. But, there is another situation where a hard and fast of weather functions are accumulated by means of various sensors at a couple of statement sites. The observations of a site are now and again incomplete however provide critical clues for weather prediction at close by web sites, which aren't fully exploited in existing work yet. To solve this problem, we propose a multitask convolutional neural network model to automatically extract features from the time series measured at observation sites and leverage the correlation between the multiple sites for weather prediction via multi-tasking. To the best of our knowledge, this is the first attempt to use multi-task learning and deep learning techniques to predict short-term rainfall amount based on multisite features. Specifically, we formulate the learning task as an end-to-end multi-site neural network model which allows to leverage the learned knowledge from one site to other correlated sites, and model the correlations between different sites. Extensive experiments show that the learned site correlations are insightful and the proposed model significantly outperforms a broad set of baseline models including the European Centre for Mediumrange Weather Forecasts system(ECMWF).

[2] **Aswin S, Geetha P and Vinayakumar R, "Deep Learning Models for the Prediction of Rainfall", International Conference on Communication and Signal Processing, April 3-5, 2018, India, pp. 0657-0661**

Rainfall is one of the major source of freshwater for all the organism around the world. Rainfall prediction model provides the information regarding various climatological variables on the amount of rainfall. In recent days, Deep Learning enabled the self-learning data labels which allows to create a data-driven model for a time series dataset. It allows to make the anomaly/change detection from the time series data and also predicts the future event's data with respect to the events occurred in the past. This paper offers with obtaining models of the rainfall precipitation via using Deep Gaining Knowledge ofArchitectures (LSTM and ConvNet) and figuring out the better structure with RMSE of LSTM as 2.55 and RMSE of ConvNet as 2.44 claiming that for any time series dataset, Deep Learning models will be effective and efficient for the modellers

3. EXISTING SYSTEM

The increasing growth of machine learning, computer techniques divided into traditional methods and machine learning methods. This section describes the related works of Rainfall Detection Using Machine Learning Model Detection and how machine learning methods are better than traditional methods. The existing method in this project have a certain flow is used for model development. Decision Tree are used algorithms in existing system. But it requires large memory and result is not accurate.

Limitations of the Existing System:

1. Accuracy low

2. Requires more time

3. Difficult to handle

4. PROPOSED SYSTEM

Proposed several machine learning models model, but none have adequately addressed this misdiagnosis problem. That can be used for this purpose are Stevens Multi Rainfall prediction Using Machine Learning Model Detection. Also, similar studies that have proposed models for evaluation of such tumors mostly do not consider the

heterogeneity and the size of the data Therefore, we propose a machine learning-based approach which combines a new technique of preprocessing the data for features transformation, Linear Regression, Ridge Regression, Lasso Regression, Random Forest RegressionML algorithm give the best accuracy techniques to eliminate the bias and the deviation of instability and performing Regression tests based.

5. EXPERIMENTAL RESULTS

Training Model:

Prediction :
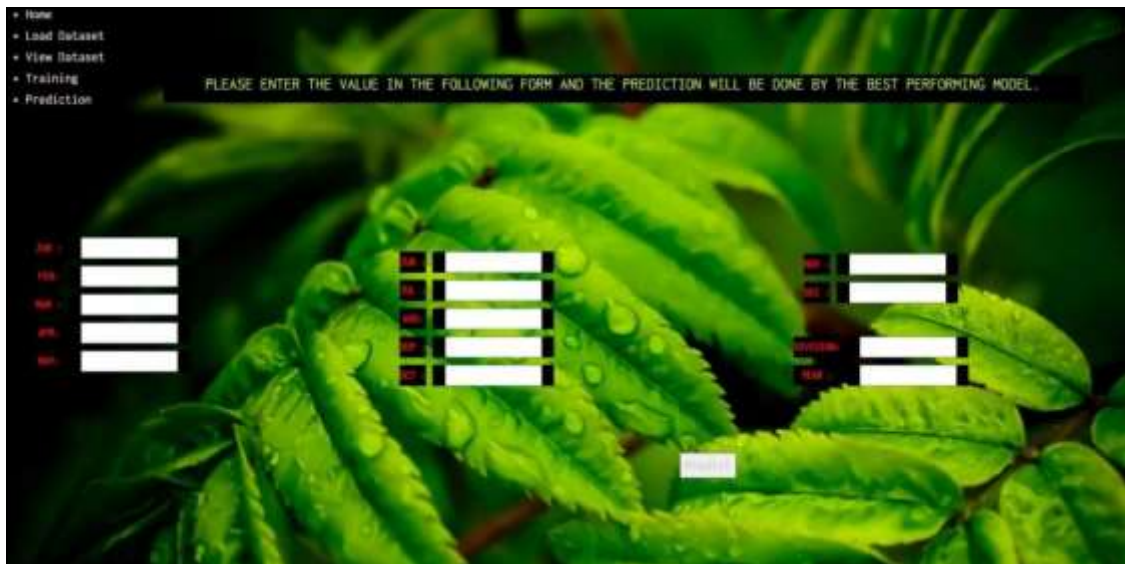
6. CONCLUSION

Rain fall prediction plays the major role in agriculture production. The growth of the agricultural products is based on the rainfall amount. So it is necessary to predict the rainfall of a season to assist farmers in agriculture. The proposed method predicts the rainfall for the Indian dataset using multiple linear regression and provides improved results in terms of accuracy, MSE and correlation. Experiments we carried out to compare popular machine learning algorithms for rainfall prediction using various performance measures over weather data of India. The different measuring attributes play a pivotal role in giving precise rainfall prediction. The level of accuracy and prediction highly depends on the data being used as input for classification and prediction. Every algorithm has its advantages and limitations , it is difficult to choose the best algorithm. The prediction accuracy of the model can be increased by developing a hybrid prediction model where multiple machine learning algorithms are put to work together.

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