

Major Crops Yield Prediction For Bangladesh

Senior Design Project

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CERTIFICATION

This is to certify that the work presented in the thesis is an outcome of the investigation carried out by the authors under the supervision of Professor Dr. Tanzilur Rahman, Department of Electrical Computer Engineering (ECE). It is declared that this thesis has been submitted only for the award of graduation.

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ABSTRACT

Bangladesh is predominantly an agricultural country where agriculture sector plays a vital role in accelerating the economic growth. Climate and other environmental changes has become a major threat in the agriculture field. In the present paper, we have considered Max-Temp, Min-Temp, Rainfall, Humidity, Wind Speed, Bright Sunshine, Cloud Coverage and Altitude from the weather dataset and Districts Name, Crop Name, Crop Category, Area, Production and Year from Crop dataset for 18 districts of Bangladesh and combined these two into one for 45 years from 1969 to 2013. Crop production environment consists of inherent sources of heterogeneity and their non-linear behavior. The proposed research work pursues to produce prediction model using machine learning algorithms on 6 types of crops (Aman, Aus, Boro, Jute, Potato and Wheat) based on weather data. For crop yield assessment and prediction 9 algorithms(Linear Regression, Lasso Regression, Ridge Regression, Bayesian Ridge, Random Forest, K-Nearest Neighbor, Decision Tree, SVR, Artificial Neural Network) these algorithms provided acceptable values and higher accuracy rate. Linear Regression gave highest score for Aman ($R^2= 0.79$), Aus ($R^2= 0.88$), Boro ($R^2= 0.95$), Jute ($R^2= 0.96$) and Wheat crop ($R^2= 0.93$) and for Potato Random Forest($R^2= 0.87$). The main purpose of this research work for helping to the farmer to predict the yield of the crop before cultivating onto the agriculture field. The crop yield prediction model discussed in the present paper will further improve in future with the use of long period dataset. Similar model can be developed for different crops of other locations.

Keywords: Crop yield, Aman, Aus, Boro, Jute, Potato, Wheat, Prediction, Linear Regression, Random Forest, K-Nearest Neighbor, Decision Tree, SVR, Artificial Neural Network