

CROP YIELD PREDICTION USING ARTIFICIAL NEURAL NETWORK

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Abstract: - Agriculture is the key origin of living for regarding 58 percentage of India's population. Agriculture is the most major zone of Indian wealth. Indian zone report for 18 percentage of India's gross domestic product (GDP). In our project, by using the Artificial Neural Networks (ANN) the crop yield prediction can be calculated. The values of weights and bias are taken by the Forward Propagation and Backward Propagation. The predicted value is compared with the Support Vector Machine (SVM) by using performance metrics. The performance metrics prove that the proposed project is more efficient than SVM, RF.

Key Words: Artificial Neural Network (ANN), Forward Propagation, Backward Propagation, Support Vector Machine, Random Forest.

1. INTRODUCTION

Agriculture is one of the most important industrial sectors in India. Rural areas mainly depend on the agriculture as the primary source of Income. Agriculture describes for concerning 13.7 percentage of Gross Domestic Product (GDP). Day by Day, the population increases. So the demand of food increases. In India, rice is the vital cereal crop. Rice is a strapping crop competent of adjusting itself to variation of ecosphere. Beyond 58% of the India's citizens be contingent on rice even as a key origin of living. The prediction of crop yield is generally used to forecast the yield of particular crop. Now- a-days, crop productivity prediction is essential to identify the cause for low or high productivity factors. There may be various factors which influence the productivity are Rainfall, Temperature, Water supply, soil types and so on. There are so many methods are available to predict the crop yield. In addition to crop yield prediction there are other types of predictions i.e., Disease prediction, Rainfall prediction, Temperature prediction etc. The prediction of crop yield is proposed in this project. A prediction can be obtain using different types data i.e., image data, tabular data etc. There are so many methods available for prediction. Prediction can be done in many ways i.e., using data mining techniques and Machine learning techniques and so on. Machine learning techniques are used in the proposed project. The Artificial Neural Networks are used in the proposed project. Seven years data was gathered through the probability and agricultural sections. The learning zone is located within the GPS synchronize of North latitude, 10°10' and 11°20' and South latitude, 79°15' and 79°50' and elevation is 9mtrs.solve the severe traffic congestion, alleviate transportation troubles, reduce traffic volume and

waiting time, minimized over all travel time and enlarge the benefits in health, economic and environmental divisions. This paper proposes a simple low budget, traffic light control system that aims to defeat many defects and improve that traffic management.

2. Project Description:

Our project is to predict the utmost yield of the crops created at minimum value. Early detection and management of issues related to crop yield indicators will facilitate increase yield and ensuant profit. By influencing regional weather patterns, large-scale meteoric phenomena will have a major impact on agricultural production.

- to check the socio-spatial and temporal variations of agricultural land use pattern.
- to analyze the pattern of agricultural productivity, intensity of cropping, crop diversification and rotation of crops.
- To assess the contribution of varied social teams to the agricultural changes in the region and examine the dominant factors behind such changes

3. Proposed Method:

A crop yield prediction using Machine Learning Techniques have been proposed. The proposed project will give the predicted value of crop yield by the tabular data. Data Collection is the most important part in the project. As earlier determine that the data is gathered from probability and agricultural section of the Andhra Pradesh, Prakasam District. The strapping area is located within the GPS synchronize of North latitude, 10°10' and 11°20' and South latitude, 79°15' and 79°50' and elevation is 9mtrs. There are various features available with respect to the crop yield. Out of those feature selection five are used to foretell the crop yield. A feature is normalized using the data mining techniques. In the proposed project, Artificial Neural Networks (ANN) has been implemented. Artificial Neural Network with the forward propagation and backward propagation instruction innovation was warned for foretelling precise paddy crop capitulate. Forward propagation is used to find the predicted value of the crop yield and backward propagation is used to recheck error and replace the previous value to new value to increase the accuracy of the prediction. Generally, the bias and weights value to initial layer has taken randomly. But, in the proposed project, the weights and bias values are taken from

intercepts and coefficients of Forward Propagation and Backward Propagation. So, the proposed project is implementation of ANN.

IMPLEMENTATION:

In this paper crop prediction methodology is employed to predict the acceptable crop by sensing varied parameter of soil and conjointly parameter associated with atmosphere. Parameters like form of soil, PH, nitrogen, phosphate, potassium, organic carbon, calcium, magnesium, Sulphur, manganese, copper, iron, depth, temperature, rainfall, humidity. For that purpose, we tend to square measure used artificial neural network (ANN). This project shows the power of artificial neural network technology to be used for the approximation and prediction of crop yields at rural district norms. Implementation literally suggests that to place into product or to carry out.

3.1.PROJECT MODULES:

The modules incorporated in this project are:

1. Data Collection
2. Data Normalization
3. Executing ANN
4. Performance Metrics
5. User login

3.2 MODULE DESCRIPTION

3.2.1 Data Collection:

Data collection is the primary mark of the proposed work. Data with seven features has been gathered from the agricultural and statistical sector of Prakasam District as mentioned above.

3.2.2 Data Normalization:

The upcoming step after the data is collected is data normalization using data mining techniques. The null, duplicate, empty columns are restored by some numbers using the data mining techniques. This Techniques used in the current work for Data Cleaning and Data Normalization.

3.2.3 Executing ANN:

ANN is a computational algorithm. It deliberated to restoring the character of biological systems collected of neurons. It is an efficient of machine learning techniques as well as pattern identification.

3.2.3.1 Forward Propagation:

The key in features is providing for the forward intendance between the webbing. Each concealed surface receives the

input features, summons it as by the activation function and proceed to the consecutive surface. It describes to the computation and the warehouse of halfway variables for the neural network. In sequence from the input layer to the output layer and then perform step by step between the techniques of a deep network with concealed layer.

3.2.3.2 Backward Propagation:

It is the core of sensory net instructions. It is the execution of better-tune up the weights of a sensory net drew on the error rate (i.e., mislaying) acquired in the preceding period (i.e., iteration). Real tune up of the weights certify beneath error rates, manufacturing the imitation dependable by growing its conception. It is a supervised learning of ANN and an error purpose; the method computes the radiant of the inaccuracy function with regard to the neural network's bias.

3.2.4 Performance Metrics:

In this module, the following visual quality metrics are calculated to estimate the accuracy of crop yield predicted valued.

1.Root Mean Squared Error

$$RMSE = \sqrt{\frac{\sum_{i=1}^n (\hat{y}_i - y_i)^2}{n}}$$

$\hat{y}_1, \hat{y}_2, \dots, \hat{y}_n$ are predicted values

y_1, y_2, \dots, y_n are observed values

n is the number of observations

2.Coefficient of Calculation (R squared)

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

3.3 TECHNOLOGIES USED

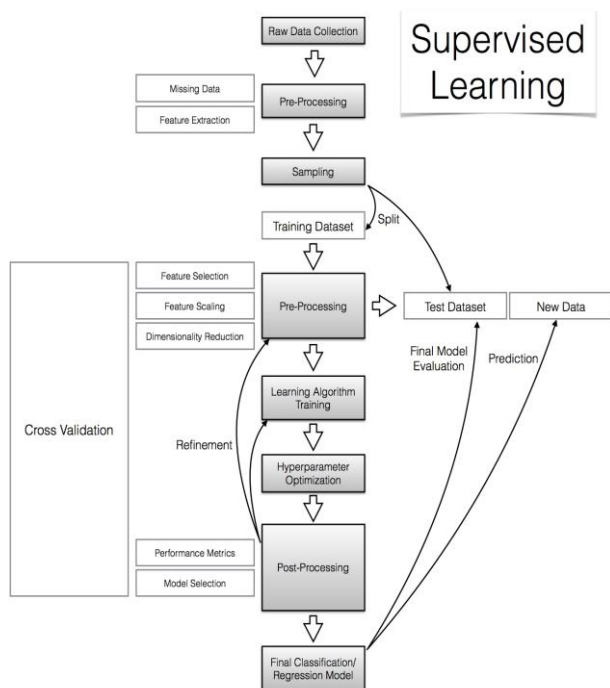
1. Hypertext Transfer Protocol

The machine-readable text Transfer Protocol is homeless, TCP/IP primarily based protocol used for human activity on the planet Wide internet. communications protocol defines the precise manner during which internet shoppers communicate with internet servers. HTTP/1.0 is that the most typical version in use nowadays. funnily enough, this protocol isn't formally recognized as a web customary. it's documented within the informational RFC 1945. Its successor, HTTP/1.1, is presently a projected net customary and lots of browsers and servers currently support this restructure.

2. SQL SERVER

SQL Server is a perfect knowledge set stage to be used in shared and devoted internet facilitating conditions. Of the various SQL Server releases, simply SQL Server specific need to never be utilized in Shared Hosting things, this version was supposed for application improvement conditions because it were. The SQL Server readying steorage for internet Hosting Environments provides best practices to transcription SQL Server to boost security, occupier confinement, and also the presentation of your expedited SQL Server organization. check scripts for provisioning shoppers and knowledge sets to be used in shared facilitating are incorporated.

3.4 ARCHITECTURE



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4. CONCLUSION:

Crop yield prediction is the uttermost important issues in the recent times. In this project, we proposed a crop yield prediction using Artificial Neural Networks is implemented. The experimental results show that the predicted value has more accuracy when compared to other methods. In future the present work will for more large datasets and more crop yield predictions to attain higher accuracy in the prediction value.

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