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Crop Yield Prediction using Machine Learning Algorithm

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Abstract - *India is an agricultural country. Yield of every crop depends on its dependent factors. It's vital to predict the yield of a crop to assist farmers. Crop Yield Prediction is predicting the yield of a crop in future supported the dependent factors. Crop yield depends on factors like rainfall, pressure, temperature and area or the geographical location. Prediction is completed using machine learning algorithms using historical data of dependent factors.*

In Crop Yield Prediction, we've got chosen Mysore region for the prediction of crops like Rice, Ragi and Sugarcane. Using the rainfall, pressure, temperature data from 1997-2014ofMysore region crop yield is predicted. To predict the yield one in all machine learning algorithm called Multiple Linear Regression algorithm is employed. The result of prediction is plotted via graph with actual and predicted values. Our models gave accuracy of 91% for the seasonal crop and also the 72% accuracy for the yearly crop.

Crop Yield Prediction helps farmers to grow a crop which supplies more yields supported the algorithmic prediction. Thus it helps to scale back loss for the farmers. Prediction also helps to extend the financial set-up.

Key Words*: *Data processing technique, Dependent factor, Multi Linear Regression, Graphical Interface, HTML, Datasets.

1. INTRODUCTION

Agriculture is one in all the most sectors to be impacted by different sources like climatic changes, soil attributes, seasonal changes etc., Crop yield prediction [1] is predicted on various style of data collected and extracted by using data processing techniques[2]like machine learning techniques [3] different sources which are useful for growth of the crop. It is an art of forecasting crop and also the quantity of yield in prior to i.e., before the harvest actually takes place. Predicting the crop yield is often extremely useful for farmers. If they need a concept of the number of yield they will expect, they will contract their crop before harvest, often securing a more competitive price than if they were to attend until after harvest. The involvement of experts in prediction of crop yield results in issues like lack of information about natural events, negation of non-public perception and fatigue etc. such issues are often to beat by using the models and decision tools for crop yield prediction. Likewise, industry can have the benefit of yield predictions by better planning the logistics of their business.

In India, average food consumption at this time is 550 sq per capita per day. With the growing population, the approaching challenge is to extend food production so as to feed the population that may reach 1.30 Billion by the year 2020. Farmers will should produce 50 percent of more grains to satisfy the present growing demand. The subsequent are the atmospheric weather variables which influences the crop production.

- Precipitation
- Temperature
- Atmospheric pressure

1.1 Proposed System

We've got collected temperature, rainfall, crop yield and other datasets for Mysore district from various sources like Indian Methodological Department, KSNDMC websites and agriculture department. Machine learning algorithms like multi linear regression algorithm, clustering algorithm, SVM algorithm to predict crop yield supported factors like temperature, rainfall, and pressure. Using Angular JS,Laveral framework,MySQL database user interfaces and backends are designed. The programme gets the result of the assorted crop yield graph and displays it to the user.

In the project, we introduce a scalable, accurate, and cheap method to predict crop yield using available climatic data and machine learning. Our machine learning approach can predict the crop yield with high spatial resolution.

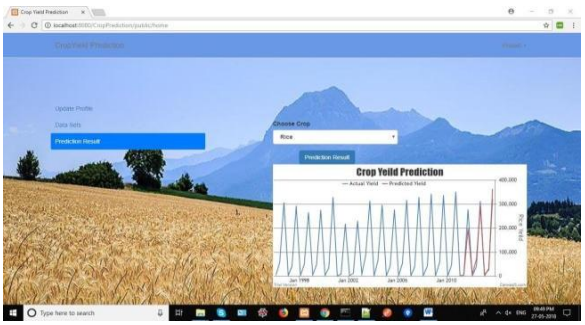

Fig 1. Example output of proposed system

1.2 System Design

Below architecture clearly explains about how the components of the system communicate among themselves ranging from preprocessing of information. This proposed framework is in a position to searching for the crop yield. This model gives clear picture of giant amount of information capture and preprocessing of information to get rid of unwanted data such as NULL etc presented in it. During preprocessing step we spit the dataset into training and testing dataset.

Train dataset to detect the crop yield present within the dataset using appropriate supervised learning algorithms. Apply the machine learning techniques which are helpful for locating crop yield for any of recent data occurred within the data. After this data acquisition suitable machine learning algorithm must be applied to compute efficiency and capability of the model, here we have applied machine learning algorithm like Multi - linear Regression Metrics like accuracy, precision are calculated for the proposed model. This method architecture focuses three parts like flow data, Machine learning techniques, and modules for detecting crop yield and feature selection modules.

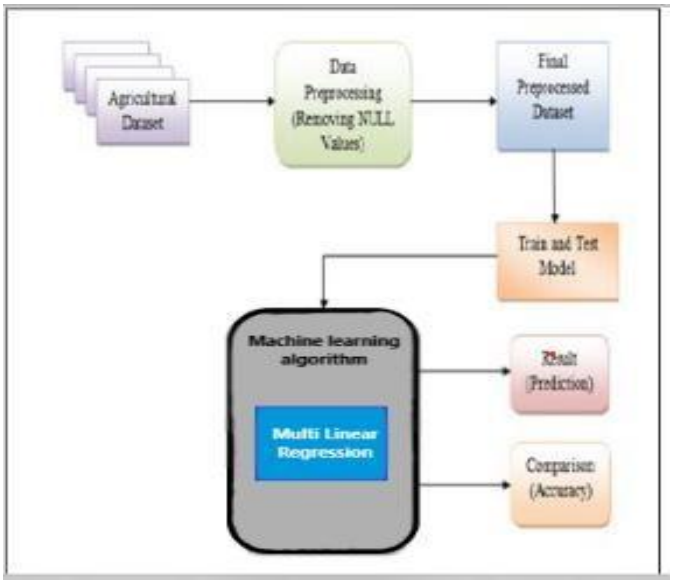

Fig 2. System design of proposed system

1.3 UML Design

Designing UML diagram specifies, how the method within the system communicates together with how the objects with in the process collaborate using both static likewise as dynamic UML diagrams since during this ever-changing world of Object Oriented application development, it has been getting harder and harder to develop and manage top quality applications in reasonable amount of your time. As a results of this challenge and also the need for a universal object modeling language each one could use, the Unified Modeling Language (UML) is that the Information industries version of blue print. It is away for describing the systems architecture very well. Easier to create or maintains system, and to make sure that the system will hindrance to the need changes.

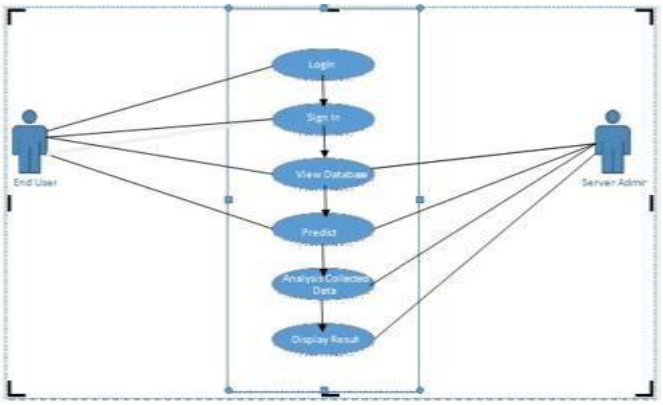

Fig 3. UML Diagram of the system

2. ALGORITHM

Machine learning algorithms like multi-linear regression algorithm, SVM algorithm to predict crop yield supported factors like temperature, rainfall, and pressure.

2.1 Multi Linear Regression

Multiple Linear Regression algorithms are employed to predict the crops. Multiple Regression is an expansion of simple Linear Regression. It is used after we want to predict the worth of a variable supported the worth of two or more other variables. The variable we would like to predict is termed the dependent variable. The variables we are using to predict the worth of the dependent variable is termed as independent variables. For instance, Multiple Regression to grasp whether exam performance may be predicted supported revision time, test anxiety, lecture attendance and gender. Multiple Regression also allows you to work out the fit (variance) of the model and also the relative contribution of each of the predictors to the whole variance.

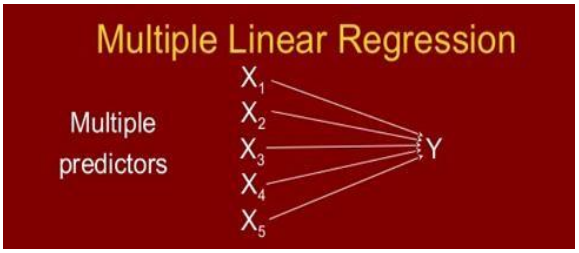

Fig 4.Multi Linear Regression

2.2 SVM Algorithm

Support vector machines (SVM) is about of supervised learning strategies used for classification, regression and outliers' discovery. It is a classification technique. Here, we have got an inclination to plot every information item as some extent in n-dimensional house (where n is style of options you have) with the worth of each feature being the worth of a

Particular coordinate. It is a classification technique. During this algorithmic rule, we have got an inclination to plot every information item as some extent in n-dimensional house (where n is style of options you have) with the price of each feature being the price of a selected coordinate. A Support Vector Machine (SVM) is discriminative classifier correctly bounded by a separating hyper plane. In alternative words, given labeled coaching information (supervised learning), the algorithmic rule outputs degree best hyper plane that categorizes new examples. Support vector simple machine (SVM) be a group of supervised learning strategies used for classification, regression and outliers uncovering.

3. CONCLUSIONS

Developed Model for Crop Yield Prediction is ready to predict the yield for crops like Ragi, Rice, and Sugarcane in Mysore region. Supported our analysis, model are more accurate if the more datasets are available. So because of datum increases our system will become more and more accurate. Our system accuracy is over the prevailing system. Since we are displaying the ends up in shape of graph with actual and predicted in the graphical computer program it is easy to match previous year's data. This model will help farmers to grow the crop which is able to give more yields in order it will be more profitable.

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