INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

ISSN
INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.488

Implementation Paper on Crop Yield Prediction

Miss. Khomane Neha, Miss.Bhasme Rutuja, Miss.Girme Shweta, Miss.Darade Supriya,

Prof. A.H.Pawar

Department of Information Technology Svpm's College of Engineering Malegaon (Bk) A/P-Malegaon (Bk), Tal.

Baramati, Dist-Pune(Ms)India

ABSTRACT- The impact of environmental change and its flightiness has made lion's share of the farming crops be influenced regarding their creation and upkeep. Anticipating or foreseeing the crop yield well in front of its gather time would help the specialists and ranchers for taking reasonable measures for selling and capacity. Exact prediction of crop advancement stages assumes a significant part in crop creation the board. Such predictions will likewise uphold the unified ventures for planning the coordination of their business. A few methods and approaches of foreseeing and showing crop yields have been grown before with changing pace of accomplishment, as these don't take into contemplations the climate and its qualities and are generally observational. For this a consolidated constructional and methodological methodology is proposed like assortment commencement, pesticide and manure the executives, coordinated cropping, water reaping, proficient water system strategies and so forth would likewise be required. The other machine learning algorithm is less inclined to blunder than other AI and data mining methods, making it a compelling AI apparatus for foreseeing crop yields. The decision tree algorithm is utilized to decide the fitting weight an incentive to compute the blunder subsidiary. The exactness of the crop yield assessment for the assorted crops associated with planning and planning is pondered to be one the very pinnacle of huge issues for agronomic creation purposes. The yield prediction is as yet viewed as a significant issue that stays to be clarified dependent on accessible information for some agrarian territories. Crop observing and estimating of crop yields for the proposed framework will be completed through State, Crop, Area, Production, Rainfall data

KEYWORDS: Crop Yield Prediction, Decision Tree, ML

I. INTRODUCTION

Yield prediction is a very important issue in agricultural. Any farmer is interested in knowing how much yield he is about to expect. In the past, yield prediction was performed by considering farmer's experience on particular field and crop. From old period, horticulture is considered as the principle and the first culture rehearsed in India. Antiquated individuals develop the crops in their own property thus they have been obliged to their necessities.

Consequently, the characteristic crops are developed and have been utilized by numerous animals, for example, people, creatures and fowls. The greenish products delivered in the land which have been taken by the animal prompts a solid and government assistance life. Since the development of new imaginative innovations and methods the agribusiness field is gradually debasing. Because of these, plentiful creation individuals are been focused on developing counterfeit items that is half and half items where there prompts an unfortunate life. These days, present day individuals don't have mindfulness about the development of the crops in an ideal time and at an opportune spot. In view of these developing procedures the occasional climatic conditions are additionally being changed against the basic resources like soil, water and air which lead to instability of food. By dissecting every one of these issues and issues like climate, temperature and a few variables, there could be no legitimate arrangement and advances to beat the circumstance looked by us. In India there are a few different ways to build the conservative development in the field of agribusiness. There are different approaches to increment and improve the crop yield and the nature of the crops.

Data mining additionally helpful for foreseeing the crop yield production. For the most part, data mining is the way toward examining data from alternate points of view and summing up it into valuable data. Data mining programming is a logical device that permits clients to examine data from various measurements or points, order, and sum up the connections recognized. In fact, data mining is the way toward discovering connections or examples among many fields in huge social databases. The examples, affiliations, or connections among this data can give data. Data can be

changed over into information about recorded examples and future patterns. For instance, synopsis data about crop production can assist the farmers with recognizing the crop misfortunes and forestall it in future.

Crop yield prediction is a significant agrarian issue. Every single farmer is consistently attempts to know, how much yield will get from his assumption. Before, yield prediction was determined by investigating farmer's past experience on a specific crop. The Agricultural yield is fundamentally relies upon climate conditions, bugs and arranging of collect activity. Exact data about history of crop yield is something imperative for settling on decisions identified with rural danger the executives. This exploration centers on advancement of a prediction model which might be utilized to foresee crop yield production. The proposed strategy use data mining procedure to anticipate the crop yield production dependent on the decision tree algorithm.

II. MOTIVATION

Data Mining is arising research field in crop yield examination. Yield prediction is a vital issue in farming. Any farmer is keen on knowing how much yield he is going to anticipate. Before, yield prediction was performed by thinking about farmer's experience on specific field and crop. The yield prediction is a significant issue that stays to be settled dependent on accessible data. Data mining procedures are the better decision for this reason. Diverse Data Mining methods are utilized and assessed in farming for assessing what's to come year's crop production. This examination proposes and executes a framework to foresee crop yield from past data. This is accomplished by applying decision tree algorithm on agribusiness data. This exploration centers on making of a prediction model which might be utilized to future prediction of crop yield. This paper presents a short investigation of crop yield prediction utilizing data mining procedure dependent on decision tree for the chose district for example Maharashtra states of India. The exploratory outcomes shows that the proposed work proficiently foresee the crop yield production.

III. LITERATURE SURVEY

Operational crop yield forecasting systems provide objective and independent early quantitative yield assessments that are used by producers and governments to make timely decisions on grain import/export and address food security issues related to adverse climatic events such as droughts [1]

This paper presents the review on use of such machine learning technique for Indian rice cropping areas. This paper discusses the experimental results obtained by applying SMO classifier using the WEKA tool on the dataset of 27 districts of Maharashtra state, India. The dataset considered for the rice crop yield prediction was sourced from publicly available Indian Government records. The parameters considered for the study were precipitation, minimum temperature, average temperature, maximum temperature and reference crop evapotranspiration, area, production and yield [2].

The prediction of the yield of different crops may help the farmer regarding taking the decision about which crop to grow. The research focuses on the prediction of different crops yield using neural network regression modeling. The data of crop cycle for summer, Kharif, rabi, autumn and whole year is used. The model is developed using a Multilayer perceptron neural network. Initially the result obtained considering optimizer RMS prop with accuracy 45 %, later it will be enhanced to 90% by increasing layers, adjusting weight, bias and changing optimizer to Adam [3].

Agriculture is the single most important contributor to the Indian economy. Agriculture crop production depends on the season, biological, and economic cause. The prognosticating of agricultural yield is a challenging and desirable task for every nation. Nowadays, Farmers are struggling to produce the yield because of unpredictable climatic changes and drastically reduce in water resource so; we are creating an agriculture data [4].

Reliable predictions of crop yield are difficult for developing agriculture. Crop production varies by various climatic conditions like dried period, increasing in temperatures remains a huge problem for agriculture workers, governments, and traders to strengthen the need for exactness and analyzing of crop production in a different weather conditions .[5] Crop yield prediction incorporates forecasting the yield of the crop from past historical data which includes factors such as temperature, humidity, ph, rainfall, crop name. It gives us an idea for the finest predicted crop which will be cultivate in the field weather conditions. These predictions can be done by a machine learning algorithm called Random Forest[6].

: The objective of this study was the estimation of yield and total volume of maize production using Spot-5 satellite images and empirical models. These models expressed a) yield (Y) as a function of LAI, and b) yield as a function of NDVI. To determine the efficiency degree of the calculated predictions at the flowering stage of the crop, yield sampling was done at the physiological maturity stage in pilot plots [7].

IV. METHODOLOGY

As shown in figure 1 firstly when user opens the app in his mobile it imports the location from Google. If the location isdetectedusercanenterthedetailsaboutallparametersrequiredlikesoilty pe, temperature, rainfall. App runs the algorithm and displays the list of crops suitable for entered data with predicted yield value. If location is not detected then user can enter location manually from drop down menu. App also shows the details and procedure to grow crops which you want.
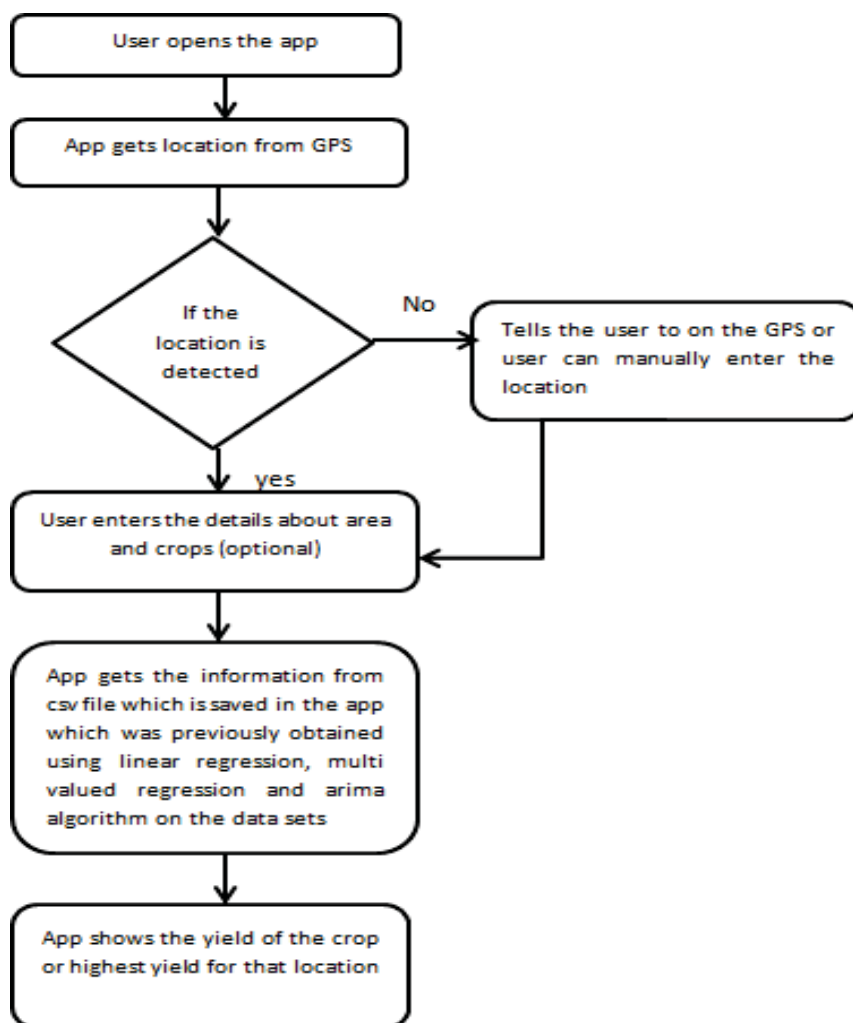

Fig.1 Flow of System

V. ALGORITHM

Decision Tree

A decision tool which uses a tree-like model to make decisions and identify consequences also includes chance event outcomes, resource costs, and utility. It is process to display an algorithm that contains conditional control statements.

Construction of Decision Tree:

A tree can be "learned" by splitting the source set into subsets based on an attribute value test. This process is repeated on each derived subset in a recursive manner called recursive partitioning. The recursion is completed when the subset at a node all has the same value of the target variable, or when splitting no longer adds value to the predictions. The construction of decision tree classifier does not require any domain knowledge or parameter setting, and therefore is appropriate for exploratory knowledge discovery. Decision trees can handle high dimensional data. In general decision tree classifier has good accuracy. Decision tree induction is a typical inductive approach to learn knowledge on classification.

Decision Tree Representation:

Decision trees classify instances by sorting them down the tree from the root to some leaf node, which provides the classification of the instance. An instance is classified by starting at the root node of the tree, testing the attribute specified by this node, then moving down the tree branch corresponding to the value of the attribute.This process is then repeated for the sub tree rooted at the new node.
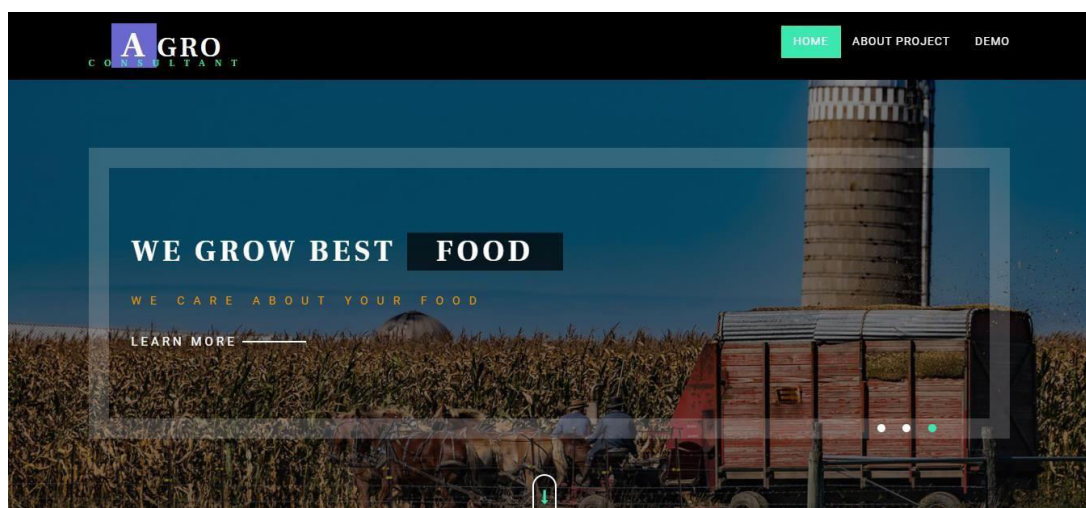
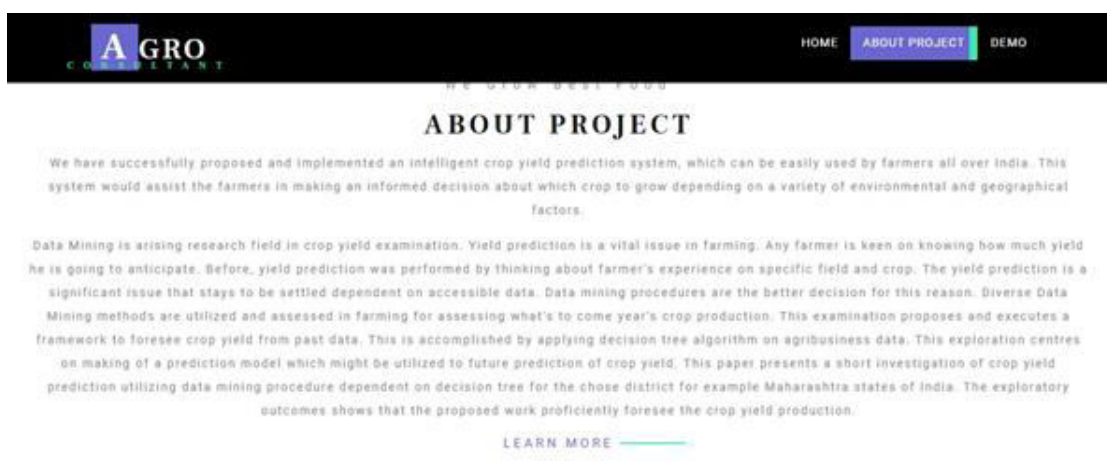## VI. EXPERIMENTAL RESULTS

Fig.2. Home Page
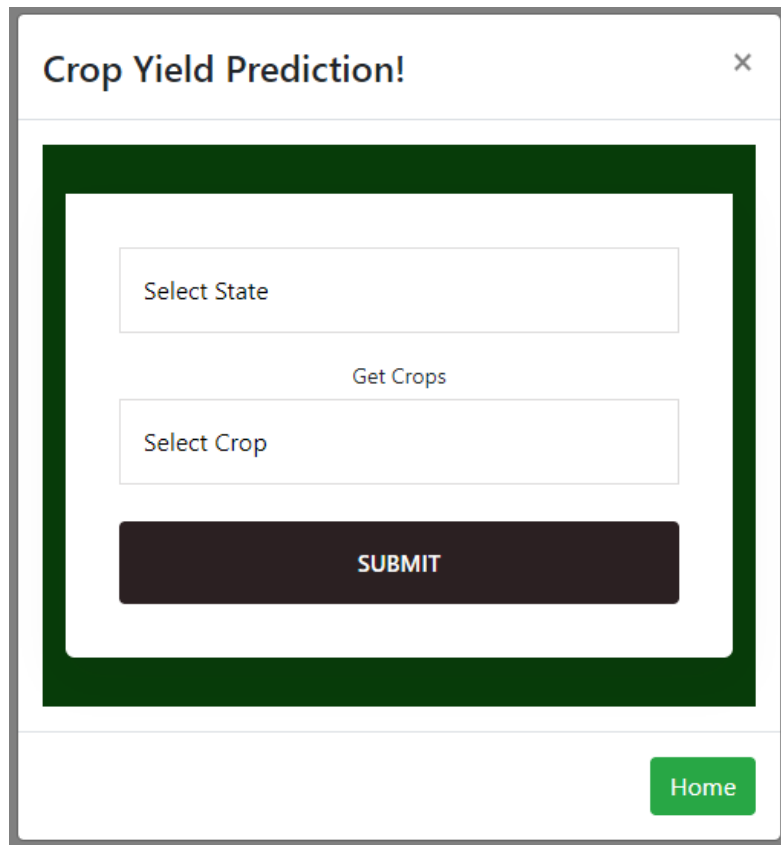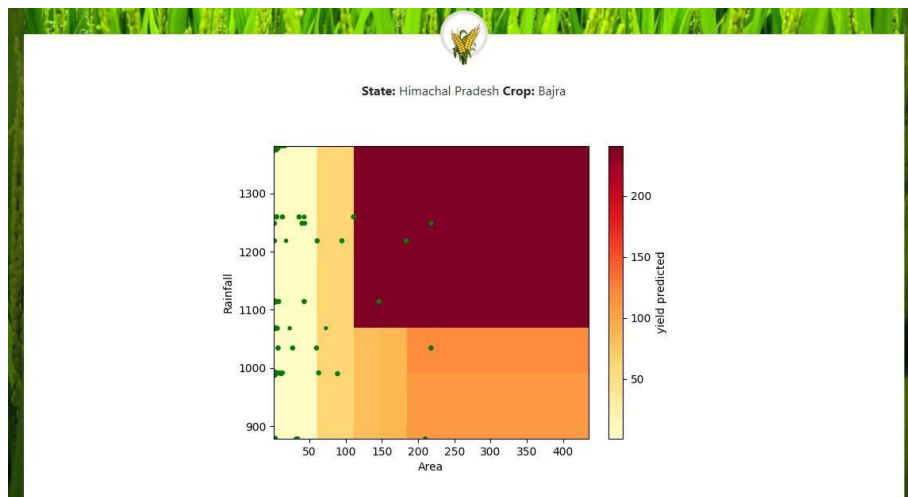

Fig.3. Abouts Page

Fig.4. Login Page

Fig.5. different results on same data set

From the above data we can say that the Decision Tree is the best Algorithm and Support Vector Machine is the worst Algorithm for Crop Yield Prediction.

Many machine learning algorithms are sensitive to the range and distribution of attribute values in the input data. . Outliers in input data can skew and mislead the training process of machine learning algorithms resulting in longer training times, less accurate models and ultimately poorer results.Even before predictive models are prepared on training data, outliers can result in misleading representations and in turn misleading interpretations of collected data. Outliers can skew the summary distribution of attribute values in descriptive statistics like

mean and standard deviation and in plots such as histograms and scatterplots, compressing the body of the data. Finally, outliers can represent examples of data instances that are relevant to the problem such as anomalies in the case of fraud detection and computer security. In machine learning.
Cross-validation types are as follows:
a. Reserve some portion of sample data-set
.b. Using the rest data-set train the model
.c. Test the modelusing the reserve portion of the data-set

VII. CONCLUSIONS

The analytical process started from data cleaning and processing, missing value, exploratory analysis and finally model building and evaluation. The best accuracy on public test set is higher accuracy score of Machine learning method from calculating cross validation checking, Precision, recall and F1score. The proposed system considers the data related to rainfall, area and past year production and gives a suggestion that the best profitable crops which can be cultivated in the apropos environmental condition. As maximum types of crops will be covered under this system, farmer may get to know about the crop which may never have been cultivated and lists out all possible crops, it helps the farmer in decision making about the crop to cultivate. This system also considers the past production of data which will help the farmer get insight into the demand and the cost of various crops in market.

REFERENCES

[1] Ananthara, M. G., Arunkumar, T., &Hemavathy, R. (2013, February). CRY—an improved crop yield prediction model using bee hive clustering approach for agricultural data sets. In 2013 International Conference on Pattern Recognition, Informatics and Mobile Engineering (pp. 473-478).IEEE.

[2] Awan, A. M., & Sap, M. N. M. (2006, April). An intelligent system based on kernel methods for crop yield prediction. In Pacific-Asia Conference on Knowledge Discovery and Data Mining (pp. 841-846).Springer, Berlin, Heidelberg.

[3] Bang, S., Bishnoi, R., Chauhan, A. S., Dixit, A. K., &Chawla, I. (2019, August). Fuzzy Logic based Crop Yield Prediction using Temperature and Rainfall parameters predicted through ARMA, SARIMA, and ARMAX models. In 2019 Twelfth International Conference on Contemporary Computing (IC3) (pp. 1-6). IEEE.

[4] Bhosale, S. V., Thombare, R. A., Dhemey, P. G., &Chaudhari, A. N. (2018, August). Crop Yield Prediction Using Data Analytics and Hybrid Approach. In 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA) (pp. 1-5).IEEE.

[5] Gandge, Y. (2017, December). A study on various data mining techniques for crop yield prediction.In 2017 International Conference on Electrical, Electronics, Communication, Computer, and Optimization Techniques (ICEECCOT) (pp. 420-423).IEEE.

[6] Gandhi, N., Petkar, O., & Armstrong, L. J. (2016, July). Rice crop yield prediction using artificial neural networks.In 2016 IEEE Technological Innovations in ICT for Agriculture and Rural Development (TIAR) (pp. 105-110).IEEE.

[7] Gandhi, N., Armstrong, L. J., Petkar, O., &Tripathy, A. K. (2016, July). Rice crop yield prediction in India using support vector machines.In 2016 13th International Joint Conference on Computer Science and Software Engineering (JCSSE) (pp. 1-5).IEEE.

[8] Gandhi, N., Armstrong, L. J., &Petkar, O. (2016, July). Proposed decision support system (DSS) for Indian rice crop yield prediction.In 2016 IEEE Technological Innovations in ICT for Agriculture and Rural Development (TIAR) (pp. 13-18).IEEE.

[9] Islam, T., Chisty, T. A., &Chakrabarty, A. (2018, December). A Deep Neural Network Approach for Crop Selection and Yield Prediction inBangladesh. In 2018 IEEE Region 10 Humanitarian Technology Conference (R10-HTC) (pp. 1-6). IEEE.

[10] Jaikla, R., Auephanwiriyakul, S., &Jintrawet, A. (2008, May). Rice yield prediction using a support vector regression method. In 2008 5th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (Vol. 1, pp. 29-32). IEEE.

INTERNATIONAL JOURNAL
OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING