Farmer's Analytical Assistant

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***Abstract*— Agriculture is the one of the source of livelihood for approximately 58 percent of Indias population primarily depends on agriculture, and it is the most crucial part of GDP to Indian economy which is not satisfactory.There are many reasons behind India's poor production in agriculture field like lack of crop planning by farmers or various environmental and economical factors that influence the crop production but unpredictable changes in these factors lead to a great loss to farmers. To reap high-quality appropriate crop desire for areas primarily based on parameters like soil conditions, rainfall and weather we have got applied gadget studying 3 method. By using data mining, machine learning crop yield can be predicted by deriving useful patterns from these agricultural data that helps farmers to decide the crop they would like to plant for the upcoming year for gaining maximum profit.With the assist of disorder assessment tool, we predict the crop and marketplace assessment at the equal time as cultivation of any crop.**

***Index Terms*—Crop yield prediction, Agriculture, Data Mining,Machine learning.**

I. Introduction

Data mining is the process which is used to find out useful patterns from large amount of data. It can be used for identifying clusters in data, and includes set of rules that describes each category or class in a data set.It is also used to find out hidden, valid, and useful patterns in huge data sets. Data Mining is all about discovering previously unknown relationships amongst the data.Data mining is also called as Knowledge discovery, Knowledge extraction, data/pattern analysis, information harvesting, etc..[9] Data Mining is the method of extraction, transforming, loading and predicting the meaningful information from huge data to extract some patterns and also transform it into understandable structure for further use[9].

One of the reason for the poor contribution of the agricultural sector to the Indian economy may be the lack of adequate crop planning by farmers as well as by the government. Rapid fluctuations in crop prices are common in the market. In such a scenario, it is difficult for a farmer to make an educated choice of crop to grow in their land or to estimate the yield and price to expect from it.

By applying farmers previous experience for a particular crop, one can make the predictions for crop but For the better crop production, the farmers definitely requires a suitable guidance to predict the future of crop yield and also an analysis is to be made in order to help the farmers to increase crop production for their crops. As every farmer is interested in knowing that how much yield is expected to be grown in their land .

In this paper we analysed different techniques to maximize and predict the crop yield productions.

II. LITERATURE SURVEY

The research by X.E. Pantazi et al. [1] by understanding yield restricting variables requires high goals multi-layer data about elements influencing crop development and yield. Consequently, on-line proximal soil detecting for estimation of soil properties is required, because of the capacity of these sensors to gather high goals information (1500 test per ha), and in this manner decreasing work and time cost of soil examining and examination. The point of this paper is to foresee inside field variety in wheat yield, in light of on-line multi-layer soil information, and satellite symbolism edit development attributes. Managed self-sorting out maps equipped for dealing with existent data from various soil and product sensors by using an unsupervised learning calculation were utilized.

The research by Michael D. Johnson et al. [3] is about Harvest yield estimate models for grain, canola and spring wheat developed on the Canadian Prairies were created utilizing vegetation records got from satellite information and machine learning techniques. Hierarchical bunching was utilized to assemble the harvest yield information from 40 Census Agricultural Regions (CARs) into a few bigger locales for building the figure models. The Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI) got from the Moderate-goals Imaging Spectoradiometer (MODIS), and NDVI were considered as indicators for harvest yields. Different direct relapse (MLR) and two nonlinear machine learning models Bayesian neural systems (BNN) and model-based recursive apportioning (MOB) were utilized to gauge trim yields, with different blends of MODIS-NDVI, MODISEVI and NOAA-NDVI as indicators.

Anshal Savla, Parul Dhawan, Himtanaya Bhadada, Nivedita Israni, Alisha Mandholia, Sanya Bhardwaj [4] they made Survey of classification algorithms for formulating yield prediction accuracy in precision agriculture This Paper makes a relative study of categorization algorithms and their performance which helps to know the yield and predict it in precision agriculture.

Aakunuri Manjula, Dr.G.Narsimha XCYPF [5]: A Flexible and Extensible Framework for Agricultural Crop Yield Prediction This concludes the requirement for crop yield prediction and its major usage and the role in a nations planned guiding principle which are made in agriculture development field.

III. OBJECTIVES AND GOALS

Agriculture is the main base of Indian economy. The agriculture is the most important economical sector in our county. The farmers totally depends on the crop production and their farms for economical gain. The yield is based on climate conditions such as rainfall structure. It highly influences agriculture. So there is need of farmers and agriculturalists, they require spontaneous guidance proposition in predicting future reaping instances to maximize crop yield.

IV. EXISTING SYSTEM APPROACH

Agriculture is the principle base of Indian financial system. In India, farmer used crop selection method is only conventional technique. The agriculture technology is the most vital and powerful financial quarter in our county. The farmers are absolutely relying on the vegetation and their farms for least expensive gain. The yield obtained generally relies upon on climate situations as rainfall patterns largely influence cultivation methodologies. So, want of farmers and agriculturalists require a spontaneous recommendation.
proposition in predicting upcoming reaping times to maximise crop . In traditional manner on machine gaining knowledge of and agriculture analysis we came throughout the truth that traditionally crop choice techniques is not pleasing the farmers cost effective delight. We are confronted such a lot of issues in present paintings. Due to incorrect or flawed crop choice approach GDP is likewise low

V. PROPOSED SYSTEM APPROACH

Agriculture is necessary in the of economy in India. In current years because of industrialization excessive use of insecticides the electricity of soil is getting affected. Many of the methods observed through agriculture aren't enough to growth the productivity. The commonplace problem gift the various Indian farmers are they dont have any data regarding the correct crop primarily based on their soil requirements so it impacts the productivity. Thus, we try to prove the current crop selection technique influences on farmers within your means ability by using degrading yield boom. So, we invent the effective crop choice technique primarily based on machine learning (SVM). We advise the first-class appropriate crop for the regions thinking about environmental conditions. Agriculture is the backbone for a growing economy like India and there is a sizable need to preserve the rural sustainability. We are going to offer one solution for all make our system smart and virtual vicinity for agriculture. This system contains following modules-

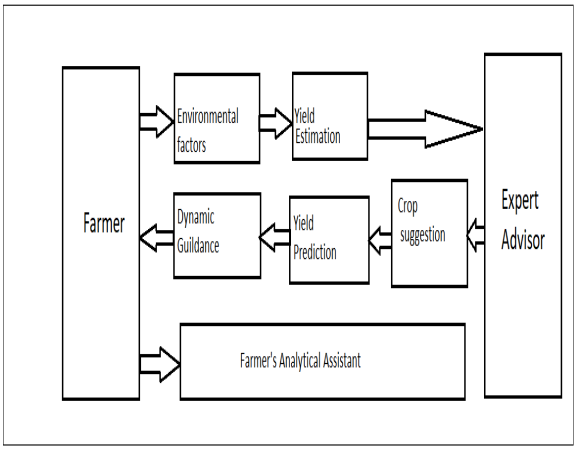

Fig. 1. Block Diagram

- Farmer -Register, login, enter environmental details, view yields prediction and crop suggestions, ask runtime queries.
- Admin -Register, login, view farmers details, view all crop details, update crop details and monitor system.
- Expert Advisor -Register, login, upload blogs videos, success stories, help farmers, solve queries, and provide dynamic assistance.

VI. METHODOLOGY

A. DATASET GATHERING

There are two data sets used for the our model. The first contains historic district-wise rainfall data for Pune districts of Maharashtra. The gathering period spans to 10 years from 2010 to 2018. Rainfall is measured in millimetres and the labelled volume for a District is the mean of values recorded at all the weather stations in the District. The other data set contains a detailed description about the soil properties recorded in Pune District of Maharashtra recorded over 10 years. Soil properties include the concentration of Nitrogen, Phosphorous and Potassium (NPK) in the soil (all in tones), the scales of pH of the soil, amongst others. Every row of values is labelled with a corresponding Yield value expressed in tones per hectare. The trained model proposed in this paper curates results of the model trained on rainfall data with the machine learning model trained on other soil properties

1) Climate and Rainfall: At the Western Ghat and hill area is cool and eastern area having hot and dry climate. The maximum temperature of pune district ranges between 34 and 410C in April-May, while the minimum temperature varies

between 50C to 100C in the months of November to January. The average annual rainfall at the district is 675mm, most of which is receive through South-West monsoon. However, medium rainfall region at district having on average rainfall of 900 mm, eastern region have an average between 600 to 7(mm while western region have an average of 1171 mm5. Tl regularity in occurrence in recent years has not experienced the district.

2) Soil and Topography : Pune region possesses main three types of soils, viz. black-fertile, brown and mixed typ In western region soil, type has brown and low quality whe as eastern region having fertile and plain type. The riche alluvial soil track found in the Valley of Bheema River. Tl rivers Velu, Ghod are left side of Bheema and Indrayan Bhama, Mula-Mutha etc. are at right side. Each tahsil of tl district have minimum one river6. Therefore, the agro-climat condition of region is favourable.

VII. ALGORITHM USED

SVM finds its place in this work for training the Recon mendation system with training set. It is also used after tl classification using yields data based on environmental factor Algorithm works as follows:
Because of this undesirable information existing in the inp data, both during training and classification, the pre-process fails to identify the exact accuracy, thus failing to perfor with improved efficiency.The parameter for the crops lik climatic factor, moisture and past dataset can be used to predi the yield of the crop. Collection of more valid details soil class, latitude, longitude and suitable crop can greatly accelerate the efficiency of work. The pre-training unit could hence be improved and a lot more features can be extended, thus significantly contributing towards the agricultural welfare worldwide[7 8]. Input of training set containing appropriate crops for given soil class and rainfall data. Output will in the form of crop recommendation for current region.

VIII. RESULTS

In our experimental setup, Below describes our system modules and respective generated output.

Sr no.	No.of Input parameters	Output Generated
1.	Soil samples of all regions in pune	NPK summarization of all regions
2.	Average rainfall dataset	Generated vector average rainfall
3.	Temperature parameter	Average temperature class
4.	All Environmental parameters	Best suitable Crop suggestion list
5.	All area of farm	Crop Yield prediction
6.	Crop and yield details	Current market evaluation

Fig. 2. Input parameters

Fig. 3. Output generated.

We proposed assistive system for economical welfare of farmers.We are creating support vector machine algorithm for classifying environmental factors.The environmental factors arelike soil types with NPK values, 10 years rainfall dataset, and temperature dataset.The trained model is constructed

based on temperature,soil types and rainfall data. The trained model gives us bestsuitable crop selection which solves existing crop selection problem.The average yield dataset for all crops is used from Google source for prediction of yields.

IX. CONCLUSION

The farmers can match the best advisable weather conditions for the cultivation of any crop. The crops which are commercial crop can be considered in the predictions of system so the loss can be avoided. Unlike this more crop productions can be predicted. The methodologies can be used with data of other crops to study their relationship with essential climatic parameters. From the above analysis, SVM and Non-Linear Regression shows an average accuracy of less than 10 percent difference between the predicted and actual market price[13]. Non-Linear Regression algorithm increases the accuracy of system and SVM is used to analyze the past data of various attributes.

REFERENCES

[1] Aakash G Ratkal, Gangadhar Akalwadi, Vinay N Patil and Kavi Mahesh, Farmers Analytical Assistance, IEEE International Conference on Cloud Computing in Emerging Markets 2016.

[2] "A study of Rainfall over India Using Data Mining" Chowdari K.K,Dept.of Computer Science and Engineering BGS Institute of Technology Bellur Cross,Karnataka,India.

[3] Mansa Manjunatha,Parkavi A,Estimation of Arecanut Yield in Various Climatic Zones of Karnataka using Data Mining Technique : A Survey.

[4] Aakunuri Manjula, Dr.G.Narsimha (2015), "XCYPF: A Flexible and Extensible Framework for Agricultural Crop Yield Prediction" , Conference on Intelligent Systems and Control (ISCO).

[5] A.ShanningBao, S. Cao, C.Ni, X.Xu, M.Ju, H.He, Q.Zhou(2017). Crop yield variation trend and distribution pattern in recent ten years. 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS).

[6] B.Kulkarni, S.Mandal, S.N.Sharma, G.S.Mundada, M.R.Meeradevi.(2018). Predictive Analysis to Improve Crop Yield using a Neural Network Model. International Conference on Advances in Computing, Communications and Informatics (ICACCI).

[7] Udayan Birajdar, Sanket Gadhave, Shreyas Chikodikar, Shubham Dadhich, Shwetambari Chiwhane, Detection and Classification of Diabetic Retinopathy Using AlexNetArchitecture of Convolutional Neural Networks, Proceeding of International Conference on Computational Science and Application, online 05 January 2020, pp 245-253.

[8] Dr. C. Nalini, Shwetambari Kharabe, Sangeetha S, Efficient Notes Generation through Information Extraction, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 8958, Volume-8 Issue-6S2, August 2019

[9] F.Kogan, N.Kussul, T.Adamenko, S.Skakun, O.Kravchenko, O.Kryvobok, A.Shelestov, A.Kolotii, O.Kussul, and A.Lavrenyuk, Winter wheat yield forecasting in ukraine based on earth observation, meteorological data and biophysical models, International Journal of Applied Earth Observation and Geoinformation, vol.23,pp.192203, 2013.

[10] H.Boogaard, C.Van Diepen, R.Rotter,J.Cabrera and H.Van Laar, Wofost 7.1 ; users guide for the wofost 7.1 crop growth simulation model and wofost control center 1.5, SC-DLO, Tech. Rep., 1998.

[11] https://www.guru99.com/data-mining-tutorial.html