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AGRICULTURAL CROP RECOMMENDATION BASED ON PRODUCTIVITY AND SEASON

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ABSTRACT:

As we realize the truth, India is the second biggest population internationally and the majority of people in India have agriculture as their career. In India even though there is sufficient information, techniques, and strategies which might be accomplished manually available in agriculture, there's no such machine where environmental factors are detected and suggest to the user which crop type is satisfactory for farming. Farmers are developing equal vegetation repeatedly without trying new varieties of vegetation and they may be making use of fertilizers in random amounts without understanding the poor content material and quantity. So, this is at once affecting crop yield and additionally results in soil acidification and damages the top layer. So, we've designed the system using machine learning algorithms for betterment of farmers. Our system will suggest the first-class appropriate crop for particular land primarily based on content material and weather parameters. And also, the device offers information about the desired content material and types of fertilizers, required seeds for cultivation. Hence, by utilizing our system farmers can cultivate a brand new form of crop, may additionally increase in profit margin and might keep away from soil pollution. System gaining knowledge of strategies develops a nicely-described model with the facts and facilitates us to obtain predictions. A crop advice device may be provided to a farmer to help them in crop cultivation with the help of information mining. To enforce such an approach, vegetation is recommended based totally on its climatic elements and . Data Analytics paves a way to conform to useful extraction from agricultural databases. Crop Dataset has been analyzed and advice of crops is performed primarily based on productiveness and season.

Keyword: Machine Learning, Crop prediction, Decision tree, SVM, Crop recommendation, Passive aggressive algorithm, Random Forest, Comparison graph.

I. INTRODUCTION:

The purpose of this document is to define and describe the requirements of the project and to spell out the system's functionality and its constraints. Agriculture is one of the important occupations practiced in India(about 60 %), It is the broadest economic sector and plays a most important role in the overall development of the country. Adopting new agriculture technology may be very important, this can lead the farmers of our states towards income(POC: Prototype of concept). Machine learning(ML) is a game changer for the agriculture sector. Machine learning is the part of artificial intelligence, which has emerged together with big data technologies and high performance computing to create new opportunities for data.

Existing system: In the present model, the 20 crops are trained, users can now choose things they like thanks to recommender systems. Previous crop prediction and yield

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prediction was achieved on the basis of farmer's experience in a particular place.

4 parameters: Climate, soil, season, location.

They will decide on the prior or community or greater trend crop inside the surrounding location only for their land if they don't have sufficient knowledge of soil.

- ➔ Existing system mainly concentrates on fertility of soil but is not concerned about the farmer's profit.
- ➔ Today farmers are facing a lot of financial problems due to lack of crop prediction.
- ➔ Due to lack of knowledge on soil it results in reduction within the yield and soil pollution(soil acidification), thus damaging the top layer.

Proposed system: The designed system will advise the most appropriate crop for a particular land using nitrogen, phosphorus, potassium and calcium. Proposed system work is based on the recommendations given by considering the season, rainfall, temperature, humidity, and pH. They are accrued from VC farm mandya, internet site and weather department.

3 Algorithms: support vector machine(SVM), choice tree(decision, random forest), passive aggressive.

- ➔ The machine recommends the crop for the farmer and additionally recommends the amount of vitamins to be uploaded for the anticipated crop.
- ➔ The gadget has some different specifications like displaying approximated yield in q/acres, required seed for cultivation in kg/acre and the marketplace fee of the crop.
- ➔ By using comparison graphs we can consider the best accurate tree algorithm for respective crop prediction.

1.Data Collection:

Data collection is the most effective way to gather and measure data from many resources, including APMC's website, VC Farm Mandya, and government websites. In order to obtain a rough dataset for the system. These characteristics must be present in this dataset.

Temperature, humidity, soil pH, humidity, rainfall, crop, and NPK readings from the data will be taken into account for predicting crops. We gather rainfall data from the prior year in order to anticipate the yearly precipitation.

2. Data Preprocessing:

After gathering data from a variety of sources, Before training to become a model, the dataset has to be preprocessed. Reading the obtained dataset is the first step in the data preparation process, which is followed by data cleaning. When data is cleaned, certain redundant attributes are removed from the datasets so they can't be used to predict crops.

3.Machine Learning Algorithm for Prediction:

Based on taught data, machine learning prediction algorithms have highly optimized estimations that must be a likely result. Using data, statistical algorithms, and machine learning approaches, predictive analytics determines the likelihood of future events based on previous data. Beyond just understanding what has occurred, the objective is to offer the most accurate prediction of what will occur in the future. We employed supervised machine learning techniques with the subcategories of classification and regression in our system. For our system, a classification method will work well.

-SVM algorithm and Decision tree algorithm.

4. Crop Prediction:

For the reason that environmental situations vary from region to location, a device studying version is used to expect the pleasant crop kind for the selected land. To educate the crop recommending model with the statistics accrued from the Arduino sensors, system studying algorithms are used to pick out the first-rate crop to cultivate with the very best possibility of developing. Assist vector machine algorithms are used to pick the satisfactory crop kind. From this model, it decides what form of plants that the farmer needs to develop. This is completed by means of studying factors of humidity, temperature, soil moisture, pH stage, and sunlight. The machine shows 4 crop types by means of reading the above noted factors and the use of device mastering algorithms.

Support Vector Machine (SVM) - The objective of the support vector machine algorithm is to find a hyperplane in N Dimensional space (N — the number of features) that distinctly classify the data points.

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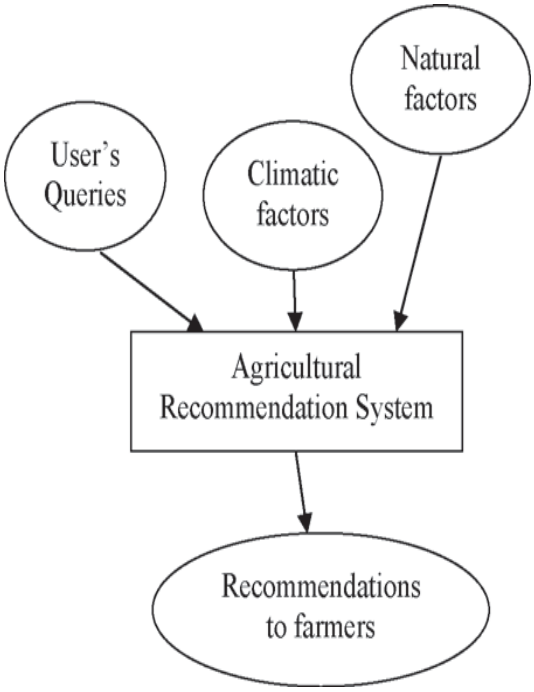
II. IMPLEMENTATION:

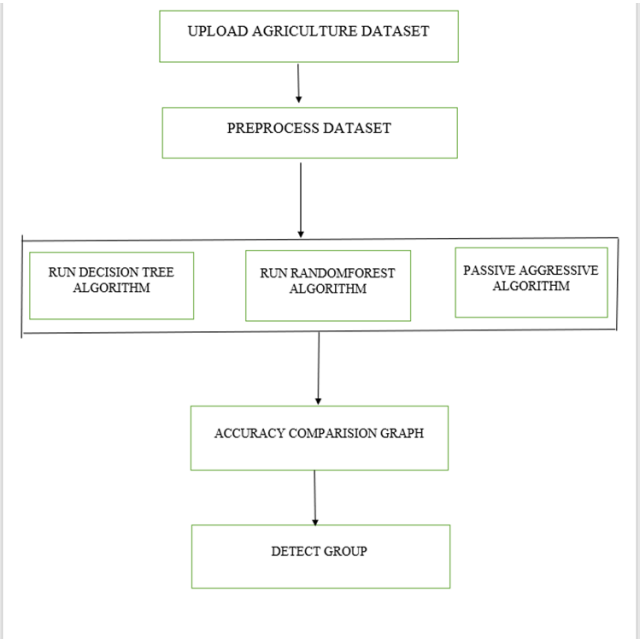
2.1. Recommendation system:



Recommender systems have lent its fingers to customers to select objects they like. A recommendation system is the approach to provide the tips to the customers of their hobby. This will be practiced for agricultural use too. Based upon the factors o f agriculture, farmers are given ideas for their cultivation manner. New techniques to grow crop cultivation can also be endorsed.

soil contents and climate parameters the device will recommend the maximum suitable crop for cultivation. This system also presents information about required fertilizers like Nitrogen(N), Phosphorus (P) and potassium(k) in Kg in line with hectare and presents the required seed for a cultivation in Kg consistent with acre for the endorsed crop. This device consists of some other capabilities including displaying the modern marketplace fee and approximated yield in quintal in keeping with acre for endorsed vegetation. The ones details will assist farmers in deciding on the maximum profitable crop.

2.2. Application architecture:



Step-1: Agriculture dataset containing temperature, humidity, Ph, label, etc... as attributes. Initially, uploading the dataset into the system takes a pre-processing function.
Step-2: After preprocessing the data, the system is yet to take machine learning algorithms such as: decision tree algorithm, random forest algorithm and passive aggressive algorithm. It therefore decides the best algorithm for the suitable dataset.
Step-3: System analyzes the best algorithm to be used for the particular dataset through accuracy comparison graph. Finally, detects the best suitable crop based on soil, season and climate.

III. RESULTS AND ANALYSIS:

The proposed system was successfully implemented in a selected land. Based on the tests conducted and the data collected, it can suggest the best crop to cultivate for maximum

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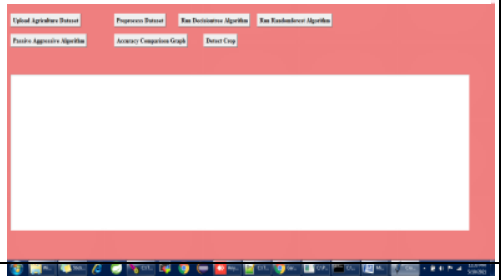
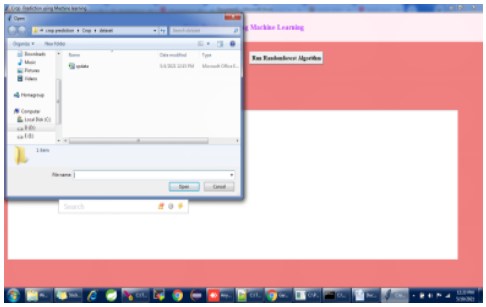
harvest. Using the feedback collected from the farmer the accuracy of the predictions is sharpened by neglecting the invalid data.

UI DESIGN	Design Description (functions, operations etc)
	Operations like: upload agriculture dataset, pre-process dataset, machine learning algorithms (decision tree, random forest, passive aggressive)
	Uploading the dataset into the system and loading it.
	Accuracy of various algorithms used in predicting results.

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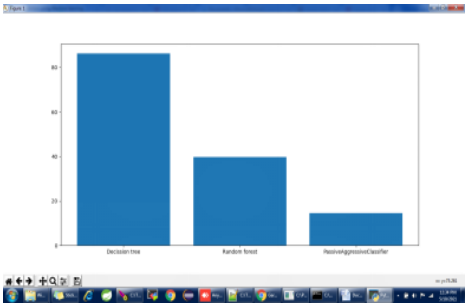
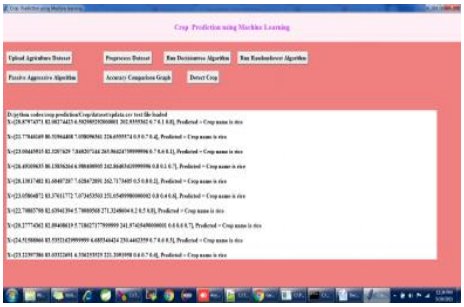
	Accuracy comparison graph showing all the three algorithms. According to our datasets, decision tree algorithm is having more accurate percentage compared to others
	By considering all the datasets and respective algorithms, the system is predicting the results for the best crop that is to be produced in that area.

IV. CONCLUSION:

The importance of crop management was substantially examined in this research. Farmers require modern technology to help them improve their vegetation. Agriculturists may be notified about correct crop predictions on a timely basis. To look at agriculture parameters, many system learning algorithms were carried out. Algorithms are: help vector gadget(SVM), preference tree(choice, random woodland), passive aggressive. thinking about the parameters like production and season, extra personalized and applicable tips may be given to farmers which lets in them to yield a good extent of manufacturing

In a current environment with much less space and less expertise of agriculture, all of the factors are taken into consideration from the perspective of farmer and plant, and the farmer is properly guided till the harvesting. Before choosing any plant to grow it's essential to have the know-how and information of the elements that affect the cultivation and how to hold or control them. From this machine, these above-stated elements are mechanically processed and choose the crop kind to be cultivated. As soon as the plant is cultivated, the farmer is requested for comments regularly with a time interval of one month. From this comments taken, the device is self-skilled, and the accuracy is advanced with time and records accumulated. From this system, the guidance of a consultant isn't always wanted, and the preservation is less. accordingly, imposing this system will no longer have any additional economic effect on the person.

V. FUTURE SCOPE:

We must acquire all required facts by giving GPS locations of a land and by way of getting right of entry from the Rain forecasting device of the government, we are able to expect crops by means of just giving GPS area. Also, we are able to broaden the model to keep away from food crises.

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VII. APPENDIX

1.SVM- support vector system
2.ML- machine learning
3.POC: Prototype of concept
4.Nitrogen(N), Phosphorus (P) and potassium(K)