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Harvestify Classifier Using Machine Learning

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Abstract: – Agriculture is considered as primary livelihood in India .It is considered as primary sector is very vast in India. The Harvesting System is a machine learning-based solution designed to optimize the harvest process for farmers. An accurate vision system to classify and analyze fruits in real time is critical for harvesting robots to be cost-effective and efficient. Farmers in many parts of India are having are trouble growing crops because of the climate and soil. There could be no genuine assistant available to assist them with encouraging the right sorts of plants using current advancement. Due to illiteracy, farmers may not be able to benefit from advance in agriculture science and continue using human method. This make it difficult to achieve the desired yield. For instance, improper fertilization or unintentional rainfall patterns may be the cause of crop failure.

Keywords: Machine Learning, Processing, Training, Testing, Predictive Model, Text Processing.

I. INTRODUCTION

We Know that in India, 118.6 million famers relay on agriculture for their livelihood, according to the 2011 census. Understanding the soil condition, when and where to apply compost, taking into account rainfall, maintaining crop quality, and understanding how various factor operate differently in different parts of the same field are some of the numerous issues that farmers have had with in the past. Like while furrowing while settling on significant horticulture choice that might be challenging to carry out all alone or on occasion, various variable and measurement should be considered, the program will provide a solution for agriculture that can assist farmers in increasing their overall productivity by monitoring the agriculture field. Rainfall reverse and soil boundaries, two example of online weather data can assist in determining which plants should be planted in a given location. This function introduces a desktop application that predicts the most profitable yield in the current climate and soil conditions using data analysis techniques. Agriculture is a cornerstone of the Indian economy, with 118.6 million farmers relying on it for their livelihood. The program will integrate environment and capacity office information.

USERS OF THE SYSTEM ARE:

1. Crop Recommendation
2. Fertilizer Recommendation
3. Plant Disease Prediction

From ancient period, agriculture is considered as the main and the foremost culture practiced in India. Ancient people cultivate the crops in their own land and so they have been accommodated to their needs. Since the invention of new innovative technologies and techniques in the agriculture field is slowly degrading. Due to these, abundant invention people are been concentrated on cultivating artificial products that is hybrid products where there leads to an unhealthy life. Nowadays, modern people don't have awareness about the cultivation of the crops in a right time and at a right place. Because of these cultivating techniques the seasonal

climatic conditions are also being changed against the fundamental assets like soil, water and air which lead to insecurity of food.

The machine learning learns the algorithm based on the supervised, unsupervised, and Reinforcement learning each has their importance and limitations. Supervised learningthe algorithm builds a mathematical model from a set of data that contains both the inputs and the desired outputs. Unsupervised learning-the algorithm builds a mathematical model from a set of data which contains only inputs and no desired output labels. Semi-supervised learning- algorithms develop mathematical models from incomplete training data, where a portion of the sample input doesn't have labels. This paper aims to improve the yield of the crop in several ways and recommends fertilizer suitable for every particular crop.

1.1 LITERATURE SURVEY

Nowadays more and more research is going on in the field of Agriculture domain. Identify what is the challenge in India Farming and come up with new solutions to help farmers.

The papers [1], [2], [5] mainly throw light on the recommend'ation of the crop which crop to grow according to your soil nutrition value and weather conditions. In this paper, the author starts from the very basics of smart farming and slowly moves to word developing a model that will help the farmer to grow crops suitable to the soil along with the weather conditions.

In the "Improved Segmentation Approach for Plant Disease Detection" paper [4] the author uses the approach in which he tried different machine learning models based on the micro and macronutrients like Nitrogen, Phosphorus, pH level, Rain value in mm to predict the best suitable fertilizer for the selected crop. The performance matrix of the classification algorithm is compared based on accuracy and execution time.

1.2 Crop Recommendation System

A. Crop Selection and Yield Prediction Using Machine Learning Techniques:

Several studies have explored the use of machine learning for crop selection and yield prediction. For instance, Shahhosseini et al. (2019) developed a model using a Random Forest and Support Vector Machine (SVM) to predict crop yields based on environmental and soil data. The study found that these models could significantly enhance the accuracy of yield predictions, providing farmers with reliable information for crop selection.

B. Analyzing Soil Data for Crop Recommendations:

A study by Kumar et al. (2020) focused on using soil parameters like pH, nitrogen, phosphorus, and potassium levels to recommend suitable crops. The researchers utilized a Decision Tree algorithm to analyse the soil data and provide crop recommendations, achieving an accuracy of over 85%. This method allows for the customization of crop choice based on specific soil conditions, optimizing yield potential.

C. Plant Disease Detection

A. Image-Based Disease Identification:

One of the critical challenges in agriculture is the timely and accurate detection of plant diseases. A study by Mohanty et al. (2016) demonstrated the use of Convolutional Neural Networks (CNNs) for identifying plant diseases from leaf images. Their model achieved an accuracy of 99.35% in detecting various plant diseases, showcasing the potential of deep learning in agricultural diagnostics.

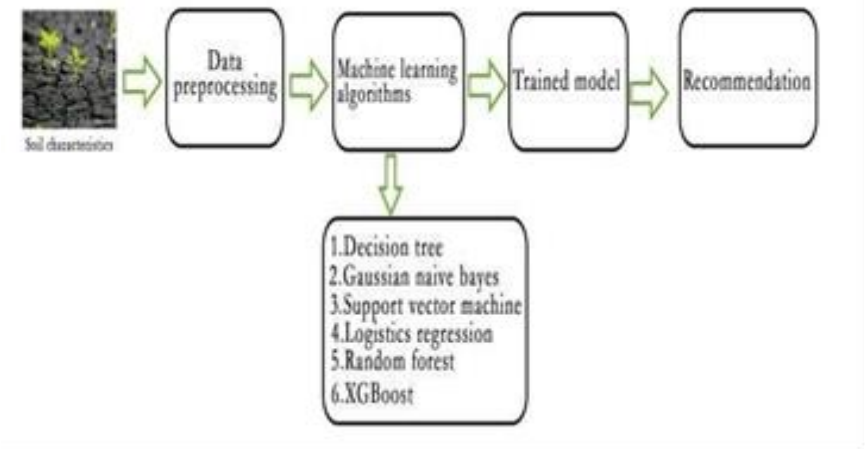

Fig: Flow Diagram of Harvestify Classifier

Soil Characteristics (Input):

The process begins with the collection of soil characteristics data. This data may include various parameters such as pH, texture, moisture content, nutrient levels, etc.

Data Pre-processing In this step, the collected soil data is pre-processed. Data pre-processing involves cleaning the data, handling missing values, normalizing or standardizing the data, and possibly feature selection or extraction. This step ensures that the data is in a suitable format for machine learning algorithms.

Machine Learning Algorithms Once the data is pre-processed, it is fed into various machine learning algorithms to create models that can classify the soil.

1.2 PROBLEM STATEMENT

A. Image-Based Disease Identification:

One of the critical challenges in agriculture is the timely and accurate detection of plant diseases. A study by Mohanty et al. (2016) demonstrated the use of Convolutional Neural Networks (CNNs) for identifying plant diseases from leaf images. Their model achieved an accuracy of 99.35% in detecting various plant diseases, showcasing the potential of deep learning in agricultural diagnostics.

1.3 METHODOLOGY

The aim of proposed system is to help farmers to cultivate crop for better yield. The crops selected in this work are based on important crops from selected location. The selected crops are Rice, Jowar, Wheat, Soybean, and Sunflower, Cotton, Sugarcane, Tobacco, Onion, Dry Chili etc. The dataset of crop yield is collected from last 5 years from different sources.

There are 3 steps in proposed work.

1) Soil Classification:

Soil classification can be done using soil nutrients data. Two Machine learning algorithms used for soil classification are Random Forest and Support Vector Machine. The two algorithms will classify, and display confusion matrix, Precision, Recall, f1-score and average values, and at the end accuracy in percentage as output.

2) Crop Yield Prediction:

Crop Yield Prediction can be done using crop yield data, nutrients and location data. These inputs are passed to Random Forest and Support Vector Machine algorithms. These algorithms will predict crop based on present inputs.

3) Fertilizer Recommendation:

Fertilizer Recommendation can be done using fertilizer data, crop and location data. In this part suitable crops and required fertilizer for each crop is recommended.

- Third Party applications are used to display Weather information, Temperature information as well as Humidity, Atmospheric Pressure and overall description

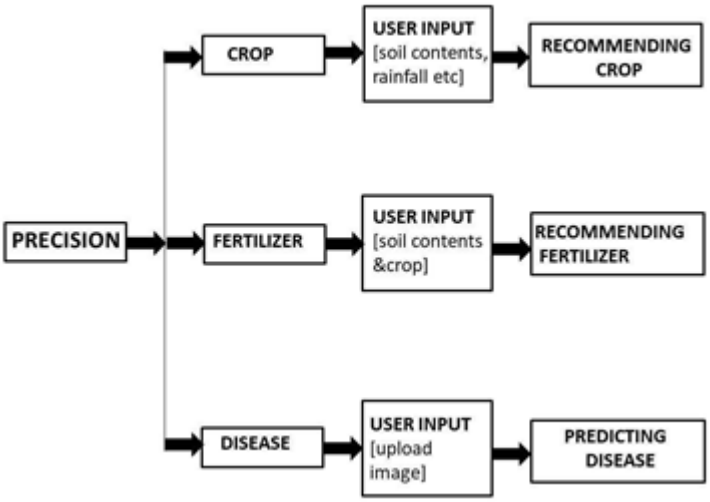

Fig: System Design

1.4 CONCLUSIONS

A model is proposed for recommending soil and fertilizer as well as predicting crop disease. The research has been done on datasets from Kaggle. Integrating the agriculture sector and machine learning will give a boost to the agricultural sector. To predict the best result various algorithms will be used and compared. This project will help the farmer to have the best yield without facing much of the loss. To implement this project thoroughly the study of soil contents and its relationship with the crop and fertilizers needs to be done as well as the study of different plant diseases and its cause and also its treatment. Analysis of the available datasets will be done to come up with higher accuracy in the model. The future work will be deploying the model into the application which will be user-friendly.

1.5 FUTURE SCOPE

The future scope of the Harvesting system project that includes crop recommendation, fertilizer recommendation, and plant disorder type the usage of the system gaining knowledge of, in addition to an internet application for the front give up may be broadened in several ways:

A. Integration of Iota gadgets: The machine can be incorporated with IoT devices such as soil moisture sensors, temperature sensors, and climate stations to acquire real-time records. This can enable the gadget to offer more accurate and unique pointers to farmers.

B. Multi-language support: The web utility can be extended to assist more than one language to cater to farmers from special regions.

C. Integration with different Agricultural systems: The machine may be integrated with other agricultural systems including irrigation systems, pest management systems, and crop monitoring systems to offer a comprehensive agricultural management answer.

D. Continuous mastering: The gadget gaining knowledge of models can be advanced using constantly feeding them with new records. The gadget may be designed to learn and adapt over time to provide more correct and customized guidelines.

1.6 REFERENCES

1]. J. Joo, U. Lee, S. Jeong, J. Y. Yoon, H. Jin ,S. C. Kim, " Periodontal Disease Detection Using Convolutional Neural Networks", International Conference paper, 2018. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8258157/

2].Jitendra Kumar Jaiswal, Rita Samik Annu, ―Application of Random Forest Algorithm on Feature Subset Selection and Classification and Regression‖, IEEE paper 2017. https://research.vit.ac.in/publication/application-of-random-forest-algorithm-on-feature

3]. Viraj Mehta, Chahat Jain, Karan Kanchan, Prof. Vinaya Sawant ―A Machine Learning Approach to Foretell the Probability of a Crop Contracting a Disease‖, 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). https://www.irjet.net/archives/V8/i2/IRJET-V8I2110.pdf

4].S. Ding and X. Xu, "Extreme learning machine: algorithm, theory and applications", Article in Artificial Intelligence Review, June 2013. https://www.researchgate.net/publication/257512921_Extreme_learning_machine_algorithm theory applications