IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Harvesting System Using Machine Learning

[1]Name of 1st Author, [2] Miss. Madhura Patil, [3]Miss. Sakshi Surve, [4] Mr. Akshay Tembe

[1]Assistant Professor, [2]Student, [3]Student, [4]Student

[1]Department Of Information And Technology

[1]Finolex Academy Of Management And Technology, Ratnagiri, India

Abstract: Agriculture is considered as primary livelihood in India . It is considered as primary sector is Indian economy. Size of agriculture sector is very vast in India. The Harvesting System is a machine learning-based solution designed to optimize the harvest process for farmers. The system is designed to help farmers accurately predict the right time to harvest crops, identify the most efficient crop for that area and fertilizer to be used, and identify the plant disease from the image. Machine Learning can turn out to be very useful for this prediction, several machine learning algorithms can be used for recommendation and prediction. This system can turn out to be very useful in precision farming.

Index Terms **- Harvesting , Machine Learning , Crop Recommendation , Fertilizer Recommendation , Disease Prediction**

I. INTRODUCTION

Agriculture has major history in India. India is ranked as second in worldwide farm output and it also contributes to country GDP.As per 2018 , agriculture sector contributed 17-18 % to country's GDP. India is also ranked as first with highest net cropped area.Crop yield is the most vital factor in contributing in agricultural monetary. The crop yield depends on variety of factors like climatic conditions, geographical factors , financial elements etc . It is difficult for farmer to decide which crop is accurate to plant in which conditions.

Soil is the key feature in yielding of the crops. Certain crops needs certain types of soil to have best yield hence, knowing the ground condition is very important. To understand the soil condition in that area farmers can perform the soil test , which helps to understand the nutrient level in the soil. Starting the cultivation of crops by believing the myths of past is not the suitable ways as condition of the ground can vary by the time. Hence , by understanding the soil we can cultivate the accurate crop which can help us to give the better yield.

Another factor which can help us to get better yield is the fertilizer . Fertilizer provide crop with the nutrients that are necessary. Without fertilizer soil will be depleted that means all the nutrients present in the soil will be consume. To ensure theyield it is necessary to supply the right balance to the soil . So, by understanding the soil type and also drained nutrients we can use the right fertilizer to ensure healthy soil and yeild . Therefore, predicting the right fertilizer by understanding the soil conditions is also important.

Even though agriculture production in India is huge still India is behind as it is difficult to identify the crop disease on time and treat it. Identification of disease is the significant challenge . The accuracy of manual prediction of plant disease is not dependable as most of the disease are hard to predict through naked eyes and also depends upon experience and knowledge of the person. Availability of research work done for plant disease is in huge amount which can help us to predict the plant disease by training the model which will study the disease patterns on plants and predict the disease , it's cause and suitable treatments.

II. LITERATURE SURVEY

In Paper[1], For prediction of crop disease using weather data with the help of extreme literacy machine they've proposed a new approach Predicting when a complaint will increase to a threshold that causes significant profitable loss is important to help. Formerly being styles and approaches have been surveyed and studied, and it shows that complaint incarnation vaticination is a linearly thick problem and the proposed approach is better for linearly thick problem. trials were conducted for different activation functions and it could give satisfactory delicacy of91.5 for radial base function.

Paper[2] Crop conditions and pests play a crucial part in reducing crop product and quality. thus, the discovery is fundamental in perfection agriculture task. Homemade discovery of conditions takes fresh time and sweats on the larger area of the ranch. Deep literacy approach can be used to descry the conditions and pest more directly on leaves and other corridor of the crop. The proposed system is helpful in detecting crop conditions as well as pests. In this paper, the deep literacy ways related to conditions and pest discovery has been reviewed and the deep literacy model for automatic opinion of crop conditions and pests is proposed.

In paper[3] author have used decision tree classifier to classify the conditions of cotton crop. Environmental and soil temperature data is collected through input detector and also shoot to garçon. Garçon also authenticates the data and transfers it to Temperature Depository i.e. database, where the stoner input values are compared with available training dataset. This data is recaptured in csv format to Decision Tree Classifier, Which predicts the applicable result and give it to the stoner. In(1), they've taken a dataset with 11 attributes and 310 rows for vaticination of crop complaint. With the help of different ways like decision tree, Naive Bayes, Neural network they've performed crop complaint vaticination. By performing these ways they concluded that, the delicacy of given data in Decision tree, Naive Bayes, SVM, Neural Network.

In[4], originally they introduced a brief review of ELM, describing the principle and algorithm of ELM. also, they've put variants of ELM, especially on incremental ELM, pruning ELM, error- minimized ELM, two-stage ELM, online successional ELM, evolutionary ELM, voting- grounded ELM, ordinal ELM, completely complex ELM, and symmetric ELM. After that, they've summarized the operations of ELM on classification, regression, function approximation, pattern recognition, forecasting and opinion, and so on. At last, they've bandied several open issues of ELM, which may be good of exploring in the future.

III. PROBLEM DEFINITION

In order to bringout best cropout, machine learning is utilized.To have accurate result previous crops and conditions are used for studying. Finding the best vrop to grow, the fertilizers to utilize and predicting the crop diseases are the goals of this project. The goal of this project study is to learn how crops can produce high yield depending upon the surrounding factors such as climate, area, and soil characteristics etc into consideration.

In this project we aim to build a website that carries out applications like:
Crop Recommendation
Fertilizer Recommendation
Plant Disease Prediction

IV. PROPOSED SYSTEM

Although there are many systems proposed , but still majority of the user faces challenge to use it. The solution proposed by us aims to solve these problem , by developing a website which is user friendly .This website application considers variety of parameters for recommending crops and fertilizers ; parameters like temperature , soil nutrients , area etc . This application will just not help user to recommend crop and fertilizer but also will predict the crop diseases it's cause and how to treat it. One the main advantage of this application is that user can have all the information at the same platform without much hustle.The proposed model recommends and predict the result from the data which is collected from Kaggle.com . The integration of agriculture sector and technology i.e Machine Learning will help to enhance the farming field.

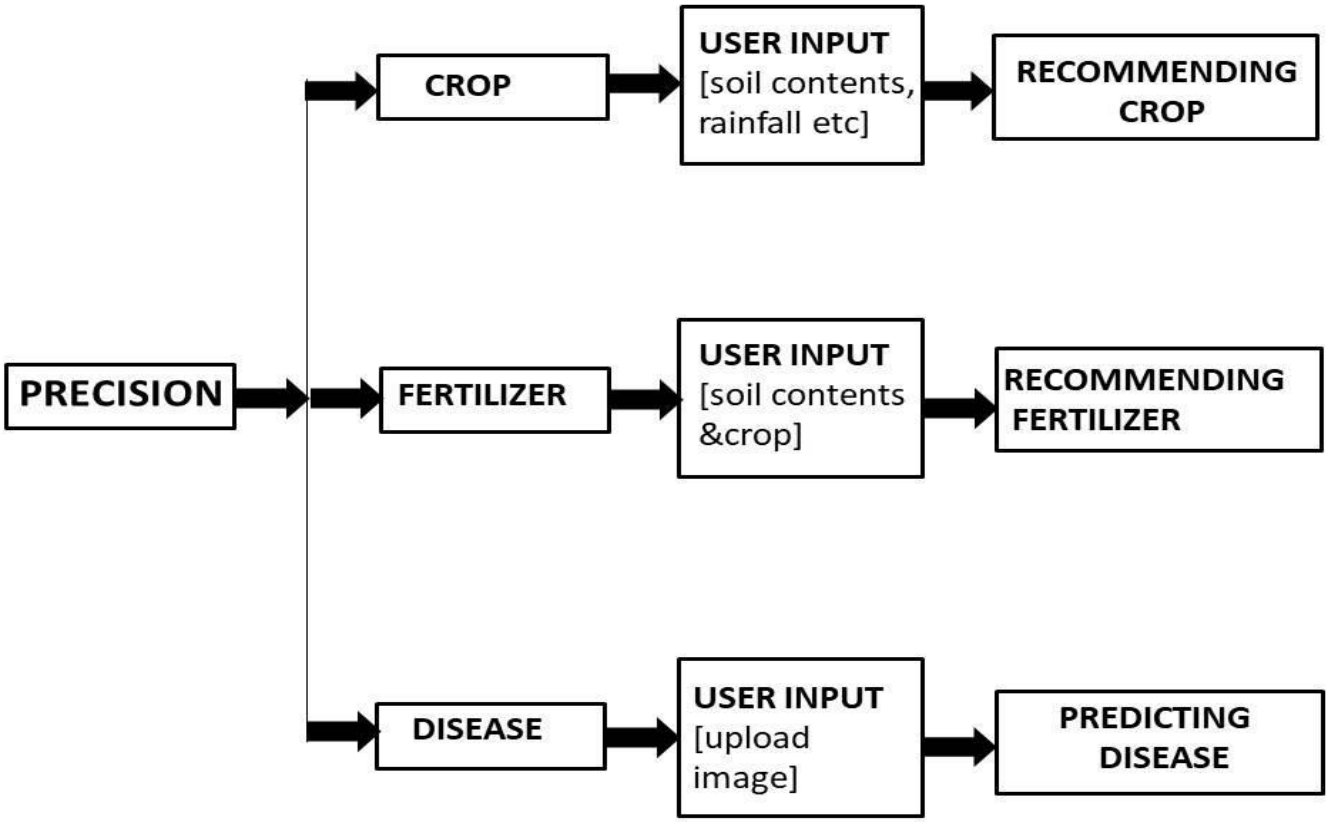


Figure 1: the system architecture of the proposed system

It is a web application which has three modules a:
1. Crop Recommendation
2. Fertilizer Recommendation
3. Crop Disease Prediction

The user just needs to access this page ; without registering user can use the application services which makes it user friendly application . The crop recommendation module recommends crop using the selected attributes from the dataset where as the fertilizer recommendation system guides regarding the suitable fertilizer for the crop . It will also predict the diseases by uploading image of the crop .If farmer is not aware of the crop to be farmed this year , he can use the crop recommendation system . In this system farmer must just provide the soil nutrients , rainfall , location . The system will predict the best crop which is best suitable for the given conditions,which makes it easy for farmer to choose the crop. Fertilizer plays the crucial role in the yield of the crop. Using the wrong fertilizer can have adverse event of the crop. This system will predict the best fertilizer using soil nutrients and crop information. This system also classifies the crop disease . It will extract the feature from the input image of the crop and will predict the crop the disease.

The process is broken down into following stages :
1) Gathering Datasets
2) Preparation (Noise Removal)
3) Feature Extraction
4) Used different Machine Learning algorithms
5) Recommendation System
6) Suggested Crop Units

V. EXISTING SYSTEM

Great paintings has been performed, and lots of ML algorithms were carried out inside the agriculture zone. the maximum essential mission in agriculture is to boom farm manufacturing and offer it to the give up-consumer with the high-quality possible charge and satisfactory. it's also determined that as a minimum 50% of the farm produce receives wasted, and it never reaches the give up-person.

The proposed model indicates the techniques for minimizing farm produce wastage. one among the current works, S. Pavani et.al. offered a version in which the crop yield is anticipated the usage of KNN algorithms by means of making the clusters. it is been proven that KNN clustering proved lots higher than SVM or regression. Nishant et. al. predicted the crop yield for the right 12 months with the assist of superior regression techniques like Enet, Lasso and Kernel Ridge algorithms. The Stacking regression helped to boost the accuracy of the algorithms.

Disadvantages of existing system:
The principle task faced in agriculture region is the lack of information approximately the converting variations in climate,each crop has its very own suitable climatic features. this may be handled with the assist of specific farming strategies. The precision farming not handiest keeps the productiveness of crops however also increases the yield rate of production. The present gadget which recommends crop yield is either hardware-primarily based being highly-priced to hold, or not easily on hand. Despite many answers which might be recently proposed, there are still open challenges in creating a person-pleasant application almost about crop recommendation.

VI. METHODOLOGY

The methodology for the Harvesting system project that includes crop recommendation, fertilizer recommendation, and plant disease classification using machine learning and a web application for front-end using Python Flask would involve several steps:

Data Collection and Preprocessing: The first step would be to collect relevant data for each module such as soil type, weather conditions, historical crop yields, soil nutrient levels, crop types, and fertilization history. The collected data would then be preprocessed to remove any noise or inconsistencies.

Model Development and Training: The next step would be to develop and train the machine learning models. For the crop recommendation and fertilizer recommendation models, we would use the random forest algorithm to predict suitable crops and fertilizers based on the collected data. For the plant disease classification model, we would use the Resnet 9 algorithm to classify plant diseases based on images of plant leaves and disease labels. The models would be developed using Python libraries such as scikit-learn and Keras.

Integration and Deployment: Once the models are trained and validated, we can integrate them into a single system using Python Flask. Flask is a lightweight web application framework that allows us to develop a web application with Python. The web application can provide a user-friendly interface for farmers to input their data and receive recommendations for crops, fertilizers, and disease management.

System Maintenance and Updates: The final step would involve maintaining and updating the system over time. This can include monitoring the performance of the machine learning models, updating the models with new data, and updating the web application with new features and improvements based on user feedback. Flask provides a flexible and extensible architecture that makes it easy to update and maintain the web application.

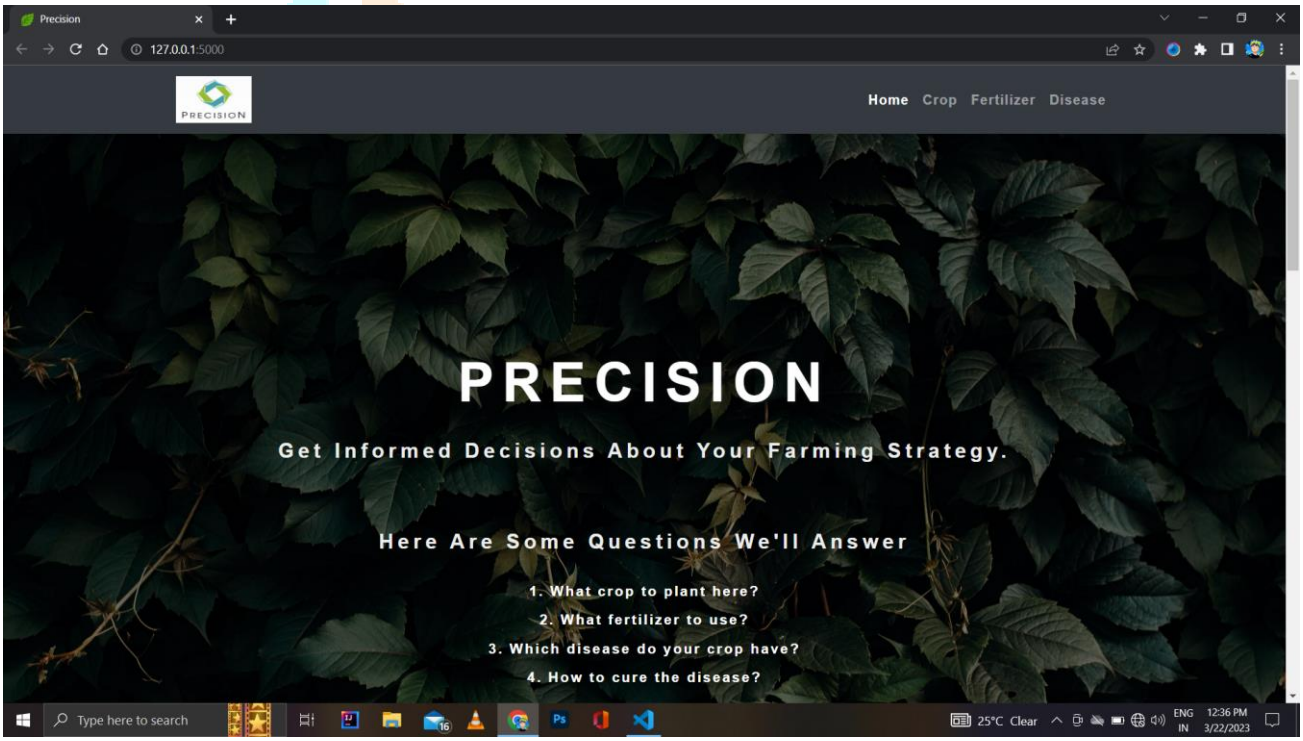
Overall, the methodology for the Harvesting system project would involve a combination of data collection, machine learning models, and a web application developed using Python Flask. The project would require expertise in Python programming, machine learning algorithms, and web application development.

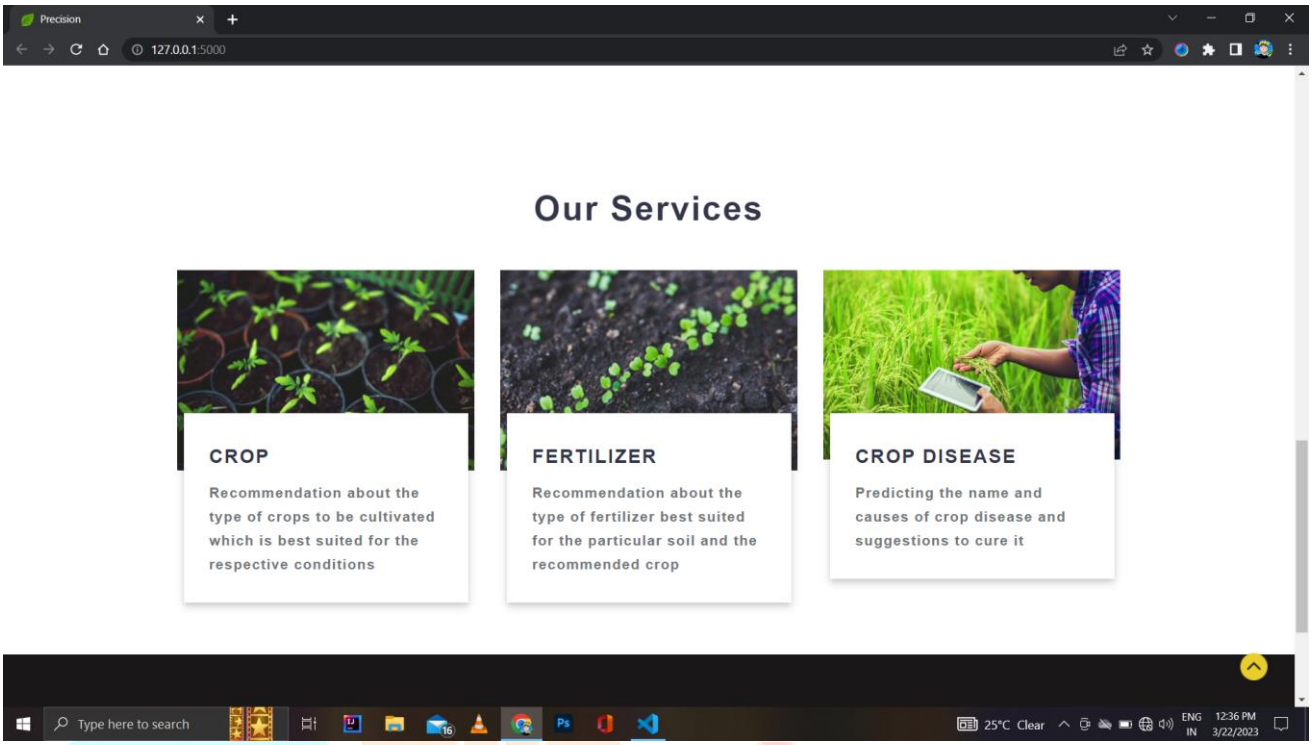
The proposed system utilizes various machine learning techniques including Decision Tree, Naive Bayes (NB), Support Vector Machine (SVM), Logistic Regression (LR), and Random Forest (RF).

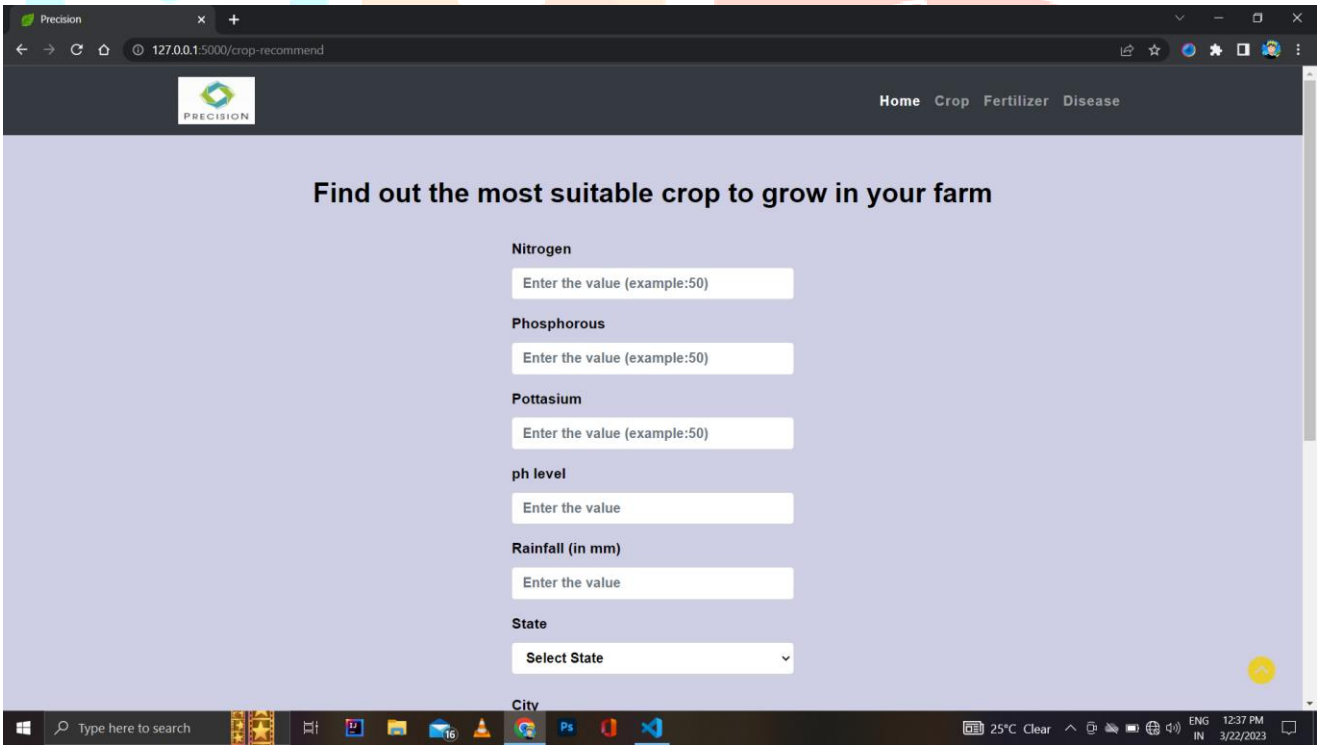
VII. RESULT ANALYSIS

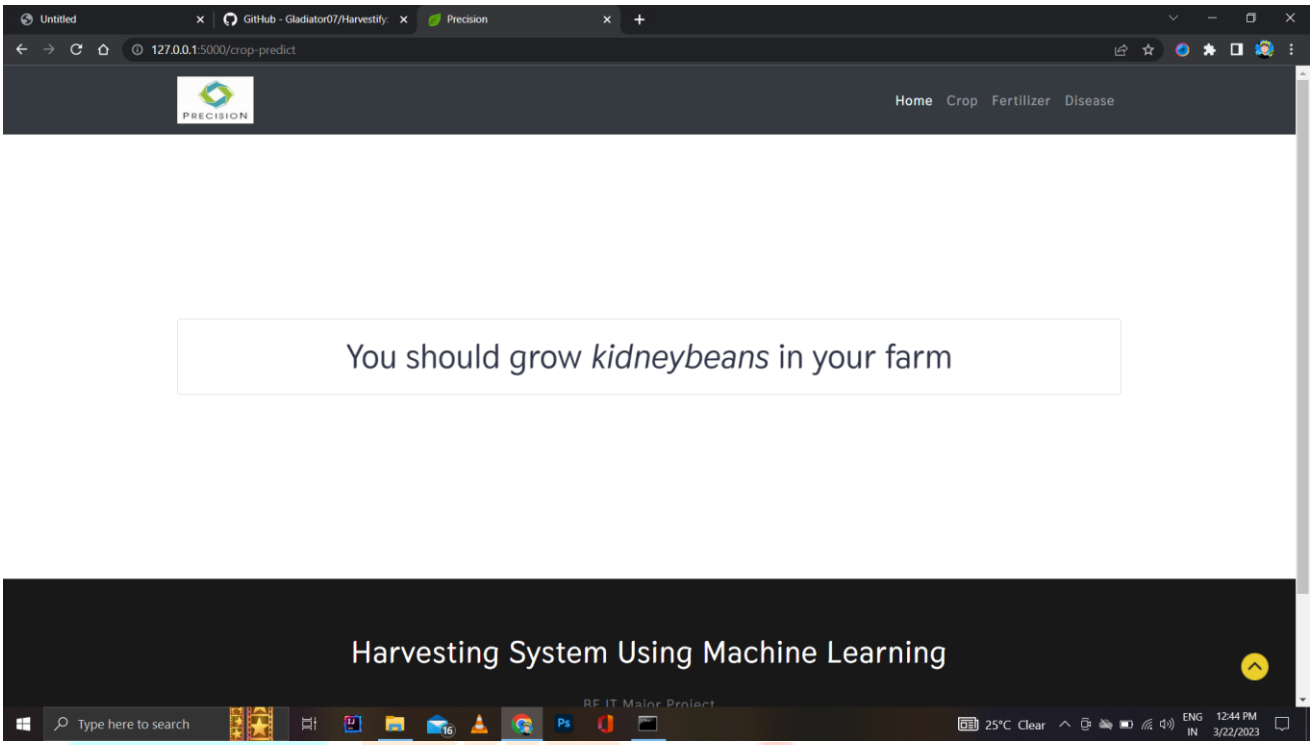
Algorithm	Accuracy
Naïve Bayes	98 %
Decision Tree	90 %
Support Vector Machine	10.68 %
Logistics Regression	96.22 %
Random Forest	99.31 %

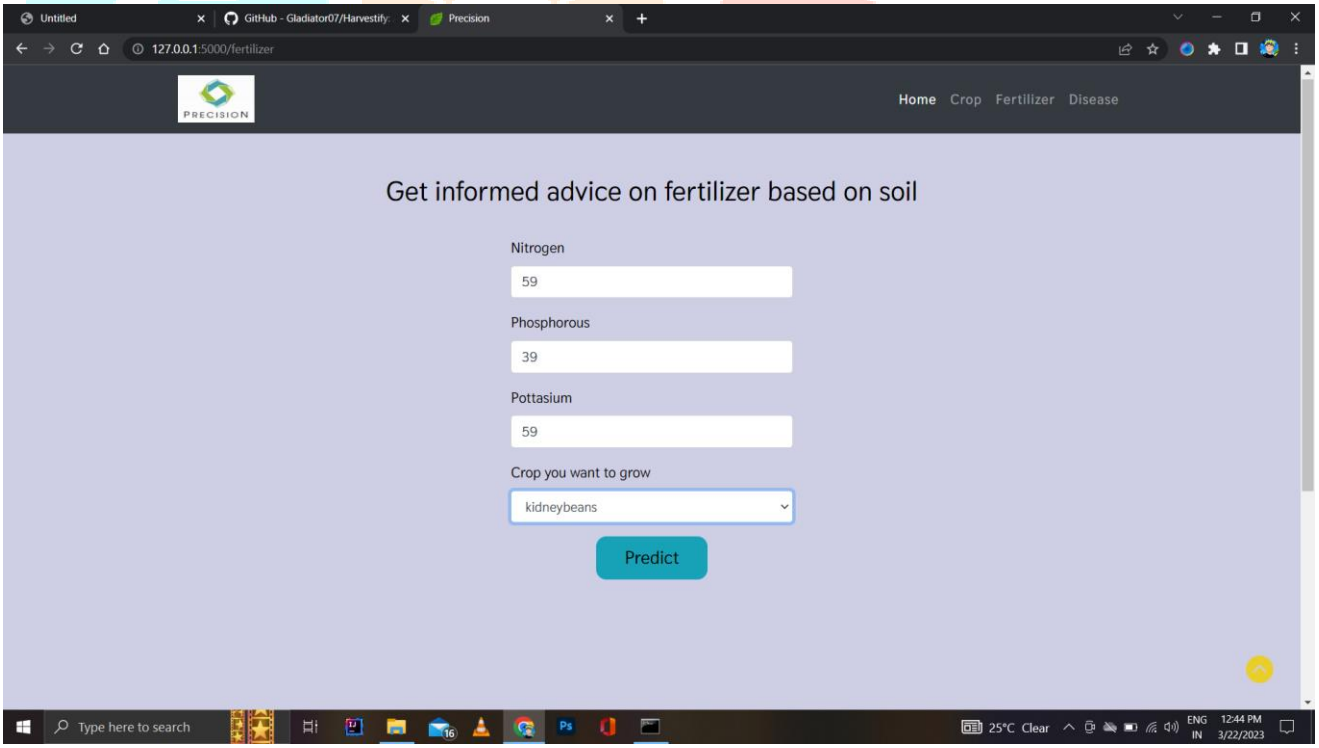
VIII. OUTPUT

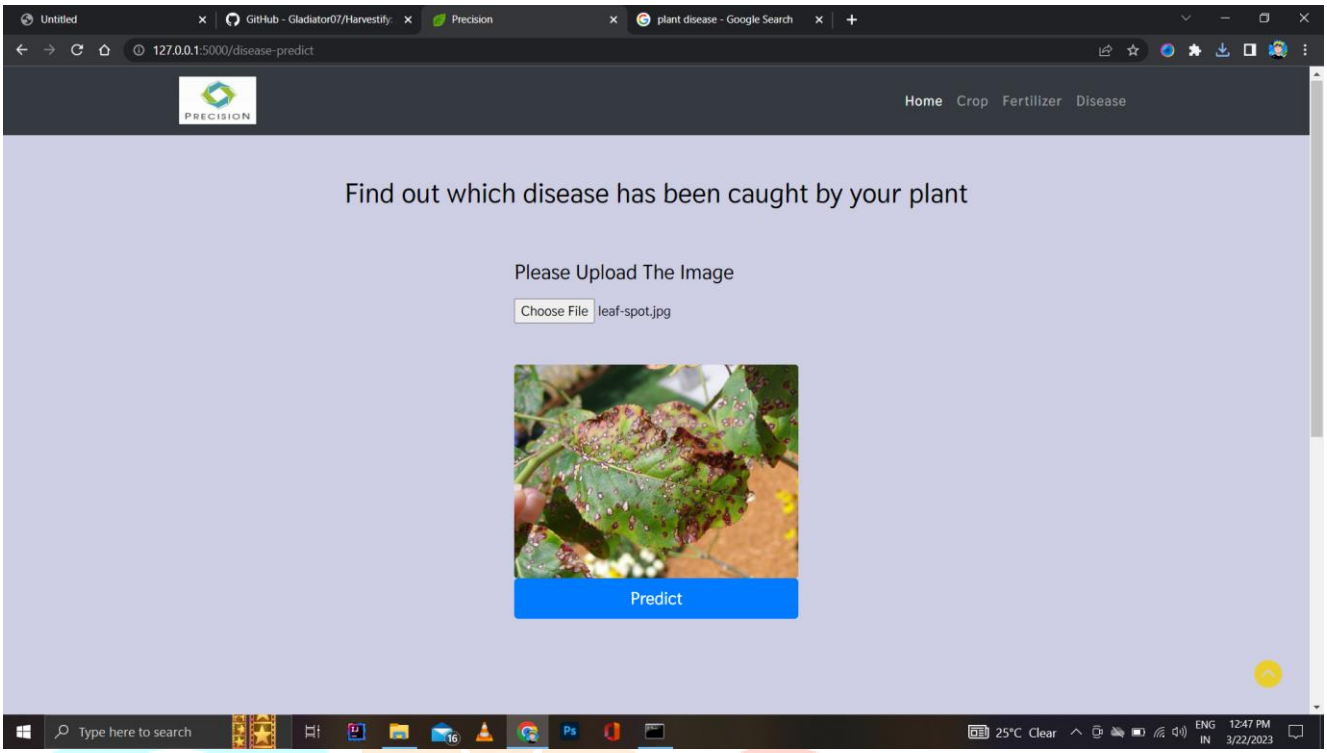



Precision
127.0.0.1:5000
Our Services
CROP
Recommendation about the type of crops to be cultivated which is best suited for the respective conditions
FERTILIZER
Recommendation about the type of fertilizer best suited for the particular soil and the recommended crop
CROP DISEASE
Predicting the name and causes of crop disease and suggestions to cure it
Type here to search
25°C Clear
ENG IN
12:36 PM
3/22/2023


Precision
127.0.0.1:5000/crop-recommend
PRECISION
Home Crop Fertilizer Disease
Find out the most suitable crop to grow in your farm
Nitrogen
Enter the value (example:50)
Phosphorous
Enter the value (example:50)
Pottasium
Enter the value (example:50)
ph level
Enter the value
Rainfall (in mm)
Enter the value
State
Select State
City
Type here to search
25°C Clear
ENG IN
12:37 PM
3/22/2023


Untitled
GitHub - Gladiator07/Harvestify:
Precision
127.0.0.1:5000/crop-predict
PRECISION
Home Crop Fertilizer Disease
You should grow kidneybeans in your farm
Harvesting System Using Machine Learning
RF IT Major Project
Type here to search
25°C Clear
ENG IN
12:44 PM 3/22/2023


Untitled
GitHub - Gladiator07/Harvestify:
Precision
127.0.0.1:5000/fertilizer
PRECISION
Home Crop Fertilizer Disease
Get informed advice on fertilizer based on soil
Nitrogen
59
Phosphorous
39
Pottasium
59
Crop you want to grow
kidneybeans
Predict
Type here to search
25°C Clear
ENG IN
12:44 PM 3/22/2023



IX. FUTURE SCOPE

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

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

Integration with different Agricultural systems: The machine may be integrated with other agricultural systems including irrigation systems, pest manage systems, and crop monitoring systems to offer a comprehensive agricultural management answer.
Continuous mastering: The gadget gaining knowledge of models can be advanced by means of constantly feeding them with new records. The gadget may be designed to learn and adapt over time to provide more correct and customized guidelines.

Integration with authorities Schemes: The system can be integrated with government schemes to provide farmers with information on subsidies, loans, and different agricultural schemes. Mobile application improvement: The web utility may be elevated to a cell application for farmers to get entry to the device at the move.
Universally, the future scope of the Harvesting system assignment is big, and it is able to be increased to cater to the ever-changing desires of farmers and the rural industry. the integration of rising technologies which include IoT and non-stop learning will enable the device to grow to be extra intelligent and offer more custom designed recommendations to farmers.

X. CONCLUSION

A model is proposed of recommending soil and fertilizer as well as prediction crop disease. The research has been done on datasets from Kaggle. Integrating agricultural sector and machine learning will give boost to the agricultural sector. To predict the best result various algorithms will be used and compared. This project will help farmer to have the best yield without facing much of the loss. To implement this project thoroughly the study of soil contents and it's relationship with the crop and fertilizers needs to be done as well as study of different plant disease and it's cause and also it's 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 .

XI. 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 Samikannu, ―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_and_applications