



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 5, May 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

# Implementation towards Crop Prediction, Crop Yield Prediction and Leaf Disease Detection

Vishal Gaikwad<sup>1</sup>, Kardile Priyanka<sup>2</sup>, Suraj Fulsunder<sup>3</sup>, Sanket Langote<sup>4</sup>, Dr. B.S. Borkar<sup>5</sup>

U.G. Student, Department of IT Engineering, Amrutvahini Engineering College, Sangamner, Maharashtra, India<sup>1,2,3,4</sup>

Assistant Professor, Department of IT Engineering, AVCOE Engineering College, Sangamner, Maharashtra, India<sup>5</sup>

**ABSTRACT:**Farming in today's life is not what our ancestor did. Strong climate changes for many reasons, such as global warming, cause difficulties in understanding climate conditions. Thus, farmers cannot understand which crop to choose, which will improve production. By understanding soil and climate conditions with this data mining system, farmers will be able to get the right crop in the right place, increasing yields. So, it is easy for farmers to decide which crop to take in unpredictable climate conditions. Yield prediction is an important agricultural problem. Every farmer is interested in knowing what yield he expects. Farmers urgently need timely advice to predict future crop productivity and analysis is needed to help farmers maximize crop production on their crops.

**KEYWORDS:**Leaf Disease Detection, Crop Prediction, Agriculture, SVM, CNN

## I. INTRODUCTION

Agriculture is the backbone of any country. Agriculture supplies food and raw materials to the people of the country. It is the sole source of income for many nations. Nations belonging to the field of agriculture are facing many problems such as declining production due to unfavorable climate change, floods, poverty and many other natural reasons and rarely factors. For this reason they cannot do agriculture. Farmers face many problems and losses due to lack of knowledge. Most farmers either commit suicide or migrate from farming. The motive of this project is to provide farmers with a system that will provide them with appropriate information in their selection. We can use information technology (IT) to overcome these problems. In today's life, information technology is used in all areas around the world. Data Mining is a part of IT that we can use to solve the agricultural problems mentioned above. Analyze cropping patterns using past records and map them using calculated data. Monitor crop yield and find ways to increase it. Recommend profitable crops for each soil type. Helping farmers with crop selection. Provide information on suitable fertilizers and irrigation method for selected crop. The basic idea behind data mining is that it generates useful information by extracting it from large datasets. More precisely, it is a technique for extracting useful information from large amounts of data.

The paper is organized as follows. Part II describes automatic text detection using morphological operations, related component analysis, and a set of selection or rejection criteria. A flowchart represents a step of the algorithm. After the text is detected, how the text area is filled using the inpainting technique, which is presented in Part III. Section IV presents the experimental results showing the results of the tested images. Finally, Section V presents the conclusion.

## II. RELATED WORK

### A. Design of a knowledge base and application of fertilization recommendations

A crop fertilization recommendation system involves the use of models to calculate the required amount of different nutrients during crop growth, select appropriate fertilizers and arrange fertilization times. Whether it can be widely used or not, the key point is that the models or parameters in the system can be easily adapted to local agricultural production practices. A knowledge base infrastructure and its application are designed to solve these problems. This article is refactoring the object-oriented model decomposition to meet the requirements of C++ programming. It is divided into three categories: entity, parameter, and operator for converting entity objects in spawn to software system



objects. And then the knowledge required to run the model is classified into four types according to their operation and expressed as different forms of rules stored in a relational database. Finally, a reasonable decision inference engine designed for their application. It is actually a specific computer program to check local entities and the form of rules introduced into the system within a certain strategy and produce actionable recommendations.[1]

**B. A Study on Different Data Mining Techniques for Crop Yield Prediction**

India is a country where agriculture and related industries are the main source of people's livelihood. Agriculture is the main source of the country's economy. It is also one of the countries that suffers from major natural disasters such as drought or oil that damages crops. This leads to huge financial losses for farmers, leading to suicide. Predicting crop yield well in advance of harvest can help farmers and government organizations to make appropriate planning such as storage, marketing, fixing minimum support price, import/export, etc. Predicting crop well in advance requires systematic study of huge data. coming from various variables like soil quality, pH, EC, N, P, K, etc. Since Crop Prediction works with a large database set, this prediction system is a perfect candidate for data mining application. By data mining, we gain knowledge from a huge amount of data. This paper presents a study of various data mining techniques used for crop yield prediction. The success of any crop yield prediction system strongly depends on how accurately the features have been extracted and how appropriately the classifiers have been used. This article summarizes the results obtained by different algorithms used by different authors for crop yield prediction, with their accuracy and recommendations.[5]

**C. System for agriculture Recommendations using data mining**

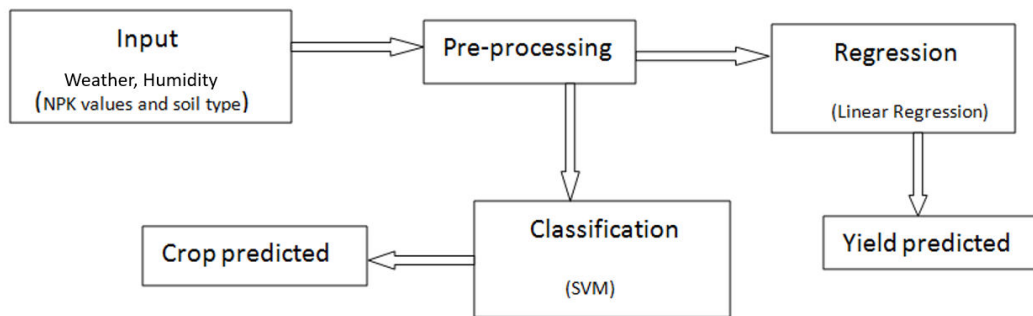
In this paper, the authors propose a new algorithm based on deep learning for masked face detection. Their algorithm is based on a newly designed cascaded CNN framework consisting of three CNNs. In addition, they propose a new dataset called "MASKED FACE dataset", which has 160 images for training and 40 images for testing. To overcome the overfitting problem due to lack of training samples, we pre-train our models using the WIDER FACE dataset and fine-tune them using the MASKED FACE training set. They evaluated the masked face detection algorithm on the MASKED FACE test set and it achieves a very satisfactory performance.[2]

**D. Web-based referral system for farmers**

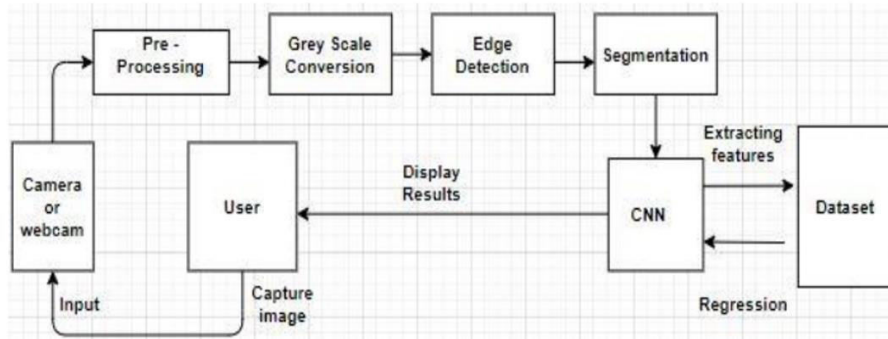
Being an agricultural country, India still uses traditional methods of referral for agriculture. Currently, the recommendations for farmers are based on mere interaction between farmers and experts, and different experts have different recommendations. Recommendations can be provided to farmers using past farming activities using data mining concepts and merge the market trend with them to ensure optimized results from the recommender. The paper suggests using data mining to provide crop recommendations to farmers, crop rotation and identify suitable fertilizers. The system can be used by farmers on the web and on Android mobile devices. [3]

**III. METHODOLOGY**

**A. System architecture**



For Crop Prediction



For Leaf Disease Detection

B. Methodology:

1) Crop prediction:

- The main components of the system, which are:
- Pre-processing: The dataset is used for pre-processing technique which is used to transform the raw data into a useful and efficient format.
- Regression: Regression is used as a model.
- Yield Predicted: The model is trained with the data and the crop is predicted.
- Classification: Classification is used with SVM.
- Crop Predicted: Crop is predicted

2) Detection of leaf diseases:

- The main components of the system, which are:
- Image Capture : The image is captured
- Preprocessing: The dataset is used for a preprocessing technique that is used to transform raw data into a useful and efficient format.
- Grayscale conversion: The image is converted to grayscale.
- Edge detection: Edges are detected.
- Segmentation: is segmented or classified.
- Disease Detection: Disease is detected.

C. Algorithm:

1) Support vector machine:

SVM is a machine learning technique for data separation that tries to maximize the gap between categories. This algorithm helps classify text feedback and classify by emotion.

- Input: D Dataset, token semantics, resources;
- Output: Classification of the application
- Step 1: for each resource ID in D do
- Step 2: Get the features on demand and store them on the vector x for the tweet ID
- Step 3: x.add(Get Features(ResourceID));
- Step 4: end for
- Step 5: for each Feed v x vector do
- Step 6: Load the first element and store it in b and the other elements in w
- Step 7: h w, b (x) = g (z) here, z = ( w T x + b) Step 8: if (z ≤ 0)

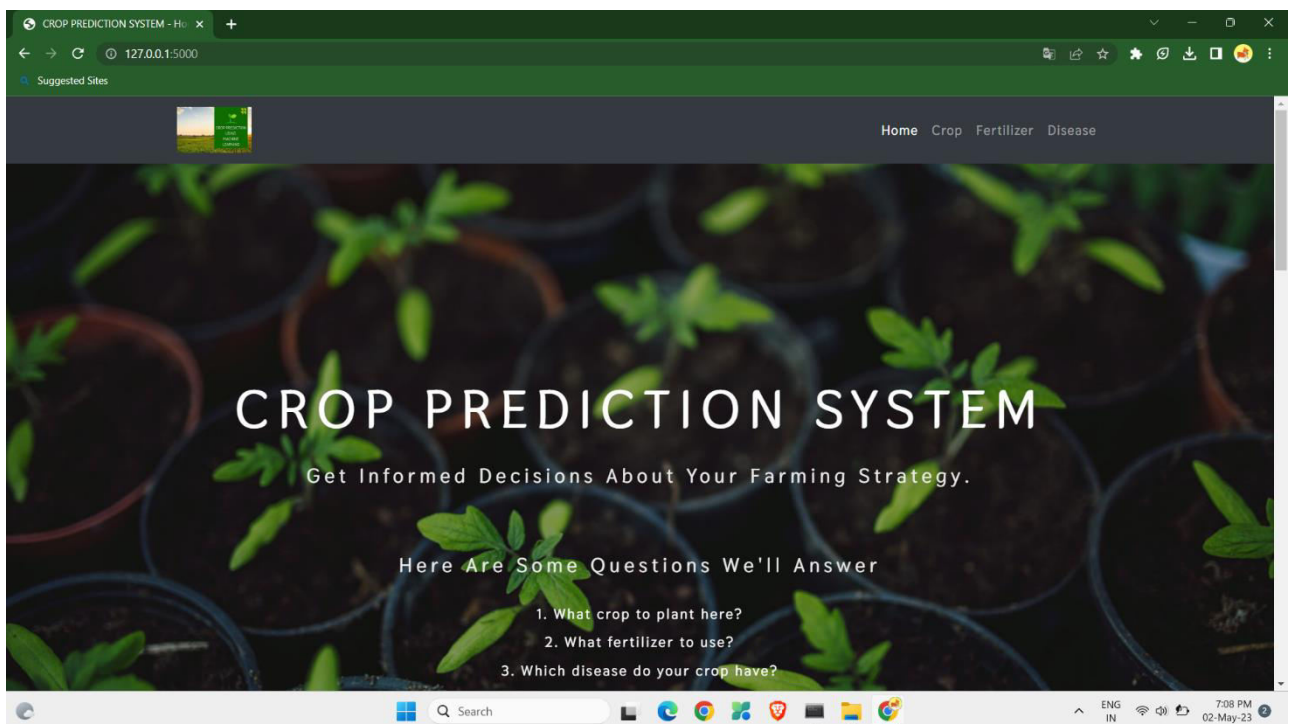


Step 9: assign  $g(z) = 1$ ;  
Step 10: else  $g(z) = -1$ ;  
Step 11: exit if

2) CNN:

- Step 1: The data file containing the images along with the reference label is fed into the system•
- Step 2: A convolutional neural network uses an encoder that extracts the “f” image elements pixel by pixel. •
- Step 3: Matrix factorization is performed on the extracted pixels. The matrix is  $m \times n$ .•
- Step 4: A max pooling is performed on this matrix, where the maximum value is selected and fixed back into the matrix. •
- Step 5: Normalization is performed where every negative value is converted to zero. •
- Step 6: Rectified linear units are used to convert the values to zero, where each value is filtered and a negative value is set to zero. •
- Step 7: The hidden layers take the input values from the visible layers and assign weights after calculating the maximum likelihood.

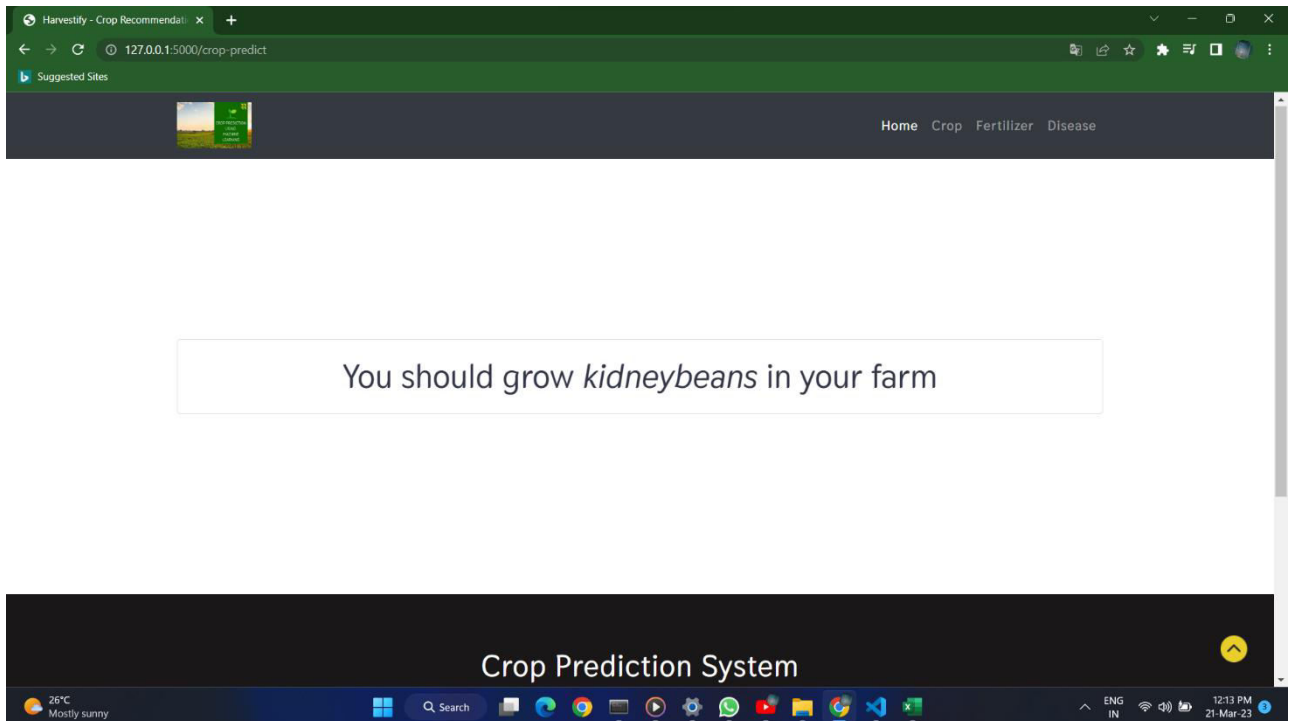
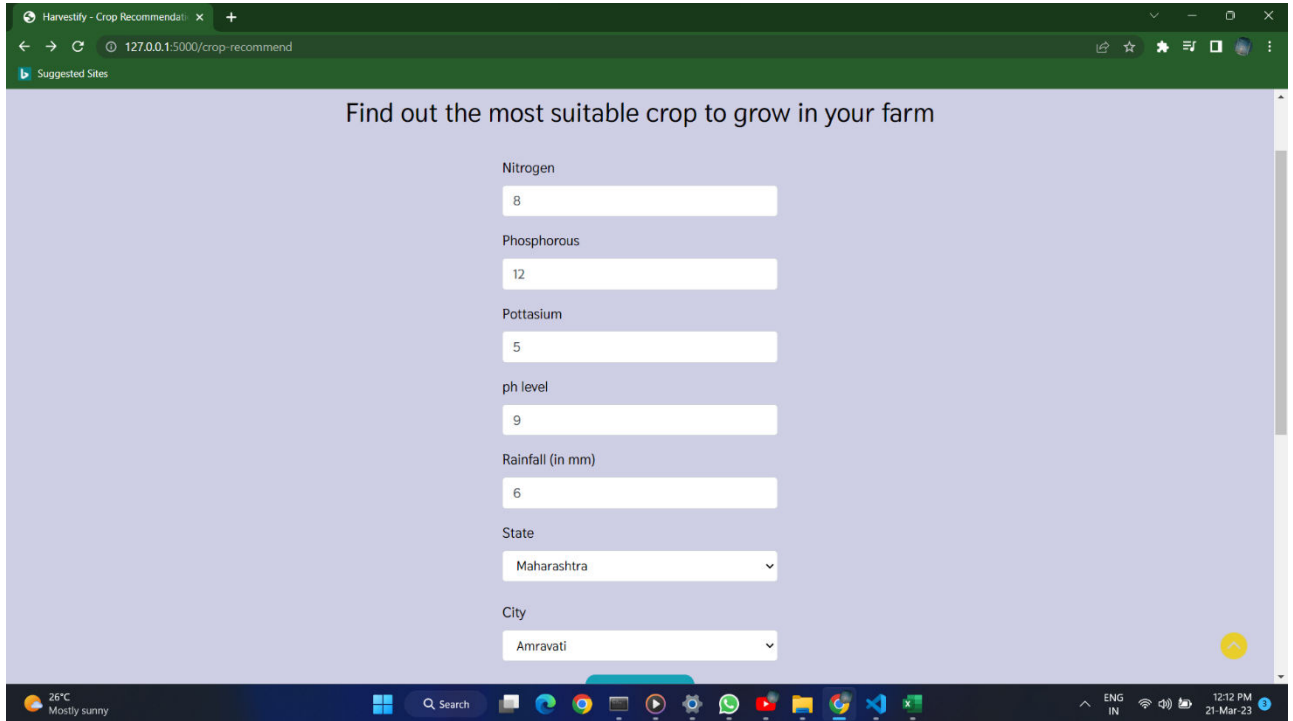
#### IV. EXPERIMENTAL RESULTS

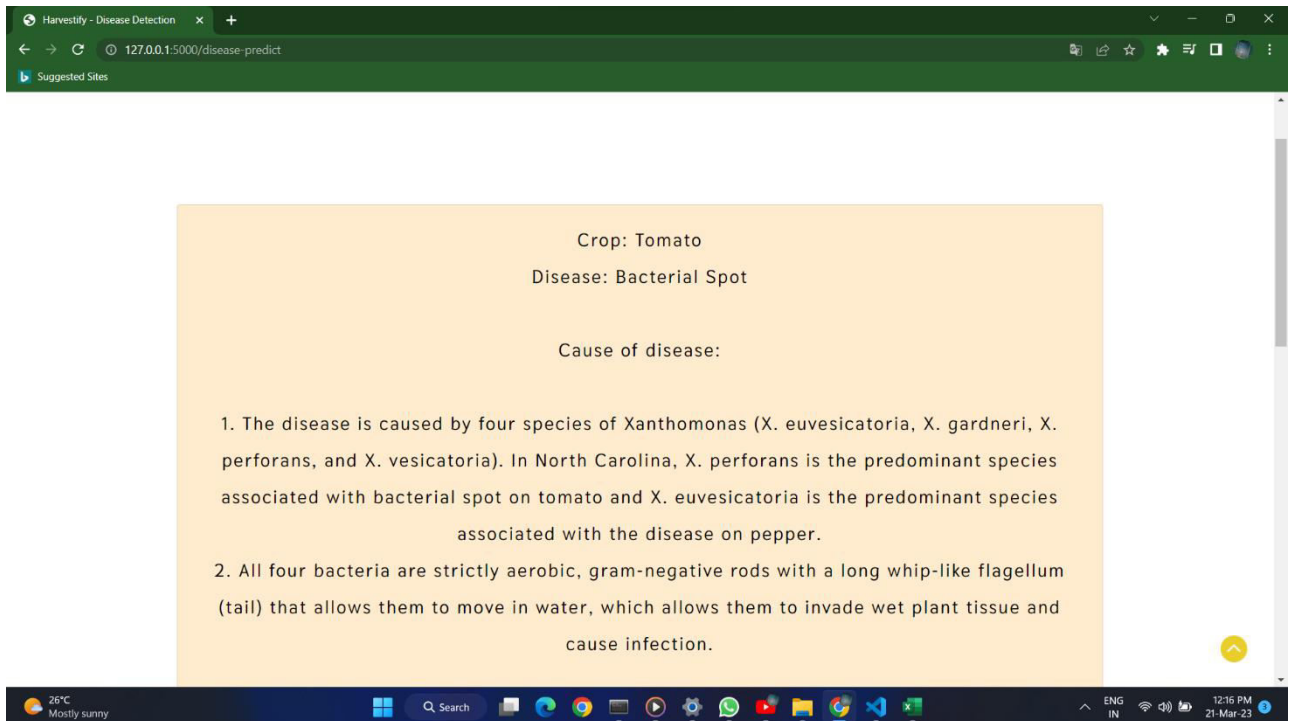
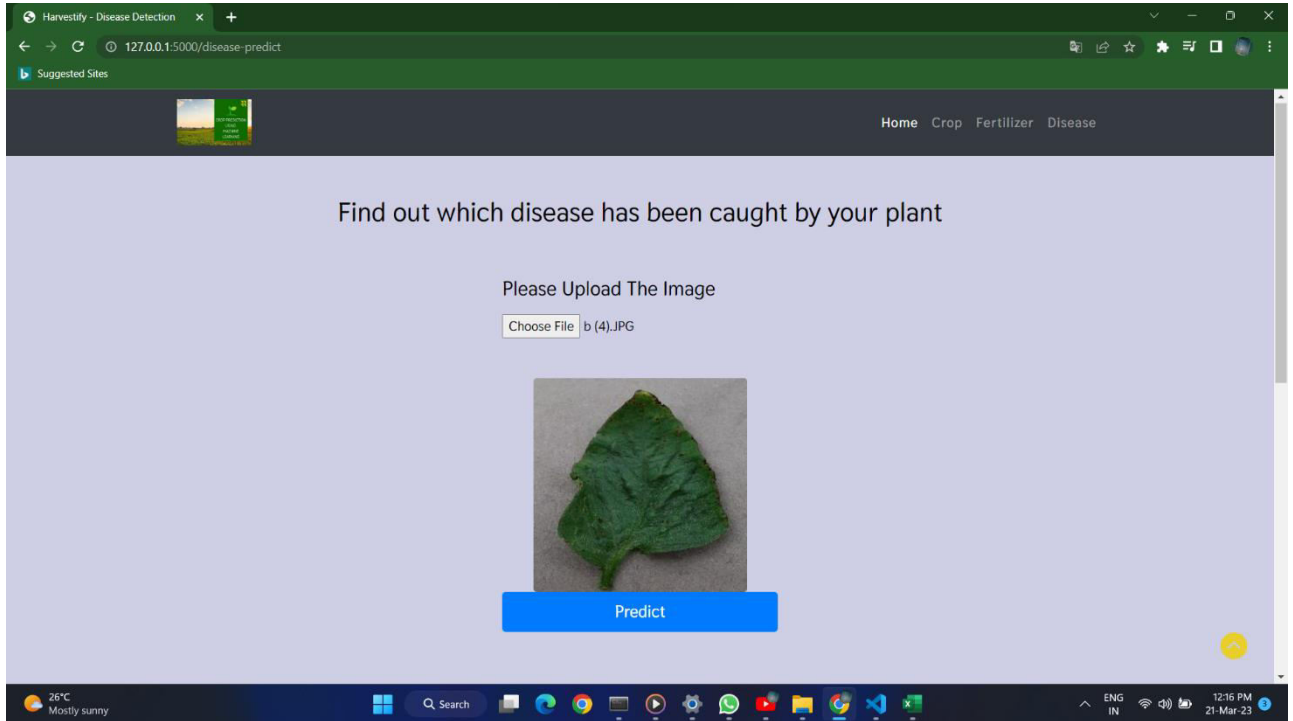


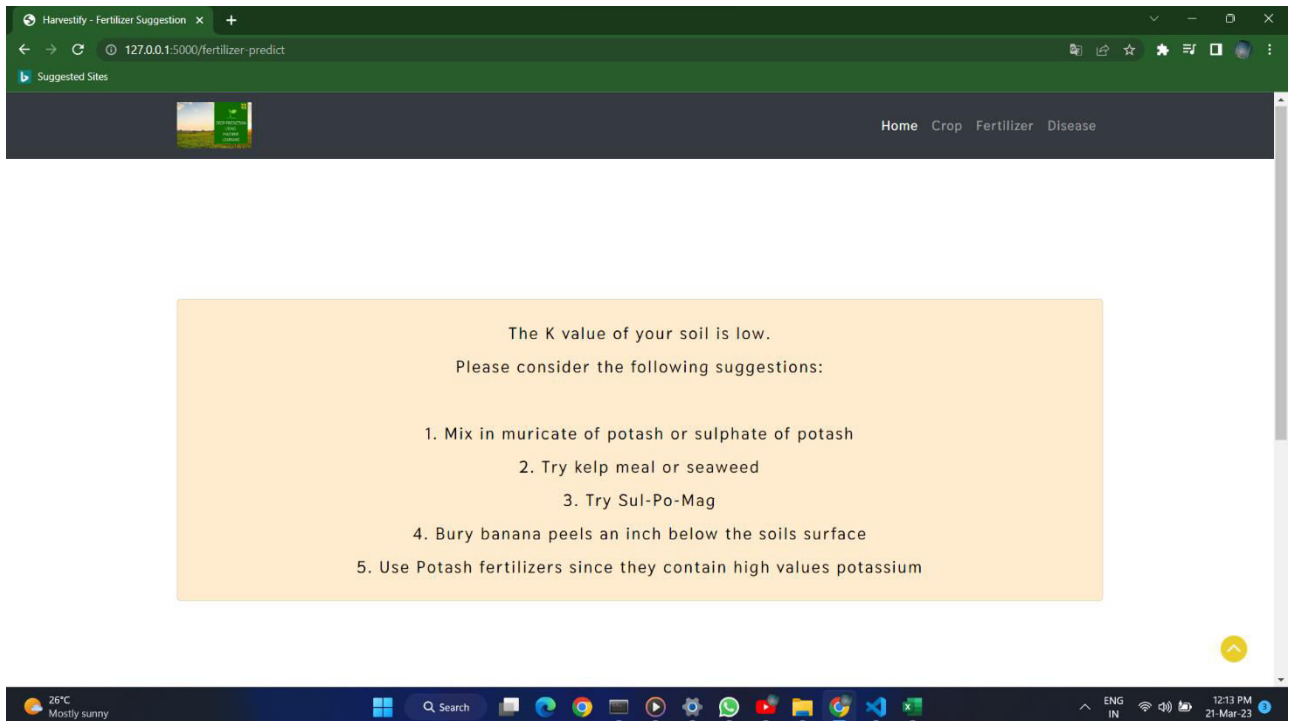
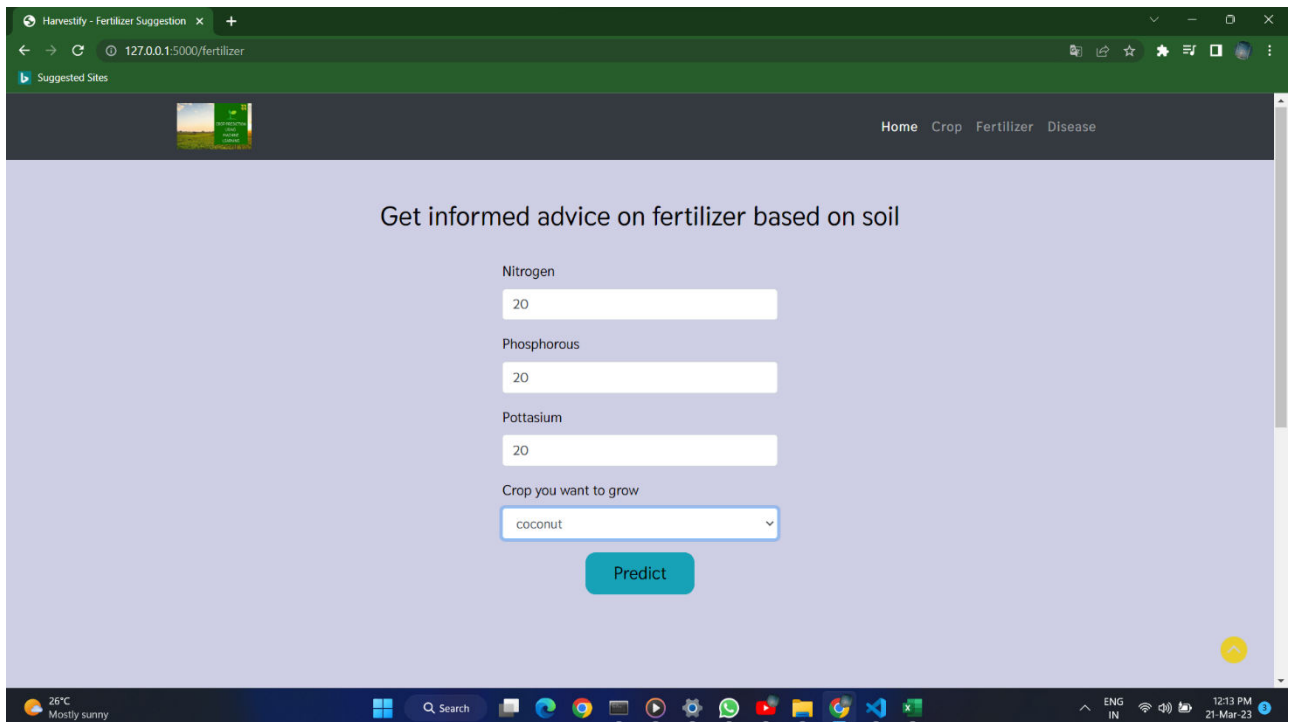


|| Volume 12, Issue 5, May 2023 ||

| DOI:10.15680/IJIRSET.2023.1205047 |







## V. CONCLUSION

Crop prediction and crop yield prediction for rice crop will be done. The system will be trained on standard NPK data value and soil type required for good crop growth. The system will be tested on a real dataset that contains NPK values and soil type. SVM, decision tree is used to predict the crop to grow. A linear regression machine learning algorithm is used to predict rice crop yield. To analyse the accuracy of the data, we tested the system to predict the crop





to grow and the yield of the next crop. We compare the training dataset with our test dataset to select the next crop to be cultivated. Leaf diseases will also be detected using image processing.

#### **REFERENCES**

- [1] Zhouqiao Ren, Xiaonan Lu, “Design of Fertilization Recommendation Knowledge Base and Application”, IEEE, 2012.
- [2] [2] Omkar Chikane, Nilesh Dumbre, Gitesh More, “System For Agriculture Recommendation Using Data Mining”, IERJ, December 2015.
- [3] [3] Kiran Shinde, Jerrin Andrei, Amey Oke, “Web Based Referral System for Farmers”, IJRITCC, March 2015.
- [4] [4] R. Harine Rajashree, C. Kavya, T. Kiruthika, J. Nisha, “Crop Recommendation System for Precision Agriculture”, IEEE, 2016.
- [5] [5] Yogesh Gadge, Sandhya, “Study of Different Data Mining Techniques for Crop Yield Prediction”, IEEE, 2017.



**INNO SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 8.423**



**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

9940 572 462 6381 907 438 [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details