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Detection of Crops, Fertilizers and Diseases Using Machine Learning

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Abstract: Agriculture is an important sector in India. We propose developing a simple ML based project which recommends the best crop to grow, fertilizers to use and the diseases caught by your crops.
This work aimed to design and develop a testing or we can call it as suitable crop checker system using ML and data management via a web application.

Keywords: Detection Of Crops, Detection Of Fertilizer, Detection Of Diseases, Agriculture.

I. INTRODUCTION

In Indian agriculture farmer facing so many challenges, one of the challenges like soil changing. For eg.: India has 29 states every state is having different type of soil. Having different type of soil causes the productivity of crops.
i.e., soil is the main factor of crop production different types of soil then it doesn't support all types of crops. So, it effected on crops productivity. To avoid these problems and to improve the growth of the plants. We propose developing a simple ML based website which recommends the best crop to grow, fertilizers to use and the diseases caught by your crops.

II. LITERATURE SURVEY

Agriculture and its allied sectors are undoubtedly the largest providers of livelihoods in rural India.
The agriculture sector is also a significant contributor factor to the country's Gross Domestic Product (GDP). Blessing to the country is the overwhelming size of the agricultural sector. However, regrettable is the yield per hectare of crops in comparison to international standards. This is one of the possible causes for a higher suicide rate among marginal farmers in India. This paper proposes a viable and user-friendly yield prediction system for the farmers. The proposed system provides connectivity to farmers via a mobile application. GPS helps to identify the user location. The user provides the area & soil type as input. Machine learning algorithms allow choosing the most profitable crop list or predicting the crop yield for a user-selected crop. To predict the crop yield, selected Machine Learning algorithms such as Support Vector Machine (SVM), Artificial Neural Network (ANN), Random Forest (RF), Multivariate Linear Regression (MLR), and K-Nearest Neighbour (KNN) are used. Among them, the Random Forest showed the best results with 95% accuracy. Additionally, the system also suggests the best time to use the fertilizers to boost up the yield.

III. PROPOSED SYSTEM

Proposed work is to design a software based on machine learning techniques for accurate prediction of crops to grow and to predict the fertilizer to be used and to find out which disease is obtained according to the knowledge obtained from the lab information.

IV. FEASIBILITY STUDY

Whatever we think need not be feasible. It is wise to think about the feasibility of any problem we undertake. Feasibility is the study of impact, which happens in the organization by the development of a system. The impact can be either positive or negative. When the positives nominate the negatives, then the system is considered feasible.

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V. ADVANTAGES & DISADVANTAGES

A. Advantages

1) Digital Farming solution can propose a crop recommendation system that helps farmers to decide the right crop to sow in their field based on the weather condition, moisture and season.

2) Machine learning techniques provide an efficient framework for data-driven decision making. This website also helps in determining the best pesticide, seed spacing and seed depth using the ML recommendation engine.

3) The solution will benefit farmers to maximize productivity in agriculture, reduce soil degradation in cultivated fields, and reduce fertilizer use in crop production by recommending the right crop by considering various attributes. This would provide a comprehensive prediction on the basis of geographical, environmental and economic aspects.

B. Disadvantages

1) Farmers need smartphone/desktop with good internet connectivity.

VI. HOW SYSTEM WORK FOR USER

A. Visiting our site

If a user land on our site then firstly he/she need to find out value of N-P-K (Nitrogen-Phosphorous-Pottasium) and then needs to enter it in given form.

B. Modules

We have three modules that are given below :-

I. Detection of crops :- Enter the corresponding nutrient values of your soil, state and city. Note that, the N-P-K (Nitrogen-Phosphorous-Pottasium) values to be entered should be the ratio between them.

II. Detection of fertilizer :- Enter the nutrient contents of your soil and the crop you want to grow. The algorithm will tell which nutrient the soil has excess of or lacks. Accordingly, it will give suggestions for buying fertilizers.

III. Detection of diseases :- Upload an image of leaf of your plant. The algorithm will tell the crop type and whether it is diseased or healthy. If it is diseased, it will tell you the cause of the disease and suggest you how to prevent/cure the disease accordingly.

C. Results

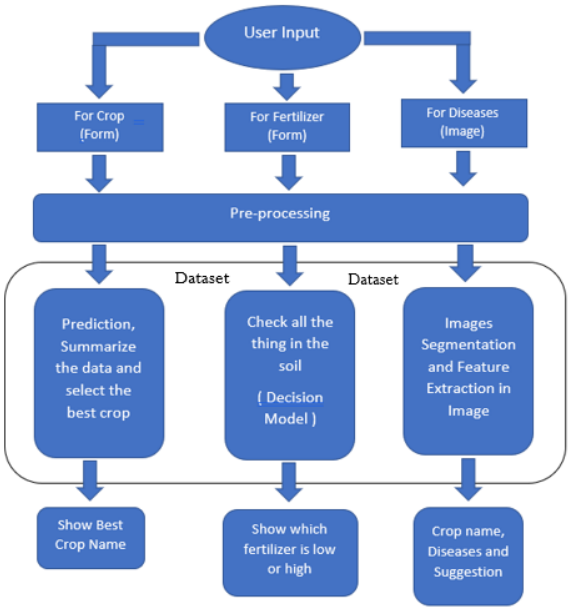
When users undergoes this whole process then modules predict as per users given input.

VII. HOW SYSTEM WORK FOR ADMIN

Admin will operate whole dataset present in the modules.

IV. DIAGRAMS

A. Block Diagram



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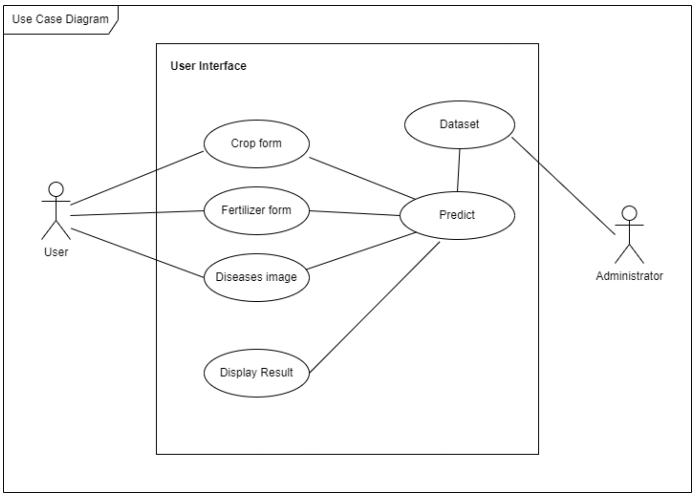
B. Use Case Diagram



VIII. SOFTWARE & HARDWARE REQUIREMENT

A. Window 7 or Higher
B. Visual Studio
C. Any Browser
D. Kaggle
E. RAM - 1GB

IX. APPLICATION

A. The project is built from easily available and reasonably priced components. Therefore, the cost is reasonable and maintenance is easy.
B. The status of crops can be viewed remotely on a smartphone or laptops using the internet. This helps to keep the farmer up to date.
C. In agriculture to improve crop yields.
D. Improve quality, limited use of fertilizers and reduce costs.

X. CONCLUSION

This system helps the farmer to choose the right crop by providing insights that ordinary farmers don't keep track of thereby decreasing the chances of crop failure and increasing productivity. It also prevents them from incurring losses. The system can be extended to the web and can be accessed by millions of farmers across the country. We could achieve an accuracy of 89.88 percent from the neural network and an accuracy of 88.26 percent from the linear regression model Further development is to integrate the crop recommendation system with another subsystem, yield predictor that would also provide the farmer an estimate of production if he plants the recommended crop.

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