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Survey towards New trends for Leaf Disease Detection, Crop Prediction and Crop Yield Prediction by Machine Learning

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ABSTRACT: Agriculture in today's life is not like as our forefather done. The strong Climatic changes due to many reasons like global warming cause difficulty to understand climatic conditions. So the farmers unable to understand which crop to select by which the production will improve. By understanding soil and climate conditions by using these data mining system farmers will be able to take right crop at right place which will improve 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, how much yield he is about expect. The farmers necessarily requires a timely advice to predict the future crop productivity and an analysis is to be made in order to help the farmers to maximize the crop production in their crops

KEYWORDS: Text detection, Inpainting, Morphological operations, Connected component labelling.

I. INTRODUCTION

Agriculture field is the backbone of any country. Agriculture supplies the food and raw materials to the people in country. It is the only income source of many peoples. Peoples who belong with agriculture field faces many problems such as decreasing production due to unsuitable climatic changes, flood, dearth and many other natural reasons and rarely factors. They are unable to do agriculture due to this reason. Farmers are facing lots of problems and loss due to lack of knowledge. Most of the farmers are either committing suicide or migrating from the agriculture. Motive behind this project is to provide a system to the farmers that will provide them the suitable information while choosing. We can use Information Technology (IT) to overcome these problems. In today's life Information Technology is used in every field worldwide. The Data Mining is a part of IT which we can use to solve agriculture problems mentioned above. Analyse crop patterns with the help of past records and map them with calculated data. Monitor crop yield and find ways for increasing it. Recommend profitable crops for each land type. To help the farmers while choosing the crop. To provide the information about appropriate fertilizers and irrigation method for selected crop. The basic idea of the Data Mining is that it generates useful information by extracting from large datasets. To be more accurate, it is a technique of extracting useful information from large amount of data.

The paper is organized with presenting the implementation of leaf disease detection while giving the analysis for earlier used systems. Section I gives detail introduction while section II gives the overall systems survey when used by farmers. The section III gives architecture for both crop prediction and leaf diseases detection with discussion for methodology

II. RELATED WORK

A. Crop Recommendation System for Precision Agriculture

Data mining in agriculture is used for analyzing the various biotic and abiotic factors. Agriculture in India plays a predominant role in economy and employment. The common problem existing among the Indian farmers are they dont choose the right crop based on their soil requirements. Due to this they face a serious setback in productivity. This problem of the farmers has been addressed through precision agriculture. Precision agriculture is a modern farming

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technique that uses research data of soil characteristics, soil types, crop yield data collection and suggests the farmers the right crop based on their sitespecic parameters. This reduces the wrong choice on a crop and increase in productivity. In this paper, this problem is solved by proposing a recommendation system through an ensemble model with majority voting technique using Random tree, CHAID, K-Nearest Neighbor and Naive Bayes as learners to recommend a crop for the site specic parameters with high accuracy and efficiency.[4]

B. Design of fertilization recommendation knowledge base and application

Crop fertilization recommendation system involves using models to calculate the needed amount of variety of nutrients during the crop growth, choosing suitable fertilizers, and arranging fertilization time. Whether it can be used widely or not, the key point is that the models or parameters in system can be customized easily according with local agricultural production practices. To help address these issues, an infrastruc- ture of knowledge base and its application is proposed. This paper rstly focuses on decomposition of the model by method of object-oriented in order to comply with the requirements of C++ programming. It is divided into three categories of entity, parameter, and operator for converting the entity objects in fertilization to the soft- ware system objects. And then the required knowledge to run model are classified to four types by their action, and expressed as a variety of rules form stored in relation database. In the end, a reasonable decision inference engine designed for apply- ing them. It is actually a specific computer program to control local entities and the rules form introduced to system under a certain strategy and produce applicable recommendation.[1]

C. A Study On Various Data Mining Techniques For Crop Yield Prediction

India is a country where agriculture and agriculture related industries are the major source of living for the people. Agriculture is a major source of economy of the country. It is also one of the country which suer from major natural calamities like drought or ood which damages the crop. This leads to huge nancial loss for the farmers thus leading to the suicide. Predicting the crop yield well in advance prior to its harvest can help the farmers and Government organizations to make appropriate planning like storing, selling, xing minimum support price, importing/exporting etc. Predicting a crop well in advance requires a systematic study of huge data coming from various variables like soil quality ,pH ,EC,N,P,K etc. As Prediction of crop deals with large set of database thus making this prediction system a perfect candidate for application of data mining.Through data mining we extract the knowledge from the huge size of data. This paper presents the study about the various data mining techniques used for predicting the crop yield. The success of any crop yield prediction system heavily relies on how accurately the features have been extracted and how appropriately classifiers have been employed. This paper summarizes the results obtained by various algorithms which are being used by various authors for crop yield prediction, with their accuracy and recommendation.[5]

D. System For Agriculture Recommendation Using Data Mining

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

E. Web based Recommendation System for Farmers

India being an agricultural country is still using traditional ways of recommenda- tions for agriculture. Currently recommendations for farmers are based on mere one to one interaction between farmers and experts and different experts have different recommendations. Recommendation can be provided to farmers using past agricul- tural activities with help of data mining concepts and the market trend can be merged with it to provide optimized results from recommender. The paper proposes the use of data mining to provide recommendations to farmers for crops, crop rotation and identification of appropriate fertilizer. The System can be used by farmers on web as well on android based mobile devices. [3]

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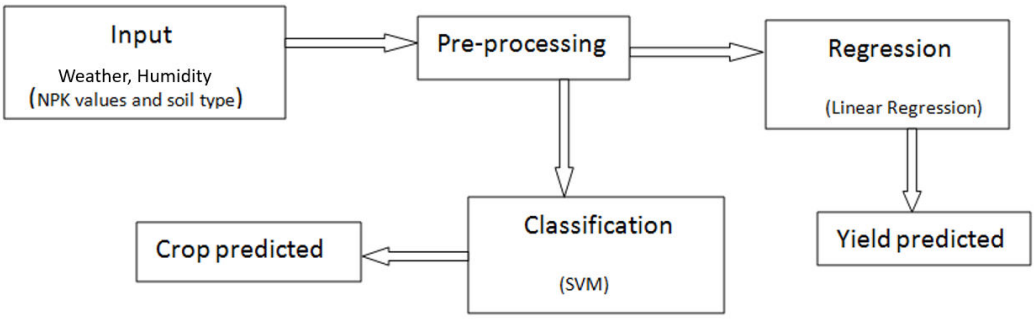
F. **A novel framework for potato leaf disease detection using an efficient deep learning model**

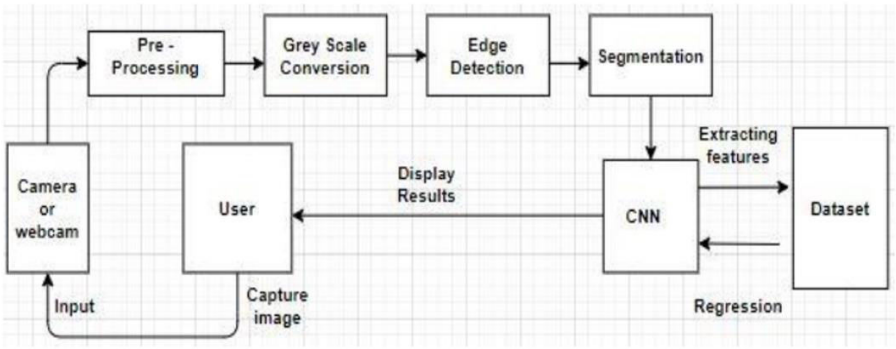
The proposed algorithm is a novel and first-of-its-kind method that addresses and demonstrates the success of detecting and classifying four diseases in potato leaves. The performance of the algorithm was evaluated in the test and an accuracy of 97.2% was achieved. Many experiments have been conducted to ensure that our proposed method is more consistent and accurate in detecting and classifying potato diseases than current standards.

III. PROPOSED METHODOLOGY

A. System Architecture



For Crop Prediction



For Leaf Disease Detection

B. Methodology:

1) Crop Prediction:

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

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2) Leaf Disease Detection:

- The major components of the system, which are:
- Image Capture : Image is captured
- Pre-processing: The dataset is taken for pre-processing technique which is used to trans-form the raw data in a useful and efficient format.
- Greyscale Conversion: The image is converted to grayscale.
- Edge Detection: Edge are detected .
- Segmentation : it is segmented or classified.
- Disease detection : The disease is detected.

C. Algorithm :

1) Support Vector Machine:

SVM is a machine learning technique to separate data which tries to maximize the gap between the categories. This Algorithm helps to classify the textual feedback and classifies according to emotions.

Input: D Dataset, Semantic of Tokens, Feeds;
Output: Classification of Application
Step1: for each Feed id in D do
Step2: Get on-demand features and stored on vector x for tweet id
Step3: x.add (Get Features (Feed id));
Step4: end for
Step5: for each Feed in x vector do
Step6: Fetch first feature and stored in b, and other features in w
Step7: h w, b (x) = g (z) here, z = (w T x + b) Step8: if (z≤0)
Step9: assign g(z) = 1;
Step10: else g(z) = -1;
Step11: end if

2)CNN:

Step 1: Dataset containing images along with reference caption is fed into thesystem•
Step 2: The convolutional neural network is used a encoder which extractsimage features ‘f’ pixel by pixel.•
Step 3: Matrix factorization is performed on the extracted pixels. The matrixis of m x n.•
Step 4: Max pooling is performed on this matrix where maximum value isselected and again fixed into matrix.•
Step 5: Normalization is performed where the every negative value is con-verted to zero.•
Step 6: To convert values to zero rectified linear units are used where eachvalue is filtered and negative value is set to zero.•
Step 7: The hidden layers take the input values from the visible layers andassign the weights after calculating maximum probability.

IV. CONCLUSION

Crop Prediction and crop yield prediction for rice crop will be performed. System will be trained on a standard data value of NPK and soil type required for the good growth of crop. System will be tested on a real dataset which contains NPK values and soil type. SVM, Decision Tree is used to predict crop to be cultivated. yield prediction of rice crop Linear Regression machine learning algorithm is used. To analyse the accuracy of data, we have tested the system to predict the crop to be cultivated and next crop yield. We compare the training dataset to our testing dataset for choosing a next crop to be cultivated. Leaf Diseases will be also detected using image processing.

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