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CROP YIELD PREDICTION USING MACHINE LEARNING ALGORITHM

Ishwarya R*1, Nagapooja BN*2, Raghavi R*3,
Soundarya K*4, Prof. Chitra C*5

*1,2,3,4,5Department Of Information Science And Engineering, Maharaja Institute Of Technology, Mysore, Karnataka, India.

ABSTRACT

Observing the present situation faced by farmers in India. We have also seen that there are so many suicides happening in India from many years, the reason behind this is the changing weather conditions in our country and continuous change in Government. Sometimes farmers are not unaware about the crops which is suitable for their soil. Our project is to help farmers to check the soil quality by analyzing the different related attributes like temperature, moisture, pH value from which quality of the soil is determined and predicts the best suitable crops and their yields in that soil so that the farmers get to know the yields of the crops before cultivating in the agricultural field. Machine learning is the best approach for achieving practical and effective solution for this problem by using various machine learning algorithms which will be precise and accurate in predicting crop yield and provide information to the farmers about the suitable crop and about required fertilizer based on soil quality of the land to get maximum crop yield and revenue.

Keywords: Temperature, Moisture, PH.

I. INTRODUCTION

Agriculture is the backbone of every economy. Agriculture is considered as the main and the foremost culture practiced in India. The main goal of agricultural planning is to achieve maximum yield rate of crops by using limited number of land resources. Many machine learning algorithms can help in improving the production of crop yield rate. Whenever there is a loss in unfavorable conditions. We can apply crop selecting method and reduce the losses. The maximizing of yield rate helps in improving economy. We have observed that there is an increase in the suicide rates. So, we want to help the farmers to understand the importance of prior prediction of crop, to increase their knowledge about quality of soil, to understand location wise weather constraints, in order to gain intense yield of crop through our technology solution.

II. LITERATURE REVIEW

[1] In this paper SVM method used to classify crop data and CNN is used to reduce the relative error. By using these, methods losses of crop yield reduced irrespective of environment distraction.

[2] In this paper K-means clustering is used to create clusters, Apriori algorithm is used to count frequent features of a crop for specific location and Naïve Bayes algorithm is used to find exact crop.

[3] In this paper Decision tree uses greedy methodology and Random Forest algorithm used to predict the best crop. It helps the farmers in decision making of which crop to cultivate in the field.

[4] In this paper K nearest algorithm, Naïve Bayes and Decision tree are used to predict the crop yield. It helps the farmers to identify the yield of crops in different soil and atmospheric conditions.

[5] In this paper J48 and IBK are used for classification, LWL used to assign instance weights, LAD tree used to classify based on binary target value. It is useful to the farmers for early prediction and decision making.

[6] In this paper naïve Bayes and KNN algorithm have been used inorder to achieve maximum crop yield. By this we can also get the accuracy yield by checking for different method.

[7] In this paper LSTM and Simple RNN methods are used to predict the temperature and rainfall. Finally, we got know to that Random Forest Regressor will more accuracy.

[8] In this paper Feed Forward Neural and Recurrent Neural Network techniques is used. Comparing the FNN and RNN based on loss of error RNN has low error rate at the same it is better for crop yield prediction.

[9] In this paper they have developed a user friendly webpage and the accuracy of predictions are above 75 percent by Random Forest Algorithm.

[10] In this proposed work a Hadoop framework based on Random Forest Algorithm described works faster

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and gives better accuracy in prediction than the current system to predict the suitable crop for the field.

III. METHODOLOGY

The system uses machine learning to make predictions of the crop and Python as the programming language since Python has been accepted widely as a language for experimenting in the machine learning area. Machine learning uses historical data and information to gain experiences and generate a trained model by training it with the data. This model then makes output predictions. The better the collection of datasets, the better will be the accuracy of the classifier. It has been observed that machine learning methods such as regression and classification perform better than various statistical models. Crop production is completely dependent upon geographical factors such as soil chemical composition, rainfall, terrain, soil type, temperature etc. These factors play a major role in increasing crop yield. Also, markets situation affect the crop to be grown to gain maximum benefit. We need to consider all the factors to predict the yield. Hence, using machine learning techniques in the agriculture field, we build a system that uses machine learning to make predictions of the production of crops by studying the factors as rainfall, temperature, area, season, etc.

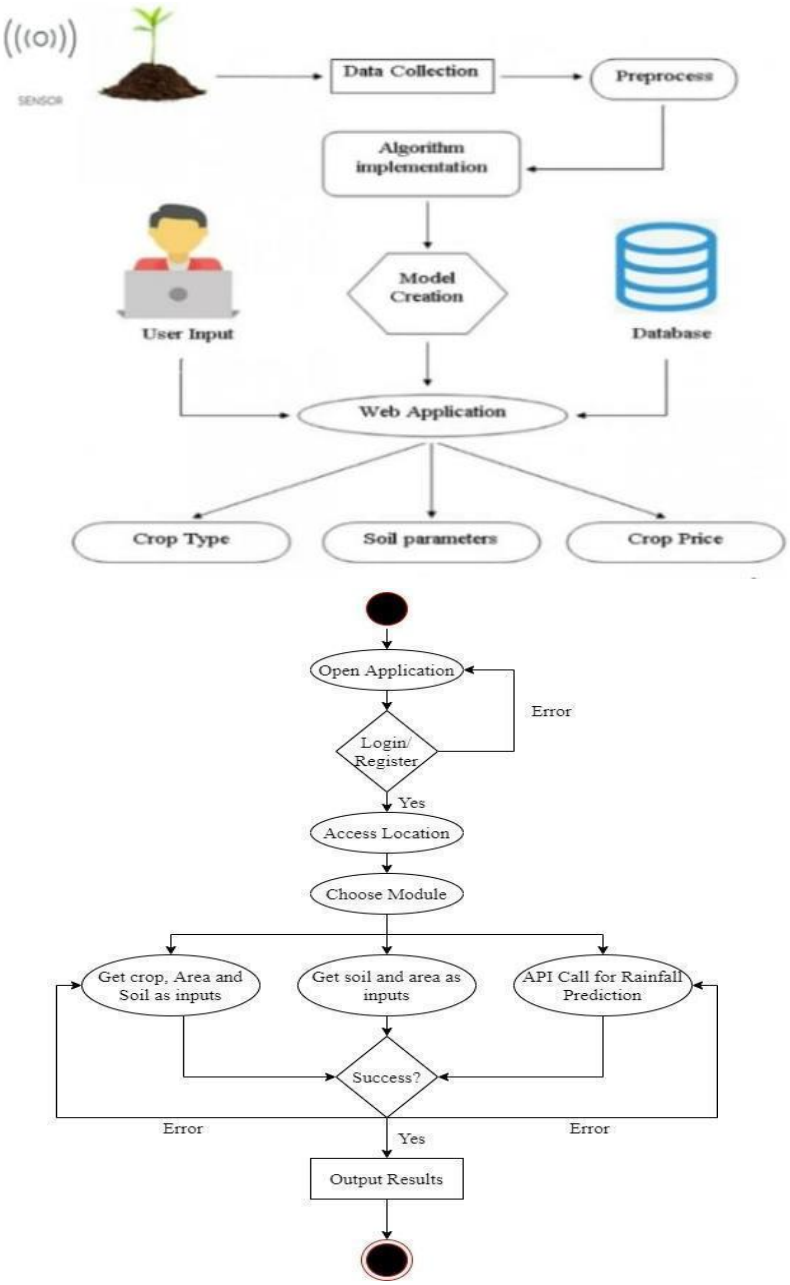

Figure 1: Basic block diagram of Application

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IV. DATA FLOW DIAGRAMS

Data Flow Diagram 0

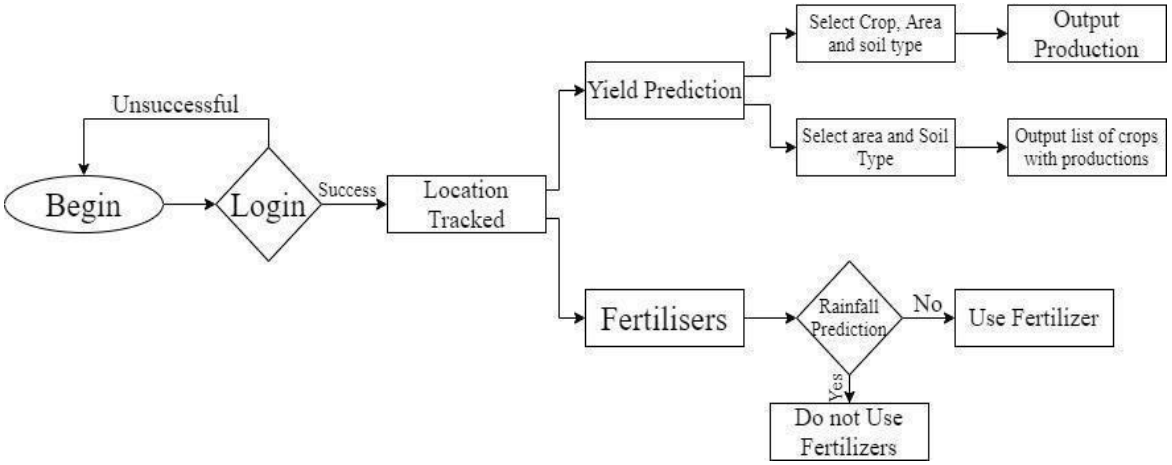

Figure 2: Dataflow diagram 0

V. RESULTS

The application was tested for accuracy, translation time, and memory usage. The application maintained 75-80% accuracy when it was used to predict the crop yield in various location based on soil parameters, the application was able to predict the crop yield within a minute.

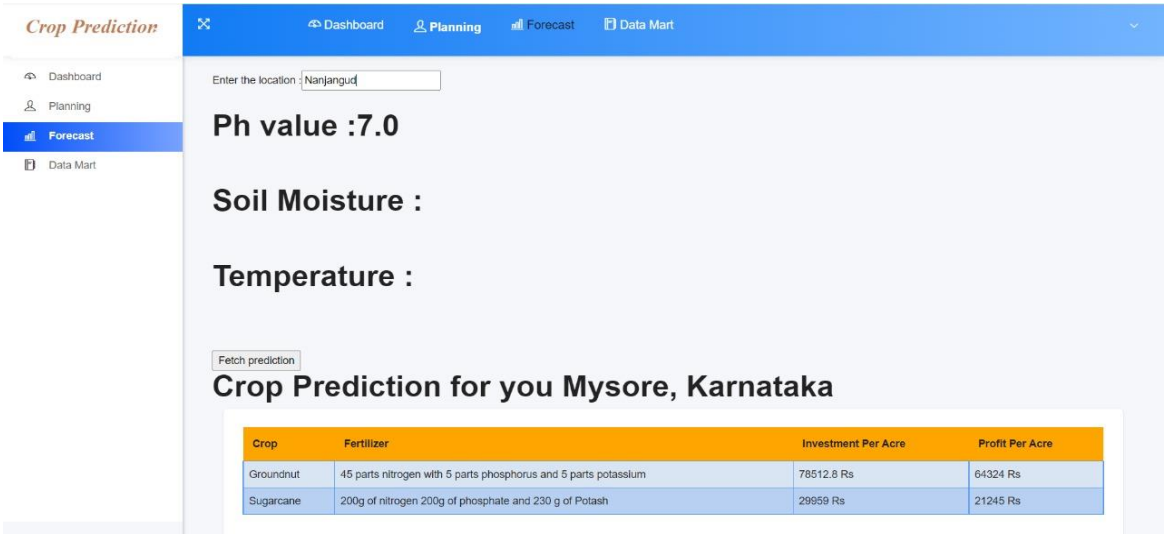

Figure 3: prediction in software

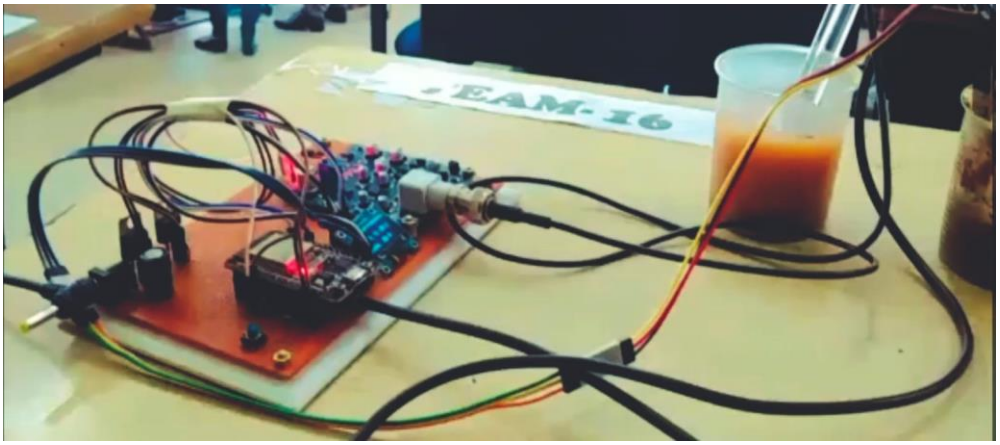

Figure 4: Measuring values in hardware

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VI. CONCLUSION

This system is proposed to deal with the increasing rate of farmers suicides and to help them to grow financially stronger. The crop yield prediction system helps the farmers to predict the yield of a given crop and also helps the farmers to decide which crop to grow. Appropriate datasets were collected, studied and trained using machine learning tools. The user needs to provide the information of location and the output has been predicted for that particular location. It will suggest the fertilizers suitable for that crop.

VII. FUTURE WORK

The future work is focused on providing the sequence of crops to be grown depending on the soil and weather conditions and to update the datasets time to time to produce accurate predictions. The Future Work targets a fully automated system that will do the same Another functionality that we are trying to implement is to provide the correct fertilizer for the given crop and location. To implement this through study of fertilizers and their relationship with soil and climate is required. We are also aiming to predict the crisis situation in advance like the recent hike of onion prices. We also aiming to install geolocation tracker so that farmers send the details from their home location.

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