A MACHINE LEARNING APPROACH FOR AGRICULTURAL CROP PREDICTION USING DECISION TREE ALGORITHM

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Abstract- In India, over 50% of India's population depends on agriculture for their survival, making it the foundation of the Indian economy. Variations in weather, climate, and other environmental factors are now a serious threat to the continued success of agriculture. Determining the type of crop that can be grown and suggesting the fertilizers that can be used for a certain crop using historical data that is now accessible. Using the machine learning approach, we were able to accomplish this. We conducted a comparative analysis of several machine learning algorithms, including ANN, K Nearest Neighbour, Random Forest, SVM and Linear Regression. This project was created to make broad and specific predictions about crop productivity. Along with that, it advises the user how to use the proper fertilizer . The current study examines a systematic review that separates and synthesizes the features used for prediction. In addition, a number of methodologies have been created to examine the agricultural amount of the production prediction utilizing artificial intelligence techniques.

Keywords—Agriculture; Crop prediction; Fertilizer;

I. INTRODUCTION

The agricultural economists concentrated on the role that agriculture may play in the overall modernization and expansion of the economy. Strong agricultural productivity and growth are thought to be essential components of long-term economic growth. The control of pests and illnesses for the crops being cultivated is one of the major issues that farmers face. The project uses embedded sensors and microcontrollers to analyze soil nutrients and crop productivity in order to assist farmers in cultivating crops for higher yield output. According to the algorithm, we load the acquired data sets into this method ,

After converting them into csv file format. The program forecasts the
sort of crop to that will be grown in that particular place with the help
of the user's input regarding the soil and location. The main goal of crop yield estimation is to increase agricultural crop production , and numerous tested models are used to do so.

II. RELATED WORK

A. IoT based Smart Soil Monitoring System for Agricultural Production

The goal of this project is to develop an embedded system for soil monitoring and management that will lessen the need for the field level soil monitoring in order to collect data via the mobile application. Several sensors, including pH , temperature and the humidity sensors are used to test the soil. The farmers can choose to cultivate the best crop for the soil based on the outcome.

B. Improving Crop Productivity through a Crop Recommendation System Using Ensembling Technique

The Ensembling technique is used to create a model accurately recommends the best crop based on the type and characteristics of the soil by combining predictions of numerous machine learning models . Random Forest, Naïve Bayes , and Linear SVM serve as the ensemble model 's independent base learners . Every classifier offers a unique set of class labels with a respectable level of the accuracy.

C. An Effective Method of Controlling the Greenhouse and Crop Monitoring Using GSM

This work supports GSM wireless technology and presents a greenhouse technique. The suggested greenhouse system affects different crop species, primarily flower, vegetable, and fruit crops. The system that is being demonstrated efficiently monitors and regulates critical green house factors including temperature, humidity, soil moisture, light intensity, and CO2 gas. The system was tested in a greenhouse setting, and observations were made for the aim of analyzing crops.

III. SYSTEM ARCHITECTURE

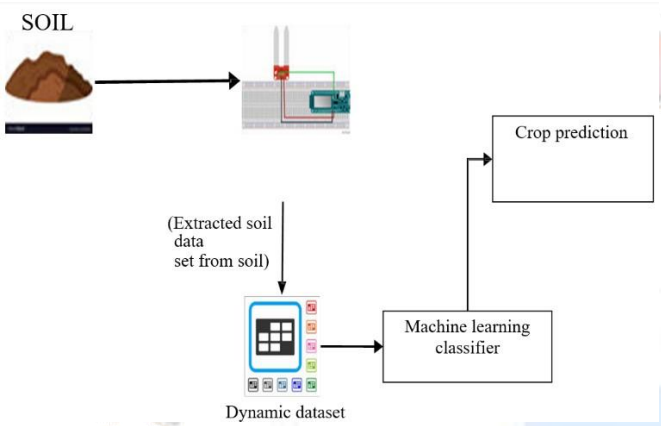

Fig.1 System Architecture

The system's goal is to assist farmers in cultivating the right crops for higher yields. The research uses embedded sensors with microcontrollers to analyze the nutrients in the soil and crop productivity in order to provide precise and accurate crop predictions. The end user is given accurate advice on fertilizers suited for each individual crop, and the soil quality is examined and crop production is predicted in accordance with that information. The method will assist in easing the issues the farmers confront. It will serve as a conduit for giving farmers the effective information they need to obtain high yield and hence maximize revenues.

IV. METHODOLOGIES

The system use machine learning to estimate the harvest, and Python is used as the programming language because it is well-known for usage in machine learning experiments. In order to learn from past events and create a trained model, machine learning employs historical data and knowledge. The model then forecasts the output. The classifier's accuracy will increase with the quality of the dataset gathering. Regression and classification techniques used in machine learning have been found to outperform a number of statistical models. The production of crops is entirely reliant on geographical elements such as soil chemistry, rainfall, topography, soil type, temperature, etc.

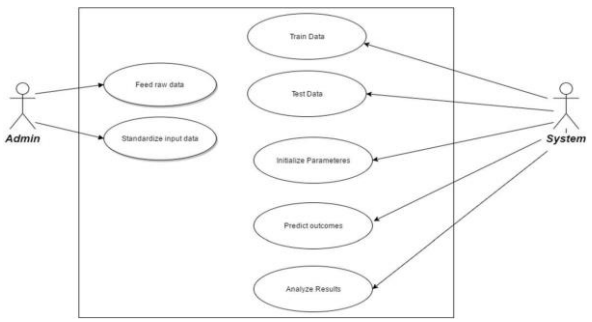

Fig.2 Use Case Diagram

V. EXPERIMENTAL RESULT

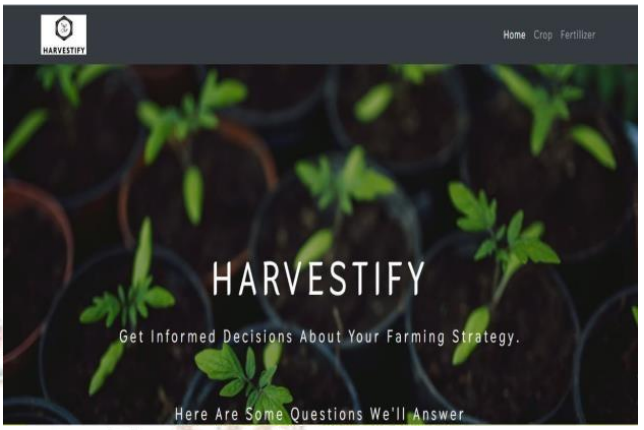

Fig.3 Home page

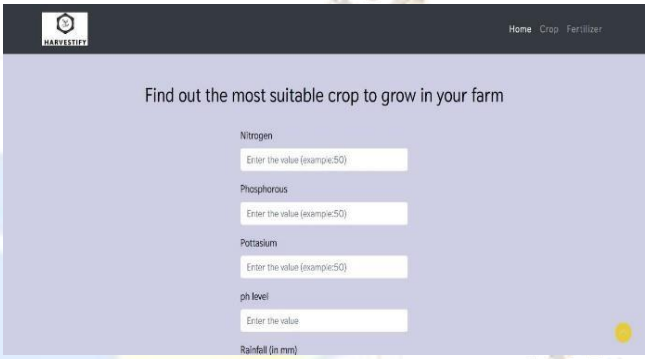

Fig.4 Crop Recommendation

VI. CONCLUSION

Our farmers have fallen behind in terms of farming methods because they are currently not utilizing technology in their operations. Therefore, we created this project to motivate farmers to rely on modern technology rather than outdated practices. It makes sense for the farmer to accept modern technologies since they will make his life simpler. Growing a crop involves a great deal of knowledge and insight into many different aspects, such as the contents of the soil, the temperature of the area, the pH of the soil, etc. If the farmer uses this technology, it would not only make his life simpler but will also help the farmer grow the proper crop with an accuracy of 93%.

VII. FUTURE SCOPE

Future work will concentrate on providing the crop sequence to provide good predictions, the datasets need to be regularly updated based on changes in the soil and weather. The Future work aims to create a completely automated system that would be more accurately estimate crops and recommend fertilizers.

VIII. REFERENCES

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