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SOIL CLASSIFICATION USING MACHINE LEARNING METHOD AND CROP SUGGESTION

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Abstract: Soil analysis is a valuable tool for your operation because it identifies the inputs needed for efficient and economical production. A proper soil test helps ensure that enough fertilizer is being applied to meet crop needs while using nutrients already present in the soil. A series of different chemical processes determine the amount of plant nutrients and the chemical, physical and biological properties or "soil health" of the soil, which are important for plant nutrition. Taking soil samples, analyzing the samples in the laboratory, issuing fertilizer recommendations and interpreting the results is a very time-consuming process for farmers. Therefore, we have developed a soil analysis system. I have two data sets, one of which is an image of a different soil 1. Red soil 2. Black soil 3. Hill soil 4. Desert soil is a different plant. The model can suggest soil types and suggest suitable plants depending on the soil type. Use CNN (Convolutional Neural Network) algorithm to train the models and find the results. The final application is a web browser that loads the clay image. The app predicts the soil type and, depending on the soil type, it also predicts the suitable crop for the soil.

Index Terms - (CNN)Convolutional Neural Network, Crop Suggestion, Soil Classification, Soil Testing, Soil Types.

I. INTRODUCTION

Agriculture is a major source of the Indian economy India is also known as an agricultural country. In India, 50% of the workforce is engaged in agriculture. In agriculture, the soil is the most important and basic. But now farmers also use standard methods. Because the usual methods do not give satisfactory results and do not increase the yield. Good soil quality is required for high yields. The soil survey is now complete. Soil testing is not the most important mission of agriculture, but it is very important. Plant composition and quality depend entirely on the soil. Soil tests are very important as they provide information about all the nutrients present in the soil such as Ca (calcium), K (potassium), and N (nitrogen). Farmers in many parts of India, especially Maharashtra, are facing droughts, resulting in reduced crops and yields. They know nothing about the nutrient supply in their fields. Due to the low success rate, we are unable to pay the approved loan amount for our crops. Failing to repay the loan amount, they attempted suicide. This is the main reason for the increase in suicides. We motivated ourselves with this method to help farmers choose which crops to cultivate that is made up of these quantities. Supported nutrient levels, our system predicts soil type Predict the list of crops that can grow on a given soil according to a soil type system. This will increase yields and farmers will also earn additional income with this new method. We build systems using advanced technology. Use machine learning to shape your system. Machine learning focuses on creating computer programs that can access data and use it to learn. Machine learning makes it possible to build models from sample data and automatically drive decisions based on experience. Agriculture is at the heart of many countries, and soil is the most important component of agriculture. There are many different types of soil, and each type has different characteristics for different crops. Various methods and models are used daily in this field to increase yields. Therefore, the main purpose of this technique is to create a model that helps farmers understand which crops should absorb the soil type of choice. The entire system uses machine learning techniques to help suggest plants per soil classification or soil series. The model can only suggest soil type and suggest suitable plants depending on the soil type. Different classifiers are used and the model suggests cultures accordingly.

2. PROBLEM STATEMENT

Estimating soil moisture content is one of the most difficult tasks for humans and robots in packing, separating, and pickand-place operations. To operate, the automatic machine must be able to identify the correct moisture content.

3. LITERATURE SURVEY

The In this section, we look at various crop forecasting work done in the agricultural sector. The authors proposed how to use information mining techniques in the agricultural field. Since treatment has good potential as an alternative technology, the authors also investigated and analyzed the problem of prediction of agricultural productivity. They thought of the first. The goal of their study was to find a data model that provides high accuracy and generality in terms of yield predictor functionality. The Crop selection method was proposed by the authors in. (CSM). The authors proposed a tool to help identify plant selection problems.

They specify machine learning and various machine learning methods. Crops were classified into seasonal crops, perennial crops, short-term plantation crops, long-term plantation fields, etc. by the proposed crop selection method. The author proposed a clever method for predicting crop yields and his key climate factors for maximizing crop yields. During this time, multivariate polynomial regression, support vector machine regression, and other techniques were used. Crop yield per acre was predicted using random forest models and other methods. To compare multivariate polynomial regression, support vector machine regression, and random forest, the authors used mean absolute error (MAE), mean squared error (RMSE), mean absolute error, and R-squared values. The authors used a nonlinear regression approach to predict yield and price for crops based on historical data trends. The authors proposed a framework to recommend to farmers the crop options most profitable for farming and management. Implement requirement-level classification in a planned manner.

The authors also performed text-to-speech conversion within the proposed framework. The authors proposed an ideal system called Agro Consultant to help Indian farmers decide which crops to plant based on season, geographic location, and soil properties. The authors built such systems using machine learning algorithms similar to random forests, K-Nearest Neighbors (K-NN), decision trees, and neural networks. Map visualization capabilities and precipitation forecasting are also included in the proposed framework. The developer of [8] invented a new structure known as the Extensible Crop Yield Prediction Paradigm (XCYPF). This tool allows you to select a crop, select dependent and independent variables and datasets, and predict yield. The author explained how this system is adaptable and extensible. The authors used precipitation data and surface temperatures to predict rice and sugarcane.

The authors used a new approach using vegetation indices in combination with other techniques. The authors developed a crop yield prediction model based on a modifying cluster approach. Measure and use Bee Hive modeling techniques to classify crop growth trends and yields by plant. The authors also identified that the Bee Hive Cluster was used because it describes an agricultural dataset that supports plant growth and is considered a heterogeneous data cluster acting as a repository. The authors looked at Bee Hive, which performed better than the others. Graphs were plotted to show the variation in yield and the Bee Hive algorithm was used to obtain patterns. The authors have created a cloud-based farming system that supports Indian farmers and the agricultural industry in obtaining useful agricultural information. This system provides soil classification and yield prediction.

4. RESULT AND DISCUSSION

This system uses a classification system developed after reviewing several previous crop prediction systems to recommend crops based on soil classification. It takes input as ground image and uses CNN algorithm to extract the features. On the other hand, it provides results on which crops are suitable for harvesting by farmers.



Figure 1 Architecture of the System

In this two data sets are present. One is a picture of different soils. 1. Red soil 2. Black soil 3. Mountain soil 4. Desert soil and another is another plant. The model can suggest soil types and offer suitable plants depending on the soil type. Use the CNN (Convolutional Neural Network) algorithm to train the model and find the results. The final application is a web browser that loads an image of the soil. The application predicts the soil type and, depending on the soil type, also the crops suitable for that soil.

5. CONCLUSION

This system suggests crops based on soil classification with an assembling classifier system that has been developed after examining several previous systems on crop forecasting. Convolutional Neural Network (CNN) algorithms are used to improve the accuracy of the framework that lists suitable crops based on soil type.

5.1 CONFLICTS OF INTEREST

The location recommendation module can be introduced in the future based on the crop recommendation, which means the correct location will be recommended

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