Soil Type Analysis And Crop Recommendation Using CNN

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Abstract

In this project we will be making a Soil Classification and Recommendation System. This application will help the farmers to test the quality of the soil for the cultivation, so the farmers no need of going to the laboratories for testing the soil. By checking this we can find which crop can give more yield. With the help of a smartphone the farmers can test the soil by themselves. We are implementing this system by applying machine learning algorithm. The models are trained on the basis of a large dataset, so it will increase the accuracy of the model.

Keywords: *Quality,Testing, Machine Learning Algorithm.*

1. Introduction

Countries around the world's economies and sustenance depend heavily on agriculture. The efficiency and nature of harvests rely altogether upon different elements, with soil wellbeing being quite possibly of the most basic determinant. Manual processes that are time-consuming, laborintensive, and sometimes inaccurate are common in traditional methods of soil analysis and crop recommendation.By utilizing data-driven strategies, there is a tremendous opportunity to revolutionize agricultural practices thanks to technological advancement, particularly in the field of artificial intelligence (AI).

The goal of the project, which is called "Soil Image Data crop-based Recommendation system designed to Farmers Using AI," is to develop an innovative solution to farmers select crops built on analysis of soil images. The goal of this AI driven system is to make it easier and more effective to identify the suited to a given optimal soil conditions to boost agricultural productivity and sustainability.

2. Related works

In the Paper [1] “Prediction Of Land Suitability For Crop Cultivation Based On Soil And Environmental Characteristics Using Modified Recursive Feature Elimination Technique With Various Classifiers” [2] - Crop cultivation prediction is associate integral apart of agriculture and is based on factors like soil, environmental options like precipitation and temperature, and therefore the quantum of fertilizer used, significantly chemical element and

phosphorus. These factors, however, vary from region to region: consequently, farmers are a unit unable to cultivate similar crops in each region. This is often wherever machine learning techniques step in to assist realize the foremost appropriate crops for a selected region, so helping farmers a good deal in crop prediction. The feature choice side of metric capacity unit may be a major element within the choice of key options for a selected region and keeps the crop prediction method perpetually upgraded. This work proposes a unique feature choice approach known as changed algorithmic feature elimination to pick out acceptable options from an information set for crop prediction. The planned changed algorithmic feature elimination techniques selects and ranks salient options employing a ranking method. The experimental results show that the changed algorithmic feature elimination methodology selects the most correct options, whereas the material technique helps accurately predict a suitable crop.

Soil properties (including physical, chemical, and biological properties) and thus the characteristics of the spatial soil data are a unit first introduced. Spatial agglomeration techniques are a unit then summarized in five fully completely different categories. Soil data analysis practice spatial agglomeration is reviewed in four categories of agricultural applications: agricultural production management partitioning, comprehensive assessment of soil and land, soil and land classification, and correlation study for agro-ecosystem. The quality agglomeration algorithms usually work well, and prototype-based agglomeration ways that are a unit further preferred in observe. Some machine learning models is any introduced into the spatial agglomeration algorithms for higher accommodation to various characteristics of soil dataset.

In the paper “Comparative Analysis of Soil Properties to Predict Fertility and Crop Yield using Machine Learning Algorithms” [6] - Agriculture is a vital part of human lives. It's one in every of the most important supply of employment in India. More than 1/2 the population depend on agriculture. It's the backbone of our economy. Crop yield depends on several factors. One in every of the most important factors that have an effect on the yield of the crop is soil. Improvising the techniques to predict crop yield in several atmospheric conditions will facilitate farmers and other stakeholders in higher cognitive process in terms of scientific agriculture and crop choice.Crop yield prediction includes foretelling the yield of the crop from previous historical knowledge that consists of things like temperature, humidity, pH, rain, and crop name. It provides United States of America an inspiration for the best foreseen crop which can be cultivated within the field weather. In the planned work, a comparative analysis on soil properties to predict fertility and crop yield has been performed mistreatment machine learning algorithms. The analysis has been done on self–obtained dataset, for 3 crops - tomato, potato, and chili. The crop yield prediction has been done mistreatment K Nearest Neighbour algorithmic program, Naïve Thomas Bayes algorithmic program, and call Trees

3.Methodology

Soil Image Dataset and crop which is the main task of the project to collect the soil images. The dataset is consisting of different soil types and their features and different types of crops suitable for the soil. On this soil data we are training and testing the model for soil classification and crop Recommendation system. After collection the soil and crop data, the

next step is preprocessing. We can see it in the architecture [Fig.1]. Preprocessing, its main aim is to improve the quality of the images of the soils which we are taken using camera's etc. It is having different steps inside the preprocessing to format the image. Color correction, resizing etc. Then Data is splitting, To soil data and crop data. The soil data consist of the soil types and its properties, the crop data consist of which of the grown in that particular soil. Dataset Deviation Here the existing Data is taken for both Training and Testing of the data.

3.1 Flow Chart

In a large dataset, more number of data consisting of soil images and their features will undergo for Training the model. After the Training of the model, only by using our we can predict the soil type and its features. And the remaining data will be used for testing the model which trained. This Dataset of soil which will be divided for both the training and testing. In a large dataset, more number of data consisting of soil images and their feature will undergo for Training the model. After the Training of the model, only by using our we can predict the soil type and its features. And the remaining data will be used for testing the model which trained. The crop dataset which will be also divided to both training and testing. In a large dataset, more number of data consisting of crop images and their details will undergo for Training the model. After the Training of the model, only by using our we can predict the crop which can be cultivated in that soil. And the remaining data will be used for testing the model which trained.

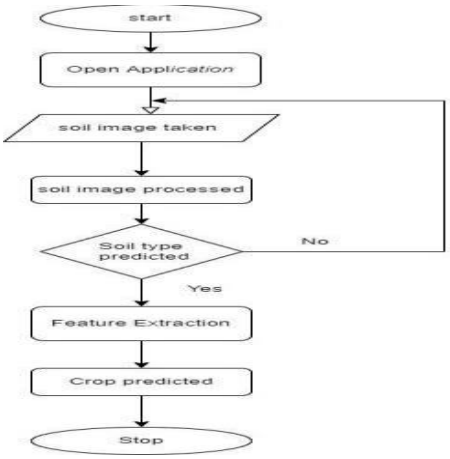

Figure 1.Flow Chart

3.2 Architecture Diagram

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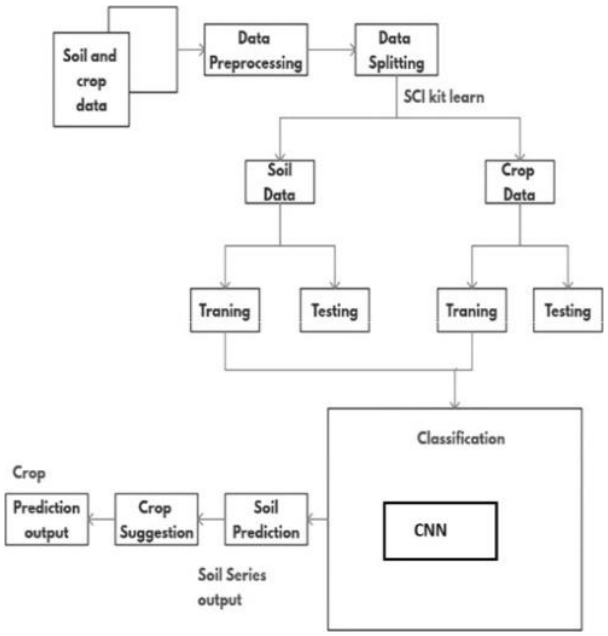

Figure 2.Architecture

4. Result

Our product can give our farmers a better knowledge about the suitable crop for the land with ease of using of the product. It also gives better accuracy than existing systems. When we compared this product with another product it is proved that pH, nutrients predicted by the product is more accurate than that of another product. The temperature and humidity shown by the this product is also most same as the original temperature and humidity.

5. Conclusion

Agriculture is that the major source for living for the people of India. Agriculture research is that the major source of economy for the country. To supply data for creating interpretations as to the adaptability of particular soils for agricultural purpose. For correct crop yield, farmers should bear in mind of the proper soil type for a specific crop, which affects the increased demand for food. There are different laboratory and field methods to classify soil, but they also have limitations. So there's a requirement of computer-based soil classification techniques

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