Soil Doctor-Smart Farming Solution

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ABSTRACT- A crop's productivity is affected by the soil, fertilizers, and water. For cultivating vegetables, fertilizers include micronutrients like zinc, nitrogen, and others. Crops should be able to handle the negative effects created by the environment and inconsistent sources in order to supply the increasing demand for food. Precision agriculture has a three layer structure that is comparable to networks. Details about various factors, goods, and the operational environment can be obtained through the sensors to send and receive data between the various devices and from a distant server. Application layer for data analysis, visualization, and prediction in preparation for further actions.

***KEY-WORDS*:** Iternet of Things (IoT), Sensors, Crop recommendation, Crop prediction.

1. INTRODUCTION

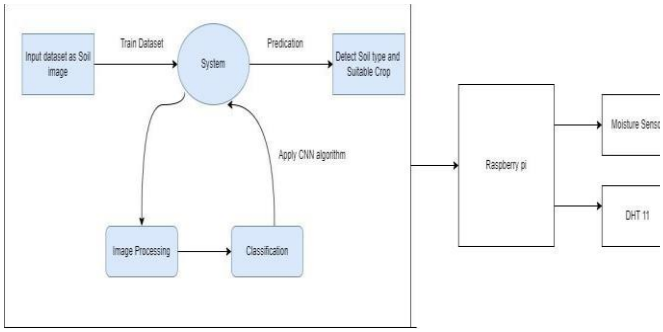
Agriculture is one of the most important professions practiced in India. It is a very important economic sector and plays a most important role in the overall development of the country. It also contributes a large portion of employment [1]. Researchers have started offering solutions by integrating the Internet of Things with deep learning techniques, or ”Smart IoT,” to feed food for an increasing population in nations like India [2, 6]. Because of this development, e-farming has adopted a new pattern in which all the sensors required for farming are linked to the distant server through wireless or remote protocols in a distributed setting. The farmers can keep an eye on these fields even when they are a long way away thanks to their intelligence [3]. In a rainy season, the data from various sensors is translated into a single, computable format so that the specified framework can deal with it IoT-based Smart Farming improves the entire agriculture system by monitoring the field in real-time. It keeps various factors like humidity, temperature, moisture of soil, etc. under check and gives a crystal-clear real-time observation. The design paper consists of seven sections. In the first section, we have given information about the existing system and proposed system. In the previous system, they use the KNN algorithm for predicting crops. In our system, we use the CNN algorithm and DH11 and moisture sensor to detect the temperature, humidity, and moisture of the soil. The second section consists of the system architecture of the project. The next section includes the data flow, and use case of the project.Advantages are the fifth section. In the next section, we have described the application and the last section is about the conclusion in which we have improved the performance and accuracy of an existing system case.

2. RELATED WORK:

Data pre-processing in problem-solving is regarded as an important machine learning phase. Pre-processing is extracting the functionality adding the correct gathered data, and adding the missing values. The format of the data set is difficult for the analysis process. Pre-processing the data is regarded as a critical step in the machine learning process. Preprocessing entails adding the correct collection of data, missing values, and functionality extraction.

3. SYSTEM ARCHITECHTURE

Due to India's harsh weather, crops may become submerged in water as a result of heavy rains and flooding. This renders the soil's moisture level inadequate for high yield. Each crop has a range of soil water content that influences production. Temperature and humidity are two more elements that have an impact on crop output. As a result, they must be kept within their specific ranges for each crop variety. The implementation of our project will address this problem. It aids farmers in preventing excessive water logging of their crops



A. PROBLEM STATEMENT

The system architecture consists of hardware and software systems. In the software system we have given input as a soiled image by using the CNN algorithm we extract the features of the soil and pre-process the image and then the system gives the output and which predicts the soil type and suitable crop for input soil image. In the hardware system, we have used two sensors i.e. DHT11 and Moisture sensors which detect the humidity temperature, and moisture of particular soil.

B. HARDWARE INTERFACES

•RAM: 8 GB As we are using Machine Learning Algorithm and Various High-Level Libraries Laptop RAM minimum required is 8 GB.
•Hard Disk: 40 GB Data Set of CT scan images is to be used hence a minimum of 40 GB Hard Disk memory is required.

- Sensors: Moisture Sensor, DHT 11
- Processor: Intel i5 Processor

C. SOFTWARE INTERFACES

- Software: anaconda navigator
- IDE: Spyder Best Integrated Development Environment as it gives possible suggestions at the time of typing code snippets that make typing feasible and fast.
- Coding Language: Python Version 3.5 highly specified Programming Language for Machine Learning because of the availability of High Performance Libraries.

Operating System: Windows 10 Latest Operating System that supports all types of installation and development Environments

4. ADVANTAGES:

- By using sensors we detect moisture, humidity, temperature, etc. of soil.
- Predicting the productivity of crops in different climatic conditions can help farmers and can be helpful for increasing the productivity of crops.
- This model can be used to select the better crops for the region and also its yield thereby improving the values and gain of farming.

5. APPLICATION:

- Agricultural Applications means applications relating to Cultivating, characterizing, or modifying soil and improving productivity.
- Producing, growing, improving, and protecting are some of the important characteristics of a farm identifying these characteristics can be helpful.
- It is mainly used in selection of crops for yielding.

6. RESULT:

Before Here in this section, we are going to see the results. The first window page is about the Home Page of the system. It consists of two options login and registration option for end users. If we have already registered then we can log in to the page if not then register for a new account and create a user I'd and password for a particular user for login.

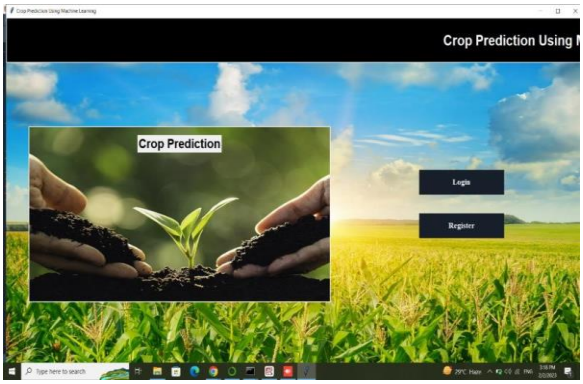


Fig -2: Home Page

The second figure is about login page. In which we can login by entering User Name and password. If not register account then go to register page.

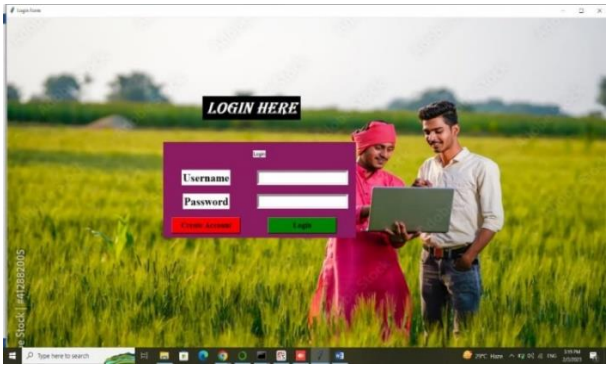


Fig -3: Login Page

The registration form is the third window through which can create an account by filling in the following details of the user they are Full Name, Address, Email, Phone No., Gender, Age, User Name, and Password.

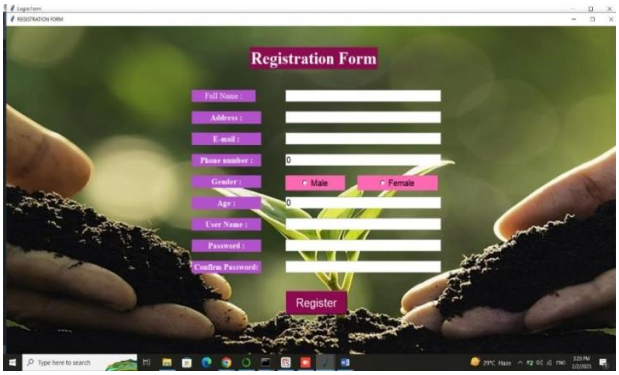


Fig -4: Registration Page

The last window is the result page. In which by selecting the image of soil from dataset and by applying the CNN algorithm we predicting the suitable crop.

Fig -5: Result Page

7. CONCLUSION:

Agriculture is the field that helps in the economic growth of our country. But this is lacking behind in using new technologies of machine learning. Hence our farmers should know all the new technologies of IOT and other new techniques. These techniques help in getting the maximum yield of crops. Many techniques of IOT are applied in agriculture to improve the yield rate of crops. These techniques also help in solving the problems of agriculture. We can also get the accuracy of yield by checking for different methods. Hence we can improve the performance by checking the accuracy between different crops.

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