



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 Issue: V Month of publication: May 2021

DOI: <https://doi.org/10.22214/ijraset.2021.34126>

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Crop Prediction and Selling Platform for Farmers

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Abstract: Farmers face many problems, some of them are uncontrollable like uneven weather conditions, as the weather plays a big role in the crop's life, unfavorable weather can greatly affect the crops. Another problem is lack of knowledge, as apart from weather the other thing that affects the crops is insects and other diseases, in such cases not having proper knowledge about right solutions can damage the quality of the end product. Farmers also do not have the knowledge of current Government Schemas which can be highly beneficial for them. Even after the harvesting of the hard-earned crops, many times farmers still do not get the well-deserved price for the crops, the main reason for that is as farmers do not directly sell to the end consumer. All these problems can be solved with the help of technology by developing a platform, where farmers can sell their product directly to the end consumers. The platform will have the information about the plant's diseases with appropriate solutions on it, along with all the latest information about weather conditions and Government schemas that too in their local languages.

Keywords: Farmers, Agriculture, Market Platform, Crop Prediction

I. INTRODUCTION

Nowadays one of the major challenges in modern day farming is selection of crops according to conditions. Different crops need different types of soils and different types and amounts of nutrients. To choose the best suitable crop, the factors such as humidity, rainfall, pH, temperature and soil nutrients must be considered. Some farmers grow the same crop again and again in the same field. By repeated planting of the same plant, a part of the minerals gets depleted in the soil. It then leads to very poor yield. Even after cultivation, most farmers do not sell their crops directly to end consumers. There are middlemen due to which the prices of crops become highly inflated. Due to this, consumers also get crops at a very high price.

The main aim is to design a system that helps farmers in predicting the best suitable crop for their land and also guide them in the cultivation process of the crop. In addition, provide a platform using which they can directly sell their crops which can be highly beneficial for them.

Agriculture is one of the most important occupations in India, it contributes to around 14% of the total GDP, over 60% of the land in India is used for agriculture activities. It also contributes to 1/6th of total export. Even after Agriculture having a great influence in our country, still there is a great scope for improvement. Currently there is no one stop solution to basic agriculture problems that can be solved using today's technology. Using machine learning and data available we can predict the most suitable crop for a specific farm rather than only relying on the past experiences. In the age of abundance of information, there still isn't one place where information is available in a structured way for farmers.

With the growing misuse of pesticides and highly inflated prices of crops, our aim is to develop a web-based application which can help farmers in all ways possible. Starting with crop prediction, suggestion of crop cultivation and pesticide usage and then also helping them in selling the crop directly so that the end users can get them at a cheap rate as well as farmers can make considerable profits.

The system comes with a model to be precise and accurate in predicting crop yield and deliver the end user with proper recommendations about required fertilizer ratio based on atmospheric and soil parameters of the land which enhance to increase the crop yield and increase farmer revenue. Our System plays a proactive role in providing necessary infrastructure and related services to facilitate online trading to the benefit of farmers and buyers.

II. LITERATURE SURVEY

A. Crop Prediction using Machine Learning.

This research work is based on Naive Bayes algorithm to help beginner farmers to predict the best crop for sowing. The seed data of the crops are collected here, with the appropriate parameters like temperature, humidity, and moisture content. Type of the soil plays an important role in the plant's growth which is not considered in this paper. So, this affects the final result.

B. Soil Classification using Machine Learning Methods and Crop Suggestion Based on Soil Series.

In this paper, the authors have proposed a model that can predict soil series with land type and according to prediction, it can suggest suitable crops. Several machine learning algorithms such as weighted k-Nearest Neighbor (k-NN), Bagged Trees, and Gaussian kernel-based Support Vector Machines (SVM) are used for soil classification. SVM has given the highest accuracy among 3 algorithms but SVM is not suitable when size of dataset increases and features increases.

C. Automated Farming Prediction

In this research work, using machine learning algorithms such as multiple linear regression (MLR) and k nearest neighbors (KNN) authors predicted which crop is best for particular land. The accuracy of the model is higher only when a smaller number of crops are considered.

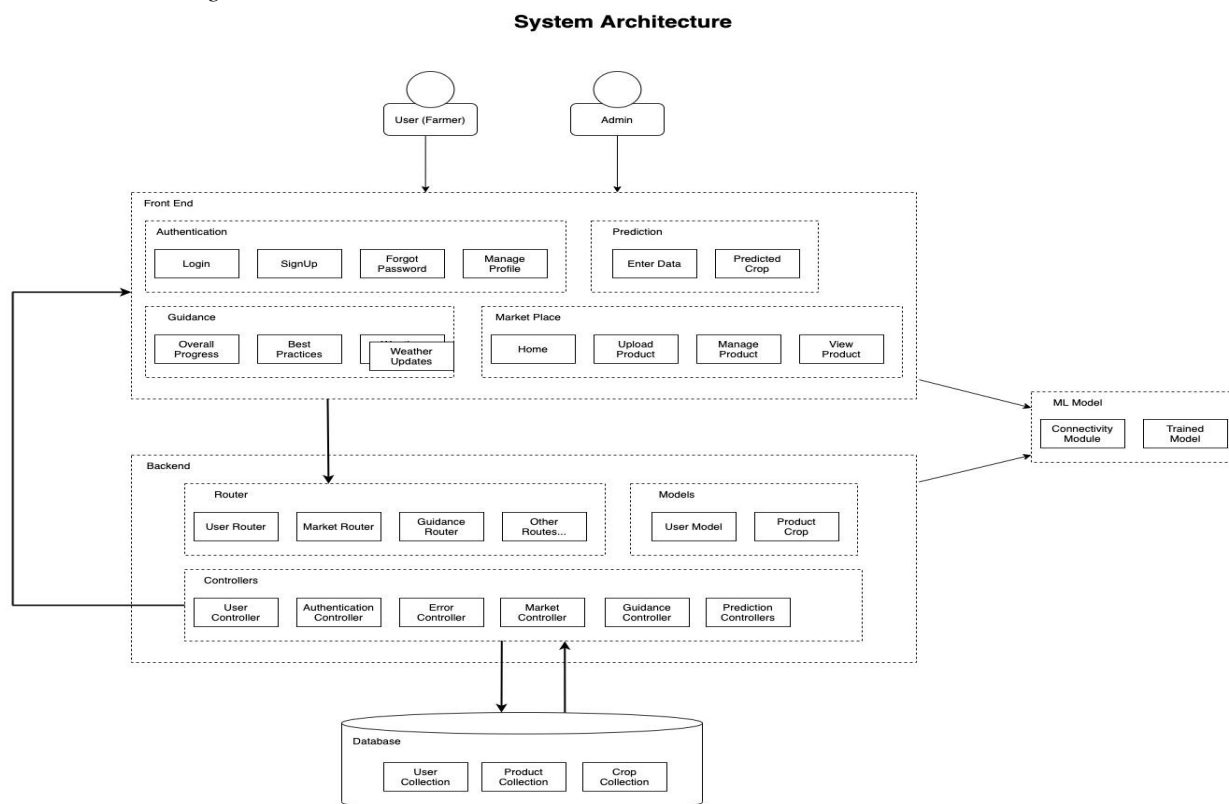
D. Supervised Machine learning Approach for Crop Yield.

In this research work, to minimize the loss, the information about the crop yield is provided. The information is based on weather, temperature and several other factors. The purpose of this research is to increase the yield and profit for producers. The proposed system concentrates on yield, weather predictions and crop type. Random Forest Algorithm is used for predicting the best crop yield as output. Type of the soil plays an important role in the plant's growth which is not considered in this paper. So, this affects the final result.

III. PROPOSED ARCHITECTURE

If we look at the farmers' task, the main tasks are plantation, cultivation, harvesting and finally selling the crop in the market. The main aim is to design a system that helps farmers in predicting the best suitable crop for their land and also guide them in the cultivation process of the crop. In addition, provide a platform using which they can directly sell their crops which can be highly beneficial for them. -We propose a web based application using ReactJS that will help farmers by predicting the best suitable crop among a set of crops with the help of Random Forest Algorithm. The application will also guide them in the cultivation process by suggesting best practices from government websites. In addition, it will help the farmers to sell their crops directly to end consumers by allowing them to upload their crop details.

A. System Architecture Diagram



IV. THE REQUIRED PLATFORM FOR IMPLEMENTATION

As the project is a web based application, the architecture of the application can be divided into two main parts, frontend of the application and backend of the application.

For the backend of the application, MVC (Model, View, Controller) architecture is used. NodeJs along with Express framework is used for the majority of the application, with the exception of the machine learning model's backend which is written in Flask.

For the frontend React JS is used. Once the user interacts with the frontend, then the request will be sent to the backend of the application where the routes will forward the request to appropriate controllers. The controllers will process the request and send appropriate responses back to the frontend.

For the database, MongoDB's cloud service known as MongoDB Atlas is used.

For Machine Learning, we have taken a dataset with shape (2200,8). The 7 features used for classification are N(Nitrogen), P(Phosphorus), K(Potassium), Temperature, Humidity, pH and Rainfall. The 8th feature is the classification label which the model will predict. Random Forest Algorithm is used for training the data and making predictions. After training the model, Flask framework is used for creating a REST API for communication with the frontend.

A. Software Requirement

- 1) Text Editor - Sublime Text, Visual Studio Code, Pycharm
- 2) API Testing - Postman Software
- 3) Cloud Database – MongoDB
- 4) Data Processing - Jupyter Notebook
- 5) Cloud Hosting - Heroku, Netlify

B. Hardware Requirement

As the application will be in the form of an online website, the application has minimum requirement of hardware interfaces.

Average Internet Connection

- 1) Any interactive device (Mobile, Tablet, Laptop, PC)
- 2) Internet Browser

V. CONCLUSION

So, in summary the application is all about helping the farmers in a few of their agricultural tasks, starting from crop plantation till it is in the hands of the end consumer. The application is a try to make use of new technologies like Machine Learning for making some tasks of farmers a bit easy.

VI. ACKNOWLEDGMENT

We would like to express our deep gratitude to our Project Guide Prof. A. M. Jagtap for his patient guidance and useful critiques. We would also like to thank our Head of Computer Department Dr. D. P. Gaikwad for his grace and inspiration. We sincerely thank our Department, Project coordinator, our project guide and all other staff members to give us the guidelines for this paper.

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