



D.Y. PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY
KASABA BAWADA, KOLHAPUR

A Project-I Synopsis
On
“Crop Recommendation System”

Submitted by

PROJECT GROUP

Student Name	Roll No.
Mr. Gourav Kumbhar	53
Mr. Aniket Yadav	54
Mr. Aditya Patil	57
Mr. Omkar Khapare	76

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

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Student Name	Roll No.	Sign
Mr. Gourav Kumbhar	53	
Mr. Aniket Yadav	54	
Mr. Aditya Patil	57	
Mr. Omkar Khapare	76	

Mr. Nitish Shinde
(Project Guide & Co-Ordinator)

Dr. Siddheshwar Patil
(H.O.D, CSE AI-ML)

ABSTRACT

Crop Recommendation System for agriculture is based on various input parameters. The system takes into account several factors such as soil type, climate, rainfall, temperature, humidity, and pH levels to determine the most suitable crops for a given region. By analyzing historical data and using predictive models, the system provides personalized recommendations tailored to the specific conditions of a farm or agricultural area. The recommender model is built as a hybrid model using the classifier machine learning algorithm. Based on the appropriate parameters, the system will recommend the crop. Technology based crop recommendation system for agriculture helps the farmers to increase the crop yield by recommending a suitable crop for their land with the help of geographic and the climatic parameters.

The proposed hybrid recommender model is found to be effective in commending a suitable crop. Crop yield production value pupation has a positive practical significance for guiding agricultural production and for notifying the change in market rate of crop to the farmer. The concept of this paper is to implement the crop selection method so that this method helps in solving many agriculture and farmers problems this improves our Indian economy by maximizing the yield rate of crop production. Different types of land condition. So, the quality of the crops is identified using ranking process. By this process the rate of the low quality and high-quality crop is also notified. The usage of ensemble of classifiers paves a path way to make a better decision on predictions due to the usage of multiple classifiers. Further a ranking process is applied for decision making in order to select the classifiers results. This system is used to predict the cost of crop which is yielded for further

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CHAPTER 1. INTRODUCTION

The Crop Recommendation System is a machine learning-based application that provides recommendations for suitable crops based on various environmental and soil conditions. It aims to assist farmers and agricultural professionals in making informed decisions about crop selection, optimizing yields, and maximizing profitability. The system takes into account several factors such as soil type, climate, rainfall, temperature, humidity, and pH levels to determine the most suitable crops for a given region. By analyzing historical data and using predictive models, the system provides personalized recommendations tailored to the specific conditions of a farm or agricultural area. In the world of developing technologies, the success of sharing information will help the agriculturists in realizing and developing their potential. The information sharing is that the valuable and timely information is being shared between agriculturists, either formally or informally. The willingness of information sharing refers to the open attitude among agriculturists.

This open attitude determines the degree and scope of information sharing. Using web-technologies like html and CSS we build the web application; we create dataset by gathering data from multiple resources and place them in place which is used to predict the price of the crop and results are subjected to non-linear test later priorities are set and rankings are given to the list of crops. Place information in our application and share that information to agriculturists whose data is collected and stored in the MySQL server. We software to automatically send the updated information to the agriculturists in the form of text message. So that agriculturists no need to go to near by towns and cities to know the updated information. We will be machine learning algorithms to predict the price of the crop for the next two months. For prediction purpose we will be using Support vector machine (SVM), Naïve Bayes (NB) and K-Nearest Neighbour (KNN) algorithms to predict the cost of the crop production. Further, a ranking process is applied for decision making in order to select the classifiers results.

CHAPTER 2. LITERATURE REVIEW.

[1] Jignesh m. Jetha Nikhil Gond Aliya, Vinita Shah, **“A Review on Data Mining Techniques for Fertilizer Recommendation 2018”**.

To keep up nutrition levels in the soil in case of deficiency, fertilizers are added to soil. The standard issue existing among the Indian agriculturists choose approximate amount of fertilizers and add them manually. Excess or deficient extension of fertilizers can harm the plants life and reduce the yield. This paper gives overview of various data mining frameworks used on cultivating soil dataset for fertilizer recommendation.

[2] M.C.S. Geetha **“A Survey on Data Mining Techniques in Agriculture, 2015”**.

Agriculture is the most critical application area especially in the developing nations like India. Use of information technology in agriculture can change the situation of decision making and farmers can yield in better way. This paper integrates the work of several authors in a single place so it is valuable for specialists to get data of current situation of datamining systems and applications in context to farming field.

[3] S. Srija, R. Geetha Chanda, S. Lavanya, Dr. M. Kalpana **“Ph. DAgroNutri Android Application,2016”**.

This paper communicates the idea regarding the making of Agro Nutri an android application that helps in conveying the harvest particular fertilizer amount to be applied. The idea is to calculate the measure of NPK composts to be applied depend on the blanked proposal of the crop of interest. This application works depends on the product chosen by the farmer and that is taken as input, thus providing the farmers. The future scope of the Agro Nutri is that GPRS can be included so that according to location nutrients are suggested.

[4] Karan “deep Machine Learning: Applications in Indian Agriculture, 2016”.

Kaur Agriculture is a field that has been lacking from adaption of technologies and their advancements. Indian agriculturists should be up to the mark with the universal procedures. Machine learning is a native concept that can be applied to every field on all inputs and outputs. It has effectively settled its ability over ordinary calculations of software engineering and measurements. Machine learning calculations have improved the exactness of artificial intelligence machines including sensor-based frameworks utilized in accuracy farming. This paper has evaluated the different uses of machine learning in the farming area. It additionally gives a knowledge into the inconveniences looked by Indian farmers and how they can be resolved using these procedures.

[5] Geeks for Geeks (How it works) - Simply Explained. [Online]

Recommendation system that will take in the different environmental attributes such as the nitrogen, phosphorous, potassium content in the soil, temperature, etc., and predict what is the best crop that the user can plant so that it survives in the given climatic conditions.[1]

CHAPTER 3. PROBLEM STATEMENT

The ultimate purpose of crop recommendation system is to assist farmers and agricultural professionals in making informed decisions about crop selection, optimizing yields, and maximizing profitability.

The system takes into account several factors such as soil type, climate, rainfall, temperature, humidity, and pH levels to determine the most suitable crops for a given region. By analyzing historical data and using predictive models, the system provides personalized recommendations tailored to the specific conditions of a farm or agricultural area. The solution will benefit farmers to maximize productivity in agriculture, reduce soil degradation in cultivated fields, and reduce fertilizer use in crop production by recommending the right crop by considering various attributes. This would provide a comprehensive prediction on the basis of geographical, environmental and economic aspects.

CHAPTER 4. OBJECTIVES

Following are the objectives of Crop recommendation system using Machine Learning:

1. Data set collection from various sources.
2. Data parsing and cleansing technique is applied to make the raw data into processing data.
3. The data collected is subject to machine learning system along with run time analysis makes an efficient crop value updating system.
4. Usage of Ensemble of classifiers makes the model more robust and efficient.
5. Ranking technique used in the project helps us to make efficient decisions.
6. Creating a web application for user registrations and collection of data.
7. The main objective is to obtain a better variety of crops that can be grown over the season. The proposed system would help to minimize the difficulties faced by farmers in choosing a crop and maximize the yield.
8. The model predicts the best crop by studying factors such as soil type, climate, rainfall, temperature, humidity, and pH levels to determine the most suitable crops for a given region. By analyzing historical data and using predictive models, the system provides personalized recommendations tailored to the specific conditions of a farm or agricultural area

CHAPTER 5. SYSTEM ARCHITECTURE.

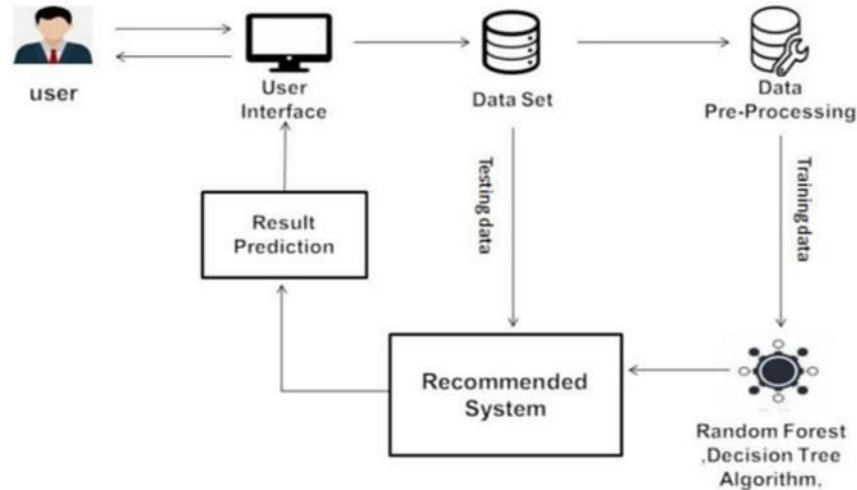


Fig 5.1: System Architecture

A crop recommendation system that will take in the different environmental attributes such as the nitrogen, phosphorous, potassium content in the soil, temperature, etc., and predict what is the best crop that the user can plant so that it survives in the given climatic conditions. The dataset which has been used in this article for the demonstration purpose can be viewed. Crop recommendation system that uses machine learning works by analyzing various data inputs to suggest the best crops for a specific area or field. Here's how it generally works:

1. Data Collection:

The system gathers relevant data, such as climate information, soil characteristics, historical crop yields, local weather patterns, and even satellite imagery.

2. Data Pre-processing:

The collected data is cleaned, transformed, and organized to be suitable for analysis. This involves handling missing values, standardizing units, and preparing the data for training.

3. Feature Extraction:

Relevant features, or characteristics, are selected from the data that can impact crop growth, such as temperature, rainfall, humidity, soil pH, nutrient levels, etc.

4. Model Selection:

A suitable machine learning model is chosen based on the nature of the problem. This could be a regression model, decision tree, random forest, neural network, or any other model that fits the data and can make predictions.

5. Training the Model:

The model is trained using historical data where the inputs are the selected features and the outputs are the corresponding crop yields or success rates. The model learns patterns and relationships from this data.

6. Validation and Testing:

The trained model is validated using separate sets of data that it hasn't seen before. This helps assess how well the model generalizes to new data.

7. Prediction and Recommendation:

Once the model is trained and validated, it's ready to make predictions. When given input data about a specific area or field, the model generates recommendations for suitable crops based on its learned patterns.

8. Feedback Loop:

The system can continually improve by incorporating new data from actual crop outcomes. This feedback loop helps the model adapt and refine its recommendations overtime.

9. User Interaction:

Users, such as farmers, can interact with the system by providing information about their land and receiving personalized crop suggestions. The system might also display confidence levels for its recommendations.

10. Deployment:

The trained model can be deployed as part of a web or mobile application, allowing users to access recommendations easily.

Overall, the crop recommendation system uses machine learning to process complex relationships between various factors that affect crop growth. It helps farmers make informed decisions, optimize yields, and manage resources more efficiently.

CHAPTER 6. MODULES.

1. Admin Login:

This is the first activity, Admin needs to provide a correct contact number and a password, which user enters while registering, in order to login into the webpage. If information provided by the admin matches with the data in the database table, then user successfully login into the webpage else message of login failed is displayed and user need to re-enter correct information.

2. Metadata:

All the main data used in the data set are initialized with the number to use in the algorithm it is like initializing all the details. In this metadata, we are going to initialize all the crop names with the numbers. This data makes us use the data easily in the algorithm. Here the metadata of all the crops is given with a particular number. This number is not duplicated that is one number is given to one crop, the same number is not given to the other crop. This metadata consists of more than hundred crops that grown all over India.

3. Data Pre-processing:

Here the raw data in the crop data is cleaned and the metadata is appended to it by removing the things which are converted to the integer. So, the data is easy to train. Here all the data. In this pre-processing, we first load the metadata into this and then this metadata will be attached to the data and replace the converted data with metadata. Then this data will be moved further and remove the unwanted data in the list and it will divide the data into the train and the test data.

4. Crop Prediction Module:

The obtained result will be 23 helpful for the farmers to know the Yield of the crop so, he can go for the better crop which gives high yield and also say them the efficient use of agriculture field. This way we can help the farmers to grow the crop which gives them better yield.

5. Crop Recommendation Module:

In this module, we have proposed a model that addresses these issues. The novelty of the proposed system is to guide the farmers to maximize the crop yield as well as suggest the most profitable crop for the specific region.

6. NumPy:

NumPy is a Python library used for working with arrays. Oliphant. It is an open-source project and you can use it freely. NumPy stands for Numerical Python. Also use the different python libraries like Pandas, sklearn, matplotlib etc.

CHAPTER 7. SYSTEM REQUIREMENTS.

- **Hardware Requirements:**

1. CPU: A modern multi-core processor (Intel i5/i7, AMD Ryzen) is required.
2. Storage: A minimum of 512GB is advised.
3. RAM: A minimum of 8GB, 16GB is required.

- **Software Requirements:**

1. Operating system: Windows OS
2. Programming language: Python, HTML, CSS
3. Database: MySQL, PHP
4. Internet and browsing facilities.

REFERENCES.

- [1] Jiangshan M. Jehovah, Nikhil Gondaliya, Vinita Shah A Review on Data Mining Techniques for Fertilizer Recommendation 2018.
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- [3] S. Srija, R. Geetha Chanda, S .Lavanya, Dr. M. Kalpana Ph.D. AgroNutri Android Application, 2016.
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- [5] Geeks for Geeks (How it works) - Simply Explained. [Online]
System <https://www.geeksforgeeks.org/crop-recommendation-system-using-tensorflow/>

Date:

Place: Kolhapur

Mr. Nitish Shinde
(Project Guide & Co-ordinator)

Dr. Siddheshwar Patil
(H.O.D, CSE AI-ML)