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CROP SELECTION AND YIELD PREDICTION USING ML TECHNIQUES

Under the guidance of

Dr.K.SUBHASH BHAGAVAN *M.Tech,PhD*

ASSOCIATE PROFESSOR

Presented By:

A.C.S.KEERTHI (19K61A1205)
B.J.N.CHAND (19K61A1207)
M.NIKITHA DEVI (19K61A1231)
K.SAI CHANDRA (19K61A1227)

Batch No:1923ITP005

CONTENTS

Contribution of the candidate

Project Associate (PA)	Problem Formulation	Design	Implementation	Testing	Deployment	Project Report Writing
PA1 19K61A1205	Yes	Yes	Yes	Yes	Yes	Yes
PA2 19K61A1207	Yes	Yes	Yes	Yes	Yes	Yes
PA3 19K61A1231	Yes	Yes	Yes	Yes	Yes	Yes
PA2 19K61A1227	Yes	Yes	Yes	Yes	Yes	Yes

ABSTRACT

Compared to other sectors, the agriculture sector's growth is two to four times more successful at boosting the lowest-income people's incomes. But today, growth that is based on agriculture is under trouble. Crop yields may be even more reduced by accelerating climate change and picking the wrong crop, particularly in areas with the greatest food insecurity, as well as most of the farmers expect their crop with high yield without knowing the land fertility this leads to increase in suicide rate of the farmers. The goal of this Project is to create a system for advising on the optimal crop by taking attributes like humidity, Rainfall and soil parameters into consideration and also forecasts agricultural yield by taking land area into account. These functions will be carried out using the best machine learning approaches, which will be chosen after comparing the outcomes of all ML techniques.

INTRODUCTION

One of the major occupations in the country is cultivation. Small farms are typical of India. Less than 5 acres make up more than 75% of the nation's total land area. Only around 45.6% of the land is irrigated, hence the majority of crops are rain-fed. India's land is cultivated on 60.46% of the country's territory. To suggest an appropriate crop to the user, environmental factors like rainfall, temperature, and geographic location in terms of the state are taken into account along with soil characteristics like soil type, pH value, and nutrient concentration.Crop production mostly depends on climate factors, soil quality, landscapes, pest infestations, availability of water, genotype, and planning of harvest activities, among other factors.

PROBLEM STATEMENT

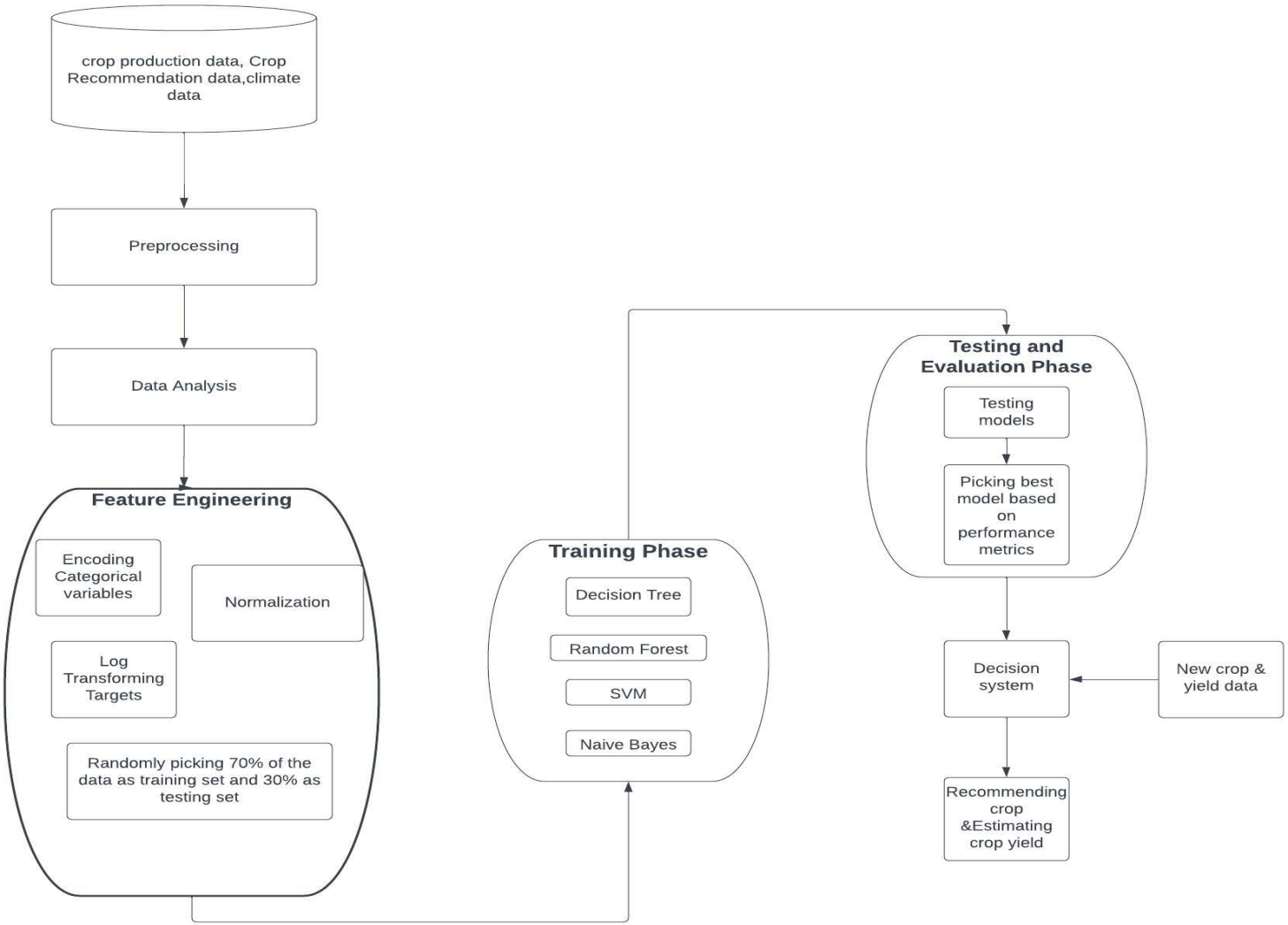
Agriculture is one of the major source of livelihood. Many farmers were failed to choose right crop based on soil conditions, sowing season, location and farmers compare their hectare of land yield with the international standards which results in farmer suicides and diversion of land for non agricultural purpose .To overcome this issue a machine learning based approach is introduced. Machine learning is techniques are crop recommendation and yield prediction is implemented in agriculture. By looking at the past few years, there have been significant developments in how machine learning can be used in various industries. Data Analytics techniques are used for data preprocessing before applying machine learning algorithms.

METHODOLOGY -

The model is predicted by taking raw data into consideration. This raw data is in csv file format containing different datasets which undergoes pre-processing after data analysis. pre-processing is done for data cleaning which removes inconsistent data, adjusting null values, duplicate values, noisy data by different approaches. Feature extraction and selection is done by selecting the major impacted attributes taken from the data set. This can be done by correlation between features or by statistical tests or by recursive feature elimination or by variance threshold. Then next step is algorithm selection. Data preparation is dividing the data into training and testing. This testing data validates the model and predicts the results. There are different techniques and approaches followed to perform This approach can give the results and predicts the results of crop recommendation of various crops for different regions and also can predicts the crop yield.

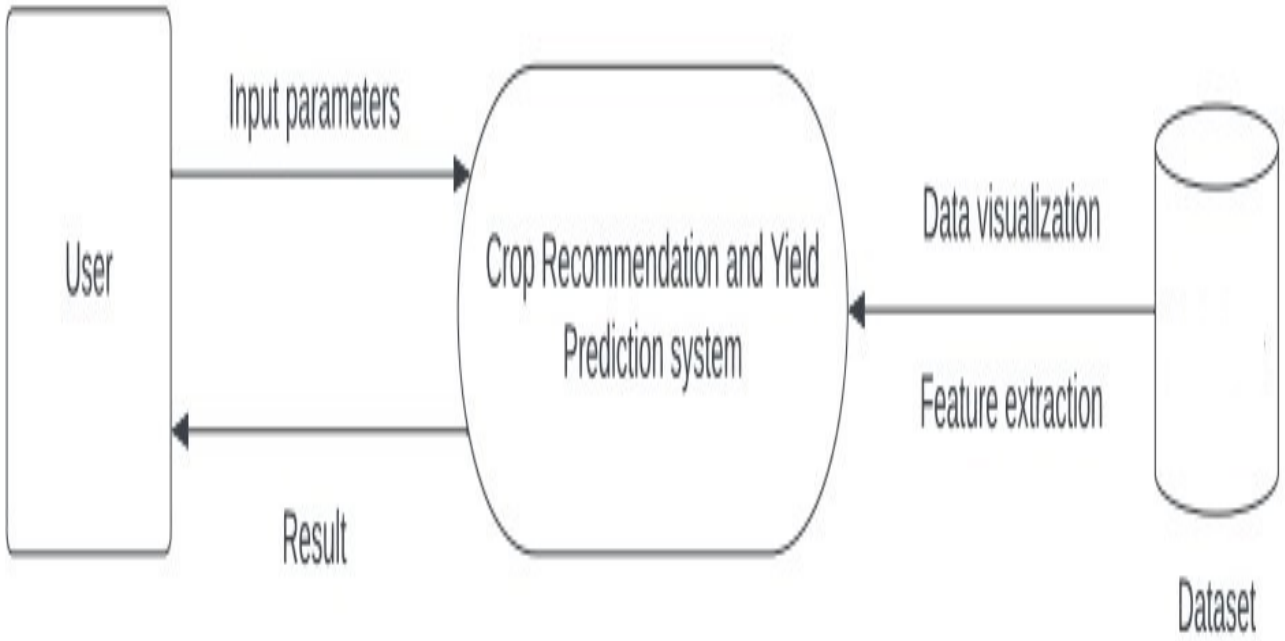
Architecture

ARCHITECTURE



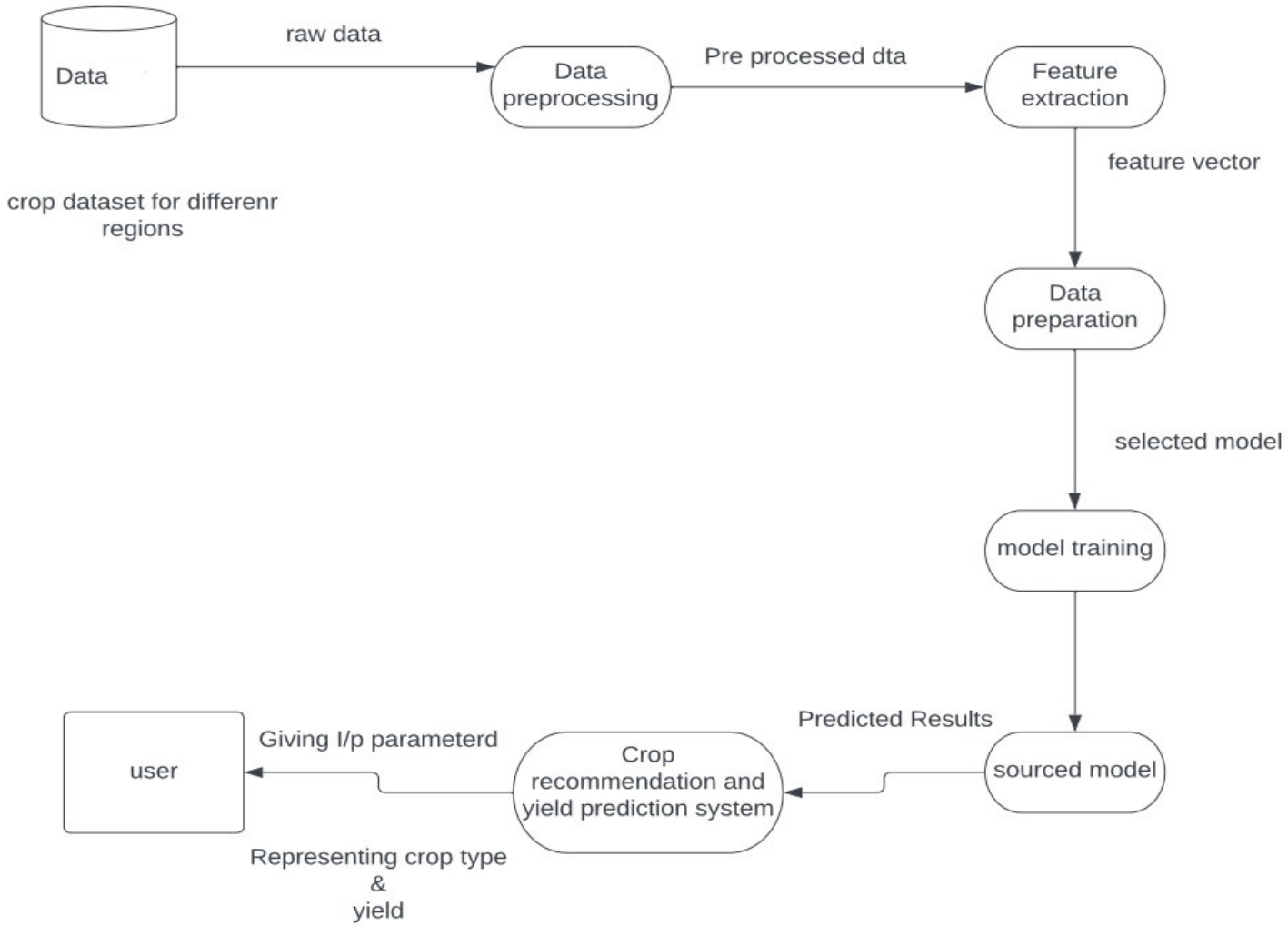
Architecture

DFD Level - 0



Architecture

DFD Level - 1



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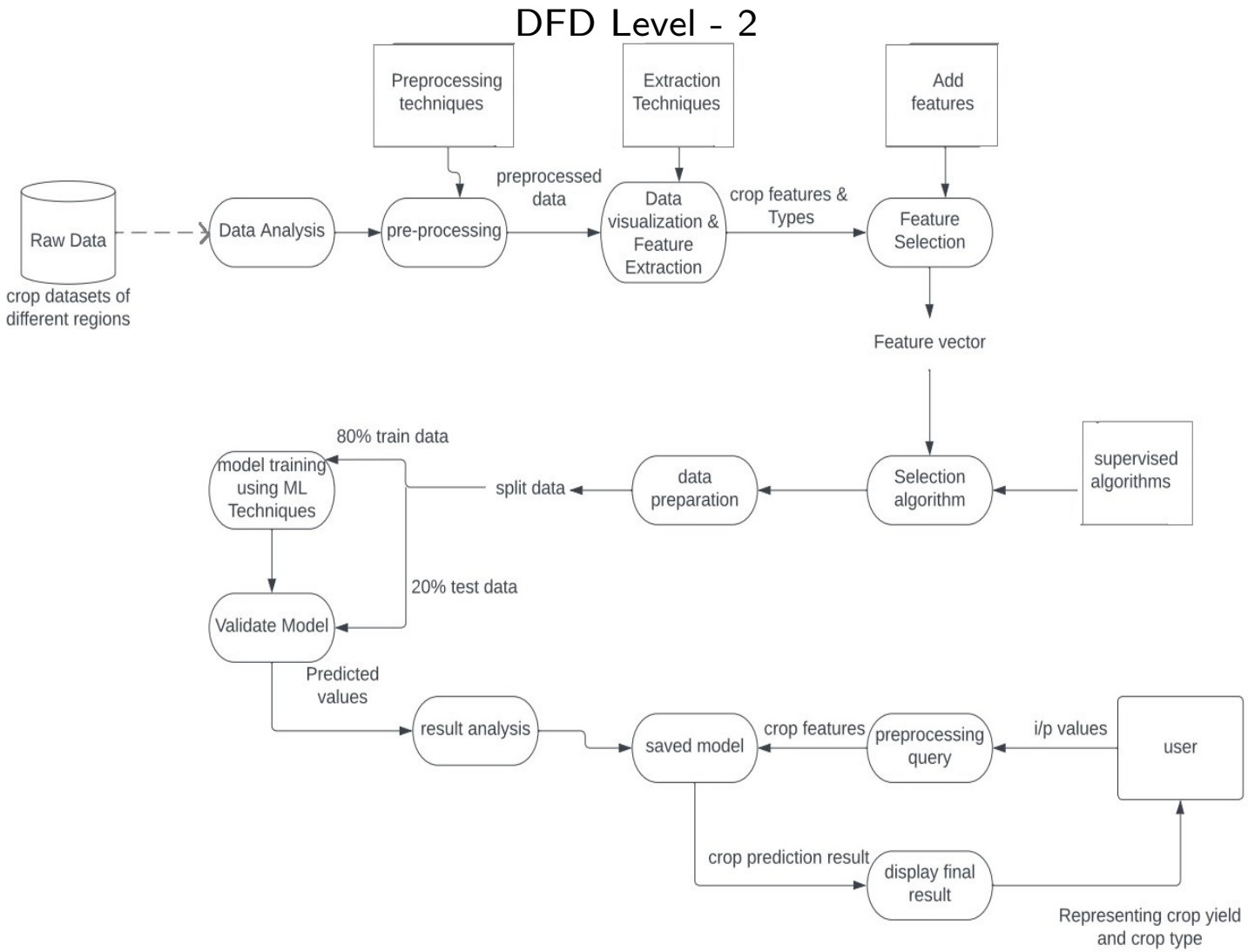


GANTT CHART

Duration in weeks ->	2	4	6	8	10	12	14	16
Problem Formulation								
Design								
Implementation								
Testing								
Deployment(a-model)								
Project Report Writing								

Literature Survey

	Paper-1
Title of the paper	Intelligent Crop Recommendation System using ML
Author & year	Priyadharshini A; Swapneel Chakraborty; Aayush Kumar; Omen Rajendra Pooniwala.(2021)
Overview of Abstract	Our system will suggest the best suitable crop for particular land based on weather parameters. It may increase in profit and avoid soil pollution.
Methodology	Load the dataset ->Pre-process the data ->Train data ->Test data -> Deploy the model and test its performance.
Algorithm	Linear Regression, neural network
Objective	To predict the best crop for the factors based on the dataset
Result	In this paper analysis ,They got the profit data for each crop grown in all the states.This provides a clear insight on which crop to be selected. This approach has an highest accuracy of 89.88%.

Literature Survey

	Paper-2
Title of the paper	Agriculture Crop Yield Prediction Using Machine Learning
Author & Year	Firdous Hina , Dr. Mohd. Tahseenul Hasan (2022).
Overview of Abstract	To Implement In this suggested system, a vast dataset that included all of India's states, whereas in the old system, just a single state was considered.
Methodology	Input data ->pre-processing->Train dataset ->feature Extraction ->Prediction Classification and Testing data ->yield Prediction.
Algorithm	K-Nearest Neighbor , Naive Bayes , Decision Trees/Random Forest , Support Vector Machine , Logistic Regression
Objective	Objective is to use a Decision Tree Classifier to propose crops to farmers. These suggestions may be extracted and used to educate the farmers.
Result	This model found with an average accuracy of 95%.

Literature Survey

	Paper - 3
Title of the paper	Soil Analysis for suitable crop prediction using machine learning and image processing.
Author & Year	vishal kumar, Raushan Kumar, Shubham Kumar, Ajinkya(2021).
Overview of Abstract	A proper soil test will help ensore the application of fertilizer to meet enough requirement of crop. They took soil type & crop for the experiment final application is a browser where we load image of soil and Predicts crop.
Methodology	Image dateset, preprocessing, Feature extraction, classification comparison, Diagnosis , Browser, feature extraction, preprocessing, input image.
Algorithm	Convolutional neutral network
Objective	To estimate moisture Content in soil.To make automation machine. To predict perfect crop including previously present nutrients in the soil.
Result	In this research this model got 92% accuracy.

HARDWARE/SOFTWARE REQUIREMENTS

HARDWARE REQUIREMENTS

Processor : i3
Hard Disk :1TB Memory
RAM: 16GB
OS: At least Windows 10System
Type: 64-bit Operating System
Input devices: Keyboard, Mouse

SOFTWARE REQUIREMENTS

Coding Language: Python
IDE: Jupyter Notebook

Proposed Methodology

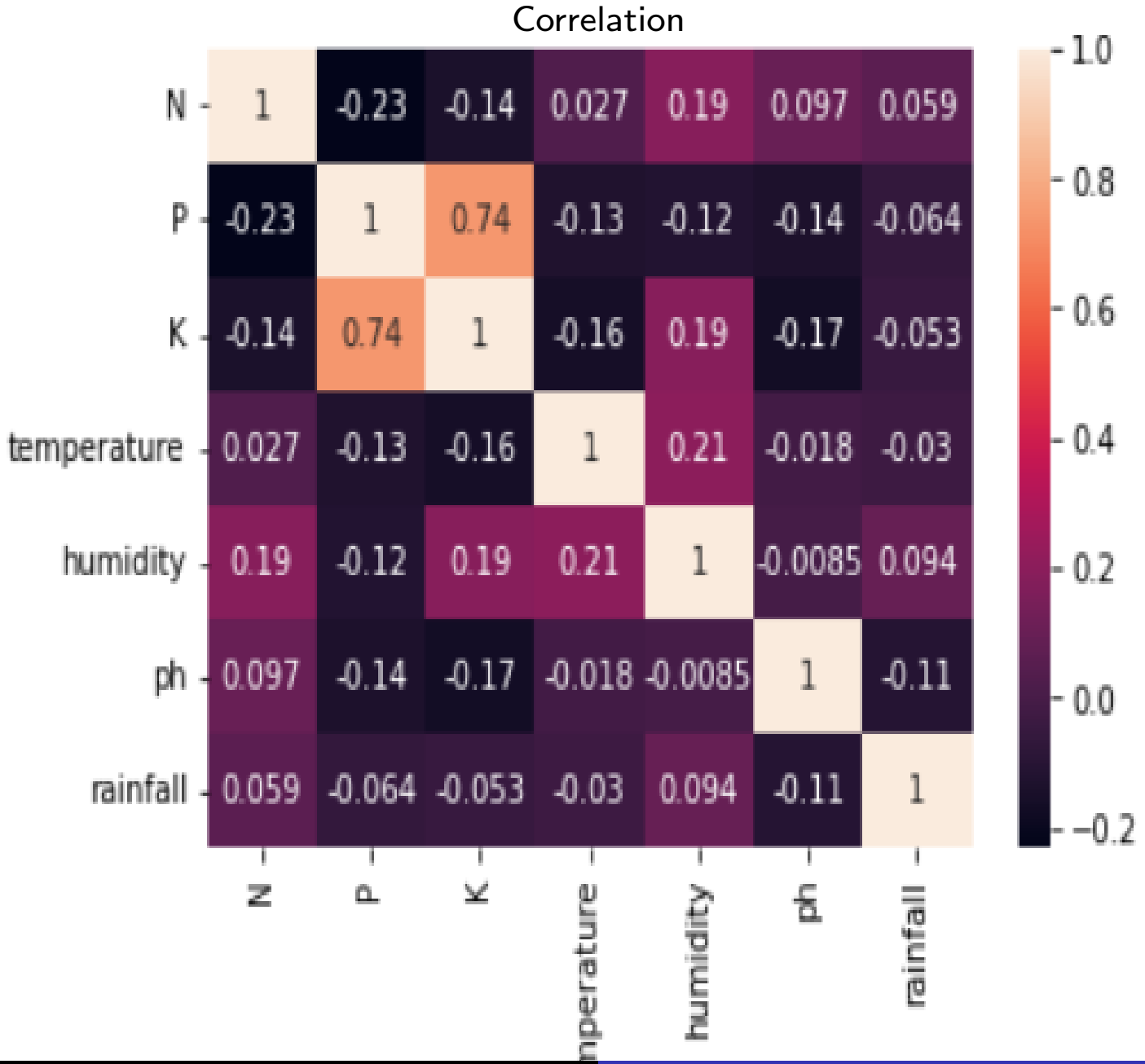
- Exploratory Data Analysis
  - Uploading Dataset
  - Data Analysis
  - Data Visualisation
- Data pre-processing
- Feature Extraction
- Feature Selection
- Model Training
- Evaluating the model

RESULTS

Table: Accuracy comparision

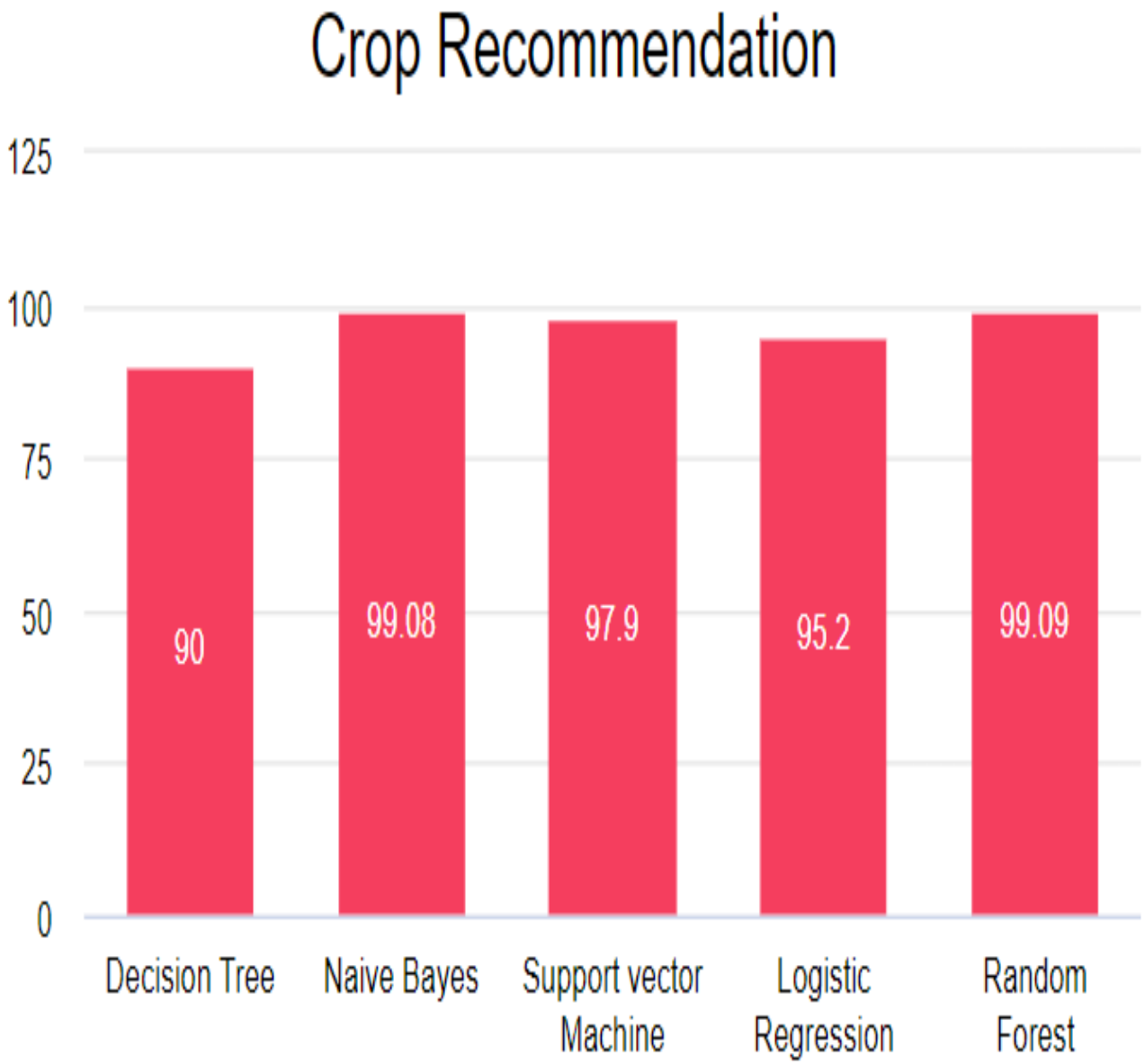
Algorithm	**Precision**	**Recall**	**Accuracy**
Decision Tree	84.29	88.16	90
Naive Bayes	99	99	99.07
SVM	98.11	97.95	97.9
Logistic Regression	95.40	95.86	95.22
Random forest	99.29	98.9	99.09

EXPERIMENT RESULTS



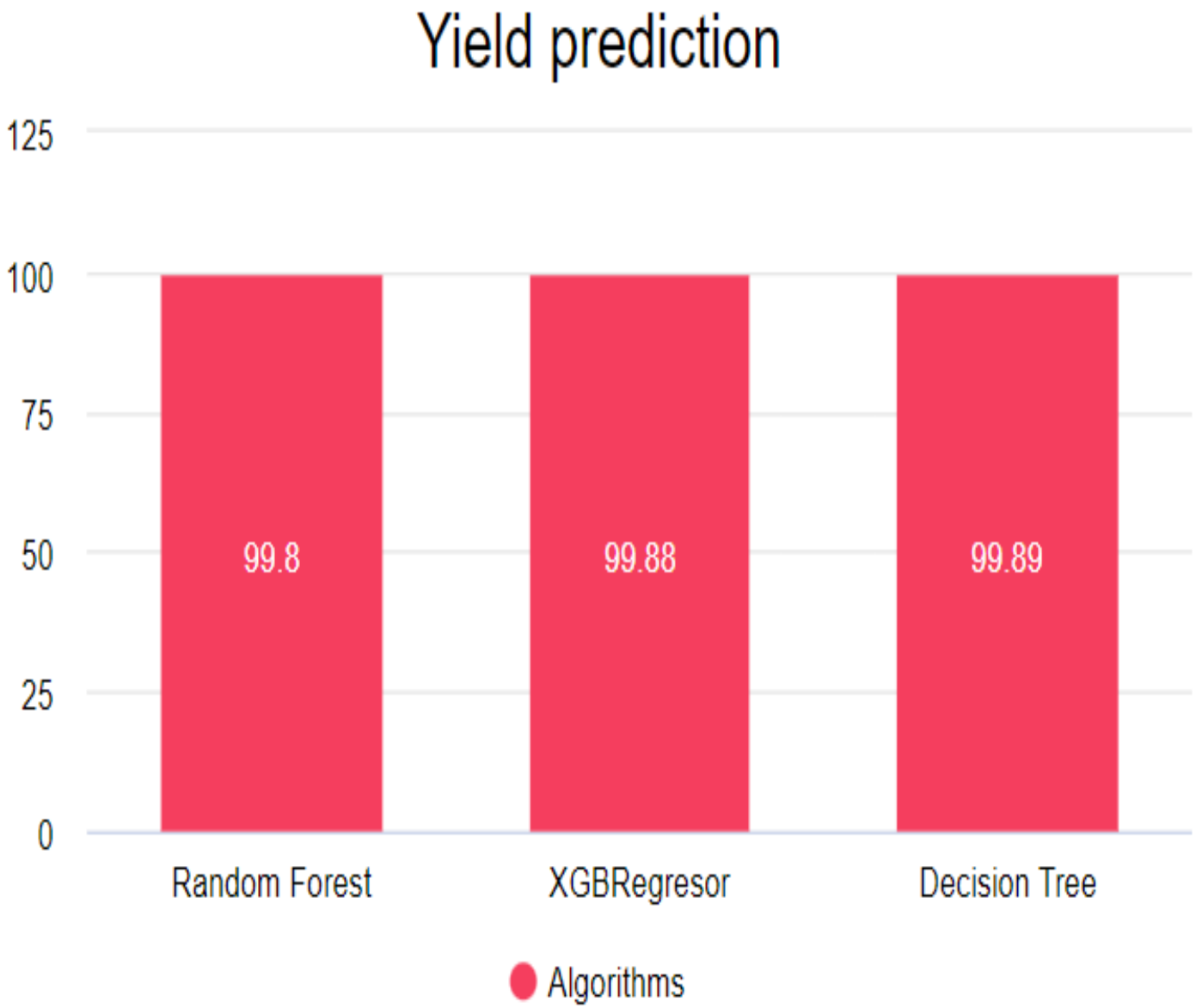
EXPERIMENT RESULTS

ACCURACY FOR RECOMMENDATION



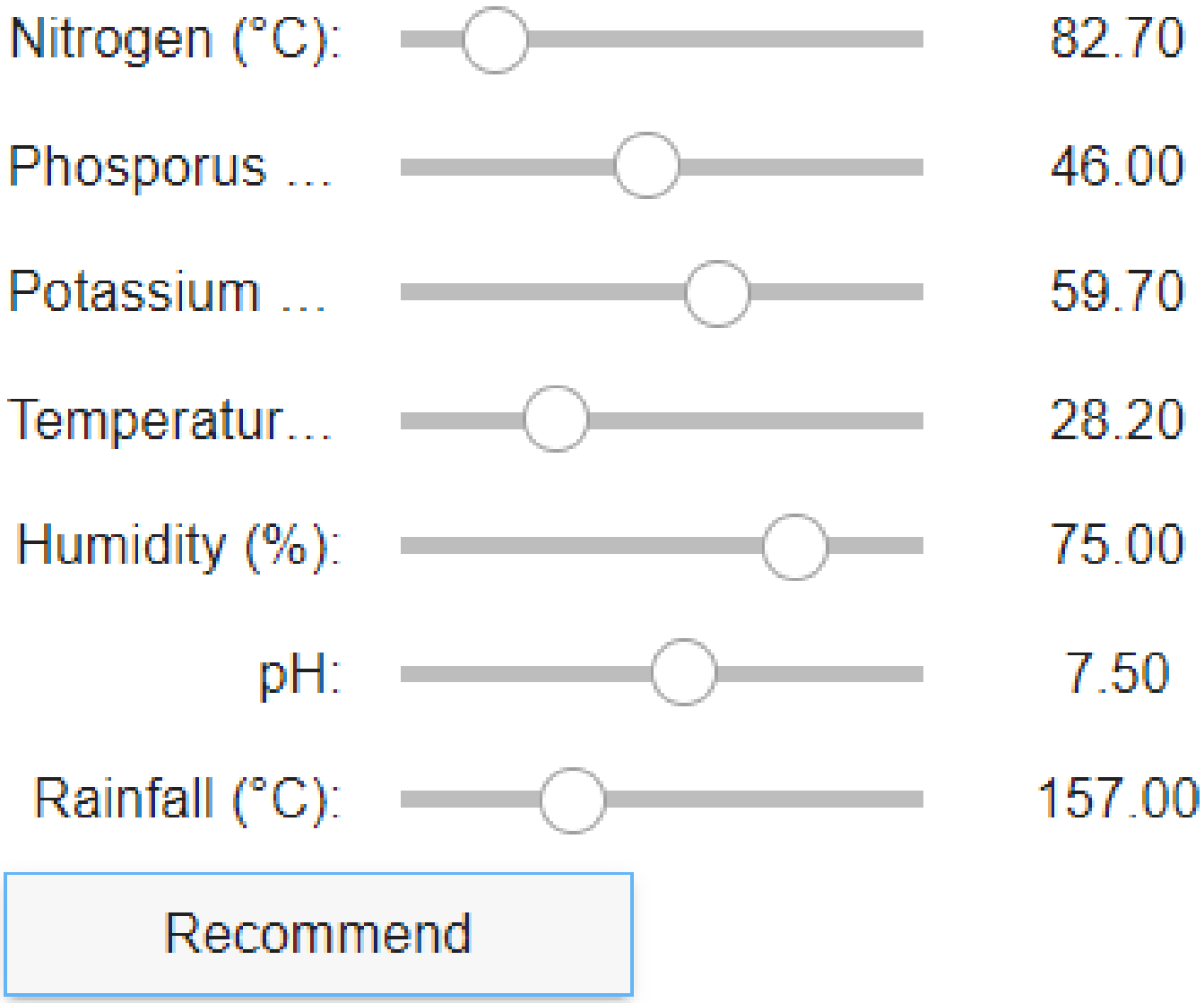
EXPERIMENT RESULTS

ACCURACY FOR SELECTION



EXPERIMENT RESULTS

RECOMMENDATION



EXPERIMENT RESULTS

YIELD TEST OUTPUT

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test[:10]
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	State_Name	District_Name	Crop_Year	Season	Crop	Area
46	Andaman and Nicobar Islands	NICOBARS	2005	Whole Year	Arecanut	795.67
51	Andaman and Nicobar Islands	NICOBARS	2005	Whole Year	Dry chillies	17.00
623	Andhra Pradesh	ANANTAPUR	2007	Kharif	Moong(Green Gram)	1000.00
630	Andhra Pradesh	ANANTAPUR	2007	Rabi	Horse-gram	1000.00
698	Andhra Pradesh	ANANTAPUR	2009	Rabi	Rapeseed &Mustard	8.00
723	Andhra Pradesh	ANANTAPUR	2010	Kharif	Other Kharif pulses	1.00
1153	Andhra Pradesh	CHITTOOR	2001	Rabi	Wheat	4.00
1317	Andhra Pradesh	CHITTOOR	2004	Rabi	Wheat	2.00
1419	Andhra Pradesh	CHITTOOR	2007	Kharif	Moong(Green Gram)	1000.00
1423	Andhra Pradesh	CHITTOOR	2007	Kharif	Small millets	1000.00

Comparision with Existing System

Traditional methods involve relying on the experience and knowledge of farmers to choose crops and predict yields.Where as statistical method are more accurate than traditional methods but require large amounts of data and may not account for all variables that affect yield.Machine learning involves using algorithms to analyze data and make predictions. Previously Crop rcommendation is done using algorithms Decision tree,KNN,Random Forest,Neural Networks, Naive Bayes, SVM. and yield prediction using ML is done by algorithms Gradient boost and Decision Tree.In our project Crop recommendation is done by Random forest and yield prediction by Decision Tree.

CONCLUSION

Implemented a system that recommend and predict crop production from the collection of past data.The more increase in accuracy results in more profit to the crop yield.

This system ML technique helps farmers to acquire apprehension in the requirement of different crops. It helps farmers in decision making of which crop to cultivate in the field.

Under this system, maximum types of crops will be covered. The accurate prediction of different specified crops across different districts will help farmers of India.

Scope of Future Work

Consideration any one of features like wind, Velocity, soil texture, soil salinity, NDVI, EVI would increase the level of accuracy while predicting the yield and crop recommendation which gives profit to farmer.

By incorporating price data into the crop selection process, farmers could choose crops that are likely to yield a higher return on investment.For fertilizer prediction, soil data, weather data, and crop growth data could be analyzed to determine optimal fertilizer recommendations.

For price prediction, market data and historical price trends could be used to project future prices for different crops.Ultimately, adding fertilizer prediction and price prediction to the crop selection and yield prediction project could provide farmers with more accurate information and improve profitability.

REFERENCES

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- https://www.google.com/url?sa=tsource=webrct=jurl=https://m.x
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ANY QUERIES???

THANK YOU...