

**Sathyabama Institute of Science and Technology
(Deemed to be University)**

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in

Computer Science and Engineering

By

CHUKKA GOPI SRINIVAS

(Reg no :-38110113)



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF COMPUTING**

**SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600119**

MARCH 2022



SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

(Established under Section 3 of UGC Act,1956)
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work **CHUKKA GOPI SRINIVAS (Reg.No.38110113)** and who carried out the project entitled “**CROP RECOMMENDER SYSTEM**” Under our supervision from DEC2021 to MAY2022.

Internal Guide

Dr. G NAGARAJAN

Head of the Department

Dr. S. VIGNESHWARI., M.E., Ph.D.,

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

CHUKKA GOPI SRINIVAS (Reg no:-38110113)hereby declare that the Project Reportentitled **“CROP RECOMMENDER SYSTEM ”** done by me under the guidance of **Dr.G NAGARJAN.** and a **INTERNSALA** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering.

DATE:

PLACE:Chennai

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr.T.Sasikala.,M.E.,Ph.D.**, Dean, School of Computing , **Dr.S.Vigneshwari.,M.E.,Ph.D.**, and **Dr.L.Lakshmanan M.E., Ph.D.**, Heads of the Department of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.G NAGARAJAN** for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of **Computer Science and Engineering** who were helpful in many ways for the completion of the project.

CERTIFICATE



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
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National Conference on Computational Intelligence and Communication Networks



NCCICN
24TH – 25TH MARCH 2022



Certificate of Presentation

This is to certify that Dr./Mr./Ms. CHUKKA GOPI SRINIVAS, of Sathyabama Institute of Science and Technology, has presented a paper entitled "Crop Recommender System Using Machine Learning Algorithms", in the National Conference on Computational Intelligence and Communication Networks (NCCICN 2022).

Dr. T. Sasikala

Conference Chair, Professor & Dean

School of Computing

Dr. L. Lakshmanan

Convener

Professor & Head, CSE

Dr. S. Vigneshwari

Convener

Professor & Head, CSE

Presentation Outline

- **Introduction**
- **Literature survey**
- **Abstract**
- **Existing System**
- **Proposed System**
- **System Architecture**
- **System Requirements**
- **Modules**
- **Data Flow Diagrams**
- **Conclusion**
- **References**

INTRODUCTION

- Agriculture has an extensive history in India. Recently, India is ranked second in the farm output worldwide. Agriculture-related industries such as forestry and fisheries contributed for 16.6% of 2009 GDP and around 50% of the total workforce
- Agriculture's monetary contribution to India's GDP is decreasing. The crop yield is the significant factor contributing in agricultural monetary. The crop yield depends on multiple factors such as climatic, geographic, organic, and financial elements.
- It is difficult for farmers to decide when and which crops to plant because of fluctuating market prices. Citing to Wikipedia figures India's suicide rate ranges from 1.4-1.8% per 100,000 populations, over the last 10 years
- Farmers are unaware of which crop to grow, and what is the right time and place to start due to uncertainty in climatic conditions. The usage of various fertilizers is also uncertain due to changes in seasonal climatic conditions and basic assets such as soil, water, and air.
- The crop yield prediction is a significant problem in the agriculture sector. Every farmer tries to know crop yield and whether it meets their expectations, thereby evaluating the previous experience of the farmer on the specific crop predict the yield.
- Agriculture yields rely primarily on weather conditions, pests, and preparation of harvesting operations. Accurate information on crop history is critical for making decisions on agriculture risk management. In this paper, 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
- The proposed model provides crop selection based on economic and environmental conditions, and benefit to maximize the crop yield that will subsequently help to meet the increasing demand for the country's food supplies. The proposed model predicts the crop yield by studying factors such as rainfall, temperature, area, season, soil type etc.

LITERATURE REVIEW

S.NO	TITLE	AUTHOR	TECHNIQUE	RESULTS	LIMITATIONS
3	THE ADDITIONAL VALUE OF HYPERSPETRAL DATA FOR SMART FARMING	Silke Migdall1, Philipp Klug1 , Antoine Denis2 , Heike Bach1	We are using ANN algorithm.	Hence, currently available sensors can be used to define possible use-cases and develop methods to derive the relevant information from the data, but cannot be offered as an actual service to farmers.	Contamination of crops by pathogenic microorganism. Increase in soil salinity
4	Agricultural Production System based on IoT	Meonghun Lee1, Jeonghwan Hwang2 , and Hyun Yoe3	Highly refined statistical techniques in agriculture are now being used to extract information from past data and to project prediction values of economic variables.	The last process presented some of the experimental results that we have obtained using visualization SW on agricultural data.	In addition, because of the "reliability" is a limitation on "reliability" and "suitability of agricultural strategy" is one of indispensable requisites to be satisfied by the information.
5	Smart Agriculture Monitoring and Data Acquisition System	Dharti Vyas1, Amol Borole2, Shikha Singh3	The control or authority layer uses the output of transmission layer as input and that data summarized as input parameters, and using automatic control algorithm it controls task of agriculture production.	These monitoring data can be observed on webpage or android device. The setup of smart agriculture field monitoring system based on Tiny OS and test implementation using comparison of real time and historical data	Compared to zigbee, Wi-Fi, Bluetooth has more limitations

ABSTRACT

- Agriculture and its allied sectors are undoubtedly the largest providers of livelihoods in rural India. The agriculture sector is also a significant contributor factor to the country's Gross Domestic Product (GDP). Blessing to the country is the overwhelming size of the agricultural sector. However, regrettable is the yield per hectare of crops in comparison to international standards. This is one of the possible causes for a higher suicide rate among marginal farmers in India. This paper proposes a viable and user-friendly yield prediction system for the farmers. The proposed system provides connectivity to farmers via a mobile application. The user provides the area & soil type as input. Machine learning algorithms allow choosing the most profitable crop list or predicting the crop yield for a user-selected crop. To predict the crop yield, selected Machine Learning algorithms such as Support Vector Machine (SVM), and K-Nearest Neighbour (KNN) are used. Among them, the Random Forest showed the best results with 95% accuracy. Additionally, the system also suggests the best time to use the fertilizers to boost up the yield.

EXISTING SYSTEM

Extensive work has been done, and many ML algorithms have been applied in the agriculture sector. The biggest challenge in agriculture is to increase farm production and offer it to the end-user with the best possible price and quality. It is also observed that at least 50% of the farm produce gets wasted, and it never reaches the end-user. The proposed model suggests the methods for minimizing farm produce wastage. One of the recent works, S. Pavani et.al. presented a model where the crop yield is predicted using KNN algorithms by making the clusters. It has been shown that KNN clustering proved much better than SVM or regression. Nishant et. al. predicted the crop yield for the specific year with the help of advanced regression techniques like Enet, Lasso and Kernel Ridge algorithms. The Stacking regression helped to enhance the accuracy of the algorithms.

DISADVANTAGES OF EXISTING SYSTEM

- The main challenge faced in agriculture sector is the lack of knowledge about the changing variations in climate. Each crop has its own suitable climatic features. This can be handled with the help of precise farming techniques. The precision farming not only maintains the productivity of crops but also increases the yield rate of production.
- The existing system which recommends crop yield is either hardware-based being costly to maintain, or not easily accessible.
- Despite many solutions that have been recently proposed, there are still open challenges in creating a user-friendly application with respect to crop recommendation.

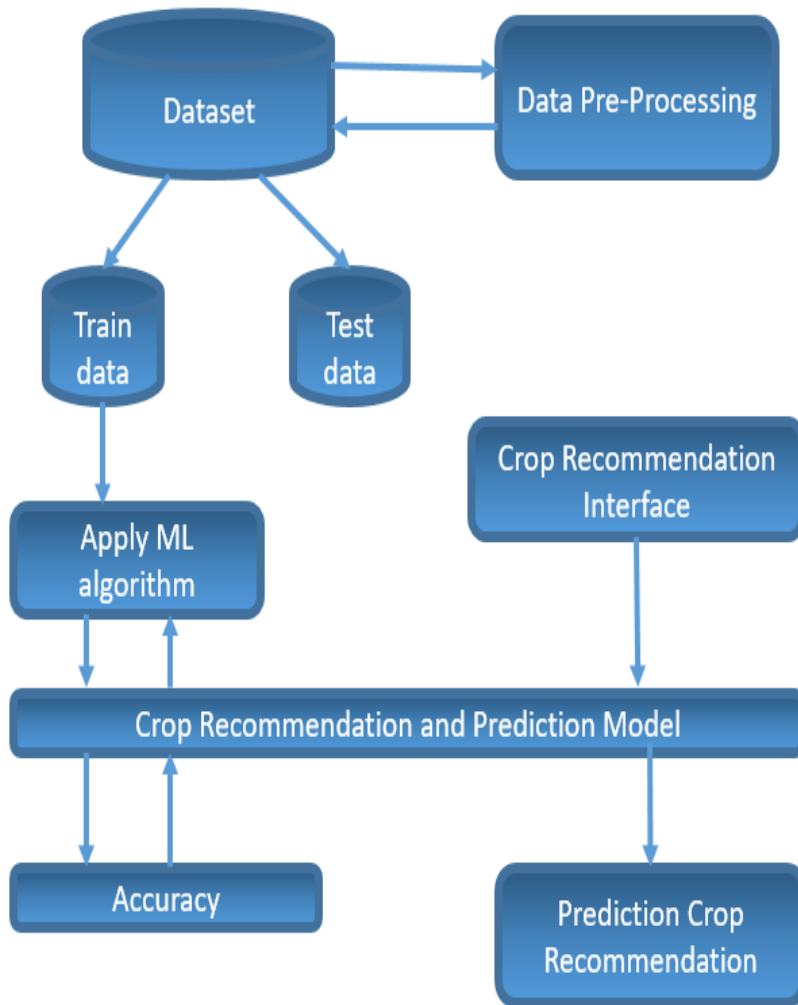
PROPOSED SYSTEM

- In this project, we have proposed a model that addresses the existing 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.
- The proposed model provides crop selection based on economic and environmental conditions, and benefit to maximize the crop yield that will subsequently help to meet the increasing demand for the country's food supplies. The proposed model predicts the crop yield by studying factors such as rainfall, temperature, area, season, soil type etc. The system also helps to determine the best time to use fertilizers.
- The user provides an area under cultivation and soil type as inputs. According to the requirement, the model predicts the crop yield for a specific crop. The model also recommends the most profitable crop and suggests the right time to use the fertilizers.
- 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

ADVANTAGES OF PROPOSED SYSTEM

- The proposed model predicts the crop yield for the data sets of the given region. Integrating agriculture and ML will contribute to more enhancements in the agriculture sector by increasing the yields and optimizing the resources involved. The data from previous years are the key elements in forecasting current performance.
- The proposed system uses recommender system to suggest the right time for using fertilizers.
- The methods in the proposed system includes increasing the yield of crops, real-time analysis of crops, selecting efficient parameters, making smarter decisions and getting better yield.

SYSTEM ARCHITECTURE



SYSTEM REQUIREMENTS

➤ **HARDWARE REQUIREMENTS**

- Speed - 2.4GHZ
- Hard disk - 40GB
- Monitor - 15VGA color
- RAM - 512MB
- Operating System - Windows XP
- Coding language - Python

MODULES

- Admin Login
- Metadata
- Data Pre-processing
- Crop Prediction Module
- Crop Recommendation Module

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.

META DATA

- 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 a hundred crops that grown all over India.

DATA PREPROCESSING

- Hear the raw data in the crop data is cleaned and the metadata is appending to it by removing the things which are converted to the integer. So, the data is easy to train. Hear 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.

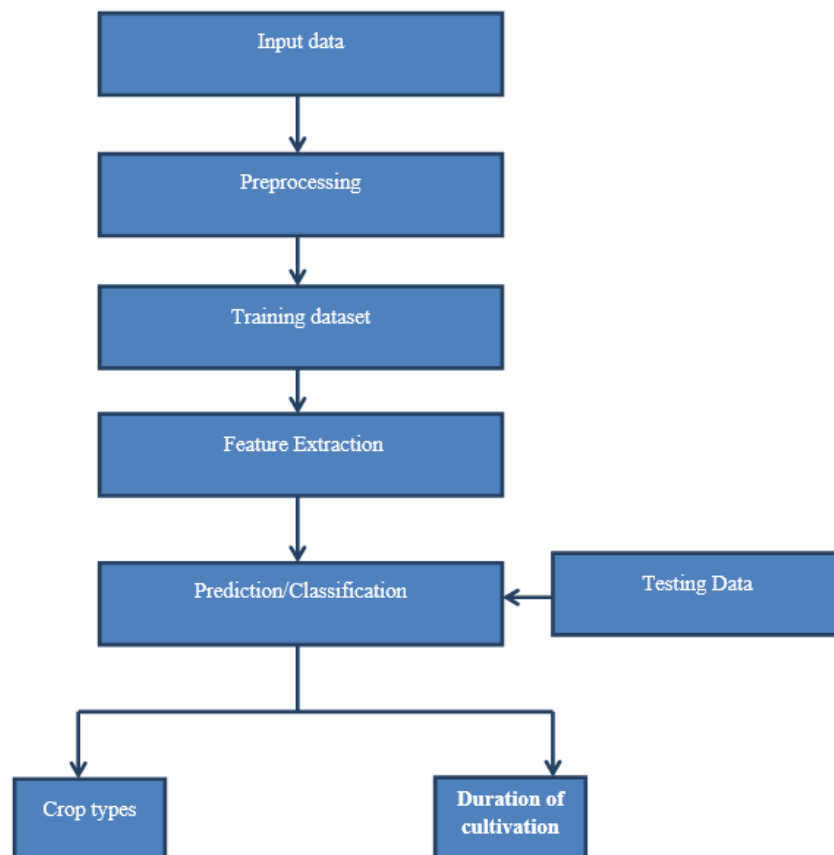
CROP PREDICTION

- The obtained result will be 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.

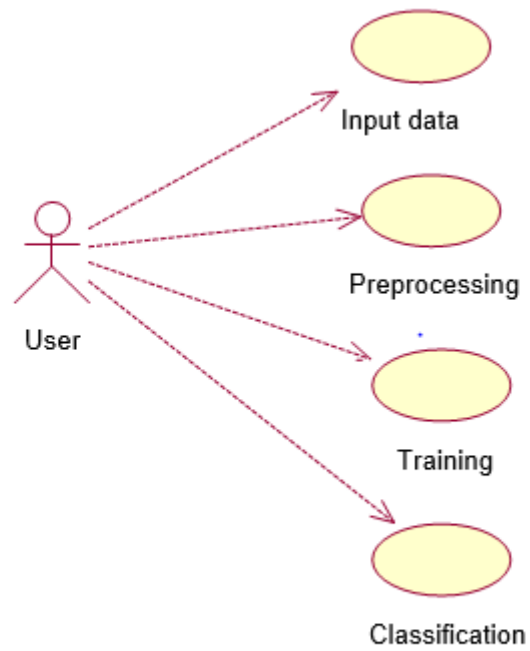
CROP RECOMMEDATION MODULE

- 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

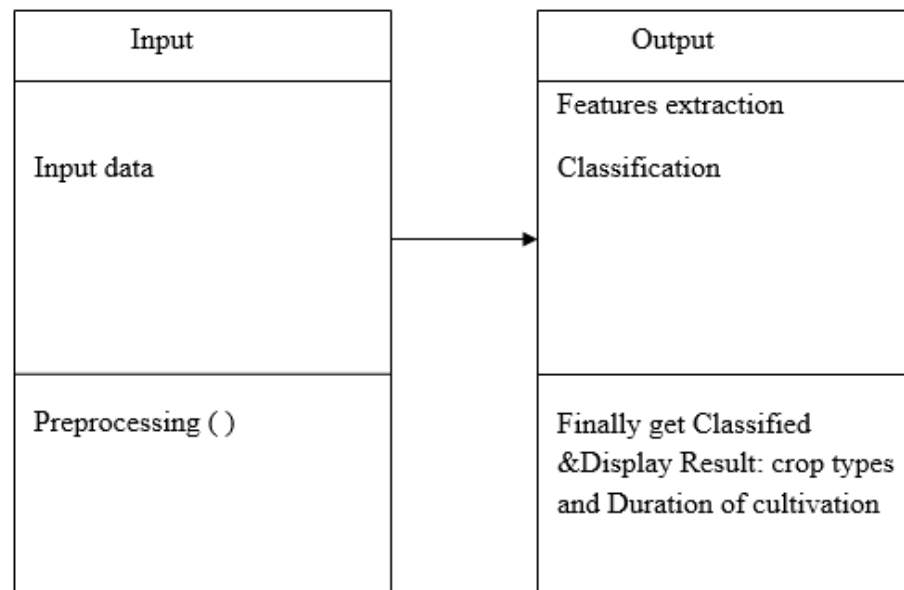
DATA FLOW DIAGRAM



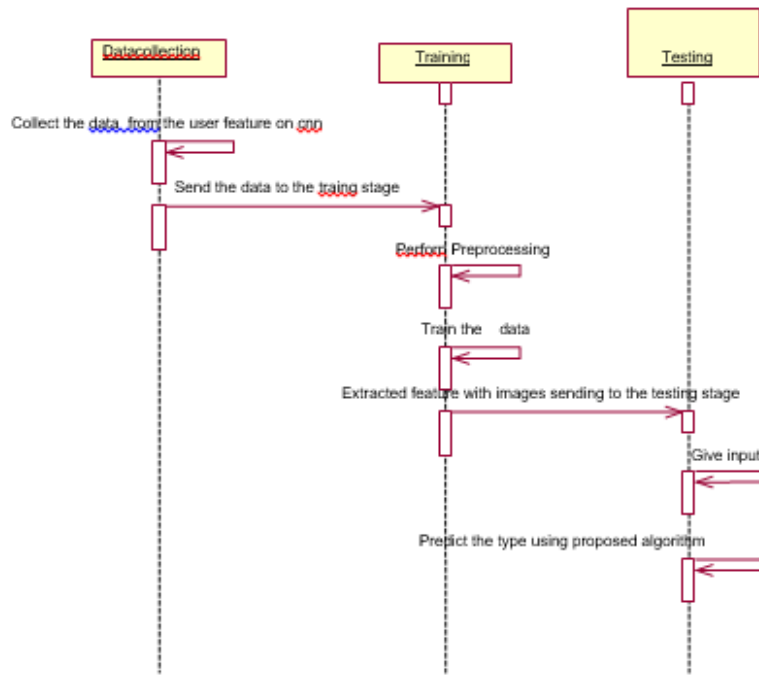
USE CASE DIAGRAM



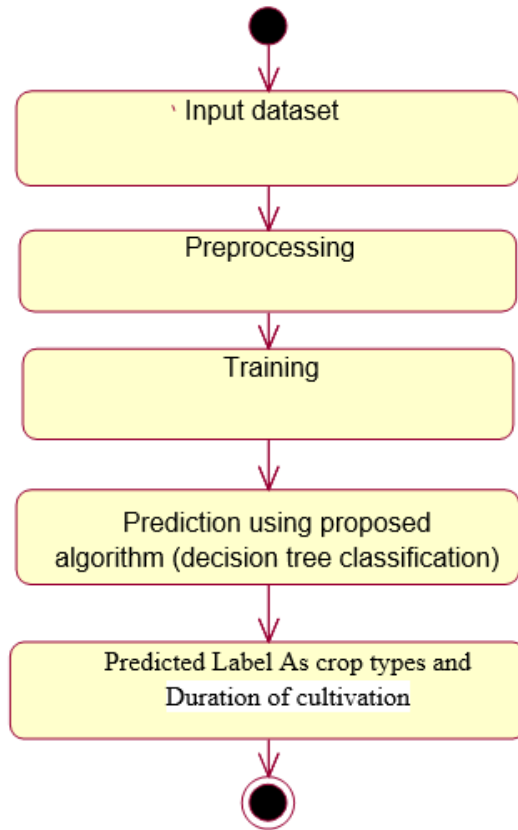
CLASS DIAGRAM



SEQUENCE DIAGRAM



ACTIVITY DIAGRAM



CONCLUSION

- In this paper, significance of management of crops was studied vastly. Farmers need assistance with recent technology to grow their crops. Proper prediction of crops can be informed to agriculturists in time basis. Many Machine Learning techniques have been used to analyze the agriculture parameters. Some of the techniques in different aspects of agriculture are studied by a literature study. Blooming Neural networks, Soft computing techniques plays significant part in providing recommendations. Considering the parameter like production and season, more personalized and relevant recommendations can be given to farmers which makes them to yield good volume of production.

