

TECHNIQUES

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To maximize farming operations, an all-inclusive smart agriculture system incorporates cutting-edge AI and machine learning approaches. Based on environmental factors, it forecasts the best crops, suggests fertilizers, uses deep learning picture analysis to identify pests, and uses an AI-powered chatbot to help farmers in real time. By giving farmers access to data-driven insights and individualized support, this system seeks to increase agricultural productivity, lower losses, and advance sustainable farming practices. Our country's foundation is agriculture, which fosters prosperity and promotes sustainable growth. Given the critical role that this primary sector plays, it is essential to provide creative answers to the numerous problems that our farmers face. The main goal of this study is to present a revolutionary Agriculture Helper Chatbot, a virtual helper ready to chat.

Keywords: - Farmers, Chat bot, FAQ Dataset, DL.

1. INTRODUCTION

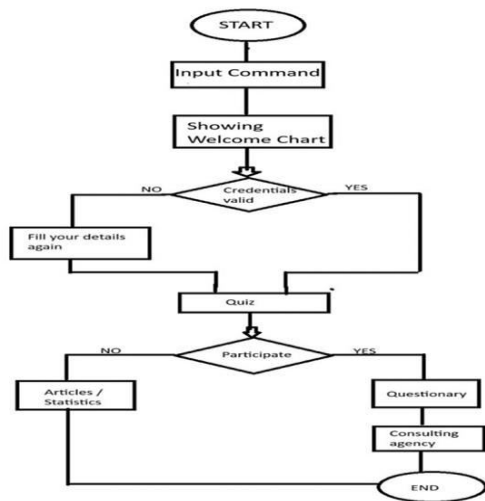
One of the main drivers of India's economic growth is agriculture. In general, farmers are accustomed to growing particular crop types, such as wheat, rice, mangos, muskmelon, etc., based on traditional practices like relying on agricultural fields. However, farmers may experience a low crop yield or even lose their entire crop production as a result of unfavorable weather circumstances. Only professionals with prior expertise may anticipate the crop type using the old method, but occasionally this prediction yields inaccurate results. Because machine learning techniques are producing positive outcomes in contemporary autonomous technologies, they will therefore increase the accuracy of crop prediction. Therefore, we would like to use machine learning categorization methods like KNN

2. LITERATURE SURVEY

This paper introduces a chatbot system for farmers that leverages deep learning models like RNN and

LSTM to interpret natural language queries. It supports multiple Indian languages and provides real-time guidance on crop care, fertilizers, and pest control. This study presents a voice-enabled chatbot integrating CNN for image-based plant disease diagnosis and NLP for language understanding. It is tailored for semi-literate farmers, offering advice through voice commands and responses. The authors propose a deep learning chatbot combining BERT and GRU to provide personalized farming recommendations. It analyzes user data and context to assist with irrigation planning, soil testing, and crop selection. This work focuses on rural usability, employing deep learning for understanding local dialects and context-aware responses. It supports multilingual interaction and adapts through reinforcement learning based on user feedback.

3. IMPLEMENTATION**System Architecture**



4. MODULES

1) Upload Dataset

This Module allows users to select and upload a crop dataset in CSV format. The uploaded data is stored for preprocessing and training.

2) View Dataset

Displays the contents of uploaded data in tabular format. It helps the user to verify data before training.

3) Model Evaluations

Trains multiple machine learning models using a dataset and evaluates their performance. Metric scores like accuracy, precision, and recall are shown in a comparison table

4) Performance Evaluations

Visualizes model performances using graphs (e.g., bar or line plots) based on the evaluation metrics for easier comparison

5) Prediction

Takes user input for crop features like temperature, humidity, rainfall, and PH value. Predicts the most suitable crop based on the trained model.

Proposed System

Integrated Platform: A virtual assistant chatbot that integrates necessary services into a single, user-friendly platform, including weather updates,

crop and soil guidance, market prices, pest management, and government programs. • Localized and Accessible: Farmers with different levels of digital literacy can utilize the chatbot because it will facilitate conversations in regional languages through natural language processing (NLP).

• Real-Time Assistance: Assures prompt decision-making and improved agricultural efficiency by giving farmers accurate, individualized, and instant information.

Algorithms Used

- 1) RFC 2) DTC 3) KNN 4) SVM 5) XGBOOST 6) NB 7) GNB) 8) VTC

Dataset

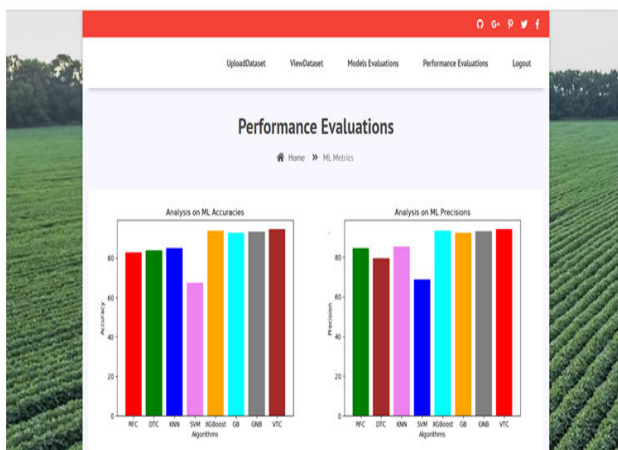
This Dataset we gathered from the Kaggle website, and this dataset has 31 crop labels. Here I showed some crops

97	22.68319	83.46358	6.604993	194.2652	rice
98	21.53346	82.14004	6.500343	295.9249	rice
99	21.40866	83.32932	5.935745	287.5767	rice
100	26.54348	84.67354	7.072656	183.6223	rice
101	23.35905	83.59512	5.333323	188.4137	rice
102	31.48468	50.66106	6.898284	78.67222	wheat
103	23.22282	59.31511	6.277127	108.6592	wheat
104	22.72115	59.08184	6.777816	96.15005	wheat
105	29.14459	52.03325	6.636012	83.12921	wheat
106	22.45073	59.95707	6.621853	102.5747	wheat

A	B
1 questions	answers
2 asking about the control measure for aphid infestation suggested him to spray rogor @2ml/lit.at evening time.	
3 asking about the control measure of flower drop prc suggested him to apply fertilizer in recommended dose like urea-600gm,ssp-1kg,mop-700gm,borax-25gm twice in a year(march/april and september/october/fil)	
4 asking about how to avail kisan credit card loan for s suggested to consult with officer-marketing and recovery (rural),sbi local branch for details.	
5 asking about source of early ahu rice variety suggested to take early ahu rice variety from atic,jorhat,assam campus through parcel or direct taking.	
6 asking that he has not got proper fruit from his cocon suggested him to apply recommended fertilizer dose-urea@1.5 kg,ssp@2.5kg,mop@1.75 kg,borax@25 gm./plant/year in trench method.	
7 asking about induced breeding of fishes given details about induced breeding of fishes.	
8 asking about training for preparation of biomaniure suggested to approach district agricultural officer or atic,jorhat,ph (0376)2310240	
9 asking about treatment of low production of milk in suggested to provide mineral mixture like rammix total, milkmin, gwala etc at recommended dose along with feed.also, suggested to feed high proteinous green	
10 asking about the premature fruit dropping of cocon.suggested to apply bordeaux mixture. apply borax @ 30 gm/plant per year along with urea & ssp.	
11 asking about preservatives of tomato squash suggested preservatives are 1. benzoic acid & 2. sulphar dioxide. these chemicals re used to preserve for several weeks.	
12 asking about a pre emergence weedicide for rice suggested herbicide- butachlor (machete) which is a pre-emergence weedicide.	
13 asking about the control measures for damping off i suggested to apply ditane m-45 @ 2-3ml/litre of water and also to check irrigation water supply in the field.	
14 asking about culture of dhuala along with carps suggested that he should go for the single species culture in one pond or he can culture some other species along with dhuala, but in the second case, size of other	
15 asking about the suitable varieties for transplanted suggested suitable early ahu varieties are as salet-4, ir-30, govind, ir-36, cauvery, krishna, jays, ir-6, lut, koptee.	
16 asking about the fym or compost requirement in bla suggested fym or compost requirement for blackgram crops as 6 quintal/dhita, this not only adds fertility but also improves soil structures.	
17 asking about availability of quail birds for commeri suggested to contact with central agricultural university, mizoram for availability of quail birds	
18 asking about the control measures to be taken on his suggested to apply 100 ppm agronomy or streptomycine twice in a week and also to avoid water stagnation in the field.	
19 asking about an n.g.o which is doing watershed proj suggested to contact deshbhandu club which is situated in each district	
20 asking about the how to take control measures of fis suggested to either spray planofth @ 1ml/4litre of water or apply borax @ 200 g/plant at the base of the tree by making ring.	
21 asking about with what chemical seed treatment of suggested that the seeds of maize should be treated with bavistin @ 2 g/ kg of seeds or captaf @ 2- 2.5 g./kg of seeds before or after sowing.	
22 asking about precautionary measure for preventing suggested to apply lime @ 1000 kg/ ha/c/yr. one third of the required dose is to be applied at the time of pond preparation & the remaining portion is to be apply	

5. EXPERIMENTAL RESULTS

Temperature	Humidity	pH	Rainfall	Class
20.87974371	82.00274423	6.50298529200001	202.9553362	rice
21.17094669	80.31964608	7.038096361	228.6553374	rice
21.00443915	82.3207629	7.840207144	263.96424759999996	rice
26.49329635	80.15836264	6.98040905	242.86403199999996	rice
20.13017482	81.66487287	7.628472891	262.7373405	rice
21.65094872	83.37011772	7.073453503	251.05499980000002	rice
22.70883790	82.63941394	5.70080568	271.3248804	rice
20.27743862	82.89408619	5.718627177999999	241.97419490000001	rice
24.51588066	83.5321629999999	6.683546424	230.4462359	rice



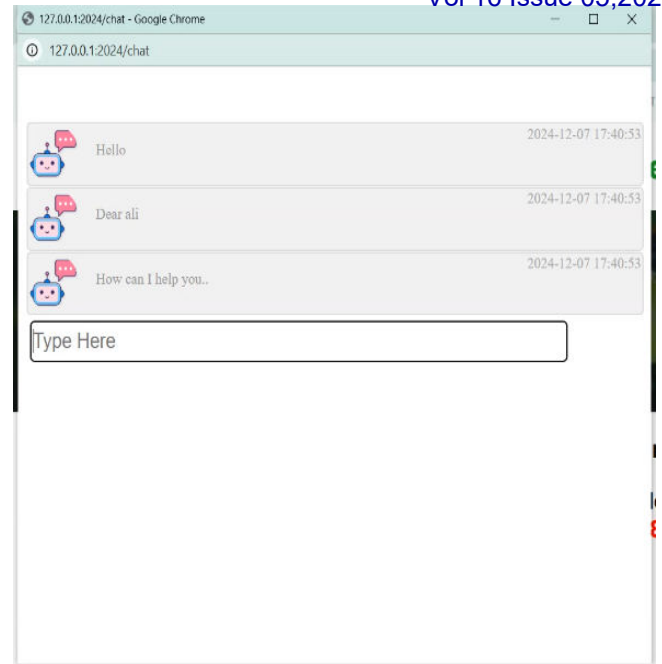
Crop Prediction

Temperature: 23.36

Humidity: 51.44

pH value: 6.29

Rainfall: 119.41



6. CONCLUSION

Several machine learning techniques, including K-NN, RF, DTC, GNB, SVM, GB, XGBoost, and voting classifier, are used in this research to predict crops. We computed the accuracy of each model as a percentage in comparison to other methods using the crop dataset. As a result, this method helps users, such as farmers, predict the type or name of crop that will be grown in different agricultural fields. We want to use a number of machine learning methods in the future to forecast crop yields. We are classifying the pests and suggesting pesticides using DL CNN, VGG-16, and VGG-19 on Pestopia: Indian Pests and Pesticides.

7. REFERENCES

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