International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 12 | December - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

AGRICULTURE GUIDER CHATBOT

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Abstract: Agriculture Guider Chatbot is a user-friendly digital tool designed to assist farmers. The users can easily interact with the Chatbot via text or voice commands, making it accessible to a diverse audience. The Chatbot leverages Artificial Intelligence and Natural Language Processing to provide real-time guidance and information. TheChatbotoffers valuable insights intoCrop cultivation, Livestock management, Pest control, Weather forecasting, and Market trends. It also helps users make informed decisions regarding Crop selection, Plantingschedules, and Harvesting techniques.It has useful info about the best farming methods, how to deal with crop issues and sustainable farming. The Agriculture Guider Chatbot is continuously updated with the latest agricultural research and practices, ensuring users can access the most up-to-date information. Moreover, the Agriculture Guider Chatbot plays a pivotal role in promoting sustainable farming practices by offering guidance on Resourceoptimization, Soil health, and eco-friendly Pest management.This digital companion has the potential to revolutionize agriculture by promoting sustainable farming practices, increasing crop yields, and enhancing overall productivity while contributing to food security and economic growth in rural communities.

Keywords: Chatbot, Natural Language Processing, Indian Council of Agricultural Research.

I. INTRODUCTION

The Agriculture Guider Chatbot primarily focuses on offering information to help users understand their specific needs.The rapid technological advancements, the agriculture industry is transforming. Farmers and agriculture enthusiasts are increasingly relying on innovative digital solutions to enhance their farming practices, boost productivity, and address the challenges of modern agriculture. The Agriculture Guider Chatbot is a cutting-edge and user-friendly digital companion designed to provide valuable guidance and information to individuals involved in agriculture. Leveraging the power of Artificial Intelligence (AI) and Natural Language Processing (NLP), it serves as an indispensable resource for farmers, agronomists, and anyone interested in agriculture.

The assistant interacts with users through voice, providing farmers with easy access to answers to their questions. With the help of the Chatbot, individuals,including farmers, can easily obtain specific and required information, such as predicting fertilizer dosages or selecting the most suitable crops based on

climate conditions. This innovative chatbot covers a wide spectrum of agricultural topics, offering real-time assistance and insights into crop cultivation, livestock management, pest control, weather forecasting, and market trends. Whether you're a seasoned farmer looking to optimize yourpractices or a newcomer seeking advice, the Agriculture Guider Chatbot is here to assist. It continuously integrates the latest agricultural research, best practices, and local insights, tailoring its recommendations to specific regions and evolving farming conditions. Despite the sector's massive size and importance, most farmers lack knowledge of proper farming techniques and management practices. This includes challenges like selecting appropriate crops have a significant impact on crop yield quality. Effective crop planning management and nutrition monitoring can greatly enhance both yield and quality. Returning to the Chatbot assistance, it is designed to be free, portable, reliable, and helpful in all aspects.

The concept aims to encourage farmers to seek information on farming techniques and raise anyrelated questions they may have.While there are various Chatbot services available, such as Google Assistant, the agriculture field is still working on improving Chatbot systems. Many farmers, even those with expertise, lack essential skills for achieving optimal crop production. Even with technological advancements in robotics, many farmers rely on small-scale production and prioritize human involvement over machines. As we delve deeper into the world of Agriculture Guided by technology, it emerges as an invaluable partner, addressing the dynamic challenges faced by the agricultural community and paving the way for a more resilient and productive agricultural sector. Explore its capabilities, and let it be your trusted guide on your agricultural journey.

II. LITERATURE SURVEY

Senthilkumar and Chowdhary [1] present an AI-based chatbot using deep learning, laying the foundation for the development of an agriculture guider chatbot with advanced capabilities in intelligent decision-making. Grossi and Buscema's work [2] on artificial neural networks provides essential knowledge for implementing neural network architectures within the agriculture guider chatbot, enhancing its learning and adaptive capabilities. Manickam et al. [3] explore the applications of artificial neural networks, offering insights that can be leveraged for personalized agricultural guidance within the chatbot, tailoring recommendations based on individual needs. Wen et al. [4] introduce a network-based, end-to-end trainable task-oriented dialogue system, a concept that can be adapted to create a task-oriented agriculture guider chatbot capable of providing step-by-step guidance and information. Luong et al. [5] address the rare word problem in neural machine translation, a consideration crucial for the agriculture guider chatbot to accurately understand and respond to specialized agricultural terminology.

Serban et al. [6] propose generative hierarchical neural network models for end-to-end dialogue systems, offering a framework that can enhance the chatbot's generative capabilities, ensuring more context-aware and informative responses in the agriculture domain. Kim and Rush [7] explore sequence-level knowledge distillation, a technique that can be applied to streamline the knowledge transfer process, enabling the agriculture guider chatbot to distill complex agricultural information for users effectively. See et al. [8] discuss the compression of neural machine translation models via pruning, offering strategies to optimize the size and resource requirements of the chatbot models, ensuring efficient deployment in agriculture guidance scenarios. Zhou et al. [9] introduce deep recurrent models with fast-forward connections, presenting an architectural enhancement applicable to the agriculture. Chen et al. [10] propose guided alignment training for topic-aware neural machine translation, a concept that can be adapted to enhance the chatbot's topic awareness, making it more adept at providing agriculture-specific guidance tailored to user queries.

In summary, these studies collectively provide a comprehensive foundation for the development of an Agriculture Guider Chatbot, offering insights into AI, neural networks, and dialogue systems that can be integrated to create an intelligent and context-aware tool for agricultural guidance.

III. PROPOSED SYSTEM

A proposed farmer's assistance system with a chatbot would involve an AI-powered virtual assistant that farmers can interact with to receive recommendations and guidance. Here are some of the key features and benefits of a proposed farmer assistance system with a chatbot. By using the below techniques.

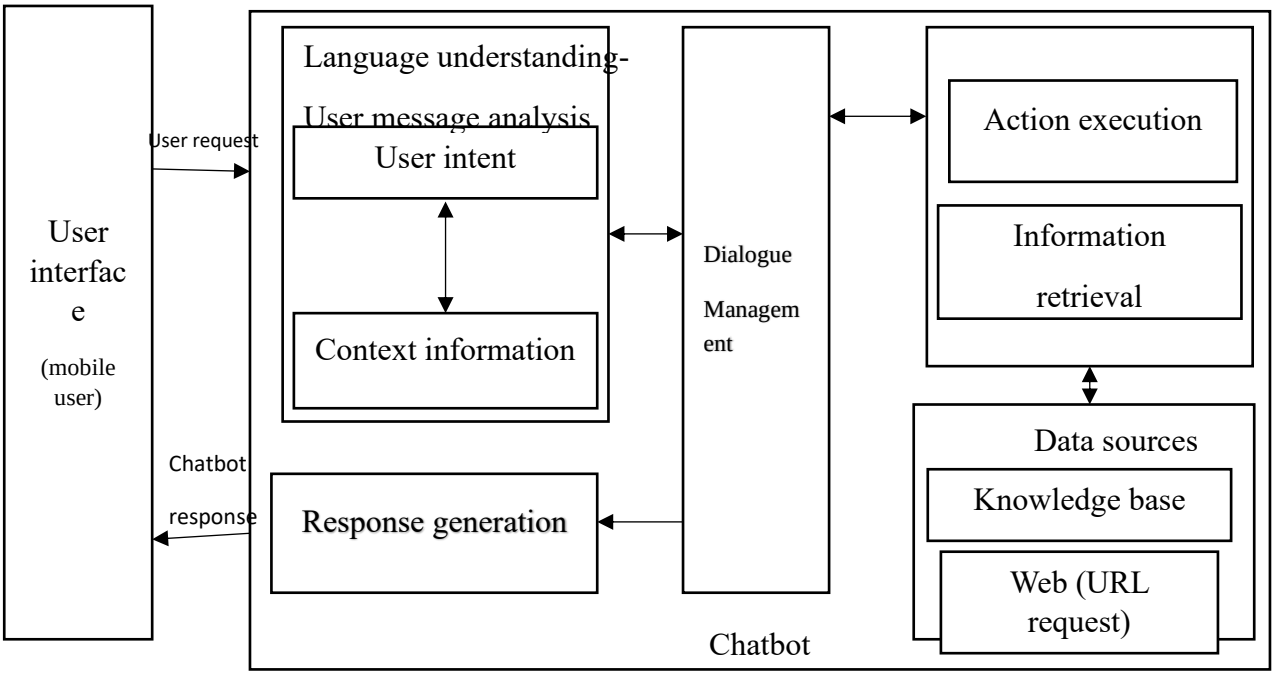
1.1 Natural Language Processing : The chatbot would use natural language processing to understand and respond to farmers questions and requests, making it easy for farmers to interact with the system.User can ask question chatbot in their voice and application will use speech recognition algorithm to understand farmer question and then display answer.

1.2 Data Analysis and Recommendations: The chatbot would analyze data from multiple sources, such as weather sensors, satellite imagery, soil sensors, and market data, to provide real-time recommendations and guidance to farmers.

1.3 Continuous Learning: The chatbot would continuously learn from its interactions with farmers, improving its recommendations and guidance over time. The more data the chatbot collects, the better it can predict outcomes and provide accurate advice.

1.4 Upload Plant Image: Chatbot ask farmer to upload crop image and then application will apply Deep Learning CNN algorithm to predict disease from that crop leaf and display possible remedies. After getting remedies user can ask questions related to crop.

IV. SYSTEM ARCHITECTURE



V.RESULTS

The system architecture for your agriculture helper chatbot project can be designed using various components and technologies. Here's a high-level overview of a possible architecture:

4.1 User Interface: It is the point of human-computer interaction and communication in a device.

4.2 Web Interface: Develop a user-friendly web interface where users can interact with the chatbot.

4.3 Mobile Application: Optionally, create a mobile application for users to access the chatbot on their smartphones.

4.4 Chatbot Engine:

4.4.1 Natural Language Processing (NLP): Utilize NLP techniques to process and understand user input, including intent recognition and entity extraction.

4.4.2 Convolution Neural Network (CNN): If image analysis is required, integrate CNNs to process and analyse images, such as identifying plant diseases or assessing crop health.

4.4.3 Deep Learning Models: Implement deep learning models, such as recurrent neural networks (RNNs) or transformers, to generate responses and carry out dialogues with users.

4.4.4 Knowledge Base: Integrate a knowledge base or database containing information on crops, seeds, soil types, sowing time, maturity time, seed rate, average yield, fertilizer, pesticide, irrigation, and other relevant agricultural data.

4.5 Backend Services:

4.5.1 Data Storage: Set up a database to store and manage the chatbot's knowledge base, user interactions, and relevant agricultural data.

4.5.2 API Integration: Integrate APIs or web services to access real-time data, such as weather information or market prices, to provide up-to-date recommendations and insights to users.

4.5.3 Analytics and Monitoring: Implement tools to track user interactions, analyse user feedback, and monitor the performance and usage of the chatbot.

4.6 Integration and Deployment:

4.6.1 Deployment Environment: Choose a suitable hosting environment, such as cloud platforms (e.g., AWS, Azure, Google Cloud) or on-premises servers, to deploy the chatbot system.

4.6.2 Integration with External Systems: Integrate the chatbot with external systems, if required, such as CRM platforms or third-party services, to enhance its functionality and data access.

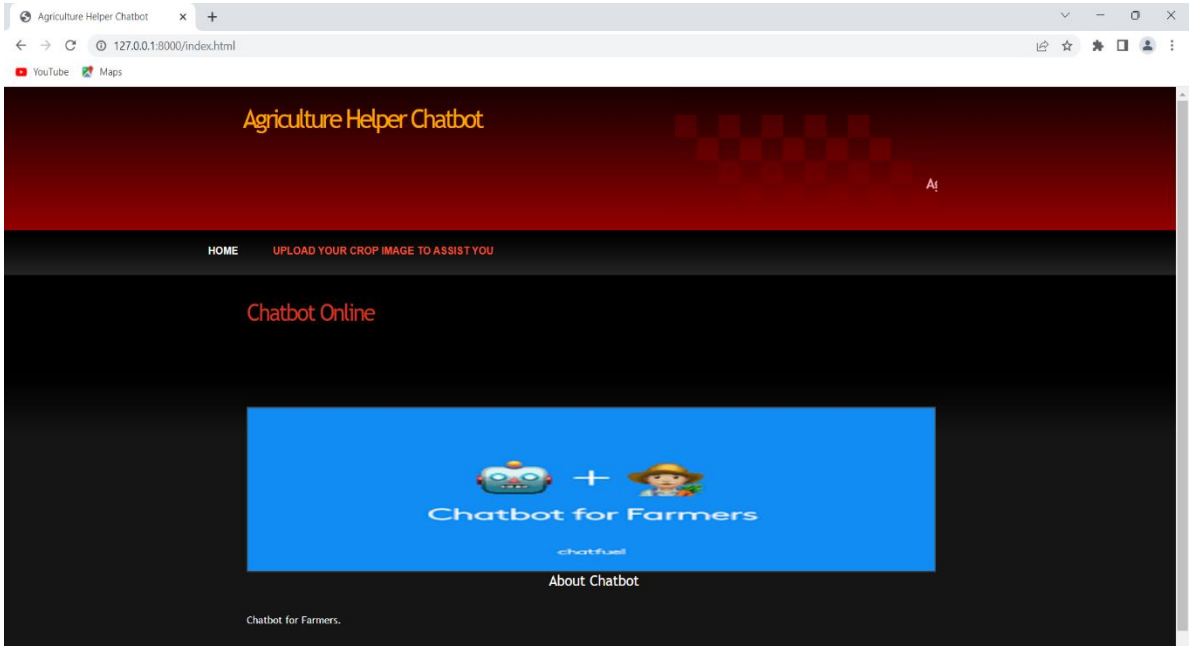
4.7 Security and Authentication:

4.7.1 User Authentication: Implement user authentication and authorization mechanisms to secure access to the chatbot and its functionalities.

4.7.2 Data Encryption: Ensure that sensitive user data and interactions are encrypted to protect user privacy.

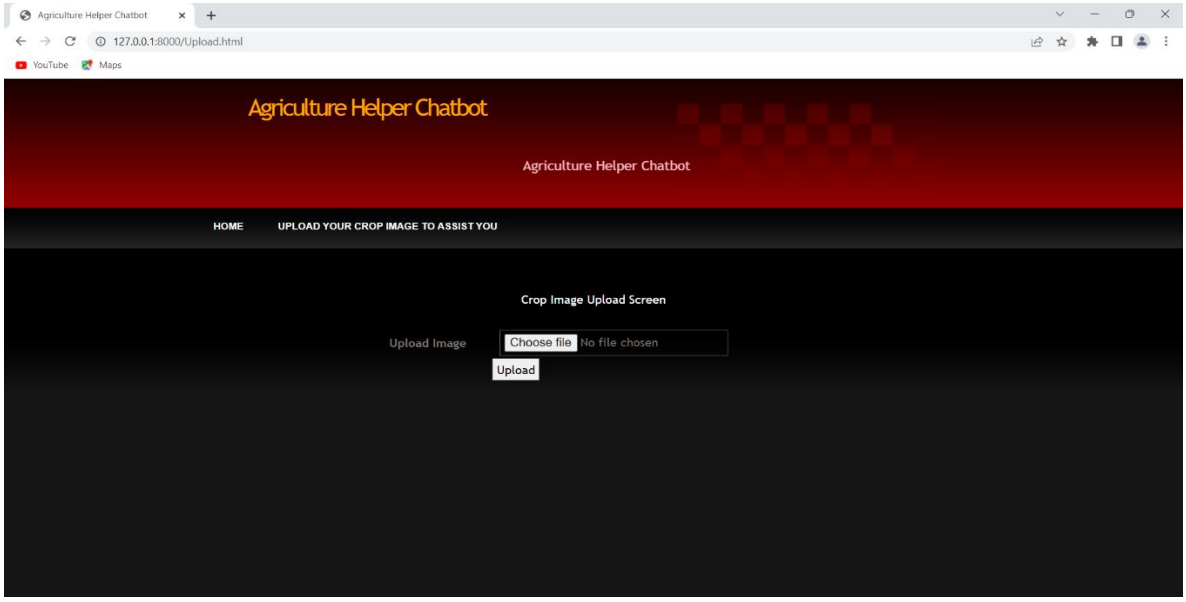
4.7.3 Input Validation: Implement input validation mechanisms to prevent malicious inputs and protect against potential vulnerabilities.

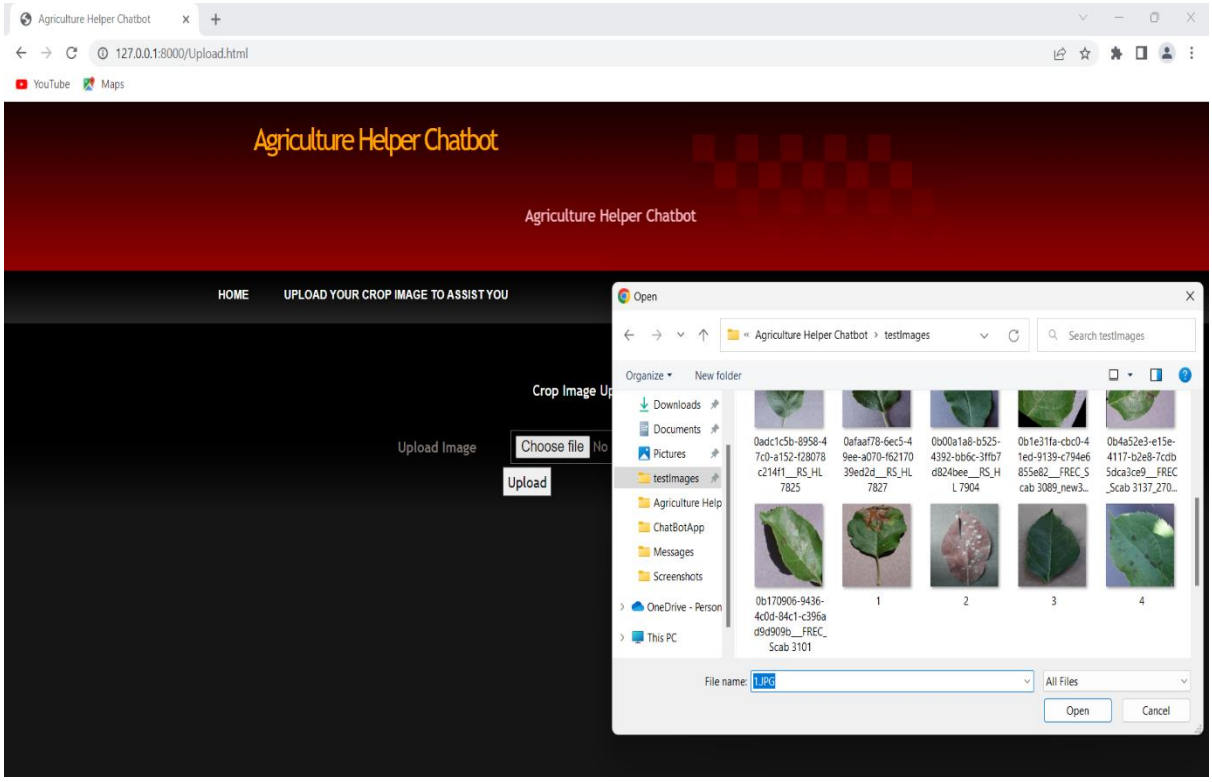
V. RESULTS



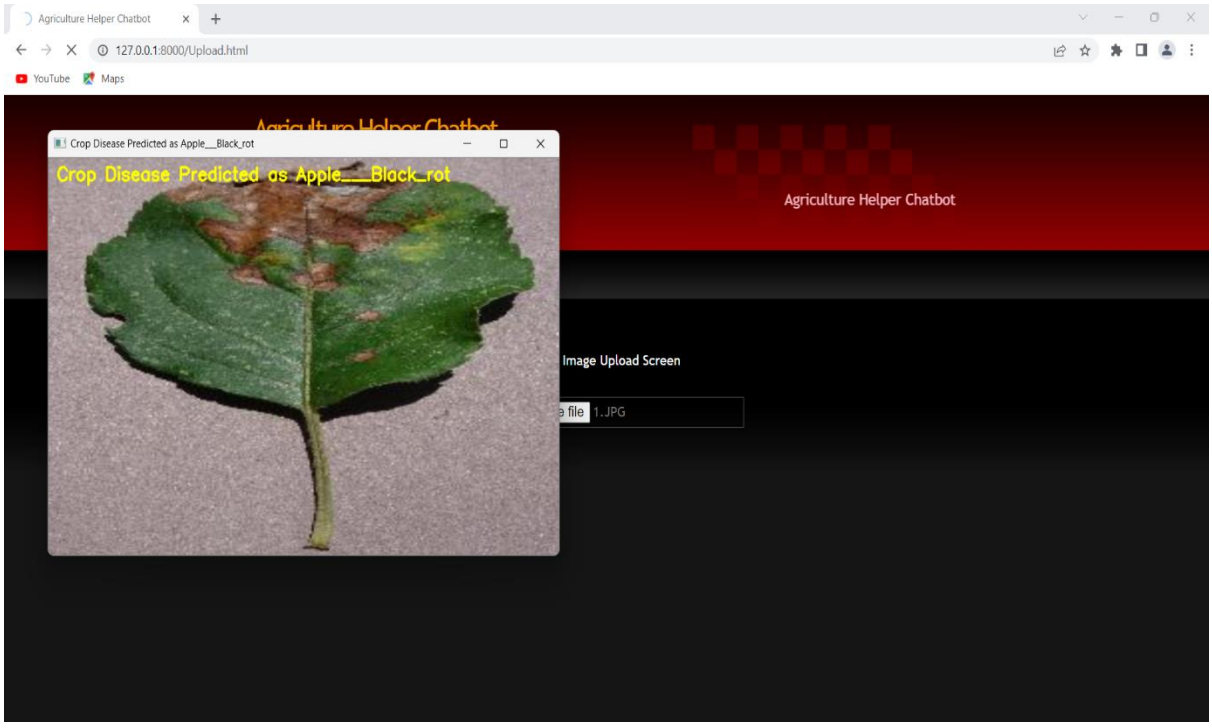
In above screen click on 'Upload Your Crop Image to Assist You' button to upload crop disease image like below screen.

In above screen click on 'Choose File' button to upload crop image like below screen.

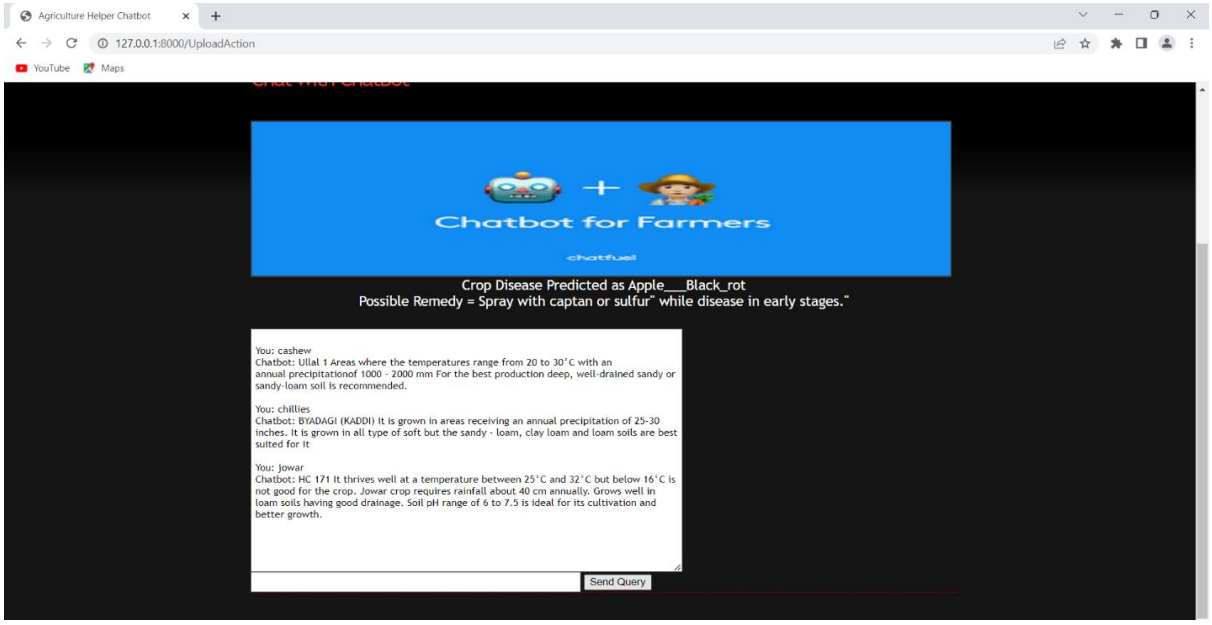




In above screen selecting and uploading '1.JPG' file and then click on 'Open' button to load image and then click on 'Upload' button to get below output.

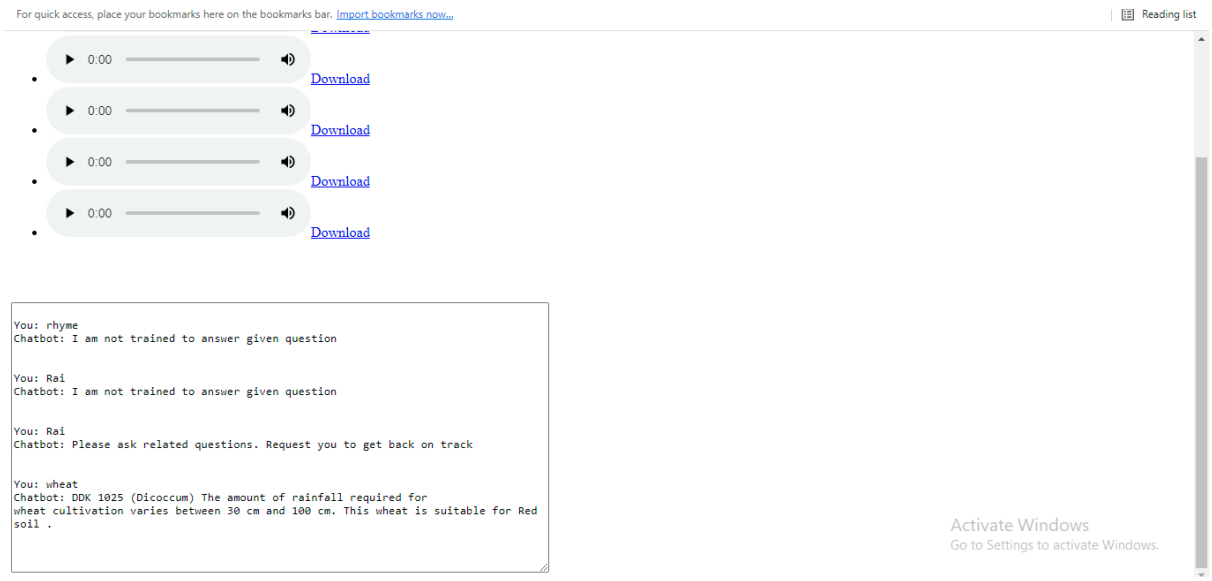


In above screen in yellow colour text, we can see crop disease predicted as 'Apple black rot' disease and now close the above image to get possible remedies from chat bot.



In above screen we got details for jowar crop from Chatbot and similarly you can ask any related question and if you ask unrelated question then will get below output.

In above screen we can see 'Chatbot suggesting user to ask related questions' and now click on **'Voice Based Chat'** link to allow user to Chat with Chatbot using voice questions which use speech recognition to understand user question.



In above screen I tried for voice command as ‘rice’ but it was not cleared voice so Chatbot replied ‘Not Trained’ and then I said voice command as ‘wheat’ to get suitable condition for sowing wheat. Similarly, you can ask any question.

VI. CONCLUSION

A large and open problem in an economy such as India that is dominated by agriculture is to build scalable, reliable, real-time, 24/7 responsive applications. An application called Agro Bot proposed in this paper, which combines NLP and machine learning, provides natural language answers to farming-related questions in a multiuser chat environment. Utilizing natural language technology, our chatbot can impact uneducated people by offering information related to agriculture and horticulture. By using the messaging app, farmers will have access to agricultural information and localized information such as market prices and weather forecasts for their area.

VII. FUTURE SCOPE

Our future plans involve expanding the reach of the chatbot to benefit a larger number of farmers. Currently, the bot is trained manually, but we aim to implement automatic learning for continuous updates with the latest information. Additionally, we envision incorporating native language support, despite the complexity of training the bot in multiple languages given India's linguistic diversity. However, providing an interface in the user's preferred language would greatly enhance usability and make a significant impact in the market.[3] This extension would be particularly helpful for the large number of uneducated farmers, as the chatbot's ability to understand and respond in their native language would provide them with genuine assistance. We are committed to exploring and developing these extensions to enhance our technique in the future.

VIII. REFERENCES

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