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NC047 AGRIBOT: AN ITELLIGENT CHATBOT FOR FARMERS WITH COPY AND DISEASE PREDICTION

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ABSTRACT

Agribot is a smart chatbot that can give farmers quality and relevant farming support, via a conversational platform. It also employs natural language processing and machine learning solutions to suggest what crops will be appropriate to plant, anticipate the potential plant diseases, and recommend what fertilizers will provide optimal soil and environmental factors. The system is multilingual and also provides both text and voice communication that makes it accessible in different parts of the world to farmers. Along with these features, Agribot provides real-time weather conditions, market price analytics, and news about government schemes so farmers could make informed decisions and diminish the risks of production. The chatbot uses the previous and real-time data and cross-checks accuracy, productivity, and sustainable farming. This study shows how conversational systems and AI can be effective making it more technology-empowered to rural communities

KEYWORDS: *Agribot,Chatbot,CropPrediction, DiseaseDetection,NaturalLanguageProcessing , Artificial Intelligence.*

INTRODUCTION

Farm is still the foundation of numerous economies, but the farmers-in-field still face such drawbacks as uncertain weather conditions, crop pests, unsustainable connection with information, and absence of blameless access to professional consulting. The traditional ways of acquiring agricultural information take a long period and may be inaccessible to the rural setup. Conversational systems have become one of the effective ways to give real-time support as artificial intelligence and natural language processing have improved. Agribot is created as an intelligent chatbot to solve these struggles

providing crop recommendation and disease prediction and fertilizer suggestions through a user-friendly interface. Designed to accommodate both speech and language conversation, and supporting numerous languages, it can also be used to accommodate even low literacy farmers. Through incorporating real-time weather forecast, market updates, and information on the government schemes, Agribot will assist farmers in making decisions, mitigate against risks and enhance productivity. The method shows how intelligence-based solutions can revolutionize agriculture as a more efficient and sustainable sphere.

LITERATURE SURVEY

The development of recent artificial intelligence and natural language processing enabled intelligent solutions in the agricultural industry. The word chatbots and predictive models have been used to help farmers in decision-making in several studies. A study done by Kumar et al. (2020) presented an advisory system using AI, which has data on potential crop choice and pest management, enhancing the general farm production. Likewise, Gupta and Sharma (2021) designed a mobile app that employs machine-learning algorithms to predict diseases using leaf photographs and this contributed greatly to reducing crop loss.

Singh et al. (2022) also conducted another study that aimed to integrate the models of weather forecasting and recommendation systems so that farmers could properly plan irrigation and fertilization. Although these systems were useful, majority of them were not multilingual and did not support voice-based interaction making them inaccessible to many farmers in the rural areas where literacy levels are low.

Moreover, a recent study involving conversational agents in agriculture proved the possibilities to utilize chatbots to provide farmers with the answers to their questions on-time. Nonetheless, most current systems are limited to text only inputs and frequently lack the delivery of context aware responses. In this study, I will work on these limitations by creating an intelligent chatbot called Agribot that integrates machine learning, natural language processing, and multilingual voice interaction to offer crop recommendations, disease fertilizer recommendations, and weather information in an easier to understand model.

EXISTING WORK

There are a few research studies on the use of artificial intelligence farming to make the farming more productive and making better decisions. Kumar et al. (2020) have suggested an AI-based recommendation engine that will help farmers decide which crops to use and control pests. In the same manner, Gupta and Sharma (2021) presented a machine learning method of crop disease detection through image analysis that greatly minimised losses. Singh et al. (2022) also conducted another study to blend weather forecasting and advisory services to enable farmers to decide on irrigation and fertilizer use in advance.

Despite the informative nature of these systems, they are not always limited by language barriers and lack of real time communication. The prevailing solutions are mostly text-based and lack support of multilingual communication and thus are inaccessible to rural populations. In a bid to beat these shortcomings, Agribot is developed as a smart chatbot that can provide crop suggestions, disease forecasts, and weather forecasts but can be voice-accessed and multilingual.

PROPOSED SYSTEM

The Agribot is a senior level AI-based chat bot capable of offering precision and the correct information on time reporting to farmers in a simple to use conversational format. It is a platform that incorporates Natural Language Processing (NLP) and Machine Learning (ML) with the aim of interpreting questions raised by farmers, and provide real-time answers. The system will provide voice and text communication, so farmers of all literacy levels can be sure to use them.

Agribot has various features, which make it essential to improve farming activities. It gives individualized crop suggestions in relation to the soil type, weather conditions, and regional factors. Disease prediction is done by use of trained models which allow analysis of crop images and environmental conditions and to give information about any possible infections in an early stage. The system also provides proper fertilizers based on the type of crops and the health of the soil to enhance a great harvest whilst reducing wastage of materials.

Agribot also displays up-to-date weather patterns, market patterns as well as government schemes in order to ensure the farmers are well informed. This facilitates planning, minimizes risks and provides decisions that can be

informed. The chatbot can be used in multiple regional languages that will broaden the use of the chatbot and help to reach rural populations. The backend applies predictive models on large agricultural data to be accurate and reliable. Security provided to data used by users. The total objective of the suggested system is toinfuse the knowledge gap and capability of technology among the farmers and support green business. Agribot is designed to offer intelligent suggestions and real-time assistance, therefore, enabling its user to become more efficient and reduce farm losses, and gain access to the high-level expertise in agriculture whenever and wherever needed.

METHODOLOGY

The methodology of Agribot would offer efficient and accurate assistance to farmers because of the conversational system powered by AI. The procedure commences with a user posing a query that can be either voice or text based query. This information will be captured and additional inference will be conducted with the help of Natural Language Processing (NLP) algorithms and identify key words and intent. NLP codifies the raw data in an orderly manner such that further analysis may be carried out. Machine learning models that have been trained on agricultural data then conduct the prediction and analysis after the query is handled. Once the query is addressed, analysis and prediction is done by machine learning models which have been trained based on agricultural data. The models advise on the most suitable crop to be planted in consideration of the weather and soil conditions, complaints facing the crops and the application of corresponding fertilizers. The user then uploads crop image so as to identify the disease and then the image processing operations are performed. The external APIs are also useful to enter the live wind information/ weather information, the market prices information / government schemes information in the system. On calculating the system will present the result in the language of choice of the user to ensure that different communities in farming are well reached. The answer is formulated both, in voice and text format, in a convenient chat bot interface. This logicalized set-up merges artificial intelligence,

Step	Description
Input	Farmer provides query via text/voice
Preprocessing	Convert input into processable format using NLP

Model Processing	Apply trained ML models for analysis
Prediction	Generate crop/disease prediction and suggestions
Output	Display result through chatbot interface

EXPERIMENTAL RESULTS

To determine the delicacy and usability of the proposed system, the system was tested on various agricultural tasks. In the first trial the prophecy of the complaint was done by uploading an infected flake image. The model was suitable to diagnose the complaint as Powdery Mildew which is generally brought about by high humidity and absence of air gyration. The system stood out by furnishing several recommendations to the position of using sulfur-predicated fungicides like Thiovit or Trifloxystrobin and natural options. The alternate trial vindicated the Soil- predicated Crop Recommendation module which was determined by choosing Sandy Soil.The system has suggested crops like Millets, Barley, Peanuts, Cumin, Watermelon, Muskmelon and Date palm, the information portraying the area where these crops can be cultivated, It also gave an suggestion that sandy soil is ideal in hot, dry and semi thirsty climate. Initially, the Plant Doctor Chatbot was suitable to respond correctly to questions about Powdery Mildew, which is, again, an suggestion of its capabilities to make real- time terrain-alive answers. These findings confirm the performance of the system in enhancing decision- making by farmers.

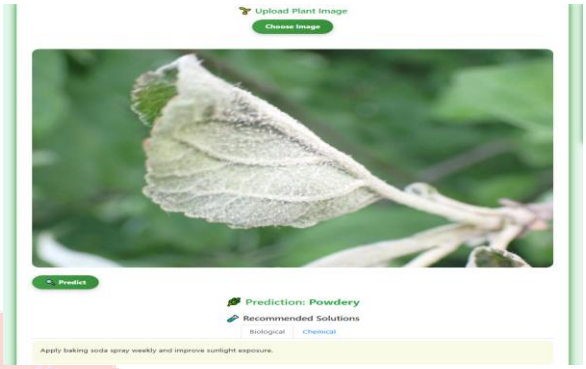

Fig 1. Plant prediction Image

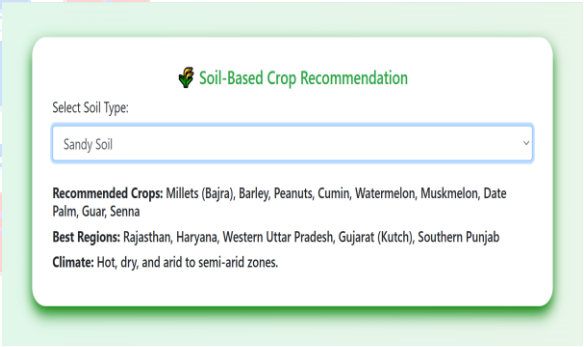

Fig 2. Soil-Based Crop Recommendation Image

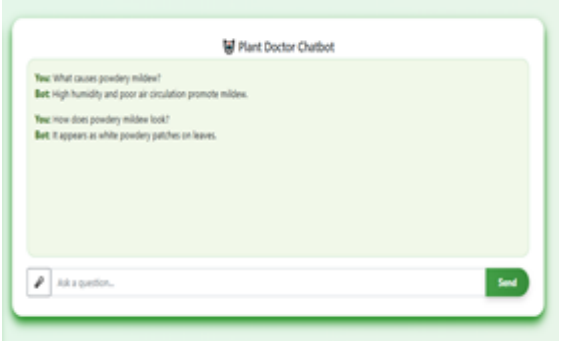

Fig. 4. Chatbot Image

CONCLUSION

Agribot introduces a new way to solve the problem of farmers with the development of artificial intelligence, natural language processing, and machine learning as one entity on a single interactive webpage. The technology makes the agricultural process easier by ensuring recommendations to farmers about the type of crop they should plant, early detection of diseases in the crops, and adequate fertilizer application recommendations. It is multilingual and suitable to both voice and text input, which makes it friendly to farmers in all literacy levels.

In addition, information on market trends and weather conditions, and government schemes in real-time give the farmers an idea on what to do, lessen risk and become more productive. The added feature of disease prediction with image recognition increases the system accuracy as well as reliability.

In sum, Agribot shows how AI-assisted systems can help fill the information gap that the agriculture sector faces today, enhance efficiency, and ensure a sustainable farming practice. Further development of the product may involve adding to it IoT devices to monitor the soil on a real-time basis or developing more advanced predictive analytics to generate even more accurate suggestions.

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