



AGRICULTURAL SUPPORT CHATBOT FOR FARMERS

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ABSTRACT

India, renowned as a global powerhouse in agriculture, has predominantly an agriculture-based economy. Despite this, many farmers and related individuals encounter numerous challenges in agriculture due to insufficient knowledge of agricultural production. These challenges include poor farming techniques, inadequate materials for crops, improper crop planning, and maintaining fertilizer balance. This project presents a prototype of a chatbot structure designed to assist individuals and farmers in crop management and predicting crop needs. Predictions encompass aspects such as fertilizer dosage, nutrient content in crops, and providing sufficient knowledge for addressing basic agricultural requirements. The structure leverages Natural Language Processing (NLP) and utilizes pre-determined data to respond to queries. To ensure accuracy, the chatbot analyzes factors such as historical data and sources from "The Indian Council of Agricultural Research."

Index Terms: Chatbot, Crop Management, Agriculture, Natural Language Processing, Fertilizer Dosage, Agricultural Knowledge.

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I. INTRODUCTION

The primary aim of this chatbot system is to assist individuals in resolving agriculture and farming-related queries to achieve optimal results. It provides informative responses to help users understand their needs better. The chatbot design includes an architecture where queries are analyzed based on pre-determined keywords associated with different types of questions, allowing the system to identify the user's needs accurately.

The assistant operates as a voice-activated chatbot, helping farmers with their questions. It includes functionalities such as a specific fertilizer dose predictor and recommendations for the best crop selection according to the climate. This allows farmers and individuals to

easily access the specific information they need. In a country like India, where many farmers struggle with complex estimations required in cultivation, this chatbot can be immensely helpful. Agriculture is the primary source of food (raw materials) globally, and a significant number of people rely on it for their livelihood. Approximately 70% of rural populations directly depend on agriculture, which is also the main source of income for many developing countries.

Agriculture accounts for 18% of India's gross domestic product (GDP), and almost 50% of the country's workforce depends on it for their livelihood. Despite the sector's massive size and importance, many Indian farmers lack knowledge about proper farming techniques



and management. This includes selecting crops based on soil and climate type, identifying pests and selecting the appropriate pesticides, and implementing effective irrigation measures. These factors significantly impact crop yield and quality. Proper crop planning, management, and nutrition monitoring can substantially improve crop quality and yield.

While various sites provide chatbot services, including well-known ones like Google Assistant and Cortana, the application of chatbots in agriculture is still evolving. Farmers seeking better crop production often lack basic skills, and even experienced farmers might not achieve optimal crop quality and quantity. Achieving 100% yield in agriculture requires comprehensive knowledge and the right techniques. This project aims to provide individuals with the information they need to enhance their farming practices.

Advancements in robotics have allowed some farmers to test new technologies, but many still rely on small-scale production, making human-centric advancements more critical than machine-centric ones. This chatbot assistance will be free of cost, portable, reliable, and helpful in every aspect, encouraging farmers to seek information on farming practices and raise queries as needed.

II. LITERATURE SURVEY

- The outbreak of the present pandemic, Coronavirus (official designation COVID-19 or 2019-nCov), as proposed by Subhajt Panda and Rupak Chakravarty, has forced us to adopt the “new normal” and rely more heavily on virtual spaces than ever before, over physical spaces. In the context of libraries, transitioning the user assistance program from physical to virtual has encountered challenges. This paper explores potential solutions through the practical implementation of conversational AI, specifically using “Bots” or “Chatbots,” to meet user needs 24/7 without human intervention. A chatbot is a computer program that can simulate conversation and interact with humans—spoken, written,

or both. It operates with a set of pre-programmed commands and continues learning based on the inputs it receives. This paper provides a general overview of conversational AI, chatbots, and their multitasking features, alongside a practical implementation of one of the well-known chatbot providers, Kore.ai, using its free-to-use plan. Additionally, the paper explains the current requirements and the long-term benefits of chatbots in libraries.

- Shreya Bisen, Shashank Bhalotia, Tarun Lalwani, and Ashish Pal proposed using software applications with various user interfaces, including command line, graphical user interface (GUI), menu-driven, form-based, and natural language interfaces. While mainstream user interfaces include GUI and web-based platforms, occasionally, there is a need for alternative user interfaces. A chatbot-based conversational user interface fits this need. Chatbots, a class of bots present in chat platforms, allow users to interact via graphical interfaces or widgets, following a growing trend in this direction. They generally provide a stateful service, saving data from each session. On a college website, where finding specific information can be challenging for those not familiar with the institution, a college inquiry chatbot can enhance user experience by providing fast, standard, and informative responses. These chatbots use artificial intelligence (AI) and natural language processing (NLP) algorithms to develop an intelligent system. They offer an effective user interface and can address queries related to examination cells, admissions, academics, attendance, grade point averages, placement cells, and other miscellaneous activities.
- Ji-Bum Moon, Yulim Lee, and Andy Kyung-yong Yoon proposed that today is the era of artificial intelligence. With AI's development, machines have begun to imitate various



human characteristics. Chatbots are one instance of this interactive artificial intelligence, enabling natural conversations with people through text. This study focuses on evolving chatbots to perform commands based on speech recognition. To emulate human dialogue accurately, it is necessary to analyze sentences correctly and extract appropriate responses. This involves classifying sentences into three types: objects, actions, and preferences. This study demonstrates how objects are analyzed and processed, showcasing the potential evolution from an elementary model to an advanced intelligent system. The research aims to evaluate the improved order-processing time efficiency of speech-recognition-based chatbots compared to text-based ones. Upon completion, these chatbots have the potential to automate customer service and reduce human effort.

- Yang Cheng and Hua Jiang explored the role of artificial intelligence (AI)-powered chatbot marketing efforts (CMEs) in establishing relationships between brands and their customers, extending the link between relationship marketing and online consumer behavioral intentions. Data were collected from 1,072 customers in the USA, who used chatbot marketing activities from any of 30 leading brands in messaging innovation. Structural equation modeling was used for data analysis. The findings indicate that interaction, information, accessibility, entertainment, and customization are crucial CMEs components. CMEs have significant direct effects on the quality of communication with chatbot agents and indirectly affect customer-brand relationships (CBR) and customer responses. Moreover, CBR mediates the association between communication quality and customer response. The study's implications enable practitioners to understand AI's effects on user experiences and provide a

guide for developing CMEs strategies and relationship building.

- Dipankar Das, Sachit Nagpal, and Kevin Garda highlighted the crucial role of speech and textual information in human communication. An article in "The New York Times" reported that adults now spend more than 8 hours a day on computer or mobile screens. As a result, most human communication occurs through web applications such as WhatsApp, Facebook, and Twitter, in the form of speech and textual conversations. This paper focuses on designing a textual communication application, namely a chatbot, for the educational domain. The proposed chatbot assists in answering user queries. To develop the system, an ensemble learning method, specifically random forest, was employed with features extracted from a prepared dataset. The validation system offers an average F-measure score of 0.870 across various K-values under random forest for the proposed chatbot. Ultimately, the system has been deployed as a Telegram bot.

III.EXISTING SYSTEM

Before the beginning of formatting this current paper let us acknowledge that there has been several works and projects related to chatbot usage and its structure-based assistance. The structural work related to chatbot query system pretty much work the same write. This general review is based on the study of implementing Conversational AI in Libraries: A practical approach. Also, the important part to notice that certain big companies are taking over farming practices leaving farmers nothing but labor. Future of farming is that it is too dominated by a handful of giant companies. Decision about farming practices should be made by more people for individuals in farming sector.

There needs to be actual farming under human supervision not company board members protecting investments. There have been several advancements in technology to aid



farming practices mostly in robotics and hardware tools which basically captures manpower and they are left with less work.

IV. PROPOSED SYSTEM

The main aim is the satisfaction of Farmers in the field by giving them the needed information about the crops as there are several outcomes that people are unaware of in the field of Agriculture. Proposed bot structure will provide information regarding as follows:

- Crop Nutrient Prediction
- Deficiency papers prediction
- Crop selection for certain sites
- Data Fetching

V. SYSTEM ARCHITECTURE

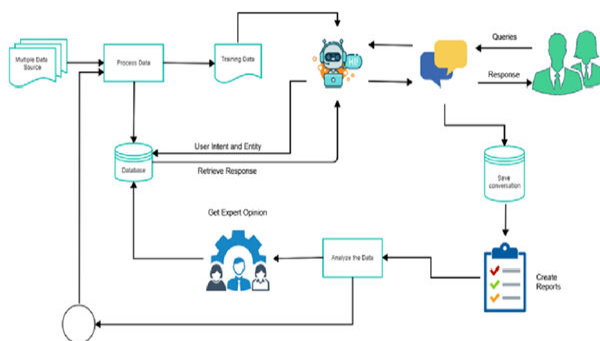


Figure .1 System Architecture

VI. IMPLEMENTATION

Modules:

- **User Module:**
 Within the User module, individuals have access to essential features such as registration and login to establish and access their accounts. Once logged in, users can utilize the dashboard for an overview of pertinent information related to the system. A chatbot feature enhances user interaction, providing support and information as needed. Users can manage their account settings and personal profile through functionalities like My Profile and Edit Profile, as well as update their login credentials via Change Password. The module includes sections for general system information, crop details, and fertilizer specifics tailored to agricultural needs. Additionally, users can provide

feedback to improve system functionality and log out securely when finished.

- **Admin Module:** In contrast, the Admin module is geared towards system management and oversight. Admins log in to access a dedicated dashboard presenting system metrics and administrative tools. They can manage pending user registrations through the Pending Users section and view a comprehensive list of all registered users via All Users. Admins have the capability to access and modify individual user profiles through User Profile management. Feedback received from users is reviewed and addressed through the Feedback feature, possibly visualized through graphs or analytics in the Feedback Graph section to derive insights. Similar to users, admins can securely log out to conclude their administrative sessions.

VII. RESULTS



Figure .2

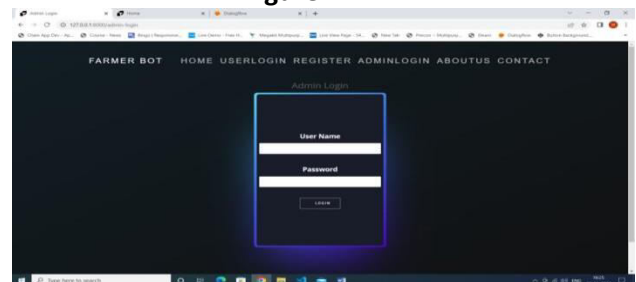


Figure .3



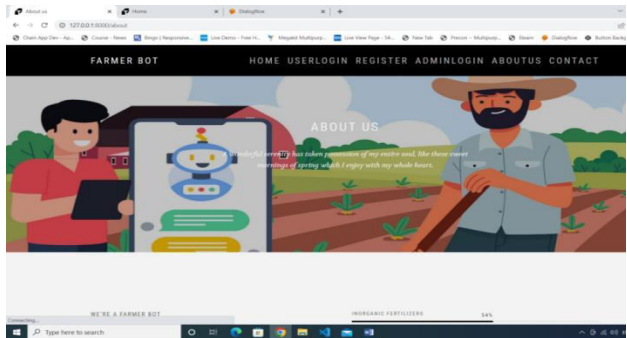


Figure.4

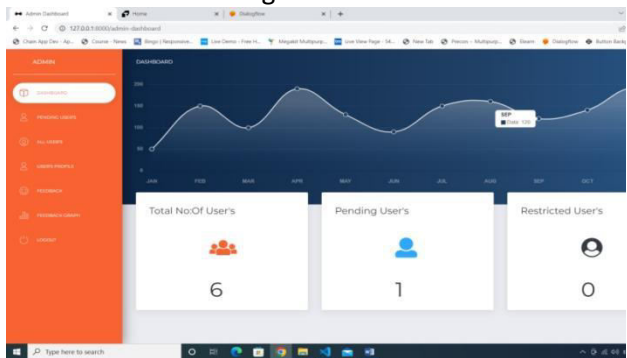


Figure.5

Profile	FullName	Email ID	Status
	Mark Allen	markallegmail.com	Approved
	Mary Jane	maryjane@gmail.com	Approved
	Nitesh	nitesh@gmail.com	Approved
	Sunny	sunny@gmail.com	Approved

Figure.6

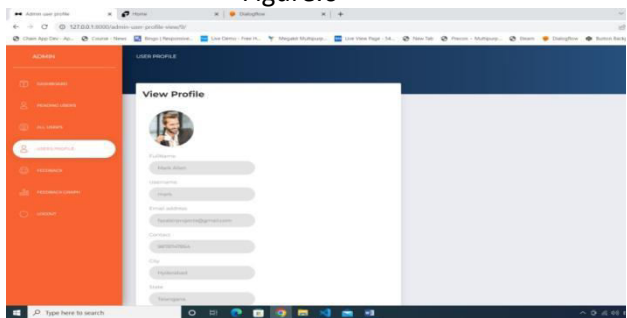


Figure.7

Profile	FullName	Date	Rating	Feedback	Sentiments	Emoji
	Mark Allen	Nov 28, 2022, 9:52 a.m.	★ ★ ★ ★	Great thoughts but needs improvements in processing	Very Positive	😊
	Mary Jane	Nov 28, 2022, 8:54 a.m.	★ ★ ★ ★ ★	Excellent Chatbot	Very Positive	😊
	Nitesh	Nov 28, 2022, 8:54 a.m.	★ ★ ★ ★ ★	Excellent website	Very Positive	😊
	Varadhan	Nov 28, 2022, 8:48 a.m.	★ ★ ★ ★ ★	Simple and positive	Positive	😊
	Varadhan	Nov 28, 2022, 8:48 a.m.	★ ★ ★ ★ ★	Neutral	Neutral	😐

Figure.8

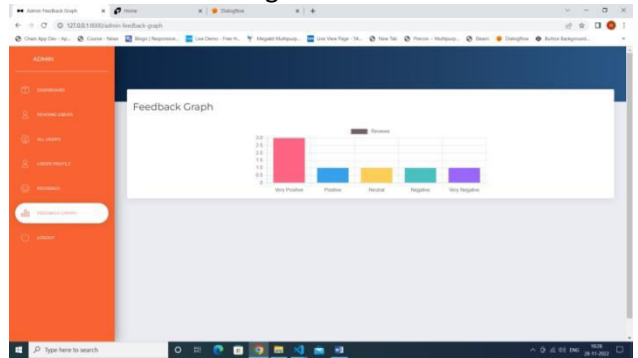


Figure.9

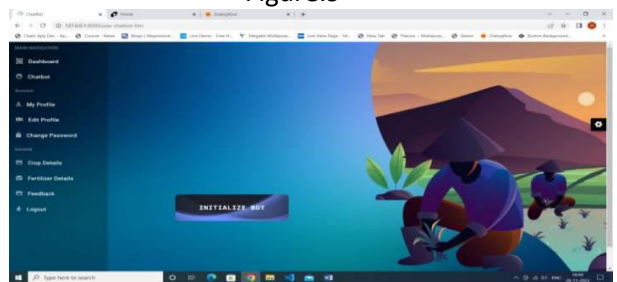


Figure.10

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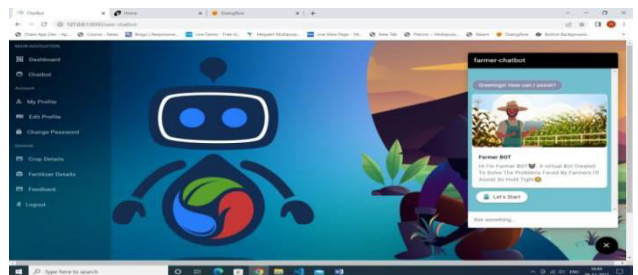


Figure.11



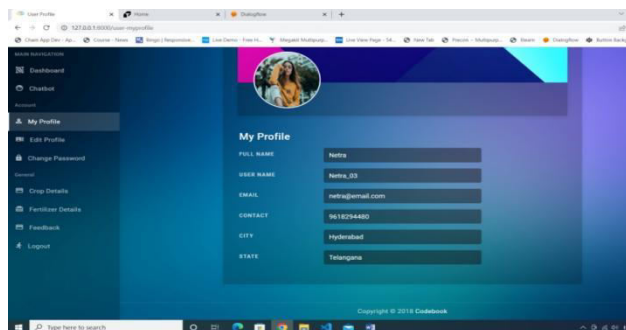


Figure.12

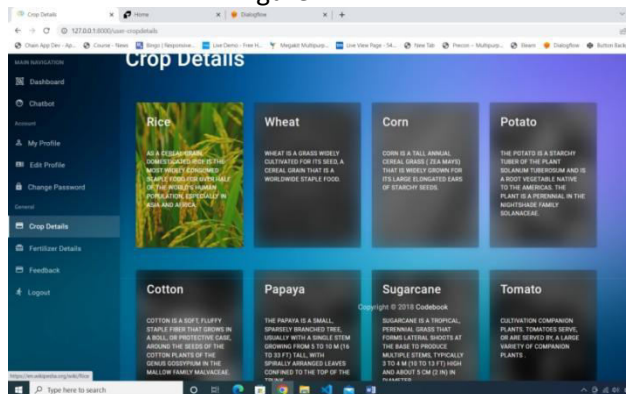


Figure.13

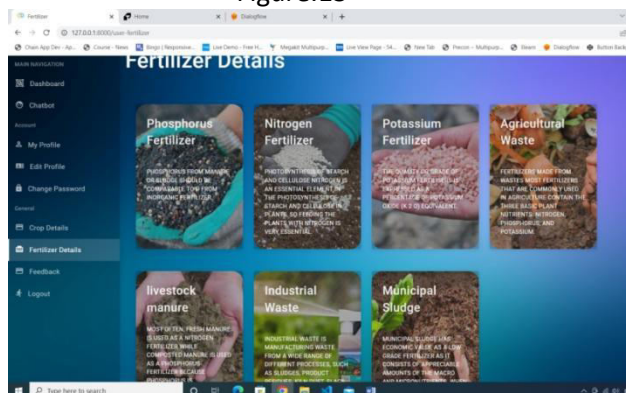


Figure.14

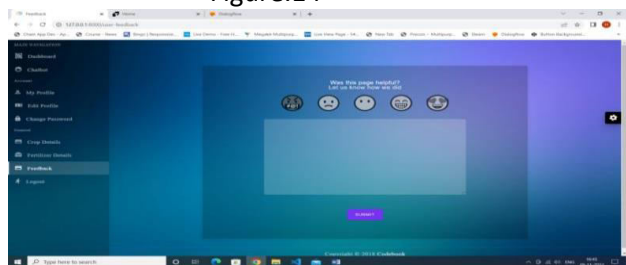


Figure.15

VIII.CONCLUSION

A Chatbot for Agricultural assistance purpose can play an important role in solving various problems in these sectors and could save a lot

of resources, reduce unproductive activities and unwanted expenses. This Chatbot helps farmers to find right answers for their queries to make the right decisions before long. Future improvements can be made by provide feedback in their language. This system will enable the farmer to ask any number of inquiries, which will help to spread the latest farming technology faster and to a higher number of farmers.

IX.FUTURE ENHANCEMENT

In Future several new ideas may emerge, and any user could add some extraordinary features to the chatbot system in Agriculture assistance like image recognition, voice activation, multilingual both text and voice programmable and operations using location finder over a wide region more than just 1 city.

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