



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 3, March 2024

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423



9940 572 462



6381 907 438



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# Auto Chatbot Heuristics and Smart Farming for Present Agriculture

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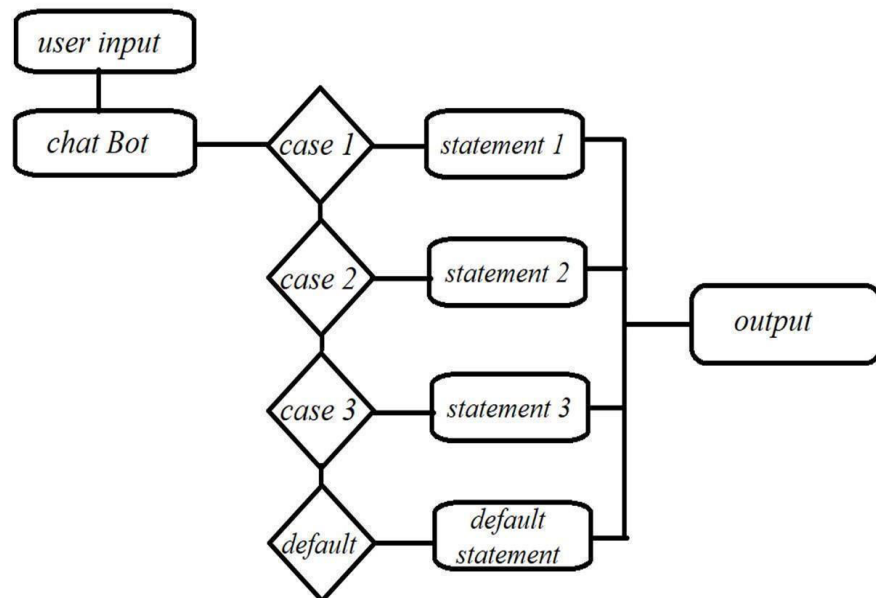
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**ABSTRACT:** Agriculture data is a vital source of country's economic growth. It is important to provide agriculture related information to all the people who are involved in agriculture activities as and when required. This meaningful information is used by people who supply services to agriculture domain and to take some correct decision related to agriculture to apply for their field. Chatbot system provides ability to extract the exact answer to the queries posed by farmers. The proposed system is called as Agriculture Chatbot system or even it is called as Question-Answering system for agriculture domain, where farmer is asking the agriculture related question which fetches the precise answers for the asked questions by farmers. India is an agro-based economy and proper information about agricultural practices is an essential key to optimal agricultural growth and output. In order to answer the queries of the farmer, agricultural Chatbot can be designed. The system "AgroChatbot" overcomes the problem and provides farmers the better opportunity to obtain the desired information and to scale up with upcoming market trends and technologies in a user friendly manner.

**KEYWORDS:** Digital Assistant, identification, Agro bot, Natural Processing Languages.

## I. INTRODUCTION

This chatbot will cover very vast topics related to farming like crop cultivation, pest control, irrigation, soil management etc. To make this happen we need to study few things to solve the farmers problem, first need to collect farmers questionnaire, statement and phrases to which make the base for chatbot. To make this happened in a simple way first need to take advice from farmers and then from the experts. At the last make it categories to understand easily. Gather a comprehensive dataset of questions, statements, and phrases related to agriculture. These will serve as the basis for your rule set. Identify User Intent Categorize user intents, such as asking for advice on crop selection, inquiring about fertilizers, or seeking weather forecasts. Develop rules that link user intents to appropriate responses. For example, if a user asks about planting tomatoes, the rule might trigger a response with details on tomato cultivation. Provide accurate and reliable information to farmers, addressing their queries with high precision. Understand the specific context of each user's query (location, crop type, weather conditions) to offer personalized and relevant suggestions. Assist farmers in diagnosing crop diseases, pest issues, and nutrient deficiencies through heuristic analysis. Offer appropriate solutions and agricultural best practices based on heuristic evaluations of the identified issues.



Fig#01: Fundamental Of Agrochatbot.

Chat-Bot has three major components: Responder, Classifier, and Graphmaster. Through the user interface user send response to the responder. The responder transfers data from user to classifier and the other side. Classifier filters and normalizes inputs and passes them to the Graph-master. Graph-master is the brain of the Chat-Bot. It matches the patterns with the stored information and sends them to the classifier.

When generating intents the sub categories of intents are also generated. For an example if a user example describe a location with an image then the intent response is an image of the location. Adding more examples, which describe the same intent, can increase the accuracy of the Chat-Bot.

In this paper the intents and the examples were collected through questionnaires, interviews with farmers, expertise and other stakeholders in the agricultural domain. The intents and the examples are the data used to train the ChatBot. The Chat-Bot is trained to predict an intent for the given example. This system overcomes the abovementioned drawbacks by providing a user interface, where farmers or any other users can interact effectively to get the desired responses with a smaller number of steps. This system “TalkBot” is a chatbot, which is a virtual assistant that enable users to get their queries clarified in a userfriendly manner.

## II. OBJECTIVES OF THE RESEARCH

- To deploy a chat bot which is enable to serve various challenges of modern days farming. a chatbot to address various challenges of modern-day farming involves creating an interactive, intelligent system capable of understanding and responding to specific queries and concerns faced by farmers.
- The goal of realizing a mechanism to optimize the way of agricultural farming involves developing a system that utilizes technology, data, and intelligent algorithms to enhance the efficiency, productivity, and sustainability of farming practices.
- To developed a system which will solve the agriculture related queries raised by farmer and provide appropriate responses The mechanism aims to streamline various farming processes, making them more efficient and reducing unnecessary resource usage.

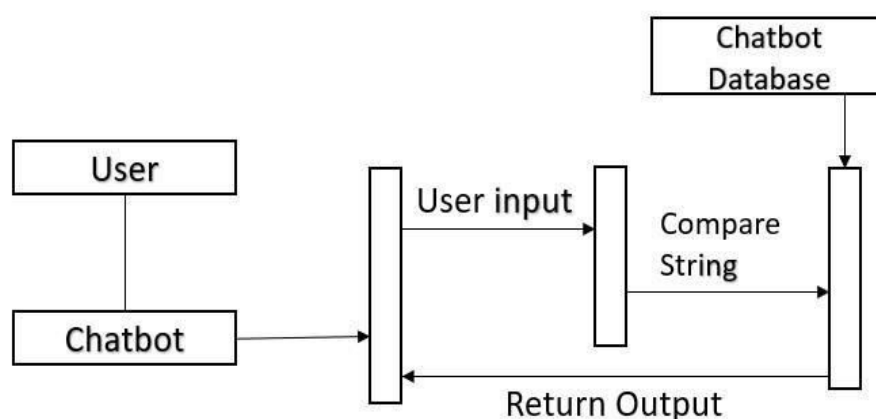
### III. LITERATURE REVIEW

[Levgen Sidenko et.al.2019] “Peculiarities of Human machine Interaction for Synthesis of the Intelligent Dialogue ChatBot”, The created keen exchange chatbot utilizing the most recent profound learning and human machine communication advances can uphold the discourse and answer inquiries regarding programming. This extraordinarily lessens the product improvement time, since it doesn't need consistent utilization of the internet browser to look for the fundamental data. Later on, the discourse chatbot can be forced by including new assignments for the discourse specialist, and by including a voice[1].

[Abbas Saliimi Lokman et.al.2020] “Designing a Chatbot for Diabetic Patients”, This chatbot configuration is yet to be actualized yet to begin with, the inquiries and answers for virtual diabetes control conclusion meeting must be planned with the real diabetes doctor. In this chatbot plan, we proposed the utilization of Path, a path for chatbot to recall the discussion way. We likewise plan the discussion to be constrained by chatbot instead of by client by making the client stay to the discussion point and not to enter unessential information, and on the off chance that they do, chatbot will react that the information was not reasonable and continue rehashing the past inquiry until the catchphrases are recognized[2].

[Dharani M et.al.2020] “Interactive Transport Enquiry with AI Chatbot”. The principle goal of the worldview is to succeed a chatbot. This thought was created by considering the issues looked by voyagers. A wide range of the writing audit is done to secure harmony in all the tasks, where a chatbot is thought of the best model to fulfill the necessities. Exploration on the chatbot attracts a nexus to seemore about the consuming fleeting innovations and contrary calculations like Man-made brainpower, Machine Learning, Python, and NLP[3].

[Prof.Naina Palandurkar.et.al](2018) proposed a Website for Farmers to Sell Vendors Directly is intended to provide an online platform that will help farmers from Indian cities sell their products directly to customers without the help of intermediaries or agents. This website will serve as a unique and safe way to do agricultural marketing. This new site allows good farmer, sellers and sellers to communicate. It allows farmers to log in and sell a product published by other farmers[5].



Fig#02 – Chat bot Components

[Rahul Singh Chowhan,et.al](2012) proposed a E-Agriculture to enhance agricultural in addition to rural improvement by using various facts and verbal exchange techniques. The inspiration to use full-fledged potential of ICTs for agriculture capability building, and marketing has existed for a long time. It's far just most currently the dissemination of records started out harnessing ICTs extra efficaciously for better provider delivery to the farmers.[6]

[Dr. Deshmukh Nilesh Kailasrao] “ICT for Indian Agricultural Informatics Developments”(2021), It aims to focus on key factors discovered for effective utilization of Information Communication Technology for agricultural boost up, at least on the surface, with supportive of evidence here in. Some issues discussed concern with how information



technologies contribute to the wide sphere of agricultural and rural developments, as they are two sides of a coin. Provide

IT- ICT based services in Asian region[7].

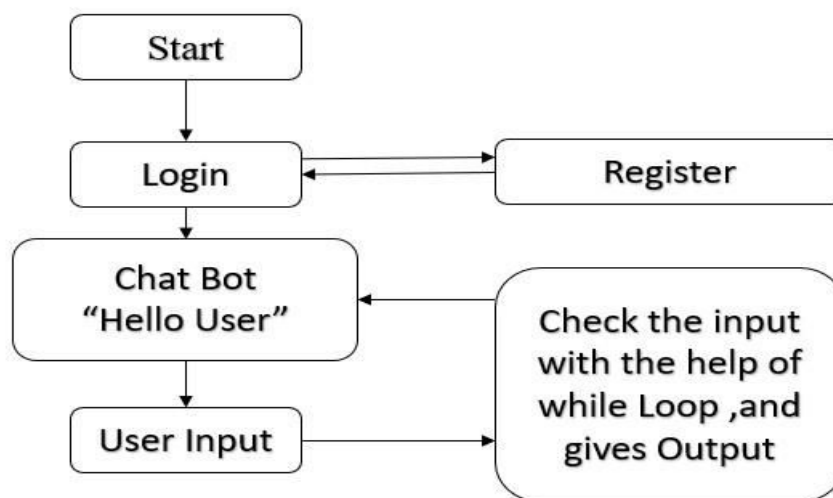
[Sindhu M R, Aditya Pabshettiwar Paresht,et.al](2019) paper says that Farming is the Prime Occupation in India in spite of this, today the people involved in farming belongs to the lower class and is in deep poverty. The Advanced techniques and the Automated machines which are leading the world to new heights, is been lagging when it is concerned to Farming, either the lack of awareness of the advanced facilities or the unavailability leads to the poverty in Farming. Even after all the hard work and the production done by the farmers, in today's market the farmers are cheated by the Agents, leading to the poverty[8].

### Summery And Discussion:

The literature review on rule-based agriculture chatbots emphasizes the significance of leveraging predefined rules for effective communication in the agricultural domain. Academics emphasise the benefits of rule-based systems in giving farmers precise and situation-specific information. In order to improve the chatbot's response, the assessment also emphasises the necessity of rule refinement based on ongoing learning from user interactions. The main topics of discussion are the difficulties in maintaining rules and the possibility of using machine learning to enhance rule-based strategies. The body of research generally lends credence to the idea that rule-based chatbots are a workable way to provide customised agricultural support.

## IV. RESEARCH METHODOLOGY

Gather data Collect relevant information about agriculture, including crop types, cultivation techniques, common pests and diseases, weather patterns, etc. This data will be used to formulate rules for the chatbot. If the user asks about crop cultivation, the chatbot responds with steps for planting and maintenance.



Fig#03:Basic Structure Of Our Chatbot

Agro chatbot operates on predefined rules and responses. It follows a set of if-then statements understand user input and generate appropriate replies. For example Input Understanding The chatbot uses rules to identify keywords or patterns in user messages related to agriculture, such as crop names, pests, or weather conditions.

Rule-based Decision Making Based on the identified keywords or patterns, the chatbot applies predefined rules to determine the appropriate response. For instance, if the user mentions a specific crop and asks about pests, the bot triggers a rule for providing information on common pests for that crop Detection. Response Generation Using the rules and retrieved information, the chatbot formulates a response to address the user's query. The response could include advice, continually recommendations, or further clarifying questions. Iterative Dialogue The chatbot can engage in an iterative dialogue, applying rules to new inputs and adapting its responses based on the evolving context of the conversation.

If applicable, the chatbot extracts specific entities from the user's input. Entities are pieces of information that are relevant to the intent. For example, in a weather-related intent, the location could be an entity. The chatbot uses a set of

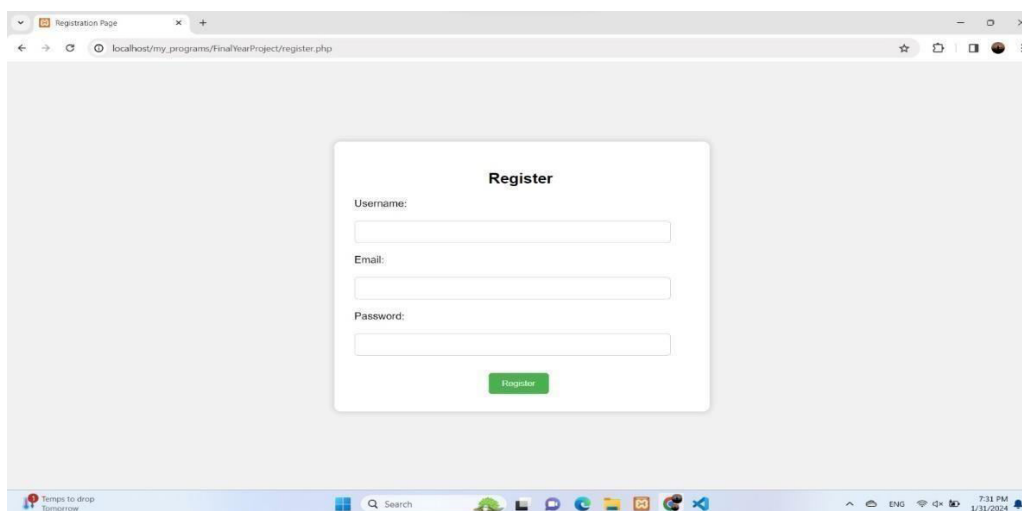
predefined rules to match the recognized intent and entities. These rules are typically created by developers or domain experts and cover various possible user inputs. If the chatbot is unable to confidently match an intent or if the user input falls outside the predefined rules, a fallback mechanism comes into play. This might involve providing a generic response or asking the user for clarification.

#### Limitation :-

- Rule-based chatbots rely on predefined rules and patterns. They may struggle to adapt to new or evolving scenarios in the agriculture domain without manual updates. This limitation makes them less.
- Agriculture-related queries and discussions can be complex and may involve ambiguous language or context. Rule-based chatbots may struggle to handle such ambiguity effectively, leading to inaccurate or incomplete responses.

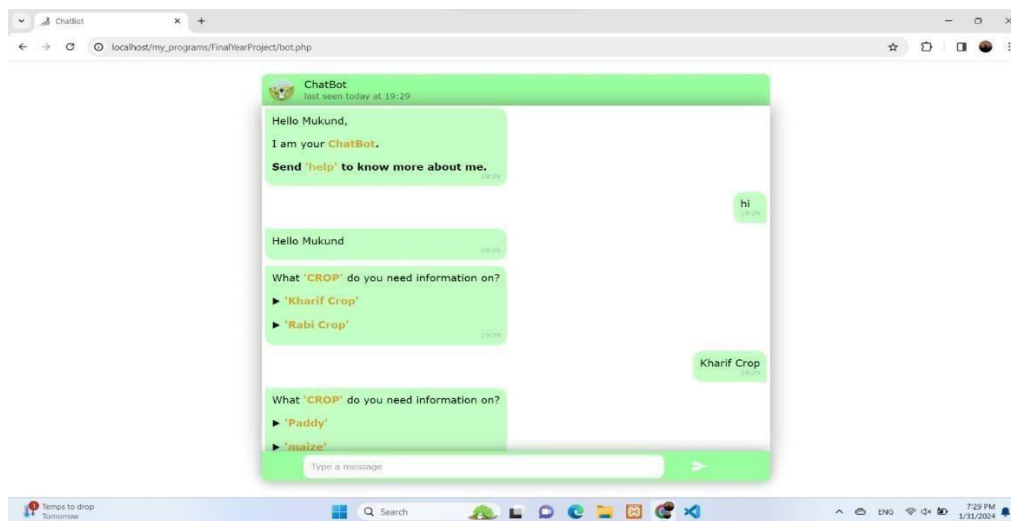
### V. RESULT/OBSERVATION SCREENSHOT

The screenshot shows registration page for the agriculture chatbot gathers essential user information, including name, email, and password. This data helps personalize the chatbot's responses and tailor recommendations based on the user's specific agricultural context. Additionally, it enables timely updates and notifications related to crop advice, and relevant events. User-friendly design and clear instructions enhance the overall registration experience, ensuring seamless integration into the chatbot platform.



Screenshot#01: User Interface Of Chatbot Room

Screenshot 02 shows the interface of the Chat-Bot. The interface was designed using the same procedure as above. The test was conducted in the laboratory and subsequently in the field. Test samples were selected from the frequently asked questions. Most of the test samples were drawn from the examples used to train the Chat-Bot. However, the test examples were slightly revised so that the Chat-Bot was tested with new queries, which are not seen by the Chat-Bot during the training. In general, the Chat-Bot provides reasonably correct answers for the given queries. Further, the farmers, who involved for the evaluation process accepted the Chat-Bot as a user-friendly and helpful tool for their farming industry. Hence, they are willing to use it in future farming activities.



Screenshot#2: Interface Of The Chatbot

## VI. SUGGESTION/RECOMMENDATIONS

Provide information about specific crops, including cultivation practices, optimal growing conditions, and common issues. Assist users in identifying pests and diseases affecting their crops, along with recommended treatments and preventive measures. Integrate weather forecasts and climate information to help farmers plan their activities based on upcoming weather conditions. Offer guidance on appropriate fertilizers and irrigation schedules based on crop type, soil conditions, and local climate. Share best agricultural practices, including crop rotation, intercropping, and soil management to enhance yield and sustainability.

## VII. CONCLUSION

The implementation of an agriculture chatbot based on rule-based systems represents a transformative step forward in the agricultural sector. By harnessing the power of technology, data analysis, and heuristic algorithms, this chatbot offers invaluable support to farmers, agricultural experts, and policymakers alike. A agriculture chatbot can be a valuable tool for providing users with predefined information and assistance related to agriculture. By defining specific rules and responses, you can address common queries and guide users in various aspects of farming and crop management. However, it's essential to recognize the limitations of rule-based chatbots, such as their inability to handle complex or unique queries effectively.

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