

Agrobot: NLP based Image and Text Query Chatbot

Vishakha Shelke, Amit Gupta, Santoshi Bisht, Radhika Gupta

Abstract: Technology is getting advanced day by day in almost every fields. But farming is a field in which the advancement in technology is still lacking in many of the rural areas. Farmers in the rural area still follow the traditional method of collecting information that is talking to each other but the information they obtain through this might not be accurate. So the proposed system aims to solve all the farming related queries within a short instant. The proposed system is named as Agrobot and is an intelligent system which can recognize misprinted words, avoids grammatical mistakes and gives output even if the sentence is inadequate. Agrobot is built using natural language processing techniques which takes the sentence does several processing on it and then the most suited result is displayed. To get the accurate output classification algorithms are used. Agrobot produces an output in text as well as in voice form. Agrobot is able to solve query in English as well as in Hindi language.

Keywords : Chatbot, Image Analysis, Machine Learning, Natural Language Processing, Text Query Processing.

I. INTRODUCTION

Agriculture is the industry that had lead the evolution of humanity from ancient times to modern days and fulfilled one of its most basic needs, i.e., food supply faithfully. In rural areas the people practice farming as it is kept followed by their ancestors to live.

The farmers are the most prestigious individuals who provides the food and are the reason for the survival of people in the world. The farmers of the India are most hard-working farmers from all over the world. Nowadays there are lot of advancement in the farming techniques. But there is lack of availability of the platform that provides knowledge related to advanced techniques used for farming. To get any farming related information they need to undergo lots of searching steps, still the desired outcome is not met.

Revised Manuscript Received on May 21, 2020.

* Correspondence Author

Vishakha Shelke, Assistant Professor and Project Co-coordinator in department of Computer Engineering at Universal College of Engineering, Mumbai.

Amit Gupta, B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai india.

Santoshi Bisht, B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai India.

Radhika Gupta, B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai.

Farmers usually seek help from other farmers within his region or search for his query on internet. But the problem is, sometimes a farmer doesn't get the proper guidance due to non-availability of a person. Krishonnati Yojna, Rashtriya Pashudhan Vikas Yojna, and many more schemes came into existence to help the farmers gain profit through it, but this information is not reachable to the farmers. So, the proposed system AGROBOT will help the farmers to get the information related to farming round the clock. Agrobot is designed to solve farming related queries in multiple language like English and Hindi such that the farmers from different states in India could be benefited. This system Agrobot is designed using natural language processing and prediction algorithm so that the users can interact in a personalized way.

II. LITERATURE SURVEY

The work done till date is explained by literature survey. The concept of chatbot was proposed by Sindhu Bhavika R. Ranoliya, Nidhi Raghuvanshi and Sanjay Singh, which gives a powerful and precise response for any question dependent on the dataset of FAQs utilizing Artificial Intelligence Markup Language (AIML) and Latent Semantic Analysis (LSA). Format based and general inquiries will be reacted utilizing AIML and other assistance based inquiries utilizing LSA to give reactions to the query whenever that will serve client fulfillment. This chatbot can be utilized by any University to answer FAQs to concerned understudies or parents in an intuitive way. The framework was restricted to reaction just content inquiry. [1]

Aakash G Ratkal, Gangadhar Akalwadi, Vinay N Patil and Kavi Mahesh chipped away at improvement of Farmer's Analytical Assistant to foresee crop yield and cost of harvests that a rancher can get from his property, by investigating designs. With the utilization of a sliding window non-direct relapse procedure and considering different variables influencing horticultural creation. The examination is accomplished for a few regions of the province of Karnataka, India. [2]

Niloofar Hezarjaribi proposed the thought on advancement and approval of Speech2Health, which can be a voice-based portable sustenance observing framework that utilizes discourse preparing, regular language handling (NLP), and content mining methods during a unified stage to encourage nourishment checking. The framework gained an exactness of 97.7 percent. It upheld both sound whilst info information and altered over it to content organization. After changing over the verbally expressed information to content, sustenance specific information are identified inside the content utilizing a NLP-based strategy that joins standard NLP with our presented design mapping system. Within the accompanying that they had built up a layered coordinating calculation to look through the nourishment name in

their sustenance database and precisely figure the calorie consumption esteems. [3]

Thomas N.T. suggested a chatbot which consequently gives quick reactions to the clients hooked in to the informational collection of Frequently Answered Questions(FAQs), utilizing Artificial Intelligence terminology (AIML) and Latent Semantic Analysis (LSA). Format based inquiries like welcome and general inquiries are going to be addressed utilizing AIML and other help related inquiries use LSA to offer reactions. The formats and examples for general client inquiries utilizing AIML needs improvement. [4]

Kyo-Joong Oh, DongKun Lee, ByungSoo Ko and Ho-Jin Choi proposed a conversational assistance for mental therapeutic administrations coordinating. The system balanced procedures to appreciate managing substance subject to of raised level basic language understanding (NLU), and feeling affirmation reliant on multi-secluded approach. The systems engage predictable impression of customer's enthusiastic changes carefully. In like manner, the practicality of directing gives indications of progress, by then the satisfaction to customers who need passionate wellbeing care will improve. [5]

Md. Shahriare Satu, Md. Hasnat Parvez and Shamin-Al-Mamun indicated an audit of coordinated applications with AIML based chatbot. Right now of human an AIML based chatbot is utilized for connection. The discussion with the bot was so genuine. They additionally said about the minimal effort and configuration of AIML based chatbots. [6]

Rashmi Dharwadkar and Neeta a Deshpande clarified that the clinical chatbots working relies upon Natural language handling that encourages clients to present their concern about the wellbeing. The client can ask any close to home question identified with social insurance through the chatbot without truly being accessible to the clinic. They utilized Google API for voice-content and content voice transformation. Question is sent to chatbot and the client finds related solution which is shown on android application. This system mainly focuses on analyzing user's sentiments. [7]

Abbas Saliimi Lokman, Jasni Mohamad Zain, Fakulti Sistem Komputer, Kejuruteraan Perisian proposed a plan to build up a chatbot that will work as virtual diabetes doctor to do a fundamental finding on diabetic patients. There was a compelling us age of a chatbot in clinical field demonstrated by the achievement of VPbot. VPbot reproduces patients that clinical understudies can "meet" through an online interface. A design coordinating procedure will be done with the end goal for chatbot to recognize watchwords from patient's information sentence. It will Create a variety of conceivable contribution to be coordinate (sentence, expression and words) by utilizing Sequence Words Deleted (SWD) strategy. Here the discussion to be constrained by chatbot as opposed to by client (prefers some other chatbot program) by causing the client to stay to the discussion point and not to enter any immaterial info, and on the off chance that they do, chatbot will reaction that the information was not justifiable and continue rehashing the past inquiry until the watchwords is detected. [8]Jia J., paper distributed in AACE portrays human is more confident with a robot as a visiting accomplice for communicating in any language. Thus, the examination was led to gather information on the use of electronic human-PC exchange framework with common language (chatbot) for showing unknown dialects to the clients. [9]

ELIZA was a development of Joseph Weizenbaum in 1966. It was a program working inside MAC time sharing framework in MIT (Massachusetts Institute of Technology) which made a sort of common language discussion conceivable between the PC and the man. [10]

III. PROPOSED SYSTEM

The Agrobot uses Natural Language Processing (NLP) and Convolution Neural Network (CNN) technology to accomplish desired output for user's query. The Agrobot System accept textual query to be answered and infected leaves for analysis as an input. For text as an input NLP is employed. The essence of NLP lies in making machines (computer, dialogue based system, clinical expert system) understand the natural language. The system will interpret the sentences which are syntactically not correct. The textual query entered by the users follows text pre-processing stages. Firstly, the complete text is converted to either lowercase or uppercase. Next is that the tokenization step where string of text is tokenized into a list of tokens. Sentence tokenizer is employed to search out list of sentences and word tokenizer is employed to search out list of words. The further step follows removal of stop words. Stops words are the foremost common words utilized in the sentences which are filtered out before or after processing of text. These stops words are removed so it might not contribute in classifying the text and then stemming processes is distributed where the list of words are converted to their root/stem/base words. For image analysis CNN is employed for effective output. CNNs incorporates convolutional layers, which are sets of image filters convoluted to photographs or feature maps, together with other (e.g., pooling) layers. Data is extracted from every small segment of leaf with the assistance of hidden layer and suitable features so to unravel the classification problem. The bot is trained with the textual and image training dataset. Fig.1 shows the system architecture of the Agrobot.

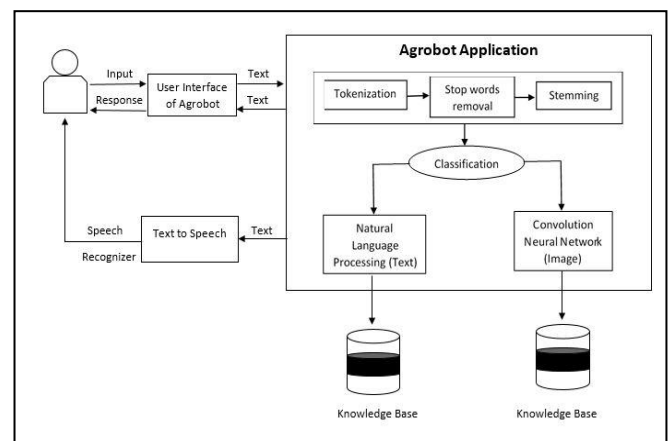


Fig 1. System Architecture of Agrobot

The query is then forwarded to the appliance where it undergoes text pre-processing stages. Based on the input provided by the user it is classified as image or text input. If the input provided is text, user will receive the output in text as well as voice form. If input provided is image Agrobot will analyze the image and supply with remedies. The various modules in the Agrobot system are:



a) Pre-Processing of Text

The user entered queries are tokenized into list of token words using the bags of words technique, and therefore the stop words (like are, is, the, etc.) are removed using NLTK (Natural Language Toolkit) Corpus. The stemming process converts the words to their root/base/stem words. For example, transportation, transporting is converted to word transport which is the root word. The whole process of text pre-processing is shown in Fig 2.

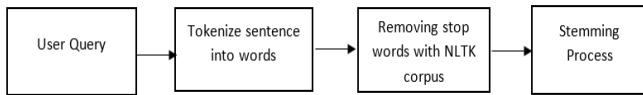


Fig 2. Text Processing

b) Agrobot : Training and Testing

All the agricultural related queries and image for training are stored in the database. Agrobot Application is trained with thousands and thousands of queries so that output provided is accurate.

c) Speech Synthesis

The textual output generated by bot is passed through Google API. The Google Speech Synthesis gets text input and converts it into speech and provides it as output. The output can be heard through the speaker as shown in Fig 3.

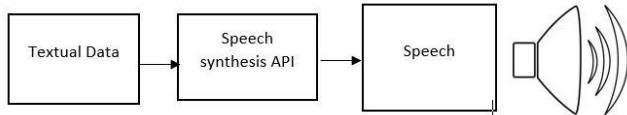


Fig 3. Speech Synthesis

d) Image Analysis

The infected image given as the input for analysis get processed with the help of Convolution Neural Network (CNN) and then the response is given by the Agrobot in the textual form with diseases name and remedies to forestall the pest. Example – image of the crop with pest is given as the input then bot will give detail description and remedies of that pest.

e) Multilinguality

The Agrobot Application supports multilingual features. Farmer can chat in English and Hindi language.

IV. RESULT AND DISCUSSION

The snapshots here forth endorse Agrobot: NLP based Image and Text Analysis’s actual outputs that may be seen and interacted by the user. Fig 4. Shows the output response of Agrobot in text format showing multilinguality feature implemented successfully. The output is also given in the form of voice.

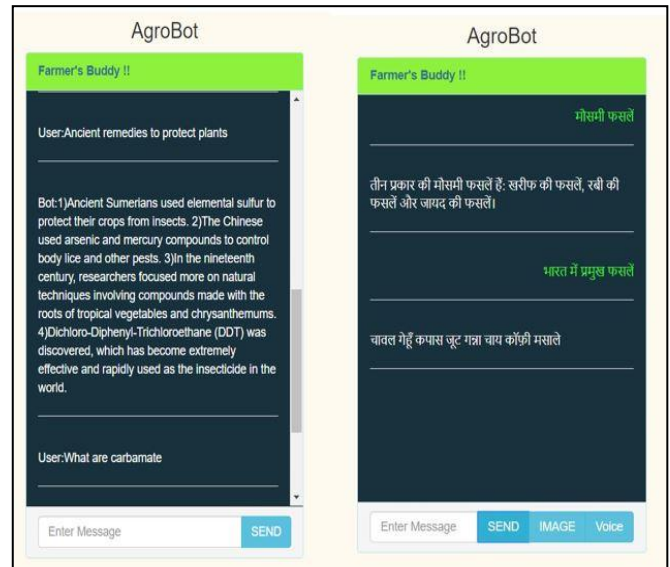


Fig 4. Output Response 1 (Multilingual)

Fig 5. Shows an image which is been analyzed and in the output the status of the leave in the image along with the appropriate remedies is given.

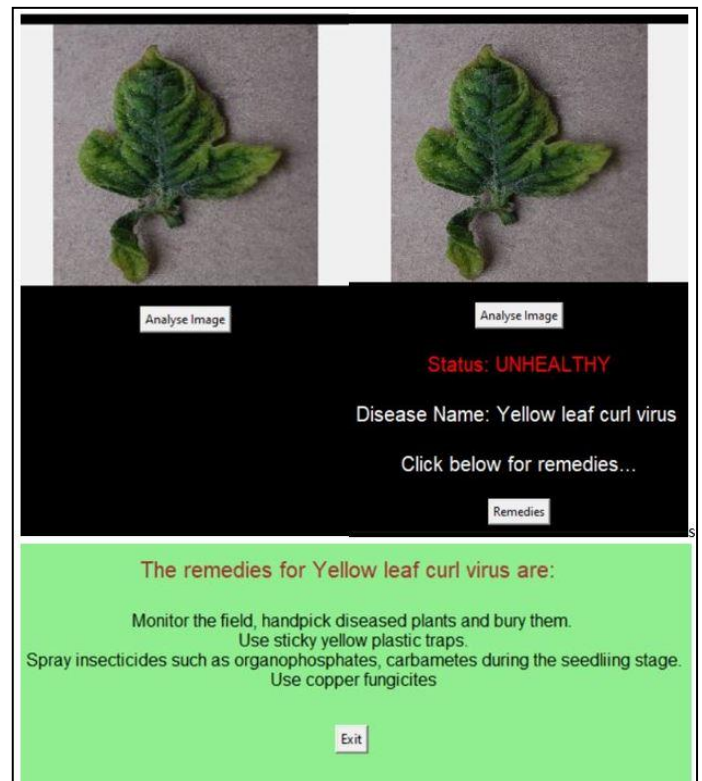


Fig 5. Output Response 1 (Image Analysis)

Fig 6. shows graphical representation of efficiency considering various parameters in the leaves disease like late blight, yellow leaf curl, bacterial spot. The efficiency comparison is done between proposed system and other available techniques. diseases annually cause an 11 to 16 percent reduction in the value of rice, wheat, corn and potato harvest.

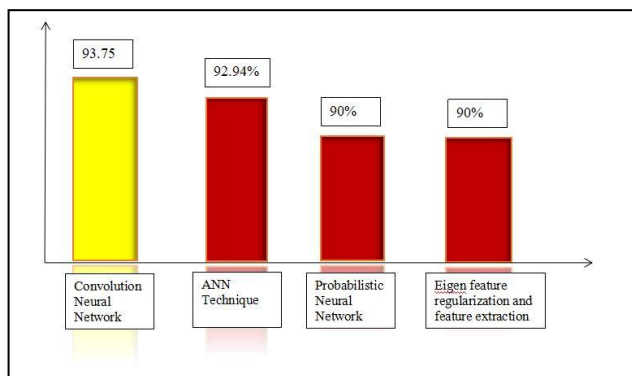


Fig.6: Efficiency of Proposed System

Additional losses to these major crops as a result of pest is estimated at 9 to 21 percent. So, the proposed system “Agrobot” will provide information about the diseases faced by the particular plants. It will also provide information about how to save the plants from particular pest. This will help the farmer in increasing the yields and protecting plants from various pest attacks.

V. CONCLUSION

Indian farmers face lots of problem regarding improper information about agriculture. For any query they need to go to another farmer who may or may not know the answer. So, the proposed system Agrobot will help the farmers to solve their query 24/7.

It is estimated that there is reduction in the value of several crops due to the plant diseases. Additional losses to the major crops results as the pest is estimated at 9 to 21 percent. So, the proposed system Agrobot will provide information about the diseases faced by the particular plants. It will also provide information about how to save the plants from particular pest. This will help the farmer in increasing the yields and protecting plants from various pest attacks.

REFERENCES

1. Bhavika R. Ranoliya, Nidhi Raghuvanshi and Sanjay Singh, “Chatbot for University Related FAQs”, in *International Conference on. IEEE, 2017*.
2. Aakash G Ratkal, Gangadhar Akalwadi, Vinay N Patil and Kavi Mahesh, “Farmer’s Analytical Assistant”, *Institute of Electrical and Electronics Engineers, 2016*.
3. Niloofer Hezarjaribi, “Speech2Health: A Mobile Framework for Monitoring Dietary Composition from Spoken Data”, *Institute of Electrical and Electronics Engineers, 2017*.
4. N. Thomas, “An e-business chatbot using AIML and LSA”, in *Advances in Computing, Communications and Informatics (ICACCI), 2016 International Conference on. IEEE, 2016*.
5. Kyo-Joong Oh, DongKun Lee, ByungSooKo, Ho-Jin Choi, “A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation”, *IEEE 18th International Conference on Mobile Data Management , 2017*.
6. Md. Shahriare Satu, Md. Hasnat Parvez, Shamim-Al-Mamun, “Review of integrated applications with AIML based chatbot”, *International Conference on Computer and Information Engineering (ICCI), 2015*.
7. Rashmi Dharwadkar, Neeta A. Deshpande, “A Medical ChatBot”, in *International Journal of Computer Trends and Technology (IJCTT), June 2018*.
8. Abbas Saliimi Lokman, Jasni Mohamad Zain, Fakulti Sistem Komputer, Kejuruteraan Perisian, “Designing a Chatbot for Diabetic Patients”, *ACM Transactions on Management Information Systems (TMIS), August 2015*.

9. Jia J., “The study of the application of a web-based chatbot system on the teaching of foreign languages”, *The 15th annual conference of the Society for Information Technology and Teacher Education(SITE), 2004*.
10. Joseph Weizenbaum, “ELIZA—a computer program for the study of natural language communication between man and machine”, *CACM, 2002*.

AUTHORS PROFILE



Mrs. Vishakha Shelke received M.E Computer from Savitribai Phule University. Currently working as an Assistant Professor and Project Co-coordinator in department of Computer Engineering at Universal College of Engineering, Mumbai. She is Faculty Head of the “Smart Organic Farming” initiative at UCoE. She has 11 years of teaching experience. Her area of interest is Machine Learning, Artificial Intelligence.



Mr. Amit Gupta currently pursuing B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai. He will be completing his undergraduate degree by June 2020. He is Student Head of the “Smart Organic Farming” initiative at UCoE. He has 1 year of trainer experience as a Internshala Certified Internship Trainer. His area of interest is Natural Language

Processing.



Miss. Santoshi Bisht currently pursuing B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai. She will be completing her undergraduate degree by June 2020. She is Technical Head of the “Smart Organic Farming” initiative at UCoE. She is highly focused on research work and a competent academic career.



Miss. Radhika Gupta currently pursuing B.E in Computer Engineering from Universal College of Engineering affiliated to University of Mumbai. She will be completing her undergraduate degree by June 2020. She is Research Head of the “Smart Organic Farming” initiative at UCoE. She has worked as a team leader for a Digifuse company and has a good teamwork and leadership qualities.