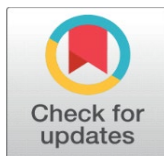
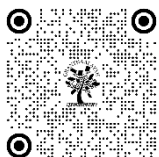


GRIETBOT - A CHATBOT FOR GRIET COLLEGE

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ABSTRACT

This work aims to develop a chatbot for our college that gives apt responses to user queries. Our college GRIET does not have any chatbot. So, developing a chatbot GRIETBOT would be beneficial to staff, students and parents as well. Through this, communication becomes easier, fast and accurate. Anyone with mere knowledge of English language can access and know more about the college. All the information regarding college student bodies, infrastructure, faculty, sports, department details give users an elaborated view about our college. It helps in increasing student-college bond and enhances student's overall growth.

Keywords: Chatbot, AWS, Amazon Lex, Kommunicate, NLP, QA Model, NLU, Lambda Function

1. INTRODUCTION

Chatbots are answering engines that simulate human conversation using artificial Intelligence (AI). They integrate system with the web-pages which helps to utilize by the larger dividends. Communication is eased with the help of chatbots as they're almost like virtual assistants answering via text messages. Conversations generally are either text-based conversation, verbal or non-verbal. Users can use chatbots through Desktop, Mobile Phones or other peripheral devices which work on active connection of Internet. Capability of understanding and replying the query suitably through messages is one amongst the main advantages of chatbots. One text is enough for chatbots to know the query instead of following multiple steps. Due to 24/7 availability, chat bots improved the response rate compared to an individual's support team.

The fundamental idea of GRIETBOT is to decrease the responsibility on college's office and reduce the time interval. Grietbot's design is based on college chatbot system through which we can answer queries regarding academic activities such as admissions, fee structure, college scholarship details, time-table of every department and other details. Repeated questions can be answered without any inconvenience. The dataset is acquired from different website of our college

manually. The excel format for storing user's input is converted into JSON format because multiple patterns cannot be mapped to the intent at the same time.

2. RELATED WORK

The Chatbots are of two types: Rule-Based and AI Based. Rule based chatbots are used to answer questions that are simple, guided by a decision tree, with a set of pre-defined options that lead to an appropriate answer. AI chatbots use natural language processing (NLP) technologies to understand the intent behind the question and solve the user's problem without any human assistance. [1] The difference between both chatbots is the usage of machine learning models. Different models that increase chatbot's functionality as it can identify hundreds of different questions written by a human, leading to insightful and dynamic thinking.[2] RASA, an open-source framework can also be used to build AI bots. This framework mainly has Rasa NLU and Rasa core. Rasa core handles the dialog engine for the framework and helps in creating more complex chat bots with customization. Rasa's NLU helps developers with technology and tools necessary for capturing and understanding user input, determining the intent and entities.

The entire process of implementing chatbot is divided into four parts -System Analysis, Design, Development, and Testing. [5] Required number of questions are defined for each and every role. Role refers to the domain or category or department of college. In this paper, 150+ queries and responses were prepared to train the chatbot. The answers to known questions are replied using already stored information in knowledge base. If match is not found for any query, such questions are answered by admin person. This time the new query along with answer are stored in the knowledge base. This helps reduce the burden on admin to answer similar queries repeatedly. "Porter stemming" algorithm (or 'Porter stemmer') is used for removing suffixes from words in English. This is useful for information retrieval. [1] In order to measure how similar, the word order between two sentences is, "word order vector" is utilized.[7].

[6] The NLU (Natural Language Understanding) is used to convert input or queries into intent by using the (NLP) Natural Language Processing. Integrating college chatbot with Facebook can help convert 32 languages, including Indian language "Hindi"[4] "College Enquiry Chatbot" is of two types:1. Pre-define set of rules. 2. Self-trained set of rules. In first type, it provides the limited number of pre-defined set of rule queries or texts. It has an ability to response those request which is already in the dataset. If anyone asked a different query and it is not defined in dataset, then it is not a well-trained Chabot. On the other hand, query which are not characterized or defined to the bot, would not react as wanted because it is not prepared about what client require. These bots are not extremely keen when compared with other type of bots. The query asked by user is a simple English language. In second type, it provides self-learning to the Chatbot. When someone asks an un-defined query to the Chatbot then chatbot learns the query and trains by the admin. So, it is called the self- trained bot. This type of query is different from the predefined set of queries. It gains answers from past discussions it had with individuals.

Table 1. Comparisions Among Different Chatbots

1	K.Bala , Mukesh Kumar, Sayali Hulawale, Sahil Pandita[1]	To help the user to know about the college-related activities with the help of this web application.	Pattern matching	Particular question if not found in the database such questions are answered by admin person	Questions are predefined in the data base	Apachetomcat, mySQL database	2017
2	Amey Tiwari,Rahul Talekar, S.M.Patil [2]	Answer the students queries which are related to college.	Keyword matching	If we enter one keyword than we get answer for the query	Larger database should be maintained	wamp server, mysql 5.6	2017
3	Akshay Kumar, Pankaj Kumar, Meena, Debiprasanna Panda, Sangeetha[3]	Simple and user friendly chatbot	LSA	User can easily get answers for the query	The chatbot can answer only those questions which he has the answer in its AIML dataset	Flask	2019
4	NidhiSharma,Gayatri[4]	The student will be updated with the college	Pattern matching	Response is fast and efficient	If somebody misspelled it, then,	Flask, Spyder	2021

		related information			at that point it doesn't react.		
5	K. Arun, A. Sri Nagesh, P. Ganga[5]	An chatbot for engineering colleges	nlu	Dialog flow is not needed any coding	The training of each and every word is difficult.	Dialog flow, Facebook api	2019
6	Manisha Sonawane, Shubham Kasar, Siddhesh Pednekar, Siddhi Suvare[6]	A web application Provides required information to the user regarding user query	Keyword matching	save time and get proper information	It is difficult to make a large Q and A maker	Anaconda, MySQL	2021
7	Nikita Ingale, Tushar Anand Jha , Ritin Dixit, Vishal Kisan Borate[7]	A chatbot which can resolve student's queries, search the result for query and give the solution	Word Embedding	Easy to use	Creating the document vector	Rasa, Python 3.6	2021
8	Shravan Kulkarni, Mridula Kulkarni, Shreya Joshi, Anala Kulkarni[8]	It identify answers related to user submitted questions	patter matching	It is scalable and easily maintainable	It require a huge Knowledge base	spyder	2020
9	Raju Shanmugam, Soumya Ranjan Jena,Vishvaketan Gaur[9]	Help the students to overcome from the helpdesk chaos.	stemming	It helps to save time from the crowd outside the enquiry office.	Language issue may arise	spyder	2020
10	Emil Babu, Geethu Wilson[10]	Helps the students to get the right sources of information	Comparing	provides an instant and accurate response	Only few queries are available in database	MySQL	2021

3. METHODOLOGY

Amazon Lex is an AWS (Amazon Web Service) service for building textual conversational chatbot. The functionality and flexibility of NLU (natural language understanding) and helps in building interactive and conversational chatbot. Specifying the conversation flow in the AWS Lex console leads to creation of AWS Lex chatbot. Amazon Lex manages the dialogue flow and dynamically adjusts the responses in the conversation of the chatbot. By using the Lex console, we can build, test, and publish our text chatbot. Conversational interfaces to bots on mobile devices, web applications, and chat platforms can be added using Amazon Lex (like Facebook Messenger)

Amazon lex provides features to build, deploy, scale, and monitor the chatbot. This bot consists of several configuration items such as intents, utterances, slot types, channels and lambda functions. A single bot can comprise of multiple intents. An intent represents an outcome or action. Different kind of phrases that user types to activate the intent are called utterances. A procedure to complete or fulfill the intent is called fulfilment process. In addition to the custom intents, lex provides several built-in intents than can be used. Each intent may require additional attributes or slots, from the user to complete this intended outcome. Slot types provide a typing system for slots. That is, each slot which is defined can be used to specify a slot type. The intents are specific to the type of query given by the user. Some of the intents include details regarding their academics, announcements, timetables, course details, attendance, academic prompts, and information regarding various student bodies of the college. The chatbot gets all this information from the AWS S3(Simple Storage Service), a service that provides object storage through a webservice interface, linked to it.

Amazon Lex has pre-built connectivity with AWS Lambda and can be easily integrated with many other AWS technology platforms, such as Amazon Cognito, AWS Mobile Hub, Amazon CloudWatch, and Amazon DynamoDB. Integration with Lambda provides bots access to pre-built serverless enterprise connectors to link to data in SaaS applications, such as Salesforce, HubSpot,or Marketo.

Automated Question Answering Systems (Automated QA) is the model used here which tries to answer user-defined questions automatically by looking at the input text. 'NER' is one of the key components in such systems because it allows QA systems to identify what type of question they need to answer and extract the relevant information from the input text for answering that specific question. QA models are first trained on QA corpora then fine-tuned on questions and

answers created from the NLU annotated data. Through transfer learning, this contextual question-answering knowledge is then used for finding intents or slot values in text inputs.

NLP is used in this chatbot that enables computers to understand natural language as humans do. It uses artificial intelligence to take real-world input, process it, and make sense of it in a way a computer can understand. Similar to humans who use different sensors like ears to hear and eyes to see, computers have programs to read and understand the text. Similar to human's brain which is used to process that input, computers have a program to process their respective inputs. During processing, the input is converted to code that the computer can understand.

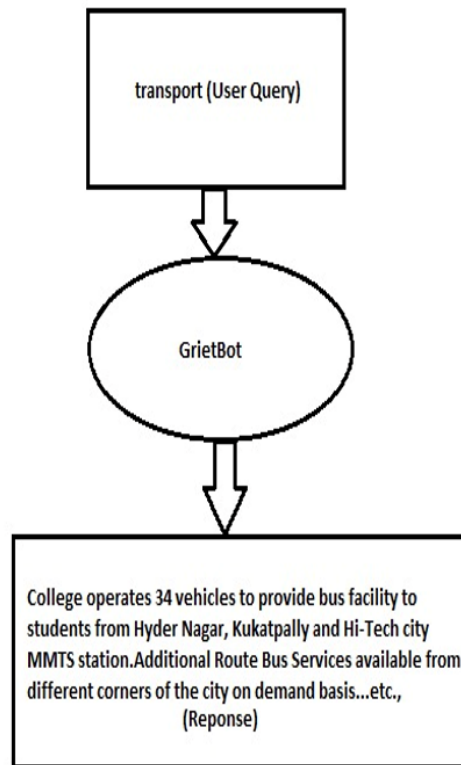


Fig. 1. GrietBot process flow

G_Charles_Babu	charles babu, G.Charles Babu, g.charles babu, babu	Dr.G.Charles Babu, Professor of Computer Science and Engineering Department, completed his Ph.D from Acharya Nagarjuna University (ANU) in 2015.He has over 21 Years of Professional Experience in Various Institutions in Telangana & Andhra Pradesh. He completed M.Tech (Software Engineering) from JNTUH Campus Hyderabad in 1999 and Completed B.Tech (CSE) from Koneru Lakshmaiah College of Engineering (KLCE) in 1997. Dr.G.Charles Babu Research interesting areas are Data Mining, Big data, Cloud Computing , Machine Learning. He Published around 60 Papers in Various International Journals and Conferences.He Published 4 Patents. He guided 32 M.Tech Projects and 50 B.Tech Projects.
J_Praveen	Principal, Principal of griet, Principal of gokaraju Rangaraju, Principal of gokaraju rangaraju institute of engineering and technology, j praveen	Dr. J Praveen, principal of GRIET, has done his PhD from Osmania University in power electronics, Hyderabad. His research work carried out at BHEL Research and Development Center with the support of University Grants Commission (UGC) Junior Research Fellowship (JRF).
Jandhyala_N_Murthy	Director, Jnm, Director of gokaraju Rangaraju, Director of gokaraju rangaraju institute of engineering and technology, jandhyala n murthy	Dr Jandhyala N Murthy, Professor and Director of GRIET studied PUC(MPC) from Maharajah's College of Vizianagaram(1969-70) and then BTech(Mechanical) from IIT Madras (1970-75), MS (Thermal Power)(1982-84)and PhD (Thermal Power)(1985-88) from Cranfield Institute of Technology, UK.
About_Griet	Griet, Griet College, What is Griet	Gokaraju Rangaraju Institute of Engineering and Technology (GRIET) is established in 1997 by Dr. G Gangaraju as a self-financed institute under the aegis of Gokaraju Rangaraju Educational Society. GRIET is approved by AICTE, New Delhi, permanently affiliated to and

		autonomous under JNTUH, Hyderabad. GRIET is committed to quality education and is known for its innovative teaching practices. check the link to know about GRIET : http://www.griet.ac.in/about.php
Location	Address, address, where is griet	Gokaraju Rangaraju Institute of Engineering and Technology is located in : Bachupally, Survey No. 288, Nizampet Rd, Kukatpally, Hyderabad, Telangana 500090. Check out the link to locate in googlemaps:https://www.google.com/maps/search/griet+location/@17.520876,78.3665002,16z/data=!3m1!4b1

4. RESULT AND ANALYSIS

Intents in this context are similar to patterns in JSON format. They are like titled keywords. Each intent has it's own utterances(tags) and messages(responses).

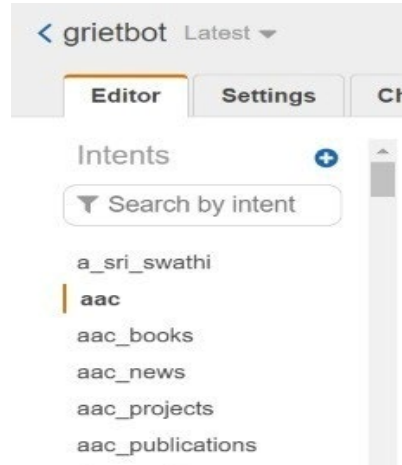


Fig. 2. Intents of GRIETBOT

Utterances are similar to tags in JSON format. There can be more than one utterance for an intent. Utterances simply are all the ways in which a user can type a query. Example: If user wants to know about CSE department, they can type "about cse", "cse", "information about cse", "tell me about cse".

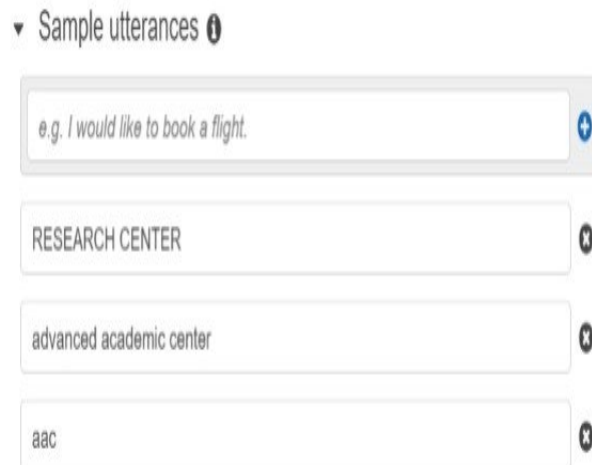


Fig. 3. Utterances of GRIETBOT

Responses are called "fulfilments" (messages) that grietbot sends, when an intent is triggered. There are two ways to define a response. One way is to create a lambda function, other is that lex returns the information. In the first way, a lambda function can be created which will be called when the intent is triggered. When triggered, lex sends details such

as intent and slot details. Then, lambda function performs appropriate action and decides which response to be sent to the user. Another way is that lex returns the information such as intent and slot details back to the client application to do the necessary fulfillment. The second procedure is indeed a time taking process and requires continuous monitoring.

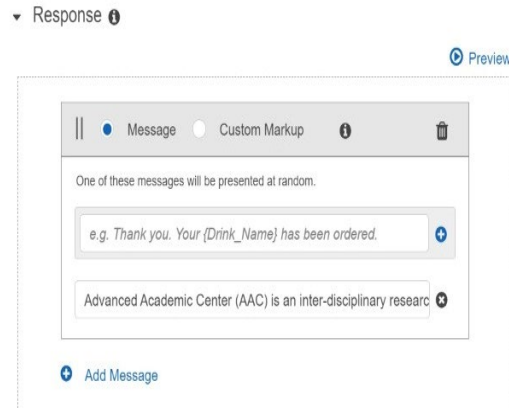


Fig. 4. Response of GRIETBOT

When a user provides all the data required to fulfil intent, lambda function will be invoked. Lex sends data to lambda function in a specific format and thus performs the business logic. Then it returns the result to lex in the mentioned format. Further, Lex forwards this response to the user. Lex can be used to integrate bots with some platforms such as Facebook, Kik, Slack, etc. The chatbot can also be integrated into personal website. It can be done either using “AWS SDK” (Amazon Web Services Software Development Kit) or using “Kommunicate”. In this paper, the data in lex is added to “Kommunicate” and further integrated to our own website. The integrated GRIETBOT is now ready to be executed and give responses to the users regarding GRIET. The responses of few user inputs can be observed in Fig. 5, Fig. 6 and Fig. 7.



Fig. 5. About GRIET

Fig. 5. represents the output or response when a user types a request. In this case, information about GRIET college is given as response. In addition to it, a link is also provided after a brief description of college. With the help of this link, one can access all the necessary information regarding college in detail.



Fig. 6. About Principal of GRIET

Fig. 6. represents the response when a user asks a query regarding principal of our college GRIET. The advantage here using this chatbot is that anyone with mere knowledge of English language can get access to information regarding our college. The utterances help in getting suitable responses to queries.



Fig. 7. About Location/Address of GRIET

Fig. 7. represents the response when a user asks a query regarding location of GRIET. GRIETBOT also gives response when asked for “address of griet”. The link provided here can redirect to the google maps and show the users exact location so that it becomes easy to find the address of college. The main advantage is that the queries need not be in complete sentence format. Responses are given even if they type “address”, “location”, “location of griet”, “where is griet?”.

5. CONCLUSION

As the usage of chatbots is becoming popular in our day-to-day lives, it is very advantageous for colleges and universities as well. We can find that from managing small requests such as college route maps to handling more complex tasks like course details, class schedules, etc., chatbots help in making students' life more easy, dynamic, and focus on their core duties. In this regard, GrietBot, the first chatbot for our college GRIET, is developed in this paper. The chatbot accepts the query from the user and the preprocessed query is passed as input to the proposed model. The response to the query is displayed as output.

6. FUTURE WORK

The future enhancement of the project is to enrich GrietBot by adding more features such as voice recognition system and adding regional languages. so that users can communicate more efficiently in their regional languages. The accuracy can be further improved by adapting various deep learning techniques. The future enhancement of the project is to enrich GrietBot by adding more features so that it will be a good online college inquiry system for GRIET.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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