International Journal of Innovative Research in Engineering
Volume 4, Issue 2 (March-April 2023), PP: 427-432.
www.theijire.com ***ISSN No: 2582-8746***

Ask-Me – A BnB's Hybrid Chat bot using RASA

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How to cite this paper:
Sai Vivek P[1],Vishnu Priya V[2], Vishnu Teja K[3], Hussain B[4], Harish B[5], " Ask-Me – A BnB's Hybrid Chatbot using RASA", IJIRE-V4I02-427-432.

https://www.doi.org/10.59256/ijire.2023040213

Abstract: *Chat bots are computer programs that can communicate with humans just like humans use Natural Processing functions (NLP) in communication. The main goal of this project is to design the Hotel Chat bot called Ask-Me Bot. Ask-Me Bot provides all the basic features required for hotels like booking rooms, breakfast convenience, FAQs, booking or canceling hotel or restaurant reservations, etc. To interact on communicating platforms with many customers, they can write different programs that converse just like humans known as Chat bot. In this, we make Ask-Me Bot for hotels.*

Key Word: *Chat bot, Rule-based, Artificial Intelligence, Natural Language Processing,.*

I.INTRODUCTION

Chat bots are also called chatter bots. This chat bot can be developed using an Artificial Intelligence application. This completely gives permission for humans to interact with digital services just like communicating with other beings. Artificial Intelligence chat bots use machine learning, an AI feature that enables bots to get smarter with use over time. The customer care functions of these chat bots are ideal. Chatter bots use digital instant messenger to talk or communicate with people and can be applied to a variety of applications. They can also be integrated with websites like B2B's, services, and E-commerce for Business purposes.

Chat bots For Business: Businesses are using chat bots to increase sales and improve customer service. They have compiled a comparison and review list of the top AI chat bot systems to demonstrate the wide range of prices and features in the chat bot space. This is a progressive collection that is updated regularly.

Types of Chat bots: A user's interaction with her AI chat bot system is defined by type. All systems have conversational chat bots that use AI or logic, and even systems that switch to humans in such chat sessions. There are four types of chat bot

1.Rule-based chat bot : Without AI, rule-based chat bots use a tree-like flow to guide guest questions. This means that the chat bot guides guests through a series of follow-up questions to arrive at the right solution. The structure and responses are all pre-determined, giving you full control over the conversation.

2. AI Chat bot: Chat bots are also known as chat bots. It's a type of AI used in messaging apps. It also contributes to improving customer convenience. They are programs that are coded to interact with customers like humans do and cost little or nothing to capture.

3. Live Chat: A live chat is a discussion between two of her users that involves sending messages over the internet, especially to obtain or share information about a company's products. The furniture company employs 20 "design consultants" who offer advice by phone, email'

4. Language base: A voice chatbot is a chatbot that can communicate using voice input and output. You can speak loudly to your bot as if you were talking to a person. Instead, answer in your own voice. Chatbots of a wide variety are software program applications that engage via conversation. This typically works through text-primarily based total enter and output.

Challenges: There are various advantages of using AI chatbots, one can put its power to work to expand customer happiness. When it comes to adopting Artificial Intelligence chatbots within the company, unfortunately, there are some major challenges.

Chatbot security- End-to-end encryption, authentication, and authorization may assure chatbot security. protocols and procedures. both awareness and education.

Unable to understand the emotions and sentiments of your customers- Because consumers may not even be aware of emotional motivators, identifying and quantifying them can be challenging. These feelings usually diverge from what consumers claim to be the factors influencing their brand decisions and from the words they choose to express their emotional reactions to specific companies.

Susceptible to data security breaches- security events that unintentionally reveal sensitive information or business-critical data Customer or client Payment Card Info and Personal Identifiable Info along with other important data could have been exposed.

Spoken language problems- the customers speak various languages for effective communication.

Goals and objectives: A chatbot can interact with a human being like a human. You may develop chatbots in any business field

Instant help for students- A chatbot can aid students by acting as a virtual personal tutor, improving student engagement, answering questions about course registration and enrollment, and doing administrative chores. Worldwide connections

Teaching Assistant- Created to complete a set of learning objectives by extracting intentions and entities from a student's free text conversation using NLP without restricting the learner to a predetermined set of possibilities.

Customize Chatbot- By pre-qualifying visitors and then proposing and scheduling a meeting with sales, custom chatbots convert interest into the pipeline. Your team has quality meetings and can concentrate on the deal rather than wrangling with the calendar.

It provides 24/7 availability- Chatbot helps to handle multiple quires and customer support 24/7

Voice-to-text- also referred to as a text-to-speech chatbot, employs text-to-speech capabilities and pre-recorded responses to respond to consumer inquiries.

Quality of conversation- The discussion should have a distinct, compelling, and intriguing flavor to it. possess knowledge The most crucial component is this. In the end, your chatbot or virtual assistant should be able to respond in a conversational manner to particular queries.

Solution: Use machine learning to understand the basic questions and emotions of the users and handle complex queries intelligently.

Chatbots are increasing rapidly over the years, and it is also gaining popularity in the hotel industry but most of them are not aware of chatbots and what chatbots can do and how they benefit from using the wide variety of chatbots.

So, we are working on BnB's Hotel Conversational AI Chatbot using RASA.

A BnB hotel chatbot is a type of chatbot that can give response to human interactions and can understand the actual human intent.

So, the chatbot can be deployed on behalf of the hotel and helps in meaningful interactions with customers.

II.RELATED RESEARCH

At first in 1996 MIT's Joseph Weizenbaum invented the first chatbot named as ELIZA. This Eliza can detect keywords in sentences and can perform pattern matches against certain predefined lists.

Amazon Echo, Alexa, Siri, and Cortana are the best examples of chatbots.

The principal purpose of this is to provide aliterature analysis of inventory management articles published in large logistics companies, identify topics from the literature, and provide future directions for inventory management research A literature review identifies, evaluates, and synthesizes literature relevant to a particular research area. Finally, we summarize the literature review on inventory management systems and explain why this system is essential for all organizations.

Alan Turing asked, "Can machines think?" Turing envisioned this issue as an "imitation game" (now known as the Turing test). In this game, the goal was to define a human by having an "interrogator" ask questions to human and artificial candidates. They believe robots can understand whether humans and robots actually resemble each other. It was called ELIZA. Later, we'll take a closer look at some of the bots developed in the late 20th century like ELIZA. In 2009, his company We Chat in China designed a more advanced chatbot. Since its introduction, WeChat has gained the hearts and minds of many users who display unshakeable allegiance. This is a tremendously flourishing social networking site.

It's less prominent and powerful than today's chat services like Telegram, Messenger and Slack, but that doesn't mean you can't develop sophisticated bots on WeChat. A sophisticated We Chat bot is produced by former google worker in 201by chumen wemen company.

The arrival of chatbots into communities ushered in the era of conversational interfaces. This is an interface that will soon require no screen or mouse. The interface becomes fully conversational, and this communication becomes indistinguishable from conversations with friends and family.

To fully explain the enormity of this impending reality, we may need to look back to earlier days of computing, when the desire for AI and conversational interfaces first arose.

ELISA: As already mentioned, ELIZA was the first chatbot. Designed by Joseph Weizenbaum in late 1966, it depends on pattern recognition and replacement ways to simulate speech.

The program is designed to closely resemble human interaction. The ELIZA chatbot works by typing words into a computer and matching them against a list of prepared answers. Use the script like a psychotherapist.

The script has had a major impact on natural language processing and artificial intelligence, with copies and adaptations appearing in academies around the country. On the other hand, the user's reaction upsets his Weizenbaum. ELIZA was intended to caricature human conversation, but users began to rely on it [12].

As for the benefits, below is a summary of some studies conducted by the researcher regarding his use of Chabot for tutoring.

A)Tailored learning: Students benefit from personalized attention as teachers understand areas where students are at risk. More professionals can be designed if specific students with different abilities have access to tutors. Students can learn more about their areas of interest.

Technology-Mediated Learning (TML) is known as "an environment where intelligent data technology mediates learners and their interactions with resources (readings, assignments, exercises, etc.), peers, and/or instructors." TML's branch personalizes learning and allows students to learn in real-time using bots.

Paper [1] outlines the advantages of employing chatbot education. This white paper will show students how Teachers

can also utilize chatbots. instructor feeds in advance A chatbot comprising a sequence of questions and responses. Students ask questions so the chatbot may answer a query. Therefore, time is saved. natural language OK, I'm using DL. Downside A model can only address a few questions. interaction. The Paper [2] describes how chatbots are designed under the hood of Messaging apps such as Facebook and Messenger. about 47 of them Chatbots are known to be of high quality. concept Including discussion and information gathering about humanity and how the best bots send personalized output. Bot discoverability on social media platforms is one of them. A big challenge because it requires word processing etc. Training is required for accurate results. Papers [3] Describe how chatbots are being used in e-commerce. suggests Products and Track User social media Send me updates about recommended products. give Individual recommendations are difficult, and Bot suggestions may not be liked by users.

Paper [4] outlines the process of learning English Word Pronunciation, Meaning, and Instruction Can be used in communicating in English. stage ASR, which includes dialogue management (DM), natural language generation (NLG), and text-to-speech (SS) [4]. The ASR phase continues with user input. The input received by the DM stage is processed. The NLG stage from the user is Questions from users. Finally, SS creates votes based on text output or votes based on text output. The user's preferred output text. Knowing what your customers want It is tough to provide as input since it involves text processing. More training is required for appropriate outcomes. Paper [5] A chatbot that can be able to answer all routinely asked enquiries is created. The model comprises a neural network inter-sequence model based on the RNN encoder-decoder. The Seq2Seq model with attention mechanism gives some insight into the question-answering system It is an instructional chatbot and the model has limited accuracy. Paper [7] It is aimed to enable older individuals participate. it will be It provides communications in both the text and voice. it works like one An ingenious radio that keeps people entertained many milliliters A model is used to find the optimal radio or news system. for users. This approach is really helpful for the elderly It motivates folks and keeps them away from loneliness. However, only 80% indicated they were pleased.

Paper [6] Android applications are created for the distribution of crucial knowledge. Education for those who are visually impaired. I'll try to answer user questions. In this approach, persons who are visually impaired can benefit from language-based output. Many people did not sign up to use this application; therefore, users should be well trained. Understanding user input, user attitude, interpreting input, and producing appropriate output have all been challenges. It is suggested in the paper.. Paper [9] illustrates how e-learning can aid with tailored learning and how time-consuming it can be. It is possible to save it in e-learning platforms. advantage Includes engaging dialogue and prompt replies at day or night irrespective of time. The chatbot is the only limitation. When it comes to learning solutions, it still lags behind actual human teachers. The existing record and knowledge foundation are still in their early stage, which is a major constraint for everyone. The paper [10] Describes the platform. On a single platform, all pupils can master different subjects. Students are able to find similar-meaning sentences in a different knowledge base using this learning platform. A video knowledge base andan article base are available. Students will then understand the solution much more rapidly. However, for training purposes, the model's accuracy is unimportant. [11] tells us to learn about different frameworks you can use during the development of A chatbot that considers various parameters. Non-AI chatbot. Non-AI chatbots are Less sophisticated than AI chatbots. not AI Bots are keyword driven. So, the bot is response based. The question given the top question becomes the following series of questions decided. But like AI bots, what means trying to make sense of the question being asked Answer questions by users? education is non-AI chatbots are easy and fast, while AI chatbots take more time.

SVMs and CRFs are used to determine intents and extract those entities in our chatbot,The k-Nearest Neighbor (KNN) technique is utilised to find the exact entities, while the LSTM algorithm is used for managing those.

III.METHODOLOGY

To build a Conversational AI chatbot we need to use RASA Framework.

RASA Frame work:The Rasa framework is made up of two components, Rasa NLU and Rasa Core. Rasa NLU is an open-source natural language processing engine for intent and entity classification. It basically processes unstructured user input and extracts meaning from it. There are many steps involved in this. Tokenization, vectorization, POS tagging, intent classification, etc. are a number of steps to name a number. Rasa Core is a machine learning framework that acts as a dialog management model. It takes structured input from the Rasa NLU and using a machine learning algorithm predicts the output to display. Simply put, the Rasa NLU is used to interpret the user's unstructured input and convert to structured data. Rasa core is used to decide the most likely response or action. Rasa NLU and Rasa Core are independent of each other and can be used separately if needed.

NLP combines the two main process one is NLG-Natural language understanding and the other one is NLU-Natural language understanding. NLP is a superset of NLU and NLG. NLU understands the importance of user input. Focusing primarily on machine readability, his NLU allows chatbots to understand the meaning of the text. NLU basically understands the text input given to it and classifies it into appropriate content.

NLU includes Natural Language Inference (NLI) and Interpretation, Semantic analysis,Answer the questions, Sentiment analysis, and Summary of user comments

The two main components of NLP are - natural language understanding (NLU) and natural language generating (NLG). For example, when you give input text into NLP the user's context is decoded by NLU structure and the reply is created by NLG.

IV.PROPOSED APPROACH

Rasa Modules

Any framework, such as tensor flow, may be used to develop a basic chatbot is built on top of DL and ML algorithms. They have to be constructed from the ground up. When applying Rasa, however, we merely utilize the Rasa modules for

training inbuilt model with input data from which the user intent may be collected, as well as change the output for the user intent.

1.Rasa NLU- Generating the NlUData:Rasa NLU is a critical module or file that specifies a collection of intentions so that the intent received from the user input text may be matched with any of the intents.

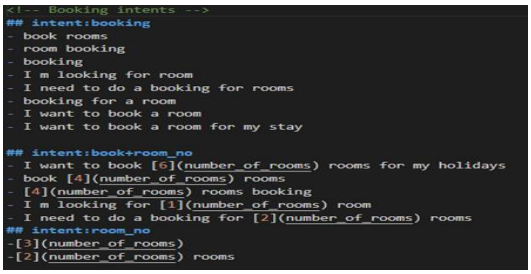

Fig -1: Examples showing the intent with entities

We can see from the above image that there are examples with multiple text phrases and purposes for each example.2. Rasa Rules Creating Relevant Responses Rasa rules are those that when an input text is provided and matched with intent in modules in rasa then the action is performed based on a rule. This is determined by the rasa rules module.

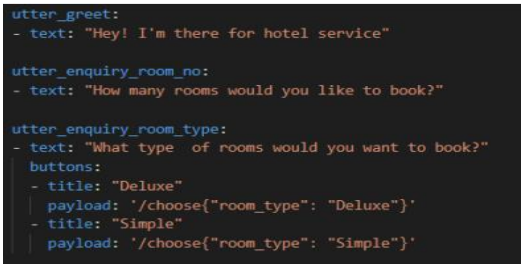

Fig -2: Example of answer pattern

We develop a range of pattern replies for each inquiry aim to keep the bot nimble and not too stereotypical and dull. Using the sample response patterns presented in Figure 2, the bot may execute the action "utter greet" by picking the answer pattern.

3. Rasa Stories- Building Dialogue Data: Stories in rasa are nothing more than a sequence of intents and responses in a conversation that is going to happen one after other. You can observe it from the screenshot below.

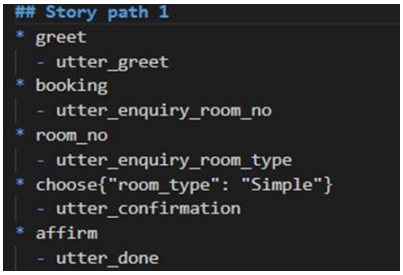

Fig -3: Example of dialogue data

Dialogue information, tales, or example conversations illustrate a dialogue and its relevant data about the chatbot and user from starting to end. The chatbot anticipates the context and executes the next action based on these discussions. The bot answers to each purpose with a meaningful response that relates to the Meaning of the interaction. A vast volume of conversation information is used by bot to anticipate and execute actions more precisely. Figure 3 depicts an example of dialogue data. In Figure 3, the previous action is utter_greet is the previous action and now booking is intent and utter_enquiry_room_no is the next action. 4. Domain.yml: Figures 1,2 and 3 all of them combined describe this module. Let's analyze an example for the input word "hello" from the user intent of greet will be matched therefore for the intent there are both actions and stories made. It may pick any action mentioned for that purpose. Here from fig 2 utter greet will offer a response as "Hey I am there for hotel services" to the user. 5. Custom Actions: Custom actions are the one that are used to produce answers according to user intent. This may be achieved by invoking the module actions.py within the action's subfolder. It allows you to change or create new classes. So, after understanding the user's purpose, and developing a response. The solution can come from domain.yml, which provides an action definition. In addition to that, we can specify an action in actions.py. The function's returned name may be employed as the action name. Whenever you insert this action name inside an action just as you did previously, that function that returns the name will be called. A thorough figure to grasp is as follows

```
class ActionHelloWorld(Action):

    def name(self) -> Text:
        return "action_relative"

    def run(self, dispatcher: CollectingDispatcher,
            tracker: Tracker,
            domain: Dict[Text, Any]) -> List[Dict[Text, Any]]:

        now = datetime.now()
        hrs= (int(now.strftime("%H"))+5)%24
        min= (int(now.strftime("%M"))+30)%60
        offset=int(tracker.get_slot("number_of_hours"))
        final_time=hrs+offset
        time=final_time+":"+min
        print("Sure, I have scheduled a cleaning at "+time)
        dispatcher.utter_message(text="Sure, I have scheduled a cleaning at "+time)
```

Fig -4: Depicts custom responses generated by custom action file

As shown in the diagram above, there is a class called Action Hello World which contains two main modules, one is name and the other one is run. The name module gets the name of the module, and the run module executes it. For example, if you want to schedule cleaning, there is an action called action_relative. So the final output can associate with the action and return value of the function as shown in fig. This will display a message for cleaning along with the time.

An utterance is initially divided into tokens, which are tiny pieces of text. This must take place before text features are enabled for machine learning, which is why a tokenizer is typically placed first at the beginning of a pipeline.

3. Results

We run experiments on PCs with Windows 11 operating system, Intel core i5-9500E @4.5GHz CPU, and 8GB Ram. In this chapter, we will see how our chatbot works and see at the per outputs of specific menu options in our project.

Algorithm:

Step 1: Tokenizers

Step 2: Featurizers For machine learning models, feature generators provide numerical features.

Step 3: Intent Classifiers After the features prodced for all tokens and sentences we now pass that into intent classification model. It is recommended that using Rasa DIET is best which can handle both the intent , classification, and entity extraction. This makes it able to learn from both sentence features and token features. Step 4: Entity Extraction DIET is capable of learning how to find entities and, but it is not necessary to use it. For example, entities that follow structured patterns like numbers don't really need an algorithm to detect them. We can simply handle it using RegextEntityExtractor.

B. Result Screenshot:

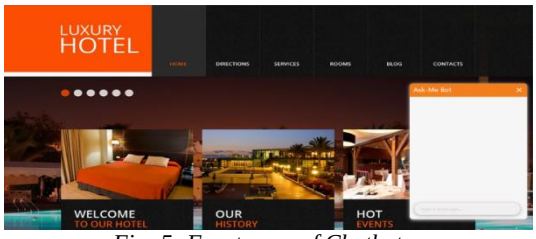

Fig -5: Front page of Chatbot

The above image tells that there is a chatbot with a hotel page at the background.

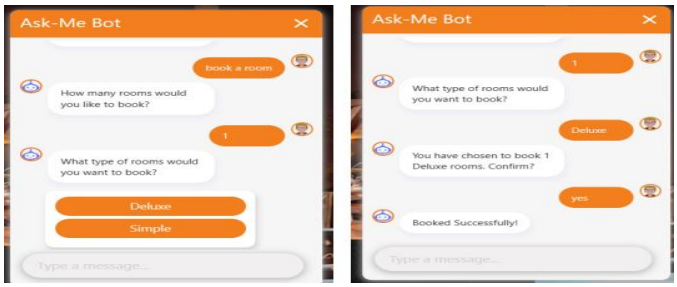

Fig -6: Booking a room

In the above two images, we can see that when user asks to book a room and bot replies to the above replies in the images.

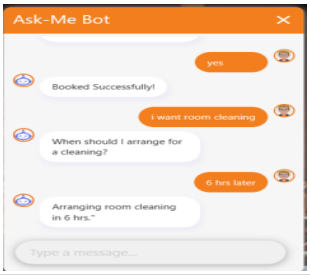

Fig -7: Booking a room

The above image depicts how the bot can provide room cleaning services.

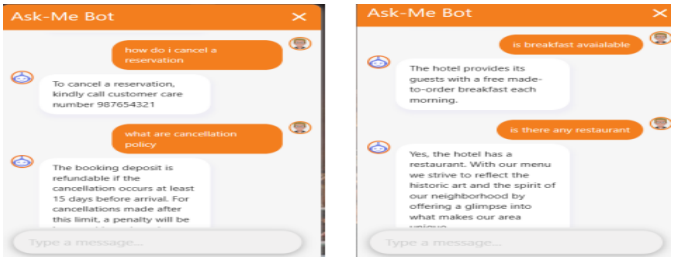

Fig -8: FAQ'S

The above image tells how the bot responds to some FAQs like canceling a reservation, what are the policies for reservations and whether is there any restaurant facility like that.

V.CONCLUSION

To conclude, Ask-Me Chatbot is helpful in guiding customers with correct and most up-todate sources of information. It is advantageous for visitors for queries such as Booking rooms, FAQs, booking / canceling reservations, etc. Customers can get the information at their fingertips rather than Hotel. This project talks about the capability of chatbots to BnB Hotels and enriches its services. This can give a feeling of interaction with humans and can make it a joyful conversation. By implementing the above functionalities, we have added some basic functions of chatbots for the hotels.

References

[1] *S. Balaji, E. Kasthuri, " A ChatBot for Changing Lifestyle in Education", ICICV 2021, pp. 1317-1322.*
[2] *P. Schreiberova and P. Smutny „Chatbots for Learning : A review of Educational Chatbots for FB Messenger", Computer and Education 2020.*
[3] *Rakhra M " E-Commerce Assistance with a Smart Chatbot using AI ", ICIEM 2021, pp. 144- 148.*
[4] *R. Lee, N.Shi , Zeng Q , "Language ChatbotThe design and Implementation of English Language Transfer Learning Agent Apps, AUTEEE 2020, pp 403-407.*
[5] *K. M. Soe and N. N. Khin "Question answering based university chatbotusing Seq to Seq Model O-COCOSDA 2020, pp. 55-59.*
[6] *P.C.L. Chandar, M.N. Kumar, A.V. Prasad and K. Sumangali "Android based education chatbot for visually imapired people", ICCIC 2016, pp. 1-4.*
[7] *F. De Arriba-Perez, S. Garcia-Mendez , F.J. Gonzalez- Castano "Entertainment Chatbot for thrGigital Inclusion of Elderly People Without Abstraction Capabilities", IEEE vol 9 2021, pp. 75878-75891.*
[8] *J. Cabot and G. Daniel "Software Challenges of Building Smart Chatbots", ICSE-companion 2021, pp. 324-325.*
[9] *C. Lin, W. Wangand, "Advantages and Constraints of a Hybrid Model K-12 Assistant Chatbot" IEEE Access vol 8 2020, pp.77788-77801.*
[10] *J. S. Heh, L. E. Chen, S. Y. Cheng , Chatbot: A question answering system for student", ICATL 2021, pp. 345-346.*
[11] *EI Habib Benlahmar, Hafsa Ouchra, Omar Zahour, Ahmed Eddaoui, OumaimaHourrane "Towards a Chatbot for educational and vocational guidance in Morocco: Chatbot EOrientation", 2020 April, IJATCSE,DOI10.30534/ijatcse/2020/23792202M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.*