

Educational Chat Bot Using Rasa

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Abstract—Digitization is developing society into a "mobile-first" population. Now-a-days the popularity of networking applications is increasing, due to this chatbots are playing a crucial role in this mobility-driven transition. A chatbot is a software application that processes human conversation, allowing humans to interact with digital devices as if they were communicating with a real person. Chatbot analyses the inputted text and matches it with predefined data called "intents," which are categorized to manage the conversation. Admission to a college or university is a big deal; it raises so many questions in our hearts that we get confused every time we think about it. A major problem faced by students is the absence of an inquiry person as well as not getting a solution in real time and waiting for days to get a response to a simple query. The proposed model consists of a system that is an AI-based conversational bot and can provide responses to students' queries with high accuracy in real time. We will use Rasa, an open-source platform that will allow us to create, train, and test our chatbot model, as well as deploy it via a web interface to make it more interactive for development. Rasa consists of two components Rasa NLU and Rasa Core. This paper addresses the design and implementation of a Chatbot system using the RASA framework and understanding its important tools. This conversational agent can be used in educational institutions as well as in places where inquiry becomes a time-consuming task.

I. INTRODUCTION (HEADING 1)

Technology plays a crucial role in the industry and day-to-day chores. It serves different purposes and is applied in a variety of ways in different parts of the world. Recently, the public has been mesmerized by Artificial Intelligence. Artificial Intelligence (AI) simulates the psychological abilities of a person. To be more precise we have observed that the AI Chatbots are now replacing human responses.

Chatbots are computer programs that answer a simple query with a single-line response, or as highly developed as digital assistants that learn and evolve on the basis of the information gathered and processed to deliver increasing levels of personalization.

Chatbots are implemented in dialogue systems for numerous purposes including customer service, content gathering or request routing. While some chatbot applications use extensive word-classification processes, natural-language processors, and advanced AI, others simply scan for general keywords and generate responses using common phrases extracted from an associated library or database.

Most chatbots are integrated with web interfaces which can be accessed online via website pop-ups or through virtual assistants. They are classified into categories according to their usage which includes: commerce (e-commerce via chat), finance, entertainment, news, health, and productivity.

II. LITERATURE SURVEY

This section of this study explains the project's conceptual justification, commencing with a description of Natural Language Processing and deep learning and probabilistic models, relevant surveys, and challenges faced by sight-challenged individuals.

The first era of this technology concentrated on short task-oriented dialogue [1], such as music playback (e.g. "Alexa, play music") or information retrieval. The current challenge in this area is to maintain a continuous, coherent, and attractive dialogue, as current software is still far from being capable of natural everyday conversations with humans.

The E. Kasthuri and S. Balaji [2] discuss the advantages of using chatbot in education. This model refers to, how students and teachers can both use chatbot. Teachers would train the chatbot with a predefined set of questions and answers and thus when students ask questions the chatbot can respond with the exact answer of the asked question. The authors have used Natural Language Understanding and DL for the development of this model. The drawback of this model is that it can answer only a defined set of questions and is not interactive.

The authors [3] analyzed the Rasa platform in detail and based on that they built a chatbot integrating with API and database. However, this system was built using basic capabilities of the Rasa platform, without using the advanced functionality of the platform.

Prof. Ram Manoj Sharma [4] proposed a college enquiry chatbot system which has been built by using Artificial Intelligence algorithms. The bot learns from user's query and extracts important features from user messages. The system has modules like online chatbot, online Notice boards etc [4].

Natural language processing (NLP) is a technique used for understanding natural language i.e. human language [5]. To understand human language, the machine needs to separate the whole text into paragraphs, sentences, and words. It should recognize the relationships between the different words, extract the exact meaning from the text, and understand sentences [6].

The Authors introduce [7] a chatbot which can answer all frequently asked questions (FAQ's) is designed. The model uses neural network Sequence to Sequence model based on RNN encoder decoder. Major disadvantage of this model is that it provides less accuracy.

Rasa NLU is used to build a conversational AI. It comprises of modules which contain several NLP and ML libraries in a consistent API system [8].

III. PROBLEM STATEMENT

Taking admission into a new program is a big deal. Major problem faced by students is absence of an enquiry person as well as not getting a solution in real time and waiting for days for getting a response to a simple query.

The best solution to this problem is creating chatbot they are AI based conversational bots which can provide response to student's queries with high accuracy in real time.

The following are the goals:

- 1) To build a model that takes queries as input from user and interprets the meaning inside it.
- 2) The objective is to build a chatbot which can give response to users in real time.
- 3) To develop a system this is available to take user's queries anytime from anywhere.

IV. SYSTEM ARCHITECTURE

- **User:** user sends natural language queries to rasa platform through web interface.
- **Web interface:** It acts as an interface between RASA API and front end, it transfer the user queries
- **Agent:** Agent are the computer servers which can interact with the customer or users and provide responses to users using rasa NLU and core components.
- **Expressions:** Expressions Phrases are the dialogues that people have said when they interact with a bot. Expressions represent a user's desire and they are often present in the form of a question.
- **Intent:** 'Intents' are how a chatbot can understand Expressions. The use of Intents provides an advantage as you don't have to teach your chatbot how to respond to every Expression. Instead, we can just categorize the Expressions into Intents that can be easily handled by bot.
- **Responses:** This is the chatbot's output that aims at satisfying the user's intent.
- **Entities:** 'Entities' are the term which are used for identifying and extracting useful data from natural language inputs.

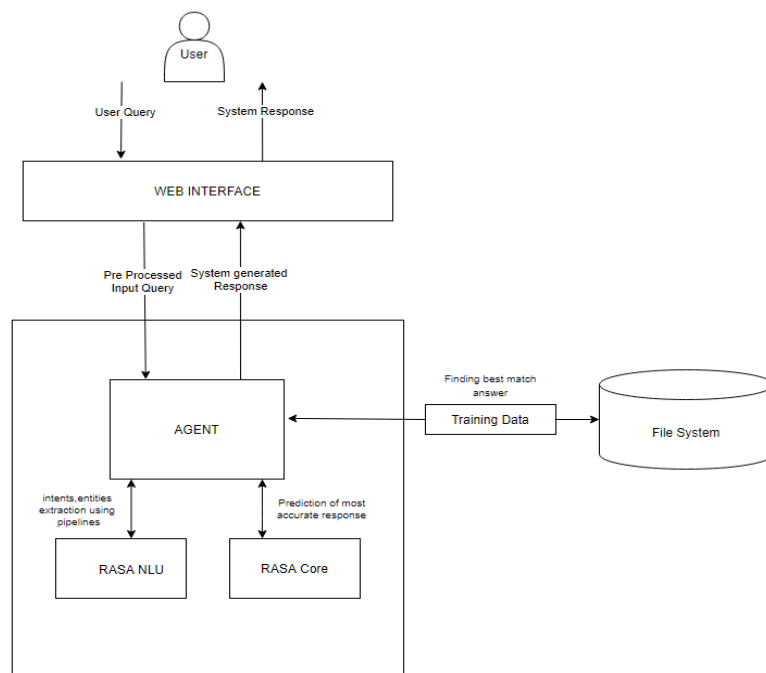


Figure 1: System Architecture

V. METHODOLOGY

For building the required chatbot we have use RASA framework. Rasa provide us

- Easy to integrate and customize
Rasa is an open-source platform that can be used for developing conversational AI chatbot. Open-source platforms are software where source code are present that can be inspected by anyone or one can modify or enhance. As Rasa is open-source it allows the developers to integrate additional features and functionalities as per user's requirements.
- No state machines
A state machine is used to data or instructions that you feed it. It then provides the result as per the instructions. Rasa does not function like a state machine. Rasa being an AI Chabot, it will be conversing with human beings. The conversations will also be acting as data for the Chabot.
- Integrate into existing systems
Another advantage of open-source platforms is that they can be integrated into existing systems without any difficulty.
- Run it on your favorite's
By using Rasa for your AI bot development, there is an option for you to run the chatbot on your preferred platform. Our AI bot can deploy the chatbot application on the cloud easily. Hence, the conversational AI can run on whichever infrastructure user prefer.
- Supports various intents
Using Rasa to develop an AI chatbot will make sure that bot actually understands messages rather than just replying with answers that have been fed to it. It allows to turn free-from text in preferred language into structured data.

Rasa is a tool which is used to build custom AI chatbots using Python and natural language understanding (NLU). Rasa also provides you with a framework for developing AI chatbots that uses natural language understanding (NLU). It also permits the user to train the model and add custom actions. The Dual Intent and Entity Transformer (DIET) model for natural language processing (NLP) is used in RASA. [9]

Rasa Component

Rasa NLU: Rasa NLU is an open-source natural language processing tool that is used in chatbots to classify intent, extract entities, and sentiment analysis. Rasa NLU interprets the user message and extracts intent and entities using the help of various pipelines. Rasa NLU process is done using, custom or prebuilt pipelines which controls the tokenization of the text (i.e., splitting each word as a token), frequency count for the tokenized input text, intent classification, and entity extraction [9]

Natural language understanding is a topic which deals with an interaction between humans and computers. Natural language understanding and natural language generation are the subtopics of natural language processing which handles the unstructured user language and convert it into structured machine understanding language to have the interaction between them. [9]

Rasa Core:Rasa core takes the user's input and generates a response accordingly using various pipelines. It takes the structured input from the NLU and predicts the next best action using a probabilistic model like LSTM neural network. [9]

VI. CONCLUSION

The model in the proposed system is designed to solve student queries while admission, without the need of physical presence of any faculty with the help of Machine Learning and Artificial Intelligence, so as to provide fastest solutions to students and parents in real time. It was observed that with large dataset the model can perform better as well as we can integrate voice recognition engines with text analysis for better user experience. Integration of multiple languages.

REFERENCES

- [1] Rahman, A. M., et al. "Programming Challenges of Chatbot: Current and Future Prospective." 5th IEEE Region 10 Humanitarian Technology Conference 2017, R10-HTC 2017.
- [2] E. Kasthuri and S. Balaji, "A Chatbot for Changing Lifestyle in Education," Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV), 2021, pp. 1317- 1322.
- [3] R. K. Sharma and National Informatic Center, "An Analytical Study and Review of open source Chatbot framework, Rasa," Int. J. Eng. Res. Technol. (Ahmedabad), vol. V9, no. 06, 2020.
- [4] Assistant Prof Ram Manoj Sharma, "Chatbot based College Information System", RESEARCH REVIEW International Journal of Multidisciplinary, ISSN: 2455-3085 (Online), Volume-04, Issue-03, March-2019, pp 109-112.
- [5] Cambria E, White B 2014 Jumping NLP curves: a review of natural language processing research J. IEEE Computational Intelligence Magazine 9(2) p 48-57.
- [6] Tembhekar S and Kanojiya M 2017 A Survey Paper on Approaches of Natural Language Processing (NLP) J. International Journal of Advance Research, Ideas and Innovations in Technology 3(3) p 1496-98.

- [7] N. N. Khin and K. M. Soe, "Question Answering based University Chatbot using Sequence to Sequence Model," 23rd Conference of the Oriental COCOSDA International Committee for the Co-ordination and Standardisation of Speech Databases and Assessment Techniques (O- COCOSDA), 2020, pp. 55-59.
- [8] T. Bocklisch, J. Faulkner, N. Pawlowski, and A. Nichol, "Rasa: Open Source Language Understanding and Dialogue Management," arXiv [cs.CL], 2017.
- [9] <https://rasa.com/docs/rasa/arch-overview>
- [10] <https://rasa.com/docs/rasa>
- [11] Nguyen Thi Mai Trang, Maxim Shcherbakov, "Enhancing Rasa NLU model for Vietnamese chatbot", International Journal of Open Information Technologies ISSN: 2307-8162 vol. 9, no.1, 2021
- [12] upreetha H V, Sandhya S,"Implementation of an Educational Chatbot using Rasa Framework", International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075 (Online), Volume-11 Issue-9, August 2022.
- [13] Harshala Gawade, Prachi Vishe, Vedika Patil, Sonali Kolpe," College Enquiry Chat-Bot System", International Journal of Engineering Research & Technology (IJERT) ISSN : 2278-0181 IJERTV9IS090396 Vol. 9 Issue 09, September-2020