

Artificially Intelligent Response Based Utility Management System

Rakshata P, Padma H V, Meghana Prakash, and Karthik V

Abstract: Every organization should have its very own Personal AI Assistant at its disposal. The aim of the assistant is to find a knowledge gap to fill by its well-structured speech synthesis and generation mechanisms. The inquiry or interrogation can be predominantly generic to the requirements of the institution. The assistant will understand based on the clarity of purpose. Responses are original, innovative, clear and concise as its vital to provide correct up to date information. They can also be visual and graphical based on the question. Extracted data from private data sets of the organization are analyzed and organized using Pandas. Speech Recognition, Understanding, and Synthesis are done using Speech Recognition Packages and Natural Language Processing Techniques.

Index Terms: Artificial Intelligent, Personal Assistant, Natural Language Processing, Speech Recognition

I. INTRODUCTION

The future of artificial intelligence has already become present. Bots are expected to accomplish every task that a human can. Machine Learning and Deep learning algorithms are becoming compound and complex. Young Individuals are expected to be highly competent and deliver outstanding results. Innovation and creativity are booming in top-notch institutions across the globe. In these fast changing times, we expect an immediate response to inquiries. Hence conversational agents and Chabot's are the best alternatives. The response based system is designed to convince its users of its simplicity, ease of use and performance. The institution can readily use its generated answers in times of dire need and be rest assured that the Personal Assistant will give apt responses to the mundane details that are frequently required. Based on the conversation flow the chatbot is capable of producing highly detailed answers, supported by both auditory and visual cues. Instead of users referring to the website they can gain plenty of answers to their dozens of questions through this intelligent assistant. The chatbot gives 24 hours' service and instantaneous answers to topics related to virtually any subject of the institution. The main intent of this conversational agent is to give comprehensive responses that cater to the needs of individuals in an educational institution or academy.

Revised Manuscript Received on July 19, 2019

Rakshata P, Department of Computer Science and Engineering, Vidyavardhaka College of Engineering, Mysuru, (Karnataka), India. E-mail: p.rakshata14@gmail.com

Padma H V, Department of Computer Science and Engineering, Vidyavardhaka College of Engineering, Mysuru, Karnataka, India. E-mail: padmapaddu98@gmail.com

Meghana Prakash, Department of Computer Science and Engineering, Vidyavardhaka College of Engineering, Mysuru, (Karnataka), India. E-mail: pranama201297@gmail.com

Karthik V, Department of Computer Science and Engineering, Vidyavardhaka College of Engineering, Mysuru, (Karnataka), India.

II. LITERATURE REVIEW

The collective comprehensive intention is to build an intelligent conversational inspired by ensemble based machine learning systems such that it allows for the ultimate and engaging service experience for its audience. It is a well-structured integration of ensemble machine learning, recurrent neural networks, and sequence to sequence models. The last phase is applying reinforcement learning on this integration to give the highest priority responses. Our system performed exceedingly well to demonstrate the answers for the audience. The response model takes as input a dialogue and answer in natural language text providing generic insights to the user's question. In addition to the response generated the conversational agent outputs scalar values such as value functions and internal confidence values. These numbers are arranged in descending priority. The one with the greatest priority is the most likely answer to provide. Since users are likely to give open-ended responses the system is prone to speech recognition errors. the may cause a significant impact on the user experience in dialogue systems [1]. Knowledge Retrieval as Generic or Specific information on virtually any subject requires many Statistical supports. It must be in line with the context of the request. The request may be all-inclusive or exhaustive on one hand and sparing or brief on the other. The fundamental practice is to incorporate indexing and retrieval mechanisms. Indexing extracts the most relevant of user's needs. Retrieval can be Document Retrieval on surface and Text Retrieval beneath. Comparison and matching must be carried out with a wide scope of vocabulary. The system is capable of retrieving parts of document like paragraphs, sentences, and words. It can move gradually from coarser views to finer views of retrieval depending on the amount of conceptual detail required for the user. The user can concentrate on questions and the system meanders its way out of the natural language vocabulary to translate into a viable answer or reply which is both linguistically sound and meaningful. Hence the user can comfortably converse with the agent without getting complicated with NLP based text processing apparatus. In some cases, the system may operate on simple Boolean logic to comprehend the answer. The constraints are the variability of context expression, request under specification, insufficient knowledge in databases and reference documents [2]. Customers seek more information every hour of every day. Now their perspicacity is combined with greater requirements for work and home.

In general, their lifestyle itself deals with humungous data in correlation with the market. This where chatbots come in. They are perfect assistants to acquire, engage and support and retain customers worldwide. Possible interactions, contexts, and sentences are fed into the system. This deals with ontology. Next, we imbibe Natural language processing to get parts of speech tags, tokens, phrases and perform stemming appropriately followed by feeding some grammar. The result is parsed form of data which the chatbot can refer to when in dialogue with consumers. Then it learns vocabulary from training data and then associates a vector to each word which is part of deep learning. Ideally, the bot is capable of understanding the requirements and can come up with solutions when in dialogue with the customer. Customers can start a conversation whenever and wherever they need to as long as they need to. The service is available throughout the day. Customers are satisfactorily guided to consult on products and services. The bot immediately gives the most significant choices through optimal searching throughout the parsed data. The users are greatly benefitted with only the best products and services. To start with consultants must be empowered with answer suggestions. This requires hiring and managing more customer service teams worldwide. Retrieval based model can be primitive while the generative model doesn't confirm human-like a conversation on a wide range of demands [10].

III. RESULTS & DISCUSSIONS

Building a chatbot interface for users to interact and have a sustained conversation by incorporating datasets. This will enable the network to learn from larger conversation corpora and dynamically give the responses. Sequence to sequence learning is the key in any deep learning approach. The input sequence is mapped to a fixed size word vector using one recurrent neural network and the target sequence is generated using another RNN on the previously generated word vector. The bot understands the intentions of the consultant and determines the best response message once it follows with the correct grammatical and lexical rules. For research prototyping, the responses generated are veracious, provided the inquiry is in line with the context of service that the chatbot provides. On average people wait 7 minutes until they are assigned an agent. Chatbots are capable of outpacing and re-establishing the needy service routines for its users in almost no time. Leading techniques of transformation and processing are built in to extract the forefront responses. When the questions are out of context with respect to the data fed in, the responses can be error prone and may not deliver the relevant message [11].

In order to evaluate the performance and quality of chatbots, the absolute scale cannot and should not be used as there exists a variety of chatbots responding to diverse needs. A structured approach can be designed involving a hierarchy of decision trees that enables us to correlate to valid or invalid justification to an answer. Utilizing a user-supplied dataset the chatbot is trained and adapted to variable responses using the same input. Dialogue efficiency and quality metrics, Evaluation of the FAQ chat prototype and users satisfaction helps to justify the ability to give direct answers specific to user's fed in inquiry or

information. The chatbot provides a specific service for users, the best evaluation is provided to the service or task that the user requires. It tries to use explicit Dialogue-act expressions more than usual to re-enforce the impression that users are speaking to a human. It tries to use explicit Dialogue-act expressions more than usual to re-enforce the impression that users are speaking to a human. Most of the words match the exact meaning of the word specified. Most of the times finding the exact meaning, type of conversation is not possible. If the conversation does not exist in the training dataset it assumes default values [3]. The chatbot prototypes can be trained gradually to be implemented on varying regional and global dialects, to visualize questions, and to provide answers for questions from the user without any delays. It uses software which converts readable text into AIML (Artificial Intelligence Mark-up Language) format. It uses sophisticated Natural Language Processing techniques for understanding the speech, expressions, phrases, tokens of words and determines parts of speech tags followed by morphosyntactic analysis, parsing, and semantic structural analysis. It is used as a tool for question and answering. 68% of the samples of the Users were able to answer. It can be used to access the information portal. The chatbot interacts with users using natural language. The chatbot is overviewed in terms of the knowledge base and its pattern matching technique. It is a useful application for the user rather than an entertainment tool. The main lack of ALICE and other chatbots is the manual developing of its knowledge. So a software program that reads from a corpus and converts it to the ALICE knowledge base is made [4].

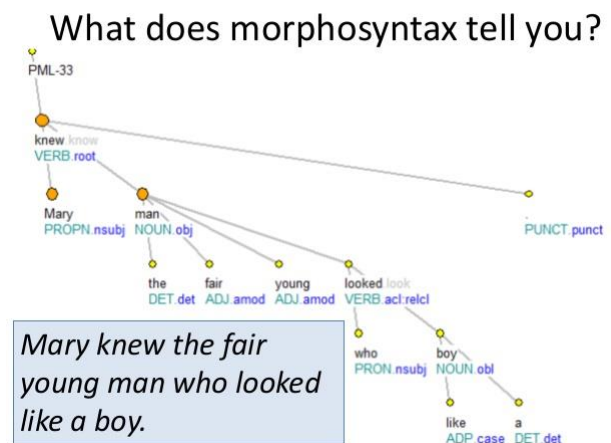


Figure 1: Morphosyntactic Analysis [6]

Conversational agents are meant to serve humanity to reach its maximum potential globally. The bots must be able to provide services in varied ways to benefit the needy in times of crisis. Hence Bayesian networks are used for simplicity in understanding and implementation. The cutting edge technology from NLP, Artificial Vision, Voice Analysis are applied together with Bayesian networks and decision trees.

It provides a strategy for extending the



chatbots that should be interesting and worthwhile to implement and experiment. The bots will be responsible for the safety of citizens and provide aids in the field of transportation, medicine, arts, and sciences. Summarization software is not always doing an excellent job. The data returned is split at every period into individual responses [5]. The objective is to investigate how an artificially intelligent chat agent answers the questions. As such, the chatbot aims to identify deviations in conversational branches that may indicate a problem with an immediate recollection from various sources across the internet. Chatbots receive natural language input, and speech recognition software, combined with data analytic tools helps to understand and translate in order to execute one or more related commands to engage in useful conversation for its users. The utilization of the chatbot was objectively tracked through the server and a web-based questionnaire was used to evaluate the chatbot and to compare it with results from search engines worldwide. The frequency and duration of conversation are also tracked through server and was found to be functioning correctly for most generic requirements. The use of chatbots within the field of health promotion has a large potential to reach a varied group of people. There is a mismatch between user queries and the message database. In order to build a voice-controlled personal assistant, text converted from the speech is analyzed and processed using python scripts to generate the output. Thus a smart personal assistant that can control IoT applications which can even answer user questions using web browser is designed. It aids in the reduction of human efforts to interact with subsystems which are performed manually. The need for internet connection for browsing has to be overcome and the machine should be able to draw sources of information offline as well [8]. To design an efficient and capable virtual personal assistant STT methods are used to convert speech to text and keyword is used to check local hard drive for the corresponding answer. TTS is used to convert text output to speech. The resultant is a fully working Virtual Personal Assistant that can take speech input and give the output in both speech and text format. It can work both offline and online. Capable of learning and creating its own module. To work in an online condition, it requires more resources and information sources [9]. Chatbots can be built as web-based or standalone applications but develop an advanced platform for evaluating and developing human-chatbot interactions a web-based chatbot is more efficient. It enables the bot to be accessible to all customers and also enables the company to leverage the existing investments they have already made in their websites. The HTTP protocol is used for the communication between server and client. Dialogue annotation technique is used for the training of dataset for an intelligent system. A chatbot is able to provide a Web-based platform for the interaction of the client with the server. The tasks such as chatting, evaluating will grant users certain points that they can use to download previously recorded chat sessions. This platform includes several resources with the goal of being easy to use for regular people, the implementation of different chatbots. It is difficult to create a data-driven-systems because a large amount of data is needed for development and training [7].

IV. CONCLUSION

Chatbots that utilize NLP in integration with Artificial Intelligence can help us achieve smarter applications that learn and evolve day by day helping consumers and businessmen alike in increasing their comforts and profits. Bots can be used for widespread scale and impact to connect to various subsystems across the world which had to be done manually. It is important to insist that bots are not here to replace human agents whereas to complement them to do a better job. Every scope of improvement will help in guaranteeing automation in vehicles, Homes, Military, Hospitals and the Global Community as a large.

ACKNOWLEDGEMENT

The authors express gratitude towards the assistance provided by Accendere Knowledge Management Services Pvt Ltd for open-ended expert advice.

REFERENCES

1. Iulian V. Serban, Chinnadhurai Sankar, Mathieu Germain, Saizheng Zhang, Zhouhan Lin, Sandeep Subramanian, Taesup Kim, Michael Pieper, Sarath Chandar, Nan Rosemary Ke, Sai Rajeshwar, Alexandre de Brebisson, Jose M. R. Sotelo, Dendi Suhubdy, Vincent Michalski, Alexandre Nguyen, Joelle Pineau, Yoshua Bengio, "A Deep Reinforcement Learning Chatbot," arXiv:1709.02349, Sep. 2017.
2. D. D. Lewis and K. S. Jones, "Natural language processing for information retrieval," *Commun. ACM*, vol. 39, no. 1, pp. 92–101, Jan. 1996.
3. Bayan Abu Shawar and E. Atwell, "Using dialogue corpora to train a chatbot.," pp. 681-690, 2003
4. B. A. Shawar and E. Atwell, "Different measurements metrics to evaluate a chatbot system," in *Proceedings of the Workshop on Bridging the Gap Academic and Industrial Research in Dialog Technologies - NAACL-HLT '07*, 2007, pp. 89–96.
5. L. Lin, L. F. D'Haro, and R. Banchs, "A Web-based Platform for Collection of Human-Chatbot Interactions," in *Proceedings of the Fourth International Conference on Human Agent Interaction - HAI '16*, 2016, pp. 363–366.
6. Silvie Cinková, "Morphosyntactic analysis for stylometry", class for undergraduate English translators at the Jagiellonian University in Krakow 2018
7. A. Datta, "Contextual Flow In Chatbot Conversations.," 2018
8. A. Dekate, C. Kulkarni, and R. Killedar, "Study of Voice Controlled Personal Assistant Device," *Int. J. Comput. Trends Technol.*, vol. 42, 2016.
9. K. Aditya, G. Biswadeep, S. Kedar, and S. Sundar, "Virtual personal assistance," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 263, p. 052022, Nov. 2017.
10. Padma Sankar, "Chatbots – The Future of IT Support", 2018
11. Mariya Yao, "Top Research Papers in Conversational AI for Chatbots and Intelligent Agents", 2019

