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Conversational Business Intelligence BOT using AWS LEX Deep Learning

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ABSTRACT: Chatbots are replacing a number of roles that are traditionally performed by human workers, like online customer service agents and educators. From the initial stage of rule-based chatbots to the age of rapid development in Artificial Intelligence (AI), the performance of chatbots keeps improving. This project is employed to perform tasks quickly responding to users, informing them, helping to buy products and providing better service to customers. Firstly, the chatbot is trained on the dataset that contains classes (intents), pattern and responses. Secondly, using a special recurrent neural network Long Short-term Memory to classify which category the user's message belongs to and then provides a random response from the list of responses. AI-based chatbots are capable of learning from interactions and change themselves on their own. To enhance the performance of the chatbot in an online platform AWS lambda function is used which connects to the DynamoDB database to store and retrieve the customer's data instantly. This also helps the customer to make full functionality use of the chatbots. Customer no need to wait for the changes to get processed. Bots can verify and make changes to the data instantly.

KEYWORDS: Recurrent Neural Network; Artificial Intelligence; Speech Synthesis Markup Language; Natural Language Processing

I. INTRODUCTION

As one of the final goals of Artificial Intelligence, automatic chatbots (also known as chat-agents) square measure expected to conduct sleek and natural conversations with humans and their search progress during this space has attracted abundant attention within the past few years. thanks to an outsized quantity of human conversations accumulated by the social network services (e.g., Twitter,1 Weibo2 etc.), the data-driven approaches for building chatbots have developed apace showing the specific benefits that square measure difficult to realize for the rule-based strategies. The outstanding explorations are created on the open domain chatbots like Clever-bot, Facebook M, Xiao ice, etc. Meanwhile, the investigation on desegregation industrial services is additionally conducted by chatbots like Dure. For all the chatbots, it's essential to produce satisfying responses to users' queries, thus as guaranteeing the conversations with human going swimmingly and naturally, that is that the essence for maintaining user's activity and promoting the other reasonably functions within conversations.

To keep the human-chatbot interaction going, responses should be perceived, understood and reacted by the user. Concretely, an extremely satisfying response ought to be not solely relevant to the corresponding question however additionally engaging and pleasant for every individual, by making an attempt to match users' preference, language vogue and even personal interests. it's thanks to that once performing arts depth oral communication, individuals tend to think about the history dialog contents (known as context), the non-public info (including opinions, interests, etc.), and therefore the language kind of one another.

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Recurrent Neural Network is that the most noted model to coaching the sequence information. the traditional RNN has hassle once it's accustomed train with an extended step size. LSTM networks square measure well-suited to classifying, process and creating predictions supported statistic information, since there will be lags of unknown period between vital events during a statistic. continual Neural Network (RNN) is extension of a convention feed-forward neural network. in contrast to feedforward neural networks, RNN have cyclic connections creating them powerful for modelling sequences.

Natural Language process (NLP) needs modelling complicated relationships between the linguistics of the language. whereas ancient machine learning techniques square measure used for IP, the models engineered for conversations, known as chatbots, square measure unable to be actually generic. whereas chatbots are created with ancient machine learning techniques, deep learning contains allowed the complexities inside IP to be easier to model and might be leveraged to make a chatbot that has a real oral communication with a people.

Keras is associate open supply, high level library for developing neural network models. Its core principle is to create the method of building a neural network, coaching it, and so exploitation it to create predictions. Keras run on high of various Deep Learning frameworks like CNTK, TensorFlow, or Theano. Here Keras can run on high of TensorFlow. Keras inherent support for multi-GPU information similarity helps in distributing the information across completely different nodes, that care for the information in parallel.

II. RELATED WORK

Cho K et al (2016) state that a chatbot may be a informal computer code that's designed to emulate communication capabilities of a personality's being that interacts mechanically with a user. It represents a brand new, fashionable variety of client help supercharged by AI via a conversation interface. Chatbots are supporting AI techniques that perceive tongue, determine which means, emotion, and style for meaty responses. as an example, it makes it simple for purchasers to induce responses to their queries in an exceedingly convenient method while not outlay their time waiting in phone queues or send recurrent emails. Chatbots will cut back the quantity of client calls, average handling time and price of client care. However, it's demanding to realize these functionalities because it needs varied advanced interactions between systems. Note that the word 'AI chatbot application system' or 'AI chatbot' is employed during this study as an equivalent word for an informal agent or advanced dialogue system.

Barla M (2017) planned that the thought is to simulate human conversations whereby one finish is user and another finish may be a machine. These bots have found applications in varied domains like E-commerce services, medical help, recommender systems and academic functions. they will be integrated into existing application platforms like Skype, Slack, etc. ITSM includes of all the social control aspects of IT businesses. Nowadays, each software system firm contains a dedicated team of IT consultants that administrate the problems baby-faced by alternative staff of the corporate. within the ancient framework, the top user generates a price tag for any cause, issue or question. this question gets appointed in an exceedingly queue to some worker at ITSM department. the top user must wait till his question gets appointed to ITSM worker. it'd take many days thanks to that he might not be ready to proceed together with his work. Once the price tag gets appointed, the ITSM worker communicates with the top user worker and solves the problem once that the price tag generated gets unemployed. the top user needn't generate a price tag when he faces some issue. Instead, he is ready to have a two-way matter spoken language with the chatbot. The input to the chatbot are within the human auditory communication that is processed mistreatment tongue process. NLP may be a field of AI that consists of laptop understanding and generation of human language.

Wang B et al (2017) explained that the system receives input from the top user within the variety of tongue. This input is certain in JSON object and passed to the chatbot plugin through a REST API decision. REST (Representational State Transfer) refers to a mode of internet The JSON object is unbound within the chatbot plugin and more the input message is distributed to the IBM Watson spoken language API. The output is coming back to the chatbot plugin. relying upon the output received some operations could occur on the info and also the output came back. This processed output is distributed back to the chat application. If the user isn't happy with the reply type the chatbot, it should raise the chatbot to come up with a price tag on his behalf.

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III. EXISTING SYSTEM

There are a several applications that area unit incorporating a personality's look and assuming to simulate human dialog, however in most of the cases the data of the informal larva is hold on in a very info created by a personality's knowledgeable. However, only a few researches have investigated the thought of making a chat-bot with a synthetic character and temperament ranging from websites or plain text a few bound person.
Traditionally, the chat larva system isn't well-known to those who aren't a lot of into the technology. although there exists a talk larva system, it's not abundant correct in proving the solution or solutions. client have to be compelled to manually raise the service supplier to induce some their queries answered. This method consumes heap of your time moreover as cash because the client required to contact service supplier for his or her unreciprocated queries.

Drawbacks:
• Customer service agents aren't out there 24/7 for discussion. If so, the price of providing such service is incredibly high.
• If a client service agent isn't useful, a client might be tempted to undertake career once more to visualize if Succeeding agent is best.
• All method like making, change information can't be handled by service agent.
• Consumes heap of your time for the client to induce response.

IV. PROPOSED SYSTEM

Data parsing is completed as a method to see whether or not a string / syntax of the question to be checked has been developed in accordance with the syntax rules of the question in process user requests in asking queries from the set of queries outlined within the cognitive content of the chatbot, thus it must be done how to interrupt down the series of input done by the user which will be employed in subsequent compilation stage, specifically linguistics analysis. There are four stages that require to be drained the method of parsing knowledge, namely: Case Folding, is that the method of changing all letters during a exceedingly in a document into little letters so solely the letters 'a' to 'z' are received once the user inputs the system as a result of once the input there'll be an majuscule like "A" and little like "a", this can inhibit the method of distinguishing queries within the knowledge contained within the information.

Tokenizer, may be a stage of cutting strings to input supported every word that composes them by dividing a collection of characters in an exceedingly text into words to differentiate sure characters which will be treated as word separators. Filtering, may be a stage of taking vital words from the results of the tokenizer method by removing the words and storing important words contained within the information. Stemming, is that the stage of finding the basis word of every word ensuing from filtering to form AN index that's done as a result of a document can't be recognized directly. At this stage, the method of returning varied sorts of words to identical illustration is employed to cut back the amount of various indexes of a question.

With the economical knowledge parsing, the pattern matching method are often accustomed analyze relevant texts by forming a pattern that's applied consecutive to extract helpful info by removing impertinent details by choosing to assist pattern matching become a straightforward and economical method. this method is employed in most Chatbots and is sort of common within the question and answer system betting on the kind of matching, like tongue queries, easy statements, or linguistics queries.

Advantages:
• AI-based chatbots are capable of learning from interactions and change themselves on their own.
• Humans have a limit to the amount of purchasers they'll handle directly. However, with chatbots, there's no such constraint and that they will handle as several queries PRN directly.
• Chatbots eliminate the requirement for labor throughout on-line interaction with customers.

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• Chatbots will handle queries at any time of day. Thus, the client doesn't have to be compelled to look ahead to a billboard of the corporate to assist him.
• Actions like dynamical or querying records are nearly instant for chatbots.

V. SYSTEM MODEL

A. Tokenizing Text

Tokenization is that the method by that massive amount of text is split into smaller elements referred to as tokens. language process is employed for building applications like Text classification, intelligent chatbot, sentimental analysis, language translation, etc. It becomes important to know the pattern within the text to attain the above-stated purpose. These tokens area unit terribly helpful for locating such patterns also as is taken into account as a base step for stemming and lemmatization. For the nonce, don't be concerned regarding stemming and lemmatization however treat them as steps for matter information cleansing victimisation informatics (Natural language processing). we are going to discuss stemming and lemmatization later within the tutorial. Tasks like Text classification or spam filtering makes use of informatics at the side of deep learning libraries like Keras and TensorFlow language toolkit has important module tokenize that any contains of sub-modules.

B. Word Tokenize

We use the strategy word tokenizer to separate a sentence into words. The output of word tokenization may be born-again to information Frame for higher text understanding in machine learning applications. It can even be provided as input for any text cleansing steps like punctuation removal, numeric character removal or stemming. Machine learning models want numeric information to be trained and build a prediction. Word tokenization becomes a vital a part of the text (string) to numeric conversion.

C. Sentence Tokenize

Sub-module accessible for the higher than is sentence tokenize. To count average words per sentence, sentence tokenize is employed. For accomplishing such a task, you would like each sentence tokenization also as words to calculate the quantitative relation. Such output is a very important feature for machine coaching because the answer would be numeric.

D. Stemming

Stemming may be a quite standardisation for words. standardisation may be a technique wherever a group of words in a very sentence area unit born-again into a sequence to shorten its operation. The words that have identical which means however have some variation in step with the context or sentence area unit normalized. In another word, there's one root, however their area unit several variations of identical words. for instance, the basis word is "eat" and its variations area unit "eats, eating, devoured and like so". within the same approach, with the assistance of Stemming, we are able to realize the basis word of any variations.
It is conjointly the method of manufacturing morphological variants of a root/base word. Stemming programs area unit unremarkably stated as stemming algorithms or stemmers. A algorithm reduces the words “chocolates”, “chocolatey”, “choco” to the basis word, “chocolate” and “retrieval”, “retrieved”, “retrieves” scale back to the stem “retrieve”.

Some a lot of example of stemming for root “like” include:
• “Likes”
• “Liked”
• “Likely”
• “Liking”

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For example:

1. He was riding.
2. He was taking the ride.

In the above two sentences, the which means is that the same, i.e., riding activity within the past. an individual's will simply perceive that each meanings area unit identical. except for machines, each sentences area unit completely different. Thus, it became laborious to convert it into identical knowledge row. just in case we tend to don't give identical data-set, then machine fails to predict. So, it's necessary to differentiate the which means of every word to organize the dataset for machine learning. And here stemming is employed to categorise identical variety of knowledge by obtaining its root.

E. Lemmatization

Lemmatization, in contrast to Stemming, reduces the inflected words properly guaranteeing that the basis word belongs to the language. In Lemmatization root is named Lemma. A lemma (plural lemmas or lemmata) is that the canonical kind, lexicon kind, or form of a group of words. Lemmatization is that the recursive method of finding the lemma of a word reckoning on their which means. Lemmatization typically refers to the morphological analysis of words, that aims to get rid of inflectional endings. It helps in returning the bottom or lexicon variety of a word, that is understood because the lemma. The NLTK Lemmatization technique relies on WorldNet's intrinsically morph operate. Text pre-processing includes each stemming in addition as lemmatization. many of us realize the 2 terms confusing.

VI. RESULTS AND DISCUSSION

The output shows the successful segregation of required details from the users. The conversational intelligence bot communicates in natural language and is capable of identifying the necessary details from the conversation created by the user. Moreover, the bot requests the user to enter some of the details to book an appointment. When the input is given by the user as shown in Fig. 1. The bot attempts to split the sentence and matches the intent formats like phone number and name of that person. After the segmentation, it sends the collected data to the DynamoDB database as shown in Fig. 2. using a Lambda function which is pre-programmed in AWS Lambda console.

Firstly, when the user triggers the bot for slot filling it asks for the details from the user using a predefined sentence already fed up into it as shown in the below Fig. 1. If the user gives an invalid response to the bot it prompts the user to enter a valid response. This can be achieved through the slot types. There are various slot types such as phone number, person name, date, time, etc., Secondly, to provide uninterrupted flawless conversation Lambda code hook is used. Which sends the intent name and slot values to the Lambda function which then processes the data and sends the desired response back to the user. Thirdly, after the slot fulfillment, filled data will be sent to the Lambda function which computes the data and stores it in the required fields in the DynamoDB database as shown in below Fig. 2.

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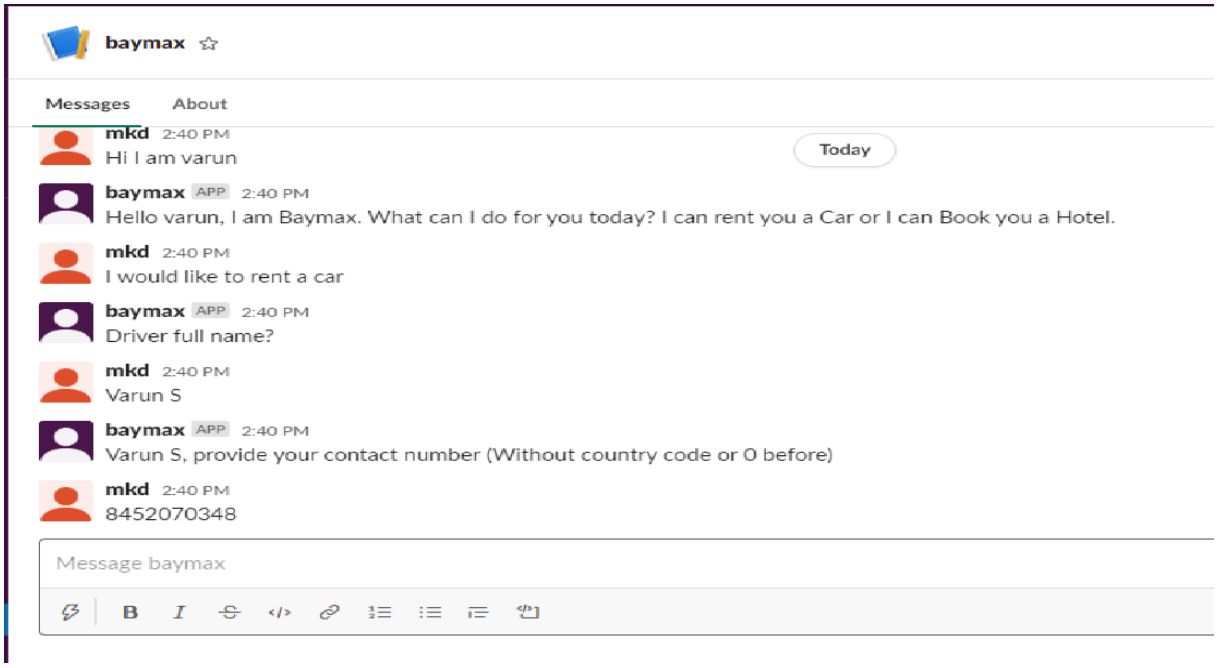

Fig. 1. Collecting Information from Users in Natural Language

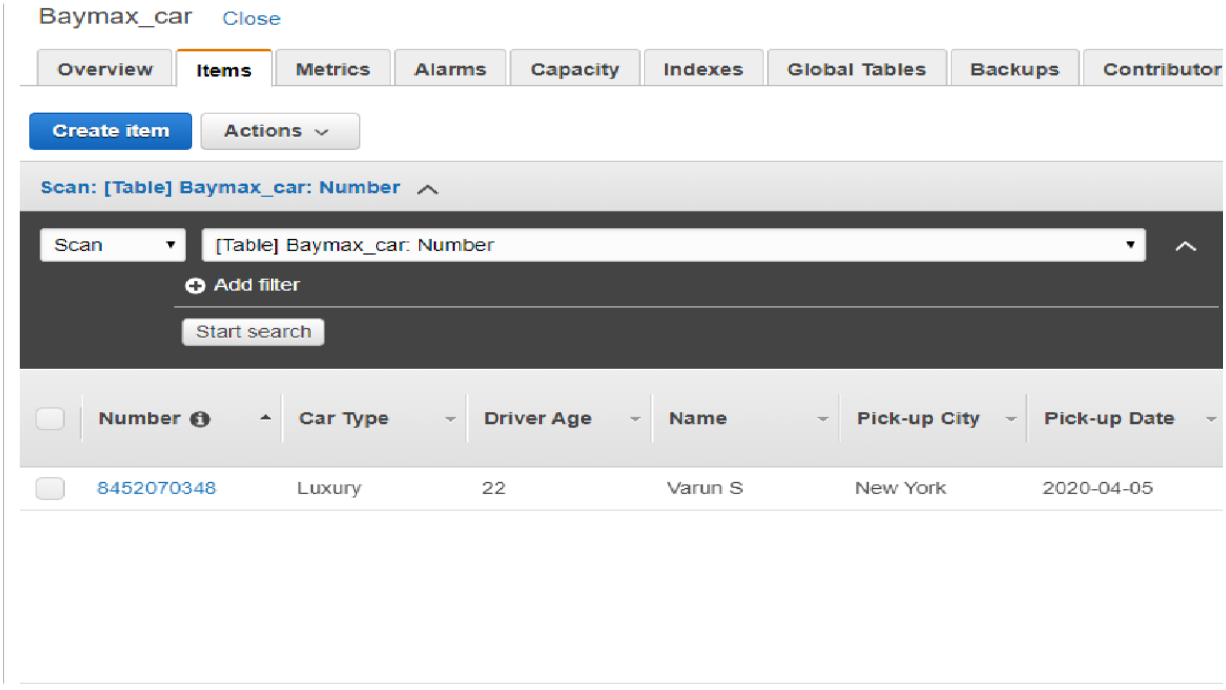

Fig. 2. Storing User Data into DynamoDB table

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VII. CONCLUSION

A neural network-based framework is to incorporate user information into the conversation modeling module for addressing the personalized response ranking problem in the building of automatic chatbots. The contributions of the work can be summarized as follows: With a two-branch neural network, each user of the chatbot can be assigned to a real-valued embedding according to his/her historical generated contents. The learned user embedding implicitly involves the personal information of users, and the experiments on user vector-based clustering analysis show that the learned embedding could represent the personal profile effectively. A deep neural network to incorporate user embedding into conversation model. This model attempts to grasp the relevance between the user embedding and the candidate response, which is considered equally with the semantic relevance between posts and responses. Based on this model, the response ranking module of chatbots could evaluate each candidate from the perspective of users, then appropriate ones can be selected for the specified user.

REFERENCES

1. A. Prakash, C. Brockett and P. Agrawal, “Emulating human conversations using convolutional neural network-based IR”, Vol.1, pp.24-39, 2017.

2. A. Sordoni, Michel Galley, Michael Auli, Chris Brockett and Yangfeng Ji, “A neural network approach to context-sensitive generation of conversational responses,”, Vol.2, pp.196–205, 2015.
3. B. Wang, B. Wu. And H. Xue, “Ranking responses oriented to conversational relevance in chatbots”, Vol.11, pp.652–662, 2017.
4. E. Ribeiro, R. Ribeiro and De Matos, “The influence of context on dialogue act recognition,”, Vol.22, pp.1620-1644, 2016.
5. Galley J Li, C. Brockett, J. Gao and B. Dolan, “A diversity-promoting objective function for neural conversation models”, Vol.1, pp.110–119, 2018.
6. H. Palangi, Li Deng, Yelong Shen, Xinying Song and Jianfeng Gao, “Deep sentence e using long short-term memory networks: Analysis and application to information retrieval”, Vol.24, no.4, pp.694–707, 2016.
7. I V Serban, A. Sordoni, Y. Bengio, A. C. Courville and J. Pineau J, “Building end-to-end dialogue systems using generative hierarchical neural network models”, Vol.17, pp.3776–3784, 2016.
8. I. Sutskever, O. Vinyals and Q. V. Le, “Sequence to sequence learning with neural networks”, Vol.33, pp.3104–3112, 2017.
9. K. Cho, Bart van Merri, Caglar Gulcehre, Dzmitry Bahdanau and Fethi Bougares, “Learning phrase representations using RNN encoder decoder for statistical machine translation”, Vol.17, pp.1724–1734, 2016.
10. K. M. Hermann, “Teaching machines to read and comprehend”, Vol.22, pp.1693–1701, 2015.
11. L. Shang, Z. Lu and H. Li, “Neural responding machine for short-text conversation”, pp.1577–1586, 2015.
12. M. Barla, “Towards social-based user modeling and personalization”, Vol.3, no.1, pp.52–60, 2017.
13. M. Habibi and A. Popescu-Belis, “Keyword extraction and clustering for document recommendation in conversations”, Vol.23, no.4, pp.746–759, 2017.
14. T. Wen, M. Gasic, N. Mrksic, P. Su, D. Vandyke, and S. J. Young, “Semantically conditioned LSTM-based natural language generation for spoken dialogue systems”, Vol.24, pp.1711–1721, 2016.
15. X. Li, L. Mou, R. Yan, and M. Zhang, “A proactive content-introducing approach to automatic human-computer conversation”, Vol.4, pp.2845–2851, 2016.
16. Y. Kim, J. Bang, J. Choi, S. Ryu, S. Koo, and G. G. Lee, “Acquisition and use of long-term memory for personalized dialog systems”, Vol.1, pp.78–87, 2016.
17. Y. Matsuyama, A. Saito, S. Fujie and T. Kobayashi, “Automatic expressive opinion sentence generation for enjoyable conversational systems”, Vol.23, no.2, pp.313–326, 2015.