Rasa NLU Chatbot

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December 03, 2020

Submitted in partial fulfillment of the requirements for senior design project

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1. Introduction

A computer program called ELIZA was invented by Joseph Wiesenbaum in 1966 with only 200 lines of code and becomes the first chatbot in the world. Chatbots, in the simple sense, is a software application which is used to employ a chat conversation online, instead of providing directly contact with a live human agent. For example, a company can setup a chatbot working as a helpdesk executive. It can identify a customer's difficulties in a task and help him/her accordingly. It can be used as a customer relationship management (CRM) tool. Even in case of applications in the fields of search, documents retrieval, content optimization, banking and financial information, and so on, the chatbot can assist users. Indeed, we first saw them in hospitals where patients with diabetes, among other things, needed to regularly monitor their blood sugar levels. Moreover, another good example of a chatbot which understands and responds to human language is Google's Google Assistant. What makes it different from a standard customer service bot is that it uses machine learning and conversational language to learn and perform tasks. Google's bots respond to questions and even offers suggestions for things you can buy. These include personalized price predictions based on your shopping history and preferences. It will even remind you about your lunch and suggest restaurants if you have a meeting. The AI Chatbots can learn, so they get smarter, such as Amazon's Alexa which learns by listening and responding to you. Also, some of the chatbot platforms like Telegram, Facebook Messenger, Kik, Slack are really growing very fast. As you can see, the appearance of AI chatbot is existing around us daily with or without your attention, and they are playing an important role in development of technology in particular and humanity in general.

In our last semester at Texas Wesleyan University, we want to develop an AI Chatbot called Wesley by using Rasa NLU to help our school's new students to answer questions. One of the main motivations behind this project is to understand how this chatbot works and answer more or less complicated questions that any students would ask the chatbot.

2. Methods / Results

2.1 Methods

Rasa is an open source machine learning framework for building AI assistants and chatbots. Rasa NLU (Natural Language Understanding) is a tool for understanding what is being said in short pieces of text. To create a Rasa NLU chatbot, first we did setup Python Environment which is exactly version 3.7.0 of Python, and latest version of pip. Moreover, to not cause any errors during the installation, we installed NodeJS, setuptools and Build Tools for Visual Studio 2019. When everything was ready, we install Rasa Open Source, Rasa[spacy] and its dependencies. Spacy, which is an open-source library for advanced Natural Language Pressing (NLP), is used to build systems understanding natural language and preprocess user's text. After that, we decided to choose a good Rasa UI to make the chatbot interface more intuitive to users.

Up to this step, our Rasa Chatbot was able to run but was juts an external shell without any functions to detect user's text and bot name, train intents to data, and choose accurate responses. First, we needed to modify file named package.json to change the local website port because rasa_nlu was running at port 5000. In .\rasa\rasa-ui-master\web\src\app\components\training\training.js, we created a function to generate data to JSON format and install Tensorflow to process very long texts. After that, in .\rasa\rasa-ui-master\server\routes\rasa_router.js, we modified codes to fix routing navigation, create function to handle user's text, to make the chat bot responses, detect well intent and choose right responses. At this moment, the chatbot trained well data but could not detect botnam in chat section. in .\rasa\rasa-ui-master\web\src\app\components\chat, we modified chat.html and chat.js to reword the chat interface and made it detect well the bot, so user's text would be analyzed and was turned to intent to access its response.

At this moment, Wesley chatbot worked well but had no data, so we spent following weeks to import our school' data to it and train them to models. The more questions in each intent, the better Wesley chatbot undestand user's question. We divided the school's questions into several sections, such as majors, department, faculties, buildings, financial, SEP, and more to make it easier to control and import them. After finishing this step, we published our local website to a live website with web hosting GoDaddy called http://tubesquare.com:5001

2.2 Experiment / Product Results

During the development of Rasa Chatbot, we did lots of testing cases. Most of them were done by using Postman, a popular API client that makes it easy for developers to test document APIs, and create simple and complex HTTP/s requests, as well as read their responses. Additionally, we tested how our code work by debugging it and check it feedback in command prompt.

Our final product is website http://tubesquare.com:5001. User can access it with given username and password. Also, they can access bot section to create a bot and intents, as well as questions inside the bot. User must click on training section to train chatbot's intents to model. Response section is used to create a text answer which is corresponding to each intent. Finallty, chat section allows users to communicate with the chatbot they created and enjoy the results.

3. Conclusion

We built this Rasa NLU chatbot in motivation to create an AI which can communicate with students. We approached our design for it with three pillars:

- Attention to users

- Experience of applying science to the "real world"

- Power of deep learning to understand and learn without bias

With Rasa NLU Chatbot Wesley, our school will be able to communicate with students automatically by using single sentence samples from our own database. It enables students to ask questions from the data in the form of sentences in which we can relate each answer to the question. Also, this enables the chatbot to reach some answers faster by learning the way students ask the questions and getting better with every question.