AI Chat-Bot for Customer Recommendation

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Abstract

Likewise, an industry tremendous in IT products, Microsoft manufacture a huge number of electronic Products, such as computers, tablets and so one. Many of these products are similar in respect of hardware like CPU power, RAM size, which is very tough to choose the desirable hardware for the customer who doesn't have much knowledge. Although, they can't directly talk to the salesman for clearing their confusions. To solve this problem, this project will help those customers by developing an online chatbot that will be able to talk to the customers and recommend the best electronic products they want.

1. Introduction

The advancement of innovation provides people the more decisions with respect to different electronic devices, likewise it builds their confusions same time selecting the correct device. A lot of customers barely recognize the differences between tens and models and choose the best for them. Moreover, the online shopping site also decreasing the chance for them to look for help from shop assistants.

To overcome from this problem, the project ***AI Chat-Bot for Customer Recommendation*** will help. The goal is to build an AI chatbot that help customer to choose their products. The bot will be accessible from Skype and Facebook online store. Customers can directly talk and acquire recommendation. They can feel like they are talking to a human shop assistant.

This bot will be different from all the bots that used on the internet because of three reasons. First, present-day bots giving users a list of multiple choices to select from them. It's very hard for a user to have a clear idea or knowledge about the product. Moreover, if a user can fill all these, that means he got a clear concept and no need to talk to the bot. But, instead of this, we leverage Natural Language Processing, so that customers can able to talk to the bot and gain their requirement. Second, present bots have a pre-defined decision tree. It's very difficult for the designer to take every structure for the restriction of human mind and the fast development of technology. Instead of, we leverage Machine Learning. The bot will be trained to deal with various situations from a huge amount of real-world data. Third, customers can access our bot from different stage, including Facebook Messenger and Skype. Users can access it from anywhere and the purchase history will be stored for registered users to give them recommendation.

2. Background

Natural Language processing (NLP) is the relationship between computers and human language. More specifically, NLP is a field of computer science, artificial intelligence and linguistics concern of natural language. Without NLP, human language is just a sequence of meaningless character to computers. Computers are not able to acknowledge the words and don't understand the grammars. So, NLP is working as a 'translator' to translate human languages to computer readable data or information.

To interact with computers, users need to follow the processes correctly. For example, in Linux systems, all commands must be precise. In this project, we are going to use the API provided by Microsoft called Language Understanding Intelligent Service (LUIS).

Machine Learning (ML) is the science of getting computers to act without being explicitly programmed. In the past decade, ML has given us self-driving cars, practical speech recognition and so one. Two most common uses of ML are Classification and Regression. As shown in figure 1, Classification is group different types of data while Regression is finding a way to describe the data. ML have two stages, *fitting* and *predicting*. In fitting stage, the program will be given a large set of data and it try to adjust its parameter based on some statistical models to make it "fit" the input data best. In the predicting stage, the program will give a prediction on a new input based on the previous parameter. In this project, we will use the Microsoft Azure Machine Learning Studio for implementing and testing ML models.

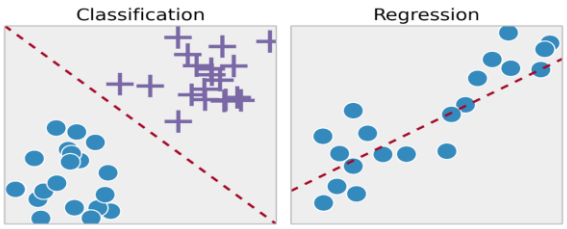

Figure 1: Machine Learning

3. Methodology

This project will be highly relied on Microsoft APIs and will make our bot by using some of APIs.

3.1 Microsoft Bot Framework

Our bot will be built on top of Microsoft's bot framework. It will be a SDK provided by Microsoft to build general chat bots. With built-in classes to handle conversation. With the help of the SDK, we can focus on the logic of handling messages but forget about how the message is transferred between the chat box and the backend engine. It will also define a common gateway to connected with different front-end interfaces, such as Skype or Facebook.

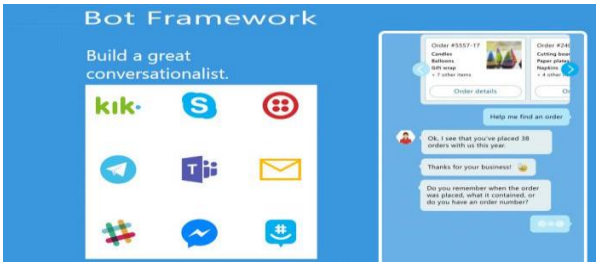

Figure 2: Microsoft Bot Framework Demo

The framework will only responsible for transferring conversation contents. After receiving an object represents an input from user, we will be able to get the input string or images together with the metadata such as timestamp or user id. We will freely analyze the input sentence and create another object representing output and send back to the user.

3.2 Microsoft Azure QnA Maker

QnA Maker is a cloud-based API service that creates a conversational question and answer layer over the data. QnA Maker enables to create a knowledge-base (KB) from the semi-structured content such as Frequently Asked Question (FAQ) URLs, product manuals, support documents and custom questions and answers. The QnA Maker service answers the user's natural language questions by matching it with the best possible answer from the QnAs from the knowledge base. After creating the KB, you must publish the KB so that the bot can interact with the KB and get the best answers for the users' questions. There are two important concepts in QnA Maker KB namely "*question*" and "*answer*". *Questions* describes what intention the speaker want to convey while saying the sentence. *Answers* are the useful information detected in the input sentence.

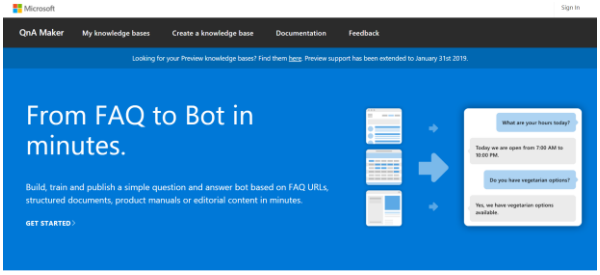

Figure 3: QnA Maker Service page

3.3 Microsoft Azure Bot Service

Azure Bot Service speeds up development by providing an integrated environment that's purpose-built for bot development with the Microsoft Bot Framework connectors and Bot-Builder SDKs. Developers can get started in seconds with out-of-the-box templates for scenarios including basic, form, language understanding, question and answer, and proactive bots.

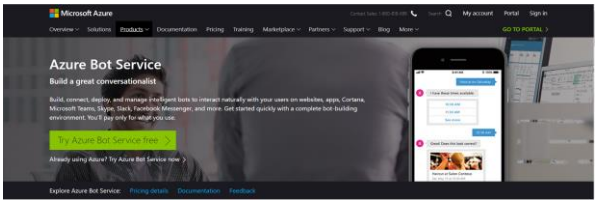

Figure 4: Microsoft Azure Bot Service

3.4 Microsoft Azure Machine Learning Studio

Microsoft Azure Machine Learning Studio is a platform for users to build machine learning predictive models. It has a drag-n-drop graphical interface to represent the logic flow of a machine learning model. A trained model can be deployed as a web service, taking data as input and give prediction based on the trained model.

4. Implementation

When a user inputs something to the bot through Messenger and Skype, the input will be firstly sent to the knowledge base for its labelling. The knowledge base will classify the input from its database within the input sentence. Then the labelled result will be returned to the bot hosted on Azure in a JSON format.

The JSON string from knowledge base will be received by the bot developed using Bot Framework. The JSON string is parsed by the bot and the questions and answers are extracted for further processing. Corresponding response will be made to user based on the intent. For example, if the question is "greeting", simply a predefined sentence "Hey there! How may I help you today?" will be returned. If the question is "purchase", the bot will guide the user through the purchase by giving them recommendations.

Finally, the bot will interact with the database, either query the product catalogue for the products that meets user requirement then return the query result to the user or insert a record for the user to be handled later.

5. Bot Prototype

I have implemented a functional bot prototype which is able to understand the intent and entities in a user input by using LUIS, ask follow-up questions, search the SQL database based on user demands and finally recommend the product that meets these requirements to the customer. One can try talking to the bot in similar manners illustrated by the following screenshots.

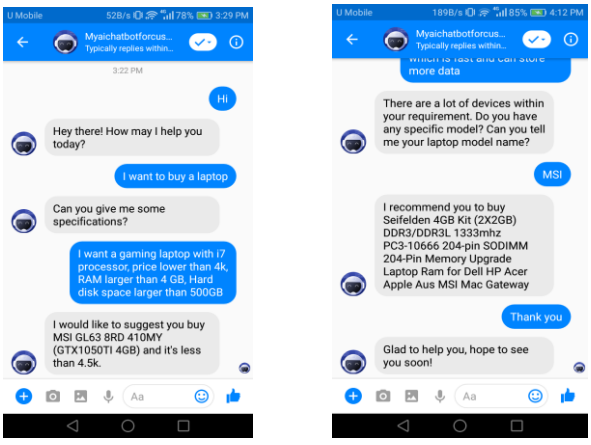

Figure 5: Messenger conversation with the bot

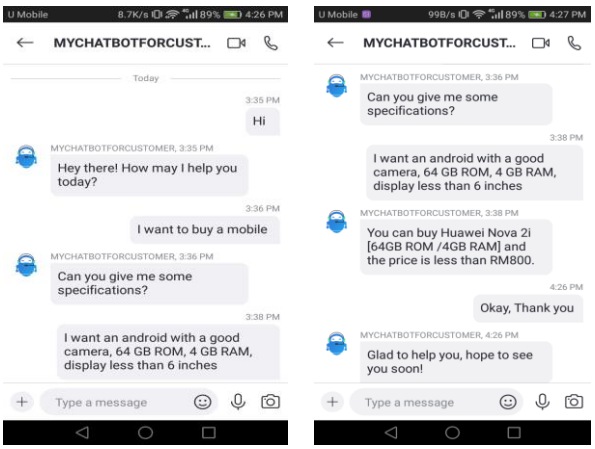

Figure 6: Skype conversation with the bot

6. Conclusion

Machine Learning and AI bots are the most heated topic in the current Computer Science world. However, in order to have good performance, other than a good algorithm, the training data is also critical. In this project, I will build a Machine Learning based bot prototype as a standalone web service to give recommendation of electronic device for customers. I hope this bot will be continually developed by Microsoft and be online someday.

7. References

[1] Quora [Internet]. USA: Why do PC laptop manufacturers have such a confusion of differently specified models? [updated 2012 Mar 17, cited 2017 Oct 22]. Available from: https://www.quora.com/Why-do-PC-laptop-manufacturers-have-such-a-confusion-of-differently-specified-models .

[2] Kissmetrics [Internet]. USA: Are you Losing Sales by Giving Customer Too Many Choices? [updated 2012, cited 2017 Oct 22]. Available from: https://blog.kissmetrics.com/too-many-choices .

[3] Lexalytics [Internet]. USA: NLP in 5 Minutes. [updated 2016 April 27, cited 2017 Oct 21]. Available-from: https://www.lexalytics.com/lexablog/2016/nlp .

[4] Apple [Internet]. USA: Siri. [cited 2017 Oct 21]. Available from: http://www.apple.com/ios/siri .

[5] Microsoft [Internet]. USA: What is Cortana. [updated 2017 Sep 10, cited 2016 Oct 21]. Available from: https://support.microsoft.com/en-hk/help/17214/windows-10-what-is .

[6] Microsoft [Internet]. USA: Language Understanding Intelligent Service. [cited 2017 Oct20]. Available from: https://www.microsoft.com/cognitive-services/en-us/language-understanding-intelligent

[7] Simon P. Too Big to Ignore: The business Case for Big Data. USA: Wiley; 2013 Mar 18.

[8] Gitbooks [Internet]. Artificial Intelligence: Machine Learning. [cited 2017 Oct 20]. Available from: https://leonardoaraujosantos.gitbooks.io/artificialintelligence/content/

[9] Fisher RA. The use of multiple measurements in taxonomic problems. Annals of Eugenics.1936; 7(2): 179-188.

[10] Microsoft [Internet]. USA: Microsoft Azure. [cited 2017 Oct 20]. Available from: https://www.microsoft.com/cognitive-services/en-us/language-understanding-intelligent

[11] Microsoft [Internet]. USA: Microsoft Bot Framework. [cited 2017 Oct 20]. Available from: https://dev.botframework.com/ .

[12] Microsoft [Internet]. USA: Microsoft Azure Bot Service. [cited 2018 Nov 10]. Available from: https://azure.microsoft.com/en-us/services/bot-service/

[13] Microsoft [Internet]. USA: Microsoft QnAMaker Service. [cited 2018 Nov 10]. Available from: https://www.qnamaker.ai/