Sentiment Analysis Services Using an AI Chatbot

Univ.AI

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Motivation and About the Project

We always rely on opinions of others for making any decision. We always go through the product reviews when buying a product online. Twitter tweets help us in forming our opinion about anything. But it usually eats up a lot of our time in going through all the reviews and tweets.

In this project, we are trying to solve it using NLP and a Chatbot. Without wasting much of his time, user can just give a keywork and sentiment Analysis will be done on the tweets or on Amazon product reviews. Also, with the help of a Question-Answering model in chatbot, it can answer any question about the product from it's reviews.

Data and Models

Sentiment140 dataset is used for training the sentiment analysis model. Only the first few lines of the Tweets were taken for training which resulted in faster training and eventually better accuracy. **Sentiment Analysis** Models:

1. **Custom Model:** This is our base model which contained one embedding layer, one bidirectional LSTM layer, two dense and two dropout layers.
2. **BERT model:** BERT base-uncased model from Hugging Face is loaded. Data is first processed using its preprocessing function and then training is done.
3. **GPT3 model:** This sentence prediction model from OpenAI has been trained in such a way that the next word it predicts will be the sentiment of the sentence given as input into it.

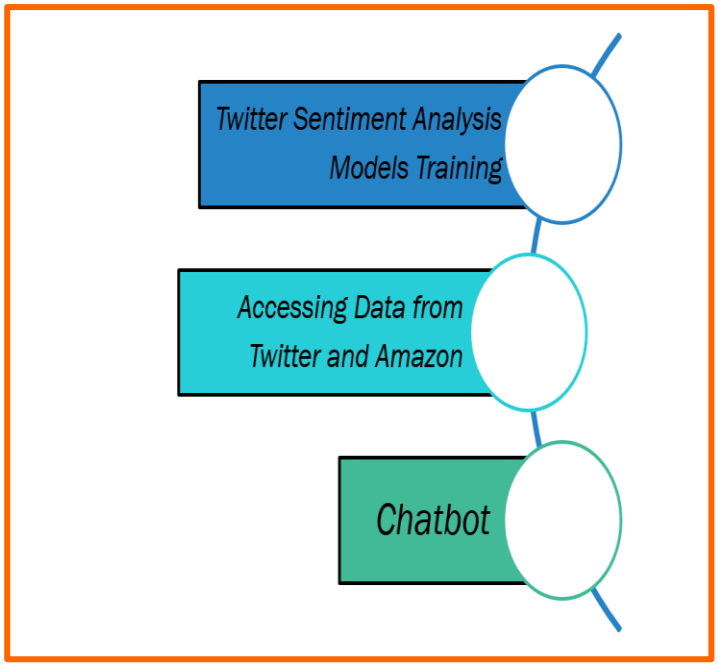
Models used in **Chatbot**:

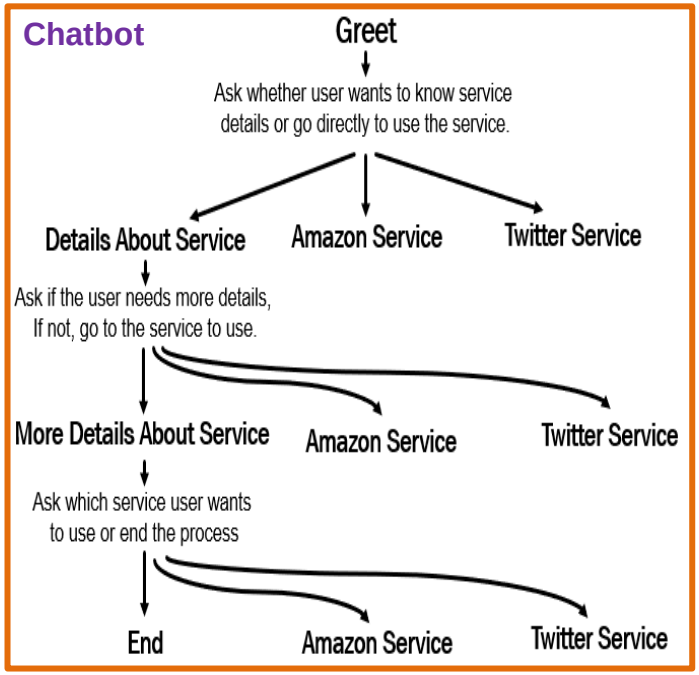
1. **Sentence Embedding Model:** Pre-trained MiniLM model from Hugging Face has been used for this.
2. **Question-Answer Model:** Roberta model from HuggingFace has been used for answering user's questions about the product (from reviews).
3. **Emotion Detection Model:** Distil Roberta model from Hugging Face has been used for greeting users.

References

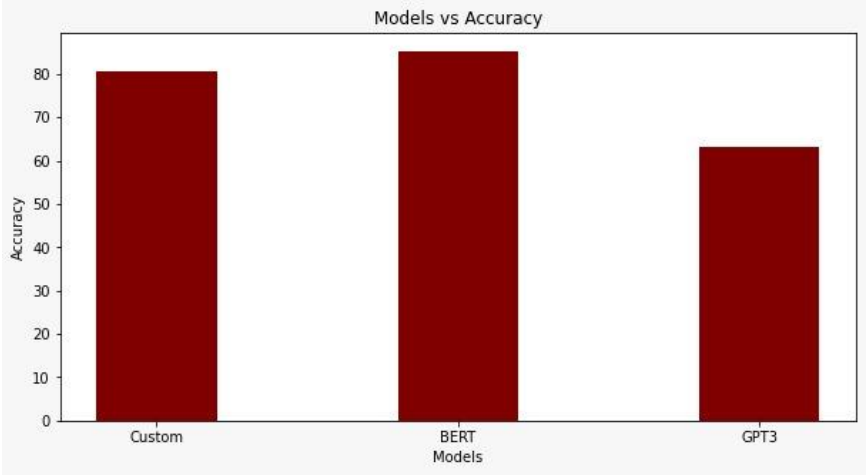
1. Tutorial for making a chatbot using IBM Watson Assistant. : Gave idea of basic structure of Chatbots.
2. Fine tuning BERT model for Sentiment Analysis

Model





Results



Conclusion and Future Work

Improving Chatbot: Current Chatbot is good for its sentiment analysis and question answering on Amazon reviews and if structured in a better way, can be very useful as we always want our questions answered from customers who bought rather than the sellers. Limitations of the chatbot include very slow response when there are very large number of reviews, don't learn from the user interaction and don't generate its own sentences.

Twitter Sentiment Analysis Models: Performance of each of the models are considerably high including the base model. The only limitation is that not all tweets have location information, so it's hard to access tweets based on location. So, we failed to know sentiments based on geo locations.