Emotion-Aware Chatbot

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Github: https://github.com/SabaJazi/EA-Chatbot

Abstract:
The Emotion-Aware chatbot project objective is to design a human-like interactive system using a chatbot that can talk and react to users' written queries with appropriate texts and emojis.
We are planning to use python for our backend and Frontend. We aim to demonstrate the NLP and Machine Learning techniques while designing the chatbot for general daily conversations which can act as a companion or friend for the user. Our model will help users to express their feelings and receive appropriate feedback regarding their input.

Introduction:
Although NLP and machine learning have made significant progress toward tackling different challenges during the last decade, recognizing emotions has remained one of the challenges that are not fully addressed. Detecting emotions can help the communications between machines and humans to sound more human and trustworthy. It also helps to increase the confidence of users in machines' ability to conduct a meaningful discussion. There are many chatbots available developed using different tools. However, they are in many cases good at answering questions, but they are generally not able to detect emotions and react in a manner that shows their emotional intelligence. In this project, we will try to develop a chatbot that will recognize the emotion of users based on their input(text) or will show their emotional intelligence based on the received input.

Data:
In this project, we use the Cornell Movie-Dialogs Corpus dataset[1], which is publicly available. This is one of the databases that we found which contains conversations between 2 humans and is closest to what we aim for. In case we found a better database, we may opt for the latter.This dataset includes the dialogues between pairs of actors and actresses extracted from scripts of a collection of fictional movies. We will use and divide this dataset for different steps of our project, including training, tuning, and testing using the standard practices suggested for a good machine learning approach.

Significance
Humans have emotions, but machines do not. Humans need emotion and awareness to feel and react to what is happening inside and outside the body and mind. If our project will be successful, then the chatbot will realize it’s users’ emotion although the system does not have a feeling. Thus, users will feel more comfortable and interested to communicate with this emotional aware chat bot. The users will feel like conversing with a real person. This chatbot

may not be a therapist or a friend, but can play the role of a companion that can demonstrate the trust and empathy that human beings look for.
If the system is successful in showing the users its knowledge of current emotion, then the user will be more willing to continue conversation and finally, improve their mood.
These specific users can get many benefits from the emotion aware chat bot:

- A lonely person needs to talk with someone but nobody is available. According [3] approximately 24% of elderly Americans (who are 65 and older) do not have social communication. 35% of Americans who are 45 and older feel lonely. These people may benefit from the emotional awareness chat bot.
- An elder person in a nursing home or who is just lying in the bed (cannot walk around) can talk with the emotion awar chatbot any time to realize their emotion and be aware if they need clinical help.
- People will be recognised by the emotion aware chatbot when they have negative emotions such as anger. In such situations, if they are aware that they are experiencing such emotions for a short time and they could be heard and understood, they could feel much better and be prevented from moving toward high risk activities. Even if It does not work as an anger management tool, it could be very helpful for those who have heart disease. Research shows that a person gets higher risks of having chest pain, a heart attack, and a stroke while being angry[4].

Objectives

In this project, we just focus on applying the NLP techniques which have been learned in this course due to our limited time and experience. The Python language and NLP libraries appropriate to our goals will be used to build our system.

First, we will design a user interface diagram by Google draw, Microsoft Visio, or Lucidchart then we use the GUI's library in python to create a graphical user interface.

Second , we use chatterbot or NLTK library to build the basic functions of our chatbot. We train our model by a training data set. After that,a tuning data set will be applied to tune our model.

Then, we will add recognizing emotion functions by collecting emotional words, sentences for training our model or use API pretrained models.

Two popular metrics(EM and F1) for question answering dataset will be considered to evaluate our system.

Work Plan:

Sprints	Description	Deadline
Sprint0:	The proposal, Work plan	09/20
Sprint1:	Data analysis, preprocessing, GUI Design	10/7

Sprint2:	Basic features, build algorithm, training, tuning	10/21
Sprint3:	Recognizing user's emotion, Unit Testing	11/7
Sprint4:	Integration, system testing	11/21
Sprint5:	Final Delivery	12/2

Conclusion:

The emotion-aware chatbot will pose as a companion that many need in their daily life. This chatbot will process the input text from the user and try to identify the emotion after reading the text and will give a response to the user depending on their mood. Using the libraries, packages and online resources available, we will try to demonstrate the best knowledge of Natural Language Processing and machine learning we have to achieve the best results for our project.

References:

[1]: https://www.cs.cornell.edu/~cristian/Cornell_Movie-Dialogs_Corpus.html?ref=hackernoon.com

[2]: [1106.3077] Chameleons in imagined conversations: A new approach to understanding coordination of linguistic style in dialogs (arxiv.org)

[3]: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7205644/

[4]: https://www.health.harvard.edu/heart-health/from-irritated-to-enraged-angers-toxic-effect-on-the-heart