



Chatbot with Song Recommendation based on Emotion

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ABSTRACT -

Music is the universal language of mankind. However, since social media platforms like Facebook and Instagram have a huge influence on the music charts worldwide, users are exposed solely to mainstream music, and recommendations on music streaming platforms are not very personalized. In this era of technological advancement, recommending songs based on a person's emotions is much needed as it will improve users' listening experiences and help them relieve stress by listening to soothing music according to the emotion perceived. In this paper, we have implemented a chatbot that interacts with the user, analyses the emotions of chats, and recommends a song playlist based on the user's emotions. The objective of our application is to identify the emotion perceived by the user, and once the emotion is identified, a list of songs is suggested based on the emotion. A user can play these recommended songs and can simultaneously chat with the chatbot. Our proposed system is implemented as a web application. We have built a simple retrieval based chatbot which uses predefined input patterns and responses. We have used a special recurrent neural network named Long Short-Term Memory to classify the category of a user's message and get an appropriate response from the chatbot. Support Vector Machine, Linear Support Vector Machine, Random Forest, and Decision Tree Classifiers are used to detect the emotions expressed by the user in chats.

Key Words: Deep Learning, Natural language processing, Long Short-Term Memory, SVM, Random Forest Classifier, Decision Tree, LSVM, Emotion Detection.

1. INTRODUCTION

Natural language processing is the ability of a computer programme to understand human language and has a lot of applications in today's world. The most popular application is the recognition of emotions from text. Emotion Detection and Recognition from Text analysis is a recent field of research that is closely associated with sentiment analysis. Sentiment analysis is a branch of Natural Language Processing (NLP) that seeks to detect positive, neutral, or negative emotions in text. It is dedicated to the exploration of subjective opinions or feelings collected from various sources about a particular subject, whereas Emotion Analysis is a process of detecting and recognising different types of feelings through the expression of texts, such as anger, fear, disgust, happiness, sadness, and surprise. Detecting a person's emotions is a difficult task but detecting emotions using text written by a person is even more difficult as a person can express their emotions in any form. The context-dependence of emotions inside the text is one of the most difficult aspects of determining emotion. For example, consider the phrase "Shut up!" It has an element of anger without using the word "anger" or any of its counterparts. Emotion detection is a crucial process in our project. Recognizing these emotions from a text plays a vital role in our application. In our project, the process of emotion detection of the user is done with the help of four supervised machine learning algorithms, namely Support Vector Machine (SVM), Linear Support Vector Machine (LSVM), Random Forest, and Decision Tree. The proposed model will detect six basic emotions as 'happy', 'sad', 'anger', 'surprise', 'fear' and 'neutral'. The Chatbot module of the application makes use of Deep Learning techniques for its implementation. We created a simple, retrieval-based chatbot that employs pre-programmed input patterns and responses. To classify the category of a user's message and obtain an appropriate response from the chatbot, we utilized a special recurrent neural network called Long Short-Term Memory.

2. LITERATURE SURVEY

A few of the key features emphasized by the papers that have been surveyed are:

According to the paper "Approaches, Tools and Applications for Sentiment Analysis Implementation" in the year, September 2015 written by Alessia D'Andrea, Fernando Ferri, Patrizia Grifoni, and Tiziana Guzzo the machine learning approach is used for predicting the polarity of sentiments based on trained as well as test data sets. While the lexicon-based approach does not need any prior training in order to mine the data. It uses a predefined list of words, where each word is associated with a specific sentiment. A challenge in applying sentiment classification approaches and tools for sentiment analysis of posts in social media is to overcome the ambiguity that actually represents a particular problem since it is not easily made use of coreference

information. Typically the analyzed posts contain irony and sarcasm, which are particularly difficult to detect. So the evolution of approaches and tools is required to overcome this limitation.

According to the paper "Music recommendation system based on facial emotion recognition" in the year March 2020 written by Deny John Samuel, B. Perumal, Muthukumaranelangovan the Model recognizes the mood of the user from facial emotions and recommend music. The proposed system is both time and cost-efficient. Due to the unbalanced nature of each element set, effective approaches to incorporate different highlights and functionalities should be investigated. To improve the exactness of the arrangement framework the informational collection used to construct the grouping model could be expanded further.

According to the paper "Sentiment Analysis of Students' Feedback with NLP and Deep Learning: A Systematic Mapping Study" in the year 28th April 2021 written by ZenunKastrati, FisnikDalipi, Ali Shariq Imran, KrenarePirevaNuci, Mudasir Ahmad Wani In this model, both Sentiment analysis and opinion mining are used interchangeably. Applied systematic mapping as the research methodology for reviewing the literature. The sentiment/ opinion polarity, which could either be positive, negative, or neutral, represents one's attitude towards a target entity. Emotions, on the other hand, are one's feelings expressed regarding a given topic. Identifying figurative speech, such as sarcasm and irony, from student feedback text, in particular, is lacking and needs further exploration. Most of the datasets found in the studies discussed in this survey paper were unstructured. Perform more analysis in mapping study by conducting systematic literature reviews (SLRs). Papers that were written in English were selected in this study so, some relevant papers that are written in other languages were not included.

According to this paper "Music Recommendation System" in year July-2019 written by Smt. Namitha S, the playlist is a special function of such systems. Many users find it difficult to create a list from a long list of songs. Hence, this particular approach provides them an option to create their personalized playlist through recommendations. A successful personalized music recommendation technique has become key to stay their members from jumping to another service. Facing a massive collection of music. Users are unable to make a decision and have no idea of what to listen to. Users sometimes have problems discovering new songs when using music streaming websites. To involve such techniques that can give recommendations for new songs. Including methodologies for providing good and accurate music.

According to the paper "Music Recommender System Using ChatBot" written by ShivamSakore, Pratik Jagdale, Mansi Borawake, and Ankita Khandalkar this system can be integrated with various systems such as e WhatsApp, Facebook, Slack, Telegram, and Instagram. Here the song is broken down into different segments such as rhythm, harmony, and timbre, which can be matched to specific mood categories according to expected data. There is no automatic detection of the user's mood.

According to the paper "An Emotion-Aware Personalized Music Recommendation System Using a Convolutional Neural Networks Approach" written by AshuAbdul ,Jenhui Chen , Hua-Yuan Liao, and Shun-Hao Chang This paper proposes the implementation of a personalized song recommendation system based on the user's time, ambiance, preference, geographical location, user's current emotion, user's song listening behavior, play count of the songs, duration of the audio track, etc. In this proposed system users' current emotions cannot be automatically detected.

According to the paper "Music Recommender System CS 365: Artificial Intelligence" written by Garg, Shefali, and Fangyan Sun SVD based latent factor model gives better results than the popularity-based model. It lags behind the collaborative filtering algorithm because the matrix was too sparse which prevented objective functions to converge to the global optimum

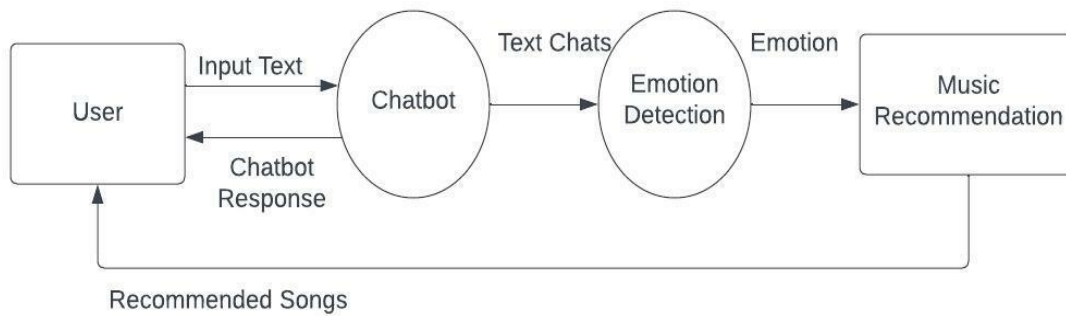
The metadata includes huge information and when exploring it, it is difficult to extract relevant features for song. Technically speaking, processing such a huge dataset is memory and CPU intensive.

According to the paper "Chatbot Song Recommender System", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN:2349-5162, Vol.8, Issue 12, page no.d222-d226, December-2021 customers can get instant support and solutions for their problems using chat-bots while using agents takes a longer time. Chat-bots are available to solve customer problems 24/7 whether it is day or night! Chatbots are still a basic Artificial Intelligence technology and so they can only answer the basic questions of customers and provide general information that is already available to them.

According to the paper "Evaluating Critiquing-Based Music Recommenders with Conversational Interaction" written by Jin, Yucheng Cai, Wanling Chen, Li Htun, NyiNyiVerbert, Katrien. an online evaluation of two different critiquing settings (UC and HC) implemented in a conversational agent for music recommendations. Generally speaking, the recommendations generated by UC and HC were perceived equally by users in terms of several UX metrics. However, compared with UC, HC tends to increase user engagement in searching for a song, which might be attributed to more dialog turns, listened songs, and completion time found in the HC system. Provided a public Spotify account for the sake of some participants who are not active Spotify users. For these users, instead of retrieving the user profile from a Spotify account, we asked users to build their user profiles manually, which may be biased by their engagement in the study. Ultimately, the quality of user profile may affect the actual quality of recommendations.

3. METHODOLOGY

The application in our project is a webapp called "Melomane". The application primarily is a chatbot application which incorporates the emotion detection module. The emotion detection module is used for identifying the emotion expressed by the user while chatting with the chatbot and songs are suggested according to the user's emotions. The application consists of three modules: Chatbot, Emotion detection, Music Recommendation.



3.1 Chatbot Module

A chatbot is an intelligent software that is capable of communicating and performing actions similar to human. The chatbot in our project is name as “Myoosik”. There are two basic types of chatbot models based on how they are built namely Retrieval based and Generative based models. We have built a simple retrieval-based chatbot which uses predefined input patterns and responses. The chatbot will be trained on the dataset which contains categories ,patterns and responses. It then uses an heuristic approach to select the appropriate response. We have used a special recurrent neural network named Long Short-Term Memory (LSTM) to classify which category the user’s message belongs to and then we will give a random response from the list of responses. The data set used is a JSON file which has predefined patterns and responses. As the data is in json format we use the json package to parse the JSON file into Python. With the help of Keras sequential API we build a deep neural network containing 3 layers. We then train the model for 200 epochs. After the model has been successfully trained, it is saved using the 'model.save' function. . The advantage of preserving the model is that you don't have to fit the model every time you execute the code, which would take a long time. The load function can be used to load the model.

3.2 Emotion Detection Module

The Emotions Detection model is built to classify the emotions of a chats. The model is implemented by using four supervised machine learning algorithms namely Support Vector Machine (SVM), Linear SVM, Random Forest and Decision Tree. The proposed model will detect 5 basic emotions as ‘happy’, ‘sad’, ‘anger’, ‘surprise’, ‘fear’. The dataset for emotion detection model is downloaded from Kaggle which is a dataset containing different sentences with emotions. The dataset contains 7480 instances. The emotion column consists of a key (0-4) that represents the emotion being expressed. The emotions are classified as: 0=Surprise, 1=Happy, 2=Fear, 3=Sad, 4=Angry. We train our data using four machine learning models and then choose the model that works best on the training and testing sets. The Classifiers used for prediction are Support Vector Classifier, Linear Support Vector Classifier, Random Forest Classifier and Decision Tree Classifier.

3.3 Music Recommendation Module

Once the emotion has been detected and classified into one of the five categories it is sent to our third module which suggests songs based on the emotion being detected. When the user clicks on the Suggest songs button song playlist is displayed on the user’s screen with the options. The user can select a song among the list displayed and play songs. The songs will play one after the other, until the user asks the chatbot to detect the mood again. Only the songs appropriate for the mood are listed on site. Each song listed on the website provides the user with the song poster and some basic details of the song such as the artist, genre, rating of the song in case the user is interested and wants to know more about the song.

4. CONCLUSION

Chatbots are one of the maximum essential improvements of AI Technology. Our venture efficiently combines this generation with the human’s want for leisure withinside the shape of Music. In this age and time of generation, such a utility could serve the motive of supporting people to loosen up and relieve their stress. This utility is an easy chatbot that permits customers to pick out tracks in line with their temper. The utility is applied as a computing device utility, thereby being to be had to the consumer every time required. When the consumer chooses the track option, songs suitable to his temper are played.

REFERENCES

- [1] Alessia D'Andrea, Fernando Ferri, PatriziaGrifoni ,TizianaGuzzo ,Approaches, Tools andApplications for Sentiment Analysis Implementation September 2015.
- [2] Deny John Samuvel, B. Perumal, Muthukumaranelangovan, Music recommendation systembased on facial emotion recognition 23rd March 2020
- [3] ZenunKastrati, FisnikDalipi , Ali Shariq Imran, KrenarePirevaNuci, Mudasir Ahmad Wani, Sentiment Analysis of Students' Feedback with NLP and Deep Learning: A Systematic Mapping Study, 28th April 2021
- [4] Smt. Namitha S J, 2019, Music Recommendation System, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH TECHNOLOGY (IJERT) Volume 08, Issue 07 (July 2019)
- [5] Ashu Abdul, Jenhui Chen, An Emotion-Aware Personalized Music Recommendation System Using a Convolutional Neural Networks Approach,8 July 2018.
- [6] Kapoor, Nishtha Gupta, Arushi Kumar, Gulshan Aggarwal, Dhruv Ijmtst, Editor. (2022). MU-SYNC - A Music Recommendation Bot. International Journal for Modern Trends in Science and Technology. 8. 19-21. 10.46501/IJMTST0801003.
- [7] Zhou, ChunyiJin, Yuanyuan Zhang, Kai Yuan, Jiahao Li, Shengyuan Wang, Xiaoling. (2018). MusicRoBot: Towards Conversational Context-Aware Music Recommender System.
- [8] A. Nair, S. Pillai, G. S. Nair and A. T, "Emotion Based Music Playlist Recommendation System using Interactive Chatbot," 2021 6th International Conference on Communication and Electronics Systems (ICCES), 2021.
- [9] V. Oord, S. Dieleman, and B. Schrauwen, "Deep content- based music recommendation," in Proc. 26th Int'l Conf. Neural Info.Process. Systems, pp.2643- 2651, December 2013.
- [10] Shivanand, Shivani et al. "Chatbot with Music and Movie