Emotions Based Music Recommender

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Abstract: *Listening to songs has been found to affect the state of human brain. Emotion based music recommender with automated playlists can help users to maintain a selected emotional behaviour. This research proposes an emotion based music recommender that create playlists based on real time pictures of the user. A great indicator of the state of a mind for a person are its facial expressions. The most expected way to express emotions is through facial expressions. Humans most likely link the music they listen to, to the emotion they are feeling. The song playlists though are, at times very large to be sorted automatically. It would be helpful and amazing if the music player was smart enough to sort out the music playlist based on the current state of emotion the person is feeling. Generally people have a large number of songs in their playlists. The main aim of project is to minimize the effort of categorizing these playlists manually according to the real time emotions. Usually people randomly select a song from their playlists and it may happen that the given song might not be appropriate for the current mood of the user which may upset the user. Moreover there are very few softwares which would actively sort music based on the current mood of the user. The project mainly aims to provide better enjoyment to the music lovers in listening music*

Keywords- *Emotions, facial-feature extraction,audio feature extraction,classification,music segregation.*

I. Introduction

Music plays a very relevant and crucial role in raising an individual's life as it is an important medium of amusement, relaxation or entertainment for music lovers and listeners and sometimes even imparts a therapeutic approach. People love to listen to songs based on their emotional state and intellectual curiosity and mood. This project mainly focuses on creating an application that will suggest and generate song playlist for user based on their real time mood by capturing facial expressions. The obsolete form of data transmission is facial expression. In recent world, with this ever increasing progression in the field of multimedia and technology, various emotions based music recommenders have been developed with features like fast forward, reverse, variable playback speed (seek & time compression),local playback. Although these features fulfill the user's essential requirements, yet the user has to face the tedious job of manually browsing through the songs playlists and select songs based on his/her current mood and emotional state. Although the mutual way of expressing emotions is speech and gesture, but facial expression is the most existent and natural way of expressing feelings, emotions and mood. The prime objective of this paper is to design an efficient and accurate algorithm that would generate a playlist based on current emotional state and behavior of the user. The algorithm designed requires less memory overheads, less calculation and processing time, reducing the expense of any additional hardware like sensors. The extraction of emotions module and audio feature extraction module is combined using an Emotion-Audio integration module. The proposed system achieves a well and better quality and real time performance than the methodologies that exist currently. The expressions or emotional state would be divided into five different categories - They are: Happy, Sad, Angry, Sleepy and Neutral. This paper mainly aims and lights the attention on finding the solution for the drawbacks involved in the existing system by designing an automated emotion based music recommender. This system is used for the creation of playlist according to the personal preference based on extracted facial expressions or emotional state of user and thus avoiding the use of any supplemental hardware. A music player should be smart and intelligent and must act according to user's choice. A music player should help users to categorize and play the songs automatically without putting much effort into selection and re-categorization of songs playlists. The Emotion-Based Music Recommender provides a better platform to all the music lovers, and ensures automation of song categorization and updating of play-lists at regular intervals. The player also gives suggestion for users to change songs often. The prime functionality of this project is to give users the advantage to automate the categorization of the songs playlist based on user real time emotional state.Recent research confirms that humans mostly respond and react

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to music. Music has a great impact on person's brain activity. The system will not only act as a boon for the users but will also reduce physical and mental stress.

II. Proposed System

The proposed algorithm in the emotion based music recommender involves following modules:

Phase 1: Input image
According to architecture capturing image is the first task to be performed. So we are going to capture the image of user by using the webcam or the camera. There are some conditions while the image is been captured such as user should be near to camera in case of multiple users so that the emotion gets captured correctly. For training SVM the Data is stored in file and corresponding labels are stored with it.

Phase 2: Face detection
Only face is detected first from the image by performing certain algorithms. We are going to use Viola-Jones algorithm for detecting a face.

Phase 3: Training of SVM & Trained SVM:
The data are gathered to train SVM and are provided for training of SVM. The labels are given manually for training Image database provides the training image.

Phase 4: Testing Data :
SVM as by doing this data and label the SVM are trained.

Phase 5: Music Player :
In this it is the actual music player where the user can chose the music according to his will as they are arranged based on users emotions.
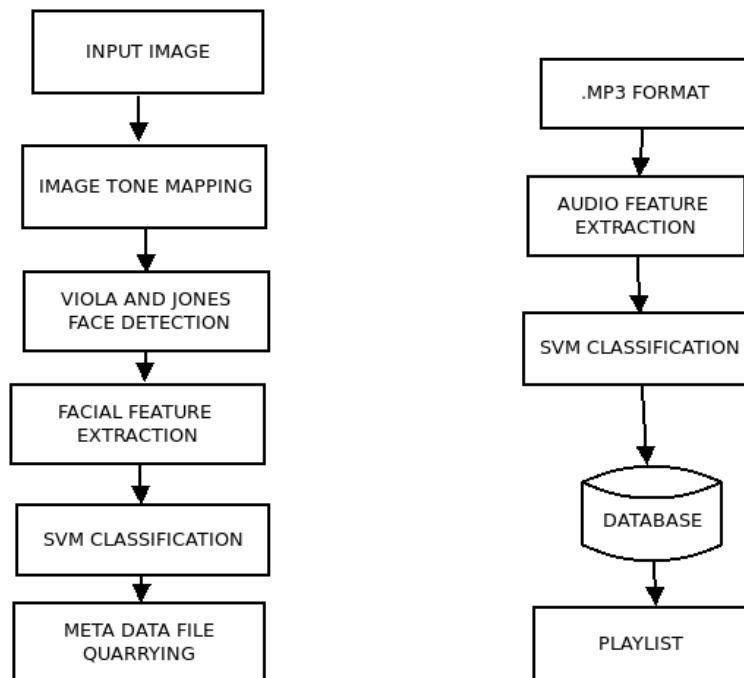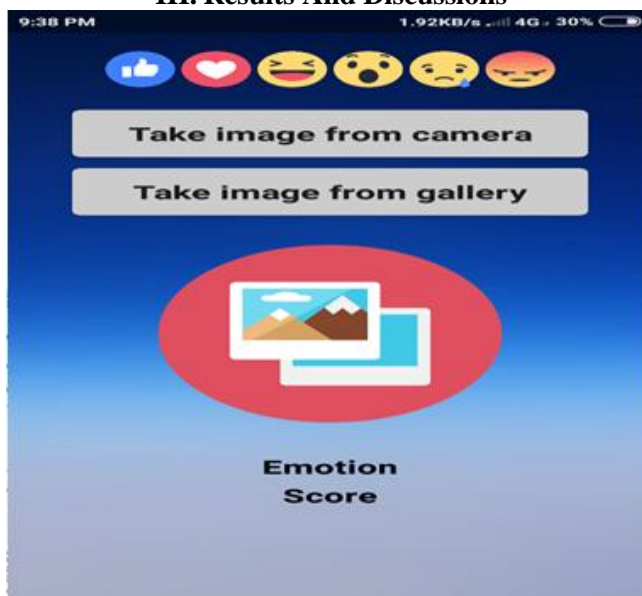

Fig 1: Proposed Architecture

III. Results And Discussions


```
In [8]: df["SES"].fillna(df["SES"].median(), inplace=True)
        df["MMSE"].fillna(df["MMSE"].mean(), inplace=True)

In [9]: # Encode columns into numeric
        from sklearn.preprocessing import LabelEncoder
        for column in df.columns:
            le = LabelEncoder()
            df[column] = le.fit_transform(df[column])

In [10]: from sklearn.model_selection import train_test_split

         feature_col_names = ["M/F", "Age", "EDUC", "SES", "MMSE", "eTIV", "nWBV", "ASF"]
         predicted_class_names = ['Group']

         X = df[feature_col_names].values
         y = df[predicted_class_names].values

         X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.30, random_state=42)

In [53]: from sklearn.tree import DecisionTreeClassifier
         from sklearn import tree

In [59]: model = tree.DecisionTreeClassifier()
         model

Out[59]: DecisionTreeClassifier(class_weight=None, criterion='gini', max_depth=None,
                    max_features=None, max_leaf_nodes=None,
                    min_impurity_decrease=0.0, min_impurity_split=None,
                    min_samples_leaf=1, min_samples_split=2,
                    min_weight_fraction_leaf=0.0, presort=False, random_state=None,
                    splitter='best')
```

Fig 2: Snapshot of UI for capturing image

This snapshot in an image of user interface when user opens the application.This is the first page he/she will cacross.
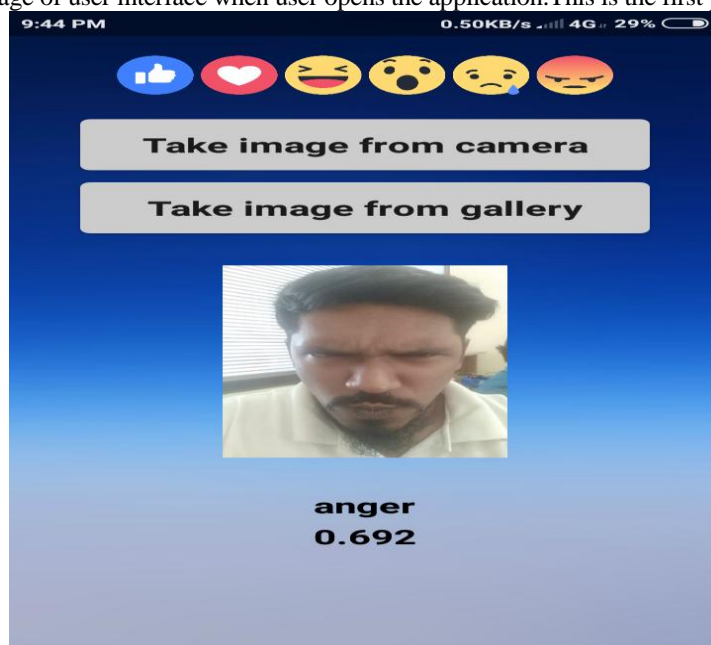

Fig 3: Snapshot of mood detection

After the image of the user is captured,the application detects the mood of the user using haar-cascade algorithm and displays the mood along with the intensity of the mood on a scale from 0 to 1.

IV. Conclusion

The system aims at providing a user a free hardware with cheaper and accurate system that provided music based on the emotion. The emotion based music recommender will be very useful and would have a great advantage to the users who are looking for such music players that plays songs based on the emotion. It will also reduce the searching time of the user to search a music according to their emotion and that will directly increase the overall accuracy and efficiency of the system. The system will a boon to the music therapies and will also assist the music therapist. It will also reduce the physical stress of the user for searching the music. It will also be a boon to the music lovers.

The facial expressions are the great indicators which depend the persons state of mind. Instead the best and the nature way for a person to expression its feeling or mood is the facial expression. Humans get linked to the music according to what their feeling. If they are happy they would get link to those songs which help them to be happy. The system is that it would help the music therapist to treat the patient suffering from various disorders such as mental stress, depression, anxiety and trauma. The system can be enhanced with a capability that it would detect group emotions along with individuals, so that it can be effectively used in public places. Even if the person is continuously changing its mood it would effectively detect a mood and play the music accordingly.

Acknowledgements

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