

Melody: An Emotion-Based Music Player Using Face Recognition

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Abstract - In these times, most people in the world love to listen to music. Music plays a dominant part in everyone's life. We use music for many reasons like relaxation, inspiration, and expressing our feelings. It provides us relaxation and helps to reduce stress. This is confirmed by the fact that now we can see numerous people with earphones in their ears while taking an early morning walk, crossing the street, or even working. There are lots of music applications that were improved with various functionality and other implementations but despite that, I found an issue in most music player applications that they play songs randomly without analyzing the user emotion.

In this paper, we introduce a system that will be able to play songs for the user according to their mood. Melody is an emotion-based music player application that suggests an automated song playlist to the user after analyzing their emotion. We adopt the use of Android Studio and Google Firebase to store songs on the server and then play them in the Melody app according to the user's mood. The user emotion is obtained using the face recognition procedure.

Key Words: android, firebase, face recognition.

1. INTRODUCTION

Music is one of the numerous ways to express feelings and emotions. It is present in everyday lives from all around the world. Music is a powerful thing. It is not only useful for entertainment purposes. Even so, there are various other benefits of music like listening to music is known to have incredibly positive effects on our brain. More precisely, music can change the way we behave, sense, and expect. So, how does this factor in managing our mental health? Music can make us dance like no one is watching, uncontrollably tap our feet and help to focus. Moreover, it develops the mind and raises self-confidence.

Music is an important part of our life than just being a source of entertainment[1]. Music can improve mood, reduce pain and fear. Research suggests that music can benefit our physical and mental health[2] in several ways. Listening to those top workout tracks can boost physical performance and increase stamina during a rugged workout. Music is also used for stimulates memories. There is no cure for Alzheimer's disease but music therapy has been shown to reduce some of its symptoms. Music therapy can relax the distressed patient and help them to raise their mood.

The development of music apps, in general, is very fascinating to watch – you never know how things will turn – will there be a new trend maker or a new, unknown function

will become standard? It is hard to imagine even a year ahead because music apps are popular and technology is advancing very quickly.

In this paper, we look at building an emotion-based music application named "Melody" that will play songs in the app according to the user's mood. Firstly, the user opens the app then the app will capture the face of the user and recognize their emotion using the face recognition technique. In the subsequent step, the application will suggest the next songs after analyzing the mood of the user. For example: If the user's emotion is sad, the application will try to change their mood by suggesting some cheerful songs. Similarly, if the user is in a depressed mood then the app will suggest motivational songs. We also determine how useful Firebase[3] is, for storing songs on the cloud and also retrieve them to play songs. In this application, we have utilized Google Firebase as a real-time database[4] that provides a real-time data connection. Firebase database is reliable, stable, and up-to-date with new market releases. The Firebase Real-time database is a cloud-based database that supports multiple Android, iOS, and Web platforms. Hence, firebase users can create and update apps faster than ever.

2. Implementation

An emotion-based music application named Melody creates an automated songs playlist according to the user's emotion. There are two applications created for this project, one is a server-side app named "Melody Server-side" that stores songs in the firebase cloud and the other one is a client-side app named "Melody" that displays songs in the application according to the emotion of the user.

Facial Recognition

A Facial expression is the visible indication of the affective state, cognitive activity, desire, character and psychopathology of a person. It plays a communicative role in interpersonal relations. Human facial expressions can be simply classified into basic emotions: happy, sad, surprise, anger and neutral. Our facial emotions are shown through the activation of specific sets of facial muscles. These complex signals in an expression usually contain an abundant amount of information about our frame of mind.

Automatic recognition of facial expressions can be an important part of natural human-machine interfaces. It has been studied for a long term and achieved advancement in recent decades. However significant advancement has been made, Recognition of facial expressions with a high accuracy remains to be challenging because of the complexity and diversity of facial expressions.

SkyBiometry

SkyBiometry[5] is a subsidiary of Neurotechnology which is a provider of deep-learning-based solutions, robotics and high-precision biometric identification technologies. The SkyBiometry API can be used for varied purposes like face detection, recognition, grouping and attributes determination. It predicts the emotion using the face recognition technique. It can determine such properties as gender, age, smile (or not), lips (parted/sealed), eyes (open/closed), emotions (neutral, angry, disgusted, scared, happy, sad, surprised), yaw, and facial feature points.

SkyBiometry applies the VeriLook algorithm [6], which in turn uses robust digital image processing algorithms based on deep neural networks. However, they do not disclose the algorithm. It detects 68 points including eyes, nose, mouth and other facial features. It can also extract the points as a set of their coordinates during face template extraction. Each of these points is assigned a fixed sequence number. For example, number 31 will always correspond to a nose tip. This algorithm is designed to recognize emotion from a human face. Basic emotions such as anger, disgust, fear, happiness, sadness and surprise are analyzed. For each of the emotions, the algorithm returns a confidence value. Emotion having the larger confidence value is the emotion displayed on the face.

Server-Side App

This is the first App developed to store the songs in the firebase cloud storage according to the emotion of songs.

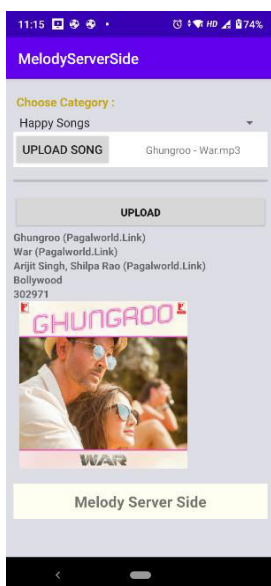


Fig-1: Interface of the server-side app to upload songs on firebase

Fetch info from genre:

There is a category class MediaMetadataRetriever class in android that provides a unified interface for retrieving frame and meta data from an input media file. It is located under android.media package. For example retrieving song name,

artist, name, duration of media, etc. Constants provided by MediaMetadataRetriever class are plentiful. These constants want to retrieve media information. Although the work done by all the constants is apparent from their name.

How to upload songs into the firebase:

Cloud Storage allows the developer to quickly and easily upload files to google cloud storage. To upload files, the first step is to create a reference to the full path of the file, including the file name.

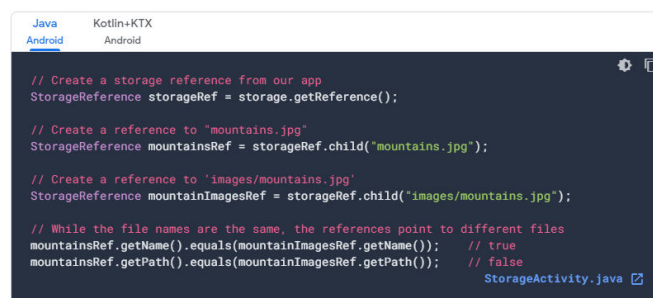


Fig-2: Upload files on firebase

[src:

<https://firebase.google.com/docs/storage/android/upload-files>]

There is an inbuilt method called putFile() which helps to upload the files on the firebase. putFile() method takes a file as input and returns an upload task which you can use to manage and monitor the status of the upload.

Client-Side App:

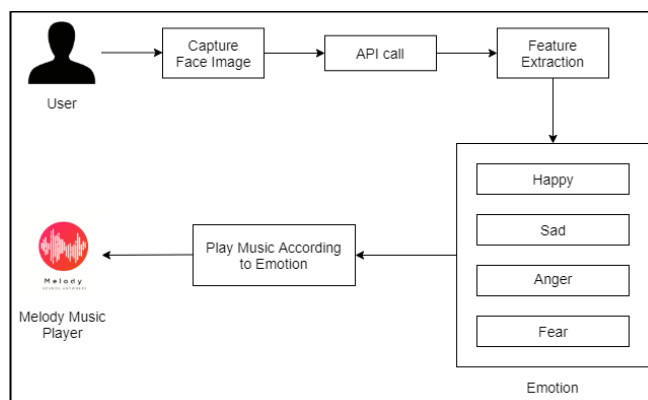


Fig-3: Architecture diagram for the client-side app

This is the main app named “Melody” that will display the automated playlist to the user according to their emotion. After analyzing the user emotion by face recognition, the list of songs from firebase displays in the application. Finally, the user can play the songs using Jcplayer[7]. This app also lets the user to choose their emotion from the categorized emotion list manually.

3. EXPERIMENTAL RESULTS

This paper concludes that the application of the music player will be to play music by recognizing the emotion of a user. Songs have been hosted on the Realtime Firebase. Firebase has been played an important role to store and retrieve the song according to emotion recognition. Firebase services are

important in the sense that those tools make the development of these applications more efficient and faster compared to building a traditional separate database using a scripting language. This app can be simply used by any user. Application UI is very interactive which makes it user understandable and easy to use.

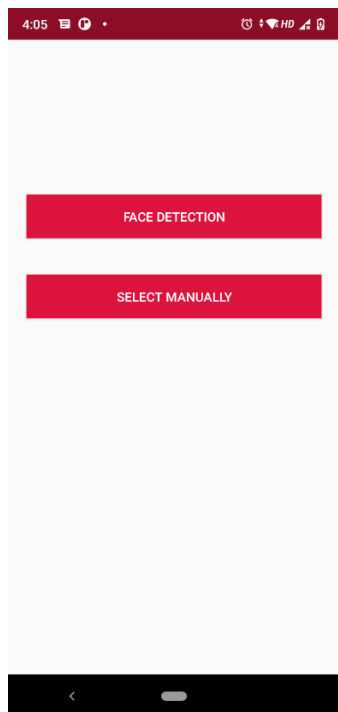


Fig-4: Choose a option

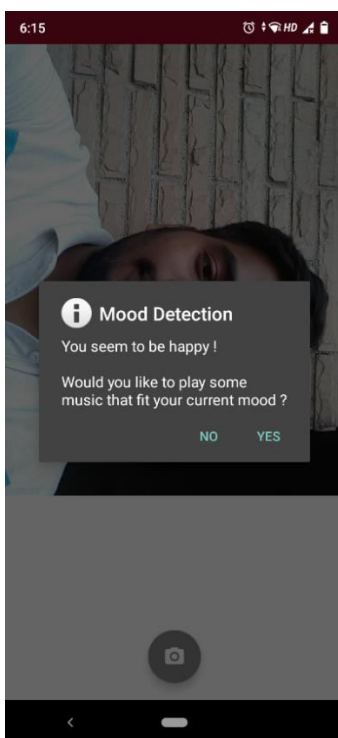


Fig-5: Mood detection using face recognition



Fig-6: Songs start playing from firebase to the melody app

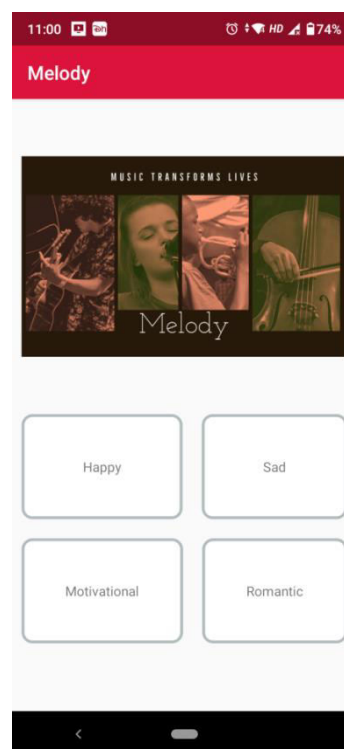


Fig-7: Interface of client app to select emotion of the user manually

4. CONCLUSIONS

The system result comes out as the melody, the emotion-based music player android application that allows users to smoothly play songs according to their emotions. This provides a custom playlist of music according to the user's emotion by real-time analysis of the face recognition and according to their emotion, the playlist is generated. The user just has to

click a picture of their face as input to the Melody app which will recognize the emotion of the user by using Skybiometry API and the application automatically creates the playlist of songs as per the user's emotion. Since face recognition is computed before playing songs, we have obtained results much better than other music players that play songs without analyzing the emotion of the user. This feature makes the melody app more reliable and efficient than the traditional music player app. Therefore, the user can comfortably listen to the songs according to their emotions.

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