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Development of Music Player Application Using Emotion Recognition

Yogesh Kumar[1] | Shikha Gupta[2]

[1]Department of Information Technology, Maharaja Agrasen Institute of Technology, Delhi, India
[2]Department of Information Technology, Maharaja Agrasen Institute of Technology, Delhi, India

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ABSTRACT

In this day and age, most people in the world love to listen to music. Music plays an important part in everyone's life. We use music for many reasons like relaxation, inspiration, and energy. It helps in expressing our feelings and emotions. It gives us relief and helps to reduce stress. This is proved by the fact that now we can see many people with earphones in their ears while taking an early morning walk, crossing the street, or even working. Many music applications were modified with different functionality and other implementations but still, I found an issue in most music player applications that they play songs randomly without reference to the frame of mind of the user.

In this paper, we propose a system that will be able to play songs for the user according to his mood. Melody is a music player application that suggests an automated song playlist to the user after analyzing the mood of the user. We use the 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.

KEYWORDS: *emotion, real-time, firebase, android.*

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 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 a distressed patient and help them to raise the mood.

Many music applications were modified with different functionality and other implementations. The development of music apps, in general, is very

interesting 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 difficult to guess even a year ahead because music apps are popular and the technology is developing 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. We also determine how useful Firebase is, for storing songs on the cloud and also retrieve them to play songs. Firebase[2] is Google's mobile application development platform that helps you build, improve, and grow your applications that require a real-time database[3]. In the real-time database, when one user updates a record to a database that update should be transmitted to all individual users instantly. Firebase is a platform which allows developers to build web and mobile application completely. Firebase mainly handles the server-side services when the application has been deployed. With the help of firebase, developers easily surpass the database creation steps and also manage the application data transfer from the server end.

In this application, we have utilized Google Firebase as a real-time database that provides 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.

Firebase is an integrated platform with Google Cloud and brings a serverless and scalable infrastructure. Developers can create real-time applications in a much faster way and easily scale them with the help of firebase. It offers the developer a bunch of services and tools useful for creating, deploying, and managing applications. Hence, firebase users can create and update apps faster than ever. Furthermore, the firebase platform takes advantage of the established security functions of Google to strengthen security features for apps.

Firebase supports multiple ways for user authentication in applications. For example, we can choose to authenticate users using passwords, Google, Facebook, phone numbers, etc. The authentication integration is done easily through the Firebase authentication SDK.

In this paper, we build an application with the prior activities that determine how useful firebase is, for developing the application. The important features [4] or services offered by Firebase are

Real-time database

The Firebase Realtime Database is a cloud-hosted database. It stored data as JSON. The major feature is that data is synchronized in real-time to every client who is connected.

The Firebase Realtime Database is a NoSQL database[5]. With the help of this, we can store and sync the data between our users in real-time. The developers manage real-time by using JSON object. Users can easily access their data from any device by web or mobile with the help of real-time syncing.

Fig 1: Realtime database
[src:
https://console.firebase.google.com/project/fir-demo-project/features/develop]

Authentication

Firebase provides user authentication to make the application more secure. Users can enable to login to the application via Google, Twitter, Facebook, Git, and the user can make their own custom Token as well. This custom token id always unique and Generated against the login id.

Firebase enables the user to store the data in the JavaScript Object Notation (JSON format), which makes the data updating, deleting, or inserting easier for the user.

Fig 2: Firebase authentication
[src:
https://console.firebase.google.com/project/fir-demo-project/features/develop]

Remote Config

Firebase Remote Config enables the application dynamically by defining the parameters in which its update values in the cloud and allows the user to change the behavior and the appearance of our

application without distributing an application update. Users will get simply up-to-date applications whenever their system connects to the cloud via Internet.

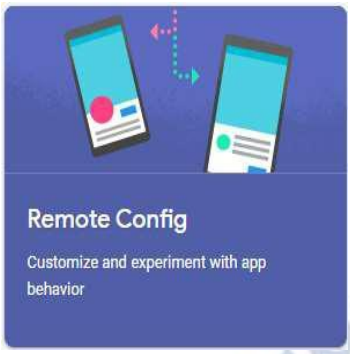

Fig 3: Remote config
[src:
https://console.firebase.google.com/project/fir-demo-project/features/develop]

Crash Reporting

Firebase Crash Reporting is a feature that is a lightweight, real-time crash reporter that helps the user to track, prioritize, and able to fix stability issues that erode application quality. Its saves time for the developer to resolve the issue and make the troubleshooting easy.

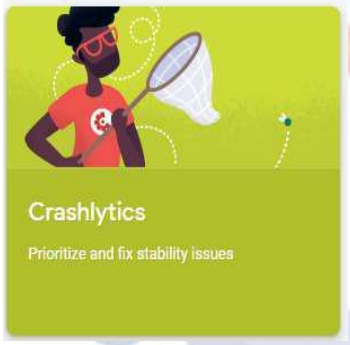

Fig 4: Crash Reporting
[src:
https://console.firebase.google.com/project/fir-demo-project/features/develop]

Methodology

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

Server-Side App:

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

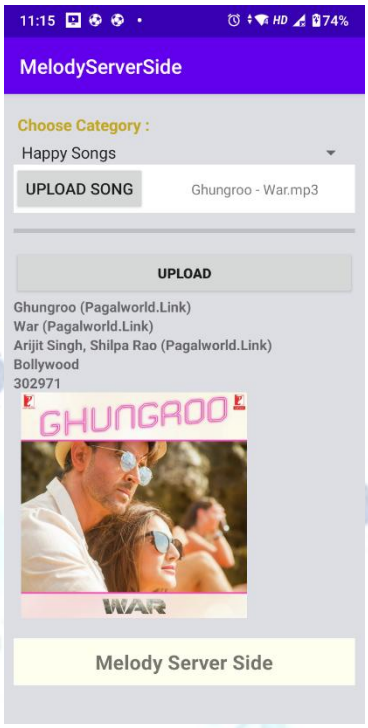

Fig 5: Interface of server-side app to upload songs on firebase

Fetch info from genre:

There is a category class MediaMetadataRetriever class in android 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 provides access to file anytime from anywhere. It allows the developer to quickly and easily upload files to google cloud storage. For uploading files, firstly needs to create a reference to the full path of that file, including the file name.

Fig 6: 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 input as a file and in output, it gives an uploaded file which we can use to handle and monitor the status of the uploaded file.

Client-Side App:

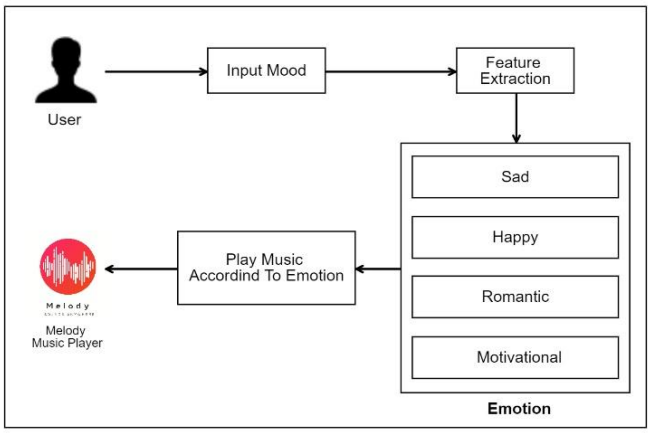

Fig 7: Architecture diagram for client-side app[6]

This is the primary app that will display the automated playlist to the user according to the emotion they had chosen. This app lets the user select their emotion from options like happy, sad, romantic, etc. When the user selects his/her emotion then the list of songs from firebase displays into the application. Finally, the user will be able to play the songs using Jcplayer.

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 provide tools that make the development of this application easier and more efficient as compared to build the traditional separate database by use of 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.

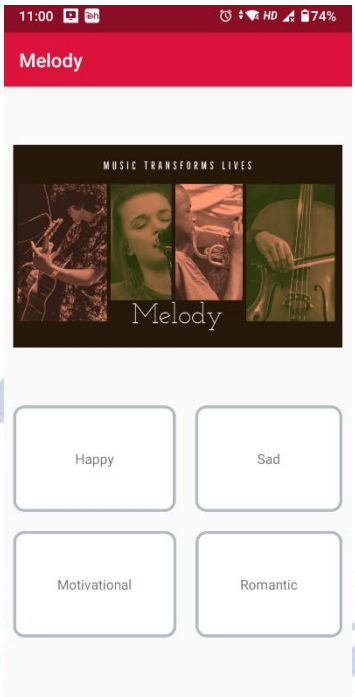

Fig 8: Interface of client app to select emotion of the user

DISCUSSION

The system result comes out as the melody, the emotion-based music player android application that allows users to smoothly play songs according to the emotion of the user. The application takes the input from the user for recognizing the emotion and the application automatically creates the playlist of songs as per of recognized emotion. Therefore, the user can comfortably listen to the songs according to their emotions.

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