

**A Synopsis on**  
**“Emotion-Based Music Player”**

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## **Abstract**

Recent studies confirm that humans respond and react to music and that music has a high impact on person's brain activity. The average American listens up to four hours of music every day. People tend to listen to music based on their mood and interests. This project focuses on creating an application to suggest songs for user based on their mood by emojis. Computer vision is an interdisciplinary field that helps convey a high-level understanding of digital images or videos to computers. In this system, computer vision components are used to determine the user's emotion through emoji. Once the emotion is recognized, the system suggests a play-list for that emotion, saving a lot of time for a user over selecting and playing songs manually. Emotion-Based Music Player also keeps track of user's details like number of plays for each song, sorts songs based on category and interest level, and reorganizes the play-list every time. The system also notifies user about the songs that are never played so that they can be deleted or modified.

Keywords: Realtime Database, Firebase Storage, SQLite Database, Media Player.

## Introduction

Music is an important entertainment medium. With advancement of technology, the optimization of manual work has gained a lot of attention. Currently, there are many traditional music players that require songs to be manually selected and organized. User, have to create and update play-list for each mood, which is time consuming. Although some of these features are enjoyable for user, there is room to improve in the field of automation when it comes to music players. Selecting songs automatically and organizing these based on the user's mood gives user's a better experience. This can be accomplished through the system reacting to the user's emotion, saving time that would have been spent entering information manually. Emotions can be expressed through gestures, speech, facial expressions, etc. For the system to understand a user's mood, we use emoji. we are using Effective SDK for recognition of emotion. The system includes a novel algorithm that organizes songs based on the user's emotions and preferences. This algorithm suggests user's songs to play based on their emotion.

Currently, there are no dedicated applications to suggest songs based on emotion of music listeners. There are also very few applications that focus on the user preferences and recommendations, and these are not customizable, like All Music. Other applications suggest predefined (not user-specific) song play-lists. Application like mood fuse include features like manual selection of songs, partly shuffle, playlist. Some popular music applications like Saavn, Spotify provide users defined play-lists that needs to be created and updated manually. All of these applications focus on general categorization rather than specificity to every user. A dedicated application that focuses more on user preferences, priorities and the creation of dynamic play-list is required to optimize the user experience. It should contain user specific play-list generated based on the usage and should be efficient in categorization.

Project Emotion based music player is a novel approach that helps the user to automatically play songs based on the emotions of the user. It recognizes the emotions of the user by the emoji present on the screen and plays the songs according to their emotion. Emotion's plays and important role in human life, it especially plays an important role in extraction of an individual 's behaviors and emotional state. The app recognizes the emotion of the user by an emoji and according to the emotion, the music will be played from the predefined directories.

## **Literature Review**

### **Existing System**

#### **Spotify: -**

Spotify allows users to add local audio files for music not in its catalog into the user's library through Spotify's desktop application, and then allows users to synchronize those music files to Spotify's mobile apps or other computers over the same Wi-Fi network as the primary computer by creating a Spotify playlist, and adding those local audio files to the playlist. Audio files must either be in the .mp3, .mp4 (.mp4 files that have video streams are not supported), or .m4p media formats. This feature is available only for Premium subscribers.

#### **SoundCloud: -**

SoundCloud offers two mobile apps; the main SoundCloud app is oriented towards streaming, with music discovery, playlist, and sharing features. In November 2015, a separate app known as SoundCloud Pulse was released for Android and iOS; it is primarily oriented towards content creators, allowing users to upload and manage their uploads, reply to comments, and view statistics. Pulse's features were previously located within the main app; senior marketing manager Brendan Codey explained that the shift to separate apps was meant to allow SoundCloud to improve its user experience for content consumers, without having to worry about how these changes affect features oriented towards creators.

#### **Amazon Music Player: -**

The Amazon Music player (formerly branded Cloud Player) is integrated with the digital music Prime and Unlimited streaming services, as well as the music store for purchases (on most platforms). The players allow users to store and play their music from a web browser, mobile apps, and desktop applications, Sonos (United States only), Bose (United States only) and other platforms such as certain smart TVs. Amazon Music Player accounts get 250 tracks of free storage; however, music purchased through Amazon MP3 store does not count towards the storage limit. Once the music is stored in Amazon Music, a user can choose to download it to one of the Android, iOS, or desktop devices using Amazon Music application. Music is uploaded via the Amazon Music player for PC and Mac. Previously, Amazon offered the Amazon MP3 Uploader, which was an Adobe AIR application.

**Shazam: -**

Shazam identifies songs based on an audio fingerprint based on a time frequency graph called a spectrogram. It uses a smartphone or computer's built-in microphone to gather a brief sample of audio being played. Shazam stores a catalogue of audio fingerprints in a database. The user tags a song for 10 seconds and the application creates an audio fingerprint. Shazam works by analyzing the captured sound and seeking a match based on an acoustic fingerprint in a database of millions of songs. If it finds a match, it sends information such as the artist, song title, and album back to the user.

## **Proposed Work and Objectives**

### **Emotion-Based Music Player: -**

The Emotion Based Music player requires the user to have a profile to access the application. The user needs to grant permissions for the application to access the device's storage. The application allows users to upload songs and give feedback on the song. Emotion-Based Music Player saves the user profile on the real-time database and keeps the profile logged-in until user logs out of the device manually. As soon as the user opens the application, the buttons labelled as emotion appears. The system will determine emotions and create play-lists for the user based on emotion captured. The application also allows users to easily customize the playlists. It recommends songs for the user that may fit their current emotion, helping the user automate the initial song selection. The recommendations are based on the previous information about the user's preferences and usage.

### **Advantages: -**

- i. Easy to find the songs you like the most.
- ii. Listen songs according to your mood.
- iii. Reduced computational time.
- iv. User gets result very fast according to their needs.

### **Objective: -**

There are many music player apps but they are particularly interested in increasing the quality and efficiency of the for only making playlist and making songs. Music listeners have tough time creating and segregating the play-list manually when they have hundreds of songs. It is also difficult to keep track of all the songs: sometimes songs that are added and never used, wasting a lot of device memory and forcing the user to find and delete songs manually. The Emotion-Based Music Player app makes the it easy to listen the songs according to their emotions and makes it easy to maintain the play-list and mange it. The Emotion-Based Music Player provides a better platform to all the music listeners, and ensures automation of song selection and periodic updating of play-lists. This helps users organize and play songs based on their moods. The player should also give recommendation for users to change songs on-the-go.

Project Emotion based music player is a novel approach that helps the user to automatically play songs based on the emotions of the user. It recognizes the emotions of the user by the emoji present on the screen and plays the songs according to their emotion. Emotion's plays and important role in human life, it especially plays an important role in extraction of an

individual 's behaviors and emotional state. The app recognizes the emotion of the user by an emoji and according to the emotion, the music will be played from the predefined directories.

**Purpose: -**

- i. Analyzing the emotion of the user.
- ii. Listen songs according to your mood.
- iii. Reduced computational time.
- iv. Extremely fast feature computation.
- v. User gets result very fast according to their needs.

**Scope of Project: -**

Emotion Based Music player is a useful application for music listeners with a smart phone and an Internet connection. The application is accessible by anyone who creates a profile on the system. In future, this system can be enhanced with capability of detecting mood using voice, facial expressions and body postures to get more accuracy. Also, we can be improved analysis and sorting of user's playlist by mood at run time. The future scope in the system would to design a mechanism that would be helpful in music therapy treatment and provide the music therapist the help needed to treat the patients suffering from disorders like mental stress, anxiety, acute depression and trauma. The proposed system also tends to avoid in future the unpredictable results produced in extreme bad light conditions and very poor camera resolution.



## **Mathematical Model**

### **Designing: -**

#### **XML: -**

Extensible Markup Language (XML) is used to describe data. The XML standard is a flexible way to create information formats and electronically share structured data via the public Internet, as well as via corporate networks. XML code, a formal recommendation from the World Wide Web Consortium (W3C), is similar to Hypertext Markup Language (HTML). Both XML and HTML contain markup symbols to describe page or file contents. HTML code describes Web page content (mainly text and graphic images) only in terms of how it is to be displayed and interacted with.

XML data is known as self-describing or self-defining, meaning that the structure of the data is embedded with the data, thus when the data arrives there is no need to pre-build the structure to store the data; it is dynamically understood within the XML. The XML format can be used by any individual or group of individuals or companies that want to share information in a consistent way. XML is actually a simpler and easier-to-use subset of the Standard Generalized Markup Language (SGML), which is the standard to create a document structure.

The basic building block of an XML document is an element, defined by tags. An element has a beginning and an ending tag. All elements in an XML document are contained in an outermost element known as Emotion-Based Music Player the root element. XML can also support nested elements, or elements within elements. This ability allows XML to support hierarchical structures. Element names describe the content of the element, and the structure describes the relationship between the elements. An XML document is considered to be "well formed" (that is, able to be read and understood by an XML parser) if its format complies with the XML specification, if it is properly marked up, and if elements are properly nested. XML also supports the ability to define attributes for elements and describe characteristics of the elements in the beginning tag of an element.

#### **XML Tags used in our project: -**

<LinerLayout>: To define a Liner Layout.

<TextView>: To set and display text to the user.

<Button>: To perform an action when the user clicks or tap on it.

<ImageView>: Displays image resources.

<SeekBar>: Extension of ProgressBar that adds a draggable thumb.

<CardView>: The view that can display views on top of each other.

<EditText>: A user interface element for entering and modifying text.

<GridLayout>: A layout that places its children in a rectangular grid.

## **Development: -**

### **Java: -**

Java is a programming language and computing platform first released by Sun Microsystems in 1995. There are lots of applications and websites that will not work unless you have Java installed, and more are created every day. Java is fast, secure, and reliable. From laptops to data centers, game consoles to scientific supercomputers, cell phones to the Internet, Java is everywhere!

Java is a general-purpose programming language that is class-based, object-oriented, and designed to have as few implementation dependencies as possible. It is intended to let application developers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to byte code that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture. The syntax of Java is similar to C and C++, but it has fewer low-level facilities than either of them. As of 2019, Java was one of the most popular programming languages in use according to GitHub, particularly for client-server web applications, with a reported 9 million developers.

### **SQLite Database: -**

SQLite is a relational database management system (RDBMS) contained in a C library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program. SQLite generally follows PostgreSQL syntax. SQLite uses a dynamically and weakly typed SQL syntax that does not guarantee the domain integrity. This means that one can, for example, insert a string into a column defined as an integer. SQLite will attempt to convert data between formats where appropriate, the string "123" into an integer in this case, but does not guarantee such conversions and will store the data as-is if such a conversion is not possible. SQLite is a popular choice as embedded database software for local/client storage in application software such as web browsers.

SQLite implements most of the SQL-92 standard for SQL, but lacks some features. For example, it only partially provides triggers and cannot write to views (however, it

provides INSTEAD OF triggers that provide this functionality). While it provides complex queries, it still has limited ALTER TABLE function, as it cannot modify or delete columns.[20] This changed in version 3.25.0 with support for ALTER TABLE RENAME COLUMN and version 3.35.0 with ALTER TABLE DROP COLUMN.

SQLite uses an unusual type system for a SQL-compatible DBMS: instead of assigning a type to a column as in most SQL database systems, types are assigned to individual values; in language terms it is dynamically typed. Moreover, it is weakly typed in some of the same ways that Perl is: one can insert a string into an integer column (although SQLite will try to convert the string to an integer first, if the column's preferred type is integer). This adds flexibility to columns, especially when bound to a dynamically typed scripting language. However, the technique is not portable to other SQL products. A common criticism is that SQLite's type system lacks the data integrity mechanism provided by statically typed columns in other products. The SQLite web site describes a "strict affinity" mode, but this feature has not yet been added. However, it can be implemented with constraints like CHECK(typeof(x)='integer').

### **Firestore Storage: -**

Firestore is a Backend-as-a-Service — BaaS — that started as an YC11 startup and grew up into a next-generation app-development platform on Google Cloud Platform.

Firestore frees developers to focus crafting fantastic user experiences. You don't need to manage servers. You don't need to write APIs. Firestore is your server, your API and your data store, all written so generically that you can modify it to suit most needs. Yeah, you'll occasionally need to use other bits of the Google Cloud for your advanced applications. Firestore can't be everything to everybody. But it gets pretty close.

Firestore evolved from Envolv, a prior startup founded by James Tamplin and Andrew Lee in 2011. Envolv provided developers an API that enables the integration of online chat functionality into their websites. After releasing the chat service, Tamplin and Lee found that it was being used to pass application data that were not chat messages. Developers were using Envolv to sync application data such as game state in real time across their users. Tamplin and Lee decided to separate the chat system and the real-time architecture that powered it. They founded Firestore as a separate company in September 2011 and it launched to the public in April 2012.

Firestore's first product was the Firestore Real-time Database, an API that synchronizes application data across iOS, Android, and Web devices, and stores it on Firestore's cloud. The product assists software developers in building real-time, collaborative applications.

In 2014, Firebase launched two products. Firebase Hosting and Firebase Authentication. This positioned the company as a mobile backend as a service. In October 2014, Firebase was acquired by Google. A year later, in October 2015, Google acquired Divot, an HTML5 web-hosting platform, to merge it with the Firebase team. In May 2016, at Google I/O, the company's annual developer conference, Firebase introduced Firebase Analytics and announced that it was expanding its services to become a unified backend-as-a-service (BaaS) platform for mobile developers. Firebase now integrates with various other Google services, including Google Cloud Platform, AdMob, and Google Ads to offer broader products and scale for developers.[15] Google Cloud Messaging, the Google service to send push notifications to Android devices, was superseded by a Firebase product, Firebase Cloud Messaging, which added the functionality to deliver push notifications to both iOS and web devices. In January 2017, Google acquired Fabric and Crashlytics from Twitter to add those services to Firebase.

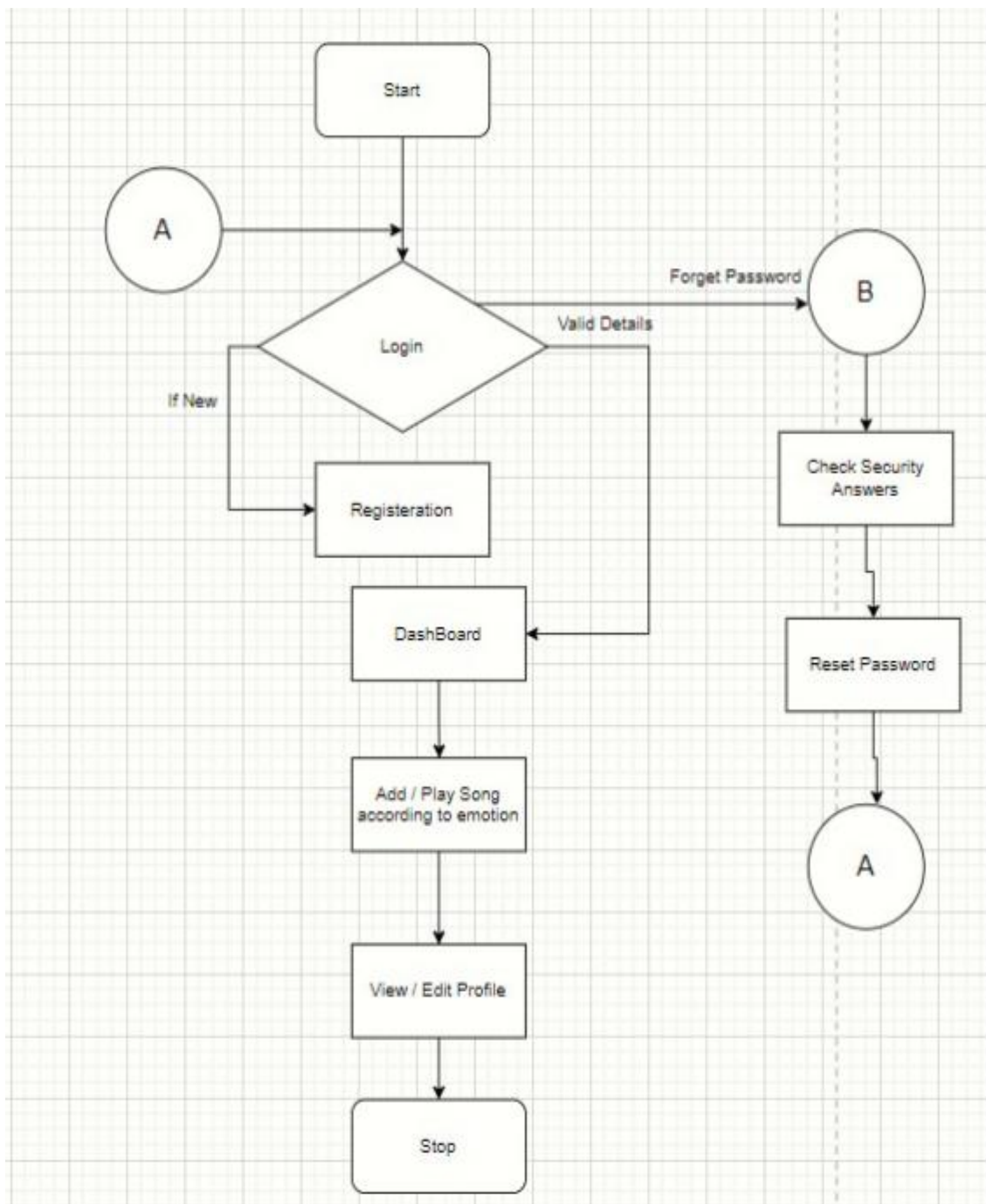
### **Real-Time Database: -**

The Firebase Realtime Database is a cloud-hosted NoSQL database that lets you store and sync between your users in real-time. The Realtime Database is really just one big JSON object that the developers can manage in real-time. With just a single API, the Firebase database provides your app with both the current value of the data and any updates to that data.

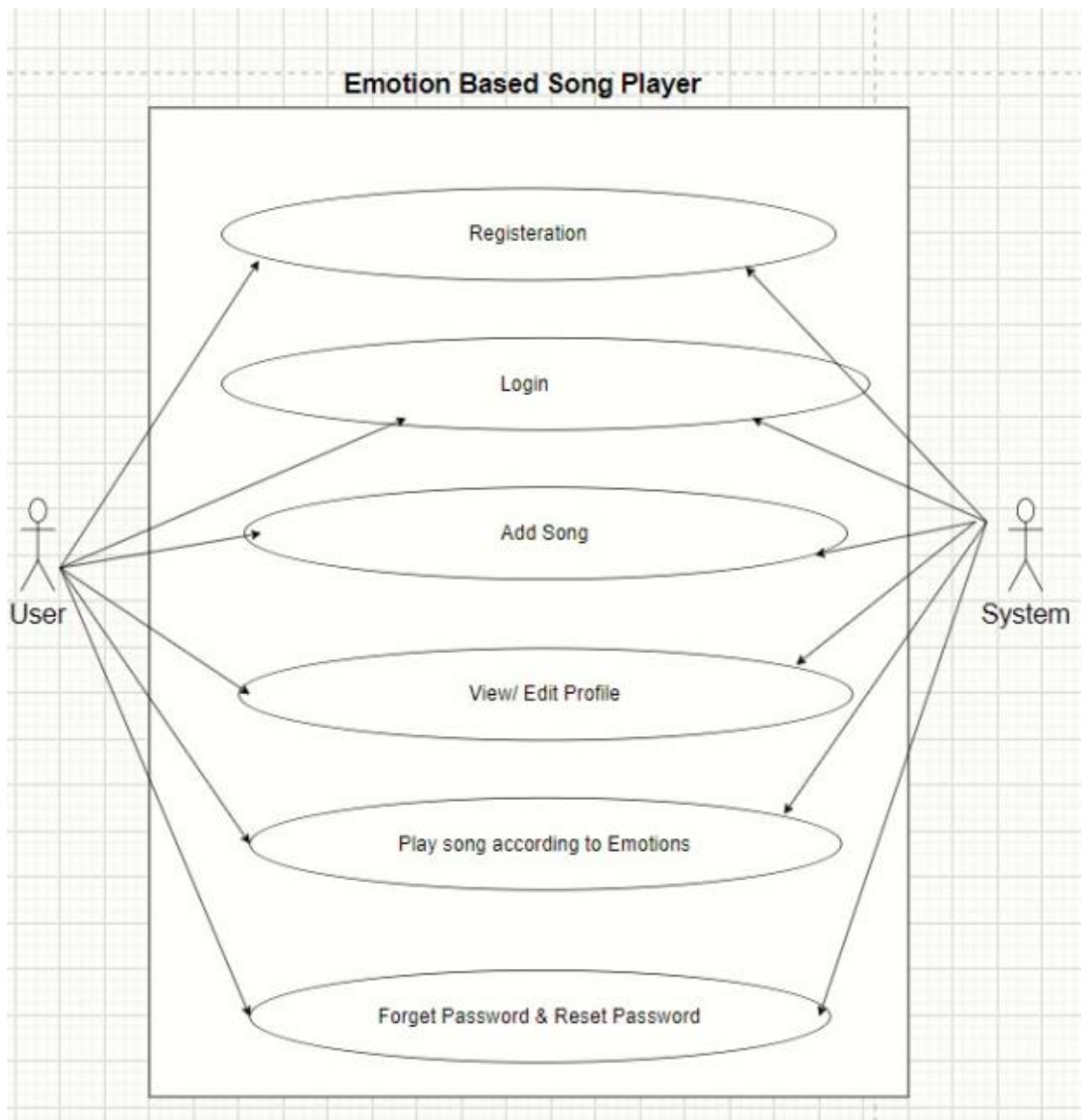
The Firebase Realtime Database lets you build rich, collaborative applications by allowing secure access to the database directly from client-side code. Data is persisted locally, and even while offline, real-time events continue to fire, giving the end user a responsive experience. When the device regains connection, the Realtime Database synchronizes the local data changes with the remote updates that occurred while the client was offline, merging any conflicts automatically.

The Realtime Database provides a flexible, expression-based rules language, called Firebase Realtime Database Security Rules, to define how your data should be structured and when data can be read from or written to. When integrated with Firebase Authentication, developers can define who has access to what data, and how they can access it. The Realtime Database is a NoSQL database and as such has different optimizations and functionality compared to a relational database. The Realtime Database API is designed to only allow operations that can be executed quickly. This enables you to build a great real-time experience that can serve millions of users without compromising on responsiveness. Because of this, it is important to think about how users need to access your data and then structure it accordingly.

## Flowchart

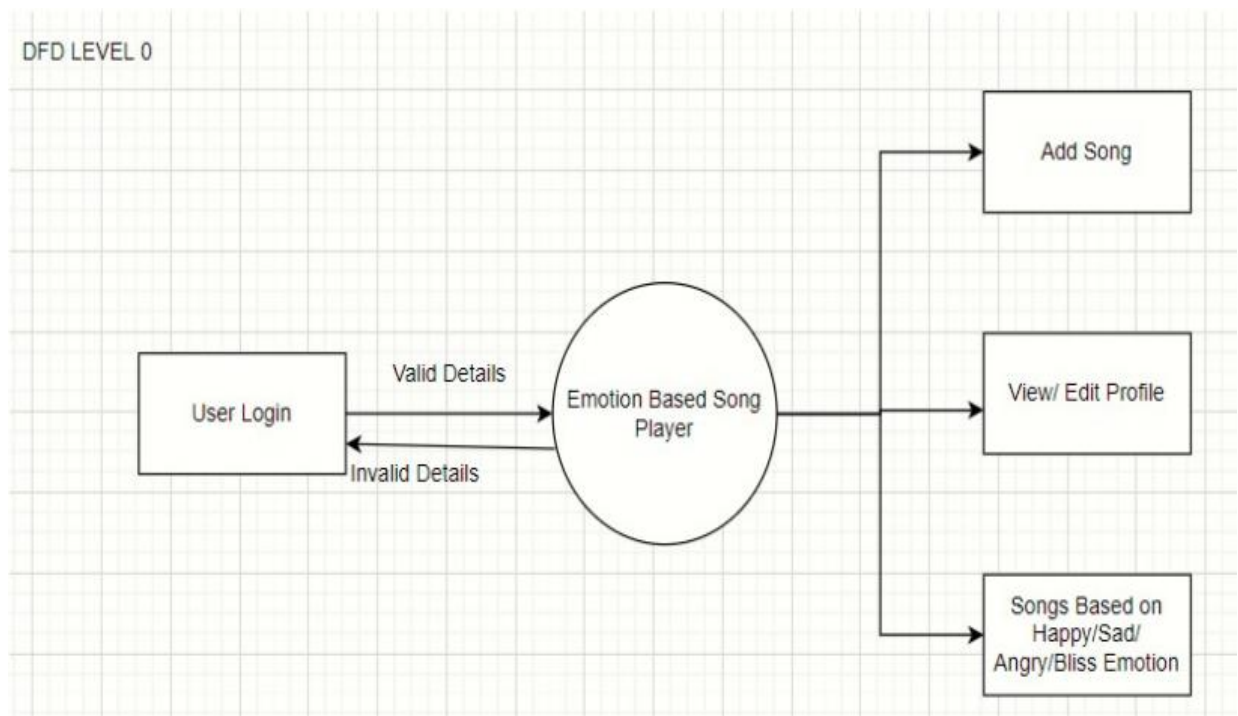


## Use Case Diagram

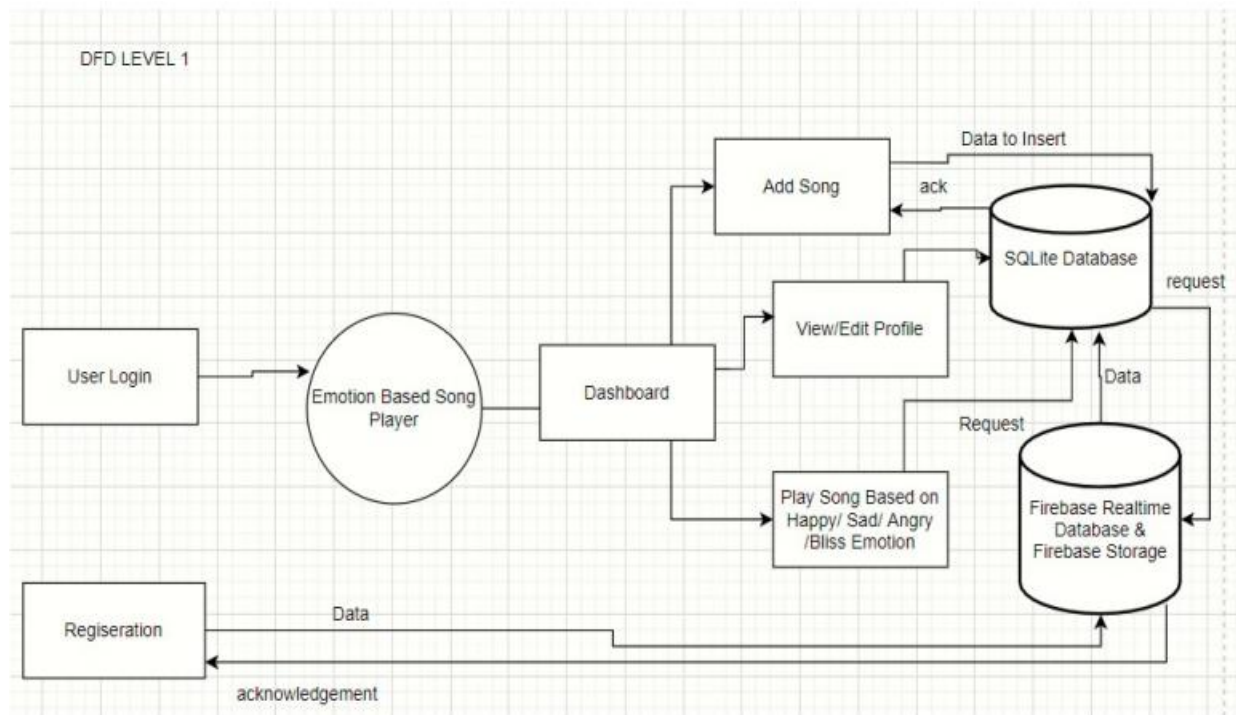


## Data Flow Diagram

### DFD Level 0

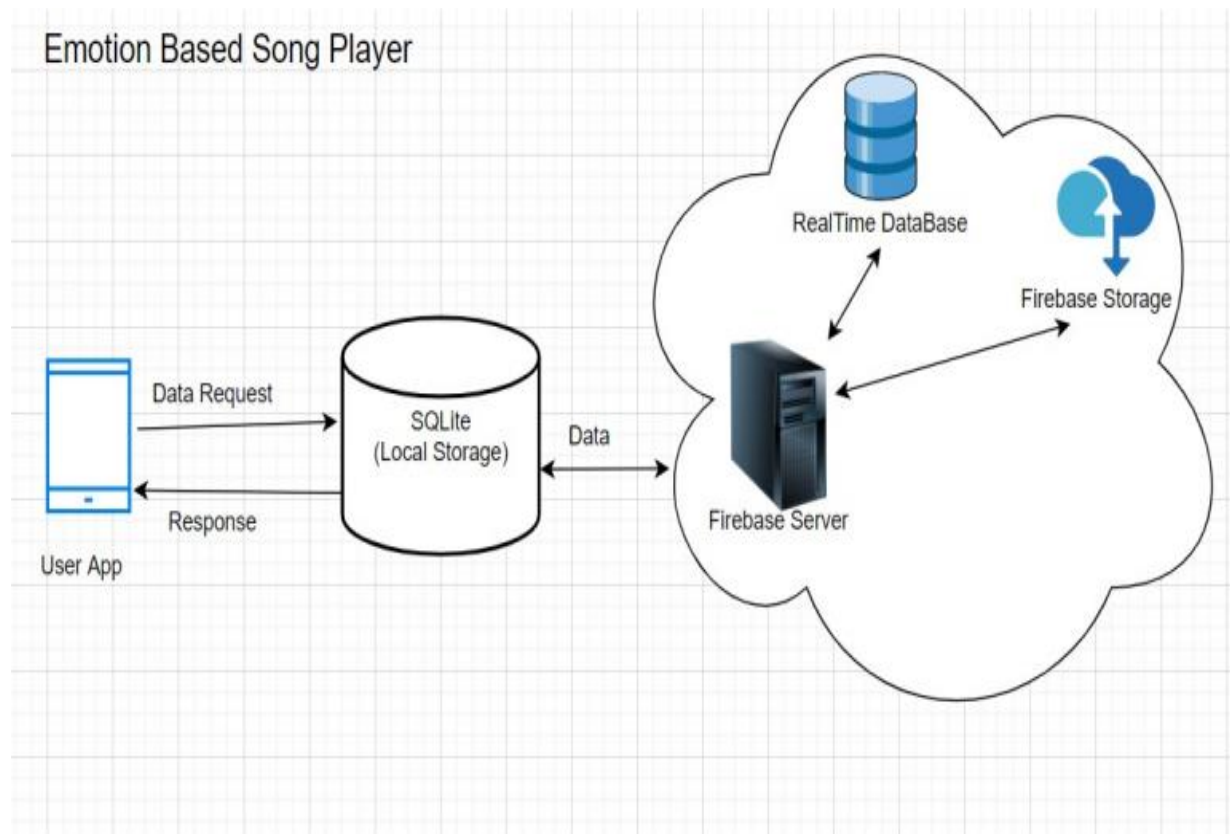


## DFD Level 1



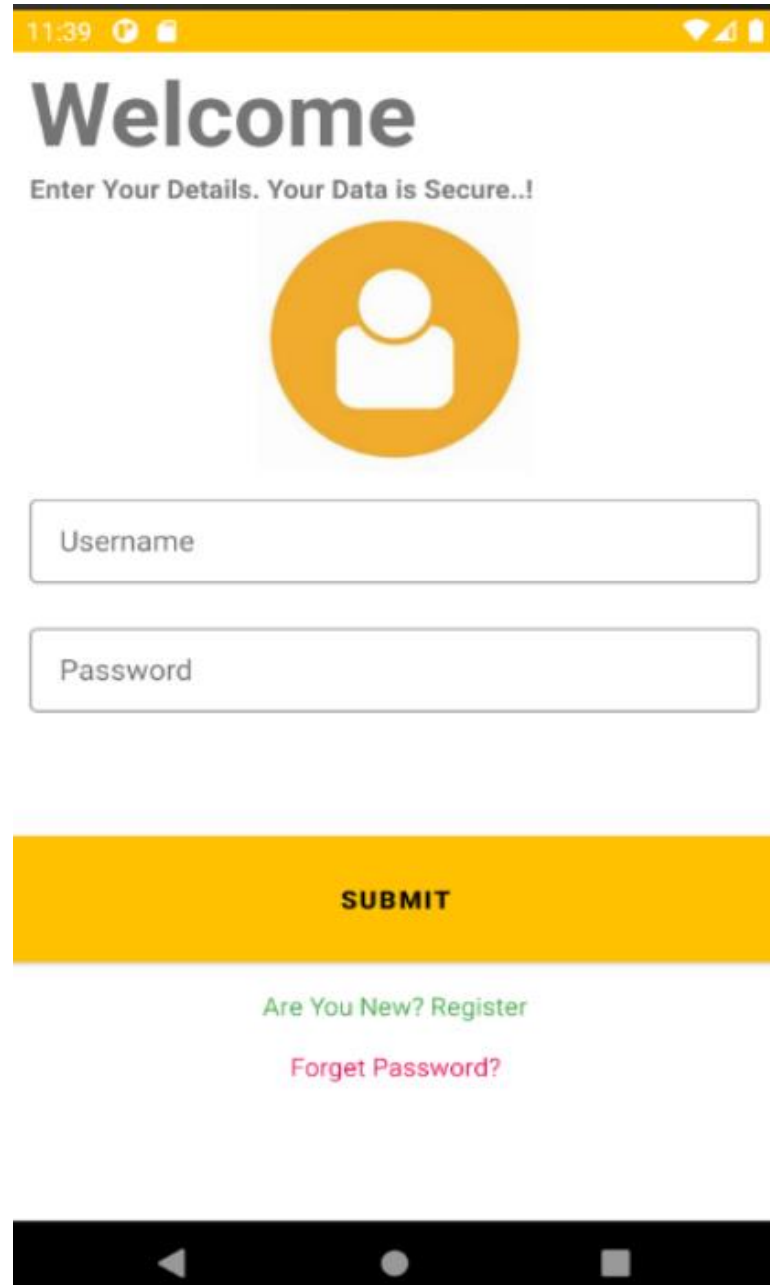


## Activity Diagram



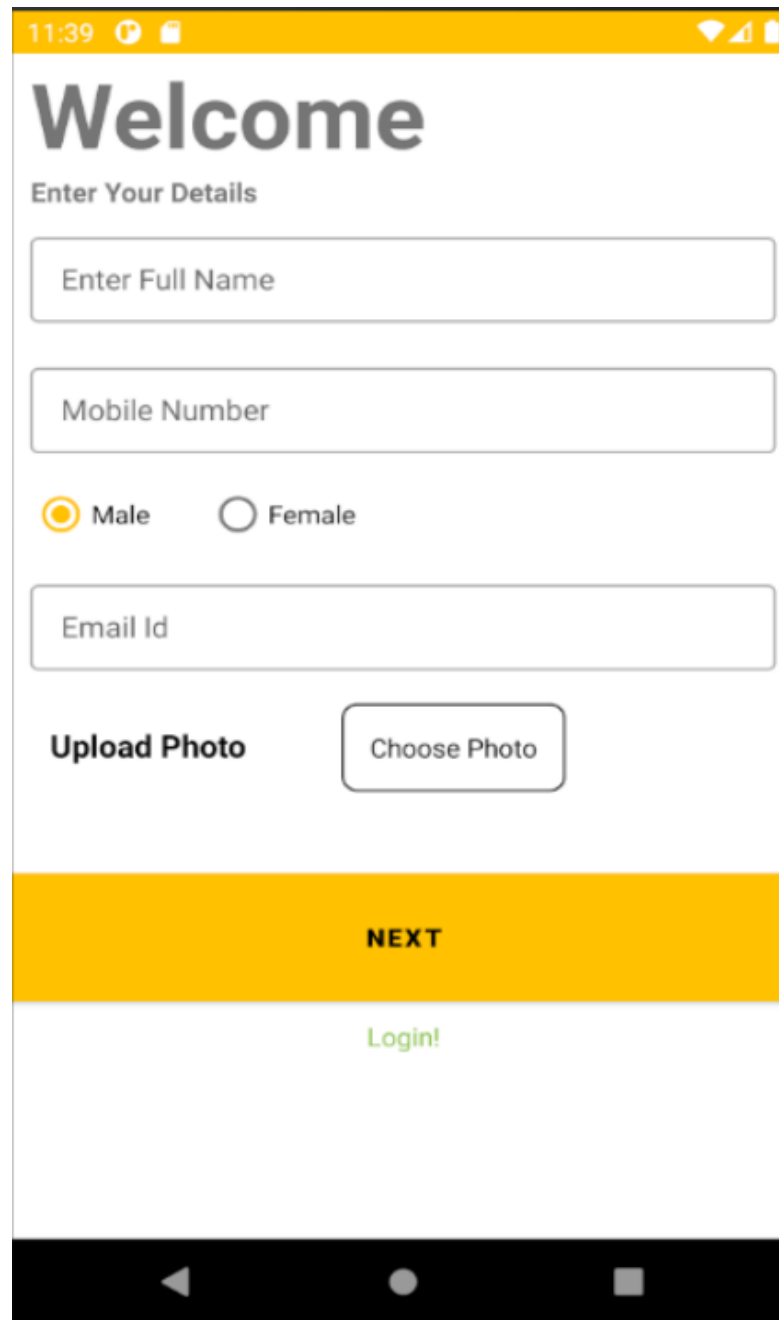
## Desired Implications

### Snapshots of Emotion-Based Music Player



Login Page

Login page contain Submit Button two textfields for username password along with two textview one is are you new? Register and the other is forgot password.



The image shows a mobile application registration screen. At the top is an orange status bar with the time 11:39 and icons for notifications, Wi-Fi, and battery. Below this is a large 'Welcome' heading in bold grey font. Underneath is the text 'Enter Your Details'. The form consists of three stacked text input fields: 'Enter Full Name', 'Mobile Number', and 'Email Id'. Below these fields are two radio buttons: 'Male' (selected with an orange dot) and 'Female' (unselected with a grey dot). Below the radio buttons is another text input field for 'Email Id'. To the left of the 'Choose Photo' button is the text 'Upload Photo'. The 'Choose Photo' button is a rounded rectangle with a grey border. Below these elements is a wide orange button with the text 'NEXT' in bold black font. Below the 'NEXT' button is a green link that says 'Login!'. At the bottom of the screen is a black navigation bar with three white icons: a back arrow, a home circle, and a recent apps square.

11:39

# Welcome

Enter Your Details

Enter Full Name

Mobile Number

☒ Male ☐ Female

Email Id

Upload Photo

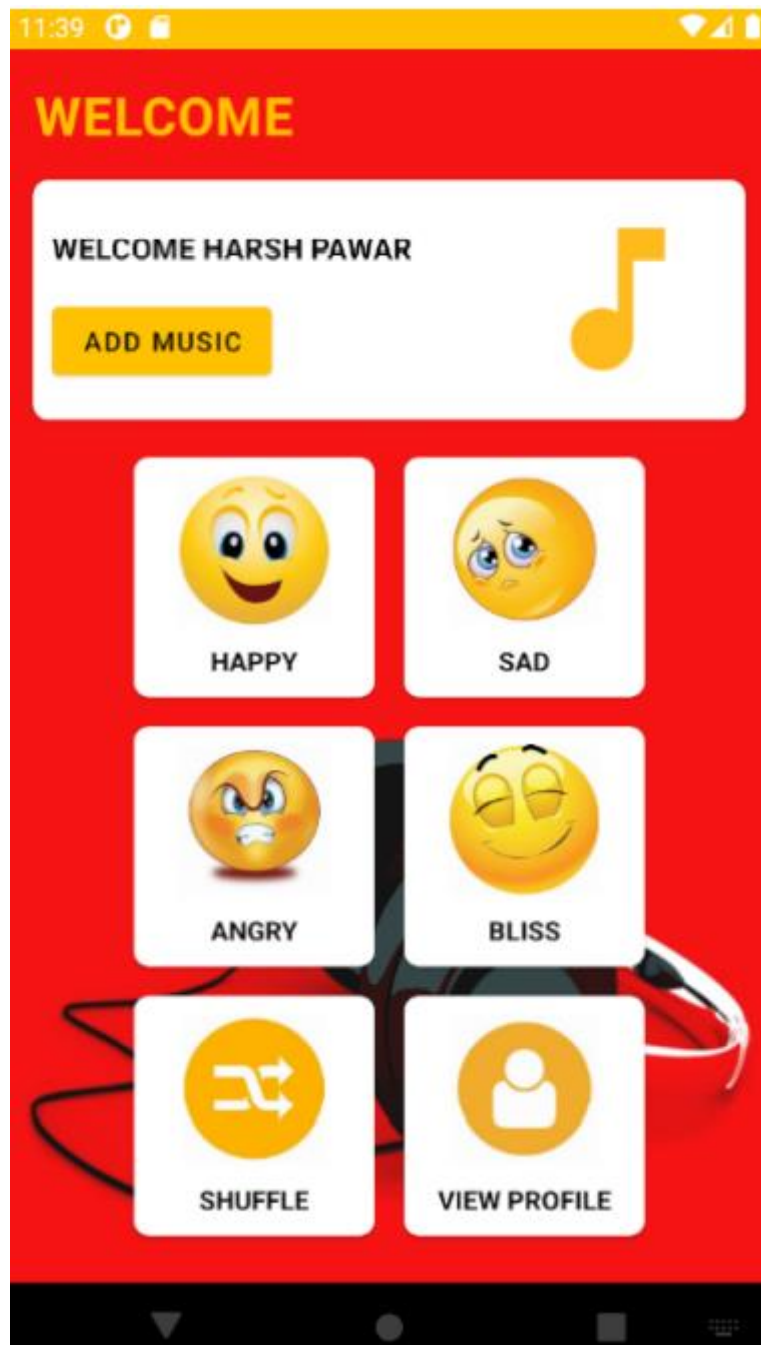
Choose Photo

**NEXT**

[Login!](#)

Registration Page

Registration page contain next Button and choose photo button, one JRadio button and three textFields for registration.



Home Page

Home page contain different Buttons which redirects to their activity.

11:40

# Welcome

Enter Your Details

## ADD SONG

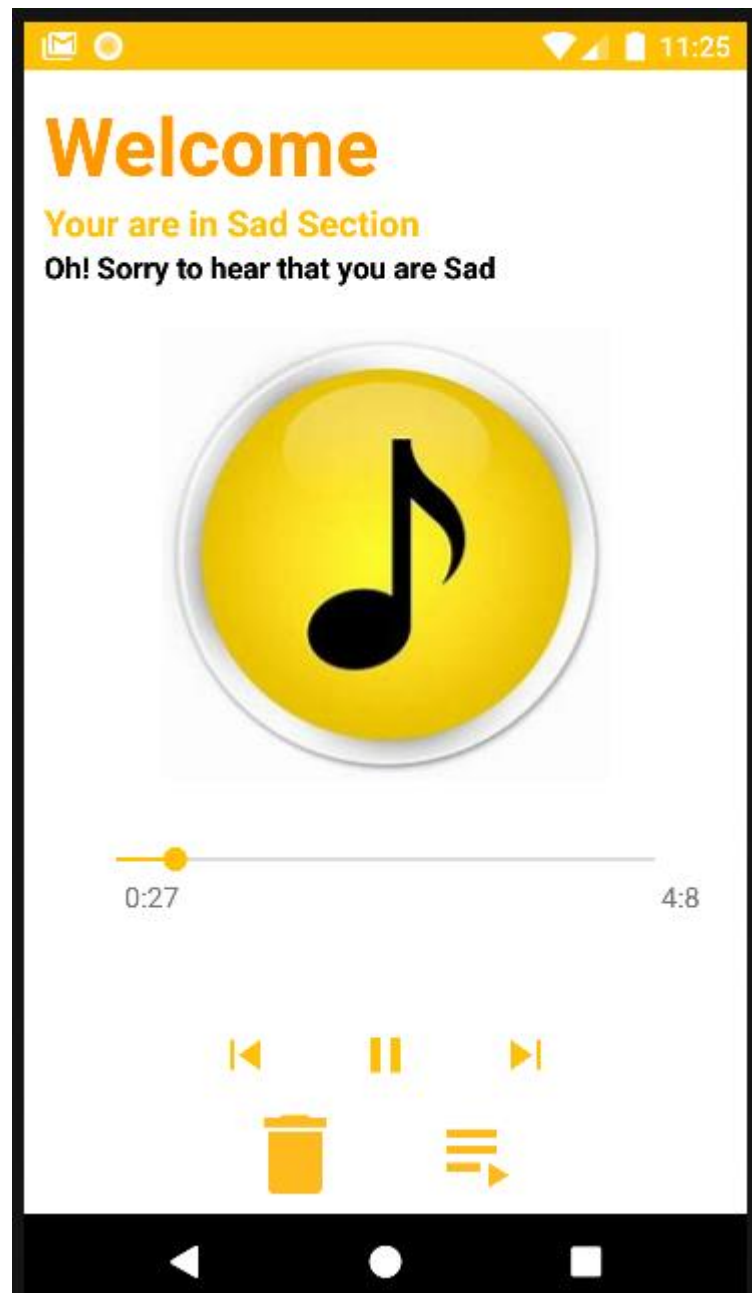
Happy ▾

**CHOOSE SONG**

**ADD SONG**

Add Music Page

Add music page contains of one textfield to enter the name of song two buttons one is choose song to choose the song from the phone storage and second is add song which is to assign the song to particular emotion and one drop down button to assign the song to a particular emotion.



Music Player Page

Music Player Page contains three text field to display message and this page contains five buttons one is to play or pause one is to play next song, one is to play previous song, one is to delete the song, and one is to see the list of the song available in the emotion to play the particular song.

## **Conclusion**

The Emotion-Based Music Player is used to automate and give a better music player experience for the end user. The application solves the basic needs of music listeners without troubling them as existing applications do: it uses technology to increase the interaction of the system with the user in many ways. It eases the work of the end-user by using emoji, determining their emotion, and suggesting a customized play-list through a more advanced and interactive system. The user will also be notified of songs that are not being played, to help them free up storage space.

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