DESIGN & DEVELOPMENT OF AN ANDROID APPLICATION NAMED

SING IT

DAFFODIL INTERNATIONAL UNIVERSITY

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DESIGN & DEVELOPMENT OF AN ANDROID APPLICATION NAMED "SING IT"

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled "**SING IT**" submitted by **Farzana Akter Happy ID: 161-15-701** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 15 October 2020.

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DECLARATION

I hereby declare that, this project has been done by us under the supervision of **Ms. Nadira Anjum Nipa, Lecturer, Department of Computer Science & Engineering** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Music is always a pleasure and healer for us. It refreshes our mind. In our daily busy life it gives us strength to work with our full mood. Music is loved by every single soul. My aim was to build an app based on music. I also wanted to make it easy to the people. So I have developed SING IT android app. It has voice searching system using this feature user can easily search their required song. There are some category of songs like Rock, Jazz, User Record, Metal, Pop, Hip Hop, Disco, K-pop. I have arranged this category according to user's preference. Now a day people are loved with those types of songs a lot. Using my app people can find his preferred song which he want to enjoy. This app has similarity with Sound Cloud app. Which has actually similar concept with my app. But I have added voice searching system which actually make difference from sound cloud. I have added google voice searching engine which can provide accurate voice to search a particular song. That feature can make my app more reliable to the user. User also can upload their own recorded song which actually help to bring out the hidden talent. I also developed an admin panel. Using this admin panel I can input songs according to category. I have used firebase as backend server. That's all I have done in my whole project.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

I have planned to develop an app related with Music. Songs [1] plays an important role to make our mind fresh and stronger. It increases our focus and IQ level. Songs are loved by all kinds of people. Not only the young but also the oldest people also hear songs for their pleasure. It plays an important role to fulfil the demand of our entertainment. My app contains different types of category. People can enjoy those according to their wish. Even I have developed user's record field which will help the people to hear the song of local talents. For the users reliability I have added voice searching system. In this case system will take users voice to match a particular songs user want to hear. All the process is happening in real time as I used real time database in this project. Over all this app is easy, quick and reliable to the users that can be expected.

1.2 Objectives

Music is loved by all. From the beginning of the history music has an influence over our civilization. The type of music depends on culture and geographic position. But all of this types of songs has their own fashion and style. But in the past it was difficult to collect the songs from another culture and geographic position. But now a day it is easy to collect them by the blessing of modern science. Now we can easily access and download songs via internet using websites and application. In this same way I have developed an app named Sing It. Having an app for music can make enjoying song more easy and reliable. So I have decided to develop the project named SING IT. Even I wanted to find out the hidden talent around us. That's why I have developed user recorded song system. This app could be helpful and best media if anyone want to express his/her talent to the people.

1.3 Methodology

My project is an android based app. You have to run it by an android operated system. There must need an internet connection. I have used firebase as my backend database. It can provide real-time data. In the search feature of our app user can quickly find the song he/she want

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to enjoy. Our database is secure and only the registered user can access the songs. While registration user has to provide their Mail and phone number. Users can't use multiple account. For Security, we can access the information of the user's. Admin can monitor in real time whether a user posted any illegal recording or not. After login user will find the home page. All the types of songs will be displayed here user can choose songs according to their choice. All recent songs that users have enjoyed will be saved in the history. User can replay those songs. In the profile section user can record a song and upload it to server. Then if user make that song public then all the user can hear it. Even if user make it private it will only visible to the user who has recorded.

1.4 Organization of the report

The report contains 6 chapters. In chapter 1 the introduction, methodology and project objective has described. In chapter 2 we have described about the background of the system. It is one of the important part. How the whole system is actually gone through in this chapter we have described. Chapter 3 contains the requirement and specification. It also contains the feature of firebase and the admin panel web sites information and also described what we actually needed in the whole project to complete this app successfully. This chapter also describes the Admin landing page of our project. In chapter 4 the whole project structure and the final output has been described. Chapter 5 contains the system test and the result of the project. Then at last chapter 6 which is actually conclusion part.

1.5 Expected output

My aim was to make hearing songs easy and quick. User can enjoy their loved song easily by the app. This app is in the initial stage so much more development is actually needed to make it more efficient. Anyways as far I guess this app will be a best experience for the user. The UI also designed attractive and most of the bags has been fixed. So no lagging issue is found while testing. Moreover the most important feature is firebase database. Which is a product of google. It ensures the songs playing smooth and charming. If the internet connection is fine then it will play song without any break. Even the voice searching and user record facility can add extra dimension in this app. That's all the expected output a user can experience.

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CHAPTER 2

BACKGROUND

2.1 Introduction

This app UI has some functions. I have used a view pager with 3 pages [2]. All are in a form of fragment in an activity named Homepage. We also added others activities, via fragment we can reach those activity. Most of those activity and fragments are connected with firebase in backend. Some features are listed below:

- Online Login/Registration
- Recording Own Voice
- Voice Search
- Search by category
- Access songs in backend
- Admin Panel
- Real Time response
- Admin Administration

2.2 System Development life cycle

System life cycle [3] is an organizational process of developing and maintaining systems. It helps in establishing a system project plan, because it gives overall list of processes and sub-processes required for developing a system. An effective System Development Life Cycle should result in a high quality system that meets customer expectations, reaches completion within time and cost evaluations, and works effectively and efficiently in the current and planned Information Technology infrastructure. System Development Life Cycle (SDLC) means combination of various activities for developing a system. In other words, we can say that various activities put together to develop a system are referred to as system development life cycle. In the System Analysis and Design terminology, the system development life cycle means Software Development.

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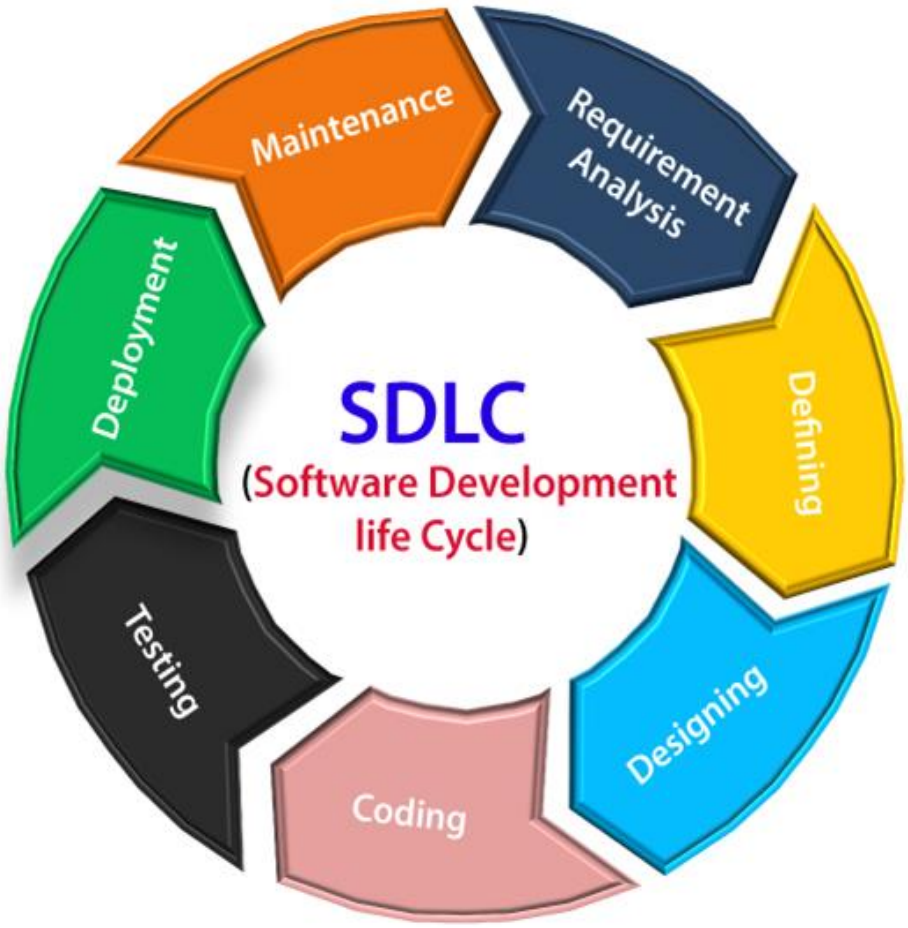

Figure 2.1: Process of System Development Life Cycle

Following are the different phases of software development cycle:

- Preliminary study
- Feasibility study
- Detailed system study
- System analysis
- System design
- Coding
- Testing
- Implementation

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- Maintenance
- Review

2.3 Phases of Software Development Life Cycle

This section describes the different phases and related activities of system development life cycle [4] in details. Every Software faces different lifecycle to be completed. All this steps need to be ensure as before developing it we need to study about the system. Then we can complete the project without any issue. Here the figure 2.3 that will show the system development life cycle process

Figure 2.2: Different phase of Software Development Process

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2.4 System Study/Initial Idea

This study is the first stage of System Development Life Cycle. This stage gives a clear picture of what actually the physical system is? After completing the system study, a system proposal is prepared by the system analyst (who studies the system) and placed before the user. All projects must start with an initial idea. Usually, this consists of a brief definition on what is the project all about, what is its purpose and what the project aims to accomplish. To describe the system study phases more analytically, we would say that system study phases through the following steps:

- Problem identification & project initiation
- Background analysis
- Interface of findings

2.5 Feasibility Study

Expanding on the Initial Idea, the Feasibility Study involves drawing up the terms of reference, which state the objectives and scope of the project, how long it should take and how the results should be presented. The terms of reference are usually drawn up by senior management. The feasibility study must determine if the development of the project is justified in terms of economic and organizational terms. The main role of the analyst in the feasibility study is to analyze the current system at a high level. Data Flow Diagrams (DFD) are used to describe how the current system performs and to illustrate known problems. The system I was trying to build a lot of potentials. The platforms I have chosen are Android Studio, Java programming language and Firebase to stored data.

2.6 Apps Comparison

For some particular feature, this project is similar like an existing app named “Sound Cloud - Online Music App”. But this project has added extra feature than sound cloud. In SING IT the new feature is artificial intelligence based voice searching system. This feature makes my app more significant. There also another similar project named “Gaana”. Also this project is little bit similar to SING IT. But there have limited feature in SING IT comparing to sound cloud and Gaana. The limitations can be fulfilled by the farther upgrade.

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CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Introduction

Every software system must need some requirements. Application process modeling represents the entire systems working procedure. This process can represent the whole conception of a process. Before developing a process, we have to ensure the requirement and application process which is a must needed thing. This app has also some requirement specification. This app must need an android to run. It only works in android OS. Not yet developed for iPhone operating system. We need permission to use firebase database. Initially firebase is providing 1 GB storage and 30 GB of data transfer limit free. If the limitation cross then it will be paid. But as testing phase it is enough but later if user increases then the paid version can be used.

3.2 Permission Requirement

For using android application, user must need provide some permission. One thing is very important here and that is, Android has launched total 16 versions. Android (A-P). From android M (Marshmallow) there a new option added which is called android runtime permission. But the lower version from android 'M' this option was not available. When any user install an app the all permission was automatically granted. But from android Mobile user must provide all permission individually. And all the state has followed perfectly in SING IT.

The set of permissions are need for using Sing It is listed below:

- Storage Permission
- Record Permission
- Internet Permission

If any user reject any permission then the particular feature will not be available for that user.

3.3 Threats to System Security

The most important things for a system is security. This app has authentication system. User also need to register first and provide their Information to open an account. User can't use same mail

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multiple Time while registering. The database is strongly secured as it is maintained by Google. We have an admin panel to input into the database. The admin panel can access all the information of the users. It will be easy to monitor the activities of the users.

3.4 Database Security

In this app online database has been used. For online database Firebase Real time database [5] has used. While using database there are an issue of giving security of these database. While using Firebase I don't have any headaches. Because this is Google's service and Google will provide the security. So there are no need of extra security. And there are another option in firebase to protest data. We may turn off all write and read data from firebase. Besides Admin can monitor the database whether there is any irrelevant contents. If found any then admin can delete it from database.

3.5 Conclusion

After completing full requirement specification SING IT will work perfectly. In those phase I have faced different issue like sometimes system was lagging, data was not fetching, UI was not showing. But all this issue was solved through this faces Also I am trying to develop this app as user can find it more reliable and user friendly. This app is in initial stage future I am planning to develop its web version as people can easily get its service. It could be a great platform for people to enjoy songs and find out the latest top songs.

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CHAPTER 4

DESIGN SPECIFICATION

4.1 Design & Prototyping

In every application designing and prototyping is a very important phase. The design concept is important as the most user friendly interface can be more efficient and reliable for the users. Besides prototyping can provide advantage to the developer that how much improvement and designing is actually need. The figure 4.1 illustrate design & prototyping of the system.

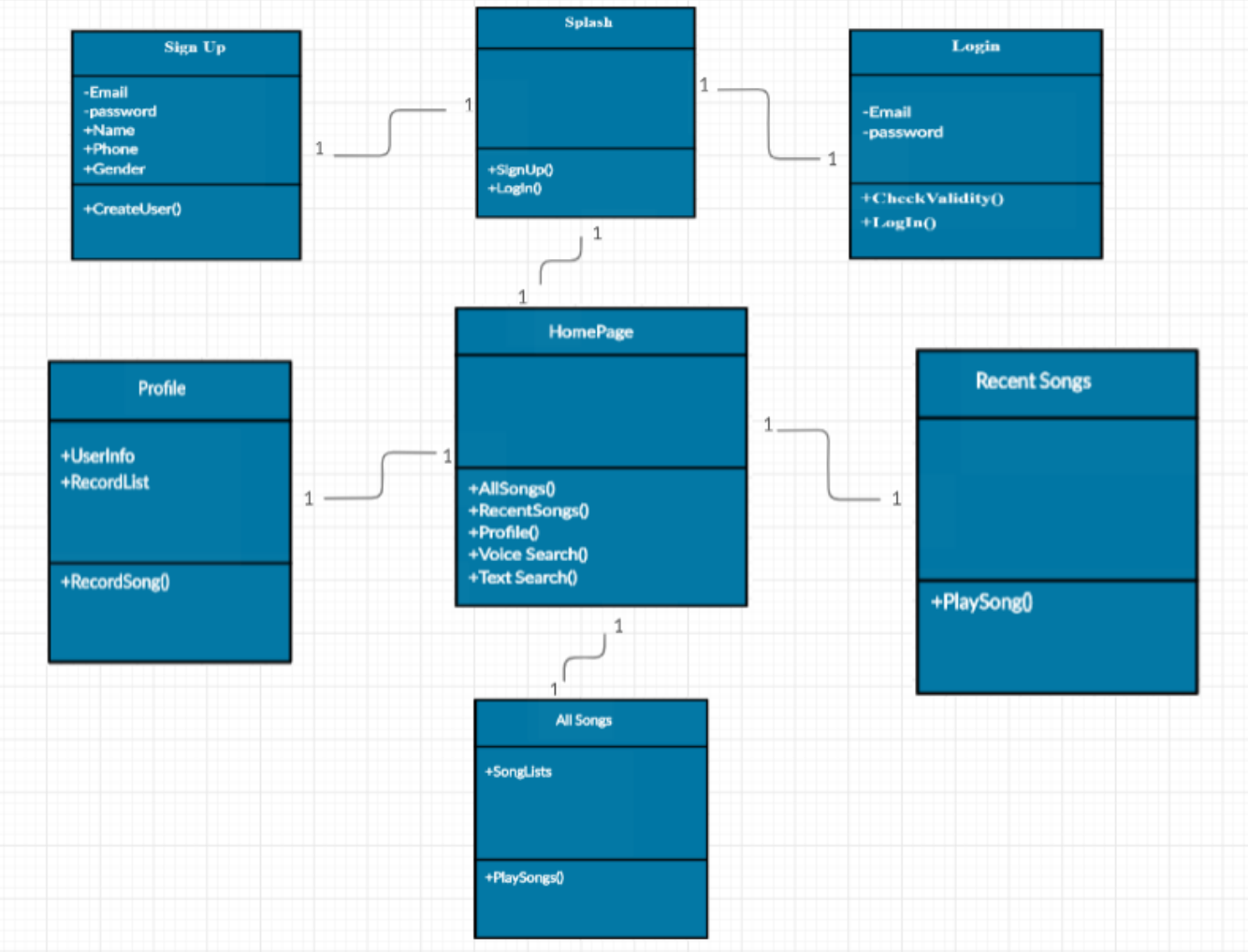

Figure: 4.1: User Class Diagram

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4.2 User Interface Prototyping

Prototype is an initial sample of an application. Prototype is actually considered as an initial phase of an application. By the prototyping developer can understand the farther requirements and facilities which is desired by the users. Prototyping is also uses for testing purpose. The test output can provide a point of view that how efficient and useable an application really is. The figure 4.2 illustrate user interface prototyping of the system.

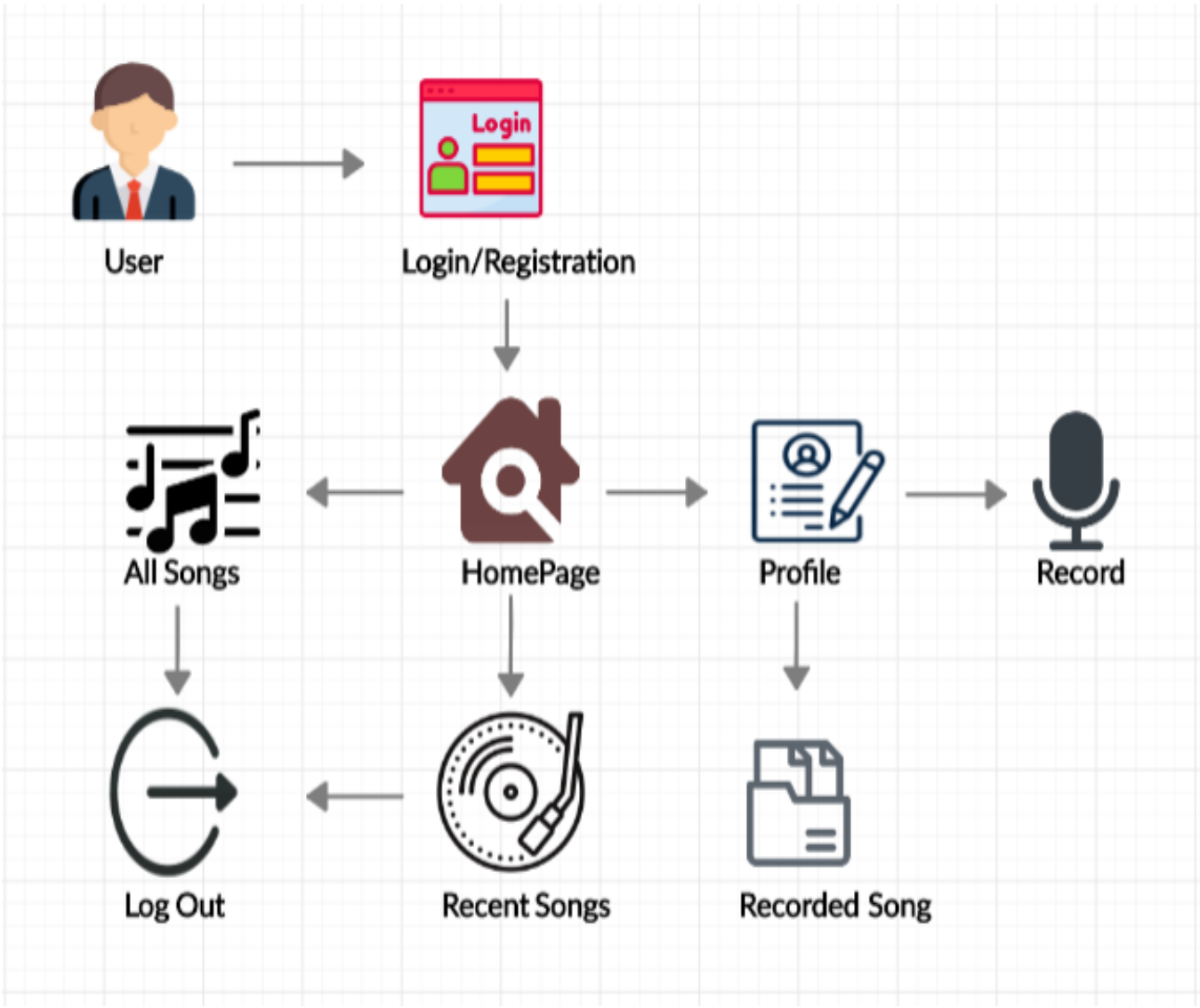

Figure 4.2: User Interface Prototyping

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4.3 ER Diagram

Here is the ER diagram [6] of the Database. For checking authentication user must need to provide email and password in the database. User can search songs by both voice and text to enjoy any kind of songs. User also can record his own voice. User also can view his/her recent songs which was viewed by him recently. The figure 4.3 illustrate ER diagram of the system.

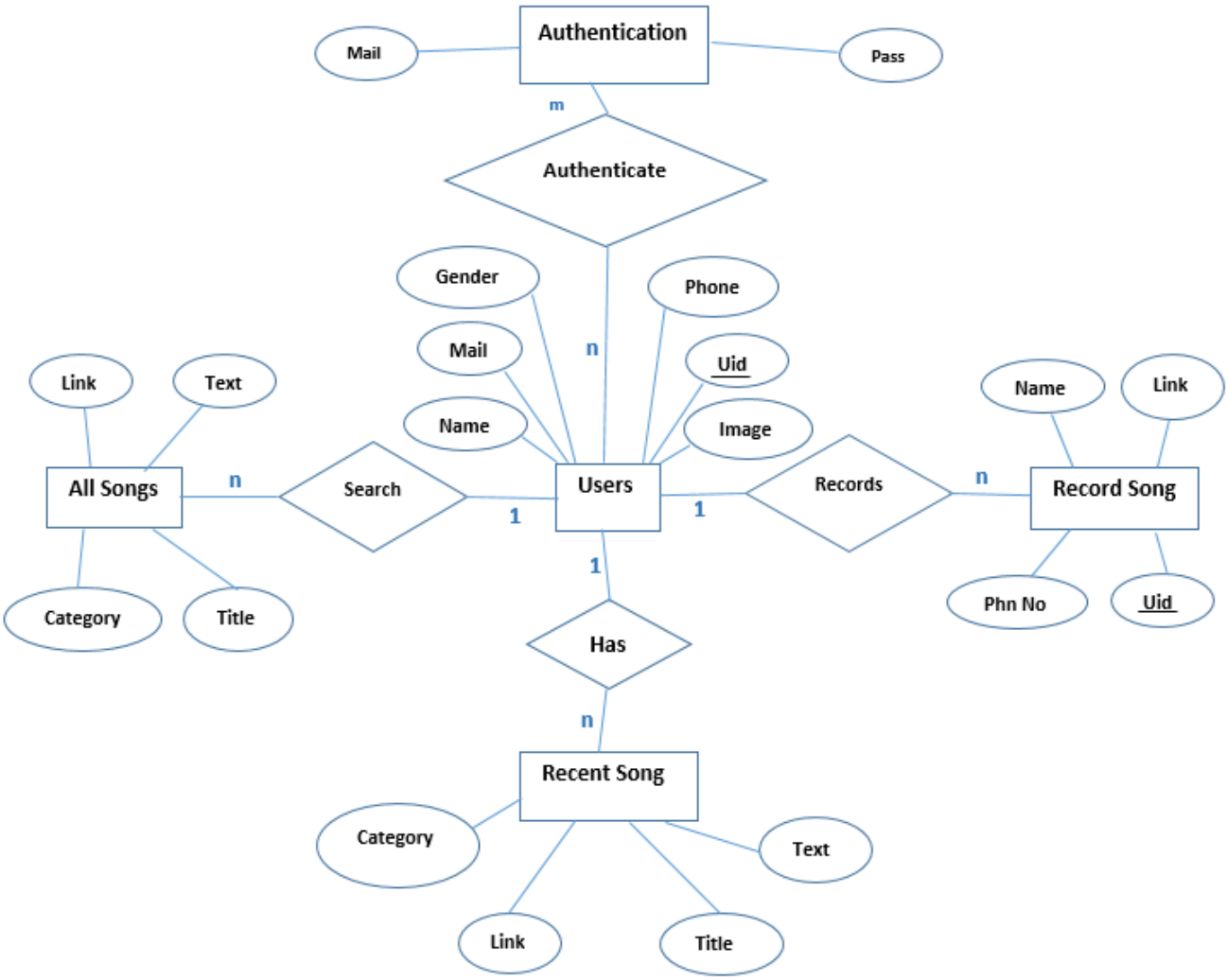

Figure 4.3: ER Diagram

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4.4 Technology Used

In this app I have used android studio, android virtual device and java programming language. Android Studio: Android studio is an IDE for developing android app. It is a product of google. It has some facilities like debugging and testing. All of those facilities are free. Android studio contains designing tools with preview. We can see our designing in preview or can run in the virtual device. It also can use different libraries for the UI update and modification. We also can generate the signed apk by a click and also help to upload app in play store. Android Studio contains SDK tools. It is platform independent. SDK provides build tools, debugging tools and so on. Android studio has android SDK manager. It provides components, tools, resources and platform needed to develop a complete android app.

ADV Manager: ADV manager is a testing device that runs on android emulator. Here we can install an apk file for testing. It runs on an emulator and provides a virtual environment. The virtual device can be configured by the user given specification.

Java: The whole project is developed in java programming language. Java is a strong programming language which can be run in different platform. Java program converted into byte code which is not human and machine readable. The code is converted by DVM then it can be readable by machine. It is secured and can run in different OS like windows, Linux and Mac OS. So java is more reliable and fast programming language. Java needs a software development kit which is actually an interpreter needs to make a complete application.

Firebase: Firebase is an online database system [9]. It is a product of Google. It provides the real time data management system which is very important. It makes the app management system easy and efficient. We can integrate multiple project in our firebase console. Initially in a given range it is free to use. It is giving facilities of Database, Analytics, Storage, Authentication, Hosting, crash report and Ad Mob etc.

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4.5 App Start

Android application are written in java programming language. First of all it is converted in byte code from the java file. Then it is only readable by DVM. Then DVM converts it into .dex file. There also exists Android Manifest and resources. Then a combination of all this generate an apk file which can be run in android device. The figure 4.4 illustrate app start process of the system.

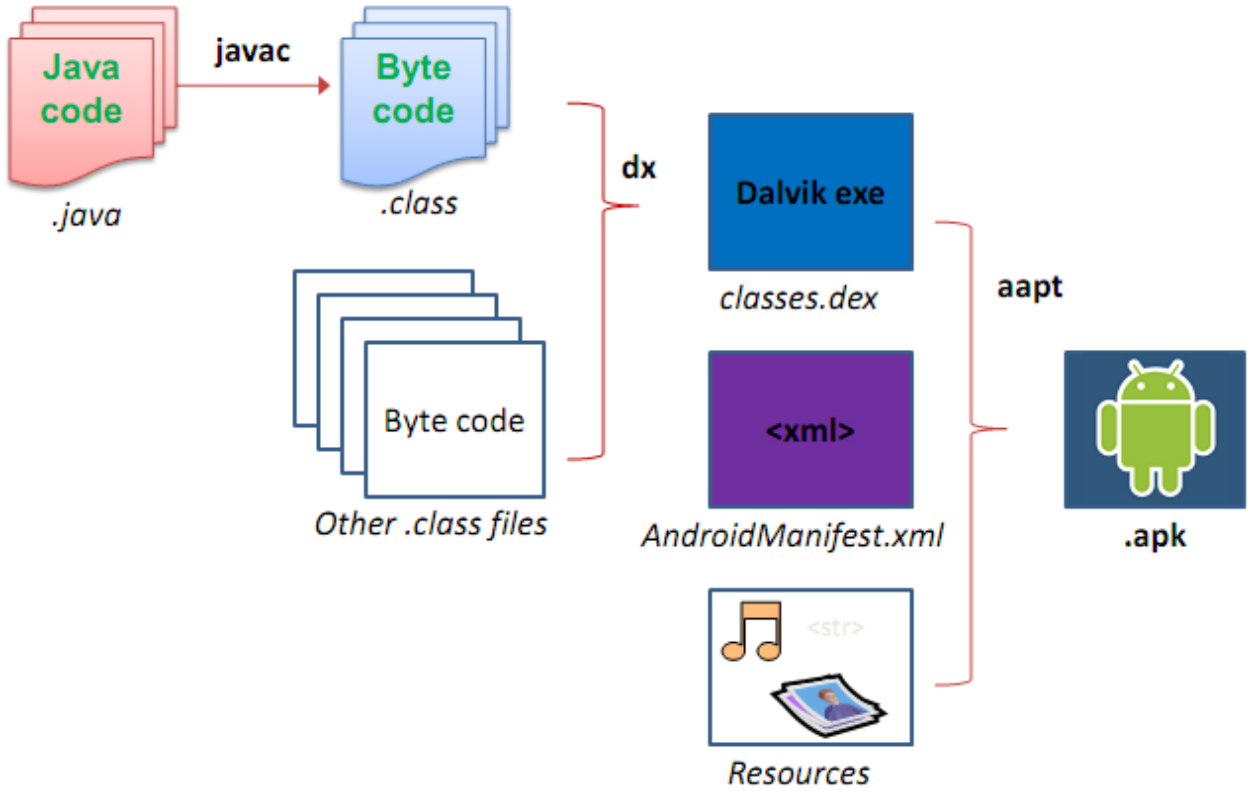

Figure 4.4: How android app start [7]

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4.6 All Songs

In the All Songs fragment user can find out the songs which he/she want to hear. The All Songs Parent node is the root node of all songs. Different types of songs are stored here according to a unique id given by firebase. Songs title, category, link etc are stored in the unique id. The figure 4.5 illustrate all song database of the system.

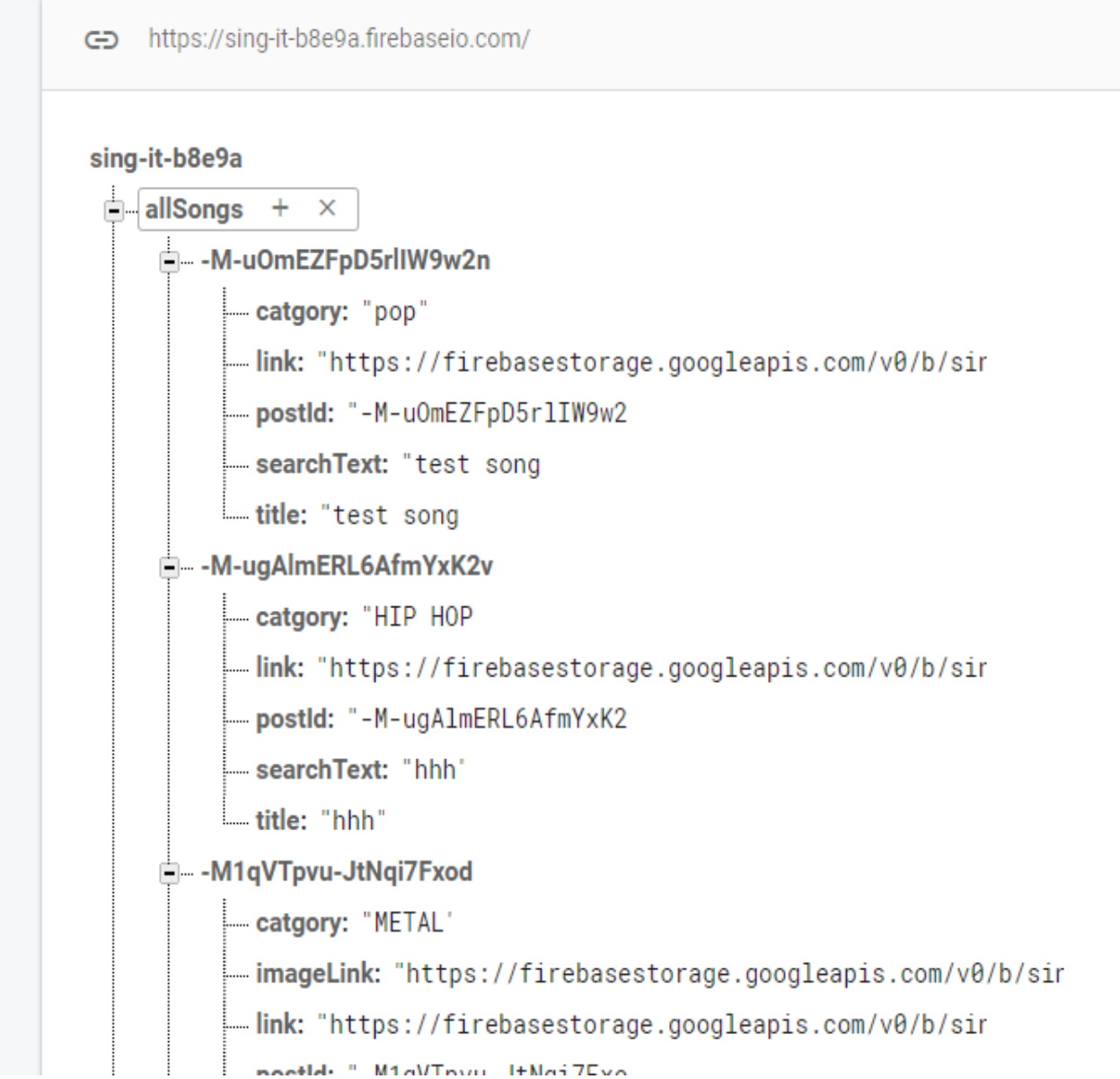

Figure 4.5: All Songs

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4.7 Users

In the Users node the user information are stored. A particular user information are stored in a unique id. Inside the unique there are also a node named recent songs. Users node contains user name, gender, phone and mail. The figure 4.6 illustrate user database of the system.

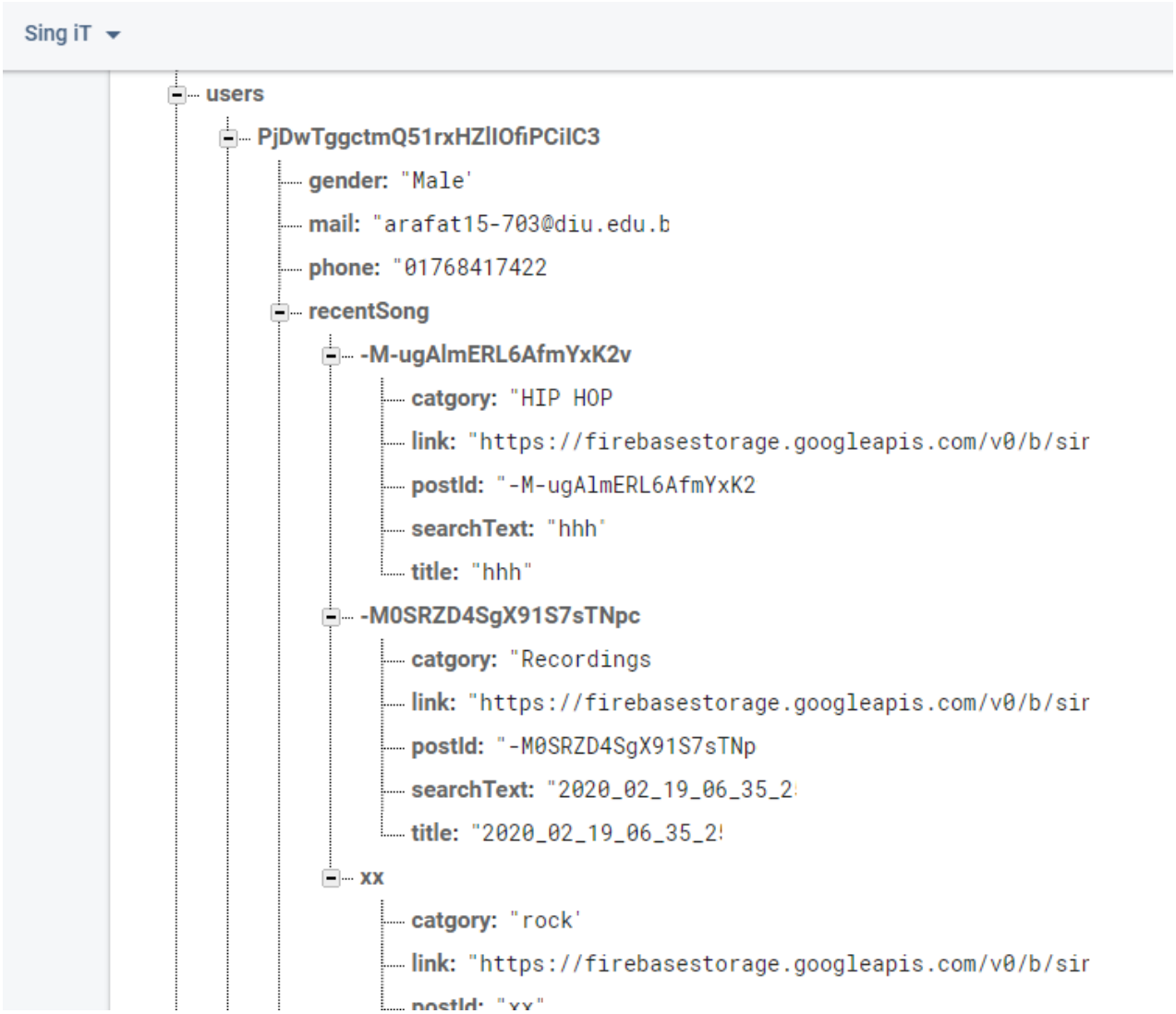

Figure 4.6: Users

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4.8 Recent Song

In the Recent Song node the songs are stored which was recently opened by users. All the recent songs are individually stored in a unique id with their storage link. The figure 4.7 illustrate recent song database of the system.

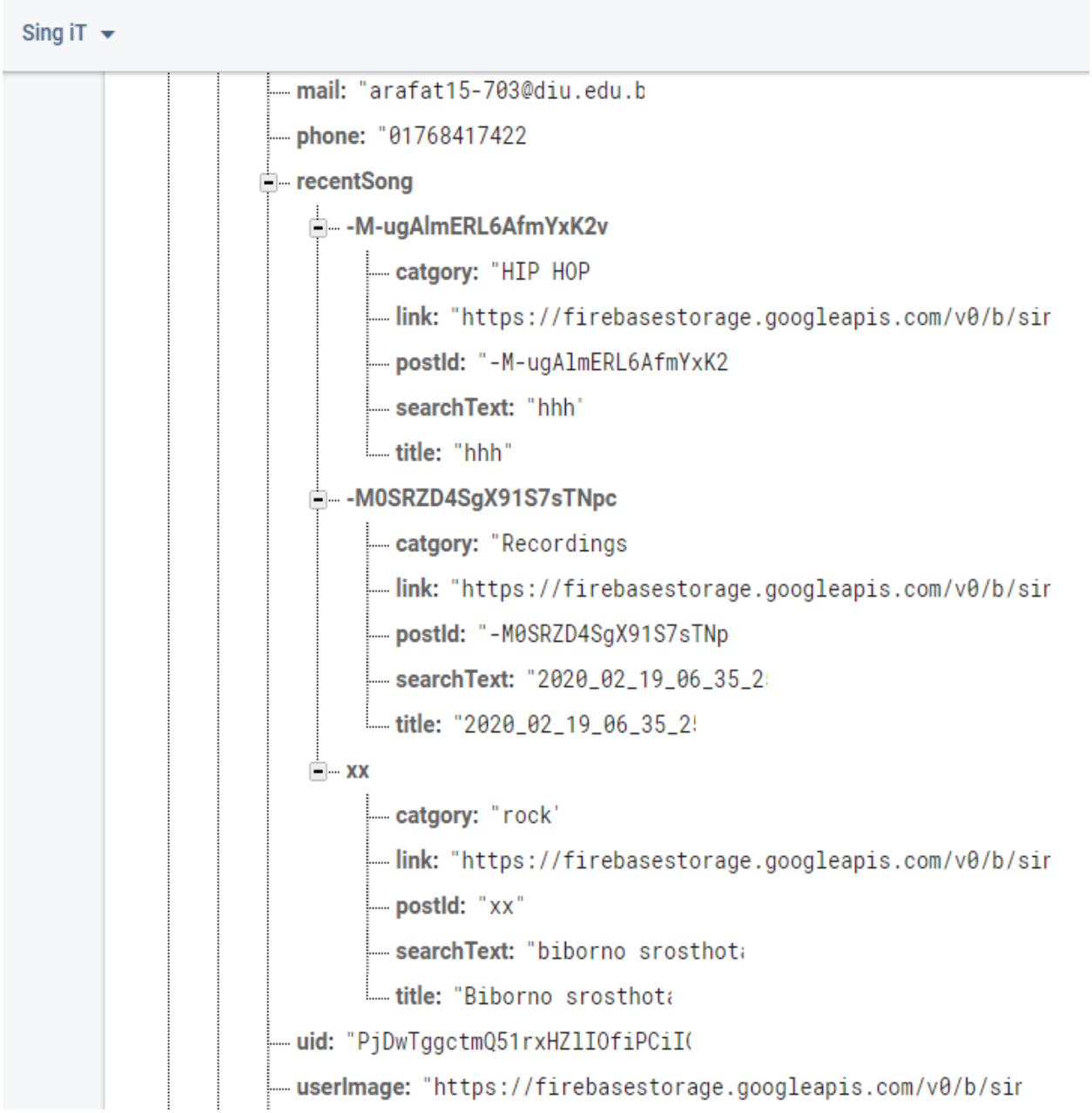

Figure 4.7: Recent Songs

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4.9 Recordings

In this app a self song recording feature was included. Using this feature user can upload their own song. In user Recordings node all the users song are stored. They are stored in an individual unique id. There are also information of the user as child node as we can fetch the recordings of a particular user. The figure 4.8 illustrate all song database of the system.

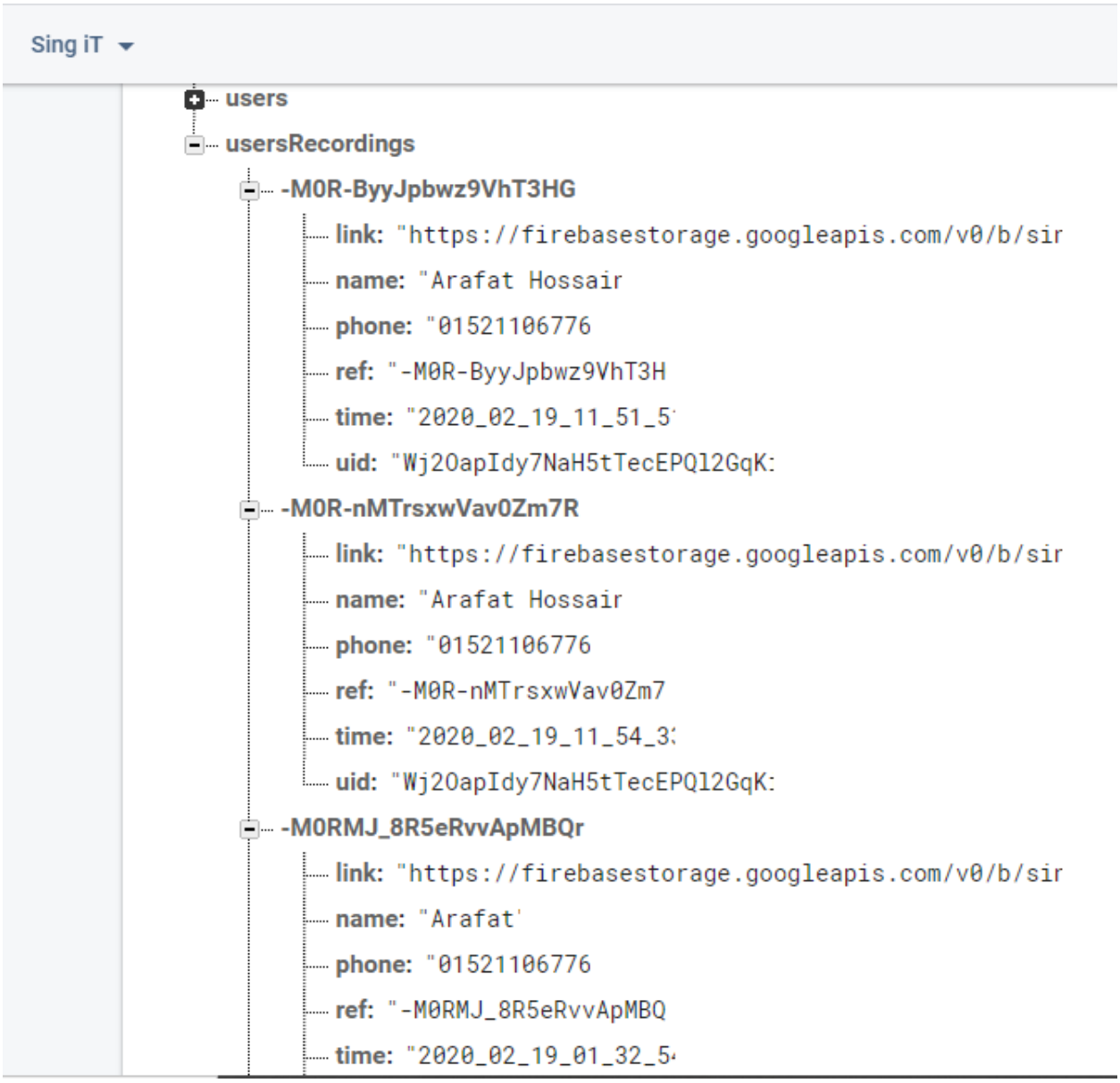

Figure 4.8: Recordings

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4.10 Songs Storage

In the Storage of firebase [8] database the songs are stored. The Real time database is actually fetch the songs from storage by link. Here is the all songs storage path. The songs of different category are stored in this path. The figure 4.9 illustrate song database of the system.

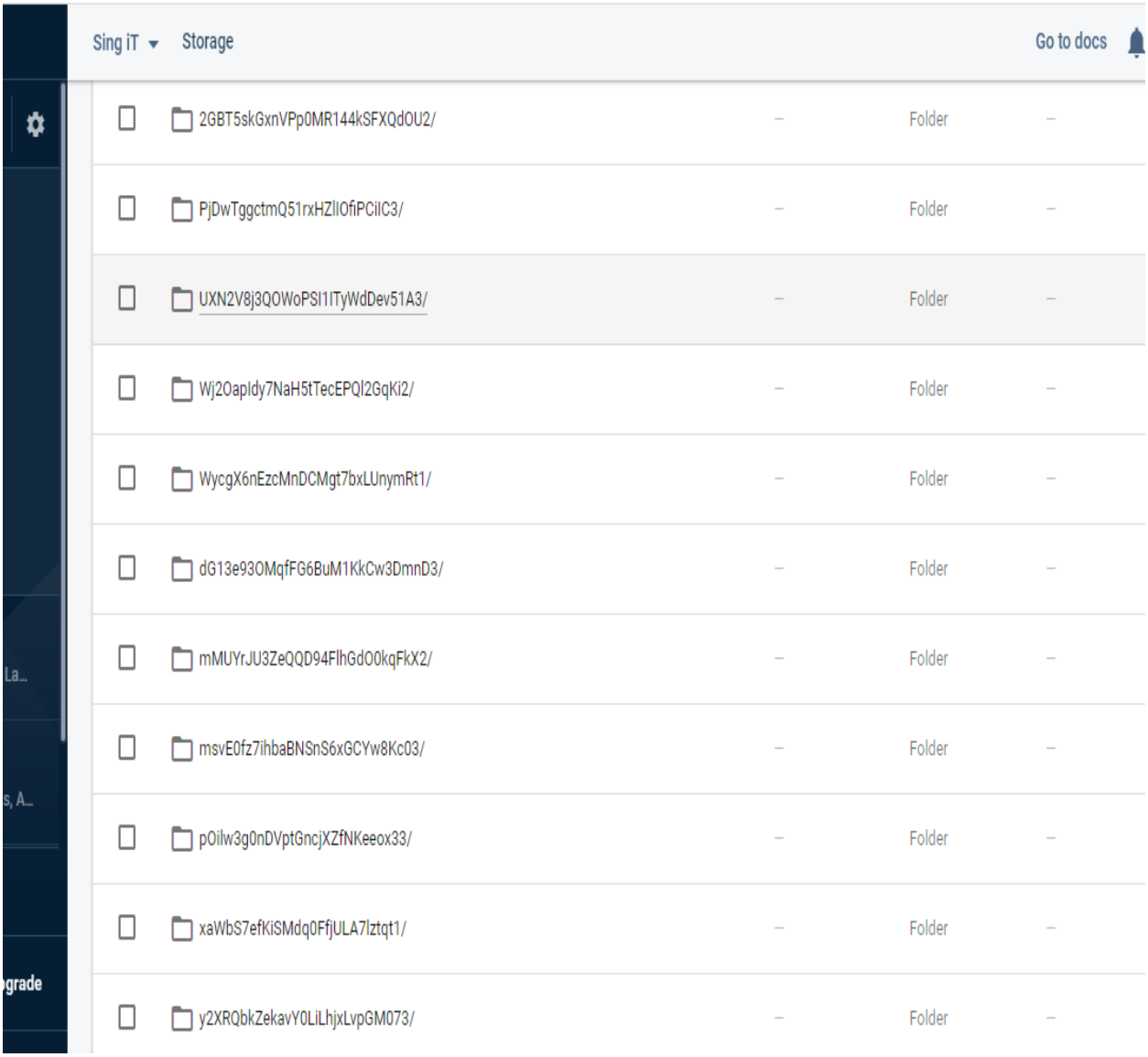

Figure 4.9: Songs Storage

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4.11 Recordings Storage

In the Recording Storage all the user recordings are stored. In this path the individual user records are stored and fetch by the user at any time. They are linked with the real time database by a unique link. Using the link real time database fetch the recordings from storage and deliver it to the user. The figure 4.5 illustrate all recorded song database of the system.

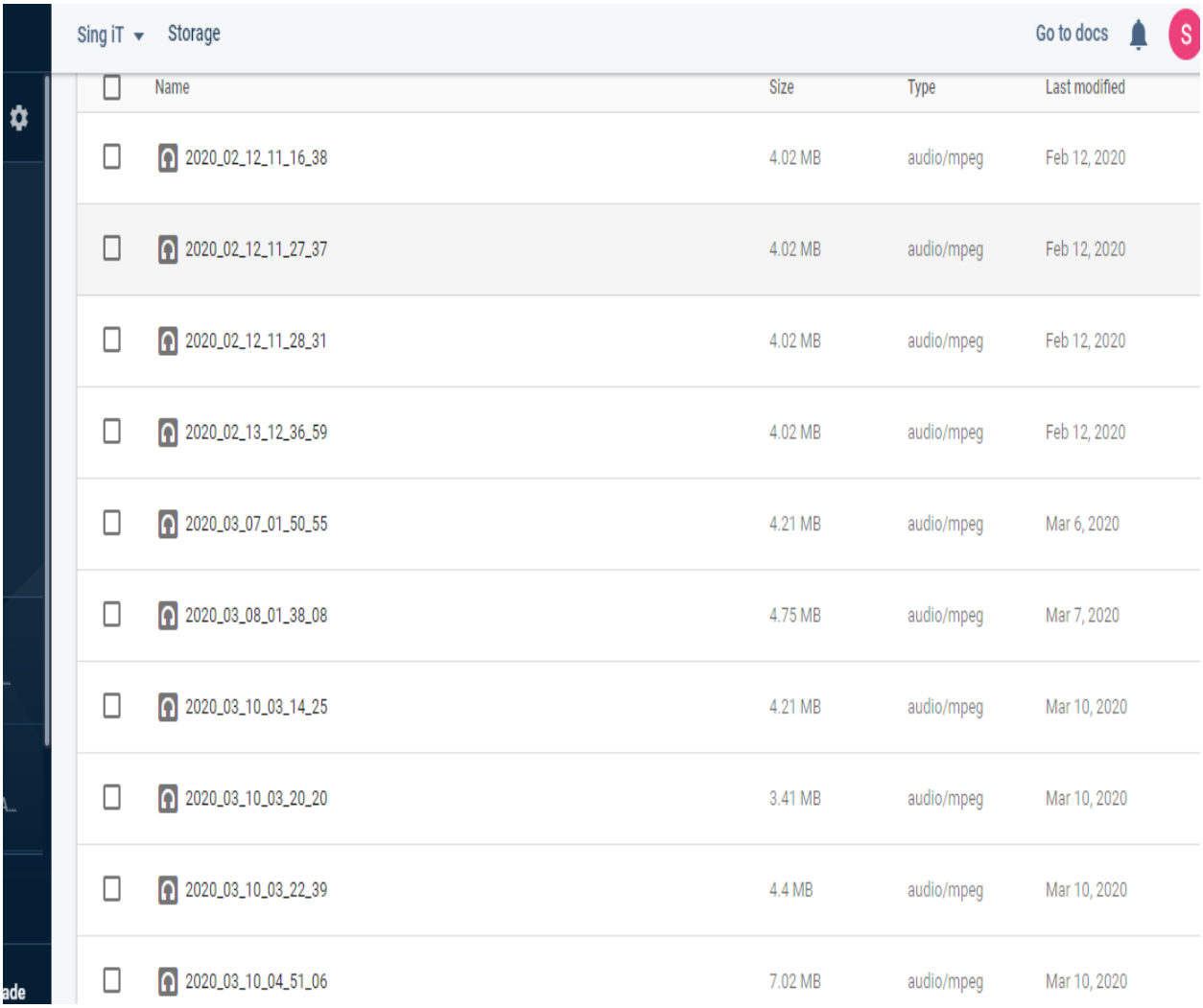

Figure 4.10: Recordings Storage

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4.12 Authentication

In The authentication section of firebase database I have used mail authentication. User need to provide their mail and password for authentication purpose. All the users who have registered will appear in this section. Registered used can read and write in the real time database. This will ensure the security of the database system. The figure 4.11 illustrate authentication of the system.

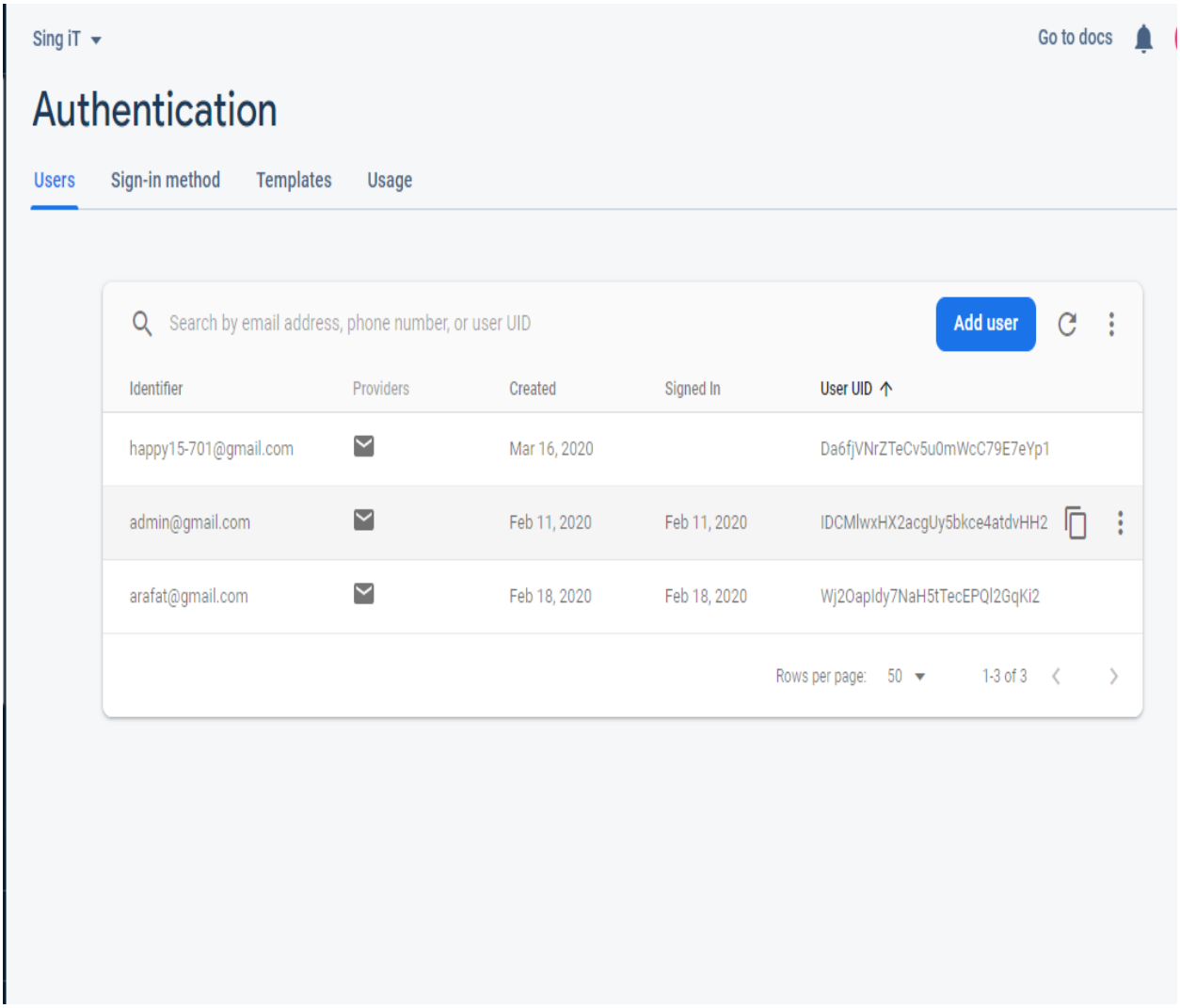

Figure 4.11: Authentication

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4.13 Final Output

The Figure 4.10.1 is the splash screen. This activity will remain for a seconds then it will disappear. Then it will enter in the Home page.

Figure 4.12.1: Splash Screen

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The Figure 4.10.2 is Email and password register page. This page is for authentication. This app will only allow the registered used to enter in the system. User also need to verify his mail after this process. After verifying the user can go to the next page.

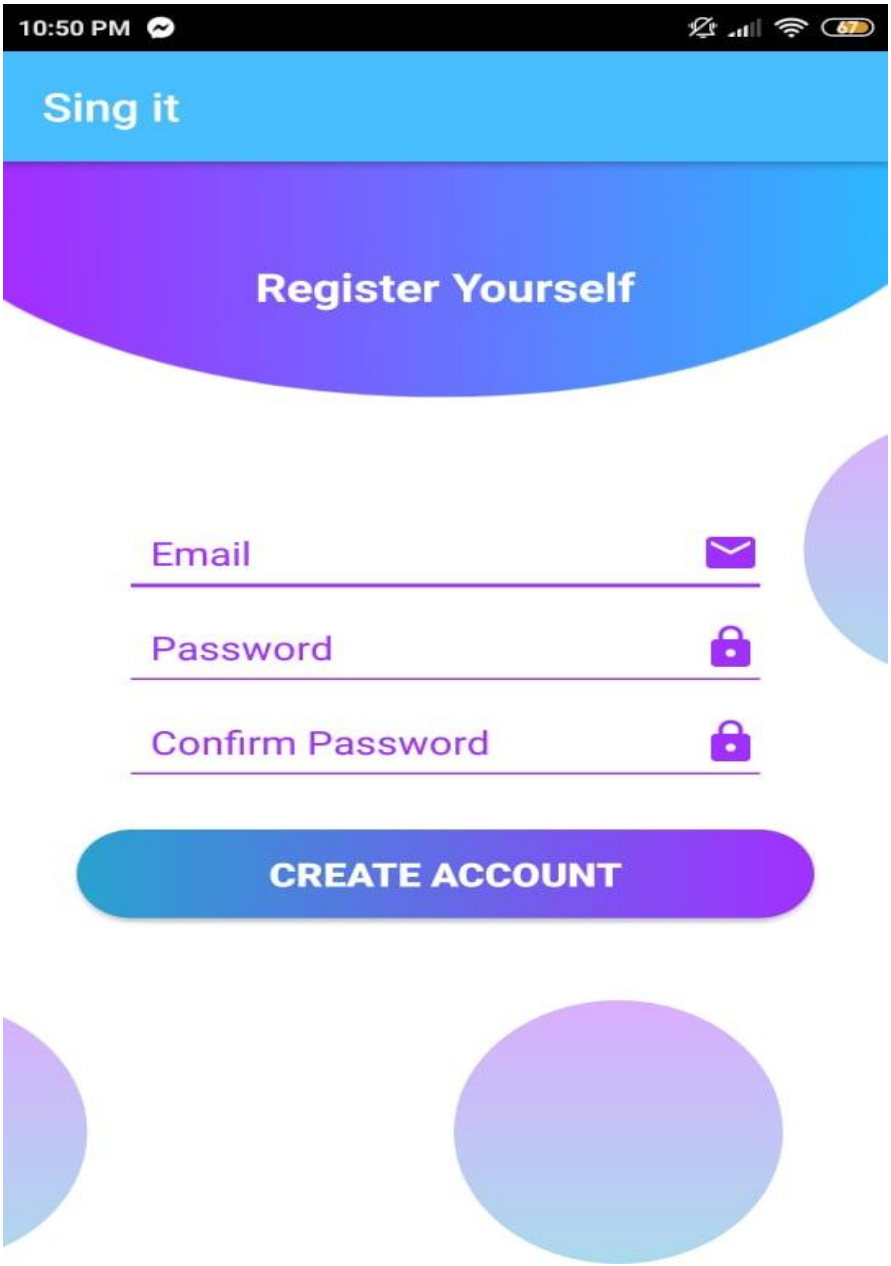

Figure 4.12.2: Create User Page

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The Figure: 4.10.3 is the signup page. Here the registration process take place. User must need to fill up all the field.

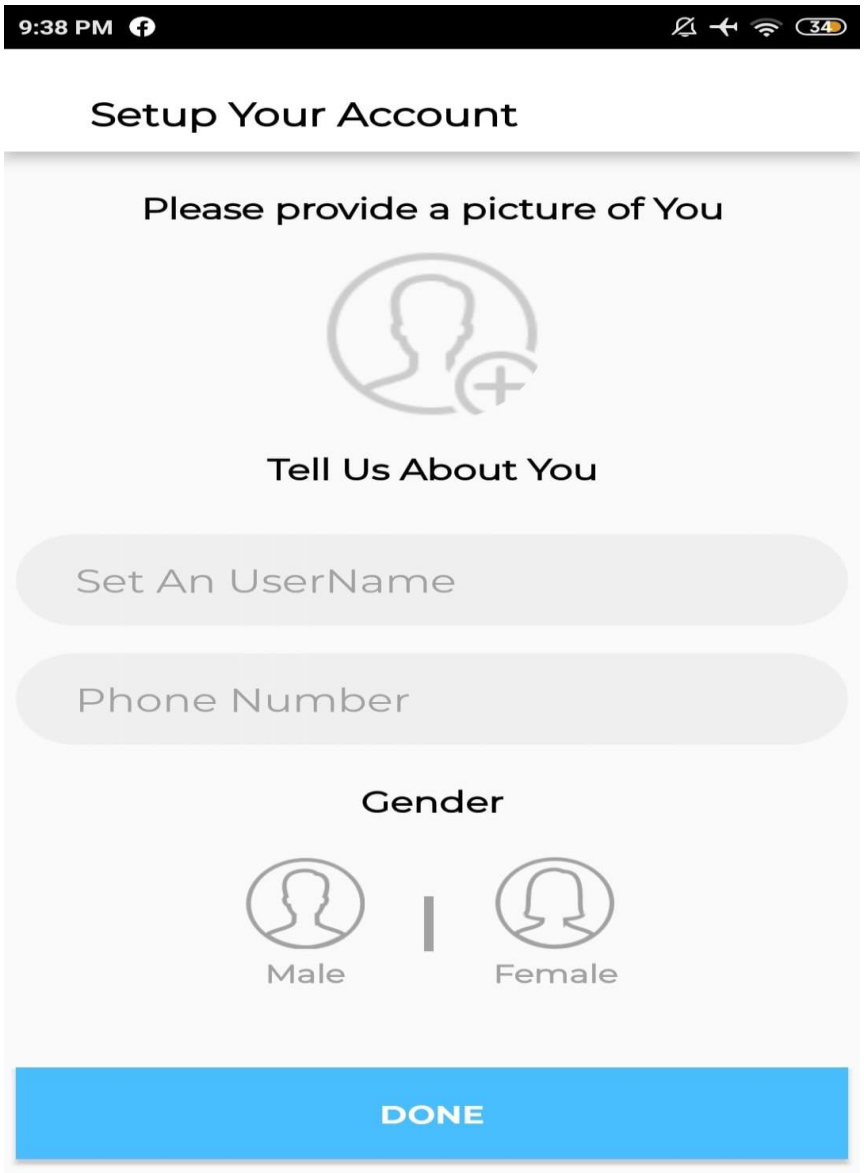

Figure: 4.12.3: Register Page

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The Figure: 4.10.4 is forget password field. In case of forgetting password user have to enter his email and then set a new password by email.

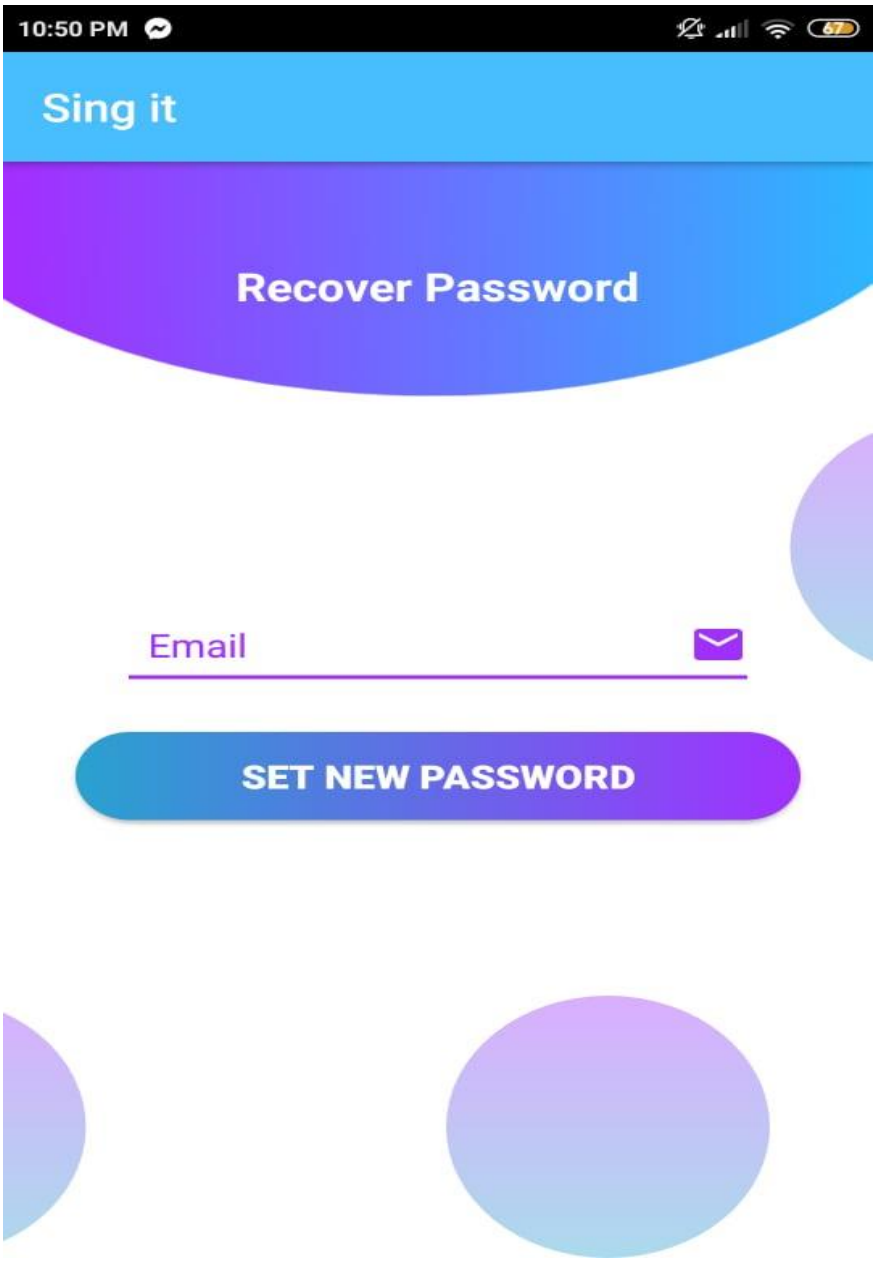

Figure: 4.12.4: Forget Password

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The Figure 4.10.5 is the login page. This page is for user authentication. We will only allow the registered used to enter in the app. The login system is based on firebase email and password authentication system.

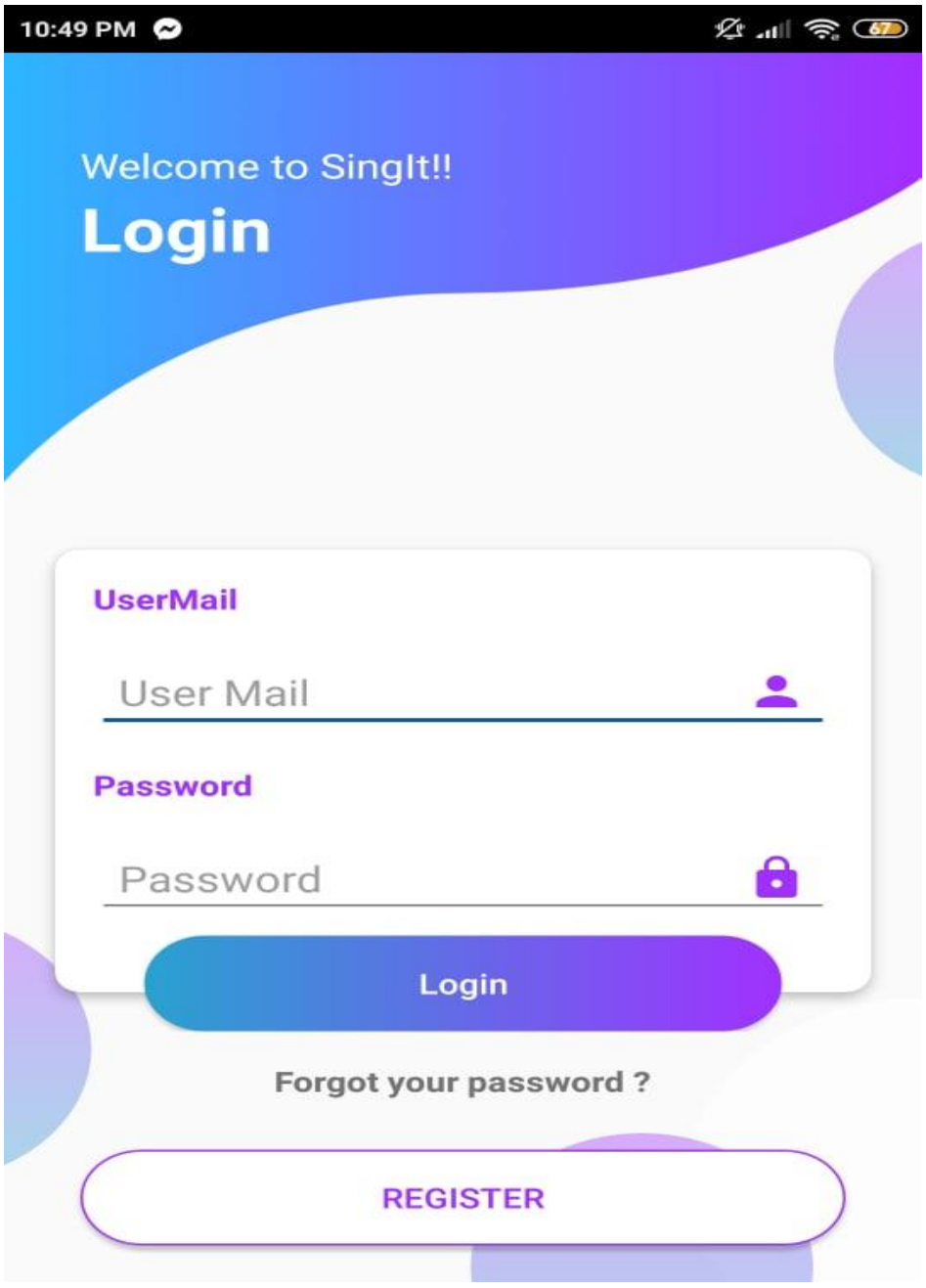

Figure: 4.12.5: Login Page

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The Figure: 4.10.6 is the All Songs fragment situated in the homepage. This fragment contains all the songs list. User can find all types of songs here.

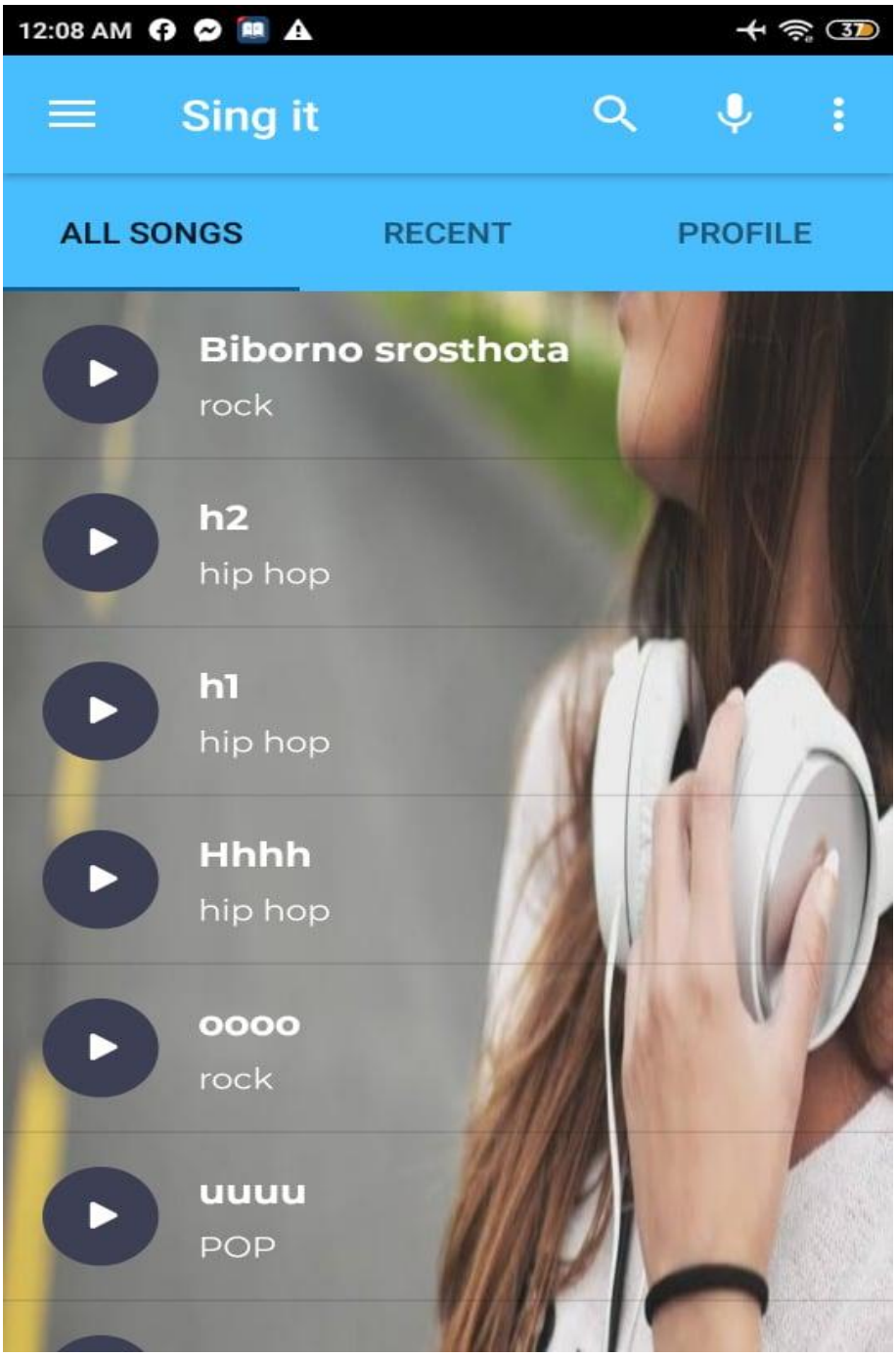

Figure: 4.12.6: All Songs

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The Figure: 4.10.7 is the recent songs fragment. Here user can find the last song he/she enjoyed. It can help user to hear the song again and again.

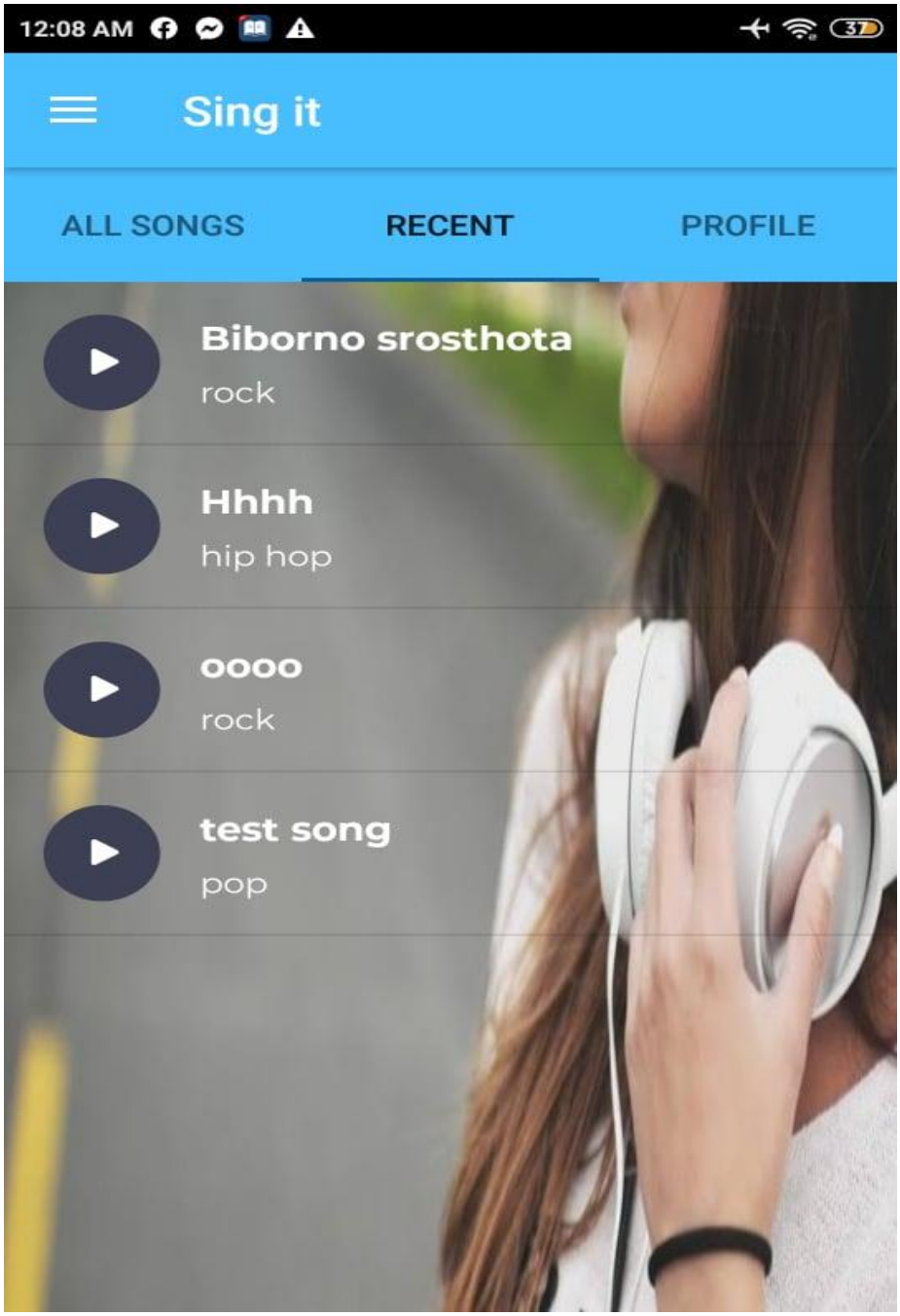

Figure: 4.12.7: Recent Songs

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The Figure: 4.10.8 is the recent songs fragment. Here user can find the last song he/she enjoyed. It can help user to hear the song again and again.

Figure: 4.12.8: Music Player

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The Figure: 4.10.9 is profile fragment. In this fragment user can find his details and also can access the voice recording feature.

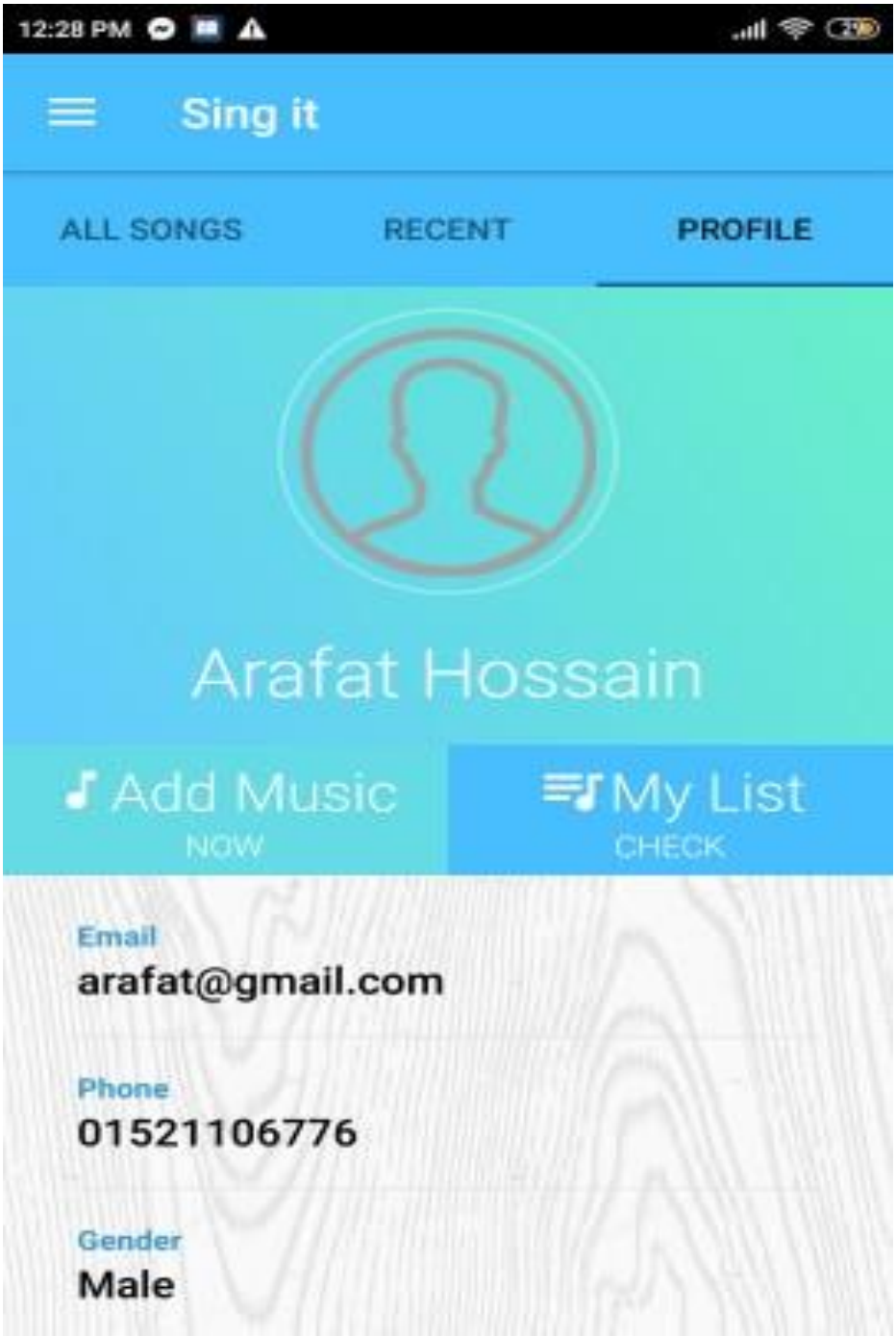

Figure: 4.12.9: Profile Page

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The Figure: 4.10.10 is also the search fragment. Here user can search by category, text and voice. Any kind of search can fetch the song that user needed.

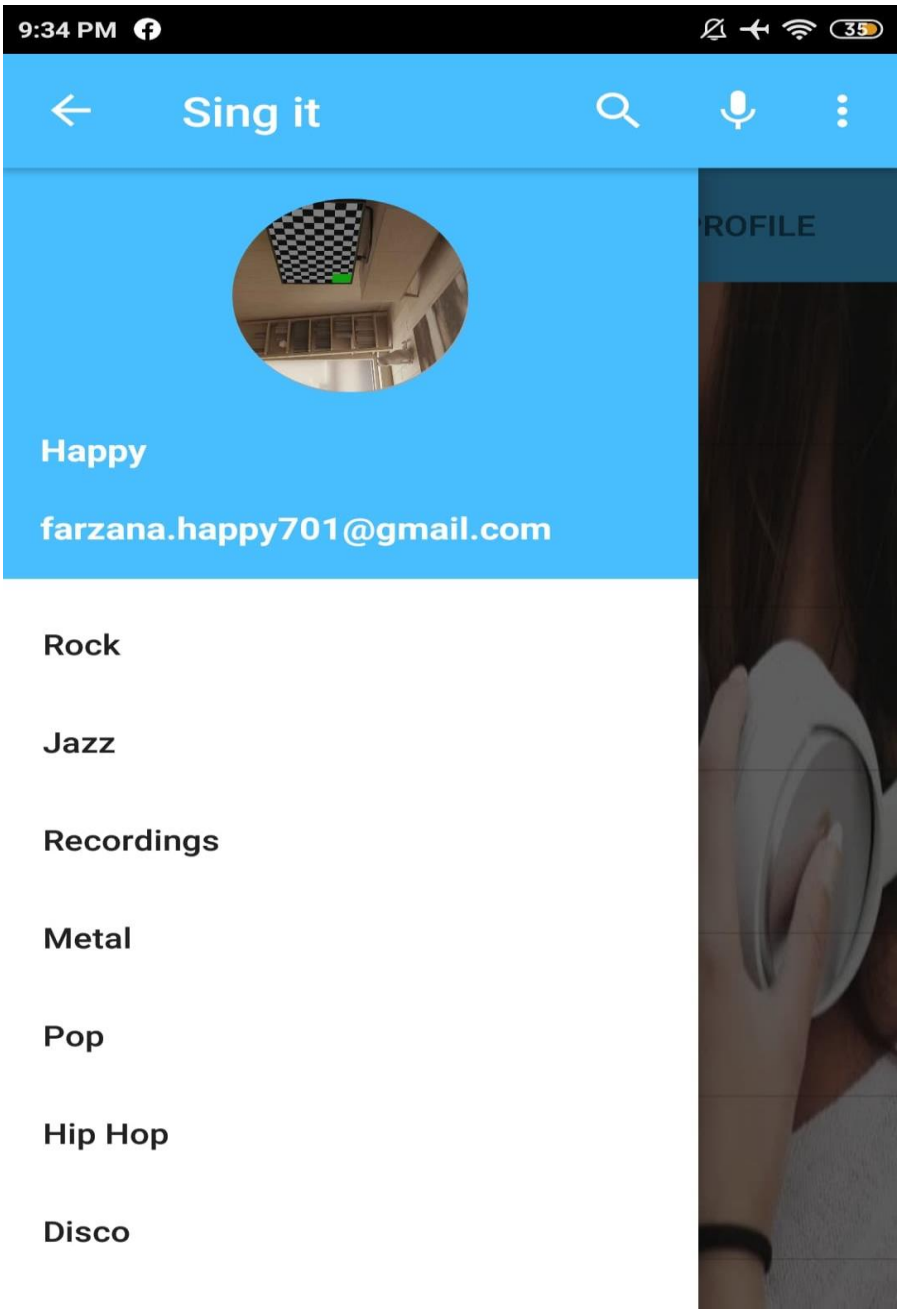

Figure: 4.12.10: Category Page

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The Figure: 4.10.11 is the voice recording activity. This activity will help user to upload their own song which is actually their voice song.

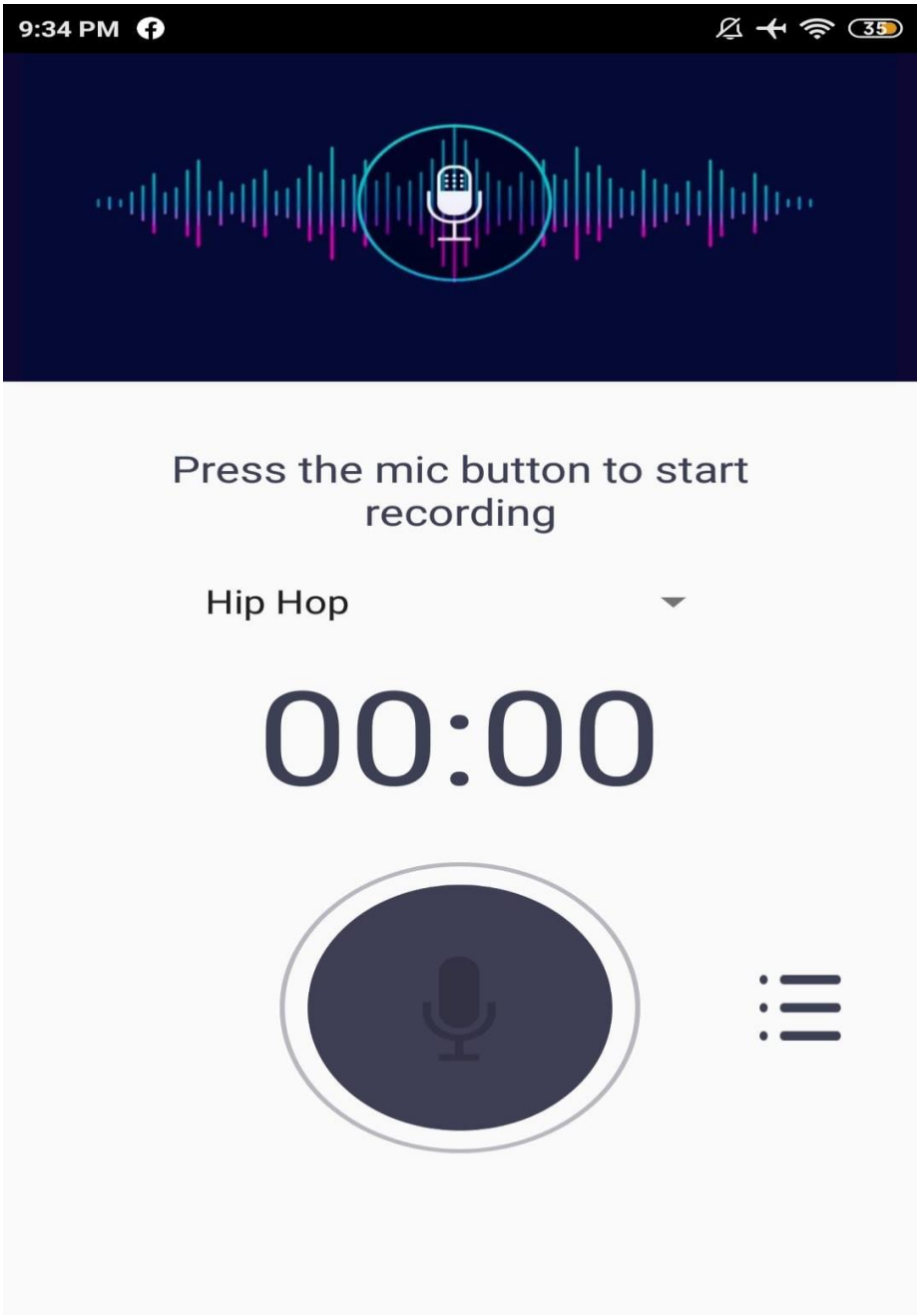

Figure: 4.12.11: Voice Recordings

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The Figure: 4.10.12 is the recording list activity. Here user can find all his sang songs. User also can delete those songs.

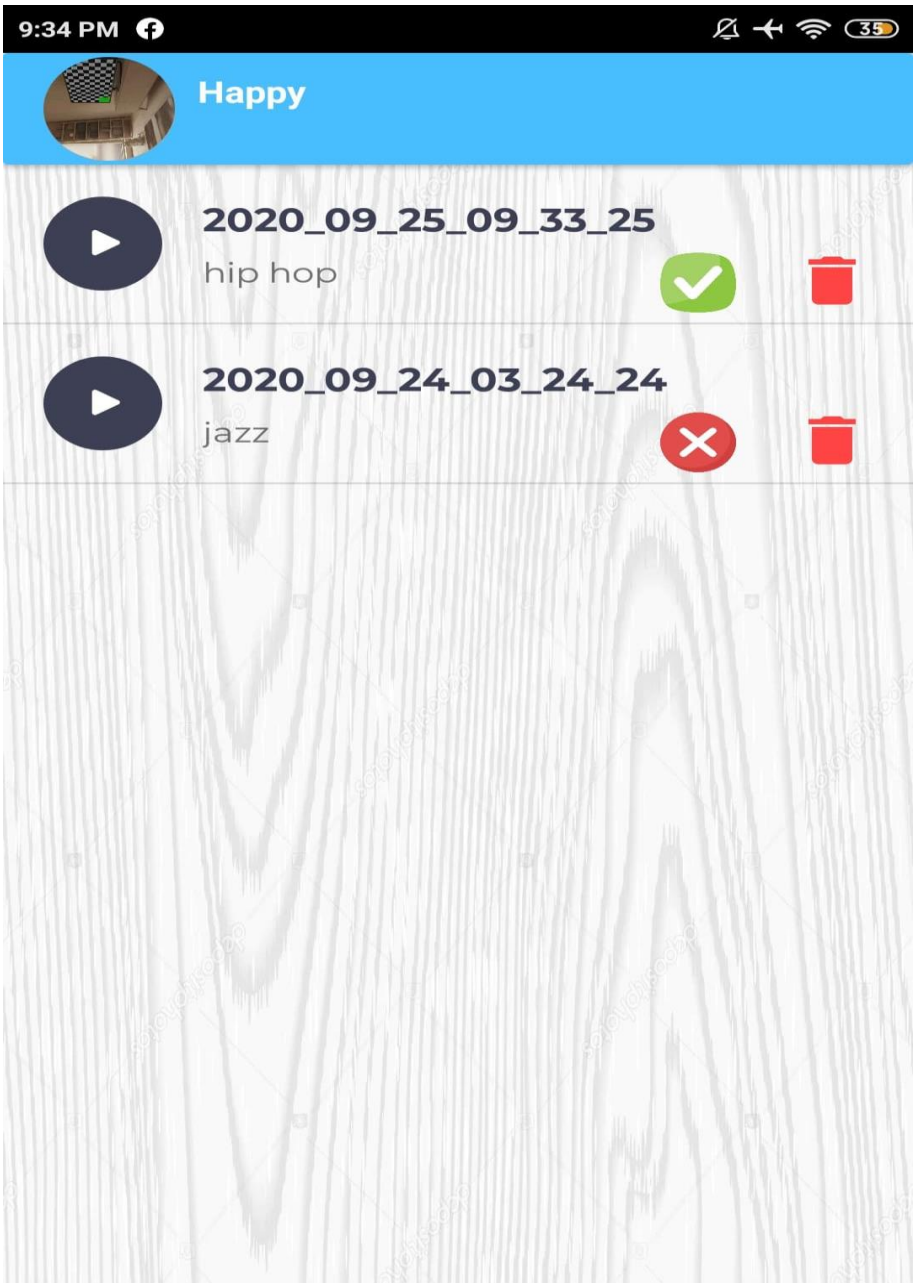

Figure: 4.12.12: User Recordings

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The Figure: 4.10.13 is the admin login page. Here only the admin can enter. Fixed email is actually can login in the system which is actually provided in the database.

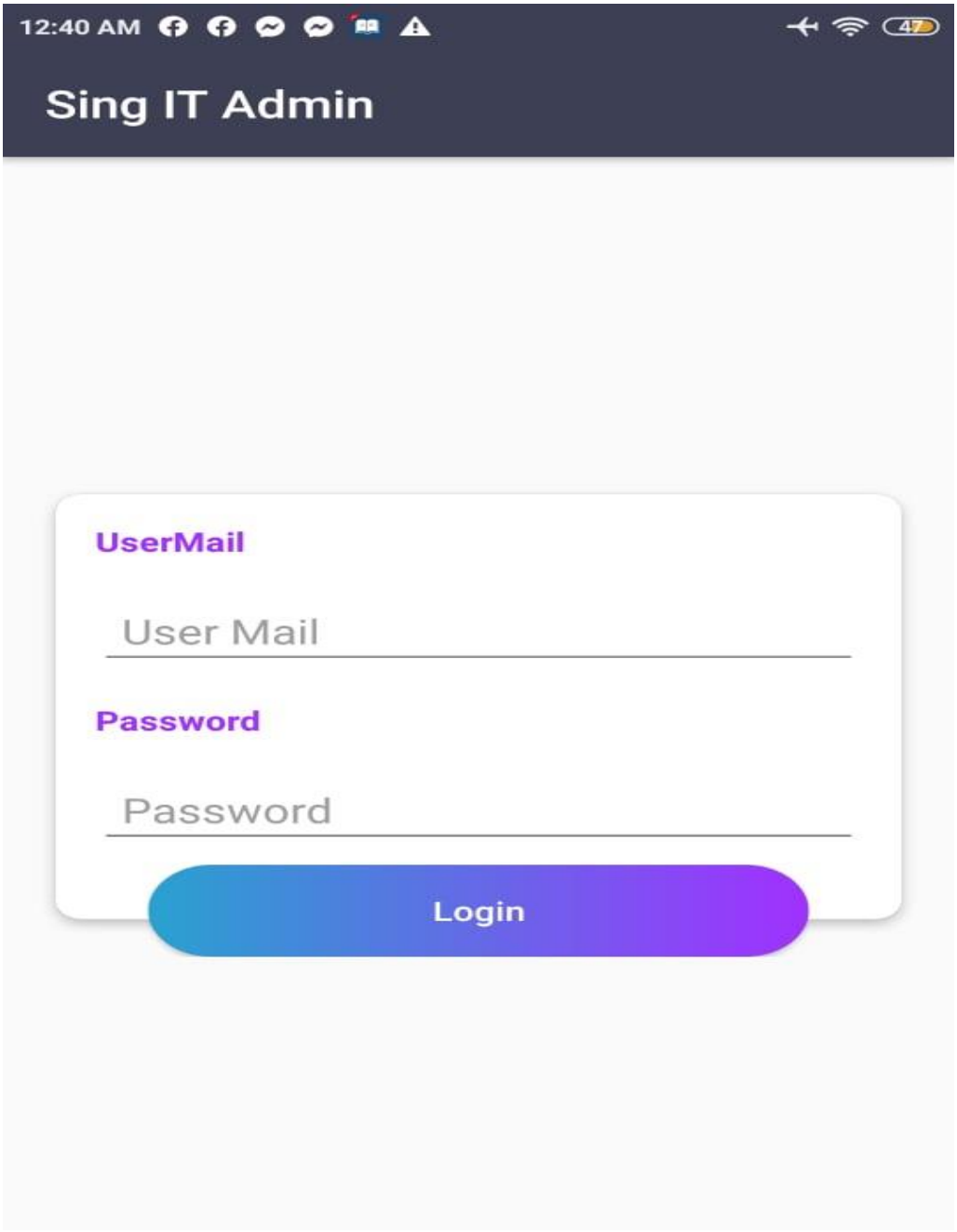

Figure: 4.12.13: Admin Login

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The Figure: 4.10.14 is the admin panel page. Here admin can add or delete songs.

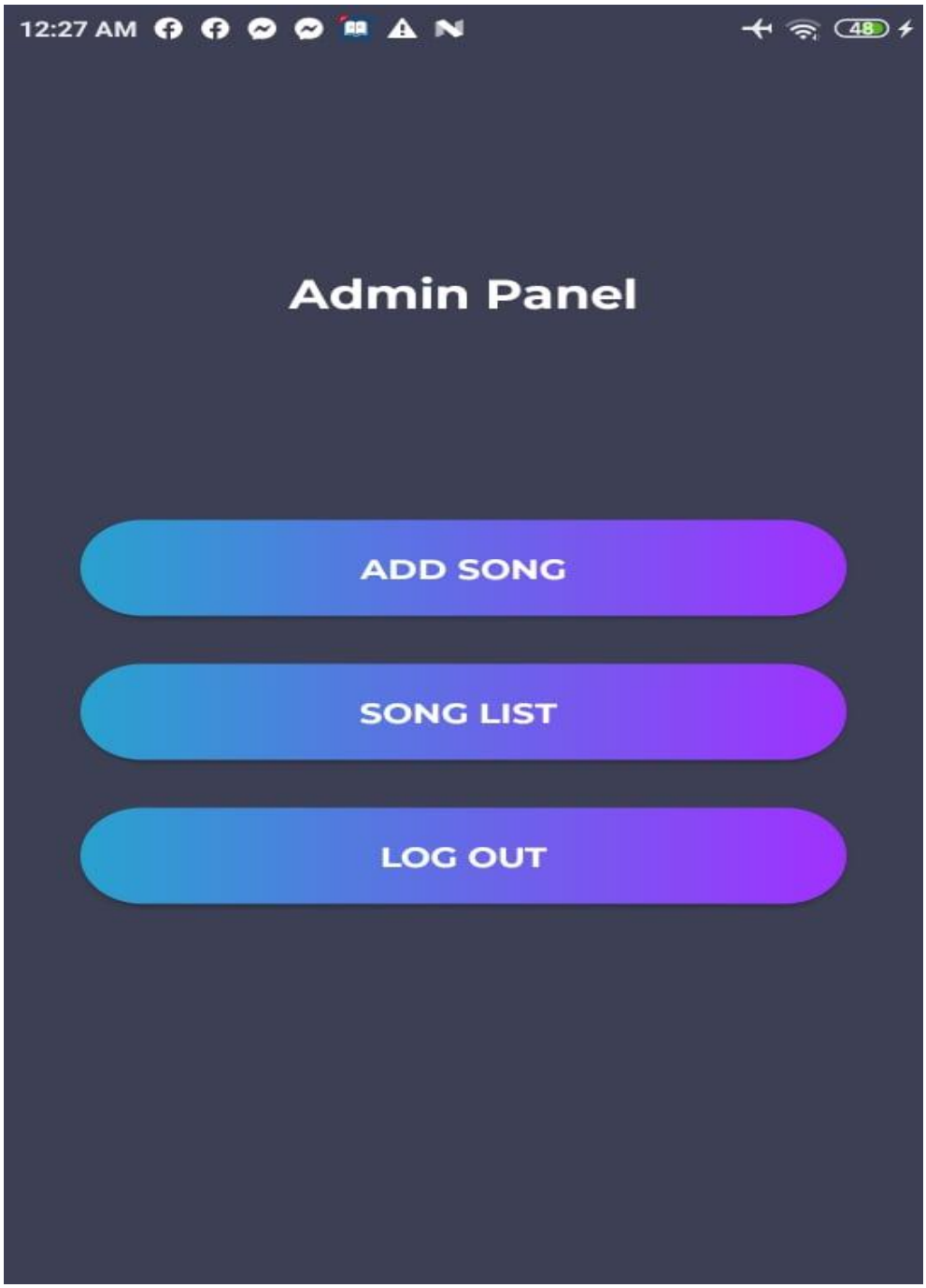

Figure: 4.12.14: Admin Panel

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The Figure: 4.10.15 is the Add song page. Admin can input song in the database according to category and given song title.

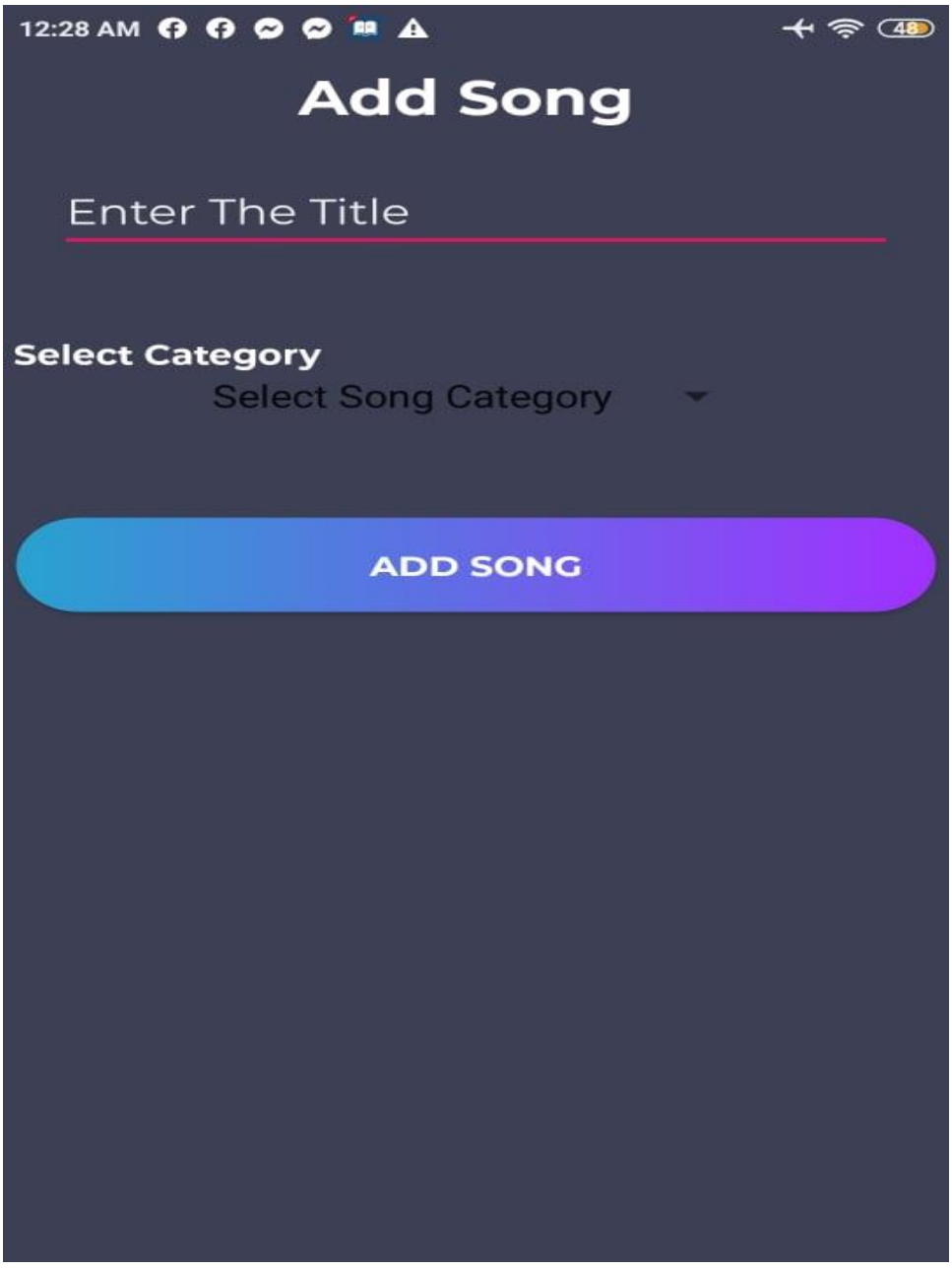

Figure: 4.12.15: Add Song page

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The Figure: 4.10.16 is the song list page. Here admin can delete songs.

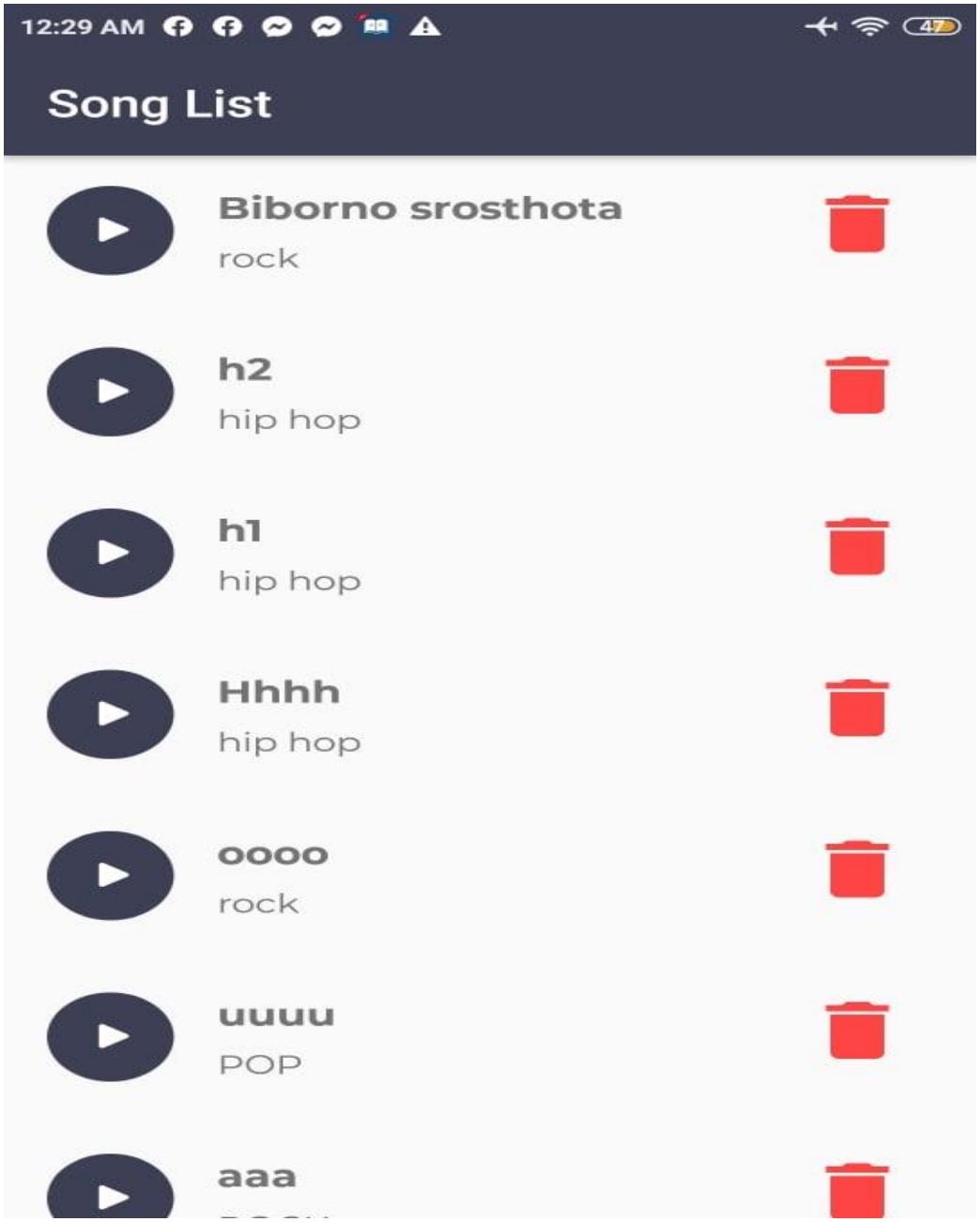

Figure: 4.12.16: Song Delete page

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CHAPTER 5
IMPLEMENTATION AND TESTING

5.1 Introduction

Implementation and testing [9] is very important for an android Application. Another important part of an android application is developing, but testing is more important than developing. After developing an android application testing and implementation is needed. After completing implementation and testing part we can published our application. When a project is accomplished, it must have an intention of future implementation. In this sector there must be an option to implement SING IT in future. At present it's all about narrow features. Nevertheless many feature will be included in future. On the other hand implementation never mean that all time include new feature. In future we will fix some weak side and then promote the quality of android application. So in future there are some option to implement the feature. On the other hand if any user have any complain about the feature or any unusable or some feature is less important they may dismiss in future. At last user really found a proper and better android application for android device.

5.2 How it works

After completing the implementation the testing period will start. During the period of developing many system need to be tested. For SING IT when I came to develop any feature I have tested the feature in the initial phase. Usually I have tested till the amusement output didn't come. Although it wasted much time from me but since doing this accurately today I have develop the system. In generally testing and implementation is vice versa. If any case the testing period is failed then further implementation is started. Many times when I didn't get my expected output. Then I start thinking and researched with this issue, I start gathered information about this issue, and then try to solve this from own. But if any time I fail to resolve any problem I went to my eldest, or Google or any types of android group. When the testing rate is 100% then it would accept.

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5.3 Goals of SING IT

The main goal of SING IT is to helping the people to search their favorite songs. We are in a busy society. Daily we have to face a lots of responsibilities. All this things make us tired. To get rid of this things for a couple of time we can enjoy songs. Songs can give us strength and power to work again with full strength. Songs also can be used to refresh our mind as well. So I wanted to develop a music based app which will be easy to develop and give people a lots of fun and enjoyment. That's all my goal behind developing this app.

5.4 Testing

Testing is very important for an android application. Before publishing an android application testing is needed. Frist we must have checked all the feature is working or not, all data are has been checked so that user may not deliver any unnecessary data. And then checked the expected output has come or not. If the expected output has come than ok, but otherwise we need to detect bug and start testing again. Verification and validation is another two very important in testing an android project. In our application verification and validation this two feature has been very much concentrated.

5.5 Automate user interface test

User interface confirm that this android application meets its functional requirement and attain a high standard of quality. After that user can use this application very friendly. We know that around the world user use a lot of android device that has different version. So we need to keep in mind that our building application should perform same in all the device. On the other hand there many android tab user around the world so our application also support this device. And the big screen this application support also. Before building our application we keep in mind about it and tested properly. In our application we use latest version of android so that user can use it friendly.

5.6 Test UI Performance

UI is very important than any other component of android application. Backend service is less important than User interface. Firstly user see the user interface carefully if user he/she think that

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this applications user interface is very good than he/she will go to the backend of this application. Also we need to figure out is there any crash in UI. Moreover we need to ensure we should need give pressure in UI thread. All the long time process should be done in the background thread. That's why In **SING IT** we use all the update version of the technology to enhance user interface performance. We hope that it will be an excellent application.

5.7 Security Testing

At present security plays a very important role for an android application. So security is most important for an application. Without higher security user never want to use an android application. So before building an android application we should keep in mind about the security issue. If security is loss than everything is lose. In **SING IT,** I used firebase database. All the data are stored in firebase. Firebase database is a product of Google. If data is lost or stolen than firebase is responsible for this event. At present we all are know that firebase is more secure than others. So no need for extra security for our application. So keep in mind and always checked that if no one can steel data or access data without permission.

5.8 System Testing

A fully integrated system needs a system testing. This will figure out the lacking of a system. The app may not install in every device and it may found some bug. So the testing approach can solve all those issues. Even we need to test is there any crash report in the logcat. If any crash report found it need to be solved. As crashing app returns a negative user experience. For this reason I was careful to ensure is there any crash report. Finally I have run this project without any crash after a long time of bug solving. The system testing of our project gone through 3 steps .UI testing, Integration testing and the Unit testing.

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CHAPTER 6

CONCLUSION AND FUTURE IMPLEMENTATION

6.1 Conclusion

Sing It is such kind of app which actually makes enjoying music easy and reliable. This app also gives opportunity to bring out the hidden talent. It connects the people and the social relation. We are in a middle income county. So people can use this app without any cost. This app includes different categories of songs. Then the user can easily find out the song according to category. In this way my app actually works. The UI of this app is designed such a way so that the user can easily control the app.

6.2 Future Implementation

The app is now in the primary stage. There need a lot of implementation to make a complete app. Some future plane is given below:

- A Website that will work same like our app
- The UI will be much more developed and colorful
- The admin section will be improved
- The interface will be developed in different languages

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