Pak Chat

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ABSTRACT

Pak Chat

This Application is aimed to provide a highly effective and reliable android application for instant messaging where users can make a secure communication with each other.

This project allows users to chat with other users securely. This system is developed so that users can send audios, videos and images. This software project concentrates on securing data on server by storing it in an encrypted form. This encryption is based on AES. This application allows user to perform audio and video calling facility. The project asks for access permission to perform a specific task. This System enables user to block chatting by geographical location, generates warning on hate speech content and also provides blockage facility of specific data type for specific user. When the mobile device is lost, this system allows to restore data.

CERTIFICATE FOR CORRECTNESS AND APPROVAL

Certified that work contained in the thesis – Pak Chat carried out by Muhammad Shahid, Muhammad Zeeshan Rafee, Muhammad Arsalan Qadir and Mohsin Ejaz under supervision of A/P Athar Mohsin Zaidi for partial fulfilment of Degree of Bachelor of Software Engineering is correct and approved.

Approved by

A/P Athar Mohsin Zaidi

CSE DEPARTMENT MCS

DATED:_____

DECLARATION

No portion of the work presented in this dissertation has been submitted in support of another award or qualification either at this institution or elsewhere.

DEDICATION

In the name of Allah, the Most Merciful, the Most Beneficent

To our parents, without whose support and cooperation,
a work of this magnitude would not have been possible

To our supervisor A/P Athar Mohsin Zaidi who has given us
great support and valuable suggestions throughout the
implementation process.

ACKNOWLEDGEMENTS

There is no success without the will of ALLAH Almighty. We are grateful to ALLAH, who has given us guidance, strength and enabled us to accomplish this task. Whatever we have achieved, we owe it to Him, in totality. We are also grateful to our parents and family and well-wishers for their admirable support and their critical reviews. We would like to thank our supervisor. A/P Athar Mohsin Zaidi, for his continuous guidance and motivation throughout the course of our project. Without their help we would have not been able to accomplish anything.

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Chapter 1: Introduction

1.1 Overview

Correspondence is a mean for people to exchange messages. It has started since the beginning of human creation. Visiting is a procedure for using development to join people and contemplations paying little heed to the land limits.

Pak Chat is a selective, cross-arrange, encoded messaging client for mobile phones. It uses the Internet to send texts, documents, pictures, video and audio messages to various customers using standard cell numbers. The purpose of this endeavor is to develop a utilitarian continuous advising application.

1.2 Problem Statement

Propelled cell phone use is extending well-ordered in every zone. It's ending up so fast. The world is twisting up continuously automated. They do make life of everyone less complex. To develop a messaging answer for engage customers to immaculately talk with each other. The endeavor should be anything besides hard to use enabling even a novice individual to use it. Any customer with inconsequential learning of working a system can use the system.

Despite the way that there is various other stage available for minute visiting. There is developing an application that keeps an eye on the issues regarding other minute visit application. To send texts, records, pictures, video, customer zone and audio messages to various customers using standard cell numbers by using internet. Regardless, there are various new features to be allowed in the application. These new features are detecting of confidential message that is not allowed, blockage by geographical location and blocking of a specific data type for a particular user.

1.3 Approach

This project PAK CHAT is for fast chatting that provides chatting facilities to users. A registered user can communicate with another registered user. The communication information is kept on in encrypted form. we tend to are operating with information that's hand-picked by users that may be pictures, Videos, Audio, Documents, Messages and Contacts, severally. This information is saved on server in encrypted form to supply backup just in case mobile phone is lost. We tend to aim to develop a system that may offer confidentiality and integrity.

1.4 Scope

This venture goes for building up an exceedingly compelling and solid android application for Pakistan people group where they can make a protected correspondence with one another. Pak Chat will be a content correspondence programming, it will almost certainly impart between clients. It utilizes the Internet to send instant messages, reports, pictures, video, client area and sound messages to different clients utilizing standard cell portable numbers.

For the extent of the task, the venture will be tried as the program is being created. A database for the clients enlisted will be created and tried, a menu will be created and tried, a customer/server interface will be created and tried, and GUI's will be created and tried, for the clients' advantages. At the point when the visit application is close finish, all the more testing will be done so as to make it less surrey or more easy to use.

1.5 Objectives

The fundamental target of this framework is to give a platform to client who mean to speak with another client. Following are the goals that are remembered: -

- Instant messaging
- Block by Geographical Location
- Permissions
- Hate Speech content Warning
- Notifications
- Message sender (username and avatar)
- Group chats
- Group Chat Restrictions
- Files sending
- Contacts sharing
- Emoji’s & animated emoticons
- Voice calls
- Video calls
- Data Encryption
- Data Retrieval

1.6 Deliverables

Table 1

Sr.	Tasks	Deliverables
1	Literature Review	Literature Survey
2	Requirements Gathering	SRS Document
3	Application Design	Design Document (SDS)
4	Implementation	Implementation on computer with a live test to show the accuracy and ability of the project
5	Testing	Evaluation plan and test document
6	Deployment	Complete application along with

1.7 Overview of the document

This archive demonstrates the working of our application Pak Chat. It begins off with the framework engineering which features the modules of the product and speaks to the framework as segment chart, Use Case Diagram, Sequence Diagram and general structure of the framework. At that point we proceed onward to talk about the itemized Description of the considerable number of parts included. Further we talk about the conditions of the framework and its association with different items and its limit to be reused.

1.8 Purpose of the document:

This document aims to elaborate the idea and design of the project that is Pak Chat. This document will highlight all the specifications of our project i.e. how it will be used, what will be the scenario in which the project will be useful. This document will help in defining functional and non-functional requirements.

Chapter 2: Literature Review

2.1 Introduction

Pak Chat is a restrictive, cross-stage, encoded texting customer for cell phones. It utilizes the Internet to send instant messages, records, pictures, video, client area and sound messages to different clients utilizing standard cell portable numbers. The point of this venture is to manufacture a practical ongoing informing application.

2.2 Methods

Integrated Development Environment (IDE) for our project is **Android Studio**. It is based on the IntelliJ IDEA, a Java integrated development environment for software, and incorporates its code editing and developer tools.

2.2.1 Database

Other than real-time Database we are using **Storage** feature of firebase. It is built for application developers who need to store and serve user-generated content, for example photos or videos. It gives secure document transfers and downloads for Firebase applications, regardless of network quality. You can utilize it to store pictures, sound, video, or other user-generated content. Firebase Storage is upheld by Google Cloud Storage, a capable, basic, and cost-effective object storage service.

2.2.2 Security

We are using the functionality of a cryptographic cipher for encryption and decryption. It forms the core of the **Java Cryptographic Extension (JCE)** framework.We are using **Advanced Encryption Standard (AES)**.

Our key specification is:

key length is **256** bits.

Salt - which is random data that is used as an additional input to a one-way function that “hashes” a password or passphrase. We are using **32** bits of random salt

Iteration – we are doing **1000** iteration which is recommended by PKCS#5.

With this key specification we do key factory with **Password-Based Key Derivation Function 2(PBKDF2)** with **hash-based message authentication code (Hmac)** and **Secure Hash Algorithm 1(SHA1)** this is also known as **PBKDF2withHmacSHA1**.

After this we generate our key with key spec and key factory in encoded form.

With this key we encrypt using Advanced Encryption Standard (AES) **using** Cipher Block Chaining (CBC) **by applying** Password-Based Encryption Standard 5 padding (PKCS5Padding)**.**

2.2.3 Firebase Rules

For securing our database we are using firebase rules. Realtime Database Rules are made up of JavaScript-like expressions contained in a JSON document.

Realtime Database Rules are *declarative* configuration in database. This means that the rules are defined separately from the product logic. This has several advantages: clients aren't responsible for enforcing security, buggy implementations will not compromise the data, and perhaps most importantly, there is no need for an intermediate referee, such as a server, to protect data from the world.

Security rules come with a set of variables that help us protect your data. For instance, the `auth` variable tells you if a user is authenticated and who they are, and the `now` allows us to check against the current server time.

Firebase Realtime Database Rules determine who has read and write access to your database, how your data is structured, and what indexes exist. These rules live on the Firebase servers and are always enforced automatically. Every read and write request will only be completed if your rules allow it. By default, your rules do not allow anyone access to your database. This is to protect your database from abuse until you have time to customize your rules or set up authentication.

2.2.4 Location

For security reasons we are blocking some features in restricted area so that it can not be misuse.

For this we are using Google Play services location APIs. Using the Google Play services location APIs, your app can request the last known location of the user's device. In most cases, you are interested in the user's current location, which is usually equivalent to the last known location of the device.

2.2.5 Design Patterns

For getting data from firebase and display it to user in this part we are using Adapter design Pattern. Adapter pattern works as a bridge between two incompatible interfaces. This type of design pattern comes under structural pattern as this pattern combines the capability of two independent interfaces. Adapter makes things work after they're designed; Bridge makes them work before they are.

Conclusion

Pak Chat is an exclusive, cross-stage, scrambled texting customer for cell phones. It utilizes the Internet to send instant messages, archives, pictures, video, client area and sound messages to different clients utilizing standard cell versatile numbers. The point of this undertaking is to assemble a practical continuous informing application. Keeping our private information secure, it implies no one but client can access and utilize the information.

Chapter 3: Software Requirement Specification

3.1 Introduction

The motivation behind this part is to depict the venture titled "Pak Chat". This part contains the utilitarian and non-useful prerequisites of the undertaking. It contains the rules for engineers and analysts of the undertaking.

Pak Chat is a restrictive, cross-stage, encoded texting customer for cell phones. It utilizes the Internet to send instant messages, records, pictures, video, client area and sound messages to different clients utilizing standard cell portable numbers. The point of this venture is to manufacture a practical ongoing informing application.

3.2 Overall Description

3.2.1 Product Perspective

This item is essentially a moment internet informing android application. The fundamental rule for working this application is to store the information at servers. This undertaking PAK CHAT is for instant chatting which gives a chatting platform to clients. An enrolled client will most likely speak with another enlisted client. The correspondence information will be put away on server in encrypted form. We are working with information that is chosen by clients that can be Images, Videos, Audio, Documents, Messages and Contacts, separately. This information will be saved money on server in encoded structure to give reinforcement if cell phone is lost. We mean to build up a framework that can give confidentiality and integrity.

3.2.2 Product Functions

The main features of Pak Chat are highlighted below:

- Communication between two individuals.
- Communication in groups.
- Sharing of Videos, Audios and Location.
- Block User by Location
- Permissions in Group Chat
- Audio and Video calling and recording.

3.2.3 User Classes and Characteristics

Following are client classes and their concise depiction.

Tester (occasional user)

Tester will use this project to check for bug finding. They will also use the project to check if it's in accordance to the Software Requirements Specification document.

Project Supervisor (occasional user)

Project supervisor will also use the product to evaluate. They will use this product to find the accuracy and error in the output.

Communicators Individuals (Regular user)

Users of Pak Chat will use this application to communicate with each other.

3.2.4 Operating Environment

Pak Chat will operate in the following environment;

Hardware

- Mobile with android platform
- Server
- PC

Software

- Android Studio
- Chrome
- Firebase

3.2.5 Design and Implementation Constraints

Following are the limitations of plan and usage in our venture

- Validate for User's Mobile Number by Verification SMS.
- Mobile Phone Self-encryption is based on client-server architecture that is Mobile phone act as client and Firebase act as server. They are connected through the internet.
- Check for any previous existing User Backups on the device. If a Backup is available, prompt to "Restore Backup".

3.2.6 User Documentation

- A user manual will be provided which will help new users to get started with the Pak Chat. The user manual will provide the instructions on how to work with Pak Chat.
- A summary will also be provided to the user which will highlight the features and limitations of this language

3.2.7 Assumptions and Dependencies

- The mobile phone needs to have internet access to be able to get synced with the server.
- The amount of data to be encrypted depends on the storage space at the server.
- The user has to login.
- Unlimited number of messages per day
- Unlimited number of changes to profile per day

3.3 External Interface Requirements

3.3.1 User Interfaces

System comprises of an android based application, using java and XML, which shall provide a graphical user interface for user friendly environment. The user would be asked for input i.e. select images etc. that need to be processed.

The user interface for the android application of the System, shall be compatible to all android devise but for best user experience the following versions are preferable

- Jelly beans 4.1.2

User Interface:

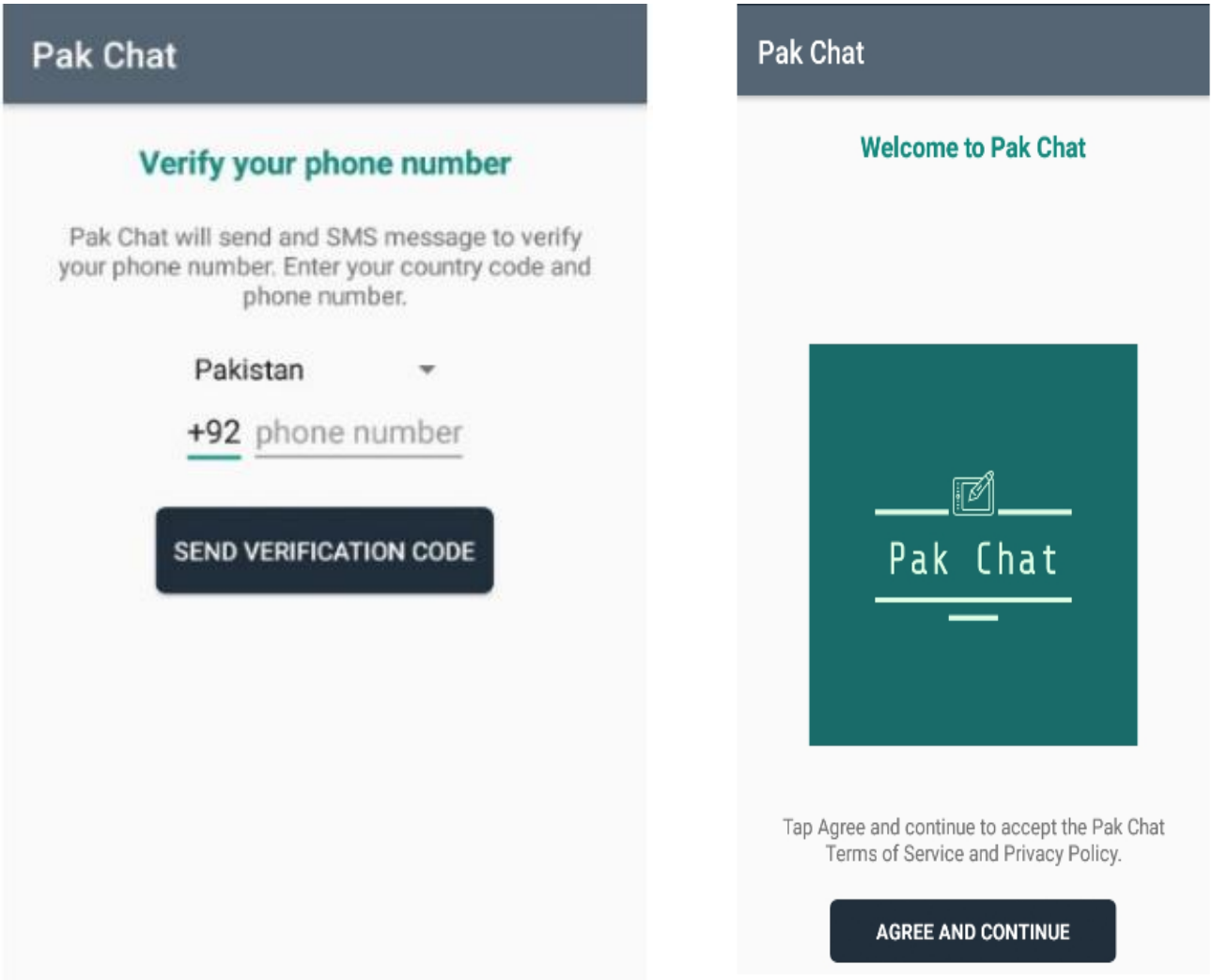


Fig. 3.3.1 Interfaces

3.3.2 Software Interfaces

- Android App will be installed on android device with android version Jelly beans 4.1.1 or later.
- The android app would be built using Android Studio.
- For this system, following API and external libraries will be used:
  - Google APIs
  - Android APIs

3.4 System Features

3.4.1 Functional Requirements

REQ-1 User Registration

Client shall enroll for the application through a substantial telephone number.

REQ-2 Verification

Phone number shall verify accordance to the user by sending a one-time code.

REQ-3 Adding New Contacts

Application shall extract all the contacts from contact directory registered at Pak Chat.

REQ-4 Sending Message

Client shall send text to any contact enrolled on Pak Chat contact list.

REQ-5 Send Attachments

User shall to send audio, video and images as attachments.

REQ-6 Grouping

User shall create groups of contacts.

REQ-7 Broadcast Message

User shall broadcast messages to these groups.

REQ-8 Audio Recording

User shall record the calls while communicating with another user.

REQ-9 Block by Location

User shall block by geographical location.

REQ-10 Group Restriction

Group Admin shall restrict any other user in sending data.

3.4.2 Nonfunctional Requirements

3.4.2.1 Performance Requirements

REQ-1

Pak Chat will probably bolster in any event 10,000 concurrent clients. The limit can be stretched out in future if necessary.

REQ-2

There will be huge measure of data to be taken care of in database, for example, messages, profile

data posts and so on and the server will be enough space to deal with this occupation.

REQ-3

Most of the capacities that is for recovering messages, companions' rundowns, posts on the mass of the spots and so on ought to be perform under 5 seconds.

3.4.2.2 Security Requirements

REQ-1

The framework must not demand superfluous consents from the client to counteract undesirable assaults.

REQ-2

Put away information of the application ought not be come to by different applications that is introduced in the client's cell phone.

REQ-3

Put away information in the cell phone and sent information by means of web ought to be scrambled. Sent and got information ought to be exchanged by means of HTTPS association. And furthermore, verified and encoded attachment level correspondence ought to be actualized.

REQ-4

Codes ought not be put away in application if there should be an occurrence of use can be influenced by a malware programming.

REQ-5

Information that originate from the application ought to scramble again in the database side.

3.4.2.3 Software Quality Attributes

Reliability

REQ-1

This framework should keep the database data reliably.

REQ-2

The application some portion of the framework ought to never come up short. In the database side, disappointments ought to be insignificant and there ought to be crash recuperation frameworks all together not to lose data in a potential database disappointment.

REQ-3

Framework should show educational messages when its segments doesn't work appropriately.

Accessibility

REQ-1

Framework ought to be accessible for 7 days and 24 hours.

REQ-2

In the application side, framework ought to be tried against likely disappointments before distributing the primary form or refreshed renditions of utilization. Distributed rendition ought to be without blunder.

REQ-3

In database side, in the event of a disappointment, framework ought to recuperate any data for client and framework.

Maintainability

REQ-1

A SVN programming ought to be utilized being developed stage so as to diminish multifaceted nature, make the framework discernible and recuperate the code from an undesirable accident while more than one engineer are managing the code.

REQ-2

Plan components ought to be reported well.

REQ-3

All pieces of the code ought to be anything but difficult to peruse.

Portability

REQ-1

Since the program is for Android gadgets, the majority of the Android gadgets which meets the prerequisites clarified in second segment of this report can work the application.

REQ-2

Application won't chip away at any OS aside from Android.

REQ-3

100 percent of the program relies upon host. So as to change the host, every one of the segments of database ought to be exchanged.

3.4.2.4 Business Rules

REQ-1

Try not to share or request that individuals share singular installment card, monetary record numbers or other cardholder information inside messages.

REQ-2

We restrict utilization of the Business Products to commend any violations, or to encourage or arrange crime that makes physical mischief individuals, organizations or creatures, or budgetary harm to individuals or organizations.

REQ-3

You are in charge of agreeing to pertinent law, including keeping up a Privacy Policy and tying down every single essential authorization and agree to gather, store, and utilize substance and data from others you reach in Pak Chat.

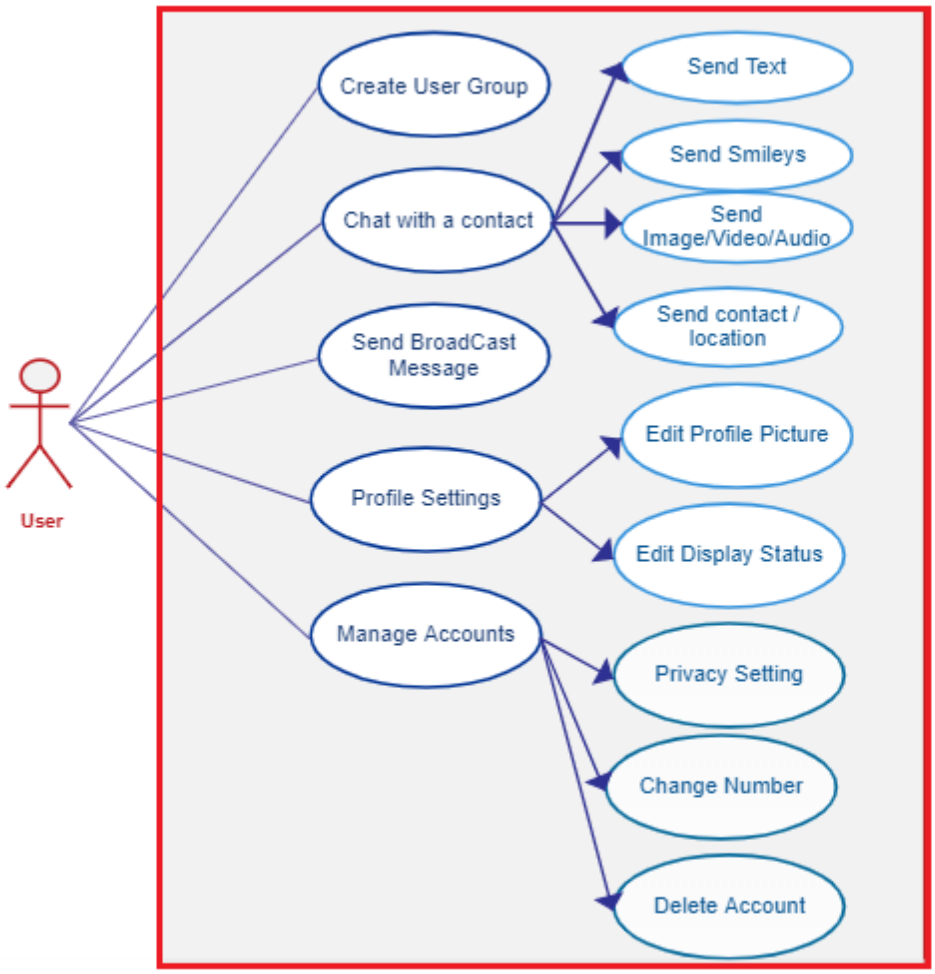


Fig. *3.4 use case*

Use Case ID:	01		
Use Case Name:	SRS-Defined		
Created By:	Shahid	Last Updated By:	Arsalan
Date Created:	31-10-18	Date Last Updated:	03-11-18
Actor:	User		
Description:	User is the regular registered user.		
Preconditions:	User is already registered.		
Post conditions:	User must be identified.		
Priority:	High		
Frequency of Use:	Medium		
Normal Course of Events:	Login before action.		
Alternative Courses:	Registered for first time.		
Exceptions:	Nil		
Includes:	Server attached		
Special Requirements:	User is active		
Assumptions:	System is working		
Notes and Issues:	Nil		

Chapter 4: Design and Development

4.1 Introduction

This part incorporates programming structure for Pak Chat. It determines the nitty gritty compositional plan of Pak Chat which is being created. It will go about as a rule for engineers and the various partners all through the advancement. Archive incorporate classes and they're between connections, use cases with definite depictions, grouping graphs, action outlines and different others. This report is planned for engineers, analyzers, clients, documentation journalists, venture customers, venture administrator and task evaluators.

4.2 Scope of the Development Project

This undertaking goes for building up a profoundly viable and dependable android application for Pakistan people group where they can make a safe correspondence with one another. Pak Chat will be a content correspondence programming, it will almost certainly convey between clients. It utilizes the Internet to send instant messages, reports, pictures, video, client area and sound messages to different clients utilizing standard cell versatile numbers.

For the extent of the task, the undertaking will be tried as the program is being created. A database for the clients enrolled will be created and tried, a menu will be created and tried, a customer/server interface will be created and tried, and GUI's will be created and tried, for the clients' advantages. At the point when the talk application is close consummation, all the more testing will be done so as to make it less carriage or easier to use.

4.3 System Architecture Description

This Section overview of application, its higher and lower levels details and user interfaces.

4.3.1 OVERVIEW OF MODULES/COMPONENTS

Here we will give brief overview of all the modules.

4.3.1.1 Registration Module

Enrollment module gathers client data for record creation, for example, a client ID and secret phrase, store this data in database. On the off chance that the client gives data that as of now exists, at that point client will be confirmed against database sections.

4.3.1.2 Authentication Module

An authentication module is a plug-in that collects user information such as a user ID and password and compares the information against entries in a database. If a user provides information that meets the authentication criteria, the user is validated and, assuming the appropriate policy configuration, granted access to the requested resource. If the user provides information that does not meet the Authentication criteria, the user is not validated and denied access to the requested resource.

4.3.1.3 Communication –Online Module

When user registration and authentication has completed the online communication, module starts its work and user can communication with another user. The communication between users start when both must have completed registration and authentication module requirements.

4.3.1.4 Communication –Offline Module

Communication –Offline module will classify the user which are offline. The data sent by active user to offline user will be stored. As offline user becomes active, the sent data sent by first user will be transmitted to second user.

4.3.1.5 Data Storage Module

Putting away talk messages and recovering those messages at an exceptionally quick rate is truly necessary for PAK CHAT. This module contains every one of the information, for example, visit history, sight and sound information, calls information and clients' data information.

4.3.1.6 Data Security Module

This module will provide security to the data. As the security is one of the critical issues, this module is divided to different levels of security, explained in section 3.

4.3.2 Structure and Relationships

This section covers the overall technical description of Pak Chat. It shows the working of application in perspective of different point-of-views and also shows relationships between different components.

Use Case Diagram

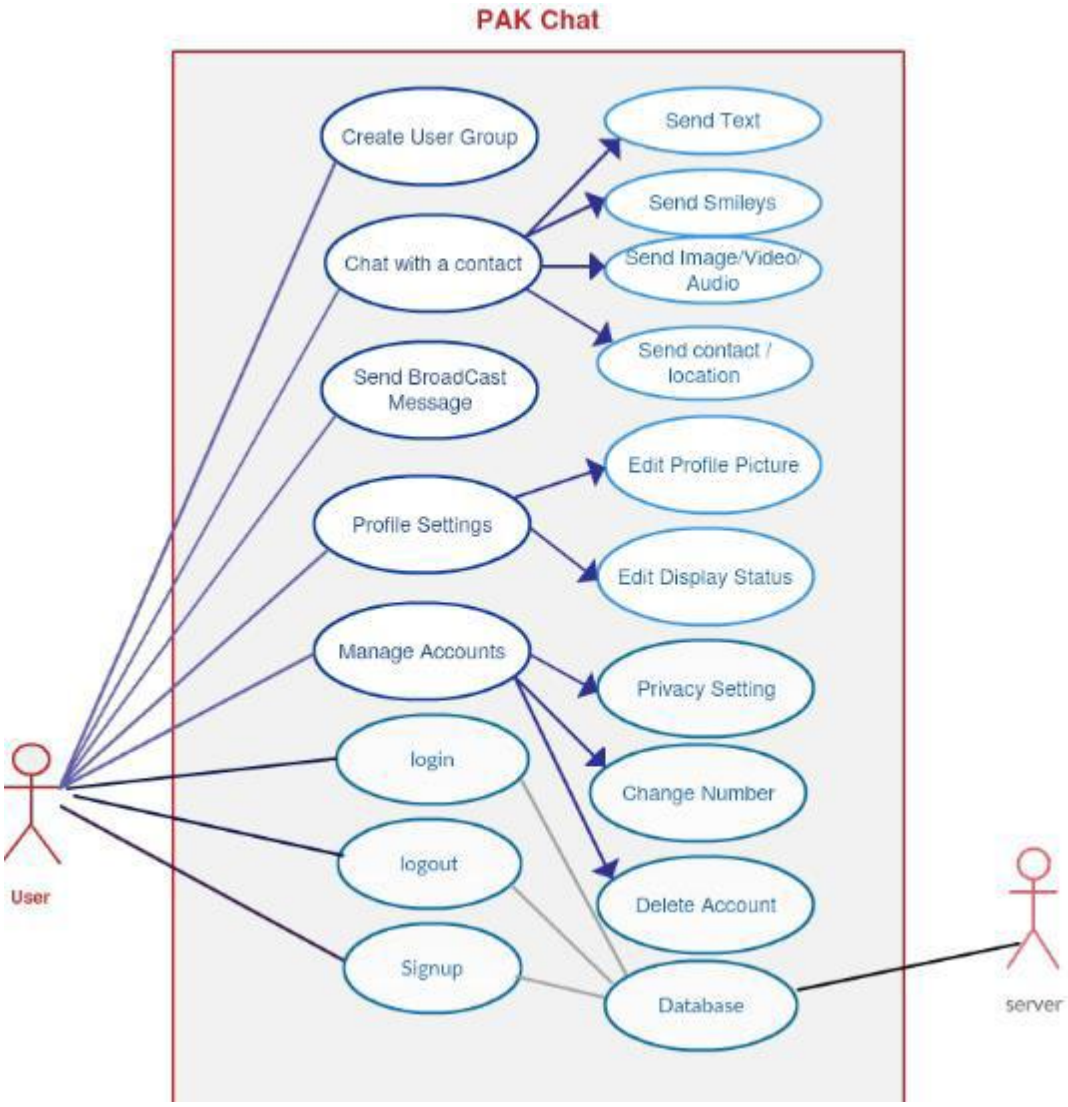


Fig. 4.3.2: *Use Case*

Actors

Primary Actor(s): Application Client

Secondary Actor(s): Server

Use Cases

1. Login
2. Create Chat
3. Open Messages
4. Send Files
5. Open Contacts

6. Add Contact
7. Block by Location
8. Group restriction
9. Permission
10. Audio Calling
11. Video Calling
12. Logout

Use Case Description

Use Case 1: Login

Use case name	Login
Primary actor	User
Secondary actor	Server
Normal course	User logs in successfully
Alternate course	Error occurred due to wrong one time code entered
Pre-condition	User has an account and the application is running
Post-condition	Menu is displayed to the user
Extend	N/A
Include	Signup
Assumptions	User has a working internet connection

Use Case 2: Create Chat

Use case name	Create Chat
Primary actor	Client
Secondary actor	N/A

Normal course	User creates chat successfully
Alternate course	Error occurred due to invalid contact entered
Pre-condition	User has the app installed and running
Post-condition	User is created.
Extend	N/A
Include	N/A
Assumptions	User has a working internet connection

Use Case 3: Open Messages

Use case name	Open messages
Primary actor	Client
Secondary actor	Server
Normal course	User received messages sent by other contacts
Alternate course	Error occurred if the file format is not supported or user is out of memory
Pre-condition	Client is signed in
Post-condition	N/A
Extend	N/A
Include	N/A
Assumptions	User has enough memory.

Use Case 4: Send Documents

Use case name	Send Documents
Primary actor	Client
Secondary actor	Server

Normal course	User sends the files.
Alternate course	Error occurred if the user is out of memory
Pre-condition	User has an account and the application is running
Post-condition	Selected file is saved in encrypted form
Extend	N/A
Include	N/A
Assumptions	User has selected valid format of file.

Use Case 5: Open Contacts

Use case name	Open Contacts
Primary actor	Client
Secondary actor	N/A
Normal course	All user contacts shown to user
Alternate course	Error occurred if user connection to the internet is interrupted
Pre-condition	User has a working internet connection
Post-condition	The data on phone and server is identical
Extend	N/A
Include	N/A
Assumptions	User has an account and a working internet connection, and the application is running

Use Case 6: Add Contact

Use case name	Add Contact
Primary actor	User
Secondary actor	Server

Normal course	New contact is added
Alternate course	Error occurred if invalid key entered (invalid length)
Pre-condition	Client is signed in
Post-condition	User can contact to newly added user.
Extend	N/A
Include	N/A
Assumptions	User has the app running

Use Case 7: Block by Location

Use case name	Block by Location
Primary actor	Client
Secondary actor	Null
Normal course	User clicks “block by location” button and block activity is displayed
Alternate course	Null
Pre-condition	Client has an account and the application is running
Post-condition	Message activity shown
Extend	N/A
Include	N/A
Assumptions	Client has an account and the application is running

Use Case 8: Group Restrictions

Use case name	Group Restriction
Primary actor	Client
Secondary actor	Null

Normal course	User clicks “Group Restriction” button and gallery activity is displayed
Alternate course	Null
Pre-condition	Client has an account and the application is running
Post-condition	Null
Extend	Null
Include	Null
Assumptions	Client has an account and the application is running

Use Case 9: Permissions

Use case name	Permissions
Primary actor	Client
Secondary actor	Server
Normal course	Client clicks “Permission” button and contact activity is displayed
Alternate course	Null
Pre-condition	Client has an account and the application is running
Post-condition	Contact activity shown
Extend	Null
Include	Null
Assumptions	Client has an account and the application is running

Use Case 10: Audio Calling

Use case name	Audio Calling
Primary actor	Client
Secondary actor	Null

Normal course	Client is allowed to call within selected user
Alternate course	Null
Pre-condition	Client has an account and the application is running
Post-condition	Selected user will be contacted.
Extend	Null
Include	Null
Assumptions	Client has an account and the application is running

Use Case 11: Video Calling

Use case name	Video Calling
Primary actor	Client
Secondary actor	Null
Normal course	The video calling option is opened.
Alternate course	Null
Pre-condition	Client has an account and the application is running.
Post-condition	Selected user will be contacted on video.
Extend	Null
Include	Null
Assumptions	Client has an account and the application is running.

Use Case 12: Log Out

Use case name	Log Out
Primary actor	Client

Secondary actor	Null
Normal course	Client logged out successfully
Alternate course	Null
Pre-condition	Client has an account and the application is running, and user is logged in
Post-condition	Logged out and log in screen shown
Extend	Null
Include	Null
Assumptions	Client has an account and the application is running

Sequence Diagrams

Following sequence diagrams show the sequence of activities performed in all use cases described above.

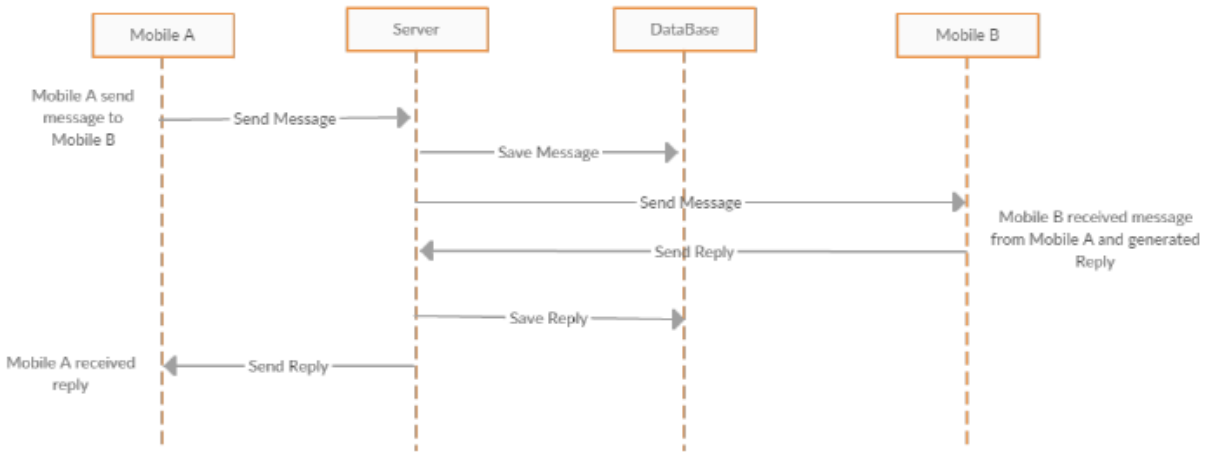


Figure 4.3.2a – Login Sequence Diagram

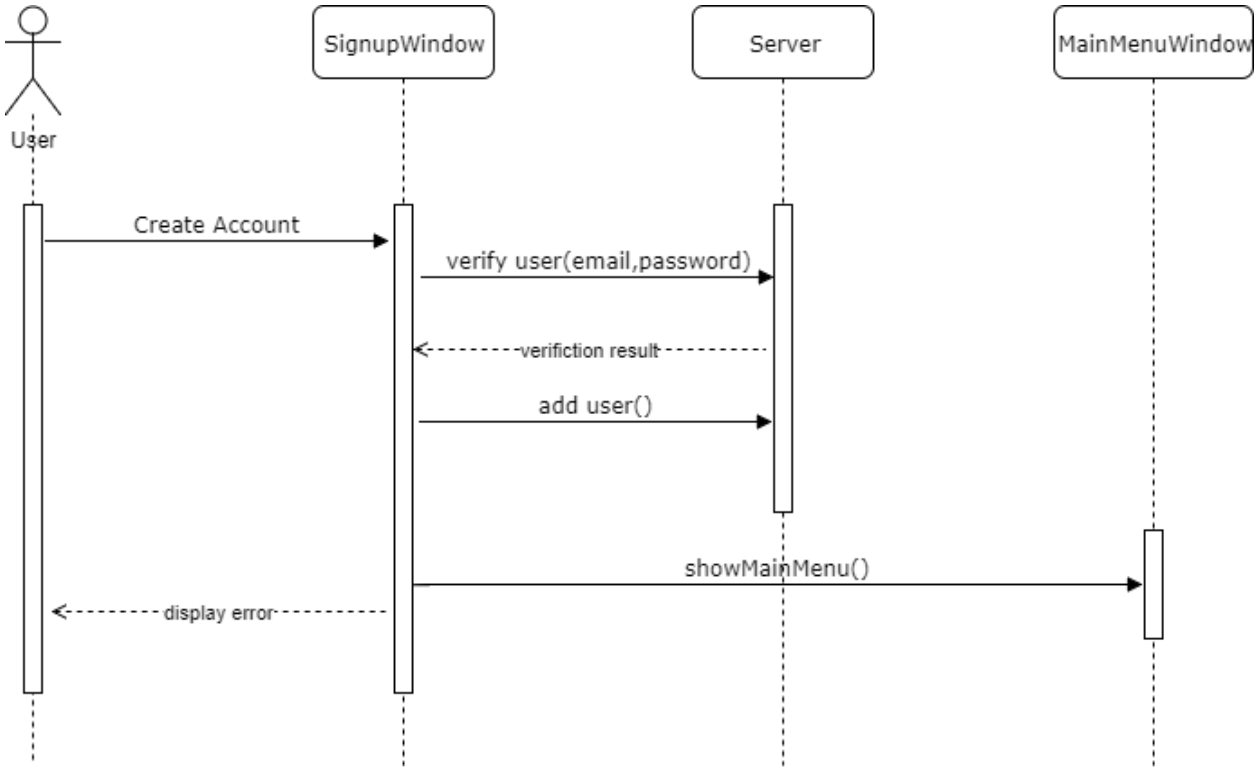


Figure 4.3.2b– Login Sequence Diagram

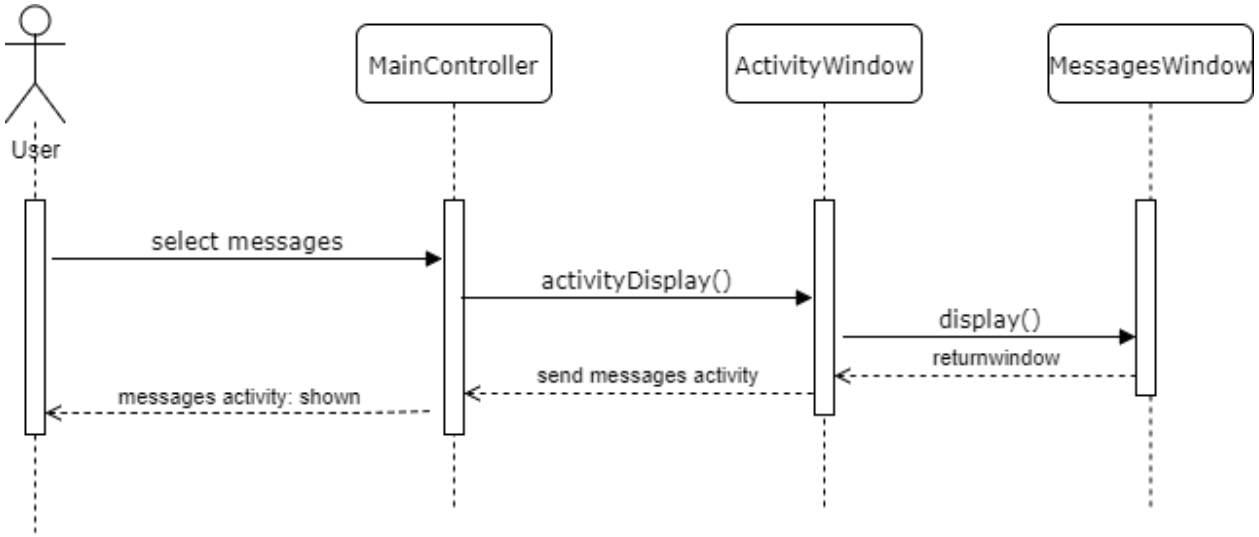


Fig 4.3.2c– Messages Sequence Diagram

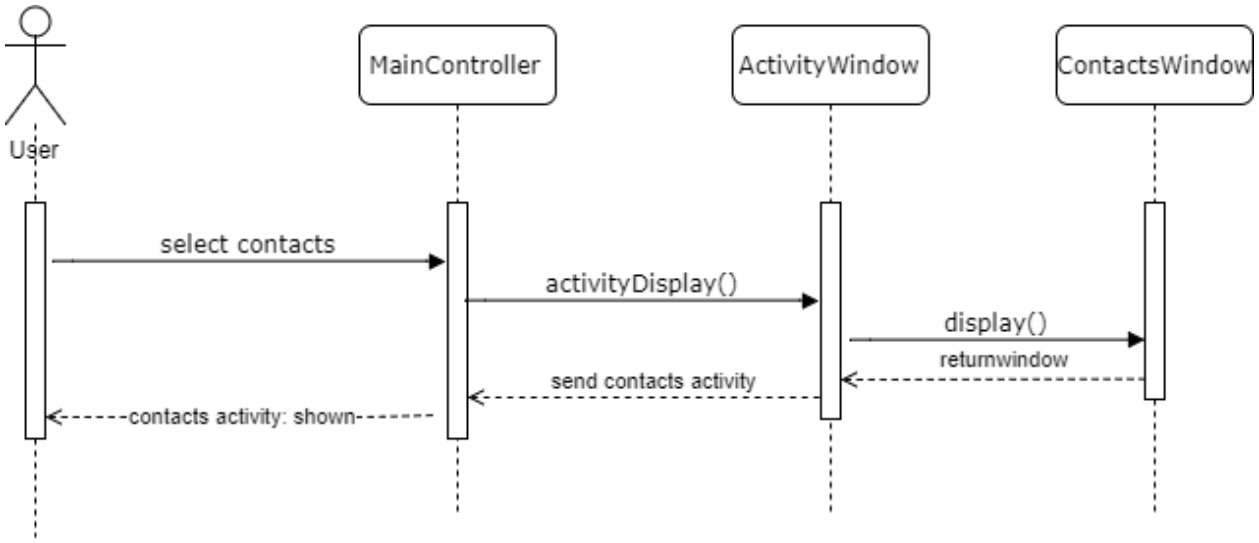


Fig 4.3.2d – Contacts Sequence Diagram

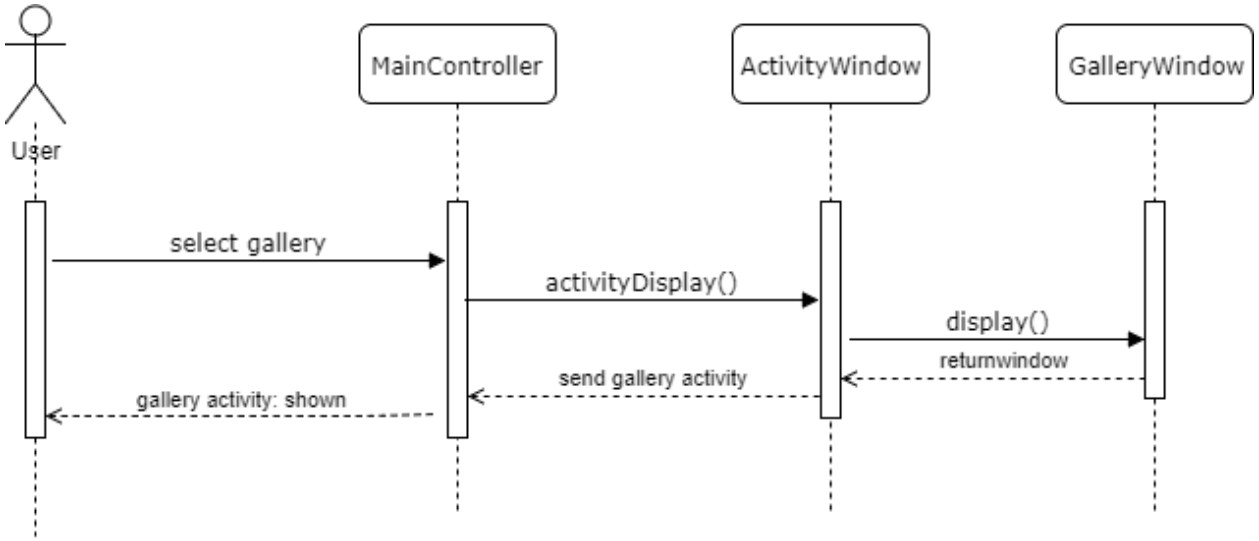


Fig 4.3.2e – Gallery Sequence Diagram

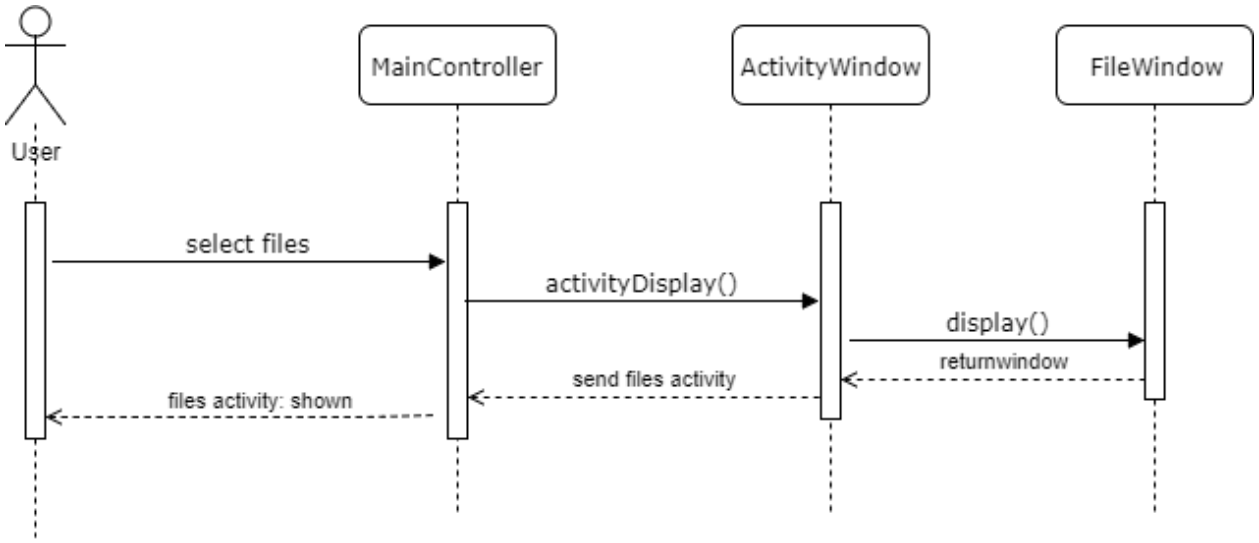


Fig 4.3.2f – Files Sequence Diagram

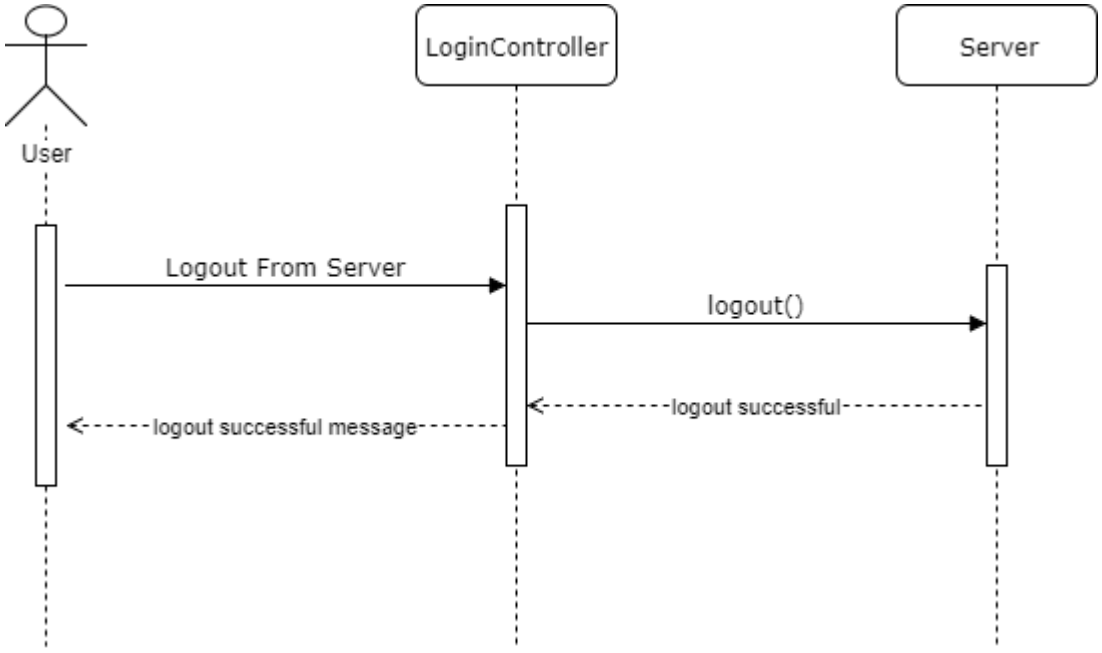


Fig 4.3.2g – Logout Sequence Diagram

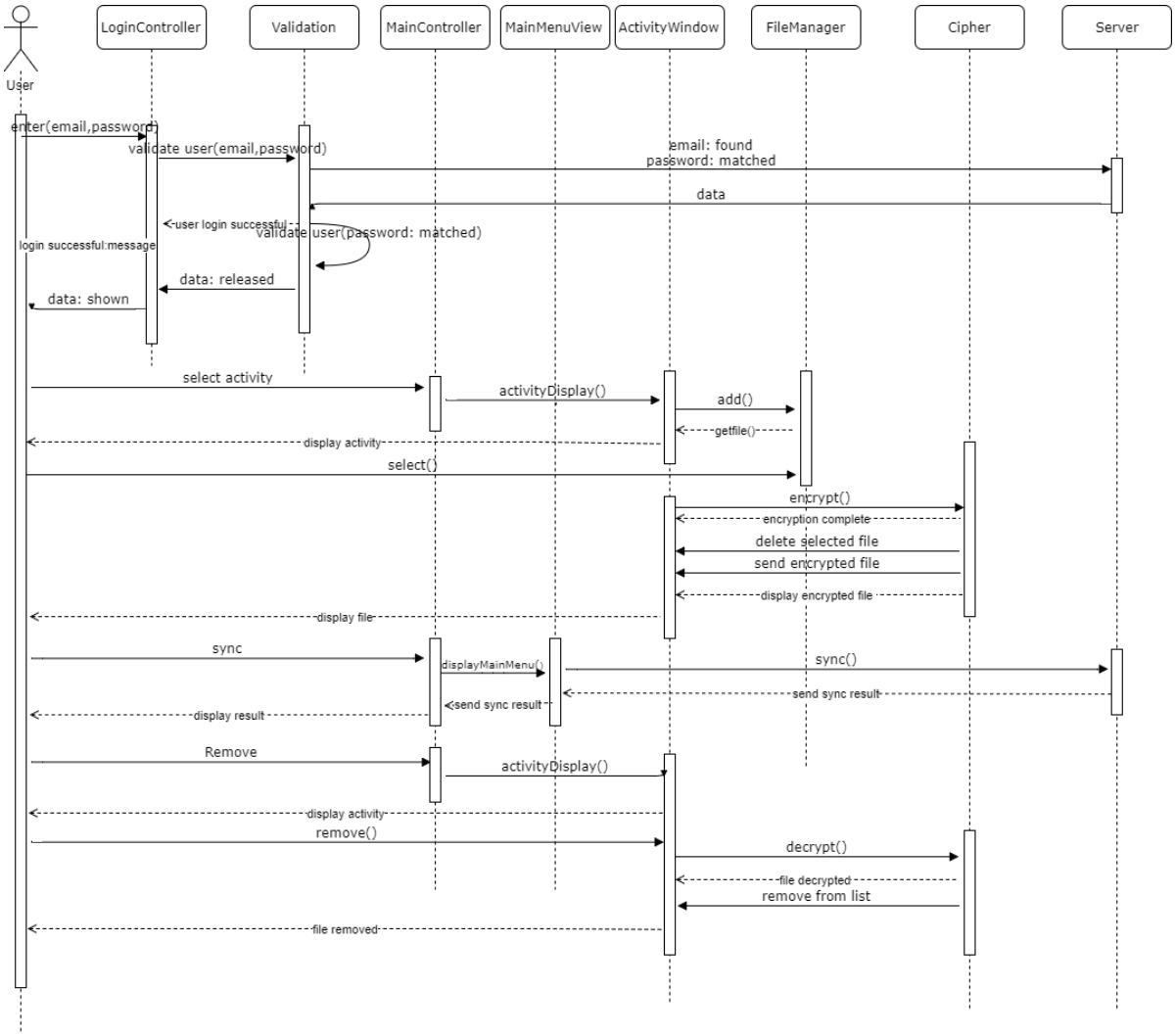


Fig 4.3.2h– Overall System Sequence Diagram

Class	**Description**
MainMenuView	This is main menu view class of the System. It creates the interface for the main menu which includes Messages Button, Contacts Button, Files Button, Settings Button and Logout Button.
MainController	It is the main Controller class. It constructs all the necessary elements for the application to run

	It invokes the events by making function calls to different methods FileManager, ActivityMenu and MainMenuView
ActivityWindow	This is the class for handling all activities displayed to user. It has four sub classes i.e. MessagesActivityWindow, FilesActivityWindow, GalleryActivityWindow, ContactsActivityWindow
SettingsActivityWindow	This class enables the user to configure settings i.e. user profile setting.
Cipher	This class is responsible to generate key stream using a standard algorithm which is then used to encrypt files.
SignupController	This class is utilized to make client accounts by making occasions of 'ApplicationUser' class. The information is sent to the server and spared in the database
SignupWindow	This class has all the necessary elements to make the interface for signup window
MessagesActivityWindow	This is a subclass of the class “ActivityWindow” and it handles messages activity. It is used to display messages view so that the user can add messages to it and send
GalleryAvtivityWindow	This is a subclass of the class “ActivityWindow” and it handles gallery activity. It is used to display gallery view so that the user can add images and videos to it and send
ContactsActivityWindow	This is a subclass of the class “ActivityWindow” and it handles contacts activity. It is used to display comtacts view so that the user can add contacts to system
FilesActivityWindow	This is a subclass of the class “ActivityWindow” and it handles files activity. It is used to display files view so that the user can add files
ApplicationUser	This class contains all the information about users that are registered on Pak Chat

Logical View (State Transition Diagram)

The State Transitions occurring in the application are shown in **Fig. 4.3.2i** below:

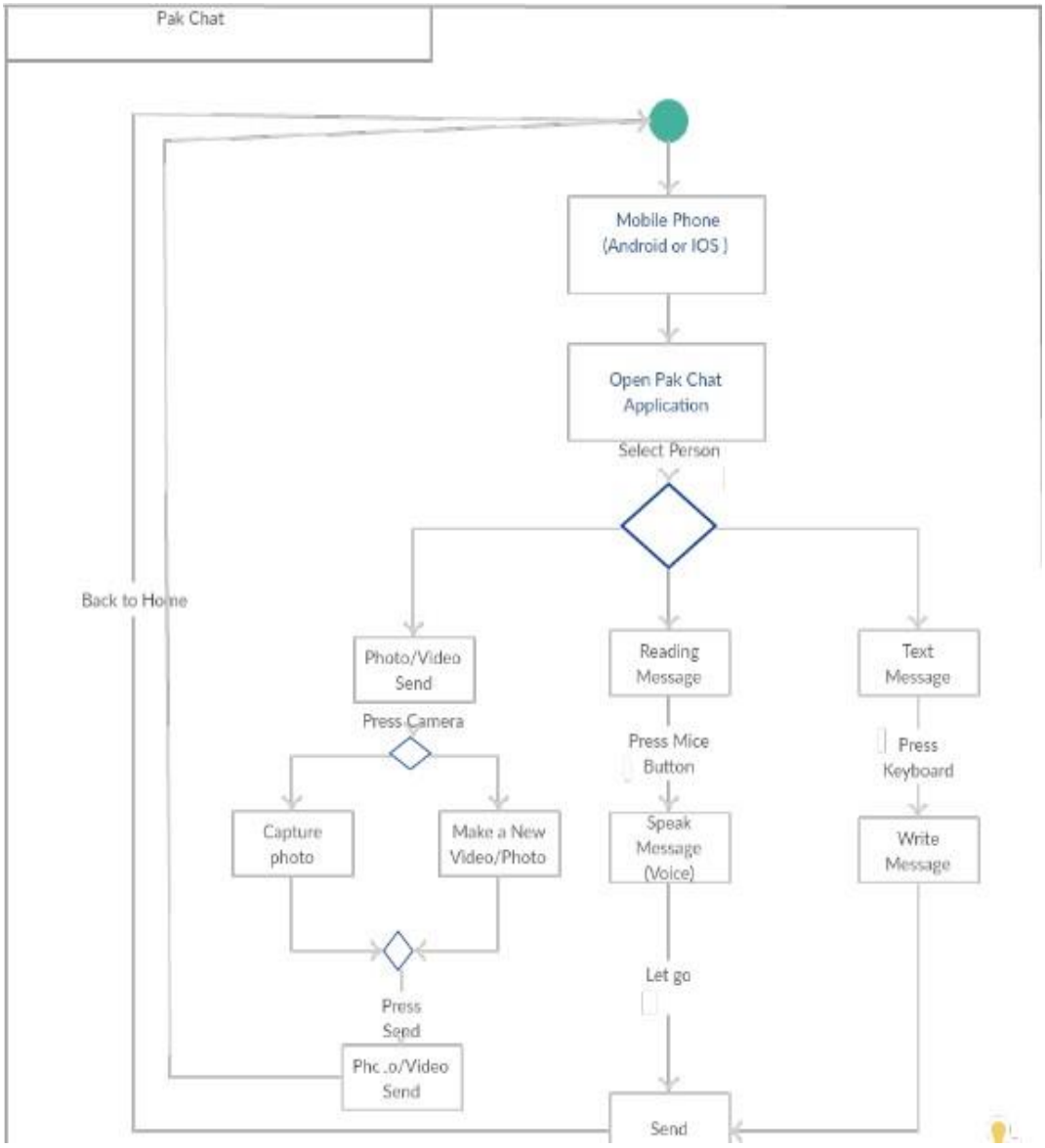


Fig 4.3.2i: *State diagram for Pak Chat*

Dynamic view (Activity Diagram)

In action outline, the dynamic perspective on the framework is appeared. Every one of the exercises are appeared with their separate begin and end states.

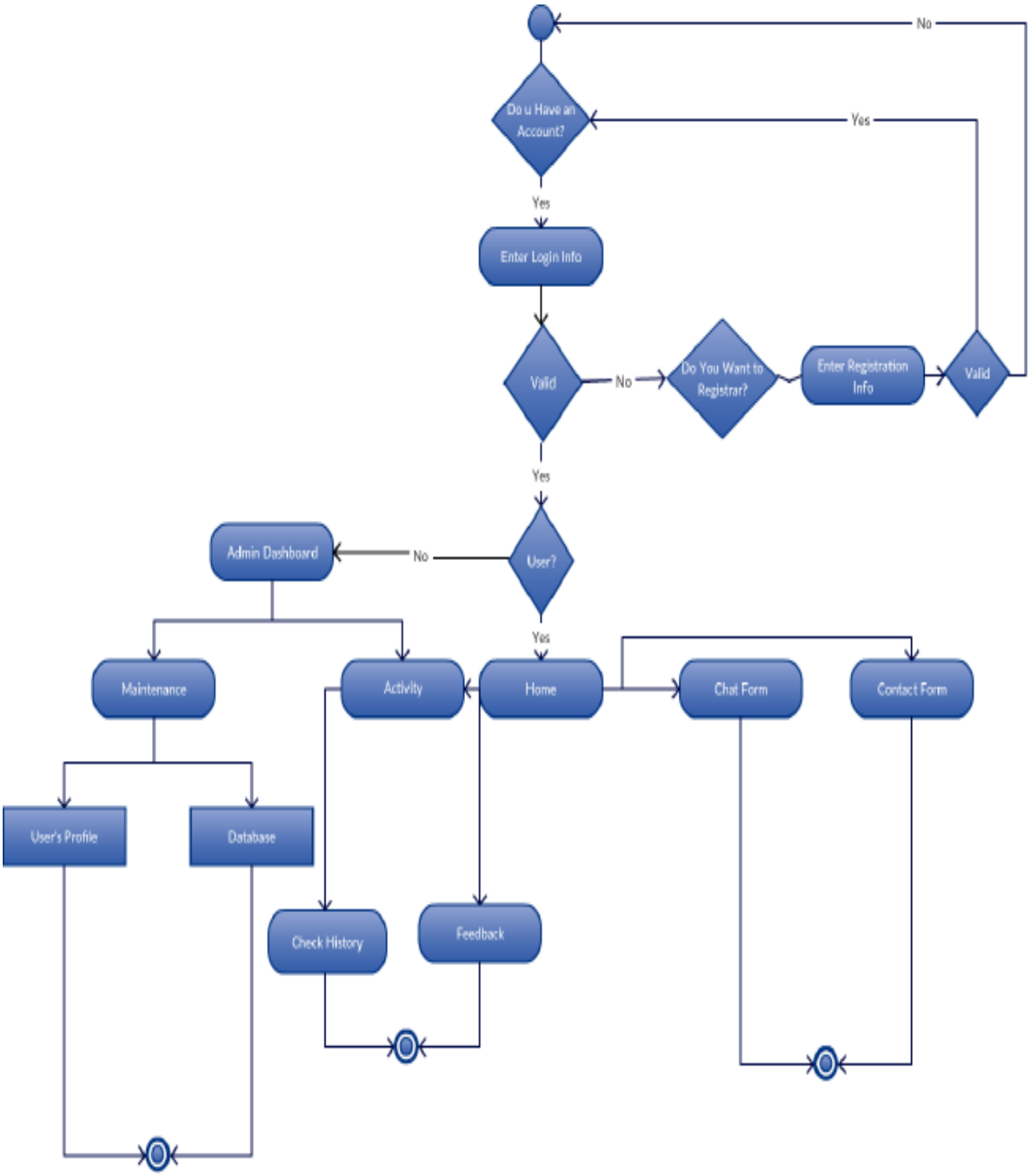


Fig 4.3.2j: *Activity diagram for Pak Chat*

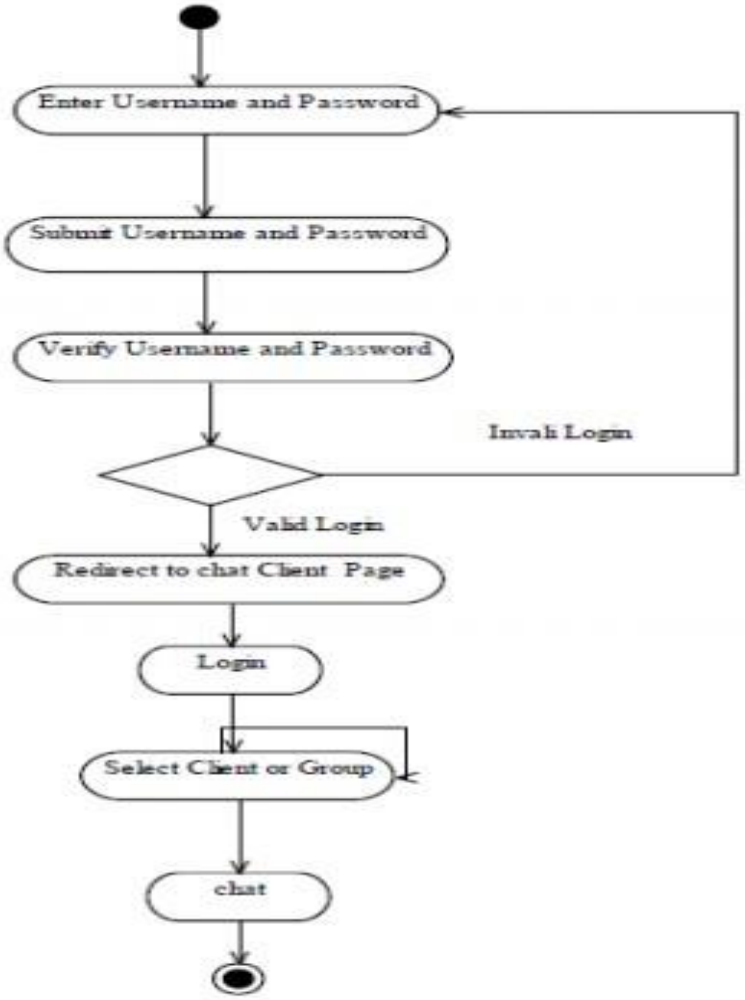


Fig 4.3.2k: *Activity diagram for Pak Chat*

In activity diagram, the dynamic view of the system is shown. All the activities are shown concurrently with their respective start and end states.

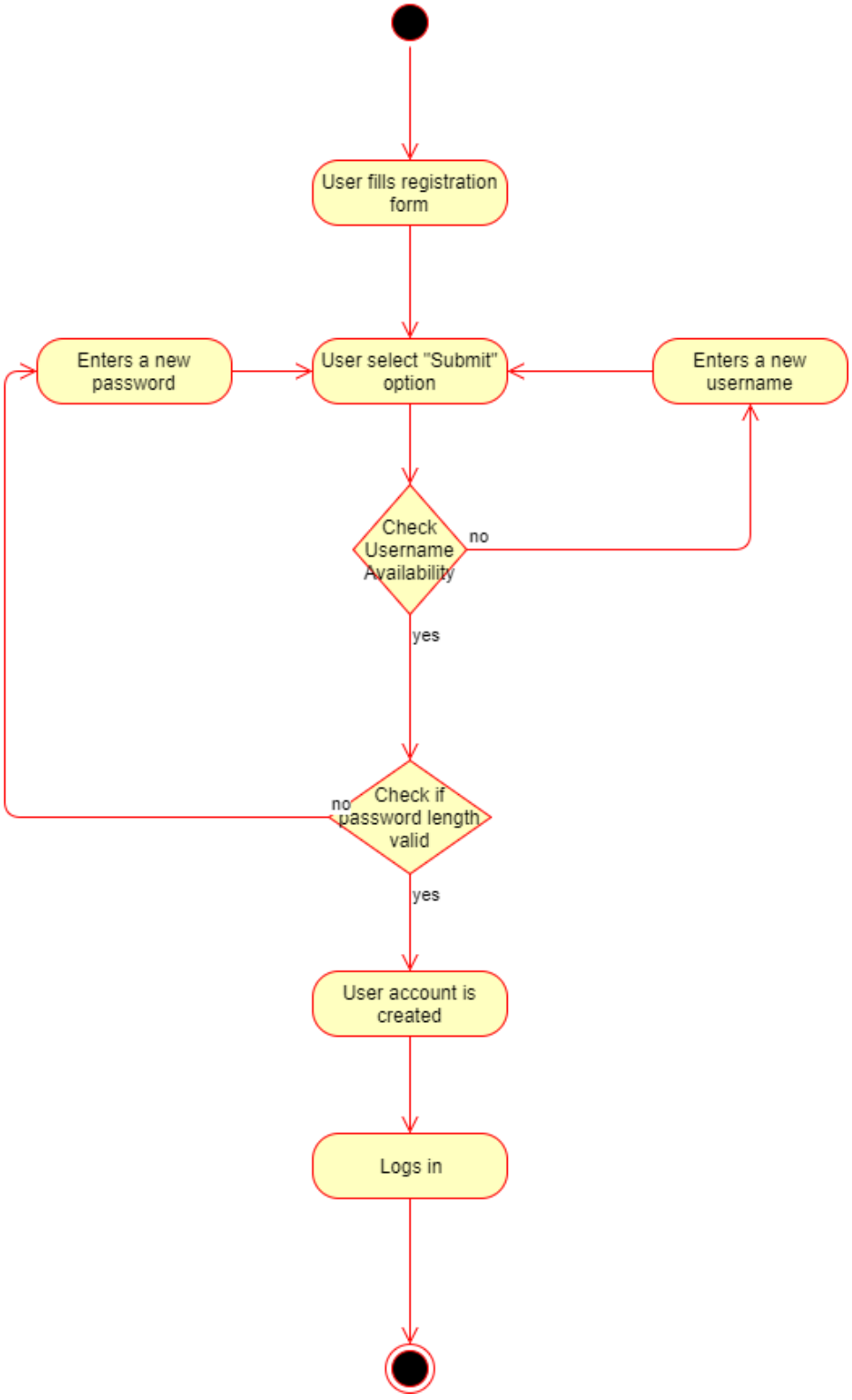
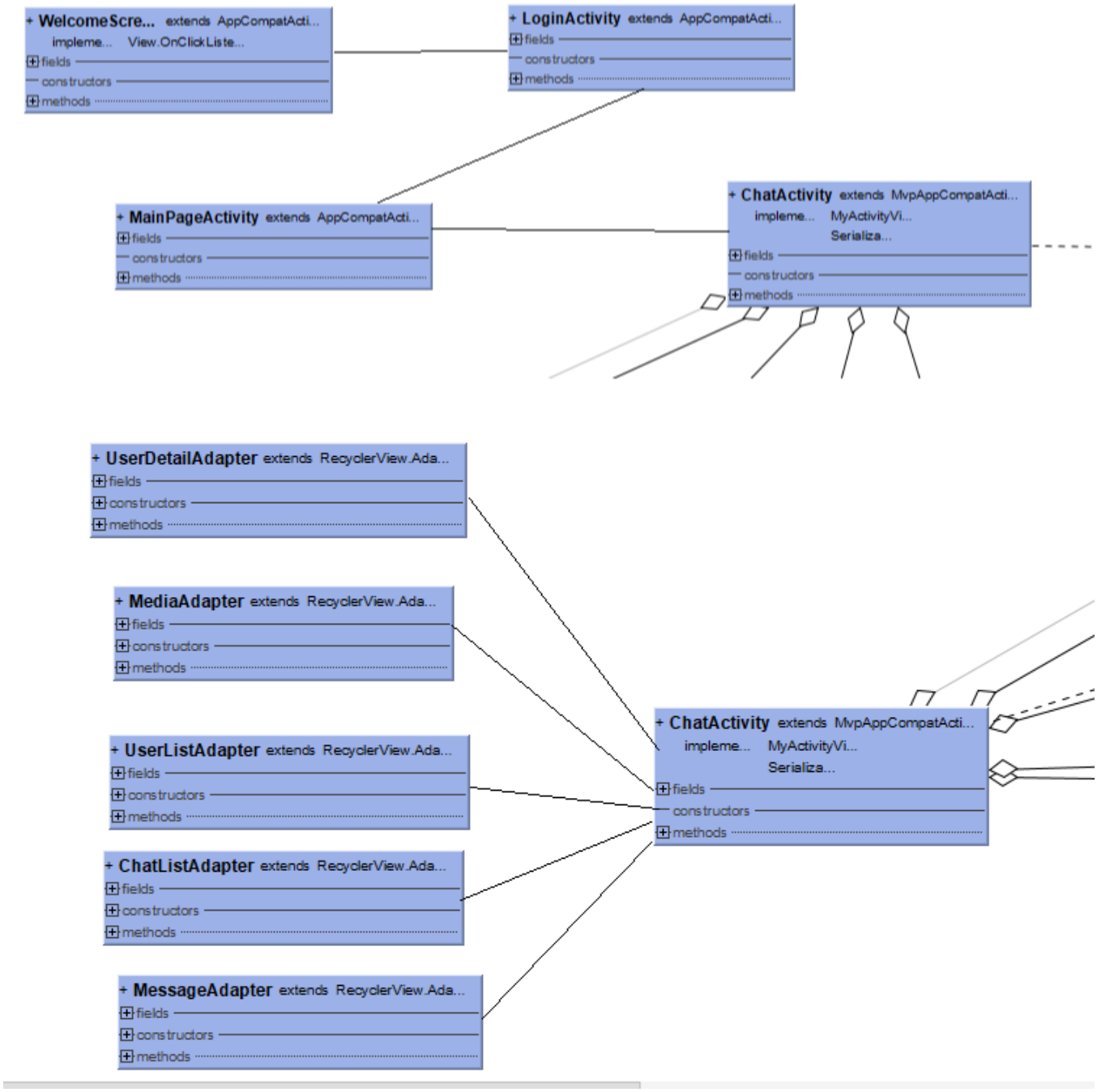
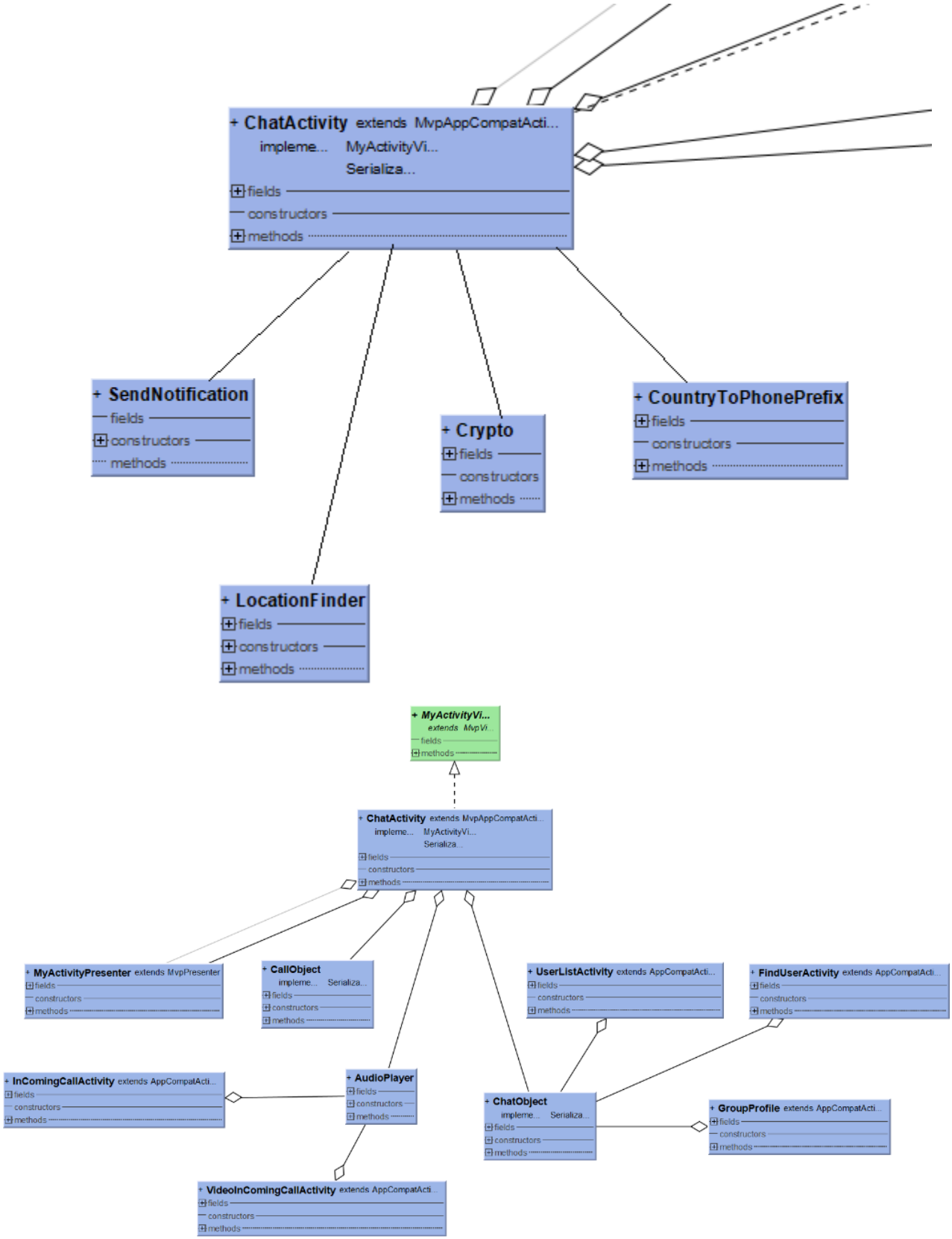


Fig 4.3.2l – Signup Activity

Class Diagram




+ ChatActivity extends MvpAppCompatActi...
impleme... MyActivityVi...
Serializa...
fields
constructors
methods
+ SendNotification
fields
constructors
methods
+ Crypto
fields
constructors
methods
+ CountryToPhonePrefix
fields
constructors
methods
+ LocationFinder
fields
constructors
methods
+ MyActivityVi...
extends MvpVi...
fields
methods
+ ChatActivity extends MvpAppCompatActi...
impleme... MyActivityVi...
Serializa...
fields
constructors
methods
+ MyActivityPresenter extends MvpPresenter
fields
constructors
methods
+ CallObject
impleme... Serializa...
fields
constructors
methods
+ UserListActivity extends AppCompatActi...
fields
constructors
methods
+ FindUserActivity extends AppCompatActi...
fields
constructors
methods
+ InComingCallActivity extends AppCompatActi...
fields
constructors
methods
+ AudioPlayer
fields
constructors
methods
+ ChatObject
impleme... Serializa...
fields
constructors
methods
+ GroupProfile extends AppCompatActi...
fields
constructors
methods
+ VideoInComingCallActivity extends AppCompatActi...
fields
constructors
methods

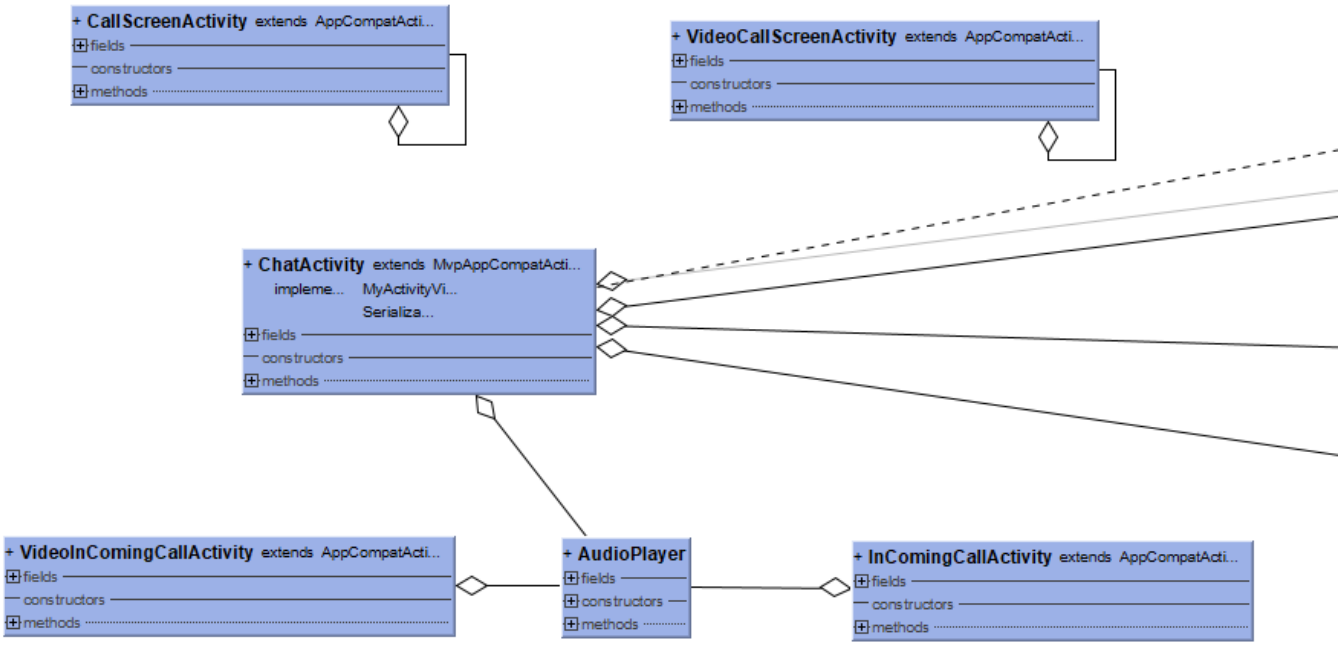


Fig. 4.3.2m: *Class diagram used Pak Chat*

User Interface

After installing application Activity would be displayed to the user. Here the user can Signup

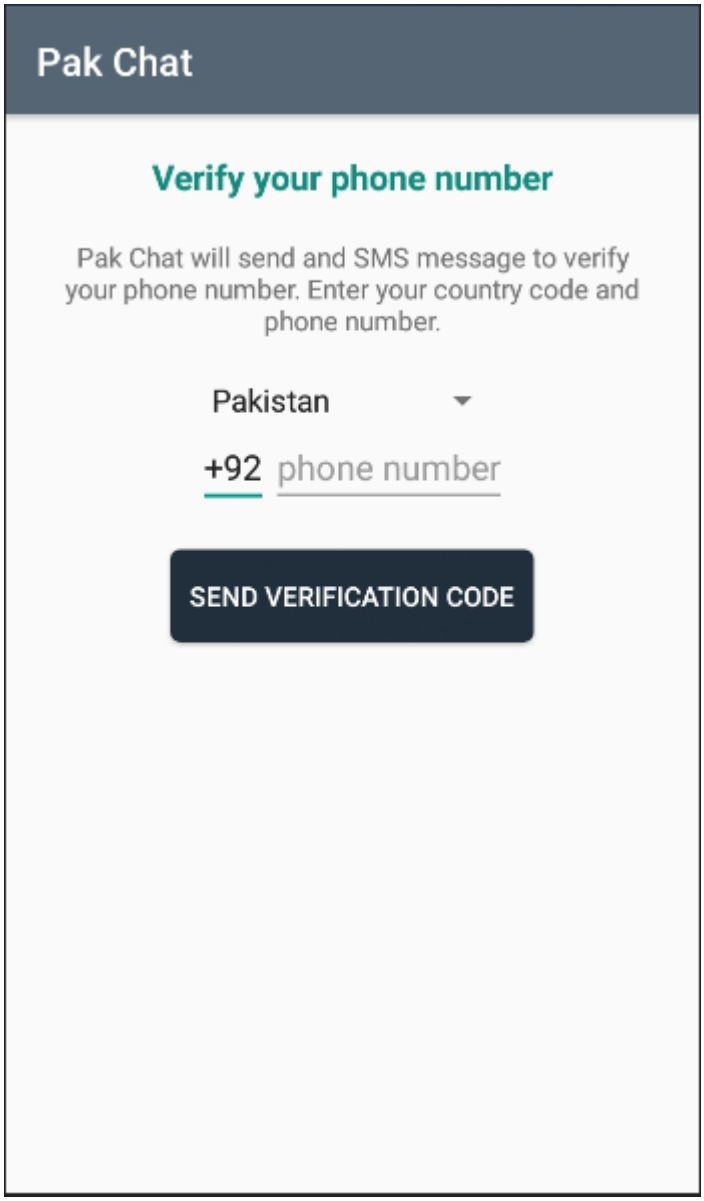


Fig. 4.3.2n: user interface *signup*

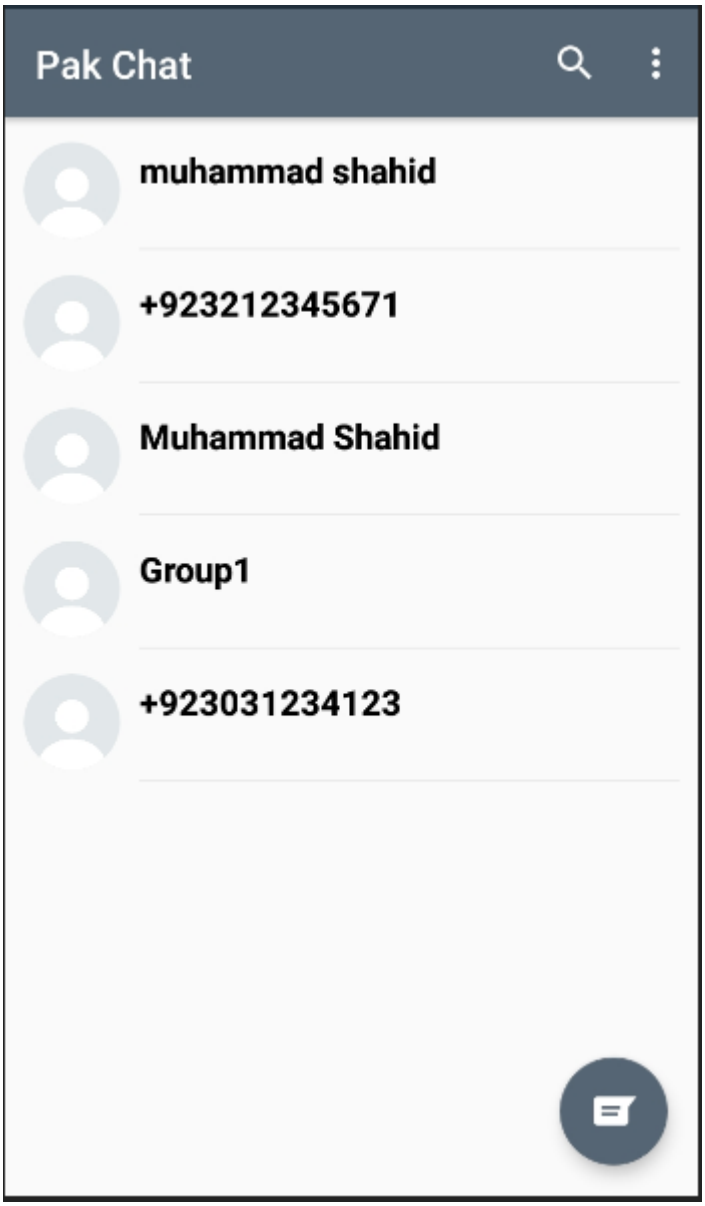


Fig. 4.3.2p: user interface *Menu*

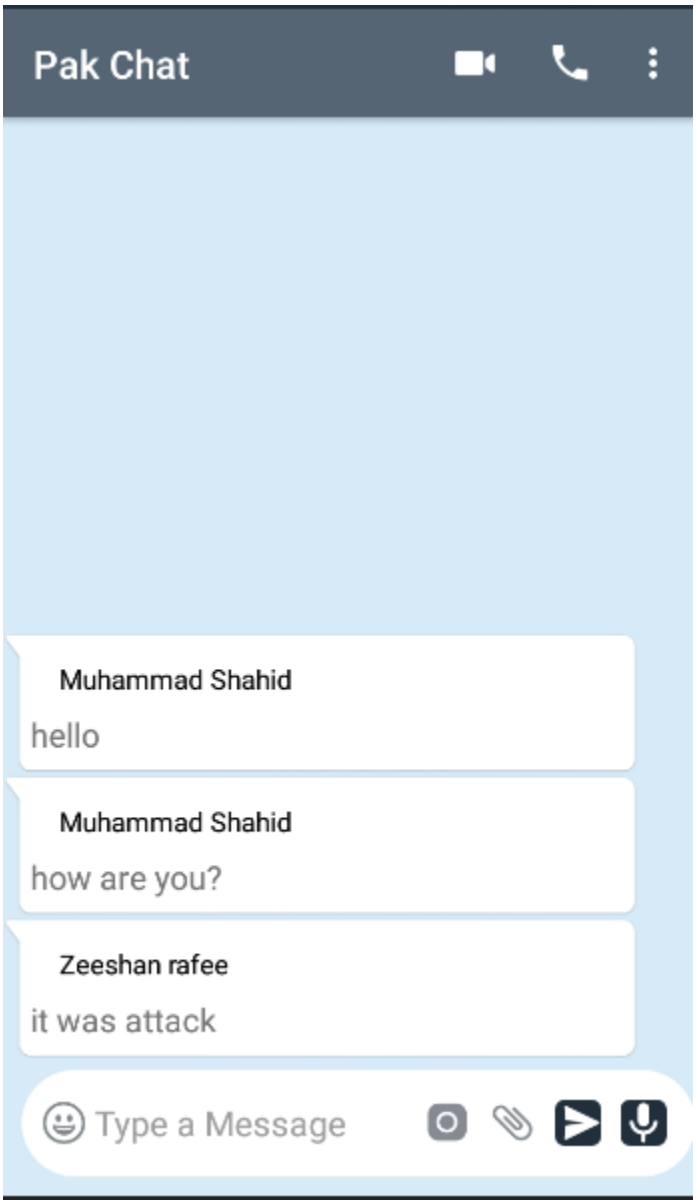
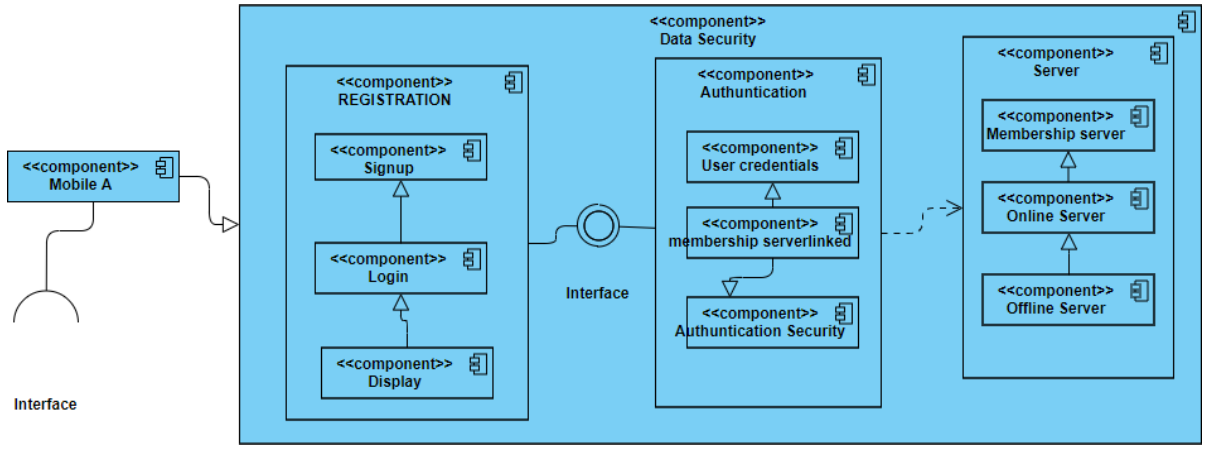


Fig. 4.3.2q: User can select Messages, Contacts, Files (Images and Videos)

4.3.3 Detailed Description of Components

This section describes in detail all the modules of Pak Chat. These modules have been assigned responsibilities. Modules are further sub classified into components.



Registration module

This module contains all the registrations for PAK Chat which includes signup and login processes. This module provides the base for successful working of other modules.

Signup

Identification	Name: Signup Location: Registration
Type	Component

Purpose	This component fulfils following requirement from Software Requirements Specification Document: **Signup** **Requirement** The framework will almost certainly register. **Portrayal** Customer will enroll for the application through a valid phone number and email.
Function	Client enter username, email and telephone number.
Subordinates	User shall set password after registration.
Dependencies	This component is independent module and runs in parallel to entire application.
Interfaces	This component has following interfaces: **Signup:** For registration process.
Resources	**Hardware:** mobile phone, Network access point **Software:** Android, IOS
Processing	User enter client name, email, phone number and submit application for registration.
Data	Client name, email, phone number

Login module

Identification	Name: Login

	Location: Membership server
Type	Component
Purpose	This component fulfils following requirement from Software Requirements Specification Document: **Requirement** Client shall be able to login to system successfully **Description** User enter username and password for login process.
Function	User enter username and password for login process.
Subordinates	Membership server
Dependencies	This component is dependent membership server.
Interfaces	Username and password fields
Resources	**Hardware:** mobile phone ,internet access point **Software:** android, IOS
Processing	User enter username and password and press login button.
Data	Username and password

Display Module

Identification	Name: display Location: Device

Type	Component
Purpose	This component fulfils following requirement from Software Requirements Specification Document: **Requirement** User shall be able to display the login and signup. **Description** This feature identifies easy to use display from mobile device for further operations.
Function	This component of system performs shwoing steps like login and signup.
Subordinates	It has one subordinate: Display enable user for further action.
Dependencies	This component is dependent on mobile device.
Interfaces	None
Resources	**Hardware: Mobile and AP**
Processing	Display is sequence of steps coming at a certain number of instruction per second. We need to enhance the display for better results.
Data	This component uses following information of the application: - user credentials

Authentication Module

This module performs all the authentication related to identification and feature extraction of pak chat from membership server.

Authentication security

Identification	Name: Authentication Security Location: Authentication Module
Type	Component
Purpose	This component fulfils following requirement from Software Requirements Specification Document: **Requirement** System shall secure all the credentials of user of pak chat. **Description** The data obtained from previous stage will be used to identify all the credentials.
Function	This component of system will secure the authentication process via member ship server by using user credentials.
Subordinates	None
Dependencies	This component is dependent on membership server.
Interfaces	None
Resources	Hardware: mobile and AP , server Software: android

Processing	This component will identify authentication by matching the data from membership server.
Data	This component uses following information of the application: user credentials

Server Module

This module will conclude the working of other two modules by finally identifying the slots based on the features extracted.

Server-Active, offline and membership

Identification	Name: Server Module Location: Server
Type	Component
Purpose	This component helps in fulfilling the following requirement from Software Requirements Specification Document: **Secure server** **Requirement** System shall store data securely. **Description** Put away information in the cell phone and sent information by means of web ought to be crypted. Sent and get information ought to be exchanged by means of HTTPS association. And furthermore, validated and scrambled attachment level correspondence ought to be executed.

Function	This component of system will work with membership, offline and active server.
Subordinates	NONE
Dependencies	This component is dependent on feature data security component.
Interfaces	None
Resources	Hardware: Mobile and server Software: android studio, firebased
Processing	Features are the characteristics which are used to classify data which belongs to membership, active and offline servers.
Data	This component uses following information of the application: user credentials, user data

4.4 Reuse and Relationship to other products

Pak Chat is an android application for instant messaging and communication. Pak Chat provides communication feature by first making user account on this application.

Various applications for instant communication have been proposed using different encryption algorithms-based systems but these systems are difficult to maintain server security. Pak Chat is simple and install to go system that can reduce the effort by its features easy to use.

4.5 Design and Tradeoffs

Pak Chat is component-based system that is driven by demand. Every component has been assigned with the responsibility to do a task. Mainly there are six modules; registration module, authentication module, active server module, offline server module, data security module and data storage module. These modules are linked with each other by assigned responsibility and tasks.

Clearly, components can do their work independently, but, in a certain flow (data as well as control). That led us to **high cohesion.**

Moreover, component don't have much interaction, once a component has completed its work system will generate an event for further action, consequently, the component registered for that event will come into action. This leads us to **low coupling**.

Chapter 5: Testing and Evaluation

5.1 Introduction

This test plan chapter describes the appropriate strategies, process and methodologies used to plan, execute and manage testing of the Pak Chat Android application project. The test plan will ensure that the application meets the customer requirements at an accredited level.

Manual Testing will be followed which includes testing a software manually, i.e., without using any automated tool or any script. In this type, the tester takes over the role of an end-user and tests the software to identify any unexpected behavior or bug. Each Unit will be tested separately and then will be integrated with other units, therefore Unit Testing and Integration testing will be followed. For each unit Black box Testing is done and for combined units Acceptance Testing is done.

The test scope includes the Testing of all functional, application performance and use cases requirements listed in the *requirement document*

Software testing, depending on the testing method employed, can be implemented at any time in the development process. However, most of the test effort occurs after the requirements have been defined and the coding process has been completed.

This document includes the plan, scope, approach and procedure of Pak Chat test. The pass/fail criteria of the test items are also defined. The Test Plan document documents and tracks the necessary information required to effectively define the approach to be used in the testing of the product.

5.2 Test Items

Based on the Pak Chat Application requirements and design description, application modules of mobile Android application and non-functional scenario will be tested. The Requirements Defined in Software Requirements Specification and the Design entities as explained in Software Design Document will be tested.

5.3 Features tested

Following features are being tested:

1. The system shall be able to authenticate user in real time for further processing.
2. System shall be able to create New Chat Room effectively.
3. System shall be able to identify Confidential Information (Hate speech) by generating warning.
4. System shall be able to identify all the Contacts contains in authenticated user contact list.
5. System shall be able to ask for the permissions to perform camera functions.
6. System shall be able to store data containing relevant user storage.
7. System shall be able to upload pictures.
8. System shall store data in encrypted format.

5.4 Approach

The project Pak Chat is a computationally intensive system that is why systems modules should be developed independently and then these modules should be integrated. Overall strategy comprises of Unit Testing using White Box and Black box testing. Integration testing is performed to successfully integrate the system.

UNIT TESTING

Unit Testing is done at the source or code level for language-specific programming errors such as bad syntax, logic errors, or to test functions or code modules. The unit test cases shall be designed to test the validity of the program's correctness.

White Box Testing

In white box testing, the UI is bypassed. Inputs and outputs are tested directly at the code level in functions and the results are compared according to requirements. This form of testing ignores the function of the program under test and will focus only on its code and the structure of that code. The test cases that have been generated shall cause each condition to be executed at least

once. To ensure this happens, we are applying Basis (alternative) Path Testing. Because the functionality of the program is relatively simple, this method will be feasible to apply.

Black Box Testing

Black box testing typically involves running through every possible input to verify that it results in the right outputs using the software as an end-user would.

Integration Testing

Integration testing is the part where we will test all the previous tested modules in a way that they are functioning normally when they are combined.

Incremental Testing

There are six primary modules that are required to be integrated. These components, once integrated, will form the complete application testing. The following describes these modules as well as the steps that will need to be taken to achieve complete integration. We will be employing an incremental testing strategy to complete the integration. The integration testing will be performed by the development team.

Authentication

This is the module from where the major functioning of application initiates. This module takes data from user for further processing. Mobile number is asked and against this number six digit code is generated. After entering the verifying code user is registered. This module is developed independently and the tested first separately and then combined with New Chat Module.

New Chat

When Authentication module has completed its work and data has stored in user credentials, this module will provide the Chat Room for Chatting. This module is developed independently and the tested first separately and then combined with Permission module.

Permission

Permission module will ask for the permission to task any action like media upload etc. On the successful permission permitted action will be performed. This module is developed independently and the tested first separately and then combined with Media Upload and encryption module.

Media Upload

Once permission are allotted successfully then media upload module stars it's working. This module will help to upload pictures which is Functionality of this module. This module is developed independently and the tested first separately and then combined with Media Upload and encryption module.

Encryption

All the modules working will be encrypted with keys. Media uploads will be stored in encrypted format. This module is developed independently and the tested first separately and then combined with media uploads and chatting modules.

Display Module (GUI)

This module will display all the relevant data like chatting and media etc.GUI is designed independently and then integrated with whole system.

System Testing

In the end, system testing will ensure that all the modules are working, separately and together combined. Then only the outcome of the program will decide the correctness of whole system.

Performance testing

This test will be conducted to evaluate the fulfillment of a system with specified performance requirements. It will be done using black-box testing method. And this will be performed by:

- Checking out the response time of the system
- Memory management of the program

5.5 Item Pass/Fail Criteria

Details of the test cases are specified in section Test Deliverables. Following the principles outlined below, a test item would be judged as pass or fail.

- Preconditions are met
- Inputs are carried out as specified
- The result works as what specified in output => Pass
- The system doesn't work or not the same as output specification => Fail

5.6 Suspension Criteria and Resumption Requirements

Any bugs found can be fixed by developers quickly and no need to start the testing process from the beginning. However, when major bugs will block the some test cases as they are interdependent and the testing has to be paused. The test will restart from the very beginning until the major error is solved.

5.7 Test Deliverables

Following are the test cases:

Test case name	**Authentication (Valid input)**
Test Case Number	01
Description	This feature enables the system to acquire Mobile number from user and send verifying code against phone number and then verify.
Testing Technique used	Unit Testing
Preconditions	Internet connection and the user must have installed Pak Chat in android operating system
Input	Mobile number

Steps	Open the application and put mobile number.
Expected output	Function returned True and verify the mobile number
Alternative path	**Cause:** Function returned False **Corresponding Output:** Error Message Displayed
Actual output	Confirmed

Test case name	**Authentication (Invalid Input)**
Test Case Number	02
Description	This feature enables the system to acquire Mobile number from user and send verifying code against phone number and then verify.
Testing Technique used	Unit Testing
Preconditions	Internet connection and the user must have installed Pak Chat in android operating system
Input	Invalid Mobile number
Steps	Open the application and put invalid mobile number.
Expected output	Function returned False.
Alternative path	**Cause:** Function returned True **Corresponding Output:** verification failed
Actual output	Confirmed

Test case name	**Send Message (valid input)**
Test Case Number	03
Description	This feature enables the authenticated user to send message.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must be satisfied.

Input	Text
Steps	Input first text message and then send to specified user from the contact list of sender.
Expected output	Message must be sent.
Alternative path	N/A
Actual output	Confirmed

Test case name	**Send Message (Invalid)**
Test Case Number	04
Description	This feature enables the authenticated user to send message.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must be satisfied.
Input	Text message sent in restricted geographical location or application is not connected to internet
Steps	Input first text message and then send to specified user from the contact list of senders.
Expected output	Message not sent to receiver.
Alternative path	N/A
Actual output	Confirmed

Test case name	**Camera**
Test Case Number	05
Description	Images send using camera to other contacts.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 is satisfied
Input	Captured Picture

Steps	Verified user selects contact to send image from camera then camera operation permitted. Finally, by taking picture from camera is to send.
Expected output	Image Sent
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Camera (invalid)**
Test Case Number	06
Description	Images send using camera to other contacts.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 is satisfied
Input	Application is restricted to camera access and not able to Capture Picture.
Steps	Verified user selects contact to send image from camera then camera operation permitted. Finally, by taking picture from camera is to send.
Expected output	Image not Sent
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Contact List**
Test Case Number	07
Description	This features enables the contact list to show list of contacts.
Testing Technique used	Unit Testing
Preconditions	User must save some contacts safe in the list of contacts. Test Case 1 is satisfied

Input	Search contact number
Steps	1. Match the contact list accordingly with searched number. 2. Show the Contact.
Expected output	Contact List Showed.
Alternative Path	**Cause:** Function returned False **Corresponding Output: No Contact Exists.**
Actual output	Confirmed

Test case name	**Profile Setting**
Test Case Number	08
Description	This features enables profile Setting.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 satisfied
Input	Profile Information
Steps	Profile name and Profile picture
Expected output	Profile Updated successfully
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Profile Setting (invalid input)**
Test Case Number	09
Description	This feature enables profile Setting.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 satisfied
Input	User not type first name in Profile Information.

Steps	Profile first name, profile last name and Profile picture
Expected output	Profile not Updated successfully please type first name.
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Confidential Option**
Test Case Number	10
Description	This features allows user to mark confidential message.
Testing Technique used	Unit Testing
Preconditions	Test Case 1
Input	Send Confidential Message
Steps	Show the warning as confidential message to be sent.
Expected output	Are you sure to send this confidential Message?
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Add Contact**
Test Case Number	11
Description	This module is related to add the new contact number in the contact list.
Testing Technique used	Unit Testing
Preconditions	Test case -1 must be satisfied.
Input	Contact number and name.
Steps	Go to Add contact. Put contact number.

	Type Contact name.
Expected output	Contact Number saved message displayed on screen
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Group Chat**
Test Case Number	12
Description	This test case tests the functionality of Group Chatting. This allows user to create group for chatting managed by admin of group.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must satisfied. Contacts to be added must be in contact list.
Input	Contact Numbers
Steps	Go to Create Group. Add members.
Expected output	Group Created Successfully! Message displayed.
Alternative Path	N/A
Actual output	Confirmed

Test case name	Group Chat Restrictions
Test Case Number	13
Description	This test case tests the functionality of Group Chatting. This allows user to create group for chatting managed by admin of group and admin of group can restrict other members for sending

	attachments image, video etc. or admin can block a specific person in group.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must satisfied. Contacts to be added must be in contact list.
Input	Contact Numbers
Steps	Go to Group. Restricted members. Restrict video or image Restrict audio
Expected output	Group member has been blocked! User is not able to send attachments! Message displayed.
Alternative Path	N/A
Actual output	Confirmed

Test case name	**Group Profile Setting**
Test Case Number	14
Description	This features allow user to make group profile Setting.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 satisfied
Input	Profile Information
Steps	Go to the group setting Profile name and Profile picture
Expected output	Profile Updated successfully
Alternative Path	N/A
Actual output	Confirmed

Test case name	Group Profile Setting (invalid input)
Test Case Number	15
Description	This feature allow user to make group profile Setting.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 satisfied
Input	User not type group name in Profile Information
Steps	Go to the group setting Profile name and Profile picture
Expected output	Please type name of group. Profile not Updated successfully!
Alternative Path	N/A
Actual output	Confirmed

Test case name	Location based chat restrictions
Test Case Number	16
Description	This test case tests the functionality of Chatting based on the location of user. If the user belongs to the restricted areas, then user is not allowed to chat with others.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must satisfied. Contacts to be added must be in contact list.
Input	Geographical location
Steps	Go to admin login. Add restricted area.
Expected output	Restricted Area added Successfully! Message displayed.
Alternative Path	N/A
Actual output	Confirmed

Test case name	Notification Feature
Test Case Number	17
Description	This feature lets the user to see the notifications sent by the PAK CHAT application.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must satisfied. Contacts to be added must be in contact list.
Input	Contact Numbers
Steps	User connected to internet and must have messages
Expected output	Notifications are visible and managed by the user.
Alternative Path	N/A
Actual output	Confirmed

Test case name	Send audio message
Test Case Number	18
Description	This feature enables the authenticated user to send audio message.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must be satisfied.
Input	Audio
Steps	Input first voice message and then send to specified user from the contact list of senders.
Expected output	Voice Message must be sent.
Alternative path	N/A
Actual output	Confirmed

Test case name	Send audio message (invalid)
Test Case Number	19
Description	This feature enables the authenticated user to send audio message.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must be satisfied.
Input	User records Audio and not connected to internet then message not sent.
Steps	Input first voice message and then send to specified user from the contact list of senders.
Expected output	Voice Message not sent.
Alternative path	N/A
Actual output	Confirmed

Test case name	Audio calling
Test Case Number	20
Description	This feature enables the authenticated user to make audio call.
Testing Technique used	Unit Testing
Preconditions	Test case 1 must be satisfied. User must be in contact list.
Input	Voice, Audio
Steps	Go to the contact number you want to call and press the call button.
Expected output	Voice call must be done.
Alternative path	N/A
Actual output	Confirmed

Test Case Name	**Download Message from server to mobile**
Test Case No	21
Description	Testing Download Message from Server to Application a Feature for Pak Chat.
Testing Technique Used	Unit Testing
Preconditions	The user must have selected Message option from application Choice Menu
Input Values	Download Message from server to Pak Chat
Valid Inputs	Choose Download Message form server to Pak Chat by clicking on the download button
Steps	First select the Pak Chat android application installed in Android operating system Log in into system choose the select Message feature which is displayed on Feature Choice Menu choose the download Message button displaying on the top of screen
Expected Output	Message successfully downloaded from server to application
Actual Output	Message successfully downloaded from server to application

Test Case Name	Download Contact from server to mobile
Test Case No	22
Description	Testing Download Contacts from Server to Application a Feature for Pak Chat.
Testing Technique Used	Unit Testing
Preconditions	The user must have selected Contact option from application Choice Menu
Input Values	Download Contact from server to Application.

Valid Inputs	Choose Download Contact form server to application vault by clicking on the download button
Steps	First select the Pak Chat android application installed in Android operating system Log in into system choose the select Contact feature which is displayed on Feature Choice Menu choose the download Contact button displaying on the top of screen
Expected Output	Contact successfully downloaded from server to application
Actual Output	Contact successfully downloaded from server to application

Test case name	**Refresh State**
Test Case Number	23
Description	This test case tests the system's functionality in which state is update at 1-2 second refresh rate so user is always entertained by up-to-date information.
Testing Technique used	Unit Testing
Preconditions	Test Case-1 must be satisfied.
Input	Click refresh option.
Steps	Fetch the information and update in GUI
Expected output	Screen with image is displayed on screen
Alternative Path	**N/A**
Actual output	Confirmed

Test case name	Logout
Test Case Number	24
Description	This test case tests the functionality of Logout button displayed on every screen.
Testing Technique used	Unit Testing
Preconditions	Test Case 1 is satisfied
Input	Logout is clicked
Steps	Nil
Expected output	System will exit.
Alternative Path	N/A
Actual output	Confirmed

5.8 Environmental Needs

Hardware

- Mobile with android platform
- Server
- PC

Software

- Android Studio
- Chrome
- Firebase

5.9 Responsibilities, Staffing and Training Needs

Responsibilities

All developers of the project are responsible for the completion of all units testing and integration testing tasks.

Staffing and Training Needs

Basic knowledge of testing strategies and techniques is needed for the testing of project.

Techniques such as Black Box testing, integration testing should be known to developers.

All the developers will be testing each other's work and will be actively participating in the development and testing of the project simultaneously.

5.10 Risks and contingencies

Efforts have been made to remove all and every chance of failure but there are certain unpredictable factors such as network issues, corrupt input data, or system failure that may lead to some issues. Error handling will be applied more deeply to cover all these issues, but unforeseen circumstances may happen.

Schedule Risk

The project might get behind schedule. So, in order to complete the project on time, we will need to increase the hours/day.

Budget Risk

The budget will be compensated by using less costly alternatives to fit the budget requirements.

Chapter 6: Future Work

This project will be a benchmark for future instant messaging android application project. For now we worked on a AES encryption algorithm. In the future we will:

- We will work on end to end encryption and users will choose a cipher according to his/her requirements i.e. if they want security over speed they will choose different cipher, vice versa.
- We will also work on block cipher to look at its effect on functionality of our project.
- Voice call recording feature that maintain a record of voice call records.
- Categorizing the data in groups i.e video or pictures in their respective field(NEWS, sports, entertainment, Islamic etc.)
- A app locker facility that provide pin or password to Pak Chat on choice of user.
- Investigate potential problems and benefits when merging different applications together such as merge of encryption algorithms and compression algorithms

Chapter 7: Conclusion

This project allows users to chat with other users securely. This system is developed so that users can send audios, videos and images. This software project concentrates on securing data on server by storing it in an encrypted form. This encryption is based on AES. This application allows user to perform audio and video calling facility. The project asks for access permission to perform a specific task. This System enables user to block chatting by geographical location, generates warning on hate speech content and also provides blockage facility of specific data type for specific user. When the mobile device is lost, this system allows to restore data.

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Appendix A: Glossary

GUI: Graphical User Interface

SQL: Structured Query Language

Redis: For encrypting the process during communication

SVN: Software virtual networks

WBS: Work break down structure

APP: Application

UML: Unified Modeling Language

SRS: Software Requirement Document

SDS: Software Design Document