"A study on social networking mediums in India"

A dissertation report submitted in partial fulfillment of the requirements

for the award of degree

of

Master of Technology

in

Computer Science & Engineering

with specialization in

Artificial Intelligence and Artificial Neural Networks

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April – 2014

CERTIFICATE

This is to certify that the project work entitled "**A study on social networking mediums in India**" done by **Naveen Verma, R102212004,** for partial fulfillment of the requirements for the award of the Degree of Masters of Technology in Computer Science & Engineering With Specialization in Artificial Intelligence and Neural Networks, to Centre For Information Technology, University of Petroleum & Energy Studies is a bonafide report of the work carried by them under our guidance and supervision.

To my best of knowledge, the literature embodied in this project work has not been submitted to any other University/Institute for the award of any degree or diploma.

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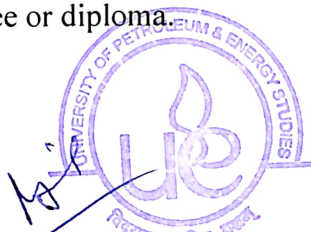
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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in this thesis entitled '**A study on social networking mediums in India**' in partial fulfillment of the requirements for the award of the Degree of Master of Technology in Computer Science & Engineering With Specialization in Artificial Intelligence and Neural Networks and submitted in the Department of CIT, University of Petroleum & Energy Studies, Dehradun, is an authentic record of my own work carried out during a period from January, 2014 to April, 2014 under the supervision of Dr. Hanumat Sastry G., Assistant Professor, CIT, CoES.
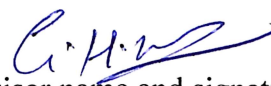
The matter presented in this thesis has not been submitted by me for the award of any other degree of this or any other Institute.

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ACKNOWLEDGEMENT

ABSTRACT

The objective of this project is to design and implement an application for searching and communicating with friends, with the assurance of profile authentication and complete anonymity of user identity, designed specifically for Indian users. It is a mobile application mainly designed for android phones.

The objective of this project is:

- Study the different existing chat and social networking applications.
- Study the Indian culture towards the existing social networking websites and applications.
- Design the process flow diagram and event flow diagram for the application.
- Designing application layouts.
- Study the client server architecture.
- Connecting android application with the server.
- Using Two samples t-test for validation of results.

The mobile application will enable simple to complex/multimedia communications while protecting user identity as per their preference. This application provides the user with a safe and secure environment. In this application, users can communicate with nearby friends anytime, anywhere. This application provides a user friendly interface. New friends in your location can be easily searched by the use of keywords, age and interests. This business offering will sharply focus on the preferences and concerns of the Indian female user, which is different from the both the global female, as well as complex and varying. The platform will be designed keeping in mind high satisfaction of users.

The user can either login with their facebook account or they can separately create an account on this application. The users can search new friends according to the location, age, their ratings, authenticity level and also their

interests. There is also an option for the user to use the system generated recommendation for the prospective users and at another instance the user can search based on GPS setting of the users. The users can send friend requests to others, the acceptance leads to further conversation. On the basis of conversation, the user can promote or demote the users that affect the authentic level of user. This application is designed keeping in mind the authenticity and verification level, so that no fake profiles are created and hence attracting more number of female users.

For statistically validating the results carried out t-test to determine whether two sets of data are significantly different from each other. It is basically a statistical hypothesis test. It is appropriate when we w ant to compare the means. It helps to decide whether the difference between the conditions is "real" or whether due merely to chance fluctuations from one time of testing to another. It enables us to decide that the mean of one condition is different from that mean in another condition.

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Glossary

ADT: Android Development Tools (ADT) is a plug-in for the Eclipse IDE that is designed to give you a powerful, integrated environment in which to build Android applications.

Dalvik: The Android virtual machine. One Dalvik instance runs for each running Android application.

DDMS: Dalvik Debug Monitor Server.

Eclipse: Eclipse is an integrated development environment (IDE). It contains a base workspace and an extensible plug-in system for software development

GUI: Graphical User Interface.

HTTP: Hyper Text Transfer Protocol.

IDE: Integrated Development Environment.

JSON: JavaScript Object Notation, lightweight data interchange format.

Mobile client: A mobile client is a application running on a mobile platform like Android.

P2P: Peer to Peer.

Php: A server-side scripting language designed for web development.

SDK: A software development kit is typically a set of software development tools that allows for the creation of applications for certain software.

URL: Uniform Resource Locator.

WAMP: A complete package with Windows, Apache, MySQL and Php as components.

XML: Extensible Markup Language is a structured, hierarchical, text based data format widely used as a data exchange format.

Chapter 1
Introduction

1. INTRODUCTION

Smartphones have become increasingly popular and the smartphone market hit a milestone in 2013 with more than a billion smartphones were sold worldwide. With this, the aftermarket for smartphone applications has grown explosively where the applications have become a part of the user's everyday life. According to Flurry Analytics, overall app use in 2013 posted 115% year-over-year growth. Because of the advances in mobile technology over the last decade, mobile applications have become more useful and also more common for both private use and within corporations.

Market research of existing applications such as momo, okcupid, zoosk, eHarmony, twoo, thrill, etc related to the project was performed. In this market research, following points related to each application was considered: unique feature, number of users, market strategies and viral factor. Each has different pattern matching algorithm and verification systems. For example in thrill females are free to join the application but male have to go through a grade system. Fake photos cannot be made profile pics as they are automatically removed by the moderator. The number of users of Twoo increases every second. Uptil now, Momo has 3 billion users worldwide. Every chat applications mainly focus on authentic and verified profiles.

A psychographic survey was conducted on the Indian girls and boys for studying their behaviour on the various social networking sites such as facebook and also various chat applications. We prepared a flowchart, depicting the process flow of the survey. The survey questions were about the demographics of the teenagers and their interaction with opposite gender. A set of questionnaire was prepared and links were posted on facebook social groups and the response was analysed using MS Excel.

Next we have developed a process flow diagram, event flow diagram for various stages/utilities of the application. The process flow diagram includes the detailed description of individual sub-processes that take place once a user creates a profile on the application. The event flow diagram includes

login interface, user's profile interface, chat interface, notification interface, search & match interface, web server modules and promoting of user's profiles.

This dissertation mainly focuses on designing and developing prototype for an android based social networking application. This application provides a safe and secure environment to the users along with a user friendly interface. The applications login system has various modules: profile authentication module and profile creation module; search and match system has: manual search module, auto search module and location based search; web server system has: profile management module, database management module and business logic unit; communication system has: chat module, block module and promote module.

The unique feature of our application is authenticity level which decides the realism to the user's profile. In this application, users can rate each other's profile which increase or decrease the authenticity level of the user's profile. Another unique feature is the Indian quotient of each profile. Users can depict their most favourite Indian context/ reference which means, dressing style, culture, local cuisine, favourite destinations, mother tongue and many more as user would like to address. Some more unique features are:

- Complete user controlled anonymity.
- Only validated and verified authentic profiles are made available for chatting, hence safe for girls.
- Several modes of privacy settings which is customizable to each buddies in the user's list.
- Permission based communication and information sharing levels.
- Block of unwanted Profiles.
- Better soft matching based on social media analytics.

Chapter 2

Literature Review

- The Android Stack Architecture
- Android devices
- Peer to Peer Architecture
- Client-Server Architecture
- Database Management Tool
- Market Research

2. Literature Review

Android[1] is a software stack for mobile devices running on the Linux kernel which includes operating systems, middleware, and key applications. Initially, Android was developed by Android Inc, later purchased by Google and recently by Open Handset Alliance. The Android SDK offers developers the ability to develop extremely rich and innovative applications using the Java language. Android runs on a Linux Kernel and utilizes the Dalvik virtual machine to run the applications. Most of the Android features are already available through other development platforms, which make Android a truly open source development platform, meaning handset makers allowed to use and run it on their devices for free.

2.1 The Android Stack Architecture

The Android software stack is made up of four different layers as listed below

2.1.1 The Application

This is the top layer of the Android software stack which containing built in applications like browsers, maps, calendar and others which are visible to mobile phone users. The applications in this layer are able to run in real time means multiple applications can be done at the same time [1].

2.1.2 The Application Framework

The applications in this layer are known as service processes which is full open source. Developers have access to these services but are invisible to mobile phone users. An example usage of one of these services would be an application using the telephony manager to initiate a call. They can be applications supplied by Google or any 3rd party developer. All applications are created equal on the platform meaning 3rd party applications get to use as much of the system resources as in house applications [1].

2.1.3 The Libraries

These include the surface manager for (compositing windows), Media framework for multimedia files, WebKit (browser engine), Media Codecs like MPEG-4 and MP3, the SQL database SQLite, SGL, SSL, Libc, and OpenGLIES[1].

2.1.4 The Runtime

Each Android application runs in a separate process, with its own instance of the Dalvik virtual machine. Based on the Java VM, the Dalvik design has been optimized for mobile devices. The Dalvik VM has a small memory footprint [1].

As can be seen from the figure 2.1, Android software stack is made up with several layers from top to bottom.
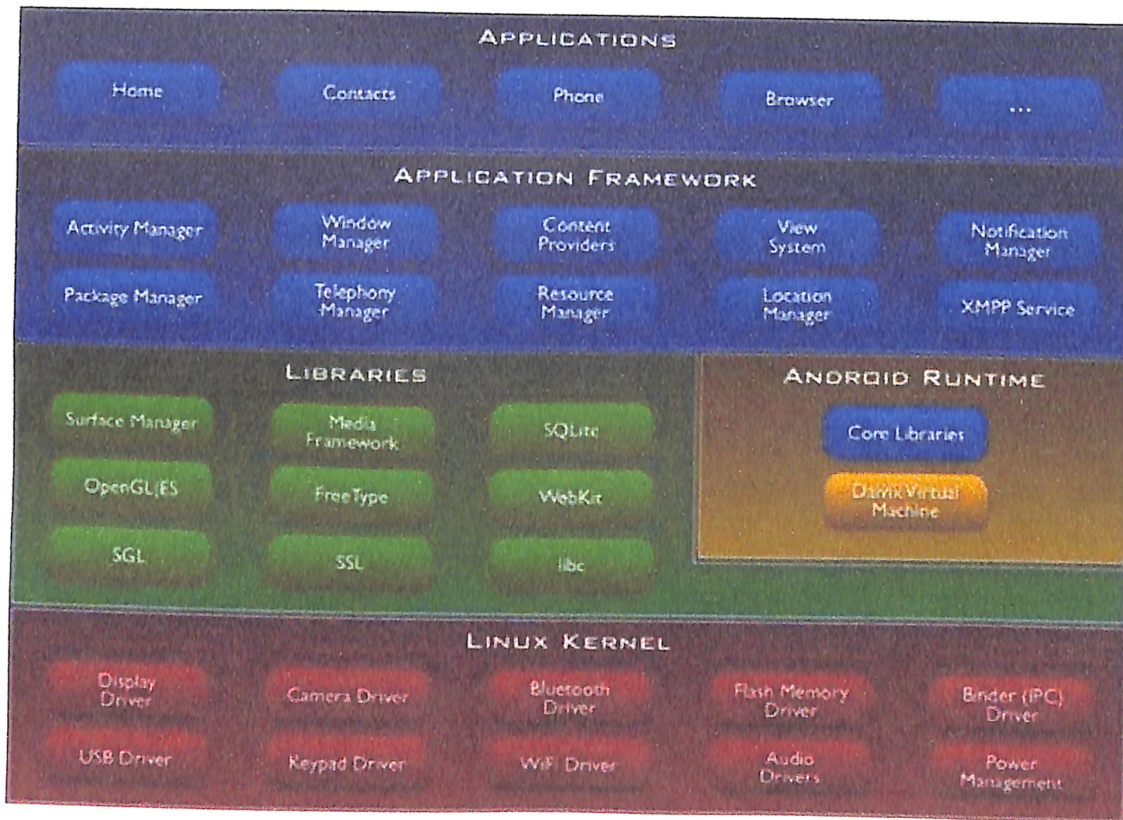
Figure 2.1: Arrangement of Android software stack layers [Courtesy Source: http://developer.android.com/guide/basics/what-is-android.html]

2.2 Android Devices

By the end of 2009[2], the following devices from different vendors were on market using Android operating system according to Google.

- HTC Dream, Magic, Hero, and Tattoo.
- Samsung Galaxy, BeholdII, Spica.
- Motorola Droid, Calgary.
- Acer Liquid A1.
- Lenovo.

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- Sony Ericsson XperiaX10.
- Nexus one (Released by Google January 5 2010).

2.3 Peer to Peer Architecture

Peer-to-peer networking is a type of network architecture that allows a group of nodes (peers) to connect with each other and share resources, and any node can operate as either a server or a client. A P2P network does not need a central server to communicate like the traditional client-server architecture which has existed for many years. Unlike client-server architecture, a P2P network is considered alive even if only one peer is active. The network is unavailable only when no peers are active [3].

Nowadays the most popular P2P networks file sharing system such as Napster, Ares, Limewire, and Gnutella use decentralized topology, Instant Messaging (ICQ) and distributed computing [4].

Though peers all have equal status in the network, they do not all necessarily have equal physical capabilities. A P2P network might consist of peers with varying capabilities, from mobile devices to mainframes. A mobile peer might not be able to act as a server due to its intrinsic limitations [3].

As seen from the figure 2.2, peers in P2P network have equal chance in such a way that any peer can act as a server or a client at the same time.
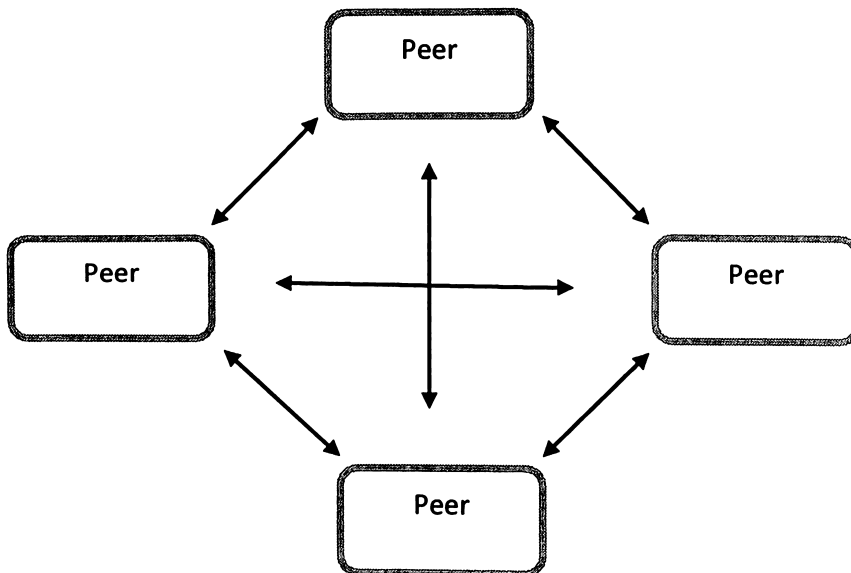
Figure 2.2: Peer to Peer Architecture

2.4 Client – Server Architecture

Client-server architecture is the oldest technology, and is also called the centralized architecture where whole network depends on a central point. If the central point fails, the entire system will collapse. In this type of architecture, a client machine contacts the server when the services are needed. It essentially requires a server, without the server the architecture would not work.

The algorithm followed by this architecture is; a client sends a request for a service to a server. The server receives the request and processes the request, and then sends back the response to the client. The client receives the response. Some of the servers existing on the Internet are web servers, mail servers, FTP and so on [5].

Figure 2.3 illustrates the communication between the server and the client.

· Client sends a query request to the server.

· Server receives a query request and process the request

· Server sends the respond to a client

· Client receives a response as per request.
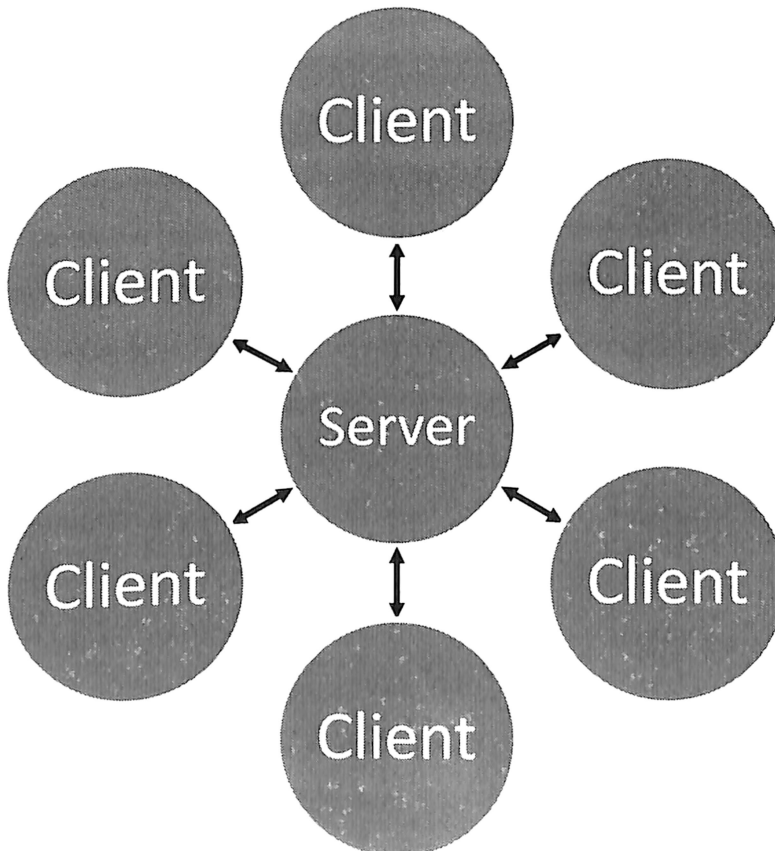
Figure 2.3: Client Server Architecture

2.5 Database Management Tool

Database Management tool is a software system that facilitates the process of defining, constructing, manipulating, and sharing database among various users. This software is mainly used for creating and maintaining the database.

As considering the architecture of the application both frontend as well as backend are equally weighted for providing a well organized and compiled system. So, database management tool plays a vital role in coupling the application modules together and to work smoothly.

In Good Frendz application, the database management tool used is MySQL. MySQL is an efficient tool for database management, specifically for creating and manipulating from the database. Keeping the application functionality and different use cases into account the frontend is moulded according to the application and working scenario utilizing/consuming data.

Major characteristics of database approach.
- Most importantly self-describing nature of database system.
- Provides insulation between programs and data.
- Supports multiple views of the data.
- Gives you the facility of sharing of data and multiuser data transaction.

Advantages
- To control redundancy.
- Restricting unauthorized access
- Persistent storage.
- Provides backup and recovery.
- To represent complex relationships among data.

✓ **Data Definition Language** (DDL), used by the DBA and by database designers to define schemas. The DBMS will have a DDL compiler whose function is to process DDL statements in order to identify descriptions of the schema constructs and to store the schema description in the DBMS catalog.

✓ The DBMS provides a set of operations or a language called the **Data Manipulation Language** (DML) for these purposes.
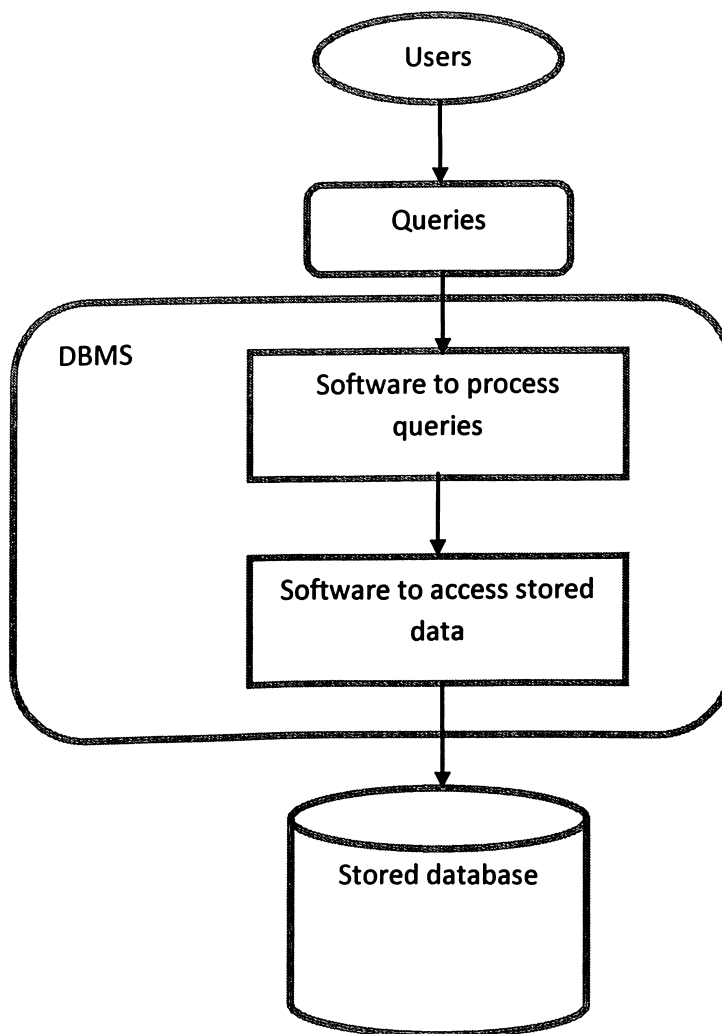
Figure 2.4.: A simplified database system environment.

2.6 Market Research:

Online dating has been the recent trend in today's world. The study provides an overview on the Indian online dating and matrimony market. It analyses various competitors in the online dating market in India and also discusses gaps and drivers in this market. The current size of the online dating market in India is around USD 130 million. By 2015, it is estimated to rise to USD 206 million, representing a CAGR of 16 percent. In India presently only 6 million people are using online dating services, according to stepout.com. By 2015, the number is estimated to rise to 115 million, a CAGR of 167 percent.
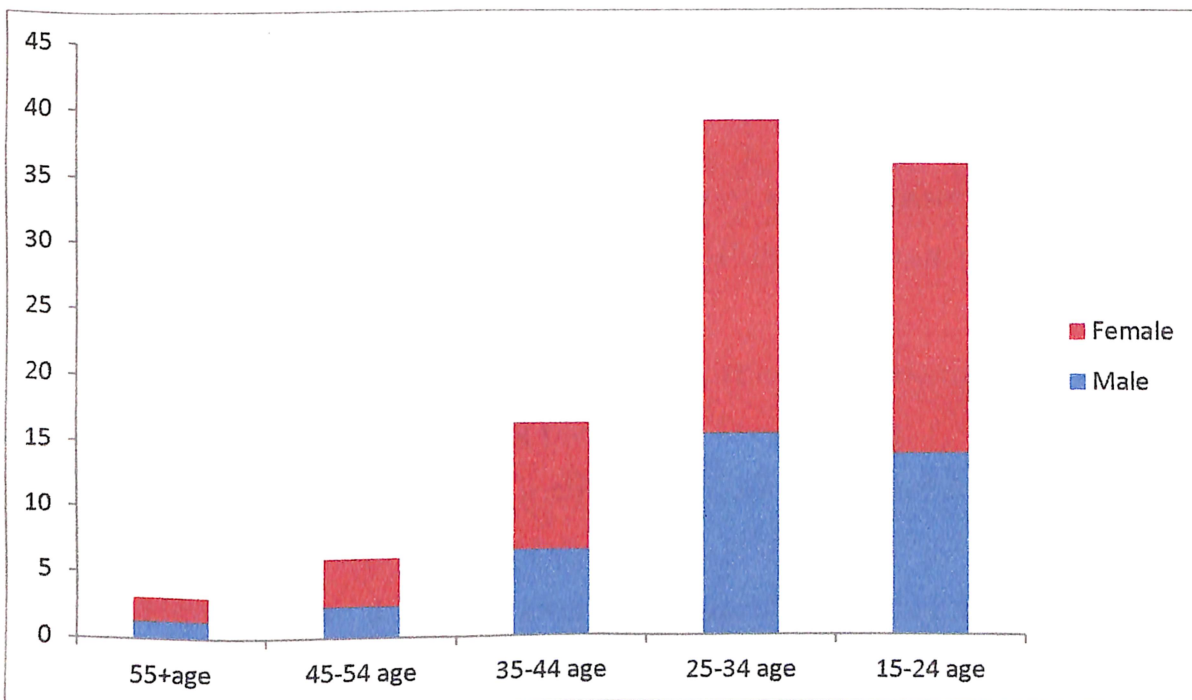
Graph 2.1: Profile of online users in India, 2012

2.6.1 Statistics on Internet Dating

- Internet dating is increasingly becoming a popular choice for people who are looking for love and companionship. Here is what the statistics on online dating has to reveal. Online dating service members include 40 million American users. That accounts for 40% of the single adults in America!

- Compared to this, China alone accounts for 140 million users and India has 15 million users of online dating.

- They say that there should be no lies in a relationship! Well, as per online dating statistics in America, men who date online lie about their height, age, and income. And women lie about their age, weight and physical statistics [6].

2.6.2 Statistics on Teenage Dating

- Teenage is the time when most of the teenagers try to find their ideal boyfriends/girlfriends, through any means possible. Technology is most used and explored by this section, therefore, making teen dating the next highlight in this article.

- As per dating statistics, almost 71% of the teenagers state that their partners have spread rumors about them through emails and social networking sites.

- 68% of the dating teenagers say that their boyfriends/girlfriends have posted their embarrassing picture on the internet.

- 1 out of every 4 girls involved in dating were forced to perform physical/oral sex on their boyfriends.

- Approximately, 1 out of every 5 girls studying in high schools has been physically abused by their dating partners.

- Most of the acts done in teen dating abuse occur in one of the partner's home.

- 20% of the teenage girls continue to date their abusive partners under threatening and constant fear.

- 80% of the teenage population believes that verbal abuse is a serious issue in teenage dating.

- 1 out of every 3 teenager claims to know or heard of some friend, relative, acquaintance that has been in a dating relationship with an abusive partner [6].

2.6.3 Various Dating Apps

Market Research was conducted on various dating applications such as zoosk, okcupid, quackquack, momo, eharmony, krush, thrill, SinglesAroundMe, and many others. The research was based on the study of factors like market strategies adopted by the each dating app, viral factor of each dating app, unique feature of each app, and total number of dating app users.

a) **Zoosk:** Zoosk is a romantic social network with an online dating service that integrates with other social networks. Zoosk is a site that combines social networking and online dating. Social graph information is incorporated into user profiles. The company has a popular application on Facebook. Zoosk has a dedicated website, a mobile app, and a desktop chat client [7].

b) **OkCupid:** OkCupid is a free friendship, dating, and social networking website that features member-created quizzes and multiple-choice questions. The site used to have a highly active journal/blogging community as well. Any adult may join the site and all users may communicate with others via private messages or an instant messaging "chat" function [8].

c) **QuackQuack:** Quackquack is a newly launched dating site that has taken a clean approach to dating – i.e. the site focuses on bringing 'real/genuine' users (and not fake profiles) and is solely aimed at Indian users. Once you register on QuackQuack, you can send blinks, waves (i.e. short messages that are templatized) and chat with others. The site has premium offering which enables users to send personalized waves (i.e. messages) etc. Unlike most of the dating sites, QuackQuack is focusing on bringing valid profiles and also ensuring that there is no 'free' content being generated on the site. That is, you either stay happy with the templatized content or you pay for access to more features [9].

d) **Momo:** Chinese messaging app Momo, the "magical tool to getting laid", has amassed 80m users according to its founder. Launched in

September 2011, the app is a location-based messaging service that lets you chat to people in your vicinity. Users can also share photos, audio and their location – as well as set up group chats [10].

e) **Thrill:** Favors women. Thrill is an Android app, which is a fresh, safe take on meeting new people around India .Women are free to join at any time, but guys have to apply to join, and the female user-base gets to vote them up – or down. Men who make the grade get to join the free service. The app requires third-party login via Facebook, LinkedIn, or Twitter as some sort of vague attempt at ensuring real IDs [11].

f) **SinglesAroundMe:** SinglesAroundMe (SAM) is the new cool Social Discovery app to meet singles wherever you are and it is a must have app for singles on the go. Covering the globe, and in your local city, SAM is the new fun way to meet and socialize with singles. It plot singles on a geographical Google map in real time and allow users to view others within a chosen range of their GPS location. From there, users can view profiles of singles close to them and send various types of winks and messages [12].

g) **Krush:** Krush is an Android app that introduces you to the single friends of friends on the social media site. Simply put, it uses your Facebook data and takes in several points such as age, gender, profession, interests, etc., to find a 'suitable' match who is right there among the friends of your FB connects (which means he/she is not exactly a stranger and you have at least one common connect) [13].

h) **Eharmony:** eHarmony is the premium online dating destination that's helped over a million people get married to date. As the most trusted online dating site today, we match singles and make amazing introductions by really getting to know you. With the eHarmony iPhone app, it literally takes minutes to sign up and to receive your first match – all for free. It asks some questions to the users that determine your online dating personality. Users can receive daily matches for free [14].

The comparison table is shown below:

Table 2.1: Comparison between different Dating Apps

NAME	UNIQUE FEATURE	STRENGTHS	WEAKNESS	NO. OF USERS	VIRAL FACTOR	MARKETING STRATEGIES
Krush [13]	Like or skip friends	Needs to login with fb	Never matches with strangers	1000-5000 installs	-	Featured in: Zee News, DNA, Deccan Chronicle and Deccan Herald
Okcupid [8]	Profiles can be rated	algorithms for matching profiles	Fake id's can be created	Installs 1-5 million	Website explains how matching algorithms work	Major social mediums
Thrill [11]	Women have the control	Pull all male user's information via fb or linkedin	No proper authentication system for females	Installs 10- 50 thousand	Thrill/not thrill	Contextual advertising and paid promotion of individual profiles
Zoosk [15]	Automatically deletes fake pics	Free behavioral match Making	Response expires on given time	25 million	Free winking and messaging	Attracts users from fb
Wechat [16]	Instant msging with group chats and animated smileys	Games can be played	Audio and video calls are not clear	3 billion	Voice messsages	TV ads featuring soccer star Lionel Messi, and Pariniti in India
Line [17][18]	Free Voice calls	Clear audio and video calls	Same line account cannot be used on different devices	300 million	Animated stickers and voice calls	TV ads featuring Katrina Kaif
Momo [19]	location-based messaging service	Chatting with strangers	Friends cannot be searched on location basis	80 million	You can play games	Poster commercials

Chapter 3
Psychographic Survey

3. PSYCHOGRAPHIC SURVEY

A psychographic survey was conducted by asking some questions to the young girls and boys. This survey was conducted in Christ University, Bangalore and many other public places. This survey was based on the set of questionnaire prepared keeping in mind the girls psychology and Indian culture towards dating as well as social networking websites and applications. The survey was conducted for two days in January.

The following graphs represent the answers given by an individual to every yes/no questions:

Girls Survey (26 Forms)

Q#	Question
3	do u like being approached by good/authentic
7	if u find good friends, would u prefer them to be local
8	is fb enough for finding/making new frnds?
9	do girls use other websites for finding new frnds?
10	does fb provide a gud enough idea about a boy's profile?
11	do girls approach 2nd/3rd degree frnds?
12	do girls in ur circle approach unknown profiles on fb?
13	do girls look at fb status before approaching them?
14	do girls in ur circle refer to other frnds?
15	would girls share their relationship status updates on...
16	do u think girls would like to approach/interact with other...
17	if we provide a safe environment, where people have genuine...

Graph 3.1: Girls Response for Psychographic Survey

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Boys Survey (14 Forms)

	do u like being...	if u find good friends,...	is fb enough for...	do girls use other...	does fb provide a gud...	do boys approach...	do boys in ur circle...	do boys look at fb...	do boys in ur circle...	would boys share...	do u think boys would...	if we provide a safe...
	3	7	8	9	10	11	12	13	14	15	16	17

Legend: ■ Yes ■ No
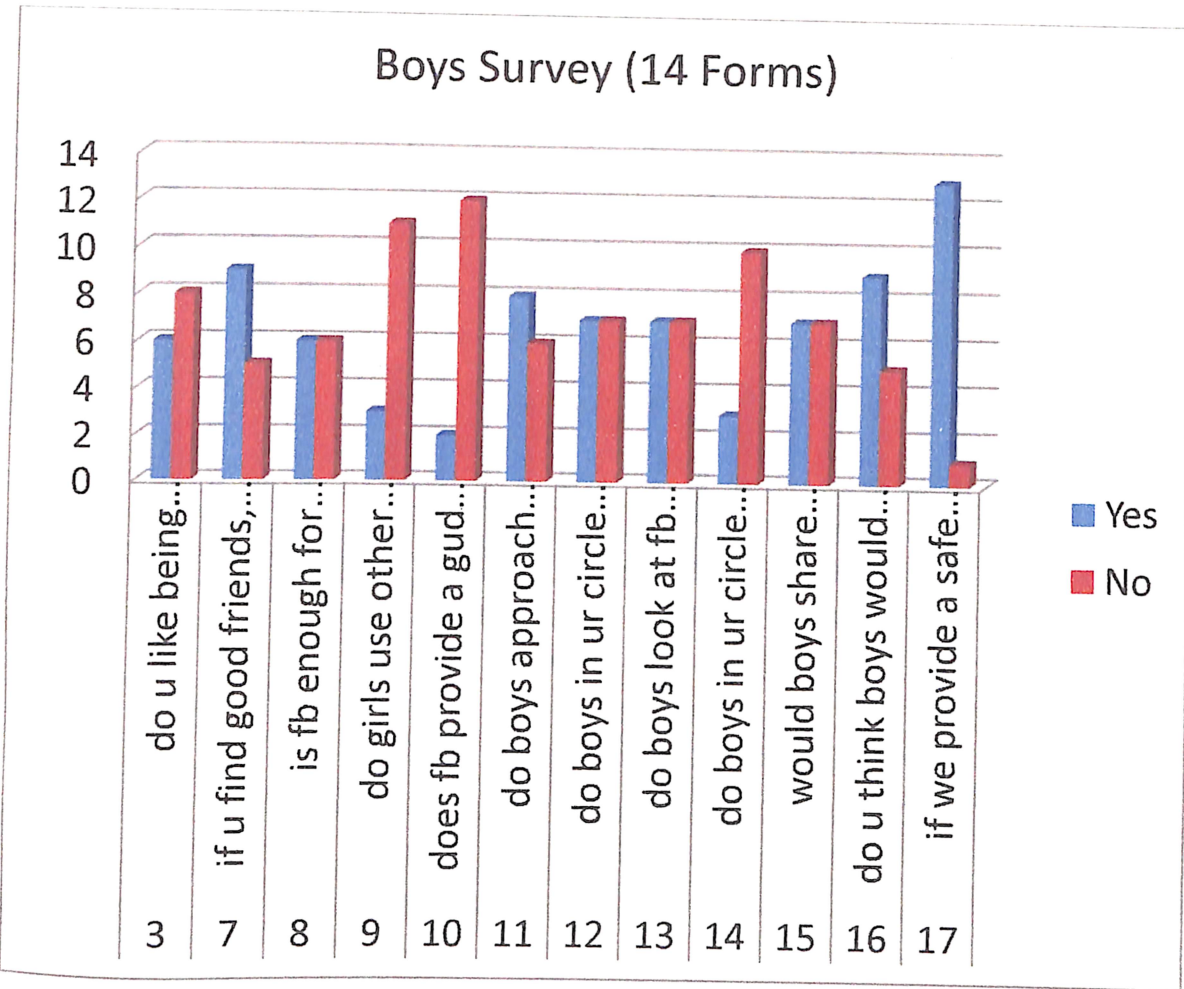
Graph 3.2: Boys Response for Psychographic Survey

After refining the survey questionnaire to understand closely an online survey was posted on facebook groups and some other social groups. The statistics is as follows:

Survey Conducted for Girls

Percentage of response vs Question no. (Questions 1–20)

Legend: ■ Response
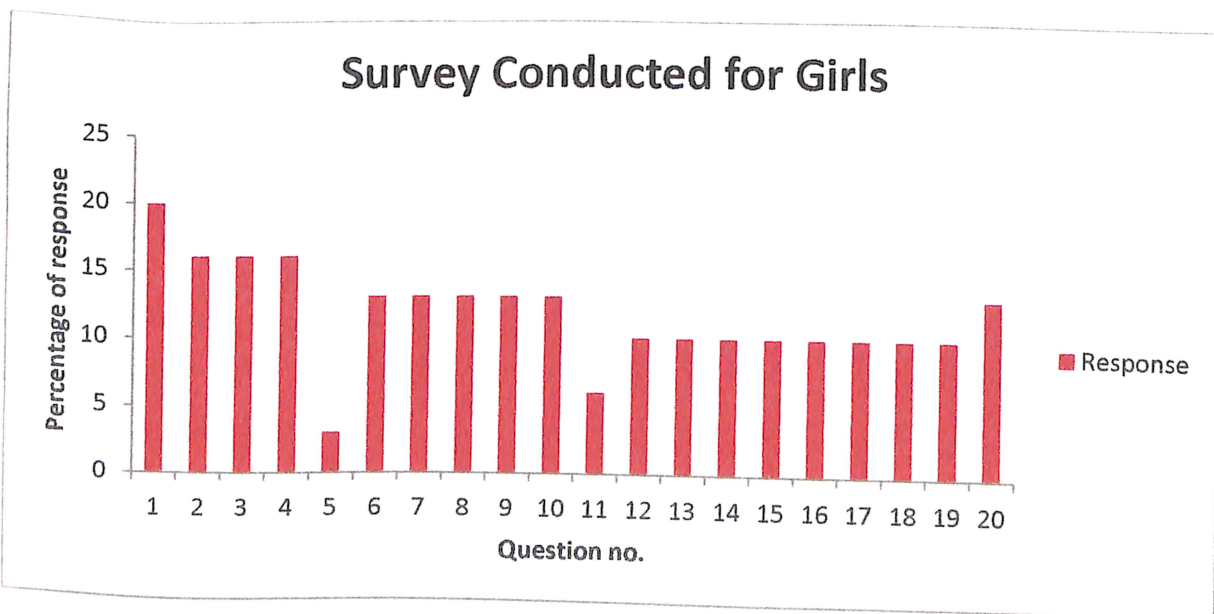
Graph 3.3 Girls Response for Online Survey
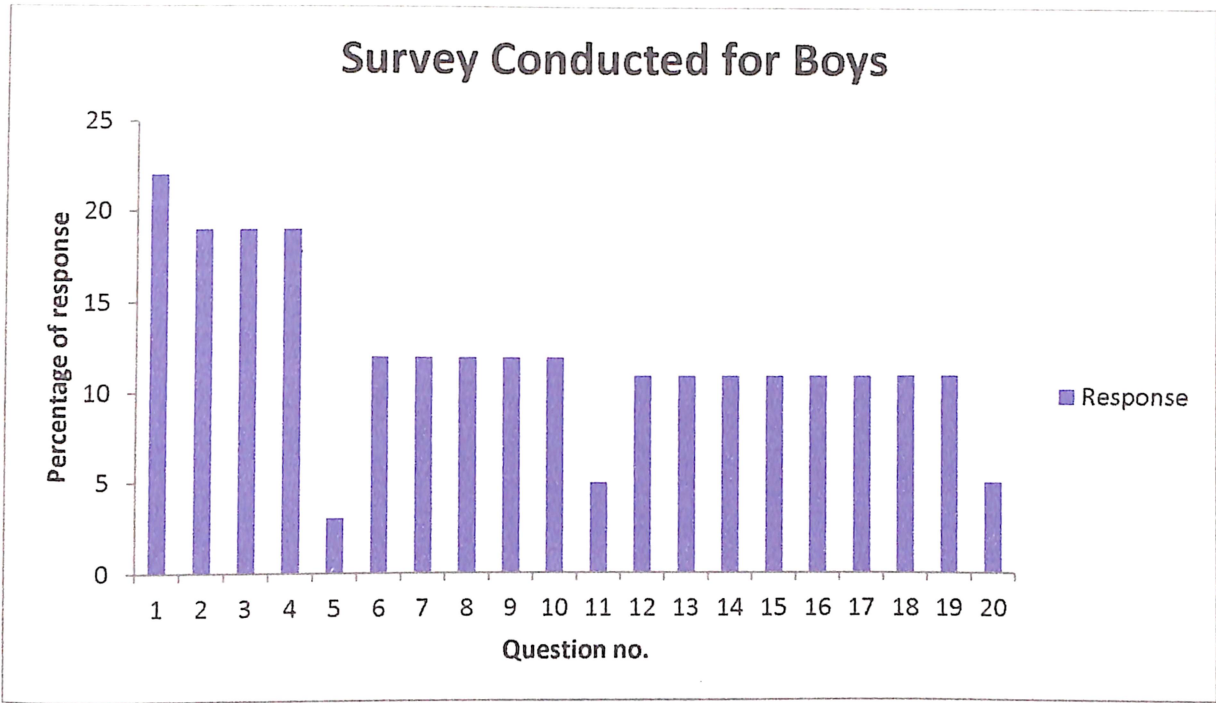
Graph 3.4 Boys Response for Online Survey

Chapter 4

Outline for Proposed Application

- Overview
- User's Dataflow
- Flow Chart
- Unique application benefits to Stakeholders

4. Outline for Proposed Application

4.1 Overview:

The product design is simple and will be modelled along popular social media applications available on mobile platforms today. The system consists of following modules and sub system as described below:

1) **Login System** with the following modules:
   a. Profile Authentication module
   b. Profile Creation module

2) **Search and Match System** with the following search modules
   a. Manual search module
   b. Auto search module
   c. Location based search module

3) **Web Server System** comprises of following modules:
   a. Database Management module – For storing profiles details.
   b. Profile Management module – To manage queries related to search profile.
   c. Business logic unit – Feedback driven analytics for rating of people and increasing the authenticity levels of the users.

4) **Communication System** with the following sub systems:
   a. Chat module – provides various modes of interaction among users.
   b. Block module – you can either downgrade a person or block him 100% from the communication.
   c. Promote module – This will help increase the visibility level of one user to another with conformed privacy settings customized for each user.
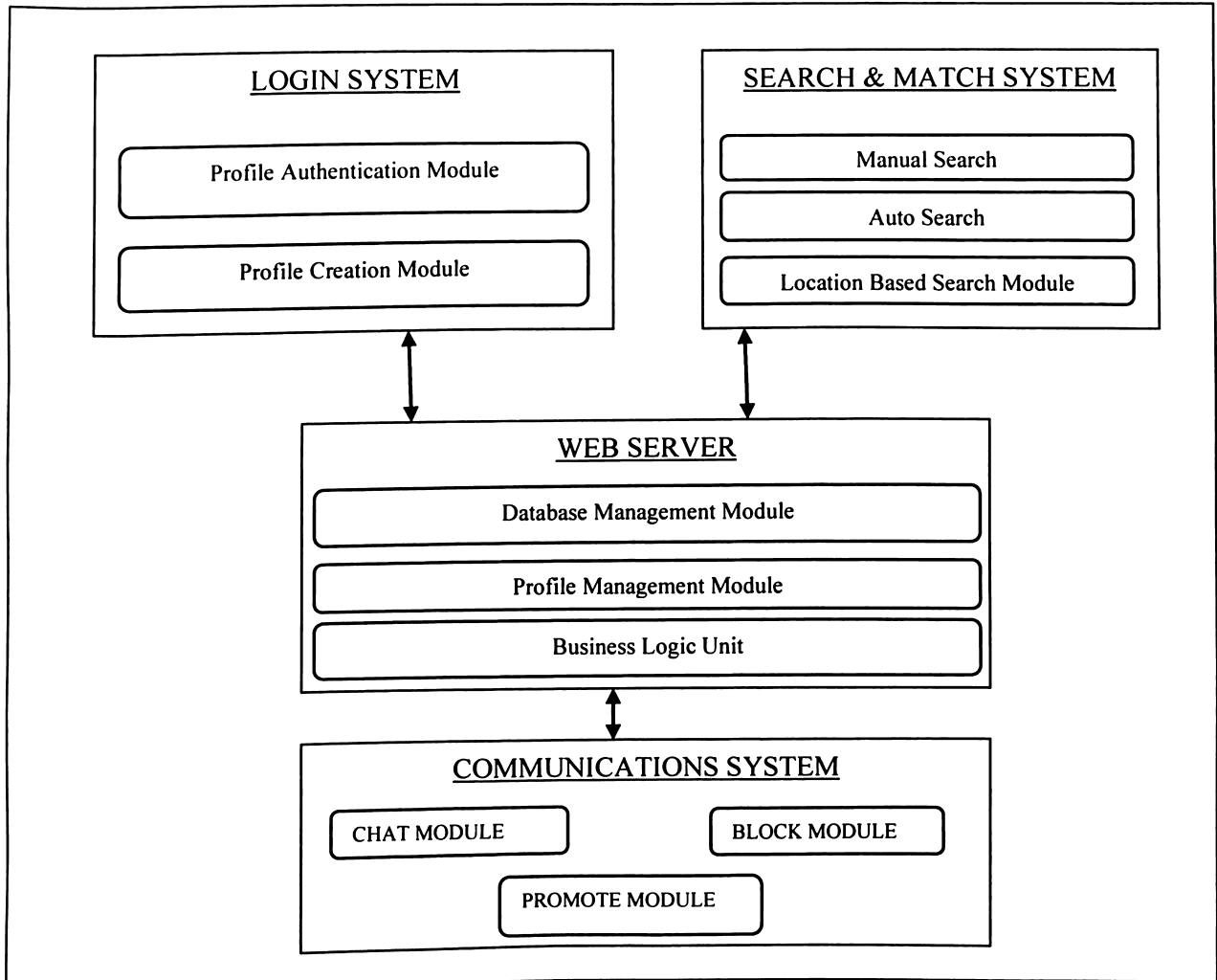
Figure 4.1: Process Methodology

4.1.1 Application's Login System

4.1.1.1 Profile authentication Module

Users should first install the Good Frendz application in their mobile phones. Then, the users register themselves with the app by logging in using their social media credentials such as Facebook®. This is to ensure and understand the authenticity of the profile.

The profile authentication process is described as below:

1. The Profile authentication module comprises of
   a. User login input module,
   b. Social media authenticity module,
   c. Profile creation module interface
   d. Business logic

Using the Good Frendz app user can login without creating a special account with the application. He/she uses the social media login and enters the credentials which are validated in the backend to make sure he/she is a valid profile. The business logic involves specific validation of criteria critical to a user through use of the social media profile such as Facebook ®. This can include, but not limited to:

- Age verification – preferably through verification of friends' profile.
- Education verification.
- Gender.
- Photo verification.
- Authenticity of FB profiles itself, based on the quality/quantity/age of profile details.
- Estimated salary range – based on education, years of experience and type of work/job.
- Interests such as music, travel, sports etc. through postings.

2. The login credentials linked to social media is automatically linked to the real time social media database and this co-relation is stored in

the database. A key step in this innovation is to avoid the use of fake login profile which cannot be tolerated in Good Frendz app.

3. The social media authenticity module automatically retrieves users' information from social media and links it to the profile creation module through profile creation module interface. Certain attributes like age, gender, hobbies, interests etc. are retrieved from social media handle.

4. The business logic includes validating the user profile and creating an authenticity bubble level for each logged in user. This authenticity level is publicly available for people to make friendship with their desired level of authentic people who have signed up with Good Frendz app.

4.1.1.2 Profile creation module

The user once logged in to Good Frendz app will be redirected to profile creation page where he/she creates his/her own profile setting. This Profile setting can be made public or private which is customizable for each of the users available in their friendship chat list. The profile creation module which is associated with creating profiles is described as below:

1. The creation module comprises of user
   a. Good Frendz input module
   b. Interface with database management
   c. Business logic module
   d. Interface with profile management module

2. The user inputs all profile information including age, Gender, religion, hobbies, interests, location, status, education etc. The Good Frendz input module is connected to the database management module which stores all relevant information of user's profile which is turn is connected to the profile management module where user's friend list along with their relationship status is stored. The whole module runs under the business logic of managing the privacy settings of all the profile information of a particular user.

3. Business logic module basically sets the user's profile information visibility to other users in their chat list. There are basically four levels of user interaction in the system. Initially, all the users in the chat environment are addressed as strangers. The user might not share his full profile information. If the user is comfortable enough to chat with strangers, the user can promote them to "Ready to chat" mode. In this mode the user can chat with the concerned person and in later stage the user might promote him/her to "Advance chat" mode. The final stage is the "Friend" mode where the user might reveal his full profile details including the profile picture to that person. At each stage of up gradation, the users can differentiate their profile visibility which is executed by business logic module.

4. The database management module stores all the profile information about the logged in user once the user completes entering his/her profile information in Good Frendz app.

4.1.2 Search and Match System

4.1.2.1 Manual Search module

The main property of this Good Frendz application is searching profiles based on authentication levels. The user can search people with the help of authenticity level set for each user during profile authentication stage. This authenticity level for a user keeps getting updated according to the rating provided by other users who were on a frequent chat level. The rating parameter is executed in communication module. The manual search process is described as below:

1. The Good Frendz app Manual search module comprises of
   a. User search input module,
   b. Interface to profile management module,
   c. Interface to communication module,
   d. business logic and
   e. output module

Using this Good Frendz Manual Search Module, the user searches profiles based on authenticity level through user search input module. If a user authenticity level is defined in percentage say for example a user is 70% authentic and anyone searching for a 70% authentic profile will feature this user. The search module will have an interface with communication module and profile management module to display users who have a close knitted connection or chat history with the search user. The search results are displayed through the output module

2. The business logic unit will help to pull out authenticity search based profiles from profile management module and communication module.

3. The communication module will have list of chat history and ratings about a particular search user. This rating is sent to business logic unit to increase or decrease the authenticity level accordingly.

4. The business logic includes the process of filtering the search results obtained from internal communication with the profile management and communication module and display select list of users in the output module accordingly.

5. Users can also manually search profiles based on single attribute or a combination of attributes like age, gender, education etc.

4.1.2.2 Auto Search module

Users can also prefer to view profiles generated automatically by the system. These are recommendation of profiles provided by system using matching algorithm which takes the current user authenticity level and rating level and searches the database with similar profiles to display the results to the user.

The Auto search module which is associated in searching profiles is described as below:

1. The Auto search module comprises of
   a. Interface to profile management module,
   b. Interface to communication module,

c. Business logic and

d. Output module.

The user clicks on the auto search button in Good Frendz app and the auto search is completely driven by the system. The system compares the current user's authenticity level from profile management module and uses business logic to display the results in the output module.

2. Every user will have two sets of parameter namely rating and authenticity based on which the system generates recommendation for auto search. Rating for any user is driven by other users and this rating level is used to increase or decrease the authenticity level which was pre-set during login module.

4.1.2.3 Location based search

The users generally specify their location information in profile creation module. Anyone can search profiles based on locations by specifying the radius limit from their current location. This will help people connect to other users in near-by locations. Every user will have a GPS association which is used by Good Frendz app to track their location.

The Location based search module which is associated in searching profiles is described as below:

1. The Location based search module comprises of
    a. Location input module
    b. Interface to database management module,
    c. GPS system
    d. output module

The user clicks on the location search button in Good Frendz app and it is driven by GPS system. The system compares the current user's location with the input location and displays the corresponding users after querying the database which is updated constantly about the location of the current user using GPS system.

2. Every user has a location GPS attribute which is created during the profile creation module. This attribute is updated whenever the user is last active and stored in database. Hence this information is used in location based search to fetch the location information of each user during location based search query.

4.1.3 Application Web Server

- Profile Management Module – to manage queries related to search of profiles and also for queries related to profile creation service.
- Database Management Module – to store all profile information.
- Business logic – Feedback driven analytics used for rating and authenticity of users.

4.1.3.1 Profile Management module

This module interfaces with login module and search module and can provide one or more of the following but not limited to these information.

- Status of each buddy with respect to the current user.
- Rating information of each user.
- Any notifications specific to the current user.
- GPS information of the current user.
- Change in profile settings for promoted users.

When a request is received from a user, this module queries the Good Frendz database to receive desired information.

This module interfaces with the business logic unit to help handle the search & match modules. The user might promote a person from 'stranger' mode to 'ready to chat' mode and the profile settings for this promoted user will change accordingly which is taken care by this module. It helps manage the whole profile of current user with other profiles in the chat list and queries database according to the business logic.

4.1.3.2 Database Management Module

This module stores the user profile details and associated data required by the web Server [20]. This includes, but not limited to the following features:

- Stores all user profile details
- Stores all authenticity level information
- Stores all buddies information

4.1.3.3 Business Logic Unit

The business logic unit is the analytics part of Good Frendz app which collects the feedback provided by various users and creates ratings for each user. Also it helps to build a robust training system to generate auto recommendations in auto search module. The business logic unit serves as a platform to better query the system and acts as an interface to communication module which feeds ratings into the web server of Good Frendz app.

4.1.4 Communication System

A user can chat with any user in Good Frendz app provided he/she is in 'Ready to chat' mode or any level above that. The communication system will be similar to any other generic chat system like whatsapp®. The Communication system comprises of following module:

- Chat module
- Block module
- Promote module

4.1.4.1 Chat module

- The chat module consists of chat server which initiates communication between two users in Good Frendz app. The mode of communication can be one of the following:
  - o Normal text chatting
  - o Video chat
  - o Tele conferencing

- o Face to Face meeting – Individual communication
- o Face to Face meeting – Group communication
- The chat server passes on the information to the Business Logic Unit for parsing information and data analytics.
- Based on the chat conversations, a user can rate another user and this will appear globally to all other users signed up for Good Frendz app. This rating is used as a judgment tool for others to befriend users.

4.1.4.2 Block module

- If a user is found to be fake or unusual behavior during chat mode, then the user has rights to downgrade him/her from friend mode down to stranger's mode.
- Also, he/she can be blocked 100% from contacting and they are barred permanently. No further friend request can be generated in the future.

4.1.4.3 Promote module

- There are four modes of users namely strangers, ready to chat, advance chat and friends as mentioned in the profile creation module. The handle is with the user and only the user can promote their chat buddies from one mode to another mode.
- At each mode, the user can decide what set of profile attributes should be visible to their buddies.

4.2 User's dataflow

1. The user first installs the Good Frendz app on the communication device such as mobile phone and encounters the Good Frendz login system to enter the Good Frendz app environment for chatting.

2. The user uses any of his/her social media username credential such as facebook to log into the Good Frendz application, which in turn validates the username password through backend profile management module which has an interface to any of the social media application such as facebook

3. At one instance the user logs in using facebook account and at another instance the user can create his/her account with Good Frendz app and in this case the facebook account connection has to be updated in the profile settings of the user. When the login happens, the authentication module is invoked which fetches user's metadata from facebook and stored in the database which is later used for validation purposes.

4. Then the user is redirected to the profile settings screen where user's age, gender, education, religion, location, employment etc are entered by the user and then he/she submits the information. Once the information is submitted, the information goes to backend for validating the information against the social media meta data which was retrieved in the previous step.

5. Every user has an authenticity bubble which is created during profile updating phase which happens in step 4. Once the user submits his/her profile info and the backend validation is performed, the user authenticity bubble is created which states the percentage level of authenticity for each user. If the meta data in backend matches the profile information completely then the user is 100% authentic else it varies according to the parameter match.

6. If the user logins using conventional method of creating an account, then he/she is prompted to updated their social media credentials like facebook. By default these users will have zero percentage

authenticity level. Only when they update the facebook credentials in the profile setting screen, their authenticity level will be updated.

7. There is also an option for the user to set ON the GPS setting in his profile. This feature will enable the user to allow the system to track the current location of the user anytime anywhere.

8. Once the user enters the login module and creates the profile page, he/she can search for prospective person to chat, which is made possible by the search & match module.

9. In Search and match module, at one instance the user can search profile based on authenticity level and at another instance the user can search profile based on age, gender, location, religion, education etc. There is also an option for the user to use the system generated recommendation for the prospective users and at another instance the user can search based on GPS setting of the users. Say for example, if they want to search people in 1 km radius distance, it is possible to search users using this functionality. The following pyramid shows various level of search mechanism in Good Frendz app:
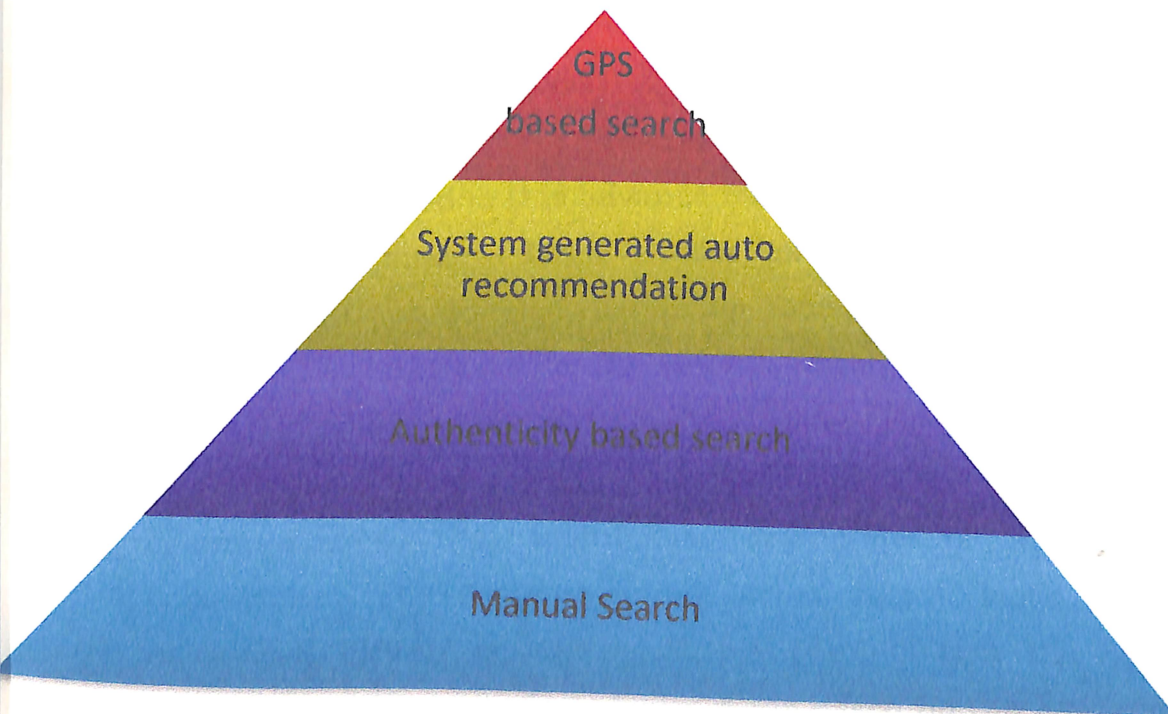

Figure 4.2: Levels in Search Mechanism

10. Once the user selects any of the search mechanism and finds his/her prospective user to chat, they enter the communication module, where they can send friend request to communicate. The UI will be similar to any of the communication services like Whatsapp®.

11. Initially all unknown profiles will be in 'strangers' mode. There are four modes of communication in Good Frendz app and each user can promote or downgrade their friends in the buddies list according to the behavior. At each level, the user can customize their profile attributes and change the visibility according to the promoted level. The following provides details about the mode promotion:

    a. 'Strangers' mode – The initial mode is stranger's mode. Everyone is strangers to one another. Chat facility is not available in this mode. A 'user A' who is a stranger to user B can only view the profile of user B. Only when the user B promote user A to next level, he/she can start chatting.

    b. 'Ready to chat' mode – If a user finds a person to be reliable to chat after accepting the friend request, he/she can promote them to this mode. Only in this mode, two users can chat and start sending messages

    c. 'Advance Chat' mode – A user can share pictures, reveal more profile information and perform audio and video chat when they get promoted to this advance chat mode.

    d. 'Friend' mode – When a user gets promoted to Friend mode, he/she can do teleconferencing, face to face meeting in group as well as individual set up which is purely managed and arranged by Good Frendz app.

12. Once the user starts connecting to another user and performs communication, they might also downgrade or block a person completely. The communication screen has a block button and downgrade button separately. At any point of time the user might demote from upper mode to lower mode based on the behavior of the person. The block action will be 100% and the blocked person can never send friend request or contact the person henceforth.

4.3 Flow Chart:

➤ To efficiently describe the navigation and options available or the overview of application environment for user to move on within the application is depicted by the flow chart. Initially starting with the point as user enters the application interface, there can be two scenarios' that he may login using facebook credentials or he/she wants to create a new account. If the user enters using facebook credentials he/she will be directed initially to the profile view along with fetching certain information from facebook server, where he/she can perform updating his/her personal details whereas in case of creating a new account will allow user to create new account and again will be directed to the profile view. As after creating a valid session i.e. after logging in they are always directed to a container tab host which collectively holds more than one layout. So, now the users have the choice of performing the activities accordingly, can go for profile view, searching someone or for settings.

➤ In case of profile view as stated above the user can modify his/her personal details and again return to the profile view with updated information.

➤ If user goes for searching someone then using the appropriate searching criteria can find desired users, which will be published as a list of usernames. Additionally here user can directly go for viewing the profile of any other user or can also grant permissions to them for revealing certain information by promoting/demoting someone.

➤ Whereas user go for settings tab he/she will be available with certain set of options which can help user to manage and maintain his/her account for example notifications, chat settings, account etc.

➤ As these three options are held by a single container the user is allowed to navigate under this periphery only.
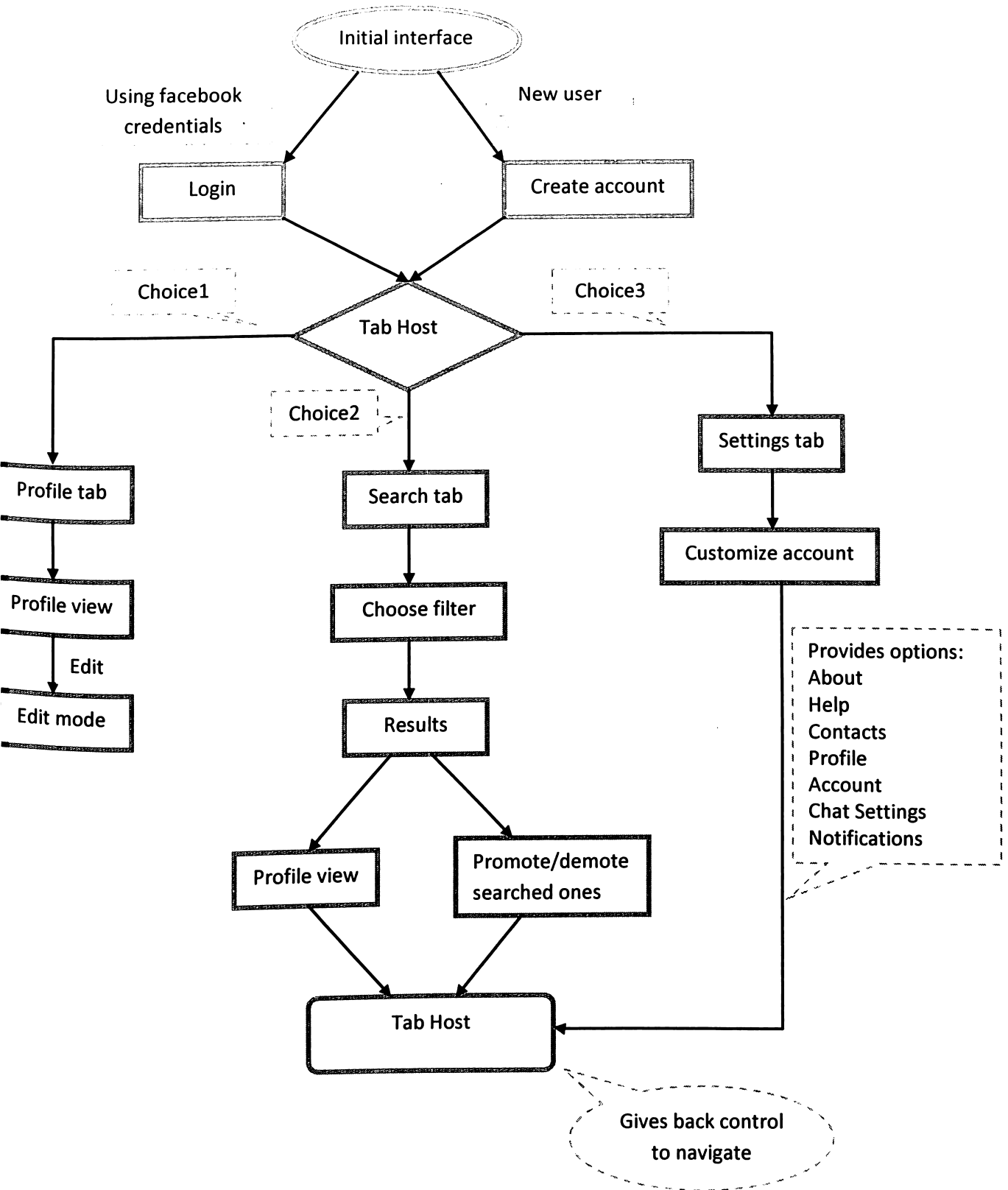
Figure 4.3: Flow chart.

4.4 Unique application benefits to Stakeholders

- Complete user controlled anonymity.
- Only validated and verified authentic profiles are made available for chatting, hence safe for girls.
- Several modes of privacy settings which is customizable to each buddies in the user's list.
- Permission based communication and information sharing levels.
- Block of unwanted Profiles.
- Better soft matching based on social media analytics.

Chapter 5

Environment & Tools utilized

- Eclipse IDE
- Facebook SDK
- WAMP Server

5. Environment & Tools Utilized

5.1 Eclipse IDE

The Android SDK is supported by several different integrated development environments (IDEs) but the eclipse IDE (Kepler) with the Android development tool ADT plug in was used for development of this application. This product includes eclipse platform, JDT, CDT, EMF, GEF and WTP. Eclipse IDE is highly recommended approach to Android development. The IDE was downloaded from the download page of the eclipse.org. Downloaded zip folder was unpacked to a known directory. Then JDK 6 or higher and JRE were installed too for good performance of the development environment.

5.2 Facebook SDK:

Facebook Software development kit is used to integrate Good Frendz application with facebook. It is a software environment provided by the social networking service Facebook for third-party developers to create their own applications and services that access data in Facebook. We used this for providing login functionality using facebook account. In our work, facebook-sdk 3.6.0 version was used.

5.3 WAMP Server:

WAMP is an acronym that stands for Windows, Apache, MySQL, and PHP (or Perl or Python). It is a Web development platform that defines the Operating System (Windows), Web Server (Apache), database (MySQL), and scripting language (PHP, Perl, or Python). In our application we used this server to create database including table of columns with username, password, age

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and gender. In our work, WampServer version 2.2 was used. We used it as a local server.
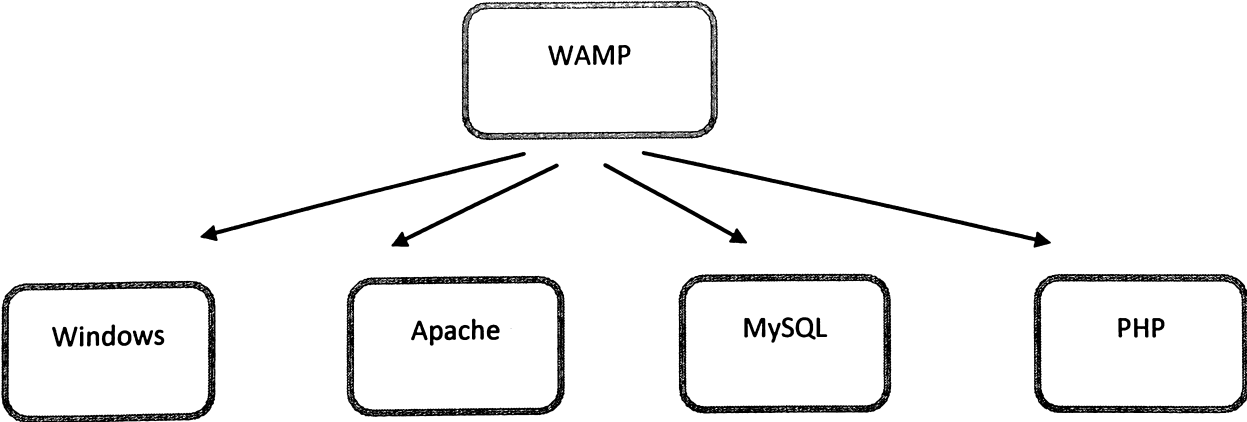

Figure 5.1 WAMP Components

Chapter 6

Proposed Prototype Implementation

- Graphical User Interface
- Client Side Implementation
- Server Side Implementation
- Communicating Mediums
- Data Flow for the implemented system

6. Proposed Prototype Implementation

6.1 Graphical User Interface:

When creating an application, the most essential thing for the software developer is the user interface. A friendly user interface is the foremost thing which we considered while making this application. The Android platform enables applications developers to create GUI easily using XML layout. The XML files are stored in the layout directory of the project. This chat is designed to have several screens/dialogs where a user will be able switch from one screen to another according to what task user wants to perform.

6.1.1 Login Screen: This is the first screen that appears to the user when the application starts. The login screen is divided into two parts: one is the "Sign in" and other is the "Sign up". The "Sign in" requires facebook login credentials in two EditText; and a "Sign in" button that will take the user to the applications interface i.e. non-editable profile screen. If the user does not want to use the facebook login credentials then user can directly create an account for the application, using the "Sign up" button, which will direct the user to the new screen, where the user would enter username, age, gender and password and clicking "create" button to create a fresh account and the user will be navigated to the non-editable profile screen.

Figure 6.1: Login Screen
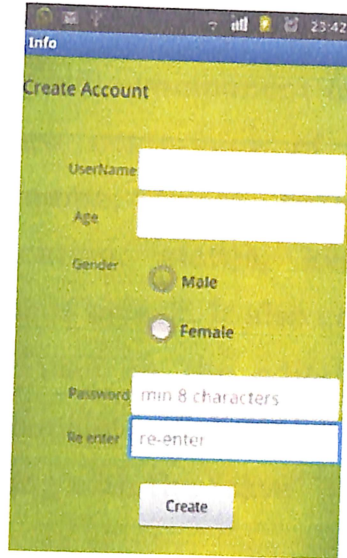
Figure 6.2: Create New Account Screen

6.1.2 Tab Host: This is basically a window container which can hold multiple layouts having individual functionality. In our application, we enabled three layouts using tab host namely profile, search and settings indicated by specific icons.
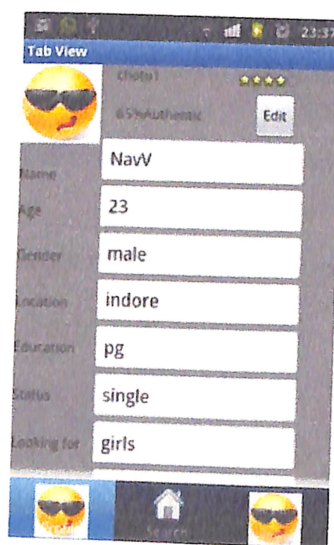
Figure 6.3: Tab Host

6.1.3 Profile Screen: It is one of the components of tab host layout. This represents the complete profile of the user. In our application we have three different profile views, one for the logged in user, other for the stranger view and last for the friends view.

1) **Profile View for Logged in User:** This is screen that appears when the user clicks on the profile component of the tab host. It is the non-editable profile view comprising of following attributes of users: profile pic, username, ratings, authentic-level, name, age, gender, location, education, status, looking for, occupation, hobbies, culture and about myself. It also contains an "edit" button which would take the user to the editable profile screen. The editable profile screen consists all the above mentioned attributes in the editable mode along with the "save" button.
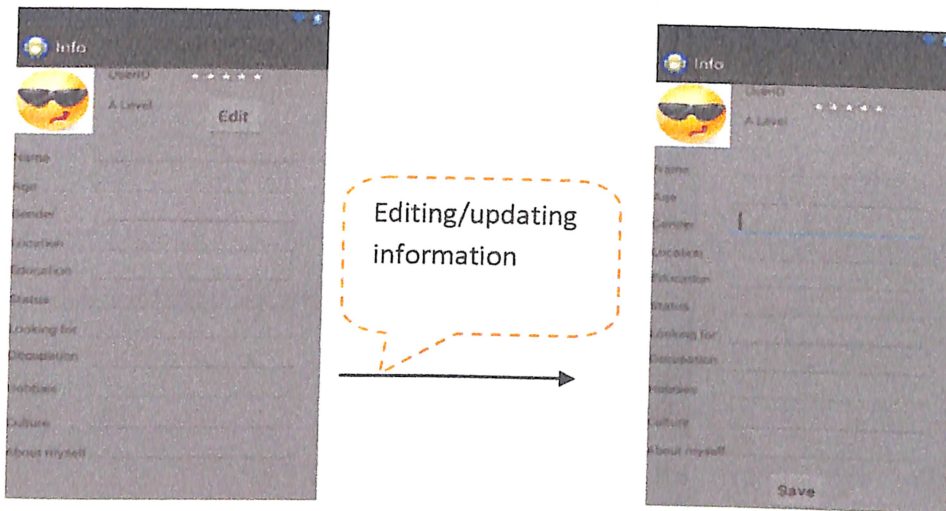
Figure 6.4: Profile Screen

2) **Profile Screen for Stranger:** This screen appears when the user A is a stranger to user B.

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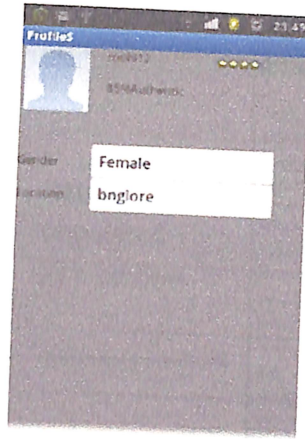
Figure 6.5: Profile Screen for Stranger

3)   **Profile Screen for Friends:** This screen appears when user A is friends with user B. This screen show following attributes of users: username, profile picture, ratings, authentic level, name, age, gender, location, education, looking for and hobbies.

Figure 6.6: Profile Screen for Friends

6.1.4 Search Screen: It is also a component of tab host layout. In this the user can search on the basis of location, age or both (location & age). There is a "go" button which would take the user to the listview comprising of the users based on the search criteria.

(a)   (b)
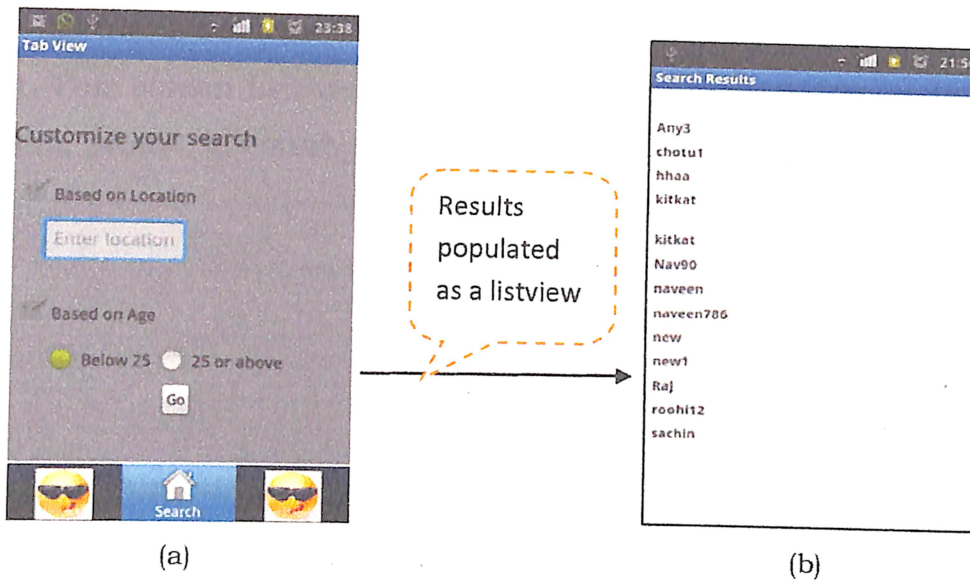
Figure 6.7: (a) Search Screen. (b) Search Result

6.1.5 Promote Mechanism: After performing a successful search and getting results in a listview, and two basic operations individual item click and individual long click can be performed. On single click on individual item navigates to the profile view of that particular user whereas on long click a popup with options to set the relationship level with other users is displayed, which allows to maintain the relationship as well as allowing certain permissions to that user.
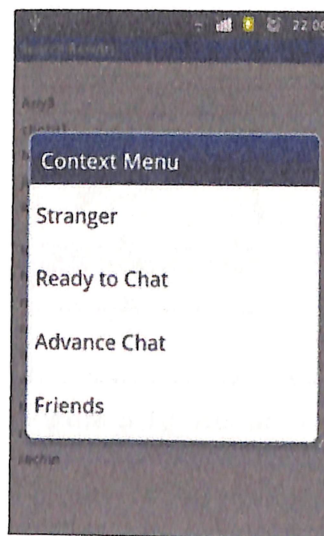
Figure 6.8: Screen showing Promote Options.

6.1.6 Settings Screen: It is also one of the components of tab host layout. This screen further has different components namely about, help, contacts, profile, account, chat settings and notifications.
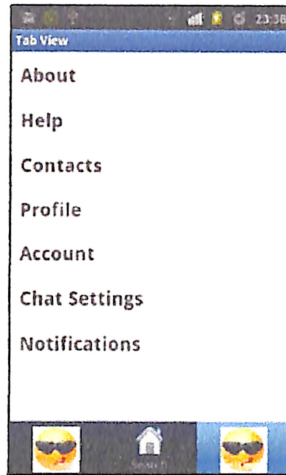
Figure 6.9: Settings Screen

6.1.6.1 About: When the user clicks on this a new window describing about the Good Frendz application will appear. The About Window is a dialog window which gives the information about the chat system, why it is developed and the developer name. The dialog has one button back Button.

Figure 6.10: About Screen

6.1.6.2 Help: In this the user can ask queries related to the Good Frendz application. There are some frequently asked questions with which the user can relate their queries.

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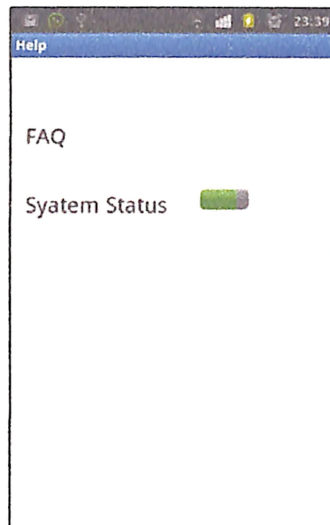
Figure 6.11: Help Screen

6.1.6.3 Contacts: This populates the list of friends.

6.1.6.4 Profile: This option leads the user to his/her profile view.
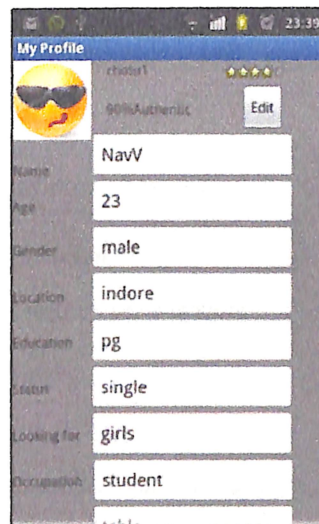
Figure 6.12: Profile Screen (Users Profile)

6.1.6.5 Account: This screen tells the user about the network usage details and also an option of deleting an account.
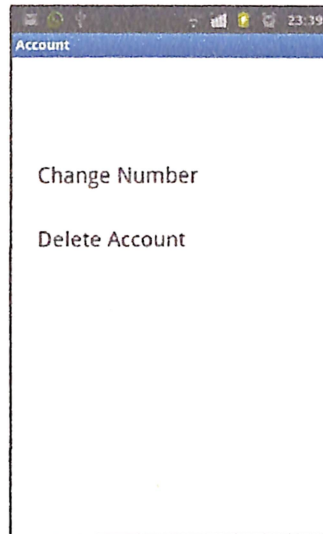
Figure 6.13: Account Screen

6.1.6.6 Chat Settings: This screen helps the user to change the font size, font theme, manage blocked list, deleting conversations, etc.
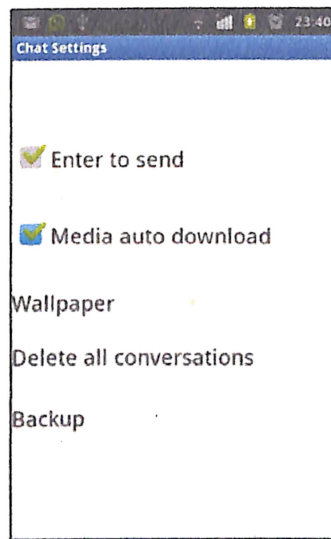
Figure 6.14: Chat Settings Screen

6.1.6.7 Notifications: This allows user to set sound tones, vibration type, light effects, popup type for the application to notify user.

Figure 6.15: Notifications Screen

6.2 Client Side Implementation:

- All the basic client side functionalities and features are managed by implementing the concepts in Java according to the requirements of the application without server involvement. In case of android application the main focus is on performing tasks by creating methods and reusing the concepts in an optimized way in order to improve the efficiency.

- The major part handled in the client side of the architecture depends on the conceptual implementation and the way of representing them in the sense of layouts. So, the client side part is also being divided on the basis of java implementation for concepts and flow whereas layout or representation part is handled by XML.

- When dealing with the implementation part there exists a hierarchy of classes which decides the complete flow of the application and helps in navigating throughout the application in a smooth manner.

- As we are dealing with the java classes, they constitutes of a basic structure which is composed of member variables and member functions (methods).
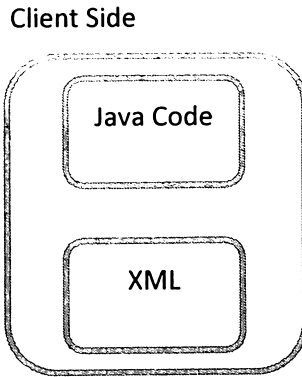
Client Side

Figure 6.16: Client Side Implementation

6.3 Server Side Implementation:

✓ The database management is one of the most important entities in the development of any application. Without implementing database management efficiently, the graphical user interface (frontend) is of not much essence since there will be no informative presentation of data coming from central or distributed database.

✓ As the application is a client-server architecture based we need a hosting medium in order to fulfill the task of server. So, the backend part is handled by WAMP which provides MySQL, Php and Apache to perform all the essential and required tasks for the well functioning of individual modules.

✓ Php bridges the gap between client and the server, and MySQL facilitates the database management. In terms of Android a single application is collection of activities (classes) and those activities are employed with the database functionality.

✓ The Php carries the information from client side by the user through activities and deals with database. Database queries are encapsulated in the Php in order to perform server side tasks on database. The tasks that are being performed by the Php medium are as:

- Establishment of connection with the specific database.
- Implementation of logic based on datasets passed from the frontend in order to decide the further flow.
- Embedding SQL queries along with the Php program structure for performing select, insert, update, delete operations on table in database.

✓ As per the need of database module in our android application we maintained two tables separately, one table for user's information such as username, password, authentic level, rating, gender, age, location, education, status, looking for, about myself, occupation, hobbies and culture whereas another one is responsible for maintaining relationship between different users which helps in representing data based on relationship.

✓ As the application domain include communication as well as involvement of network for a well furnished architecture there should be an authority that is responsible for the data management, that part is being managed and maintained here. In concern to the present scenario all the information management that includes maintaining tables in database either from internet (facebook) or from user side which further supports operations as insertion, deletion, updating data. So, as per the above used tools we employed WAMP for taking care of hosting a server and providing platform for having database management.

✓ In order to involve client server functionality in the architecture for the purpose of data migration and other manipulations like calling a PHP script to perform basic CRUD (Create, Read, Update, and Delete) operations. To brief you on the architecture, let's see how it works. First your android app calls a PHP script in order to perform a data operation, let's say "create". The PHP script then connects to your MySQL database to perform the operation. So the data flows from

your Android app to PHP script then finally is stored in your MySQL database. And similar flow to perform other operations using http requests.
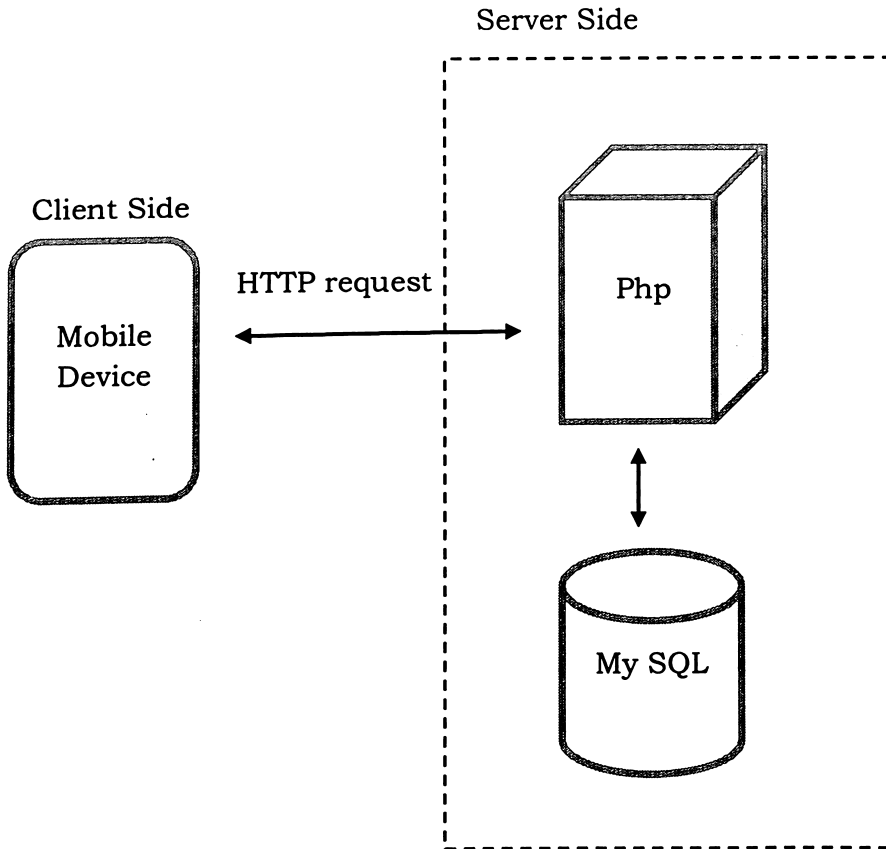
Figure 6.17: Client-Server Architecture

6.4 Communicating mediums:

These mediums can be stated as those intermediate agents that are responsible to bind each and every modules of architecture together in order to create a view that they are acting as a single entity. In general their presence is mainly important for the purpose of:

- Proper communication establishment between Java classes and Php scripts.
- Also between client sides to server side which enables data flow.

6.4.1 JSON

JSON (JavaScript Object Notation) is a lightweight data-interchange format. Easy for machines to parse and generate. Basically used to transmit data between web server and application and used as an alternative to XML.

JSON is built on two structures:

- A collection of name/value pairs. This is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
- An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

We utilized JSON objects and arrays in order to deal with the responses received from Php scripts. Used in both ways for receiving and sending data from server to client as well as client to server so as to access data for further use.
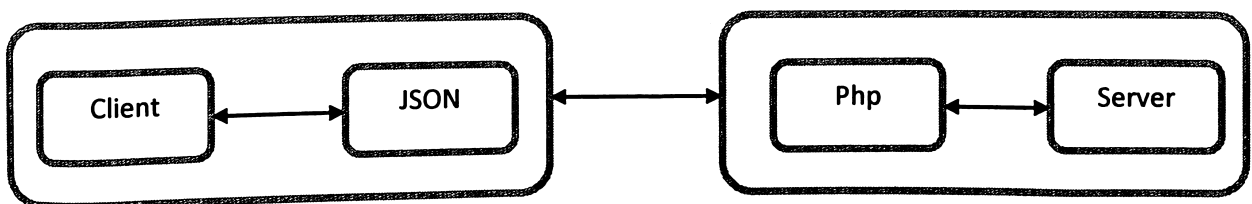
Figure 6.18: Mediums placed in architecture.

6.4.2 Php Scripts:

Php is a server side scripting language designed for web development. Php commands can be embedded directly into HTML without being externally called. In the sense of present application we along with Php commands encapsulate MySQL queries in order to perform query from database for performing operations as inserting, deletion, updating and also creating responses which can be used further by the client side to generate useful results.

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6.5 Data Flow for the implemented system:

6.5.1 Login Layout: This is the first layout encountered by user using the application enables user to enter using facebook login credentials. The activity performs a background task of integrating facebook in android platform and successfully creates a session for the username, password passed and is implemented to fetch public details from facebook as facebook user id, full name, and gender allowing the database involvement as to store these details for the user. In case user wants to create new account without involving facebook they can create a new account or else you will be directed to the profile layout.

6.5.2 Create Account Layout: This is basically a registration kind form asking for certain basic details for successfully creating a new account as username, full name, age, gender, and password. This layout allows a new user to store the details in the database supplied by this layout and navigates to the profile layout.

6.5.3 Profile Layout: The GUI consists of numerous components as displaying elements, image view for profile picture, and buttons for specific tasks. Based on conditional utilities profile layout varies for serving the purpose of displaying logged user profile, profile view as stranger or profile view as friend.

- **Profile layout for logged user:** The layout is utilized to view the corresponding details of username logged in. Basic functionality is to fetch all details for the current user to allow viewing them in un editable mode, while user wants to update information/ personal details they switch to editable mode and performs update/insert operation in database.

- **Profile layout for strangers:** As there are levels of relationship for users as either friends or stranger. So, this layout is responsible for fetching only certain limited fields if the relationship status is

"stranger" as username, ratings, authentic level, profile picture, age and location respectively.

- **Profile layout for friends:** Whereas this layout is responsible for fetching details from database if the relationship status is "friends" as username, ratings, authentic level, profile picture, full name, age, gender, location, education, looking for, and hobbies.

6.5.4 Search Layout: Implemented to provide filters for performing search based on location or age limits. On opting for a criterion navigates to search result layout basically a list view displaying usernames fetched from database by comparing the criteria passed. Now user is allowed to view the individual profiles of usernames displayed by click event brings up the layout corresponding to their friendship status and requesting database for fields. Another important task associated involving data flow is to promote/demote the friendship status by performing long press click on usernames displayed allowing you to choose the promotion level and updating status field in database.
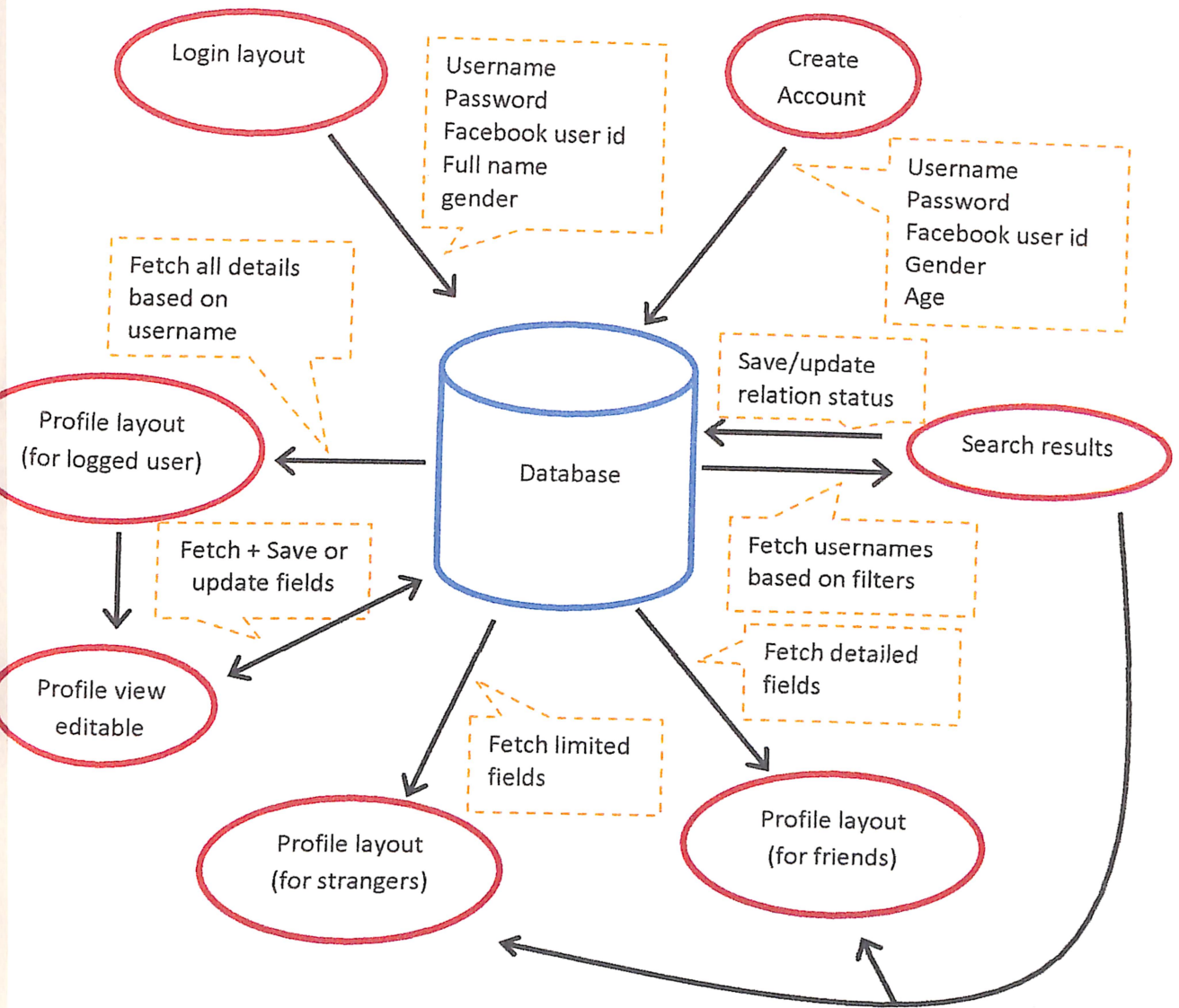
Figure 6.19: Data flow diagram

Chapter 7

Usability Testing

- Background
- Usability evaluation of new prototype for mobile device
- Result/Analysis
- Conclusion

7. Usability Testing

7.1 Background

This chapter presents the usability assessment of the prototype proposed. Usability evaluation techniques have been applied here to assess the usability and its improved usability has been presented in comparison with the most popular and widely used social networking applications.

Usability is the key parameter for evaluating any application or a product, as it describes the degree of easiness in using an application or a product. The International Standards Organization (ISO) has defined the usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" [21]. In general, usability is about the quality of the interface and it will be determined by how well the user interface is organized to present the available functionalities to the users, in a more convenient and interactive way [22] [23]. There are number of ways to evaluate the usability of the digital libraries, among them Analytical and Empirical techniques are more popular. Analytical evaluation will be carried out by the usability professionals by using the established theories and methods which includes Heuristic Evaluation [24], Cognitive Walkthrough [25] and Claims Analysis [26]. Empirical techniques involve the user for usability evaluation. Various empirical techniques include usability inspection, focus groups, and questionnaires [27], think aloud [28], log analysis [29] etc.., We have selected the empirical methodology for the usability evaluation of the UI presented in this thesis.

7.2 Usability Evaluation of New Prototype for Mobile device

7.2.1 Methodology

Mobile application usability evaluation consists of various steps and methods. We have chosen Empirical evaluation methodology for assessing the usability of the newly built UI system. We have considered the both qualitative and quantitative approaches to assess the results of the experiment.

Empirical evaluation encompasses various usability attributes which have been identified by many researchers for evaluating. Among these, learnability, low error rate, memorability, effectiveness, efficiency and satisfaction are the significant usability attributes for evaluation.

7.2.2 Subjects

Subjects were recruited from the Christ University, India with an open invitation to the identified user groups (students, researchers, faculty members etc.) from all the disciplines. We received 20 responses for this invitation, among 10 are expert users and 10 are novice users. The expert group (6 males / 4 females, ages: 21-45) consisted of two faculty members, two research students and six graduate students from the School of Science and Technology, Christ University. All these expert group members are having the substantial experience with various online social networking, android applications and other contemporary websites on the World Wide Web. The novice group (8 males / 2 females, ages 21-45) consisted of one faculty member, three research students and six graduate students from the School of Languages and School of Arts, Christ University. This entire novice group is consisted either with the no experience or inconsiderable experience with the online searching and other World Wide Web services.

7.2.3 Experimental design

Four sessions were administered in a sequence during the experiment: pretest, training, formal tasks, and post-study. Pretest session was provided a brief over view on the present experiment process to the participants and the subjects were told that they would be interrupted between questions to allow the experimenter to ask some questions related to the experiment. During the training session, a demonstration was done on different applications to the participants. The dataset used in the training was not related to the formal tasks.

After the training session, subjects were required to answer a set of 10 questions (see Appendix-C). These questions were developed by the present

researcher to ensure that the questions did not unduly favor any one product and that users would need to explore the provided application fully to find the answers.

All subjects were tested on the same configuration of the systems with the same network connectivity at our development place. Subjects were then given a set of tasks and asked to attempt all questions in the presented order. The subjects were encouraged to verbalize their thoughts.

After five tasks, subjects took short break and then proceeded as before on the second interface. Order of presentation was counterbalanced across all the subjects with half the experts and half of the novices starting on the Standard applications, and the other half of both user groups starting on the new prototype. Order of questions was randomized for each subject.

After the completion of this task, the questionnaire for tasks was distributed among the subjects, so that they could describe their satisfaction level for accomplishing the tasks.

7.2.4 Usability Evaluation Questionnaire

The usability evaluation criteria questionnaire was formulated based on the various established questionnaires [27] [30] [31] to explore different factors involved in mobile application usability evaluation. This questionnaire contained information that gave the authors quantitative results concerning usability factors such as simplicity, visibility, memorability, learnability, error prevention, effectiveness, efficiency, interactivities and satisfaction. The copy of the questionnaire is attached in Appendix-III.

7.3 Results/Analysis

Results and analysis are presented for both the experiment and usability questionnaire. Two-sample t-test has been employed to determine the impact of the interface on usability.

The following tables summarize the user ratings for usability questionnaire in percentage wise for Standard application as well as for New prototype.

Table 7.1: Summary of user responses for Standard Applications (n=20)

Usability Evaluation Criteria	Strongly Satisfied (5 points)	Satisfied (4 points)	Less Satisfied (3 points)	Not Satisfied (2 points)	Strongly Not Satisfied (1 point)
Learnability	-	20%	30%	40%	10%
Low error rate	-	10%	10%	60%	20%
Memorability	10%	70%	10%	10%	-
Effectiveness	-	10%	70%	20%	-
Efficiency	-	-	70%	30%	-
Satisfaction	-	10%	70%	20%	-
Total	1.67%	20	43.33%	30%	5%

Table 7.2: Summary of user responses for New Prototype (n=20)

Usability Evaluation Criteria	Strongly Satisfied (5 points)	Satisfied (4 points)	Less Satisfied (3 points)	Not Satisfied (2 points)	Strongly Not Satisfied (1 point)

Learnability	40%	50%	10%	-	-
Low error rate	30%	50%	20%	-	-
Memorability	40%	20%	40%	-	-
Effectiveness	20%	70%	10%	-	-
Efficiency	30%	60%	10%	-	-
Satisfaction	30%	60%	10%	-	-
Total	31.67%	51.67%	16.66%	0%	0%
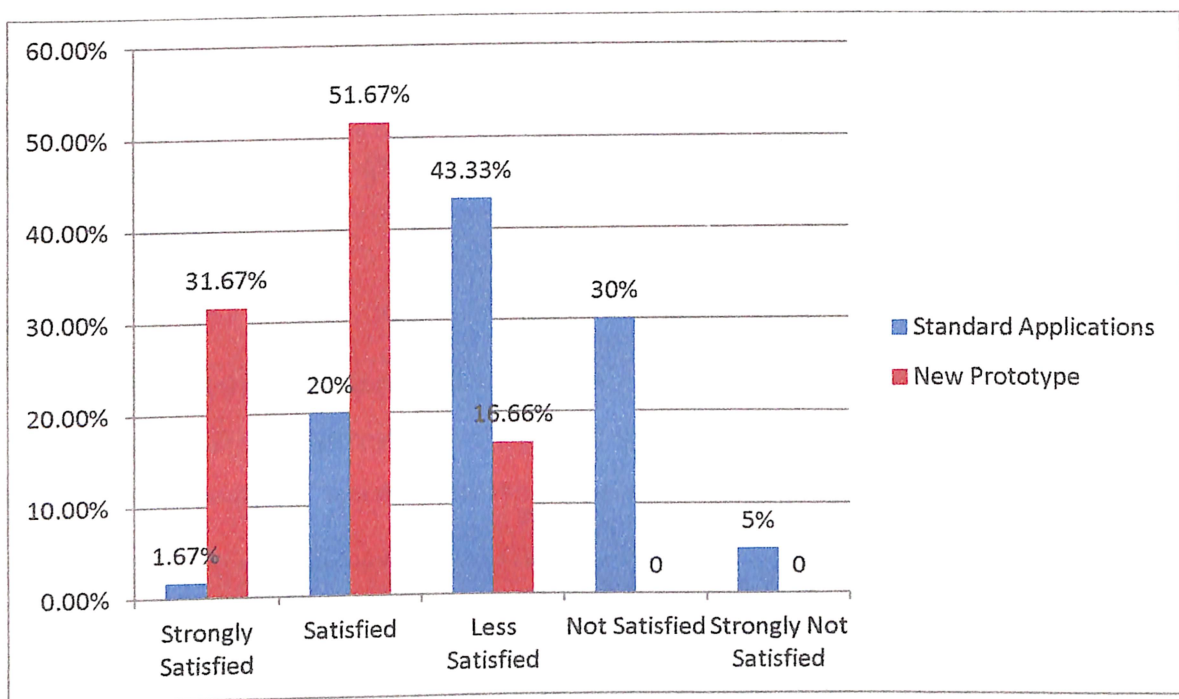
Graph 7.1: User Rating for Standard Applications and New Prototype

The above data shows that the users are very much satisfied with new prototype comparatively with Standard applications. However, the following statistical analysis will show in depth details for each usability criteria of both the interfaces.

7.3.1 Learnability

To assess the Learnability of both Interfaces, we have selected the user ratings for the statements 2, 3 and 4 from usability questionnaire. The

following tables present statistical analysis for Learnability feature of the both interfaces.

Hypothesized difference (D): 0

Significance level (%): 5

Sample variances for the t-test: Assume equality

Table 7.3: Summary of Statistics for Learnability feature of New Prototype and Standard

Variable	Observations	Obs. with missing data	Obs. without missing data	Min.	Max.	Mean	Std. Deviation
User Rating for Learnability | New Prototype	20	0	20	3.0	5.0	4.100	0.718
User Rating for Learnability | Standard	20	0	20	1.0	4.0	2.100	0.852

t-test for two independent samples / Upper-tailed test:

95% confidence interval on the difference between the means:

Table 7.4: Two sample T test for New Prototype and Standard Applications Learnanility feature

Difference	2.000
t (Observed value)	8.025
t (Critical value)	1.686
DF	38
p-value (one-tailed)	<0.0001
Alpha	0.05

In table-7.3, the mean value of new prototype (4.1) is higher than the mean value Standard application (2.1) and in table-7.4 computed p-value(<0.0001) is lower than the significance level alpha=0.05. The above statistical analysis shows that Learnability of the prototype is better than the Standard applications.

7.3.2 Memorability

To assess the Memorability of both Interfaces, we have selected the user ratings for the statements 7 and 10 from usability questionnaire for Statistical analysis. The following tables present the Statistical analysis of Memorability feature of the prototype and Standard applications.

Hypothesized difference (D): 0

Significance level (%): 5

Sample variances for the t-test: Assume equality

Table 7.5: Summary of Statistics for Memorability feature of New Prototype and Standard

Variable	Observations	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. Deviation
User Rating for Memorability | New Prototype	20	0	20	3.0	5.0	4.0	0.918
User Rating for Memorability | Standard	20	0	20	2.0	5.0	3.8	0.768

t-test for two independent samples / Upper-tailed test:

95% confidence interval on the difference between the means:

Table 7.6: Two sample T test for Memorability feature of New Prototype and Standard Applications

Difference	0.200
t (Observed value)	0.748
t (Critical value)	1.686
DF	38
p-value (one-tailed)	0.230
Alpha	0.05

In table-7.5, the mean value of prototype (4.0) is higher than the mean value of Standard application (3.8) and in table-7.6 computed p-value(0.230) is higher than the significance level alpha=0.05. As per the above statistical analysis there is no significant difference between prototype and Standard applcation in respect to Memorability feature.

7.3.3 Effectiveness

To assess the Effectiveness of both Interfaces, we have selected the user ratings for the statements 1, 12 and 13 from usability questionnaire for Statistical analysis. The following tables present the Statistical analysis for Effectiveness feature of the prototype and Standard applications.

Hypothesized difference (D): 0

Significance level (%): 5

Sample variances for the t-test: Assume equality

Table 7.7: Summary of Statistics for Effectiveness feature of New Prototype and Standard

Variable	Observations	Obs. with missing data	Obs. without missing data	Min	Max.	Mean	Std. Deviation
User Rating for Effectiveness | New Prototype	20	0	20	3.0	5.0	4.100	0.553
User Rating for Effectiveness | Standard	20	0	20	2.0	4.0	2.900	0.553

t-test for two independent samples / Upper-tailed test:

95% confidence interval on the difference between the means:

Table 7.8: Two sample T test for Effectiveness feature of New Prototype and Standard Applications

Difference	1.200
t (Observed value)	6.868
t (Critical value)	1.686
DF	38
p-value (one-tailed)	<0.0001
Alpha	0.05

In table-7.7, the mean value of prototype (4.1) is higher than the mean value of Standard applications (2.9) and in table-7.8 computed p-value(<0.0001) is lower than the significance level alpha=0.05. As per the above statistical analysis the Effectiveness feature of prototype is notably significant over the Standard applications.

7.3.4 Satisfaction

To assess the Satisfaction of both Interfaces, we have selected the user ratings for the statements 11 and 14 from usability questionnaire for Statistical analysis. The following tables present the Statistical analysis for Satisfaction feature of the prototype and Standard applications.

Hypothesized difference (D): 0

Significance level (%): 5

Sample variances for the t-test: Assume equality

Table7.9: Summary of Statistics for Satisfaction feature of New Prototype and Standard

Variable	Observations	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. Deviation
User Rating for Satisfaction		20	0	20	3.0	5.0	4.20	0.616

New Prototype							
User Rating for Satisfaction | Standard	20	0	20	2.0	4.0	2.90	0.553

t-test for two independent samples / Upper-tailed test:

95% confidence interval on the difference between the means:

Table 7.10: Two sample T test for Satisfaction feature of New Prototype and Standard Applications

Difference	1.300
t (Observed value)	7.029
t (Critical value)	1.686
DF	38
p-value (one-tailed)	<0.0001
Alpha	0.05

In table-7.9, the mean value of prototype (4.2) is higher than the mean value of Standard applications (2.9) and in table-7.10 computed p-value(<0.0001) is lower than the significance level alpha=0.05. As per the above statistical analysis the Satisfaction feature of prototype is elevated over the Standard applications.
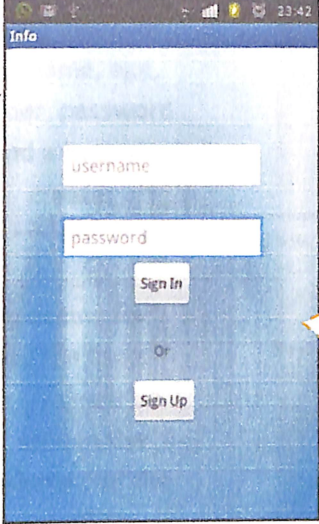
7.4 Conclusion

In this chapter, usability evaluation for Standard as well as new prototype has been presented. Further, the improved usability of the New Prototype over Standard interface was also presented with statistical analysis.

Chapter 8

Output Screenshots

8. Output Screenshots

Main page and its navigation

MainActivity.java
main.xml
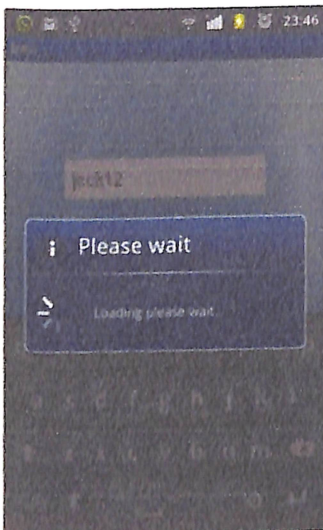
Main page/ Initial layout

User can choose to login using facebook credentials or create a new account

User logging in using facebook credentials
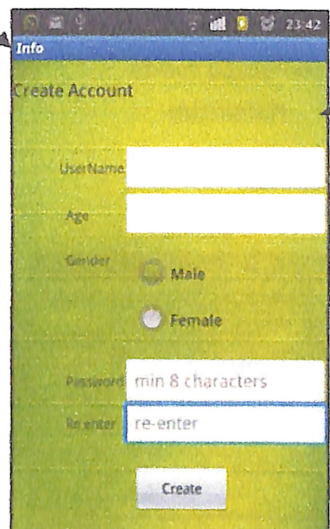
User creating a new account

Test.java
Test.xml

User directed to a tab layout initially opening profile of logged user

Tabmain.java
Tabmain.xml

User can go for profile editing by clicking Edit button

User can go for searching

Settings tab
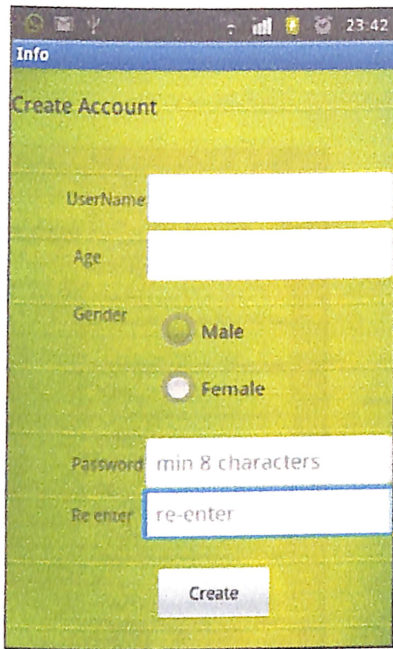
New account creation screen having fields for username, age, gender, password and a button create

On opting for create the texts in the field will be posted in the database and the user will be directed to the tab layout showing users profile
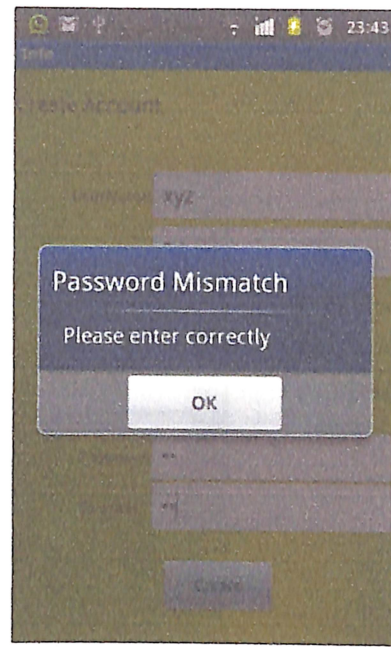
Prompt occurs alerting user about password mismatch

Finally navigates to tab layout

Prompt occurs alerting user about password length
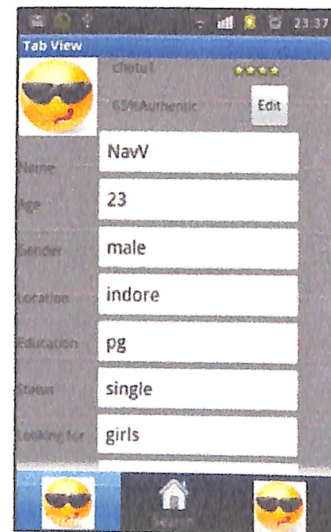
Profile layouts:
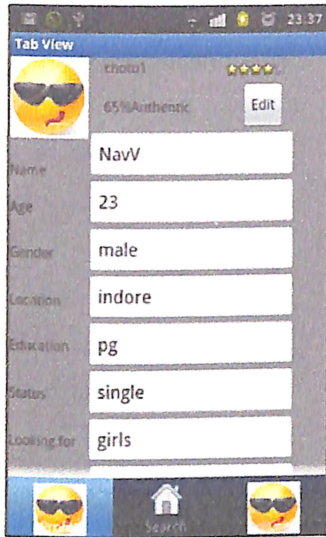
On choosing Edit option
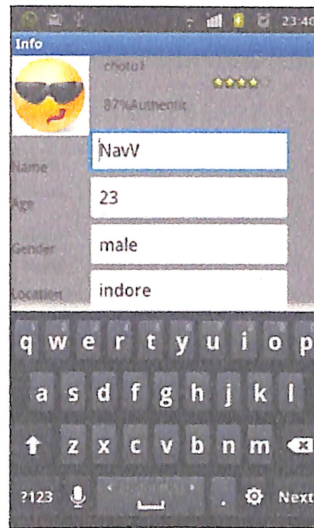
Profile fields can be updated and on selecting Save option data is updated on server

ProfileV.java
Profilev.xml

Proftest.java
Proftest.xml

Search layouts:

User can customize search by selecting the options available i.e. Based on location or Based on Age and then results are populated in a list form

SearchR.java
Searchr.xml

SearchRL.java
Searchr.xml

SearchV.java
Search.xml

On single click

Friends profile view

Long click on individual item populates context menu with some options for promoting user

Stranger profile view

ProfileS.java
profiles.xml

ProfileF.java
profilef.xml

Layout associated with Settings view:

SettingsV.java
settingsv.xml

AboutV.java
aboutv.xml

Tab View

About

Help

Contacts

Profile

Account

Chat Settings

Notifications

Settings tab

About

Good Frendz App

Version 1.0.1

About
layout

HelpV.java
helpv.xml

Account layout

Help

FAQ

Syatem Status

Help
layout

My Profile

Edit

Name	NavV
Age	23
Gender	male
Location	indore
Education	pg
Status	single
Looking for	girls
Occupation	student

Profile
layout

Account

Change Number

Delete Account

ProfileV.java
profilev.xml

AccountV.java
accountv.xml

Chat Settings layout

ChatSettingsV.java
chatsettingsv.xml

Notifications layout

NotificationsV.java
notificationsv.xml

Chapter 9

Limitations and Future Enhancements

- Limitations
- Future Enhancement

9. Limitations and Future Enhancement

9.1 Limitations

- Being involved in industry project prototype development for the initial stage, the application is not available in cross platform sense.

- Taking in sense of prototype of a product, consists of certain limited features.

- Exposed the application for testing under controlled and confined scenario, i-e under limited user traffic and small private dedicated network.

- Only public field are allowed to be accessed and used by the application from the social networking medium (facebook) for providing authenticity.

9.2 Future Enhancement

- As will be a social networking application the further extension will be firstly in concern to making it a cross platform applicable.

- With the development and need more catchy and additional features would be included in order to fulfill business need.

- For exploring more about the performance and to know how about the application closely, "usability testing" must be conducted.

- By providing certain privileges more insight fields can be extracted from the social networking medium.

Chapter 10

Conclusion

10. Conclusion

The invention relates to a custom mobile application which will enable creation of a user profile along criteria that include some minimally required ones and many customizable ones.

Recently it has been seen that the success of most social networking type applications depends on the ability to attract larger number of female users, as it is generally believed that male populations are not the problem. This business offering will sharply focus on the preferences and concerns of the Indian female user, which is different from the global female, as well as complex and varying. The platform will be designed in a way to allow such seekers to use it with high satisfaction. Based on initial research, the following criteria are key to focus on:

- Authentic male profiles
- Create perception of plentiful quality male profiles – based on educational background, professional success, family background etc.
- Serious individuals –use user feedback to provide strong filtering criteria that allows girls to weed-out frivolous individuals, if so desired
- Anonymity – many women maybe unlikely to publicly acknowledge a relationship until well later in process
- Group Meeting Suggestions – organized efforts in partnership with a venue partner (e.g. Café Coffee Day) for group meetings, to reduce fear/risk of meetings

Appendix A

1) In which age group you are ?
- 18 - 21
- 22 - 25
- above 25

2) Your hometown ?

3) What is your gender ?
- male
- female

4) Do you like being approached by good and authentic boys, for friendship?
- Yes
- No

5) Why, are you not interested in being approached by good and authentic boys, for friendship?
- No interest
- prefer offline friends
- others

6) What type(s) of relationships are majority of your age-group interested in ?
- serious
- short-term
- friend only
- anonymous chat
- not interested in meeting boys

7) What all aspects do you consider while accepting/searching new online friends (boy) ?

- age
- current locality
- education
- mutual friends
- profile picture
- others
- working/not working

8) What concerns you most about making new online friends (boys)?

- online safety
- revealing your identity & contact information before becoming familiar
- fraud profiles
- Previous Bad Experience
- No concerns, I'm comfortable
- Others
- don't believe in meeting new friends

9) If you make good online friends (boys), would you prefer them to be local?

- Yes, if we like each other, it is easier to meet.
- No, location is not important

10)   Is Facebook sufficient for finding/making new friends (boys)?

- Yes, I can find good enough profile within my own network
- No, I use it only for old contacts, not for finding new friends
- No, its too public to make new friend requests

11)   Do girls use other websites for finding/making new friends with boys?

- No
- Yes, popular sites are

12)   Does Facebook provide a good enough idea about a boy's profile?

- Yes, it has the main details i care about (age, education, work, etc)
- No, because profiles are often incomplete
- No, because there is no information on issues like personality-type, sense-of-humor, attitude to women,etc

13)   Do you think girls approach 2nd or 3rd degree friends (boys) on Facebook? (friends of friends/friends of friends of friends)

- yes
- No

14)   Do girls in your circle, use Facebook to approach unknown profiles?

- yes
- No

15)   Do girls look at boy's Facebook status while approaching ? (single/committed/complex)

- yes
- No

16)   Do girls introduce/refer boys to other girls on Facebook ?

- yes
- No

17)   Would girls like to share their real relationship status updates on Facebook ?

- yes

- No

18)   Do you think girls will like to approach/interact with more boys on a website that provides 100% authentic profiles?

- yes
- No

19)   If we provide a safe online environment, where people have genuine identities, and your name/contact can be hidden as long as you prefer, would you prefer to explore new friends (boys)?

- Yes
- No

20)   Any comments (what all you want to be implemented in such type of social system).

Appendix B

1) In which age group you are ?

- 18 - 21
- 22 - 25
- above 25

2) Your hometown ?

3) What is your gender ?

- male
- female

4) Do you like being approached by good and authentic girls, for friendship?

- Yes
- No

5) Why are you not interested in being approached by good and authentic girls, for friendship?

- No interest
- prefer offline friends
- others

6) What type(s) of relationships are majority of your age-group interested in ?

- serious
- short-term
- friend only
- anonymous chat
- not interested in meeting boys

7) What all aspects do you consider while accepting/searching new online friends (girls) ?
- age
- current locality
- education
- mutual friends
- profile picture
- others
- working/not working

8) What concerns you most about making new online friends (girls)?
- online safety
- revealing your identity & contact information before becoming familiar
- fraud profiles
- Previous Bad Experience
- No concerns, I'm comfortable
- Others
- don't believe in meeting new friends

9) If you make good online friends (girls), would you prefer them to be local?
- Yes, if we like each other, it is easier to meet.
- No, location is not important

10) Is Facebook sufficient for finding/making new friends (boys)?
- Yes, I can find good enough profile within my own network
- No, I use it only for old contacts, not for finding new friends
- No, its too public to make new friend requests

11) Do girls use other websites for finding/making new friends with girls?
- No

- Yes, popular sites are

12)   Does Facebook provides a good enough idea about a girl's profile?
- Yes, it has the main details i care about (age, education, work, etc)
- No, because profiles are often incomplete
- No, because there is no information on issues like personality-type, sense-of-humor, attitude to women,etc

13)   Do you think boys approach 2nd or 3rd degree friends (girls) on Facebook? (friends of friends/friends of friends of friends)
- yes
- No

14)   Do boys in your circle, use Facebook to approach unknown profiles?
- yes
- No

15)   Do boys look at girl's Facebook status while approaching ? (single/committed/complex)
- yes
- No

16)   Do boys introduce/refer girls to other boys on Facebook ?
- yes
- No

17)   Would boys like to share their real relationship status updates on Facebook?
- yes
- No

18) Do you think boys will like to approach/interact with more girls on a website that provides 100% authentic profiles?

- yes
- No

19) If we provide a safe online environment, where people have genuine identities, and your name/contact can be hidden as long as you prefer, would you prefer to explore new friends (girls)?

- Yes
- No

20) Any comments (what all you want to be implemented in such type of social system).

Appendix C

Tasks for Usability Evaluation.

1. Create your account in Application
2. Login into your account
3. Select and promote a user
4. Browse for the profile picture
5. Search the usernames based on location
6. Pick the Image files from above search activity
7. Change the Interface Language
8. Refer any username to your friend
9. Logout
10. Search the usernames based on age limits

Appendix D

S.No	Statement	Strongly Satisfied (5)	Satisfied (4)	Less Satisfied (3)	Not Satisfied (2)	Strongly Not Satisfied (1)
1	It assists me to get my results in effective manner					
2	It was easy to learn to use					
3	It boots up my knowledge related to my interested field					
4	Exploring the new features by trial and error is					
5	It is time saving when I am using it					
6	It gives me results according to my desired search					
7	It is simple and easy to use					
8	It Provides efficient search techniques					
9	This system shows positive feedback at every step					
10	It is consistent and its is not difficult to remember all steps					
11	I should recommend this to my colleague.					
12	It is reliable and gives nie information according to my needs.					
13	The functions/facilities of the system is effective, facilitates me to complete my tasks					
14	I am satisfied with its use.					

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