

A
Preliminary Project Report
on

**“Android Encrypted Chatting & Secure Image Sharing System with
Traceability using micro NLP library, Text Flags and Heat
Mapping”**

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CERTIFICATE

This is to certify that project entitled “**Android Encrypted Chatting & Secure Image Sharing System with Traceability using micro NLP library, Text Flags and Heat Mapping**” has been carried out by Ishan D. Gupta and Sandhya S. Mahajan of BE Computer Engineering under the guidance of Prof. D. R. Patil during the academic year 2019-20.

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ACKNOWLEDGEMENT

Perseverance, Inspiration Motivation have always played a key role in the success of any venture. At this level of understanding it is often difficult to understand the wide spectrum of knowledge without proper guidance and advice.

Hence we take this opportunity to thank my respected guide **Prof. D. R. Patil** to work under his valuable guidance, closely supervising this work, offering many innovative ideas and helpful suggestions, which led to the successful completion of this work. He has kept an eye on the progress of my work and was always available when we needed his expert advises.

We are especially thankful to **Prof. Dr. Nitin N. Patil [H.O.D Computer Engineering]** and all other members of department who fully co-operated me during my project work.

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ABSTRACT

Seeing the recent breaches and lapses in security in the technological world and information sharing. This application will provide a simple and standardised encrypted communication system for reliable communication between the users with anonymous traceability using a micro NLP library which will process the data securely locally, check for text flags and then place on a heat map depending on the severity of the threat.

Chapter 1

Introduction

1.1 Introduction

We are currently living in an age where technological revolution is at its peak. Even the moon is no longer far away from us, and digital connectivity is what is making this very possible. We can easily contact anyone across the globe within the blink of an eye. Video conferencing, instant messaging, sharing photos, data and much more is the way of the future, but this future holds a big caveat, that is privacy.

Privacy is a concern that has both advantages and disadvantages, too much or too little of it can have devastating consequences. In this project we are trying to find a way to make privacy an integral part of the common people's lives without allowing wrong doers to misuse this privilege.

1.2 Need for the System

In recent times we have seen that how anti-social elements can use privacy to do their evil bidding without being traced or having any repercussions. This is extremely detrimental to the society because to bring these wrong doers to justice or stop the spread of mis-information, currently the only way is to either cut off all forms of communication or to let nothing be private anymore.

1.3 Problem Definition

The problem we are facing is challenging but not impossible. We need to find an effective way to track people who are spreading chaos and confusion and costing of innocent lives world wide, while also keeping the privacy of the people doing their normal daily business living in harmony. This tracking has to be done in a way that the method of tracking is open source and can be in the public eye so that people with agendas cannot mis-use this power over any democracy.

1.4 Presently Available Systems

Presently there is a way to provide open source end to end encryption developed by Open Whisper Systems, but no such system or technology to provide private and open source tracking that allows users to be in control of the way information is being shared.

1.5 Modules of the System

The system designed will consist of three main modules

1. End to end encryption.
2. Local Natural Language Processing.
3. Heat Mapping based on red flags.

1.6 Future Prospects

The future prospects of this project are unlimited as this is open source system, it can be used and improved but the community of developers around the globe and create a safer tomorrow for everyone.

Chapter 2

Requirement Analysis

2.1 Requirement Analysis

Analysis of the given project based on its requirement

1. Designing a basic chat application using firebase authentication and database.
2. Implementing end to end encryption on chat data using signal protocol.
3. Implementing NLP locally using open micro library.
4. Collecting data based on NLP for analysis with open list of red flagged keywords.
5. Based on collected data, if red flags are high plot anonymous location on map.

2.2 Method of Requirement Analysis

We will be using the Figure 2.1 shown below for method of analysis:

2.3 Data Requirement

Input Data required:

1. Random created and forwarded messages without flags.
2. Created messages with flags
3. Forwarded messages with flags

2.4 Functional Requirement

Functions that will be required for carrying out the process will be

1. Decrypter

2. Encrypter
3. NLP analyser
4. Heat map plotter

2.5 System Specification

Below are the system specifications:

1. Machine capable of running android studio
(check specification on <https://developer.android.com/studio>)
2. Internet connectivity
3. Firebase connectivity

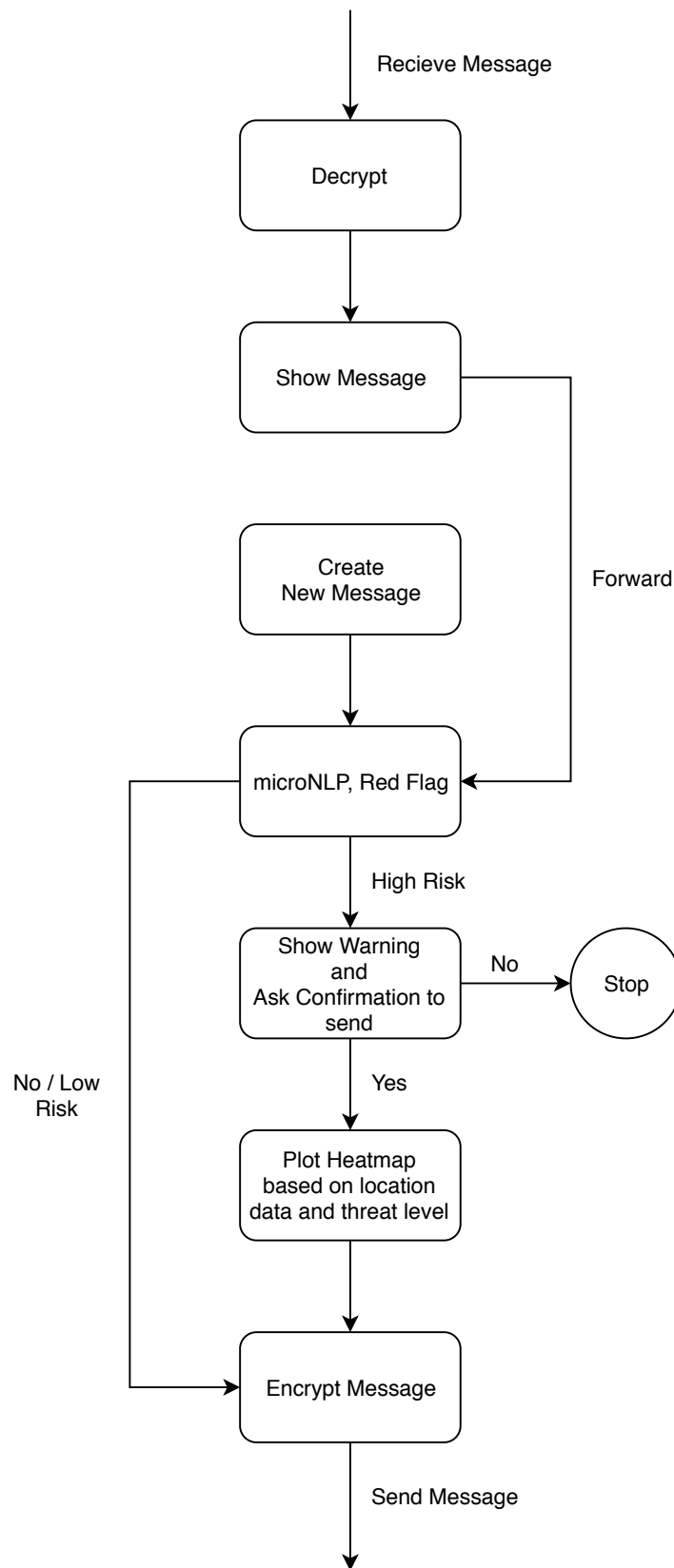


Figure 2.1: Method of Requirement Analysis

Chapter 3

Planning and Scheduling

3.1 Planning and Scheduling

The entire project will consist of 5 parts of 2 months each:

1. Building a basic messaging application in android using firebase.
2. Integrating End to End Encryption into the app service.
3. Building and integrating a Micro NLP module for red flagging of sensitive content.
4. Using red flagged data to create a heat map.
5. Alpha testing and Beta testing.

3.2 Project Planning

The Project will be made with the following guidelines

1. The End to End encryption will be modular so it can be swapped out for any other type.
2. The micro NLP module including the red flagged keywords will be open source.
3. The heat map generation will be open source so it can be easily accessed by law enforcing and practicing agencies

3.3 Project Scheduling(Cost & Effort)

The project will be scheduled into 4 initial parts of 2 months each and the last 2 months for testing which will make it a recursive process.

Since the project emphasises on the open source nature of the modules implemented there is no actual dead line for completion and the project will be active for as long as supported by the community, with constant improvements and changes for its betterment throughout its lifespan.

Being Open sourced the project will attract minimum cost with community effort

3.4 Risk Assessment

Risk of the project failing is minimal due to its open source nature and emphasis on user privacy, as improvement through out its lifespan will ultimately make it an effective solution to the current problem.

The only downside for this is, open-source projects entirely depend upon the consumer feedback and acceptance rate, developer community involvement and donations.

3.5 Software Requirement Specification

Software requirements will be as follows:

1. Android Studio (check system requirements on <https://developer.android.com/studio>).
2. Code Editor (eg. [VS Code](#), [Atom](#), [Sublime Text](#), [Notepad++](#)).
3. Android OS (supported Google Play [targetSdkVersion](#), current is API level 28).

3.6 Data Flow Diagram

Following are the data flow diagrams for the implementation of the microNLP and Heat mapping modules developed by us. Level 0,1,2

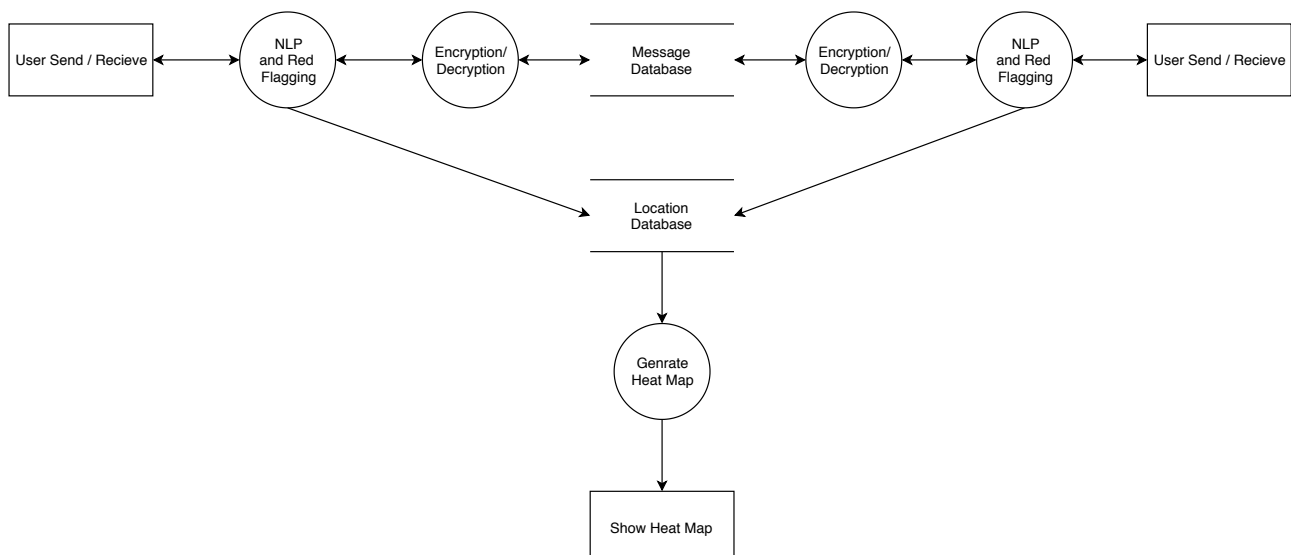


Figure 3.1: DFD Level 0

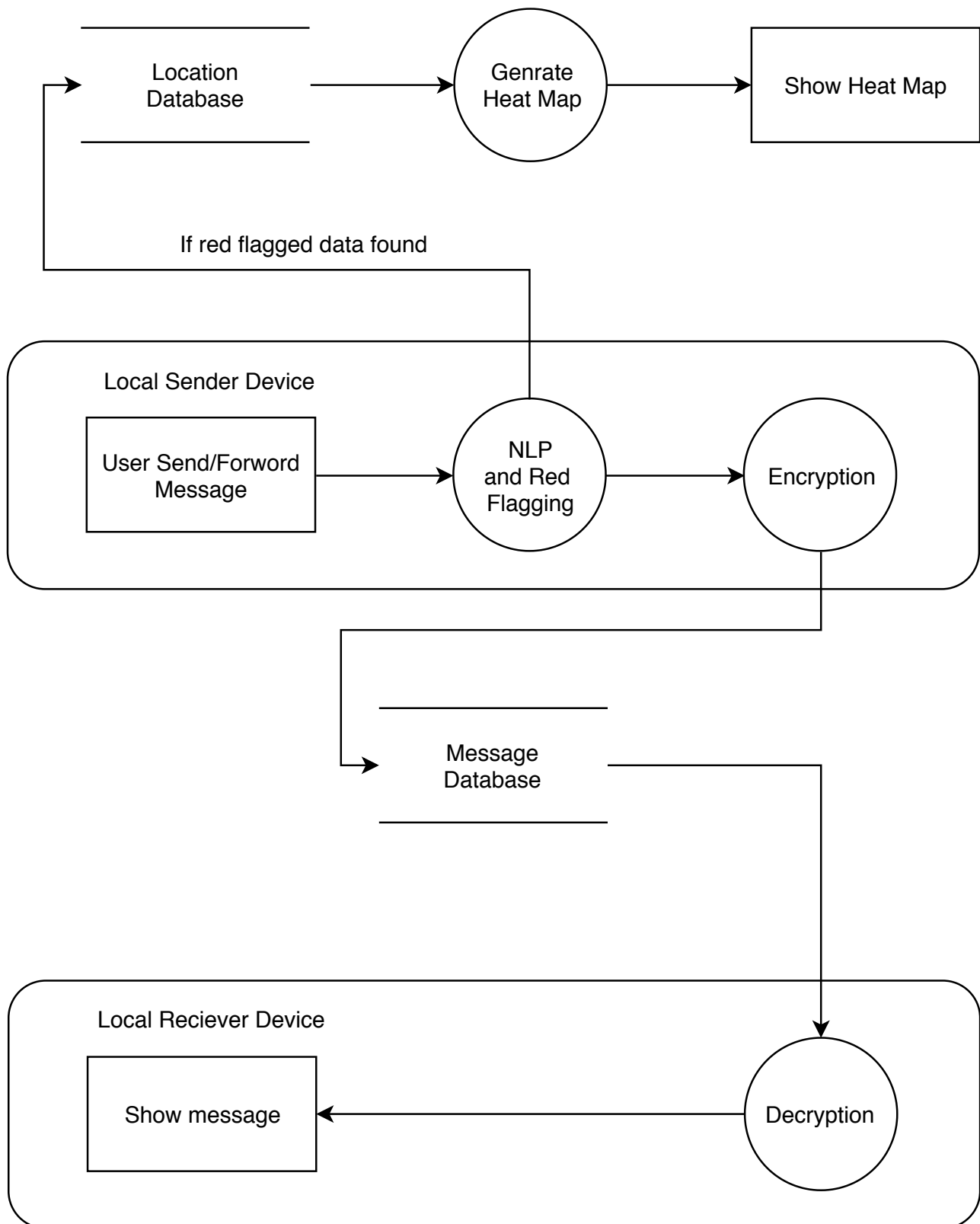


Figure 3.2: DFD Level 1

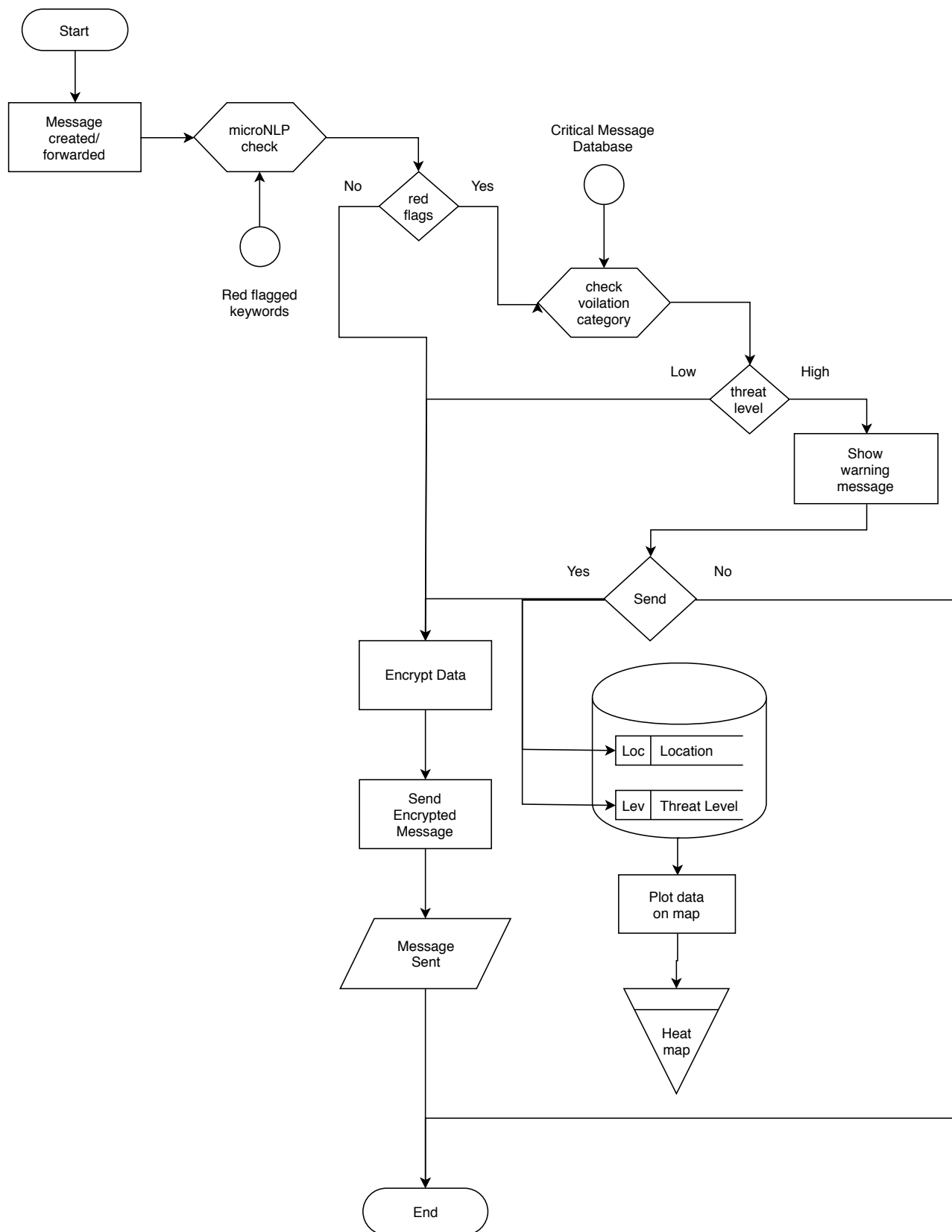


Figure 3.3: DFD Level 2

Chapter 4

System Modeling

4.1 Need for System Modelling

We are currently living in an age where technological revolution is at its peak. Even the moon is no longer far away from us, and digital connectivity is what is making this very possible. We can easily contact anyone across the globe within the blink of an eye. Video conferencing, instant messaging, sharing photos, data and much more is the way of the future, but this future holds a big caveat, that is privacy.

4.2 UML Diagrams

We are currently living in an age where technological revolution is at its peak. Even the moon is no longer far away from us, and digital connectivity is what is making this very possible. We can easily contact anyone across the globe within the blink of an eye. Video conferencing, instant messaging, sharing photos, data and much more is the way of the future, but this future holds a big caveat, that is privacy.

4.2.1 Structural Diagrams

The structural diagrams represent the static aspect of the system. These static aspects represent those parts of a diagram, which forms the main structure and are therefore stable.

- Class Diagram

4.2.2 Behaviour Diagrams

Behavioral diagrams basically capture the dynamic aspect of a system. Dynamic aspect can be further described as the changing/moving parts of a system.

- Activity Diagram
- Use Case Diagram

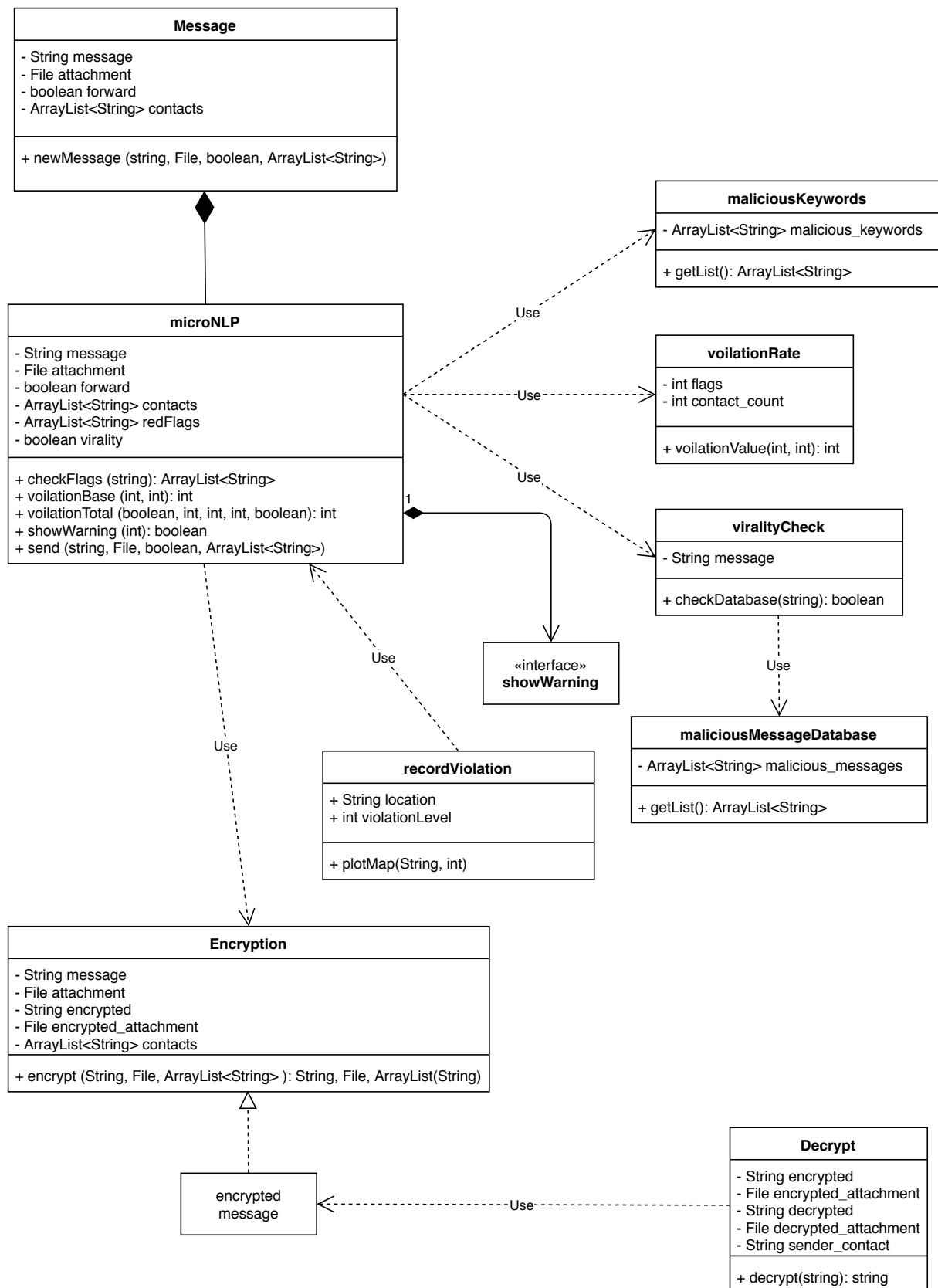


Figure 4.1: Class Diagram

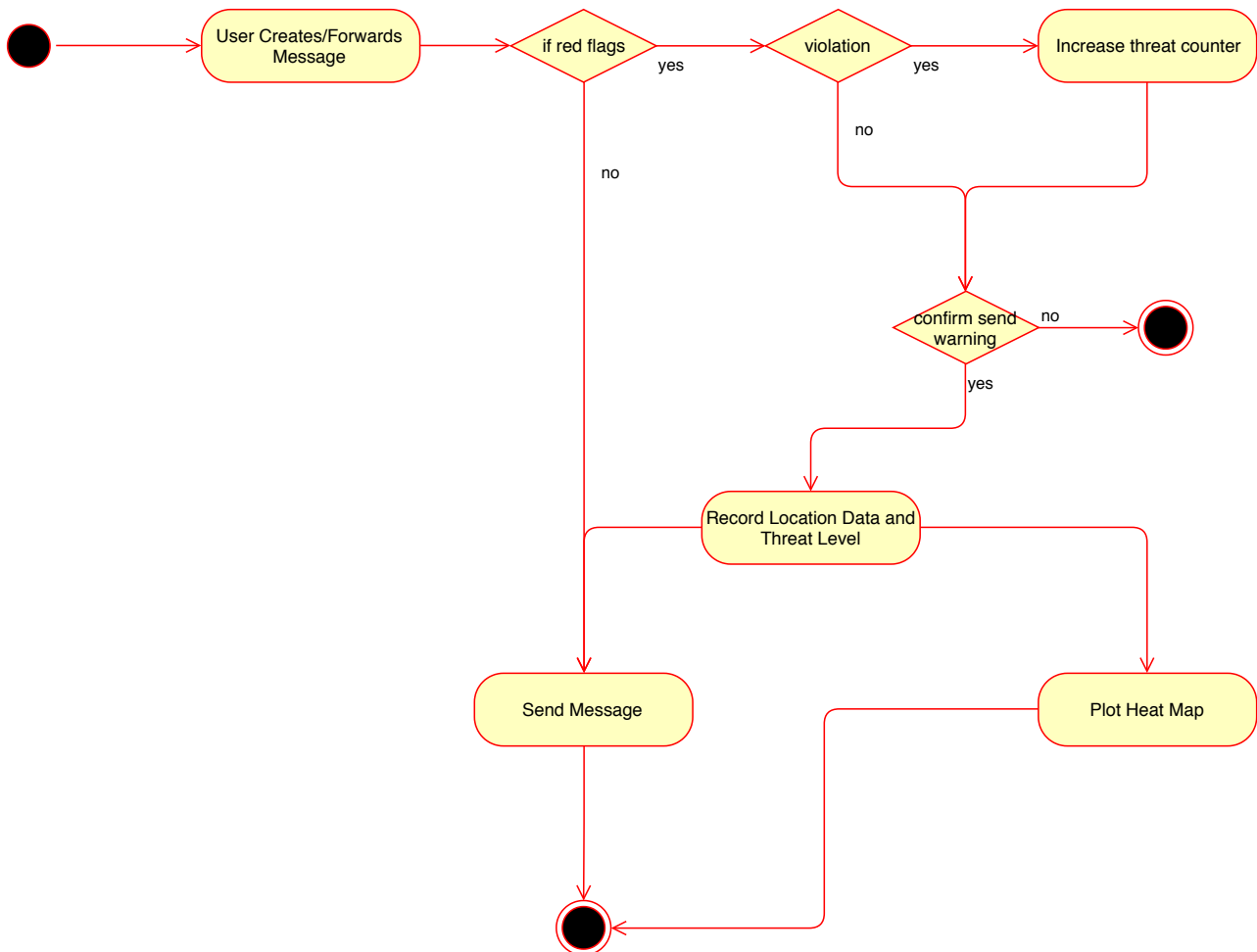


Figure 4.2: Activity Diagram

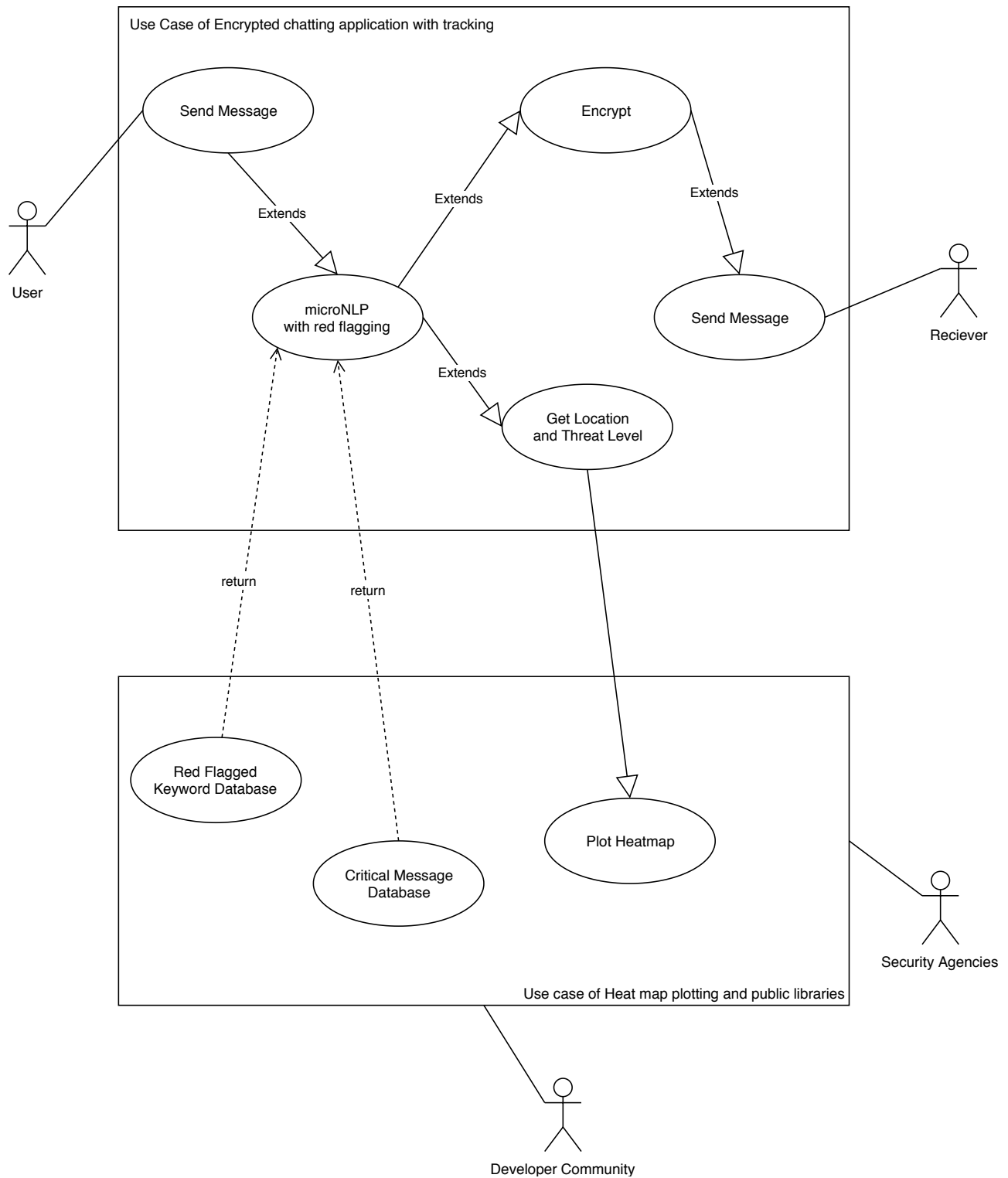


Figure 4.3: Use Case Diagram

Chapter 5

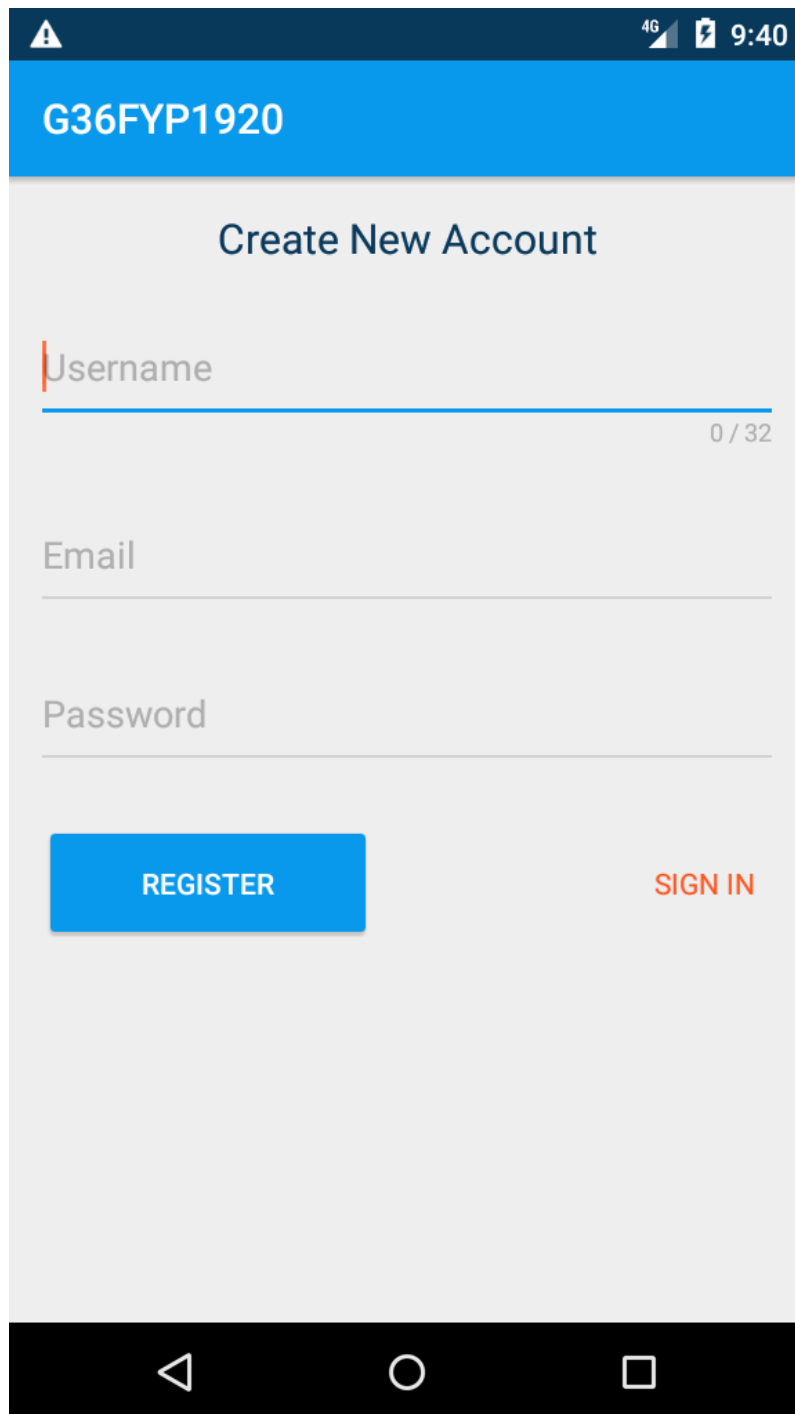
Implementation of First Module

5.1 Basic Android Chat Application

Below are screenshots of the first module which is the base for the Android Chat Application with a Database backend.



Figure 5.1: Splash Screen



A screenshot of a mobile application's registration page. The top status bar shows a warning icon, 4G signal, battery level, and time 9:40. Below this is a blue header bar with the text 'G36FYP1920'. The main content area has a light gray background and is titled 'Create New Account'. It contains three input fields: 'Username' with a red vertical cursor and a '0 / 32' character count, 'Email', and 'Password'. At the bottom of the form are two buttons: a blue 'REGISTER' button and a red 'SIGN IN' button. The bottom of the screen shows the standard Android navigation bar with back, home, and recent apps icons.

G36FYP1920

Create New Account

Username 0 / 32

Email

Password

REGISTER SIGN IN

Figure 5.2: Register Page

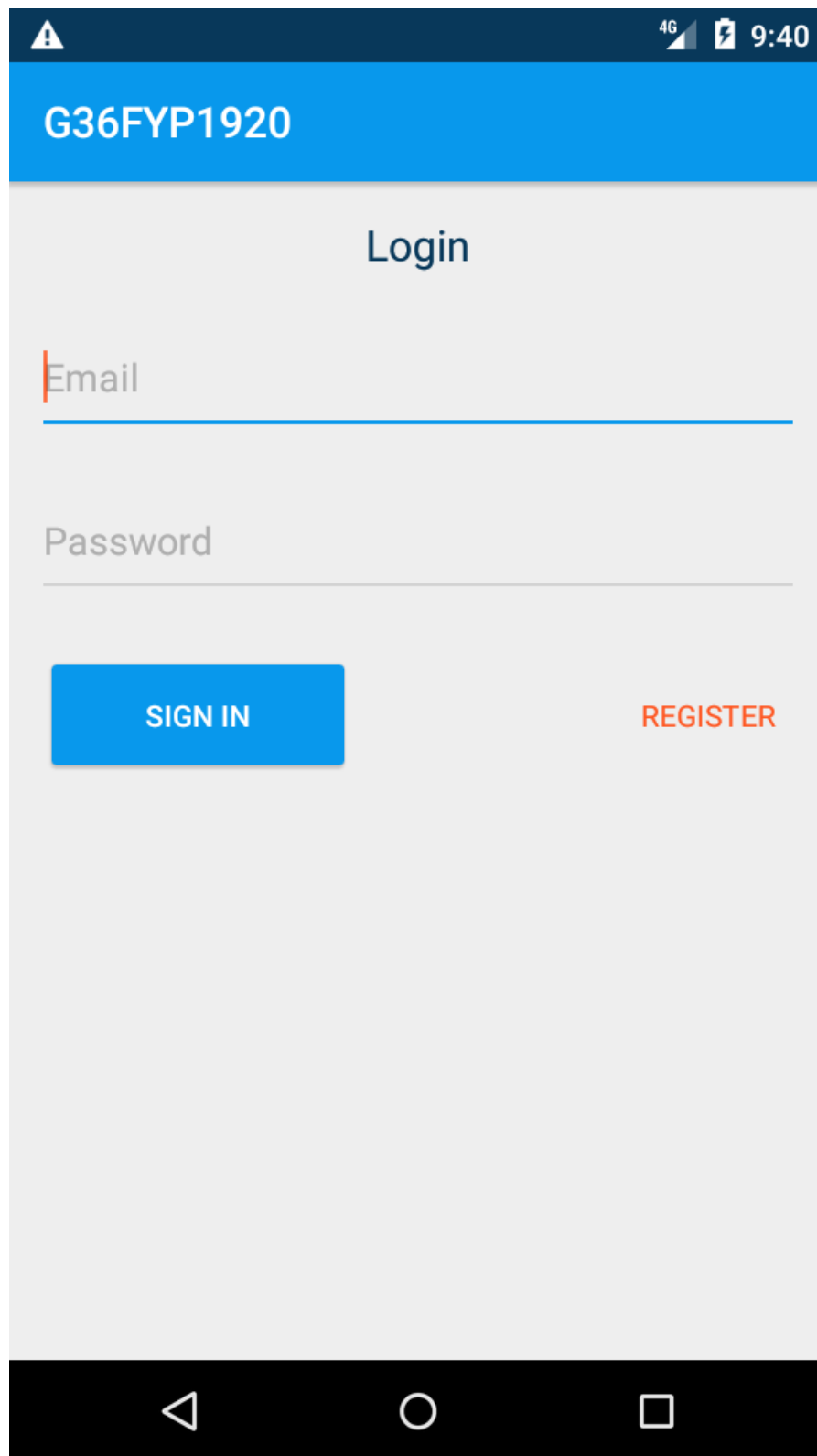


Figure 5.3: Login Page

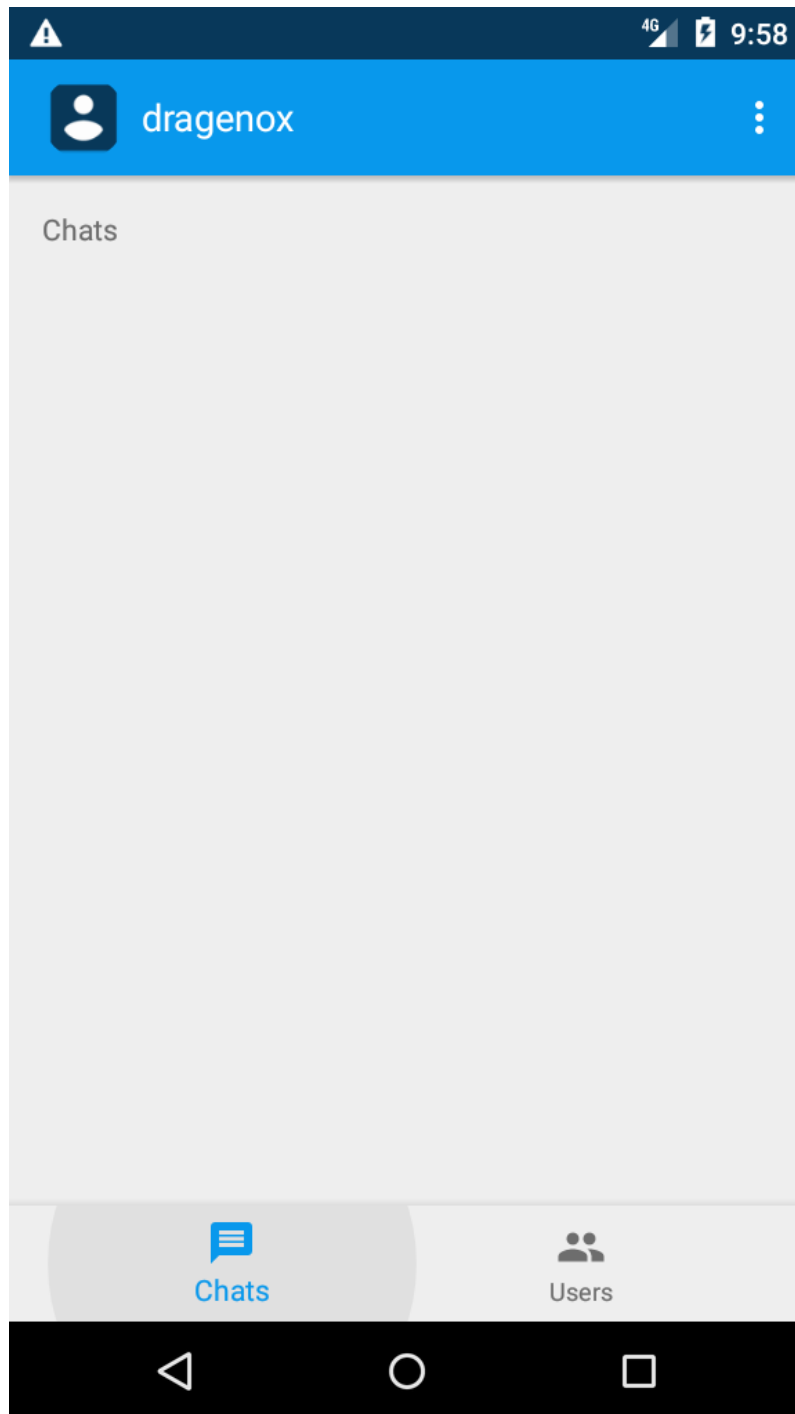


Figure 5.4: Home Page (Chats)

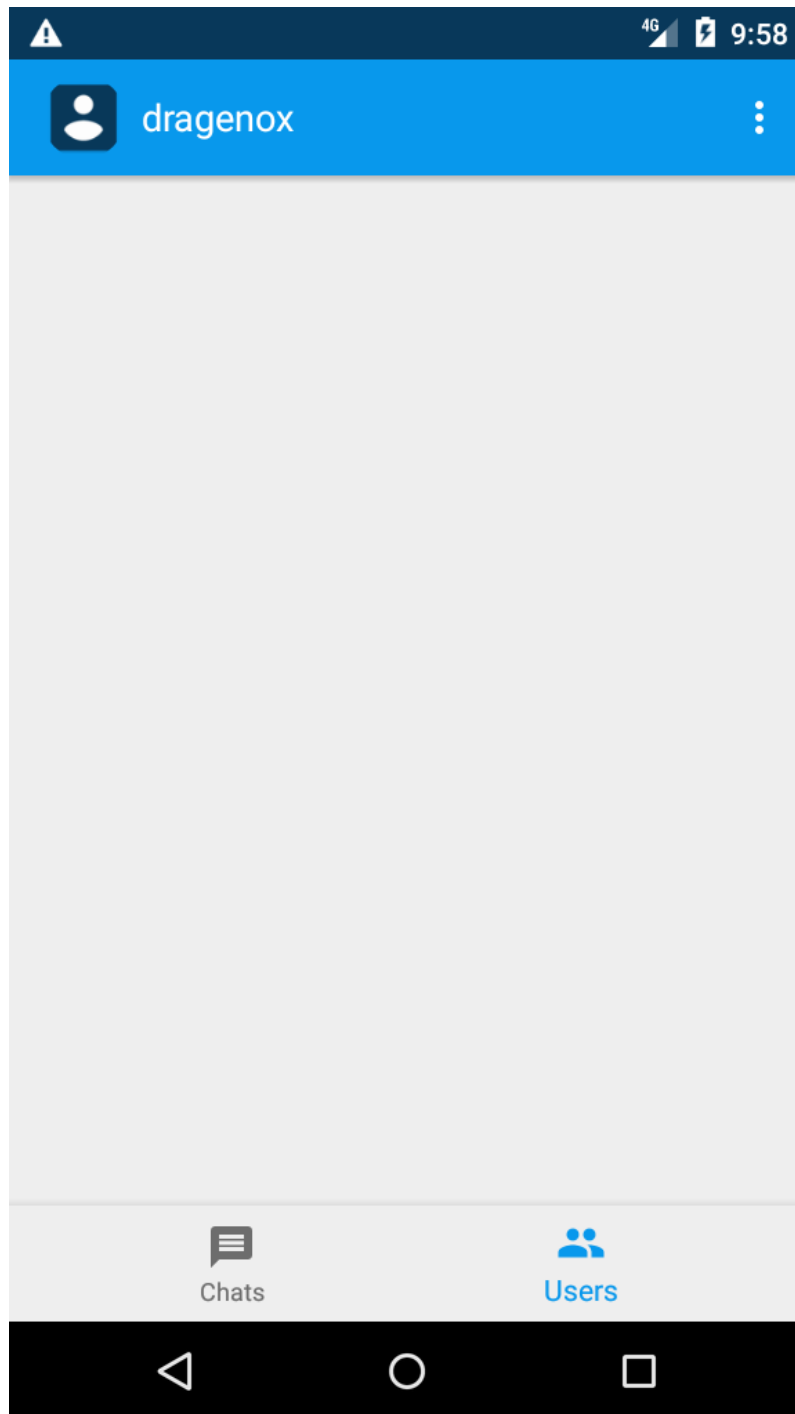


Figure 5.5: Home Page (Contacts)

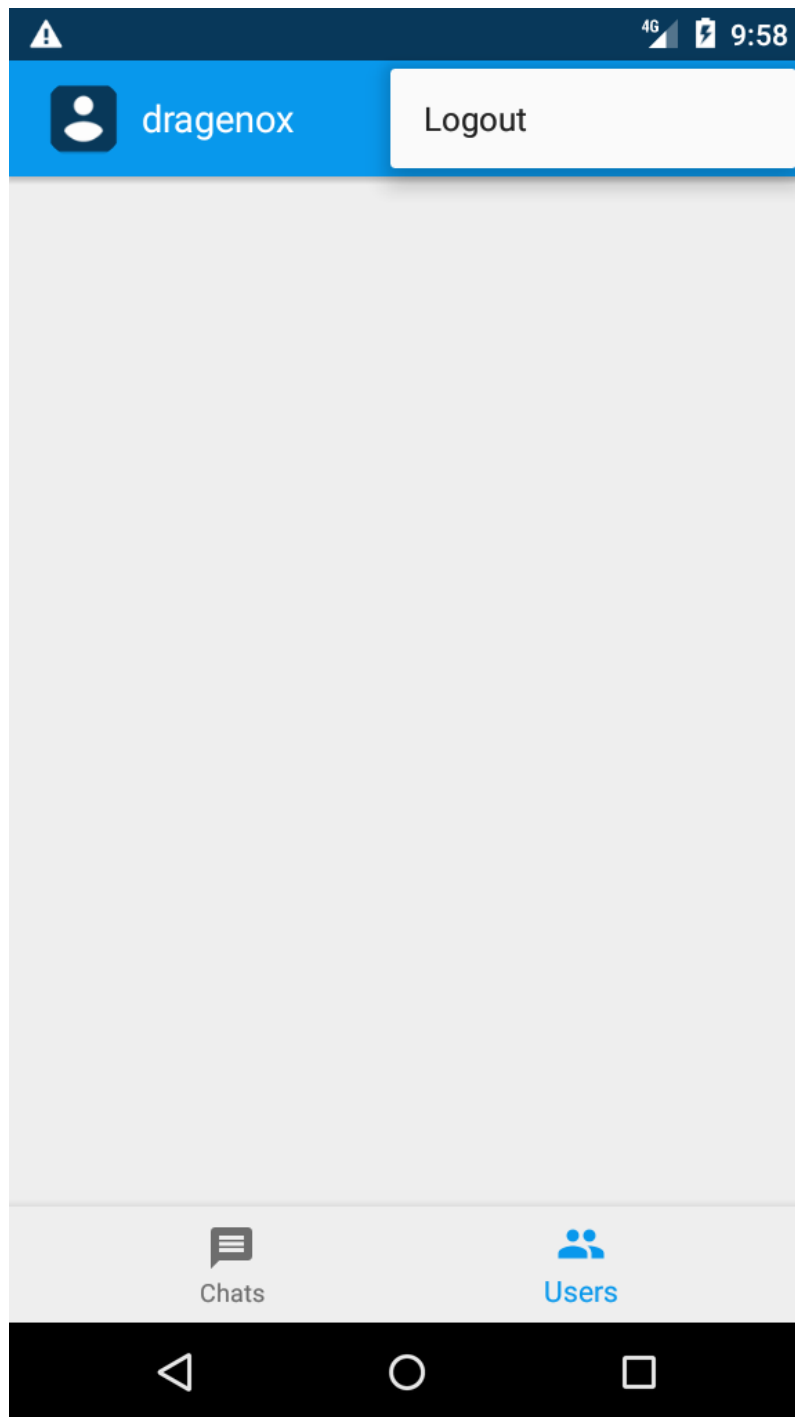


Figure 5.6: Chat View



Figure 5.7: Firebase (Database)

Conclusion

This project has been very insightful and excited new ideas in our minds on tackling a very present social evil. We as the people of the digital age still do not understand the power that we have been bestowed with and this project tries its best to keep this power in check.

The idea presented in this project is original and hence its application difficult as such a task has not been undertaken yet. But we are hopeful and confident that our efforts will not go in vain and a fruitful outcome will be presented to us.

Bibliography

- [1] Google <https://www.google.com>
- [2] Wikipedia <https://www.wikipedia.org>
- [3] StackOverflow <https://stackoverflow.com>
- [4] GitHub <https://github.com>
- [5] Medium <https://medium.com>