Finding Friends for the Same Purpose at Close Distance

Software Requirement Specification

2021.04.25.

Introduction to Software Engineering

TEAM 7 (유생찾기)

Team Leader	Eunju Seok
Team Member	Eunji Gil
Team Member	Hyeyeong Kim
Team Member	Georyang Park
Team Member	Jiwon Seo
Team Member	Hyejoon Jang

CONTENTS

LIST OF FIGURE

LIST OF TABLES

1. Introduction

1.1. Purpose

This document is a Software Requirements Specification (SRS) for providing '유생찾기' services. It is an application that users can find friends for the same purpose at close distance. This service is designed and implemented by Team 7 of the Introduction to Software Engineering at Sungkyunkwan University. The requirements for this are summarized, analyzed, and the system is designed and implemented based on the contents described. In this document, Team 7 is the main reader, and Team 7 designs and implements the functions of this service according to this specification. Additionally, professor, TAs, and team members in the Introduction to Software Engineering class can be the main readers. The purpose of this document is to outline and publish the Requirement Specification for a new mobile application for helping to find friends with the same purpose. Unlike other communities in SKKU, '유생찾기' allows users to build a social network by talking with friends comfortably and pleasantly and meeting friends for the same purpose. This app uses complex algorithms that recommend friends with similar purpose and open/exit chat rooms in places users want to go together using their own profile.

1.2. Scope

The system is an application that helps users find friends with the same purpose and has many opportunities to make various friends. This system is a location-based chat service. We will support users to open chat rooms where they can chat with friends based on places they want to go together. Users can set profiles and get friends' recommendation with the same purpose. Above all, we want users to have a user experience where they can make friends easily and pleasantly at SKKU.

1.3. Definitions, Acronyms, and Abbreviation

The following table explains the acronyms and abbreviations used in this document.

[Table 1] Table of acronyms and abbreviations

Acronyms& Abbreviations	Explanation
RAM	Random Access Memory
HDD	Hard Disk Drive
CPU	Central Processing Unit
SSD	Solid-State Drive
OS	Operating System
GUI	Graphical User Interface
API	Application Programming Interface
UI	User Interface
HTTP	Hypertext Transfer Protocol

The following table defines certain technical terms used in this document.

[Table 2] Table of terms and definitions

Terms	Definitions
User	Someone who uses a system
System administrator	Someone who quantify the keywords included in the reviews for each laptop and manage the system
Back-End	Application part that is not directly accessed by the user, such as the server and database
Front-End	The user interface, also known as the presentation layer of an application
Algorithm	A set of rules or procedures followed by a computer in problem-solving operations

Terms	Definitions
Client (user device)	A user device/user that connected to server
Server	A computer or computer program which manages access to a centralized resource or service in a network
Software	The programs and other operating information used by a computer
Network	For connect devices together so that they can share information. In this system, it usually means internet

1.4. References

- IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications, In IEEEXplore Digital Library http://ieeexplore.ieee.org/Xplore/guesthome.jsp
- Team 1. “Software Requirement Specification”. SKKU, Last Modified: May. 15, 2020. https://github.com/skkuse/2020spring_41class_team1/blob/master/docs/SRS_TEAM1.docx
- Multimedia Service Team. “Software Requirement Specification of Multimedia Contents-aware Intelligent Information Service System”. Kangwon National University. (2007)

1.5. Overview

The remainder of this Software Requirement Specification document includes three chapters and an appendix. The second chapter provides an overall description of the product's perspective, including multiple interfaces, system features, and system interactions with other systems. This chapter also introduces interactions with different types of stakeholders and systems. This chapter also discusses item details, system constraints, assumptions, and product dependencies. The third chapter provides detailed requirement specifications, including a description of the various system interfaces and software system characteristics. Various specification techniques are used to more accurately specify requirements for different users. It also displays many use cases and data dictionaries. The fourth chapter mainly deals with the priorities of requirements. This includes a support document, a timeline for this SRS document for application '유생찾기'. All members contributed equally to the production of this project. I hope readers enjoy this document.

2. Overall Description

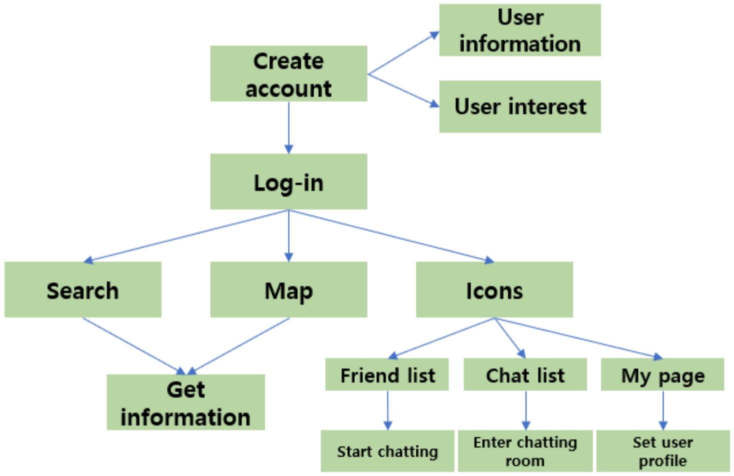
2.1. Product perspective

This product is designed for college students who don't have a lot of opportunities to make new friends in campus. This application will make it easier for those students to make friends that have same objective with them. This application will use GPS(Global Positioning System) of users, database of user information, students' requirements and purpose of their usage.

2.1.1. Market status

There are three kinds of communities to connect with students in SKKU. First, "Everytime" is a community accessible to the entire college students, and it has a lot of bulletins. Students can find some information about school life, but there is a limit to getting proper answer they want. Because there are so many questions or articles are posted in real time, so their posting is pushed back to new posting easily. Also, because of the anonymity and various topics, it is hard to promote friendship with friends that have the same purpose. Next, "Kakao open-chatting room" is a group chat composed of the same department students or club members. Compared to "Everytime", it is easier to share needed information. Because the group size of this chatting room is smaller than "Everytime". But, similar to "Everytime", it is usually anonymous and students communicate with short question and answer rather than long-term conversation, so it is difficult to form a friendship with each other in the chatting room. Finally, "SKKUTER" is a community that accessible to both current students and graduates. It provides information sharing with graduates and current students but it has low accessibility due to web page access required. Also, it is hard to promote friendship with friends with the same purpose.

2.1.2. Overall structure



[Figure 1] System Structure

2.2. Product functions

2.2.1. Create user account and log-in

The first thing for user to do is downloading the application. After the user downloads this application, the user need account for enter and use the application functions. The first page of our application is login page which include the register button. User can enter the register page with this register button and fill the required information field to create their own account. Then user can log-in and enter to the system with their account.

2.2.2. View the Map

After the logging in, user can view the map. The map only shows the range close to the user's current location. Users can choose the interesting places in the map or search for the places using search button. Then user can get the information of places they want to go.

2.2.3. Choose the Category

At the top of the map screen are category buttons where you can choose a purpose. Users can select a category to find other students with the same purpose.

2.2.4. Icons

At the bottom of the map screen are three icons. One is a “friend list”, the other is a “chat list”, and the other is “my page”. User can check the list of friends he or she have added as friends by clicking the “friend list” icon. User can start the chatting clicking the friend’s profile. User can check the list of chatting room that he or she had participated by clicking the “chat list” icon. And user can change his or her profile such as, nickname, department, image, introduction by clicking the “my page” icon.

2.2.5. Rating and Review

After the chatting room closing, users can leave ratings and reviews about the other's attitude or manners.

2.2.6. Block other users

If there is a problem with other users, a user can block them that cannot start the chat again or find on the map.

2.3. User Classes and Characteristics

2.3.1. User

The user in this application is limited to “a specific college” students. For example, it can be the SKKU students. User is assumed that are interested in finding students with the same purpose or making friends. It is also assumed that user can read and understand basic Korean or English. User is assumed to have basic knowledge to use or install applications on their own devices.

2.3.2. System Manager

The system manager in this application is limited to specialist of the system. They need to have sufficient knowledge of the system and can understand overall system circumstance. It is also assumed that they have competence to detect the system error or such kind of problems. And they should be able to deal with that error or problems. It is assumed that the system managers have ability to reflect the new system changes. To satisfy these things, the system administrator must be a computer engineering, network, or system-related major, or a person with equivalent knowledge and qualifications. And, of course, they must have a software ethics consciousness too.

2.4. Operating Environment

2.4.1. Hardware

The system is for Android mobile phone. The device, Android mobile phone need at least 1GB RAM and 1.0GHz single processor.

2.4.2. Software

The system is for Android OS. And its version should be at least Android 6.0 (API 23). But the version Android 10 (API 29) is the best environment.

2.5. Design and Implementation Constraints

The system will be designed and implemented by considering the following checklist. There are details of design and implementation directions.

- ✓ Showing the map should not take more than 2 seconds.
- ✓ The system needs to consider the users' convenient and requirements.
- ✓ The system should run on mobile devices with least 1GB RAM.

- ✓ The system requires at least 600MB for installation and execution.
- ✓ Source code will be optimized properly to prevent memory waste.
- ✓ User device and server communicate with HTTP protocol.
- ✓ Consider both the system cost and its maintenance cost.
- ✓ Korean and basic English are required.
- ✓ Avoid using additional pays for royalty, using open-source software as much as possible.
- ✓ Develop with Windows 10 environment and Android Studio. And the build tools version is 29.0.3
- ✓ Develop with minimum Android version 6.0 (API 29)
- ✓ Emulate the system using Android version 10 (API 29)

2.6. User Documentation

To assist end users to use the application and its service, some documentations are needed. First, minimum hardware and software requirements. And User manuals are also needed, the contents of user manuals are application installation guide to help users that not familiar with the device, description of how to start the system and how to use different features of the system. The screenshots explaining main features of the system and example inputs and outputs are attached in the user manual too and the explanation video about this document contents is also provided. And last, information to contact the developer of the system are given.

2.7. Assumptions and Dependencies

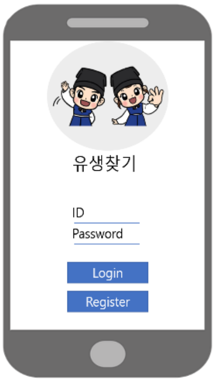
The systems are designed and implemented based on Android devices. Thus, all function and contents are based on the Android OS. And it can not be applied to different kind of Operating Systems (such as, IOS).

3. Specific Requirements

3.1. External Interface Requirements

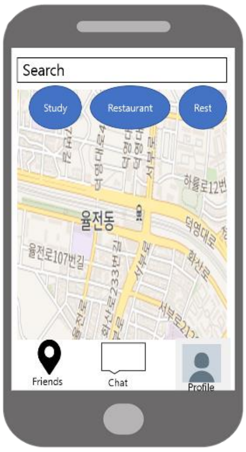
3.1.1. User Interfaces

[Table 3] Starting Interface

Name	Starting Interface
Purpose/Description	Users choose whether login or register to use this program.
Input source/ Output destination	Client/Server
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. User who has account press ID and Password before click Login button to access app. 2. User without account click register button to make new account 3. System will respond differently based on user's request. 
Format and configuration of window	N/A
Data type	Button, Text, Image
Instruction type	Instruction mapping according to the value of a button code

Name	Starting Interface
Exit message	N/A

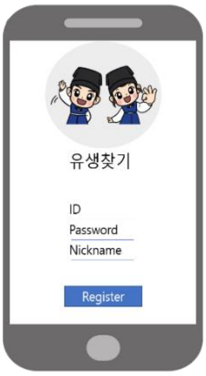
[Table 4] Main Interface

Name	Basic Interaction at Main Interface Using Touchscreen
Purpose/Description	Users transmit their instructions through a touchscreen of the device
Input source/ Output destination	User/ user device equipped with Android OS
Range/ Accuracy/ Margin of error	Range according to the number of buttons on the screen/ Accuracy according to the accuracy of touch from users/ Margin of error of touch sensitiveness
Unit	A click
Time/ Velocity	Asynchronous user input/ Instant execution of a user instruction
Relationship with other input/outputs	After receiving all the inputs, the user device transmits the input data to the server for processing the input data and request desired output data
Format and configuration of screen	1. An activity screen connected to an XML file, mainly composed of TextViews and ImageVIews 2.A TextView and an ImageView provide a basis for choosing the following input, and several Buttons are ready to receive the inputs from users 3. Users are to click a desired button to interact with the system  Search Study Restaurant Rest Friends Chat Profile
Format and configuration	N/A

Name	Basic Interaction at Main Interface Using Touchscreen
of window	
Data type	Screen
Instruction type	Instruction mapping according to the value of a button code
Exit message	N/A

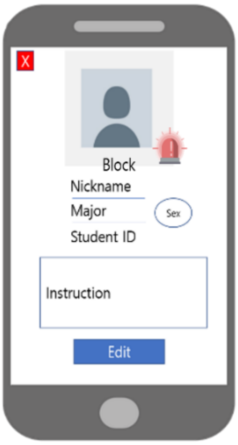
[Table 5] Register Interface

Name	Customization Interface 1 - Register
Purpose/Description	To use the service of the system, users have to register to the system, followed by Log-in process. During registration, they are asked to fill out the registration form.
Input source/ Output destination	Client/ Server
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A

Name	Customization Interface 1 - Register
Format and configuration of screen	1.Several empty slots for filling out necessary information of users in a vertical direction 2. At the bottom of the screen, there is a 'Register' button which returns all the information given by a user to the server for saving it  3.After successful registration process, the users are directed to starting interface.
Format and configuration of window	N/A
Data type	Query
Instruction type	Instruction mapped to the button
Exit message	"Register succeed!"

[Table 6] User profile Interface

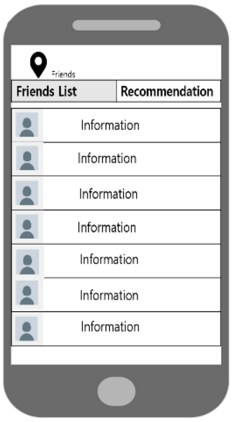
Name	Customization Interface 2 - Profile
Purpose/Description	After log-in, users can enter the 'Profile' page by clicking a button 'profile' in order to edit their information. Users can also enter the other users' profile in order to see information about them.
Input source/ Output destination	User/ Servers

Name	Customization Interface 2 - Profile
Range/ Accuracy/ Margin of error	N/A
Unit	Page
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. User can edit their profile information and picture if they enter their own profile page. 2. User can change information by click Edit button if they enter their own profile page. 3. User can exit profile page by click x button located at left above without change anything.  4. System will toast message if user who change his information click x button instead of edit button. 5. User can report other users to host by click siren button. 6. User can block other users by click 'Block' button. Blocked users

Name	Customization Interface 2 - Profile
	cannot see user profile and chat with user.
Format and configuration of window	N/A
Data type	Query
Instruction type	Instruction mapped according to the value of a button code
Exit message	“Profile Was Updated!”/ “Are you sure to exit without change information?”/ “Your report is successfully received”

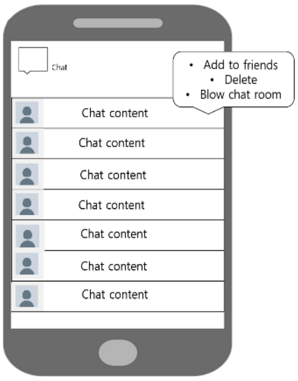
[Table 7] Friend lists Interface

Name	Customization 3 – Friends List
Purpose/Description	User can enter their friends list page by click friends’ button from main page.
Input source/ Output destination	Server / Client
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. Linear layout that shows friend lists to user with friends’ profile image, name, and information set by friends themselves.

Name	Customization 3 – Friends List
	2. User can enter friends' profile by click their information. 3. User can see friends' image by click image. 4.When a user clicks the button 'Recommendation', user is directed to the recommendation page.  Friends Friends List Recommendation Information Information Information Information Information Information Information
Format and configuration of window	N/A
Data type	Text, Image, Widget
Instruction type	N/A
Exit message	N/A

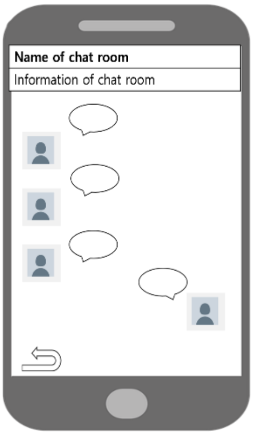
[Table 8] Chat room list Interface

Name	Customization Interface 4 – Chat room list
Purpose/Description	User can enter to chat room list by click 'chat' button from main page.
Input source/ Output destination	Client/ Server Server/ Client
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A

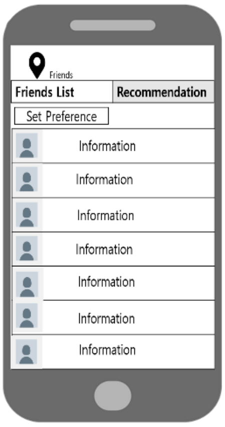
Name	**Customization Interface 4 – Chat room list**
Relationship with other input/outputs	N/A
Format and configuration of screen	1. Linear layout that shows chat room lists to user with friends' profile image, and last chat content with other users.  Chat • Add to friends • Delete • Blow chat room Chat content Chat content Chat content Chat content Chat content Chat content Chat content 2. When user click chat room, user enter the chat room. 3. When user click chat room long time, system shows buttons. 4. User can add selected friends by click 'Add friends' button. 5. User can delete chat room by click 'delete' button. 6. User can blow up chat room by click 'Blow the room' button.
Format and configuration of window	N/A
Data type	Image, Text, Widget
Instruction type	N/A
Exit message	N/A

[Table 9] Chat room Interface

Name	**Customization Interface 5 – Chat room**
Purpose/Description	User can enter to chat room by click one of chat room list from chat room list page.
Input source/ Output	Client/ Server

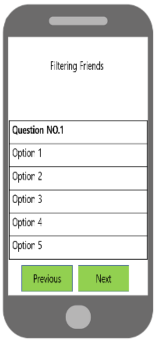
Name	**Customization Interface 5 – Chat room**
destination	Server/Client
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. TextView that show name and information of chat room. 2. User can see other users' profile by click image of other users. 3. User can send message to users in chat room by type text. 4. User can see chat content. 5. User can exit and go to chat room list by click button by left bottom. 
Format and configuration of window	N/A
Data type	Image, Text, Widget
Instruction type	N/A
Exit message	N/A

[Table 10] Recommendation Interface

Name	**Recommendation Interface 1 – Recommendation friends lists**
Purpose/Description	User can enter to recommendation friends lists by click recommendation button from friend lists page.
Input source/ Output destination	Server/Client
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. Linear layout that shows friends list recommended by system algorithm. 2. User can see other users' profile by click image of other users. 3. User can filter recommended friends by click 'preference' button. 4. User can go to friend lists page by click 'friend list' button.  Friends Friends List Recommendation Set Preference Information Information Information Information Information Information Information
Format and configuration of window	N/A
Data type	Image, Text, Widget
Instruction type	N/A

Name	Recommendation Interface 1 – Recommendation friends lists
Exit message	N/A

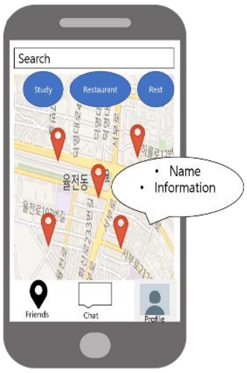
[Table 11] Filtering user preference Interface

Name	Recommendation Interface 2 – Filtering friends
Purpose/Description	User are asked numerous questions on the usage of potential friends. Users answer the questions by choosing a button representing answer regarding their preference on friends. When users answer all the questions, the data is transmitted to the server from the user device.
Input source/ Output destination	Server/Client Client/Server
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	After all the input data were received to the user device/ Communication time between the server and the user device
Relationship with other input/outputs	Each answer by user affects the result of filtering.
Format and configuration of screen	1. Question and lists of enable answers made by TextView. 2. User can answer the questions by select one of options. 3. User go next or previous question by click buttons located at bottom. 4. Server will show new recommendation friend lists reflected by user's answer after user answers all questions.  Filtering Friends Question NO.1 Option 1 Option 2 Option 3 Option 4 Option 5 Previous Next

Name	**Recommendation Interface 2 – Filtering friends**
Format and configuration of window	Activity with XML document
Data type	Image, Text, Widget, Query
Instruction type	N/A
Exit message	"Your recommendation friend lists are renewed!"

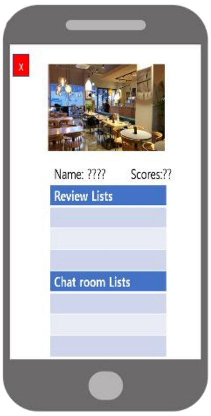
[Table 12] Search Interface - Location of targets

Name	**Search Interface 1 – Showing user requested targets on the map**
Purpose/Description	User can get location and information by searching what he wants and clicking buttons. Server will show location of targets related with user request.
Input source/ Output destination	Server/Client Client/Server
Range/ Accuracy/ Margin of error	Range according to the number of target on the screen/ Accuracy according to the accuracy of target location/ Margin of error of real location of target
Unit	Screen
Time/ Velocity	Asynchronous user input/ Communication time of a user instruction
Relationship with other input/outputs	After receiving user input, server processing the input data and request desired output data.
Format and configuration of screen	1. User can click button above the screen or type text in search widget to get location of targets.

Name	**Search Interface 1 – Showing user requested targets on the map**
	2. Server shows targets location based on location-based service 3. When user click one of targets on the map, server shows name and information of target. 4. When user click double one of the targets, user go to the place information page.  Search Study Restaurant Rest 율전동 • Name • Information Friends Chat Profile
Format and configuration of window	Activity with XML document
Data type	Image, Text, Widget, Query
Instruction type	N/A
Exit message	N/A

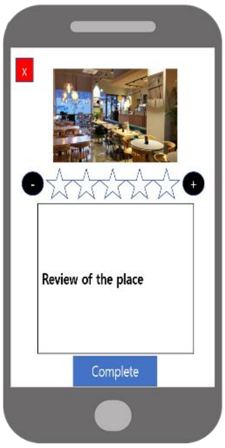
[Table 13] Information Interface of target place

Name	**Search Interface 2 – Information of target**
Purpose/Description	User can see reviews and chat room lists related with the target place.
Input source/ Output destination	Server/Client Client/Server
Range/ Accuracy/ Margin of error	N/A
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A

Name	**Search Interface 2 – Information of target**
Format and configuration of screen	1. ImageView and TextView represent information of the target place. 2. Linear layout shows review lists of the target place written by users who already used this place. 3. Linear layout shows chat rooms with information related with this place. 4. User can enter the chat room by click one of the chat room lists.  x Name: ???? Scores:?? Review Lists Chat room Lists 5. User can exit place information page by click 'x' button on the right above at the page.
Format and configuration of window	N/A
Data type	Image, Text, Widget
Instruction type	N/A
Exit message	N/A

[Table 14] Review Interface

Name	**Review Interface**
Purpose/Description	User can give score and write review of place they visited already.
Input source/ Output destination	Client/Server
Range/ Accuracy/	N/A

Name	Review Interface
Margin of error	
Unit	Screen
Time/ Velocity	N/A
Relationship with other input/outputs	N/A
Format and configuration of screen	1. ImageView of the place. 2. Star widget shows score of the place. 3. User can write review of the place on the text box. 4. User can give score of the place by click '-' or '+' button. 5. User can post review by click 'complete' button. 6. User can exit without posting review by click 'x' button. 
Format and configuration of window	N/A
Data type	Image, Text, Widget
Instruction type	N/A
Exit message	"Review was successfully posted!"/ "Are you sure to exit this page without posting review?"

3.1.2. Hardware Interfaces

[Table 15] Hardware Interface

Name	Applicable device for the system
Purpose/Description	Enable users to take advantage of the service provided by the system/Android OS Enabled Smart Phone. (At least Android 6.0)

3.1.3. Software Interfaces

[Table 16] Software Interface

Name	Firebase Real-time Database
Purpose/Description	Query input/output for managing multimedia/meta data
Input source/ Output destination	Host server/ User, User/Host server, User/User
Range/ Accuracy/ Margin of error	Depends on the performance of the Firebase
Unit	Query
Time/ Velocity	Instant reaction
Relationship with other input/outputs	Related to all inputs/outputs from server
Format and configuration of screen	N/A
Format and configuration of window	N/A
Data type	Query
Instruction type	Query statement
Exit message	N/A

3.1.4. Communication Interfaces

[Table 17] Communication Interface

Name	Client and Host
Purpose/Description	Each client requests the connection to the host, requesting list of results of friends based on preference, map based on location-based service, chat room list related with the user-selected place, and chat content with other users. Host provides a friend list, map, and chat room list, and chat content to user.
Input source/ Output destination	User/Host server
Unit	packet
Time/ Velocity	At least 10Mbps
Relationship with other input/outputs	Related to all inputs/outputs from server
Format and configuration of screen	N/A
Format and configuration of window	N/A
Data type	Query
Instruction type	Query statement
Exit message	N/A

3.2. Functional Requirements

3.2.1. Use Case

<Account Management>

[Table 18] Use case of register

Use case name	**Register**
Actor	Unregistered user
Description	When an unregistered user tries to register in our app, this process will happen.
Normal Course	1. Every user except admin encounters a log-in page after executing the application. 2. If the user isn't registered yet, the user will touch a register button under a log-in button. 3. The user is redirected to a register page. 4. In the register page, the user should provide several information. 1. ID(This should be unique) 2. Email address 3. Nickname 4. Password 5. Age 6. Gender 7. Major 8. Entrance year 5. The system sends a verification code to the given email address to verify whether the email address is correct and to prepare the situation of finding the password. 6. Then the user set his/her search filter for other users. For example, if the user wants to meet a man, the user can uncheck a woman option in the filter setting page. In the filter, 1. Entrance year 2. Gender 3. Major 7. After setting the user filter, the user should provide his/her student ID card image to authenticate himself/herself. 8. If the system administrator confirms the user, the system sends an email notifying that the user has been approved. This takes several days.
Pre-condition	The user is not registered to the system yet. The user enters correct information. The same student id card should not be overlapped with that of other users. In case of incorrect inputs or overlapped student id cards, the system sends a rejection email to the user.
Post-condition	The following information should be encrypted and saved to system DB to manage users. a. User ID b. Password c. Student ID
Assumptions	N/A

[Table 19] Use case of log-in/out

Use case name	**Log-in/out**
Actor	Registered user
Description	Log-in is the process that a registered user tries to log-in to the system. Log-out is the process that the user who has logged-in tries to get out of the system.
Normal Course	<Log-in> 1. A registered user wants to use the services of the system. 2. The user enters id and password that were the user entered in registration. 3. If the information is correct, the user can log-in successfully and use the system. <Log-out> 1. If the user wants to get out of the system, the user can touch a log-out button. This button is available in the user profile page. 2. Then if next time the user opens the application, the user should log-in again. 3. If the user closed the application without logging-out, the system arbitrarily closed the session.
Pre-condition	<Log-in> The user is already registered into the system. <Log-out> The user is logged in the system.
Post-condition	The user should be connected to the network.
Assumptions	N/A

[Table 20] Use case of find ID/password

Use case name	**Find ID/password**
Actor	Registered user
Description	Find ID is the process that a registered user tries to find id for log-in. Find password is the process that a registered user tries to find a password for log-in.
Normal Course	<Find ID> 1. When a user tries to log-in, the user enters the wrong id. And the user gets to know that the id is wrong.

	2. Touch the ‘find ID/password’ button in the log-in page and the user redirected to the ‘find ID/password’ page. 3. When the user enters the correct email address, the system sends the user's ID to that email. 4. If the user forgot the password too, go to the step of finding the password. <Find password> 1. When a user tries to log-in, the user enters the correct ID but wrong password. And the user gets to know that the password is wrong. 2. Users know their ID and don't know their password. So, touch the ‘find ID/password’ button to find the password and the user redirected to the ‘find ID/password’ page. 3. When the user enters the correct id and email address, the system sends a link to set a new password. 4. If the user touches the link, the user can set a new password for log-in.
Pre-condition	<Find ID> The user forgets his/her ID for log-in. <Find password> The user knows his/her ID for log-in but forgets his/her password for log-in.
Post-condition	The user gets his/her ID/password information.
Assumptions	The user forgets his/her ID or password.

[Table 21] Use case of profile

Use case name	**Profile**
Actor	Registered user
Description	This is the process by which users edit their profile picture and introduction. Through the profile page, users can advertise themselves.
Normal Course	1. The user clicks a profile button in the bottom of the main page for redirection to the profile page. 2. The user can show his/her information and modify the information. 3. After modifying the information, the user touches the ‘save’ button to save modified information.
Pre-condition	The user is registered, and logged-in the system.
Post-condition	When the user touches the ‘save’ button, the modified information is delivered to the server database and updated.
Assumptions	N/A

[Table 22] Use case of user filter

Use case name	**User filter**
Actor	Registered user
Description	In this process, the user can filter other users by their entrance year, gender, major.
Normal Course	1. The user clicks a profile button in the bottom of the main page for redirection to the profile page. 2. The user can show the existing filter setting and modify the filter. Default filter is set at registration. 3. After modifying the information, the user touches the 'save' button to save the modified filter.
Pre-condition	The user is registered, and logged-in the system.
Post-condition	When the user touches the 'save' button, the modified filter information is delivered to the server database and updated in real time.
Assumptions	N/A

<Friends Management>

[Table 23] Use case of friend request

Use case name	**Friend request**
Actor	Registered user
Description	The user can send friend requests to other users, and other users also can do so. Then the user accepts or refuses a friend request in his/her list of friend requests received.
Normal Course	1. The user can watch other user's profiles by touching their profile picture. The user can watch other users in, 1. Chatting room 2. Review page 3. Place chatting list(Before join in, only can watch chat owner) 2. In other user's profiles, the user can send friend requests to that user. 3. The user who got a friend request can accept or refuse a friend request in his/her list of friend requests received.

	4. If a user views the profile of another user who has sent him/her a friend request, a friend request button is diabled. 5. After accepting a friend request, an accepted user is visible in the friend list. 6. After refusing a friend request, a refused user is removed from the list of friend requests received. But refused users can send friend requests again.
Pre-condition	The user is registered, and not a suspended user in the system. <Accept/refuse a friend request> Someone should send a friend request to the user. <Send a friend request> The user must not have already sent the same friend request before. The user must not be blocked by that user.
Post-condition	<Accept/refuse a friend request> The user is visible/invisible in the friend list.
Assumptions	The user wants to be friends with others.

[Table 24] Use case of delete friend

Use case name	**Delete friend**
Actor	Registered user
Description	When the user wants to delete a friend in the friend list, the user can delete the other user.
Normal Course	1. The user can watch the friend user in their friends list. 2. Then the user touches and holds the friend user to delete him/her. 3. The system asks if the user really wants to remove the friend, and the user can choose yes or no. 4. After deleting, the deleted user is invisible in the friends list.
Pre-condition	To delete from the friend list, they should be friends already.
Post-condition	The user’s id is removed from the friend database.
Assumptions	The user wants to delete a friend user.

<User/Place Review>

[Table 25] Use case of block the user

Use case name	**Block the user**
Actor	Registered user
Description	This is the process that users can block users who don’t want to see or to be recommended.
Normal Course	1. If the user does not want to see a particular user, the user clicks the user’s profile who wants to block. 2. The user clicks the block button which is in the right bottom of the user’s profile page. 3. The system once again confirms to the user if the user really wants to block that user. 4. When the user confirms to block, the user and blocked user can’t see each other anymore.
Pre-condition	The user is registered, and logged-in the system.
Post-condition	When the user clicks the confirm button, modified friend status information is delivered to the server database and updated. Blocked users will no longer appear in the friend list or be recommended.
Assumptions	N/A

[Table 26] Use case of report the user

Use case name	**Report the user**
Actor	Registered user
Description	This is the process that users can report the user who did unpleasant behavior, such as abusive language, or if there is something to report.
Normal Course	1. If the user has something to report about the particular user, enter that user’s profile. 2. The user clicks the report button which is in the right bottom of the profile page. 3. The report page is displayed where the user can write the reasons for reporting. 4. After the user has finished writing, he/she clicks the report button to send a report message to the administrator. 5. The system once again confirms to the user if the user really wants to report that user.

	6. When the user confirms to report, the account of the reported user will be suspended after the system administrator checks the reported message.
Pre-condition	The user is registered, and logged-in the system.
Post-condition	The report message is sent to the system administrator.
Assumptions	N/A

<Place Search>

[Table 27] Use case of place review

Use case name	**Place review**
Actor	Registered user
Description	This is the process by which the user can write a review and give a rating of the places where the chat room he/she has joined has been created.
Normal Course	1. The user checks the closed chat room in the user's chat list page. 2. The user clicks the review button to write a review and give a rating to the place. 3. When the user clicks the review button, the page where the user can write a review and rating is displayed. 4. The user writes a review and rating and clicks the submit button. 5. The system confirms once again to the user if the user really wants to submit the review. 6. When the user confirms to submit, review and rating are posted.
Pre-condition	The user is registered, and logged-in the system. The chat room of the place is closed.
Post-condition	When the user clicks the confirm button, review and rating is delivered to the server database and updated. Other users can see the reviews and ratings by searching the place.
Assumptions	N/A

[Table 28] Use case of search location

Use case name	**Search location (Search filter)**

Actor	Registered user
Description	This is the process that the user searches for the desired location with desired purpose by using the map search function.
Normal Course	1. The user searches for the place name in the search bar at the top of the main page. 2. When the searched place is displayed on a map, the user can see marks of chat rooms created at that location. 3. The users can set filters and view chat rooms for the desired purposes by clicking the filter buttons under the search bar. a. Study b. Eat c.Rest 4. The user can select the chat room that fits his/her desired purpose. 5. The user can check the location in the map through the searching.
Pre-condition	The user is registered, and logged-in the system. The user should be connected to the network.
Post-condition	The user can enter the chat room.
Assumptions	N/A

[Table 29] Use case of check information of the place

Use case name	**Check information of the place**
Actor	Registered user
Description	When the user searches for the location on a map, the user can see the representative picture of the place, the total rating, and reviews left by other users and the opened chat room list.
Normal Course	1. The user searches for the place in the search bar on the main page. 2. When the searched place is displayed on the map, the user clicks the mark of the place. 3. The information page of the place is displayed, and the user can view the information of the place. a. Name b. Representative image c. Total rating d. Reviews e. Opened chat rooms in that place
Pre-condition	The user is registered, and logged-in the system. The user should search the place in the search bar. The user should be connected to the network.

Post-condition	The user can get the information of the place.
Assumptions	N/A

<Chat>

[Table 30] Use case of open/close a chat room

Use case name	**Open/Close a chat room**
Actor	Registered user (Chat room owner)
Description	This is the process that the user opens a chat room in the place he/she wants. Then the user becomes a chat room owner, who can finish the chat room.
Normal Course	<Open a chat room> 1. The user searches the place where he/she wants to open the chat room. 2. The user clicks the create button to create a new chat room. 3. The user set the conditions of the chat room. a. Name b. Purpose c. Number of people d. Short description of the chat room <Close the chat room> 1. The chat room owner can close the chat room in the chat room page by clicking the close button.
Pre-condition	The user is registered, and logged-in the system. <Open a chat room> The user set the place to open a chat room. <Close the chat room> To close the chat room, the user should have the authority of the chat room owner.
Post-condition	<Open a chat room> The chat room has been created, and other users can see the chat room by searching. <Close the chat room> Chat room is closed, and users can check that the chat room has been closed. Then users can write reviews and ratings about the place, friend request, and delete the chat room.
Assumptions	N/A

[Table 31] Use case of enter/leave the chat room

Use case name	**Enter/Leave the chat room**
Actor	Registered user
Description	This is the process by which the user selects a desired chat room from the list of opened chat rooms in the place, enters and leaves the chat room.
Normal Course	<Enter the chat room> 1. The user clicks the place mark and sees the list of opened chat rooms in the place. 2. The user selects the chat room to join where the number of people is not exceeded. 3. The user clicks the enter button to enter the chat room. 4. The user can send messages in the chat room. <Leave the chat room> 1. The user can leave the chat room in the chat room page by clicking the leave button.
Pre-condition	The user is registered, and logged-in the system. The user searched the place where he/she wants.
Post-condition	<Enter the chat room> The user can chat in the entered chat room. The chat room has been added to the user's chat list. <Leave the chat room> The chat room has been deleted from the user's chat list.
Assumptions	N/A

[Table 32] Use case of view a chat list

Use case name	**View a chat list**
Actor	Registered user
Description	This is the process by which the user can see a list of the chat rooms he/she is participating in.
Normal Course	1. The user clicks the chat room button in the bottom of the main page. 2. The user can check the list of chat rooms he/she is participating in. 3. The user can check the new message notifications. 4. The user can check the closed chat rooms and review the place, send friend requests or delete the closed chat room.

Pre-condition	The user is registered, and logged-in the system.
Post-condition	The user can enter the chat room page.
Assumptions	N/A

<System Management>

[Table 33] Use case of student ID confirmation

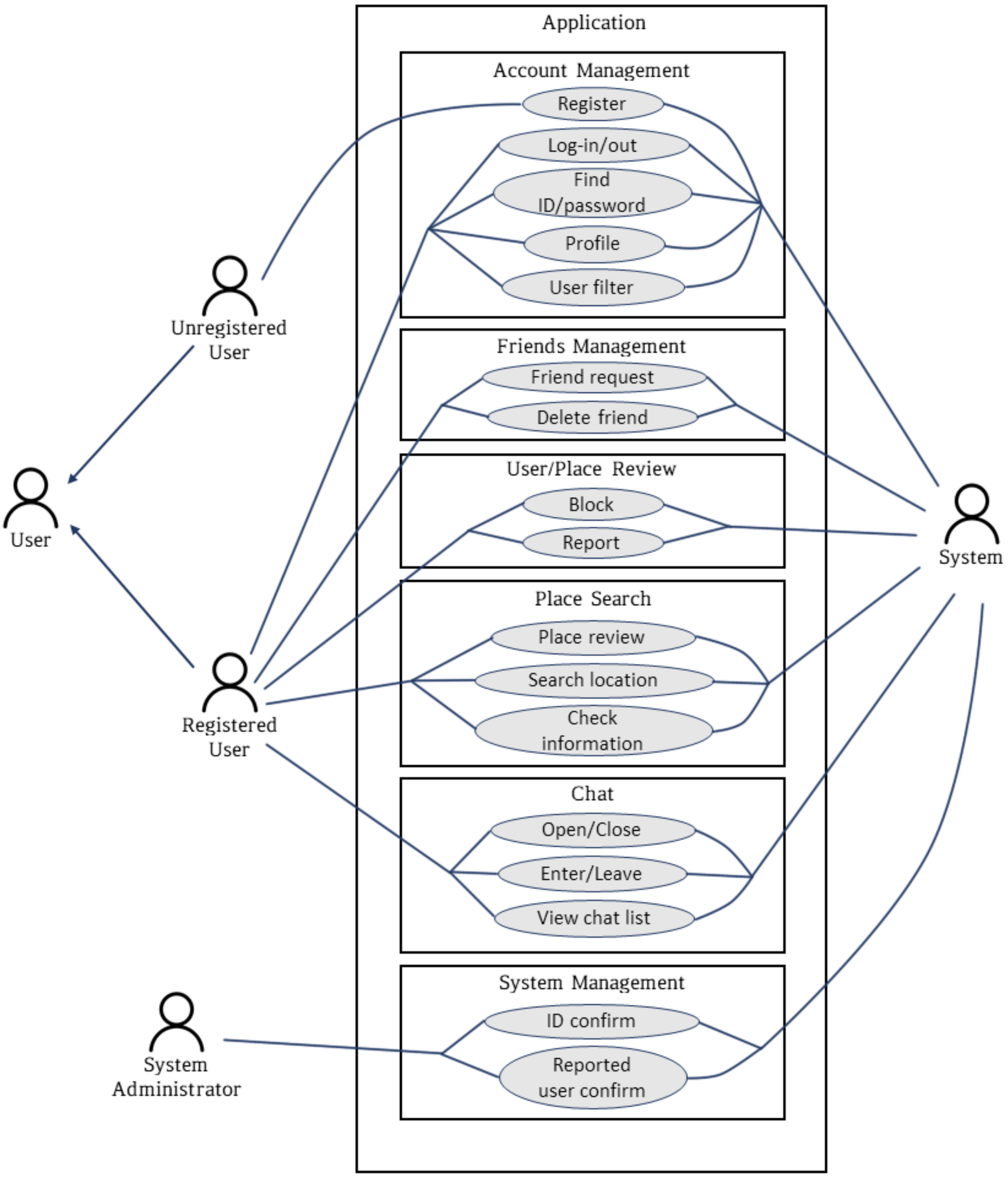
Use case name	**Student ID confirmation**
Actor	System administrator
Description	When a new user tries to sign up to the system, the user should submit his/her student id card. Then the system administrator must check it.
Normal Course	1. A new user submits his/her student id card to the system. 2. The system administrator compares the id card and user's information(name, age, etc). Also check if there is a user with the same information in the past. 3. Then if there is no problem, the administrator approves the application for admission. 4. The system saves the user id and user's student id for overlapping checks.
Pre-condition	The new user completes the sign-up process and submit the correct and non overlapped student id card.
Post-condition	The user is approved and the user can log-in to the system.
Assumptions	The user submits the correct student id card.

[Table 34] Use case of reported user confirmation

Use case name	**Reported user confirmation**
Actor	System administrator
Description	When one user reports the other user, reported user's chatting logs are sent to the system administrator to confirm the bad user.

Normal Course	1. When a user reports the other user for malicious reason(Use of unhealthy language, Suspicious of hacking, Impersonating a student), related information is sent to the system administrator. 2. The system administrator checks chatting logs, or other information of the reported user. 3. If the system administrator confirms the reported user as a malicious user, that user will be suspended from the system.
Pre-condition	The user reports the other user.
Post-condition	If the system administrator confirmed, the reported user will be suspended.
Assumptions	There is a malicious user.

3.2.2. Use Case Diagram



[Figure 2] Use case diagram

3.2.3. Data Dictionary

[Table 35] User

Field	Key	Constraint	Description
id	PK	Not Null	User id
email		Not Null	User email
password		Not Null	User password
nickname		Not Null	User’s nickname
gender		Not Null	User’s gender
major		Not Null	User’s major
entrance_year		Not Null	User’s entrance year
introduction			User’s introduction
suspended			Whether user suspended in the system

[Table 36] User’s filter

Field	Key	Constraint	Description
user_id	PK, FK	Not Null	Id of user who has this table
filter_entrance_year			The user wants to watch others whose entrance year is in this range
filter_gender			The user wants to watch others whose gender is this
filter_major			The user wants to watch others whose major is this

[Table 37] User’s friend

Field	Key	Constraint	Description
user_id	PK, FK	Not Null	The user’s id
friend_id	FK	Not Null	The user’s friend id

status		Not Null	0: Received, 1: Send, 2: Friends, 3: Blocked

[Table 38] Chat room

Field	Key	Constraint	Description
room_id	PK	Not Null	
user_id	FK	Not Null	User who made a room
member_id		Not Null	User who joined a room
name		Not Null	Room’s name
date		Not Null	Created date
introduction			Room’s introduction, Word limit
purpose		Not Null	0: Study, 1: Eat, 2: Rest

[Table 39] Chat

Field	Key	Constraint	Description
user_id	PK, FK	Not Null	
date		Not Null	Send date
content		Not Null	Chatting content
reported			Whether the chat is reported
reported_id	FK		Id of who reported the chat

[Table 40] Place Rating

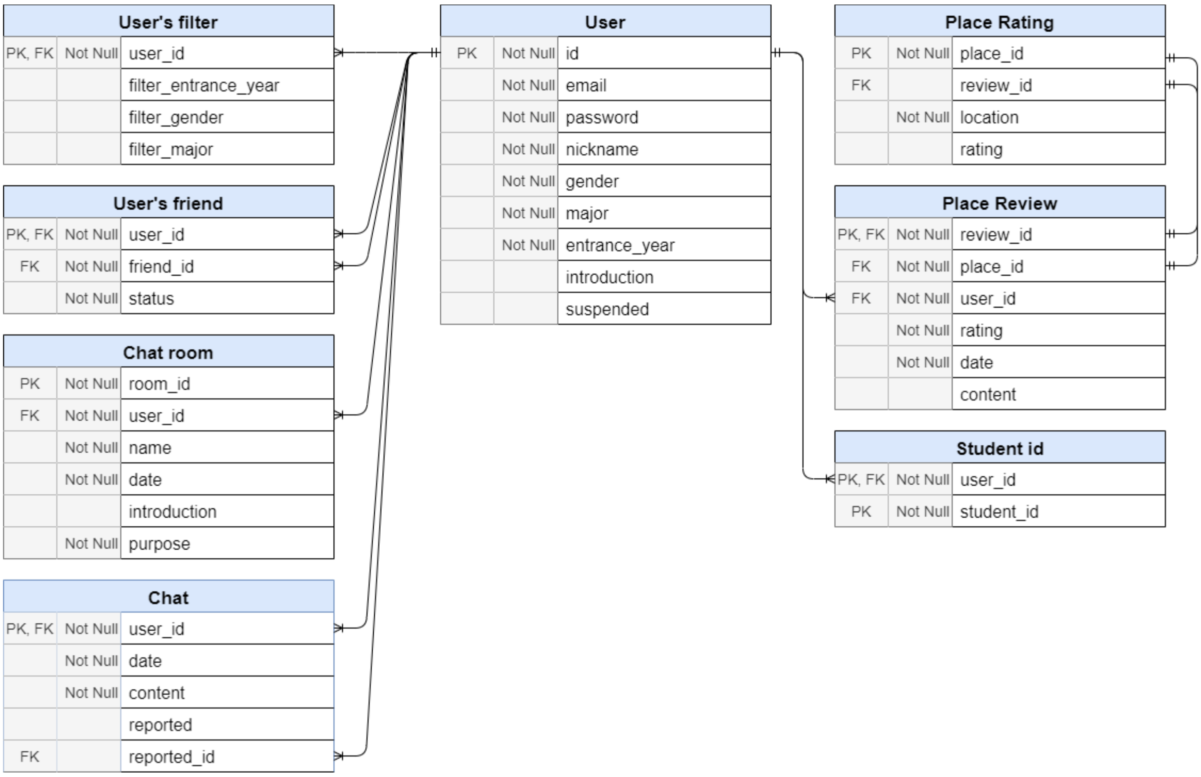
Field	Key	Constraint	Description
place_id	PK	Not Null	Place’s id
review_id	FK		Review’s ids in place
location		Not Null	Place’s location.
rating			Place’s rating

[Table 41] Place review

Field	Key	Constraint	Description
review_id	PK, FK	Not Null	Review’s id
place_id	FK	Not Null	Id of the review place
user_id	FK	Not Null	User’s id
rating		Not Null	Rating
date		Not Null	Created date
content			Review’s content

[Table 42] Student id

Field	Key	Constraint	Description
user_id	PK, FK	Not Null	User’s id
student_id	PK	Not Null	User’s student id(encrypted)



User's filter		
PK, FK	Not Null	user_id
		filter_entrance_year
		filter_gender
		filter_major

User's friend		
PK, FK	Not Null	user_id
FK	Not Null	friend_id
	Not Null	status

Chat room		
PK	Not Null	room_id
FK	Not Null	user_id
	Not Null	name
	Not Null	date
		introduction
	Not Null	purpose

Chat		
PK, FK	Not Null	user_id
	Not Null	date
	Not Null	content
		reported
FK		reported_id

User		
PK	Not Null	id
	Not Null	email
	Not Null	password
	Not Null	nickname
	Not Null	gender
	Not Null	major
	Not Null	entrance_year
		introduction
		suspended

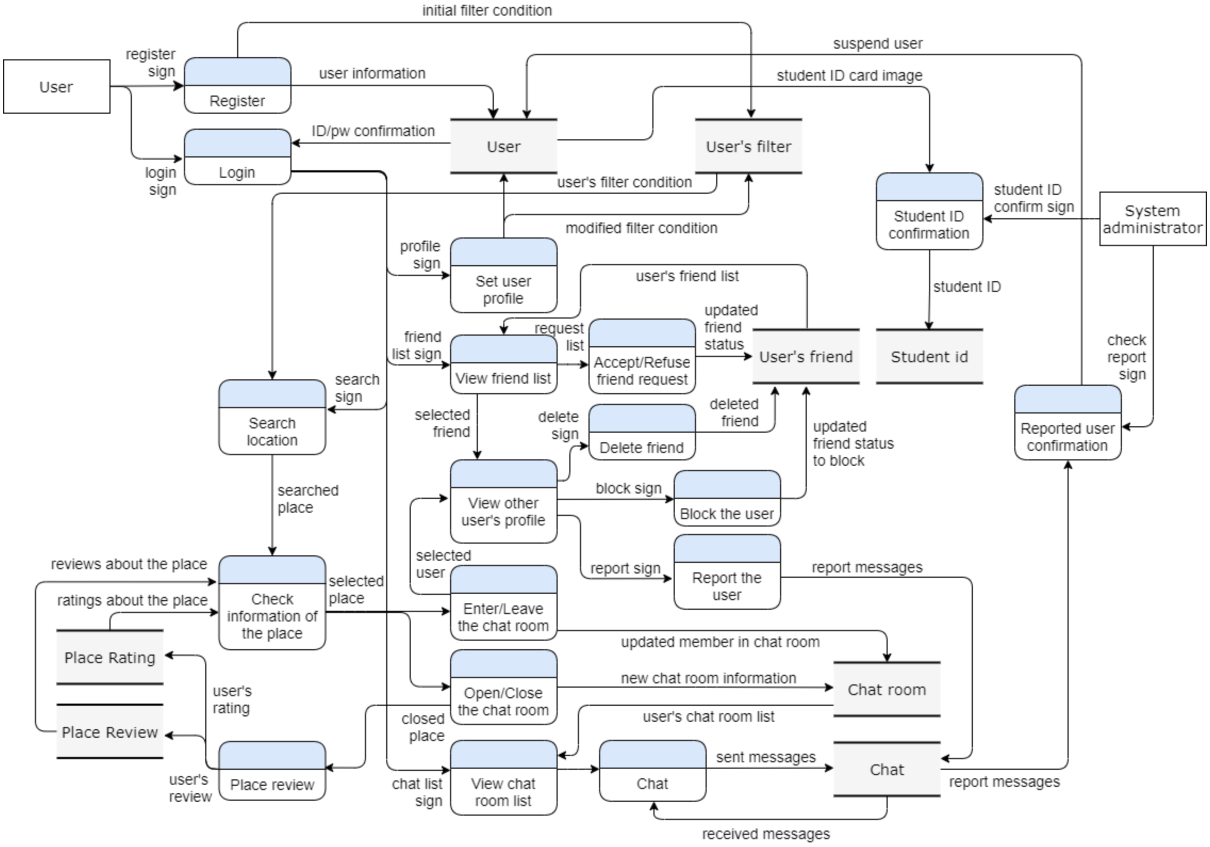
Place Rating		
PK	Not Null	place_id
FK		review_id
	Not Null	location
		rating

Place Review		
PK, FK	Not Null	review_id
FK	Not Null	place_id
FK	Not Null	user_id
	Not Null	rating
	Not Null	date
		content

Student id		
PK, FK	Not Null	user_id
PK	Not Null	student_id

[Figure 3] Entity Relationship Diagram

3.2.4. Data Flow Diagram



[Figure 4] Data flow diagram

3.3. Performance Requirements

The following requirements are based on estimates and are subject to change as the application is complete.

3.3.1. Static numerical requirement

- The system only supports one concurrent user and after disconnecting, users can switch accounts and access.

- The system is recommended to run on a mobile device with 4 GB of RAM and a 2.0 GHz single processor. And the system supports the latest version of Android 8.0 and above, IOS 13 and above.

3.3.2. Dynamic numerical requirement

- The system works well in environments with at least 300 concurrent users. And the system is built to manage at least 10000 members.
- The mapping within the application must be performed within 5 seconds.
- The basic function and connection of the application must be performed within 3 seconds.

3.4. Logical Database Requirements

The system manages user information through a database called Firebase. The system stores user information and location information in a database. The database is managed so that it can have basic performance for processing information through the database.

3.5. Design Constraints

The system must not contain components that are not covered under the license. The system must be accessible from various mobile devices using the Android and IOS operating system. Administrators should be able to access and manage the system through a web browser and administrator application. The system should be designed to use Firebase's database.

3.6. Standards compliance

All programs in the system are written according to JAVA standards. Function and variable names in the program use camel notation and underscore notation apply to the database. System management tools follow the HTML5 standard.

3.7. Software System Characteristics

This section describes non-functional requirements that are categorized as product requirements, organizational requirements, and external requirements. Software system characteristics are revealed through non-functional requirements.

3.7.1. Product Requirements

The system must meet the following product requirements.

3.7.1.1. Usability Requirement

The most important of the non-functional requirements, the system should be designed so that it can be easily used by non-experts. Users should be able to use the functions of the system without having to go through a separate manual. If a function is required to be described, it should be described as easily as possible. To satisfy the above, the system needs to have a simple and easy user interface.

3.7.1.2. Performance Requirement

The algorithm for mapping aims to provide results to users within 5 seconds. This is the most time-consuming operation on the system, which can reduce usability.

3.7.1.3. Security Requirement

The user must be certified as a student at Sungkyunkwan University before using the application. User can use the system after receiving the certification, and for system management, user must obtain a separate certification for the administrator in order to have the authority for system management.

3.7.2. Organizational Requirements

This section covers a wide range of requirements regarding the policy.

3.7.2.1. Environmental Requirement

Location information and location details are taken from ‘Naver Map’ and used it in the system. Information is provided by the application based on the rich API provided by ‘Naver Map’.

3.7.2.2. Operational Requirement

Users are identified through ID, and users are also identified through ID, but detailed ID, but detailed information of each other can be provided by agreement between users. User information is managed in a database, and user information can be provided within 3 seconds, and location information can be provided within 5 seconds.

3.7.3. External Requirements

This section covers requirements for external factors.

3.7.3.1. Safety Requirement

The system must be designed so that users of external systems cannot access the system. In addition, safety must be provided so that data is not damaged by external shocks.

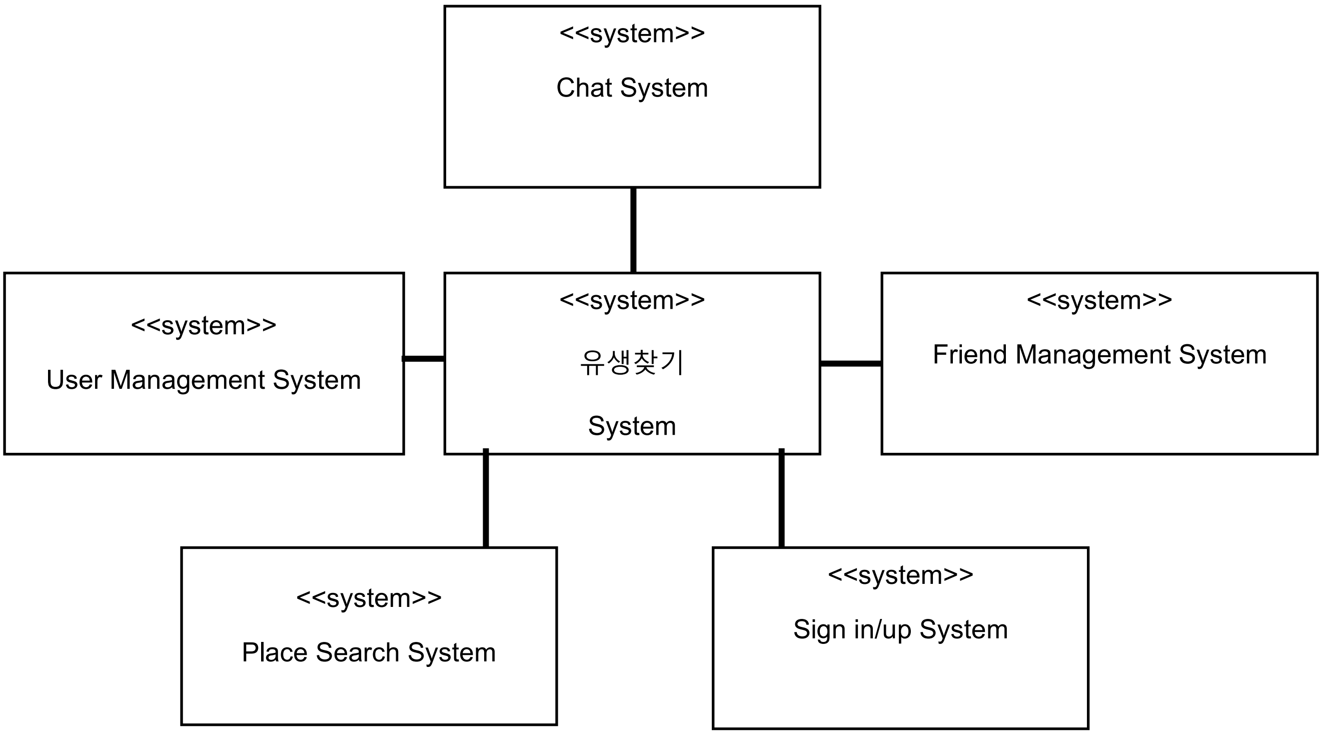
3.7.3.2. Regulatory Requirement

Permission should be given from Naver to get location information through ‘Naver Map’. Users’ personal information must be legally protected and not infringed. The system should be developed in accordance with national privacy standards.

3.8. Organizing the Specific Requirements

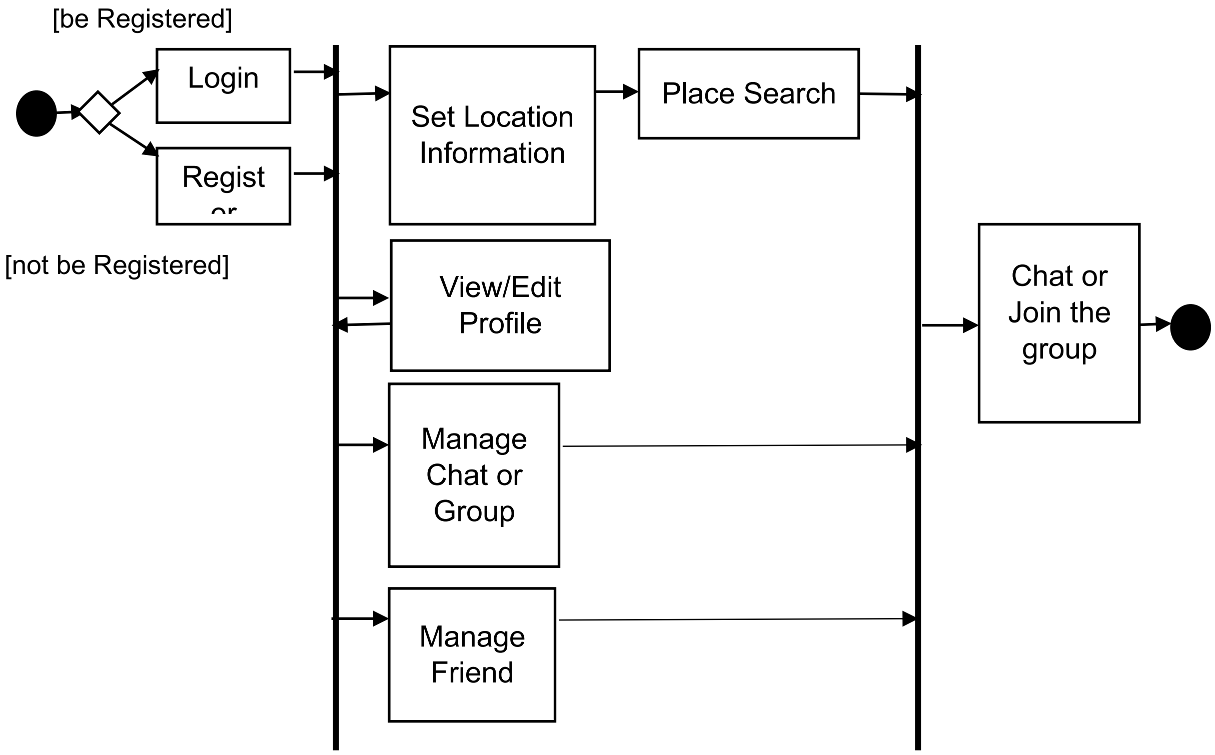
This section allows finding out specific system model for requirements. The system model uses a graphical notation based on UML (Unified Modeling Language) and tabular format.

3.8.1. Context Model



[Figure 5] Context Model

3.8.2. Process Model



[Figure 6] Overall Process Model

3.8.3. Interaction Model

See 3.2.2 Use Case Diagram

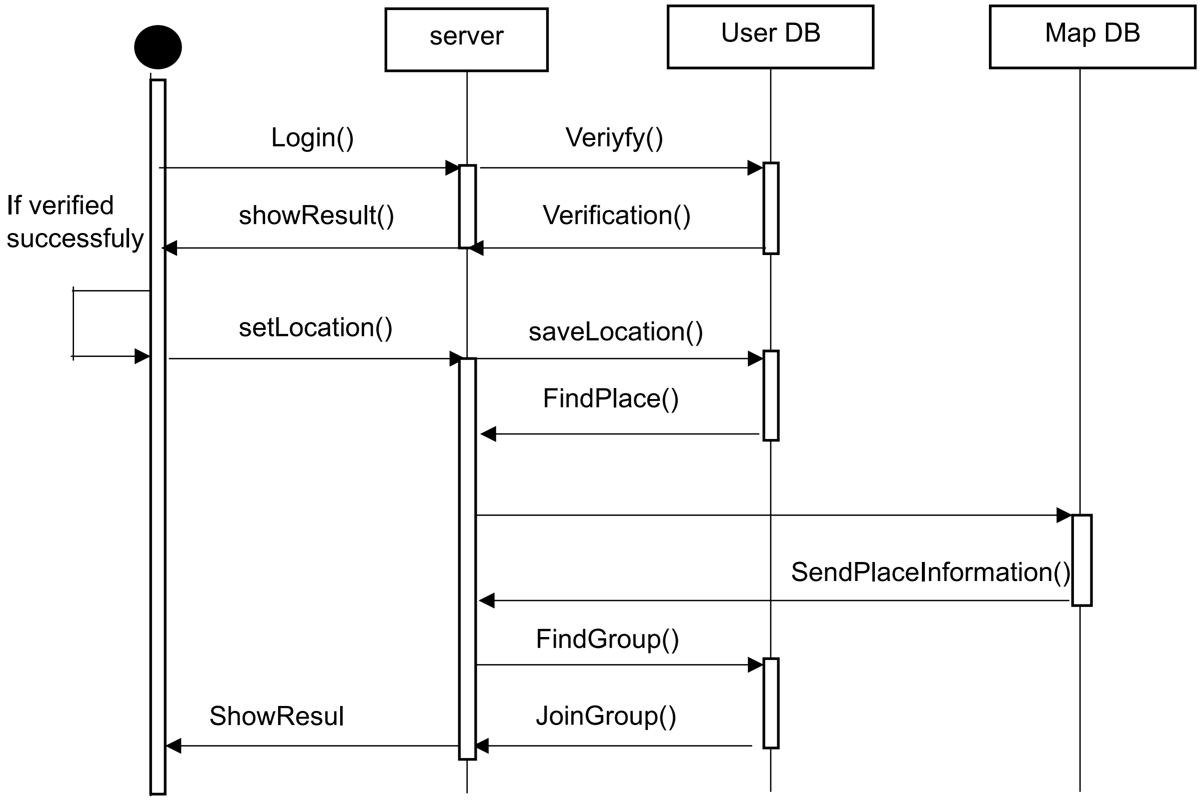
3.8.4. Behavior Model

3.8.4.1. Data Flow Diagram

See 3.2.4 Data Flow Diagram

3.8.4.2 Sequence Diagram

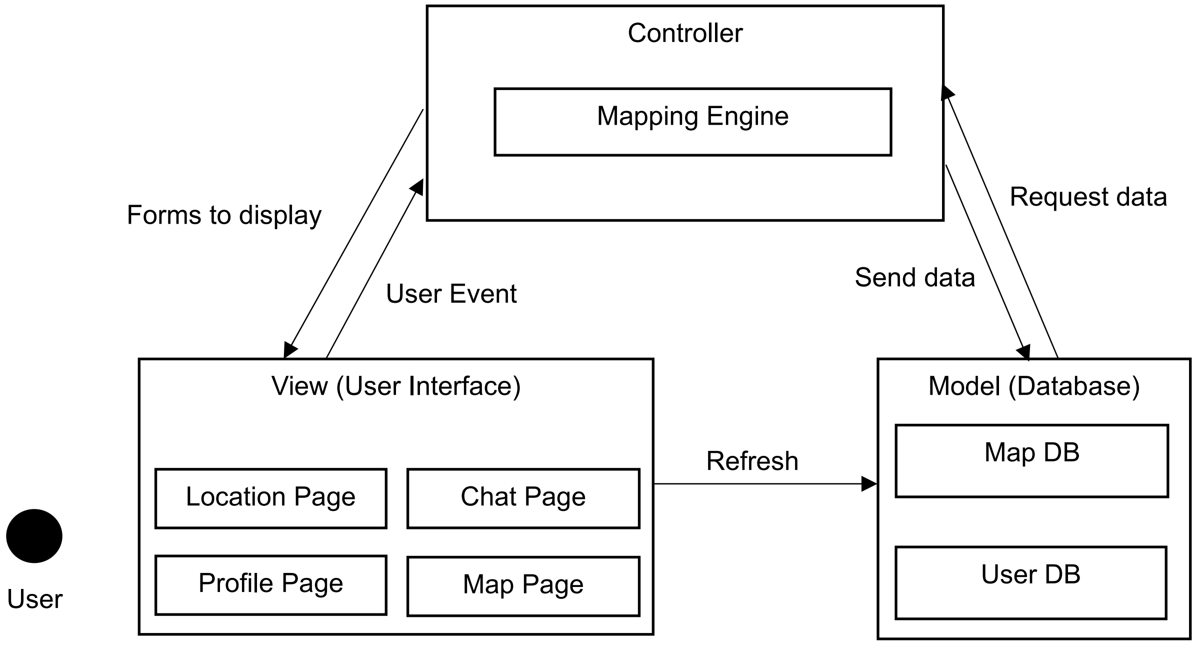
It mainly describes our main system, the locating sequence.



[Figure 7] Sequence Diagram

3.9. System Architecture

This section describes the relationship and functionality between system modules using the MVC pattern.



[Figure 8] System architecture of the system

3.10. System Evolution

This section covers system changes that will benefit system designers. Also, this section describes changes to the system caused by advances in hardware and changes in requirements.

3.10.1. Limitation and Assumption

First of all, since the goal of the application is to find friends and search for places around Sungkyunkwan University, we are servicing location information near Sungkyunkwan University. In the future, if more users use the application or can service a wider range of location information through the development of technology, we will update the application accordingly. In addition, we plan to continuously update the functions of the application if there are functions that users need, including various functions currently in service.

3.10.2. Evolutions of Map Application and Change of User Requirements

With the development of the Map application, the purpose of using our application may be lacking. For example, if a newly developed Map application provides location information of all regions including Sungkyunkwan University and also provides functions of our application, our application will not be used because it is backward compatible with the application.

In preparation for this situation, there will be a way to develop a functionally better application. However, it may be better to provide information about the school as well as location information in connection with the school, taking advantage of the merit that only Sungkyunkwan University students can use it.

In the future, there will be a need to develop an application that meets changing requirements by exploring the direction of application development.

4. Supporting Information

4.1. Software Requirement Specification

This software requirements specification was written in accordance with the IEEE Recommendation (IEEE Recommended Practice for Software Requirements Specifications, IEEE-Std-830).

4.2. Document History

[Table 43] Document History

Date	Version	Description	Writer
2021/04/08	0.1	Style and overview	Eunju Seok
2021/04/09	1.0	Addition of 3.2.1., 3.2.2.	Hyejoon Jang
2021/04/09	1.1	Addition of 3.1.1, 3.1.2	Jiwon Seo
2021/04/10	1.2	Addition of 1.1, 1.2, 1.3	Eunji Gil
2021/04/10	1.3	Addition of 2.1, 2.2, 2.3	Hyeyeong Kim
2021/04/11	1.4	Addition of 3.3, 3.4	Georyang Park
2021/04/17	1.5	Addition of 3.2.3., 3.2.4	Eunju Seok
2021/04/18	1.6	Revision of 3.2.1	Hyejoon Jang
2021/04/19	1.7	Addition of 3.1.3	Jiwon Seo
2021/04/19	1.8	Addition of 1.4, 4.1, 4.2	Eunji Gil
2021/04/20	1.9	Addition of 2.4., 2.5.	Hyeoyeong Kim
2021/04/20	1.10	Addition of 3.5, 3.6	Georyang Park
2021/04/21	1.11	Addition of 3.1.1, 3.1.2	Eunju Seok
2021/04/21	1.12	Revision of 3.1.3., 3.1.4.	Hyejoon Jang
2021/04/22	1.13	Addition of 3.1.4	Jiwon Seo
2021/04/22	1.14	Revision of 1,4 and style	Eunji Gil
2021/04/23	1.15	Addition of 2.6., 2.7.	Hyeoyeong Kim
2021/04/23	1.16	Addition of 3.7	Georyang Park