



Bilkent University

Department of Computer Engineering

Senior Design Project

Project short-name: Augma

Analysis Report

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Progress Report

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Analysis Report

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1. Introduction

New tools and ideas emerge in the profession of computer science with advancements in technology. Some of these tools or ideas start to grow and become more popular over time. Augmented Reality [1] [2] [3] is one of these emerging technologies which makes it possible to look at the world from a new perspective. Even though it is a relatively new technology, it holds many great possibilities like helping doctors in a surgery, a visual navigation that doesn't need for the driver to look away from the road, just to name a few. Unfortunately, being new also comes with many drawbacks like most users not willing to change what they are using or lack of tool kits and native platforms. Most AR applications today are designed to work on mobile devices [4] [5] like tablets or phones but true potential of this technology can only be unlocked with devices like Google Glass. We expect to see much more advanced AR applications [6] [7] [8] as native AR platforms [9] like Google Glass starts to become affordable by the general public and this can only happen if developers keep creating new and interesting Augmented Reality applications, further increasing the value of the technology and attracting more investors to the area.

Social media applications are the most used day-to-day mobile applications in the market. This is why we saw a need and a potential for a new kind of social media application in an augmented space. Augma creates a world where people can interact with each other in an exciting and creative way. Users will be able to post location based notes on anywhere in the world. Other people who are near one of these notes will be able see it using Augma like a scope, looking into another dimension from their phone's camera. With Augma, we aim to achieve a deeper level of empathy between the users than any other social media application today by putting the readers into the exact same environment where the post was written.

In this report, we aim to provide an overall analysis of the system we will develop. First of all, the existing systems that are similar to ours, their qualities, and the missing features of the available systems are described. Then the details of our system and unique features of Augma are listed. Functional, non-functional, and pseudo requirements are presented. Afterwards, our system models are included. Scenarios of Augma are explained in detail. These scenarios are generalized by common use case descriptions and the use case diagram is given. The object model and the dynamic

models of the system are also provided and explained. Finally, the screen mock-ups and the navigational paths are included.

2. Current Systems

AR is a fairly new technology and because of this, what we are trying to do hasn't been tested thoroughly. There were only 2 similar applications on the market that we could find.

- **WallaMe** is an augmented reality location based message app that lets you "Hide messages in the real world using augmented reality." [10] [11]
 - WallaMe is multi-platform. It is available in both IOS and in Android.
 - It lets you leave location based augmented reality messages on walls for certain people you chose. (You can also leave public messages but this is not WallaMe's main purpose)
 - It supports writing, drawing and painting tools, images, emojis and stickers.
 - WallaMe also includes a like and comment system.
 - It uses image recognition to display the AR messages.
- **Mirage** is an app that lets you create and leave interactive compositions on top of the real world with augmented reality. [12] [13]
 - Users can create mirages by placing gifs, objects, text, hashtags, photos, and drawings.
 - It only lets you place your mirages only on to walls and some flat surfaces.
 - Users can upvote other people's mirages and share any mirage you want with your friends.
 - It uses image recognition to display the AR messages.

Both of these applications are very well made but they have one common weakness and that is the image recognition technology in order to display AR images. This creates major problem for usability since users need to select a mirage/message first then the application displays it alone. Also users need to find that exact background image in order to make the message appear and they can only display one image at a time. Our system aims to improve these shortcomings by not using image recognition, instead by only using location data to display the images. This will allow for better and longer battery life during usage, ability to display more than one note at a time and a much better user experience.

3. Proposed System

In this section we will first explain more about Augma how it will be used and what its features are in an overview. After that we will go in depth to Augma's functional, nonfunctional and pseudo requirements. Then we will finish by giving our proposed system models with use case diagrams, object and class diagrams, dynamic models and very early designs on the user interface.

3.1. Overview

We are living in an era where conveying information is everything. The way you convey that information is just as important as the information itself. We felt like writing 120 characters or even posting a picture with a lengthy paragraph under it isn't enough. We wanted to add another dimension to our conversations. This is where Augma was born. Augma adds a new layer to our reality and lets our posts come to life.

Augma is a mobile-app which lets user leave location based notes that come to life with the power of Augmented Reality technology. Users can leave pretty much anything they want ranging from a plain text to pictures. After users have left their note to a location, other people who look through their phone cameras will be able to see their creation. These notes will be time-limited and people who see these notes will be able to rate these notes by upvoting or downvoting.

Users will have the choice to make their notes visible to all other people or just certain groups by using Augma's Circle system. Users can create their own small scale circles to leave private messages to their friends and family. Users will have the option to leave notes only they can see for personal use such as a reminder for an upcoming project. With the usage of the Circle system, users will be able to personalize their window to this new layer of reality. Augma will provide the option to see the notes that are only from the certain circles users have specified to filter the notes in the augmented world.

Augma will also feature a heat map in which users can see where the places with lots of notes are. When users get to a "Hot Zone" like this, they will receive a notification on their phones prompting them to have a look around even when the app is running in the background. If they have the map open and got close enough to a note, they will be able to see an indication and a small preview of the note. With this function they will be able to determine if there are notes they want look at without actually having to open their camera. If users have low battery, their phones aren't powerful enough or maybe they don't like having to turn around with their phone to actually see the Augma's world. They can click on these previews to see the notes like a picture taken from the perspective of their creators.

Another one of Augma's big features will be the Augma ads. Companies will be able to leave creative ads in the Augma's world for a much cheaper price than in real life. Think about seeing a giant yellow M on the moon when you look through your camera at night if you are near a McDonald's. This will allow for much more interesting ads and this way the big companies won't have to pollute the scenery with their giant ads.

3.2. Functional Requirement

In this section we will go into detail as though how Augma's main functions will work and what are their requirements. These functions can be summarized as leaving, reading, deleting and interacting with notes, leaving Augma ads, AR features and user networking.

3.2.1. Leaving Notes

- The user should be able to leave a note by using the device's camera and fill the content of the note.
- The user should be able to specify the privacy level of a note that he/she is going to leave; private, Circle-specific or public.
- The system should bind a note to the location it is left.

3.2.2. Reading Notes

- The system should provide previews of the notes in heat map.
- The user should be able to access a note left by another user providing he's in the note's location radius and the user meets privacy criteria for the note.
- The user should be able to see the notes in AR mode using the device camera.
- The user should be able to click on an AR note marker to see the whole note.

3.2.3. Deleting Notes

- The user should be able to delete a note which he left providing the note did not expire.
- The system should automatically remove notes whose time duration expired.

3.2.4. Interacting with Notes

- The user should be able to upvote/downvote other user's notes, providing the user meets the privacy criteria of the note.
- The system should display a heat map of notes with a user interface by integrating with Google Maps.
- The user should be able to report a note.

3.2.5. Augma Ads

- The system should support creation of Augma Ads that are placed by developers.

3.2.6. AR Functionalities

- The system should properly display a note marker on the proper location by using third-party AR library.
- The system should support displaying multiple note markers with AR at the same time, providing all the notes are in location scope.
- User should be able to open up the AR view and move around to see the notes just by looking around.

3.2.7. User Network

- The user should be able to register to system successfully, providing required registration information is entered properly.
- The user should be able to create circles and send circle invitation to another user.
- The user should be able to join circles by accepting an invitation sent by another user.
- The user should be able to add other users as friends to easily access their profiles and get notifications when they post notes to circles they are both in.
- The user should be able to update the user information as required.
- The user should be able to upload a profile picture to demonstrate in necessary areas of the application.

3.3. Non-Functional Requirement

In this section we will go into detail about the Augma's non-functional requirements. These quality of life features will ensure that Augma is both easy and a pleasure to use. These features can be summed up under usability, extensibility, and reliability and efficiency headings.

3.3.1. Usability

- The system should have a user-friendly UI.
- The system should display in-app assets in an understandable fashion. Users should be able to distinguish notes, pictures and other in-app assets from one another.
- Users should be able to use Augma without the real time AR function if their phones aren't compatible with AR.
- The system should obey the Usability standards (ISO 9241-11) as much as possible.
- The application should support as many Android devices as possible to increase the accessibility.

3.3.2. Extensibility

- The system should be easily extended to support new functionalities.

3.3.3. Reliability

- The system should persist uploaded user notes. It should be able to keep user notes without corrupting any of it.
- The system should load and display the same note to multiple clients consistently.
- The system should not drop frames while refreshing UI.

3.3.4. Efficiency

- Data exchange between the client and the database for the notes should be fast enough to allow users to walk around while using AR without major buffering issues.
- Application boot up time period should be unnoticeably slim.

3.4. Pseudo Requirements

- The application will have a cloud database and mobile application.
- Android application will be developed.
- Android's AR library will be used for the AR functions.

3.5. System Models

In this section we will go in depth about the proposed systems analysis with the system models. The object model of the system is provided. The use case diagram is given and then scenarios of Augma are explained in detail. These scenarios are generalized by common use case descriptions. Dynamic models of the system are also provided and explained. Finally, the screen mock-ups and the navigational paths are included.

3.5.1. Scenarios

Scenario 1

Use Case: LoginAsUser

Actors: John

Entry Conditions:

- John opens the app.

Exit Conditions:

- Augma displays map.

Main Flow of Events:

1. John enters his username as 'johndoe'.
2. John enters his password.
3. John prefers Augma to not ask for his credentials again and logins.
4. Augma checks if the given username and password are correct.

5. Augma verifies that the given credentials are correct.
6. Augma displays the map using the real world location of John.

Alternate Flow:

- 3a. John prefers Augma to ask for his credentials again and logins.
 - 3a1. Augma saves John's decision for the next time he enters the app.
 - 3a2. Augma redirects John to step 4.
- 5a. Augma notices that the given credentials are incorrect.
 - 5a1. Augma notifies John that he did not enter his credentials correctly.
 - 5a2. Augma redirects John to step 1.
- 6a. John's GPS signal is not received by Augma.
 - 6a1. Augma notifies John that his GPS signal cannot be received.
 - 6a2. John opens his phone's GPS signal.
 - 6a3. Augma redirects John to step 6.

Scenario 2

Use Case: SignupAsUser

Actors: Mike

Entry Conditions:

- Mike opens the app and is at sign up page.

Exit Conditions:

- Mike is currently looking at the map.

Main Flow of Events:

1. Augma prompts necessary information needed to create the account.
2. Mike enters his username as 'johndoe'.
3. Mike enters his email as 'johndoe@gmail.com'.
4. Mike selects and enters a password.
5. Mike rewrites his password for confirmation.
6. Augma verifies all necessary information is entered correctly.
7. Augma creates an account with the given information for Mike.
8. Augma registers Mike as User.

Alternate Flow:

- 7a. Two entered passwords are different.
 - 7a1. Augma notifies John that two passwords are different.
 - 7a2. Augma redirects John to step 2.

Scenario 3

Use Case: EditAccount

Actors: Ali

Entry Condition:

- Ali has just signed up and decides to edit his account information.

Exit Condition:

- Ali is currently on Settings page with his new settings.

Main Flow of Events:

1. Ali opens his account's settings.
2. Ali changes his email information that is taken during sign up process.
3. Ali adds his name and surname.
4. Ali saves the changes
5. Success message is shown by the system.

Scenario 4

Use Case: CreateCustomCircle

Actors: Jane

Entry Conditions:

- Jane selects Circle list and chooses to create a custom circle.

Exit Conditions:

- Jane and her friends can join the newly created Circle.

Main Flow of Events:

1. Jane selects Circle list from Augma.
2. Jane selects to create a new custom circle.
3. Jane enters the necessary information about her custom circle.
4. Augma verifies all necessary information is entered correctly.
5. Augma creates the custom circle with the given information.

Scenario 5

Use Case: CreatePublicCircle

Actors: Çağdaş

Entry Conditions:

- Çağdaş is already logged in with a developer account and chooses to create a public circle.

Exit Conditions:

- Augma users can join this public Circle.

Main Flow of Events:

1. Çağdaş selects Circle list from Augma.
2. Çağdaş selects to create a new public circle.

3. Çağdaş enters the necessary information about the public circle.
4. Augma verifies all necessary information is entered correctly.
5. Augma creates the public circle with the given information.

Scenario 6

Use Case: SearchCircle

Actors: Ibrahim

Entry Conditions:

- Ibrahim opens Augma and is logged in with his account.

Exit Conditions:

- Ibrahim selects a Circle that is returned with his search.

Main Flow of Events:

1. Ibrahim selects Circles list from Augma.
2. Ibrahim searches the list with a keyword.
3. Augma displays the Circles associated with that keyword.

Scenario 7

Use Case: InviteToCircle

Actors: Emilia, Ron

Entry Conditions:

- Emilia is already logged in and is looking at her circles list.

Exit Conditions:

- Ron is invited to the circle.

Main Flow of Events:

1. She opens up her Circle that she wants to invite Ron.
2. She invites her friend Ron from her friends list.
3. Augma sends Ron a link to join Emilia's Circle.

Scenario 8

Use Case: Downvote/UpvoteNote

Actors: Brad

Entry Conditions:

- Brad is already logged in and he is in the location range of a note.

Exit Conditions:

- Vote count is updated according to Brad's vote.

Main Flow of Events:

1. Brad chooses a nearby note.

2. Brad displays the details of the note.
3. Brad votes on the note.
4. Augma registers Brad's vote and updates the vote count accordingly.
5. Augma displays the Brad's vote in the note.

Scenario 9

Use Case: PostNote

Actors: Fatma

Entry Condition:

- Fatma is already logged in and she is currently on the map.

Exit Condition:

- Fatma sees the note on the map she recently posted.

Main Flow of Events:

1. Fatma arrives on the location that she wants to post note.
2. Augma prompts Fatma to enter post information.
3. Fatma fills the note she wants to post.
4. Fatma determines the Circles associated with the note.
5. Augma shows a preview of the post.
6. Fatma confirms and submits the note she wants to post.
7. Post is processed and published by Augma.

Alternative Flow of Events:

- 3a. Fatma chooses a picture from her library.
- 3a1. Augma redirects Fatma to step 4.

Scenario 10

Use Case: ViewNote

Actors: Emilia

Entry Conditions:

- Emilia is already logged in.

Exit Conditions:

- Emilia leaves after looking at the selected note.

Main Flow of Events:

1. Emilia opens up the map to see nearby notes while she is walking around.
2. Emilia looks at a preview of a note on the map.
3. Emilia decides to open up the AR function and look around with camera.
4. Emilia looks around to see previews of the notes in AR.
5. Emilia likes a note and decides to see the whole note.

6. Augma opens up the note in full view.
7. Emilia closes the note.
8. Emilia exits Augma.

Alternate Flow of Events:

- 1a. There are no nearby notes on the map.
 - 1a1. Emilia closes the app.
- 3a. Emilia doesn't open the AR and directly looks at a note from the map.
 - 3a1. Emilia clicks on the note on the map.
 - 3a2. Augma opens up a small preview of the note.
 - 3a3. Emilia clicks on the preview to see the whole note.
 - 3a4. Augma opens up the note in full view.
 - 3a5. Emilia closes the note and the application.
- 5a. Emilia doesn't want to see the whole note and exits the application.

Scenario 11

Use Case: ReportNote

Actors: Bülent

Entry Condition:

- Bülent is already logged in and he is currently on Map.

Exit Condition:

- Bülent's report is successfully received by Augma to considering

Main Flow of Events:

1. Bülent decides to see a note posted by someone else.
2. Augma displays the note to Bülent.
3. Bülent writes a report for this particular note being offensive

Alternate Flow:

- 3a. Augma detect Bülent has already reported the note.
 - 3a1. Augma displays a message telling Bülent that he has already submitted a report for the note.
 - 3a2. Augma redirects Bülent to step 3.

Scenario 12

Use Case: LeaveAdvertisement

Actors: Ricardo

Entry Conditions:

- Ricardo has already logged in with a corporate account.

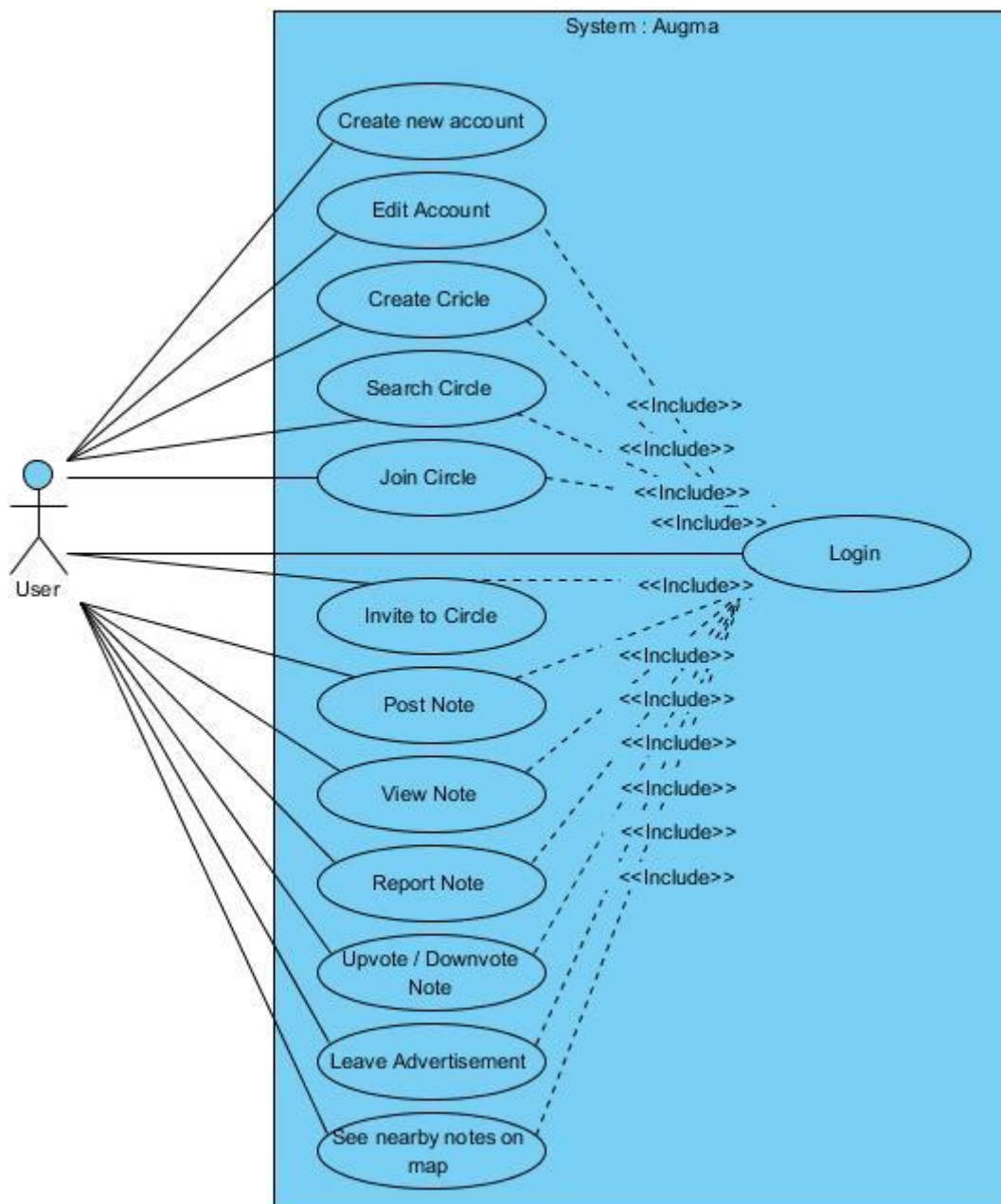
Exit Conditions:

- Ricardo's advertisement can be seen in Augma.

Main Flow of Events:

1. Ricardo gains consent from Augma Developers for his ad.
2. Ricardo selects the place which he is going to leave the advertisement.
3. Ricardo leaves the ad in Augma, just like posting a note.

3.5.2. Use Case Model



Create New Account: User can create a new account by providing necessary information.

Login: User can login to his/her account giving his/her username or email and password.

Edit Account: User can edit his account by changing the existing information or adding new information.

Create Circle: User can create custom circles by providing necessary information.

Search Circle: User can search for circles by providing a keyword.

Join Circle: User can join to the public circles by searching for them or join to the custom circles by receiving an invitation from a user who is already a member of that circle.

Invite to Circle: User can invite other people to become members of the circle he/she is already in.

Post Note: User can post notes to his/her location which can be seen both from the map and from the augmented reality part of Augma.

View Note: User can see posted notes that is available to him/her both by using augmented reality part of Augma.

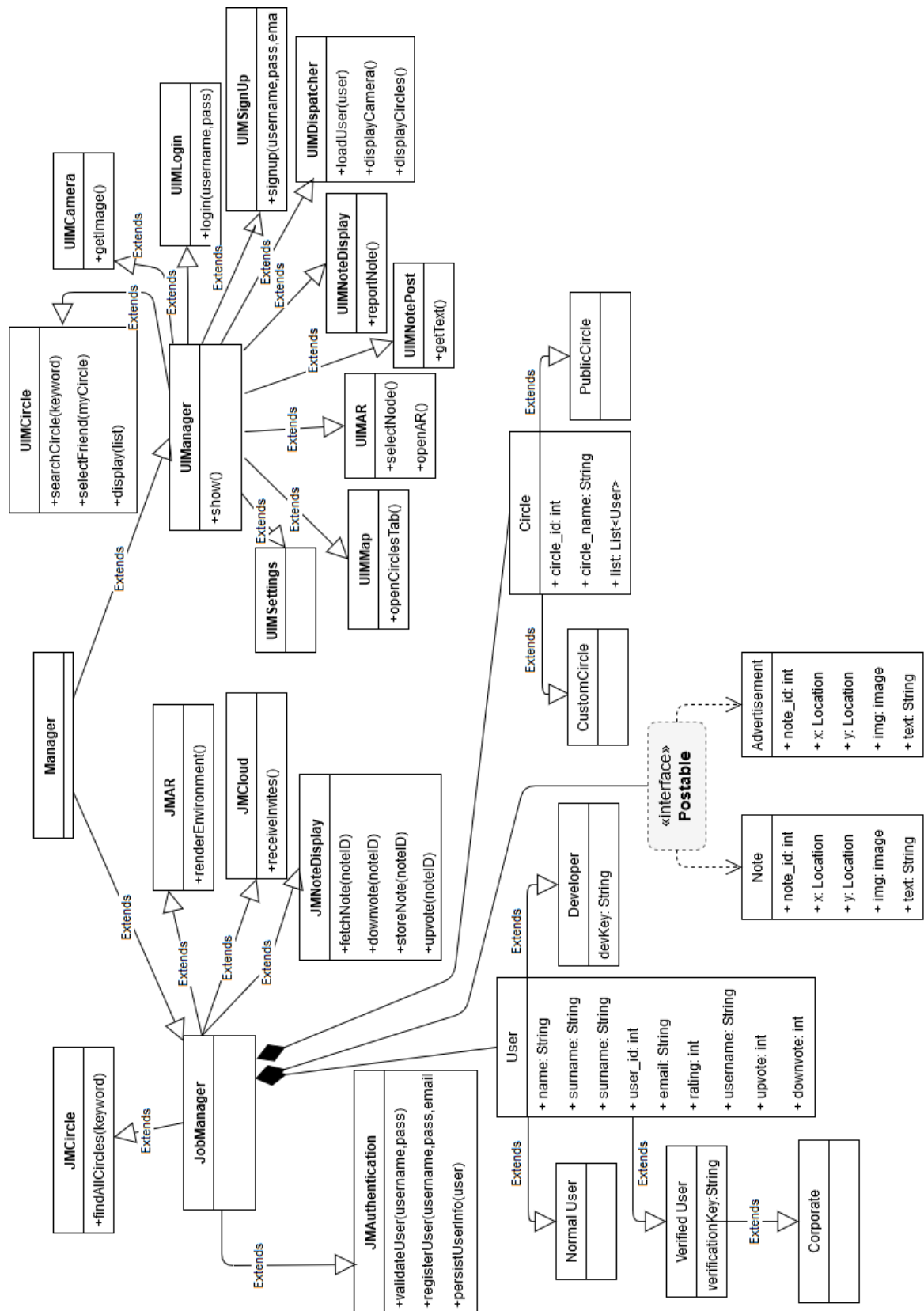
Upvote / Downvote Note: User can upvote or downvote the notes that he/she has seen from the Augma.

Leave Advertisement: Companies can leave advertisements to specific locations by contacting with the Augma development team.

See Nearby Notes On Map: User can see the notes that are near him/her from the map if the notes close to the user.

Report Note: User can report a note if the content of the note is inappropriate.

3.5.3. Object and Class Model

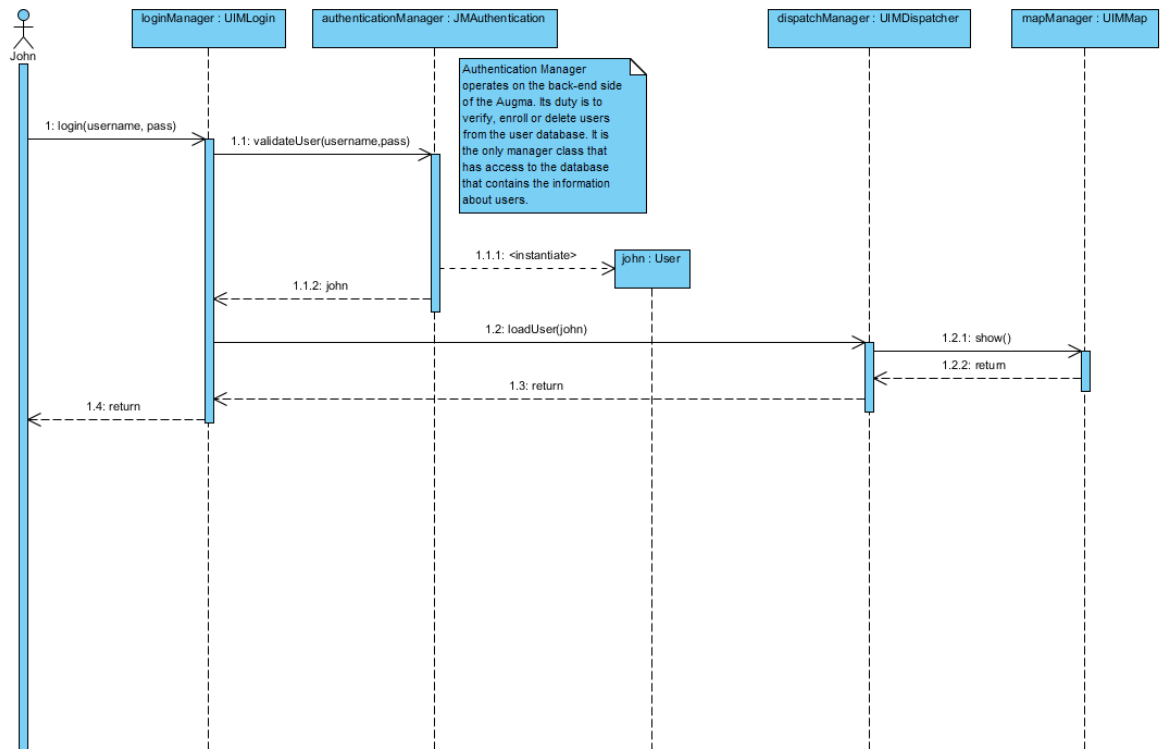


3.5.4. Dynamic Models

In this section the dynamic models of the proposed system will be explained in detail.

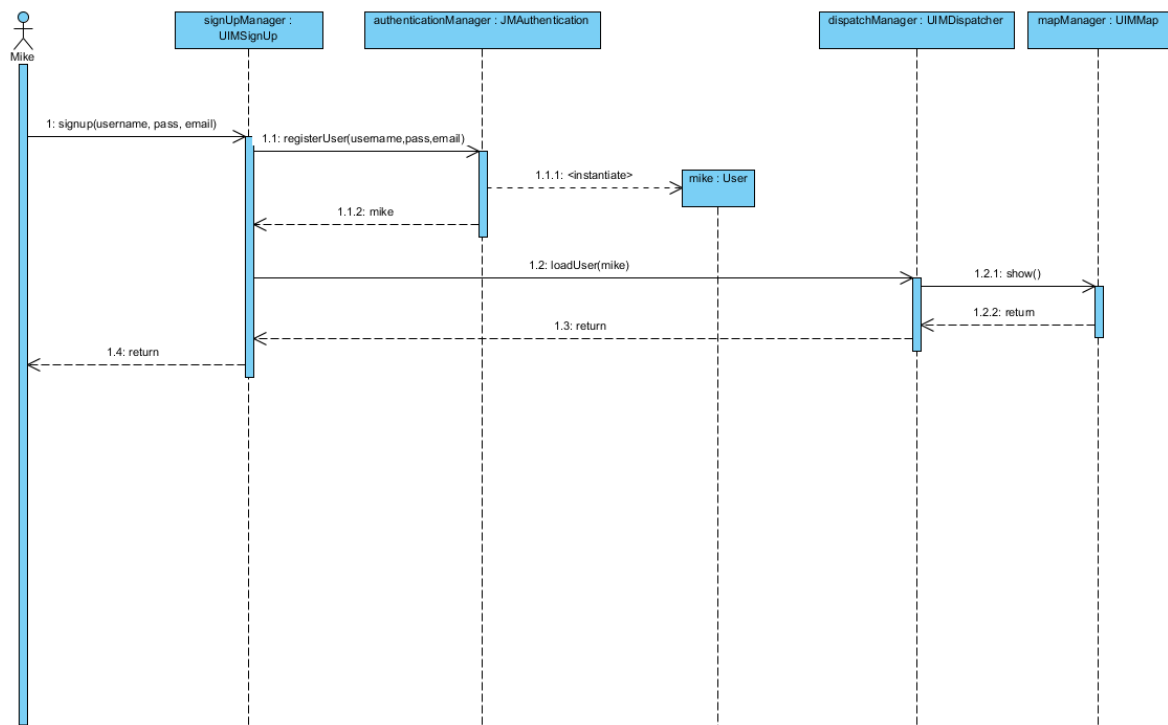
3.5.4.1. Sequence Diagrams

Login Sequence Diagram



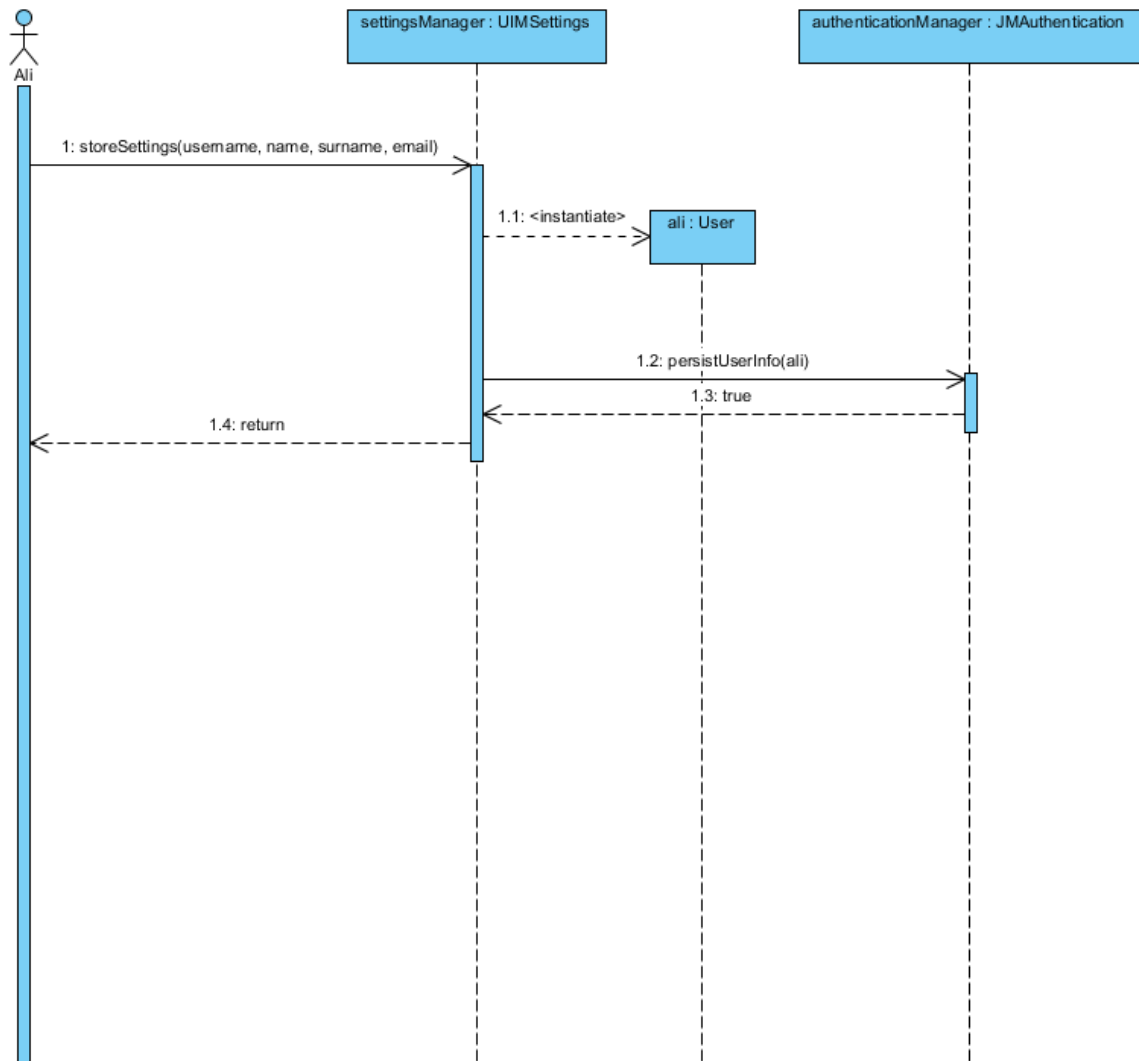
The diagram above shows the flow of execution in the case when user, John, wants to login Augma. Initially, John is prompted to enter his credentials, namely his username and password. Augma then verifies these credentials with the ones in the database through JMAAuthentication job manager, a class which has the only permission to manipulate user database. After receiving the confirmation message, Map will be displayed before John.

Signup Sequence Diagram



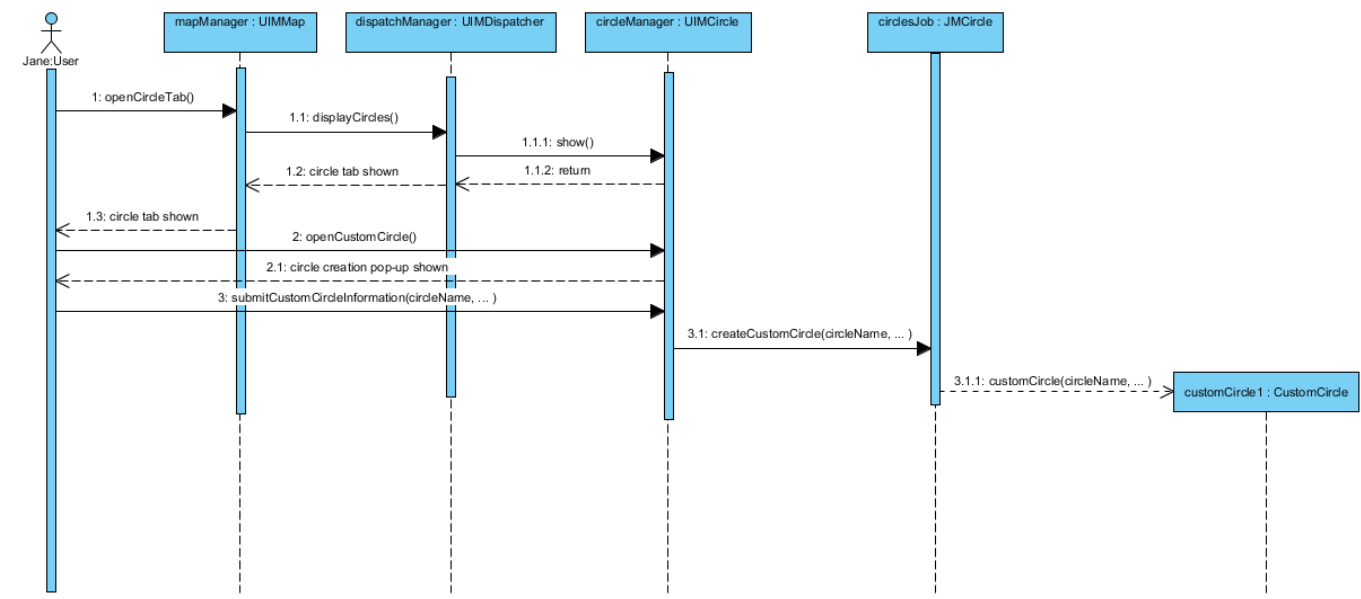
The sequential diagram above shows the case when user, Mike wants to sign up to Augma. Mike is initially prompted to enter his credentials, namely his username, password, email then Augma persists those information into the user database through JMAAuthentication job manager. After receiving the confirmation message, Map will be displayed before Mike.

Edit Account Sequence Diagram



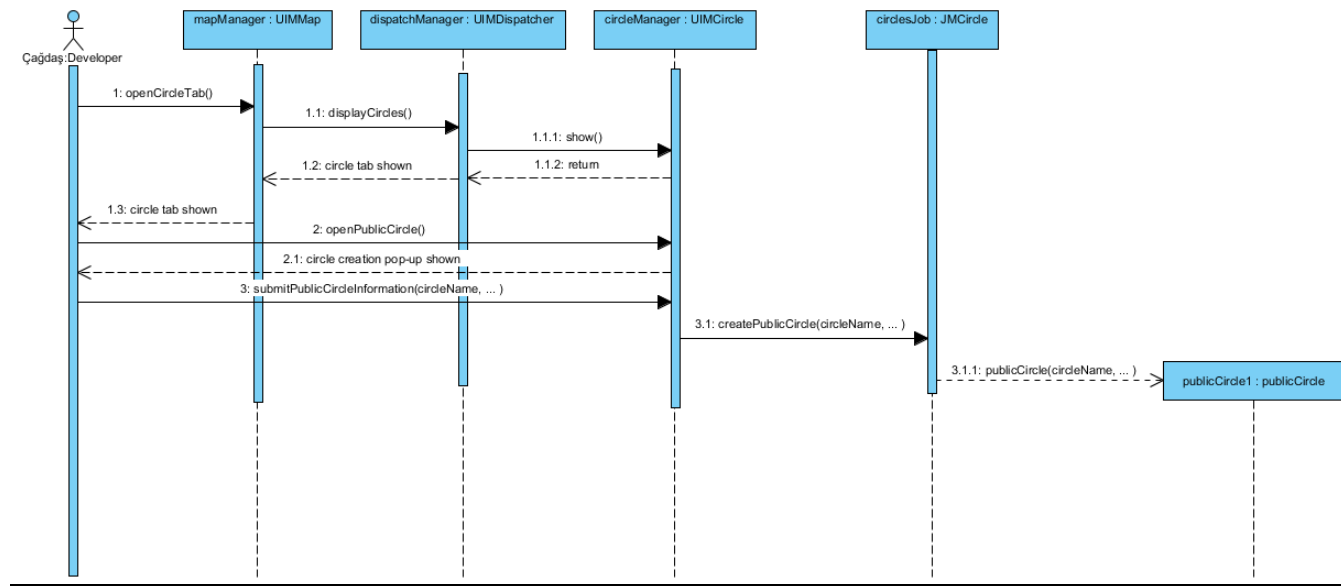
The diagram above shows the flow of execution in the case when user, Ali wants to edit his account settings. Through settings UI manager changed info is passed to the JMAuthentication job manager which controls the user information that are stored in the database.

Create Custom Circle Sequence Diagram



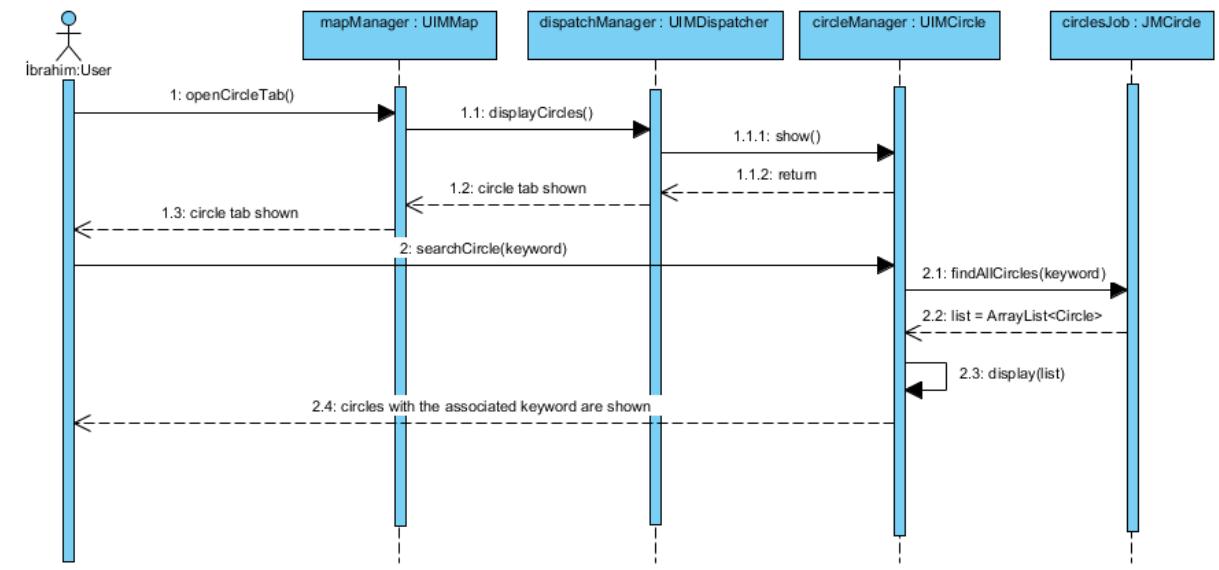
The diagram above shows the flow of execution in the case when user, Jane, wants to create a Custom Circle in Augma. Firstly, she switches to the Circles tab from the map page. Then, she presses the Create Custom Circle button and provides the necessary information like circle name to that page. Lastly, this creation request goes to a Job Manager and Augma creates a Custom Circle.

Create Public Circle Sequence Diagram



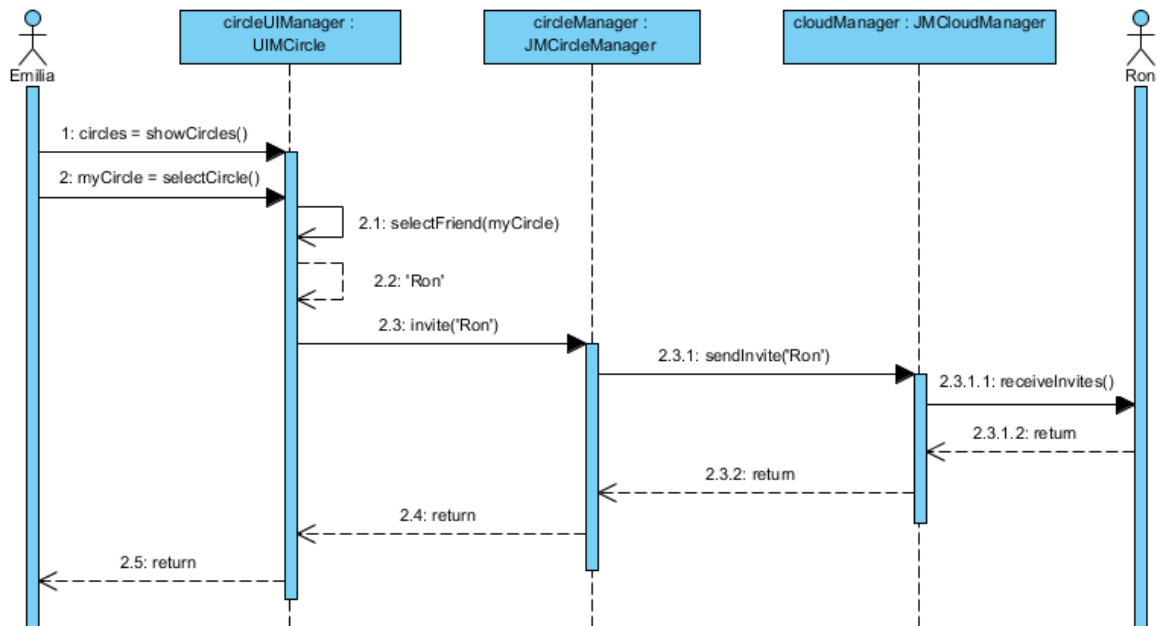
The diagram above shows the flow of execution in the case when developer, Çağdaş, wants to create a Public Circle in Augma. Firstly, he switches to the Circles tab from the map page. Then, he presses the Create Public Circle button and provides the necessary information like circle name to that page. Lastly, the creation request goes to a Job Manager and Augma creates a Public Circle.

Search Circle Sequence Diagram



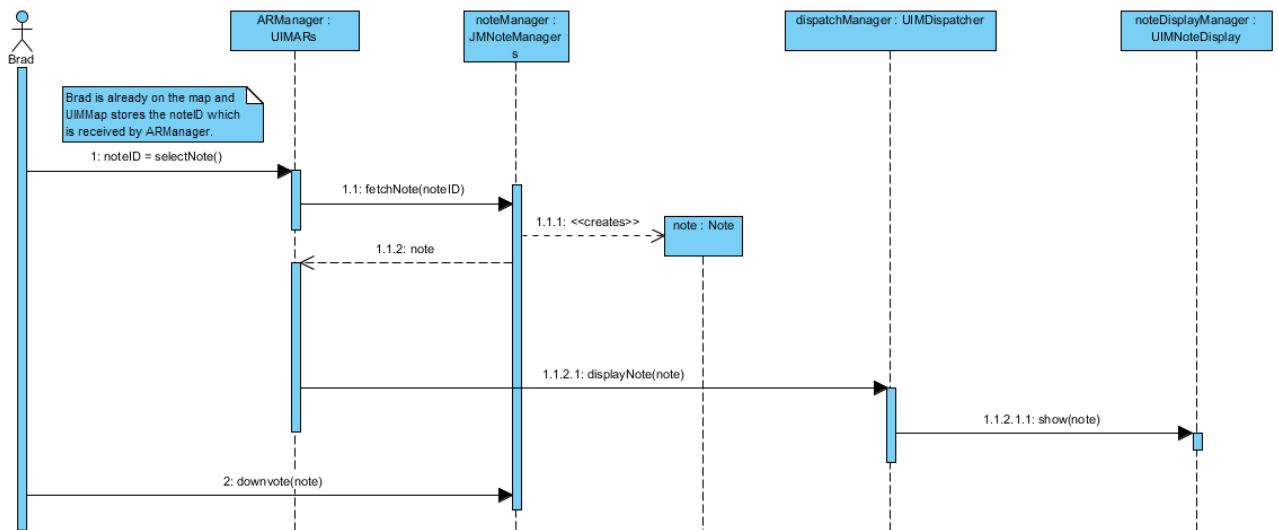
The diagram above shows the flow of execution in the case when user, Ibrahim, wants to search the Custom and Public Circles. Firstly, he switches to the Circles tab from the map page. Then, he searches for a specific keyword from the search bar. The request goes to a Job Manager and the associated list is fetched from the database. Lastly, the list is shown in the Circles page.

Invite to Circle Sequence Diagram



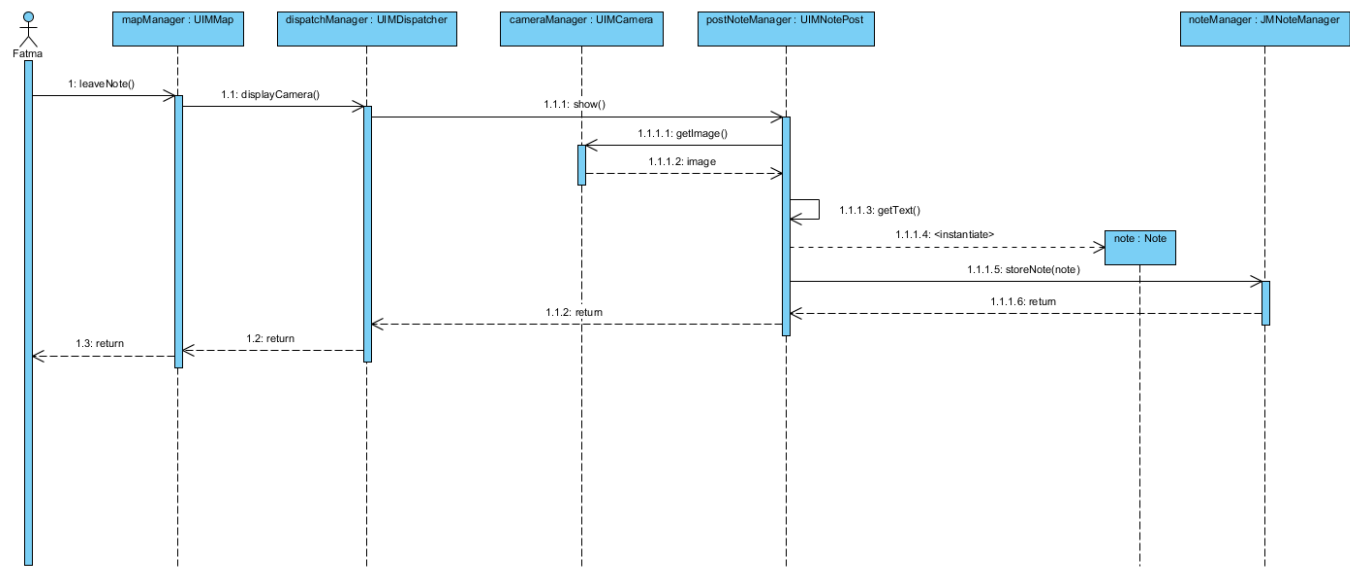
The diagram above shows the flow of execution in the case when user, Emilia, wants to invite Ron to a circle that is created by her. Initially, Emilia is on the Circles tab and selects the circle which she wants to invite Ron to. Augma shows her friends list with the exception of her friends that are already added to the Circle. Emilia selects Ron to invite to the circle with the help of JMCircleManager which sends the invite to Ron through the cloud server using JMCloudManager. Lastly, JMCloudManager transfers this invite to John using cloud services.

Downvote/Upvote Note Sequence Diagram



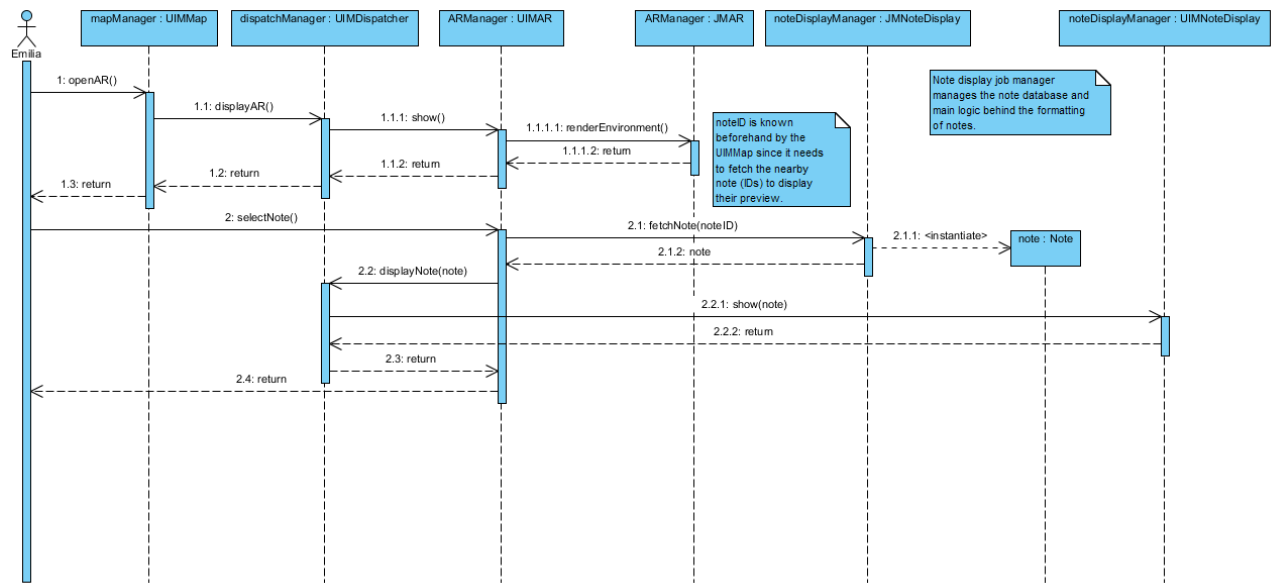
The diagram above shows the flow of execution in the case when user, Brad, wants to downvote or upvote a note in Augma. Initially, Brad is on AR view and decides to downvote/upvote a note. When he selects a note from the AR view, its ID is recognized by Augma through the usage of UIMAR. This noteID will be used to display the note which only previewed before and its downvote and upvote view shown by Augma through the UIMDispatchManager and then UIMNoteDisplay. Lastly, Brad downvotes the note through the JMNNoteManager.

Post Note Sequence Diagram



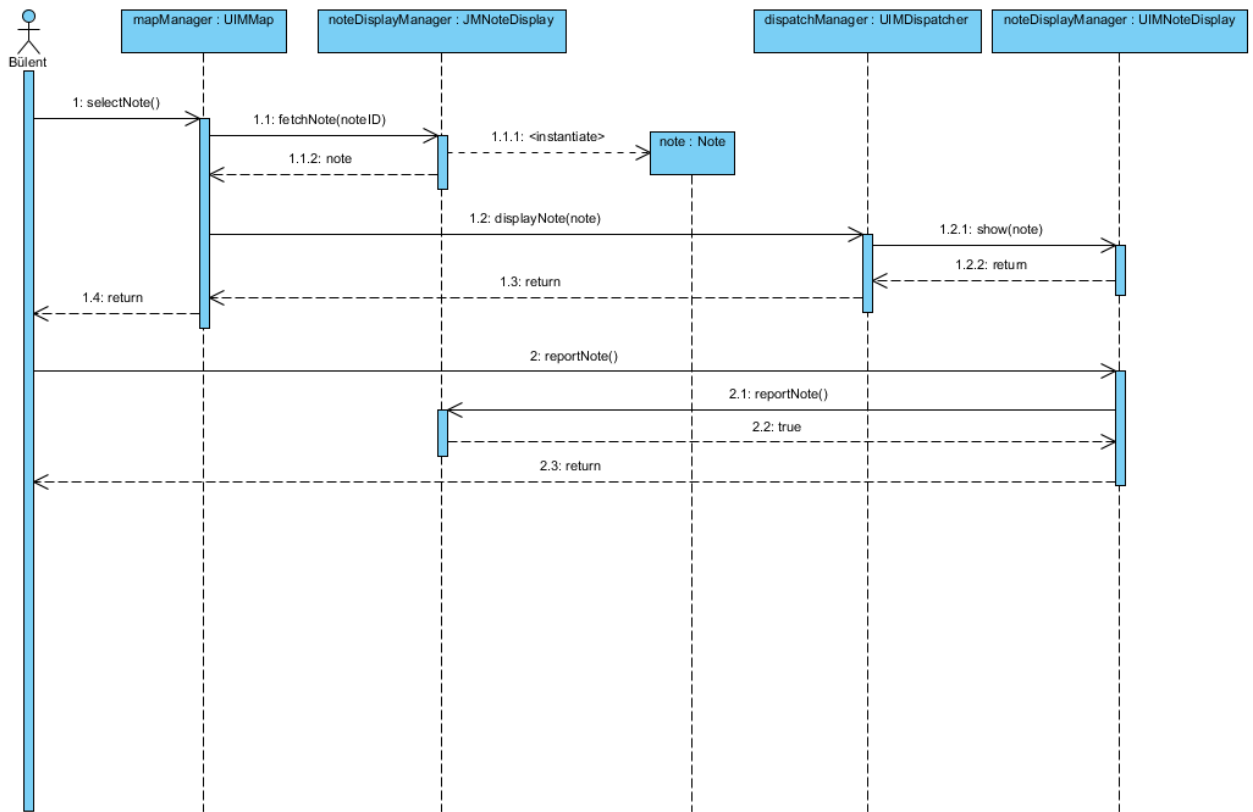
The diagram above shows the flow of execution in the case when user, Fatma, wants to post a note. Initially, Fatma is on Map view and decides to add a note. UIMNotePost is asked to show the Post Note screen by UIMDispatcher which also opens the Camera (AR) View in order to get the image of environment at the time of the post. Then, through JIMNoteManager the note is stored with both the image received by the camera, the text entered by Fatma and Fatma's location when she was posting the note.

View Note Sequence Diagram



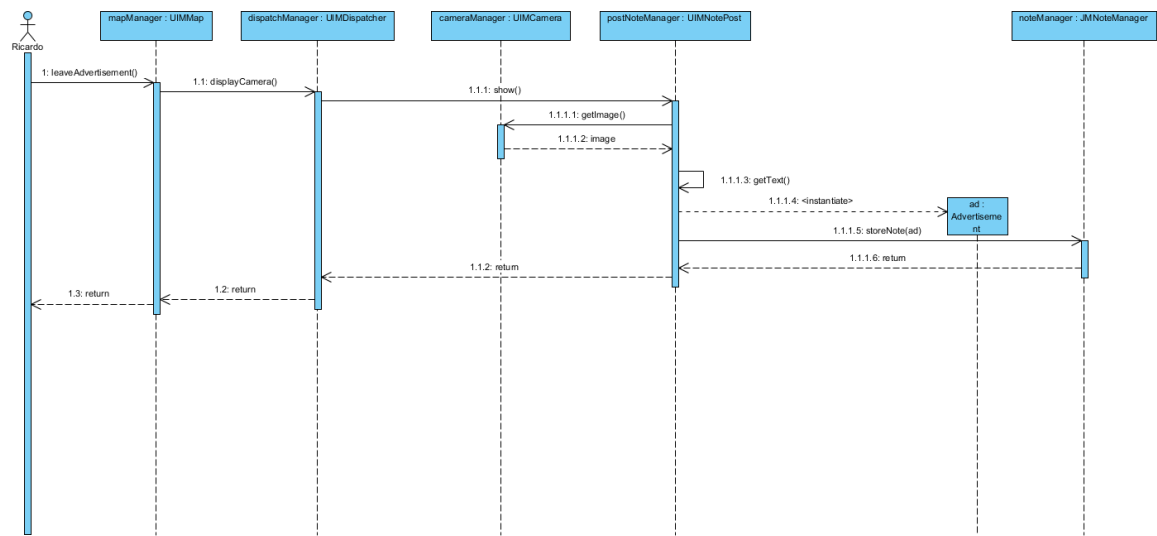
The diagram above shows the flow of execution in the case when user, Emilia, wants to view a note in her near vicinity. Initially, Emilia finds a preview of a note while she wanders around the map. She later decides to see the note and opens the AR function of Augma to see the note's preview in a better form. In the meantime Augma calls AR kit of Google and AR UI is shown on the screen. She then taps on the note and Augma opens up Note UI on the screen with the content drawn from the note database through Note Job Manager.

Report Note Sequence Diagram



The diagram above shows the flow of execution in the case when user, Bülent, wants to report a Note in Augma. Initially, Bülent is on the Map and sees a note that he wants to report. He opens up the preview of the note from the Map and presses the report note button on the Note UI. The report is recorded into the database for further reviews from the authorities of Augma.

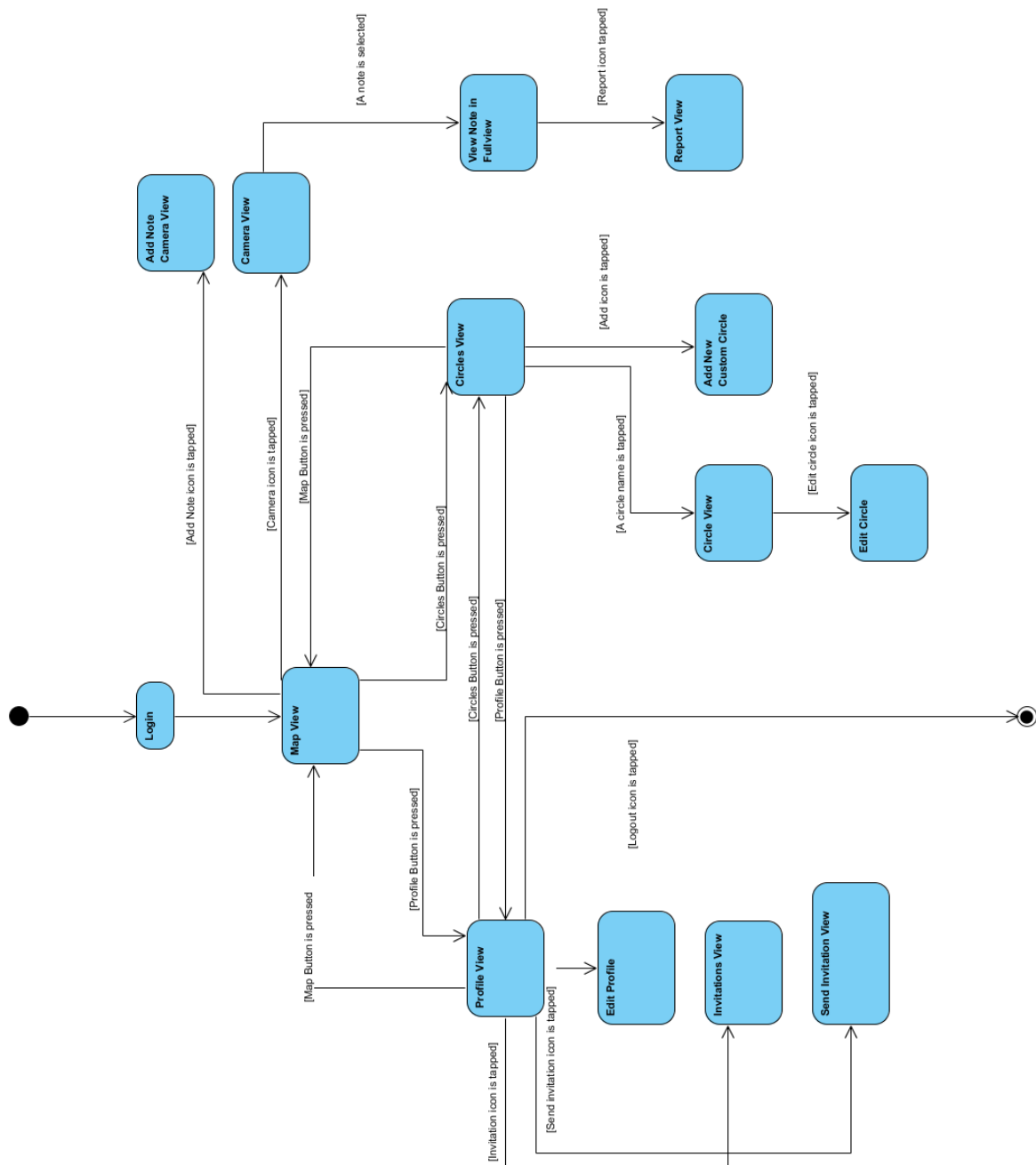
Leave Advertisement Sequence Diagram



The diagram above shows the flow of execution in the case when corporate account user, Ricardo, wants to post an advertisement via Augma. Initially, Ricardo goes to the place he desires to place his advertisement to. He prepares his note as described in Seq. 9 however since he is on a corporate account his posts are left as advertisements.

3.5.4.2. Activity Diagrams

Application Flow Activity Diagram



3.5.5. User Interface – Navigational Paths and Screen Mock-ups

In this section, screens of Augma are represented via the mock-ups and detailed explanations are given for each screen.

Login



Figure 1 - Login Screen

The user will log in to Augma via the login page as shown in Figure 1. The user will fill in his e-mail address and password by using the corresponding input fields and log in to system pressing Login button. For simplicity, the user is able to check Remember me check box to save his credentials and remove the need of entering them again. If the user has not registered to Augma yet, he will be able to sign up by pressing Sign Up button.

Register



Figure 2 - Register screen

The user will be able to register a new account in Register screen as shown in Figure 2. The user needs to fill in a username, e-mail and password and prompt the entered password in order to complete his registration. User can submit his registration to Augma system by pressing Register Account button.

Edit Profile

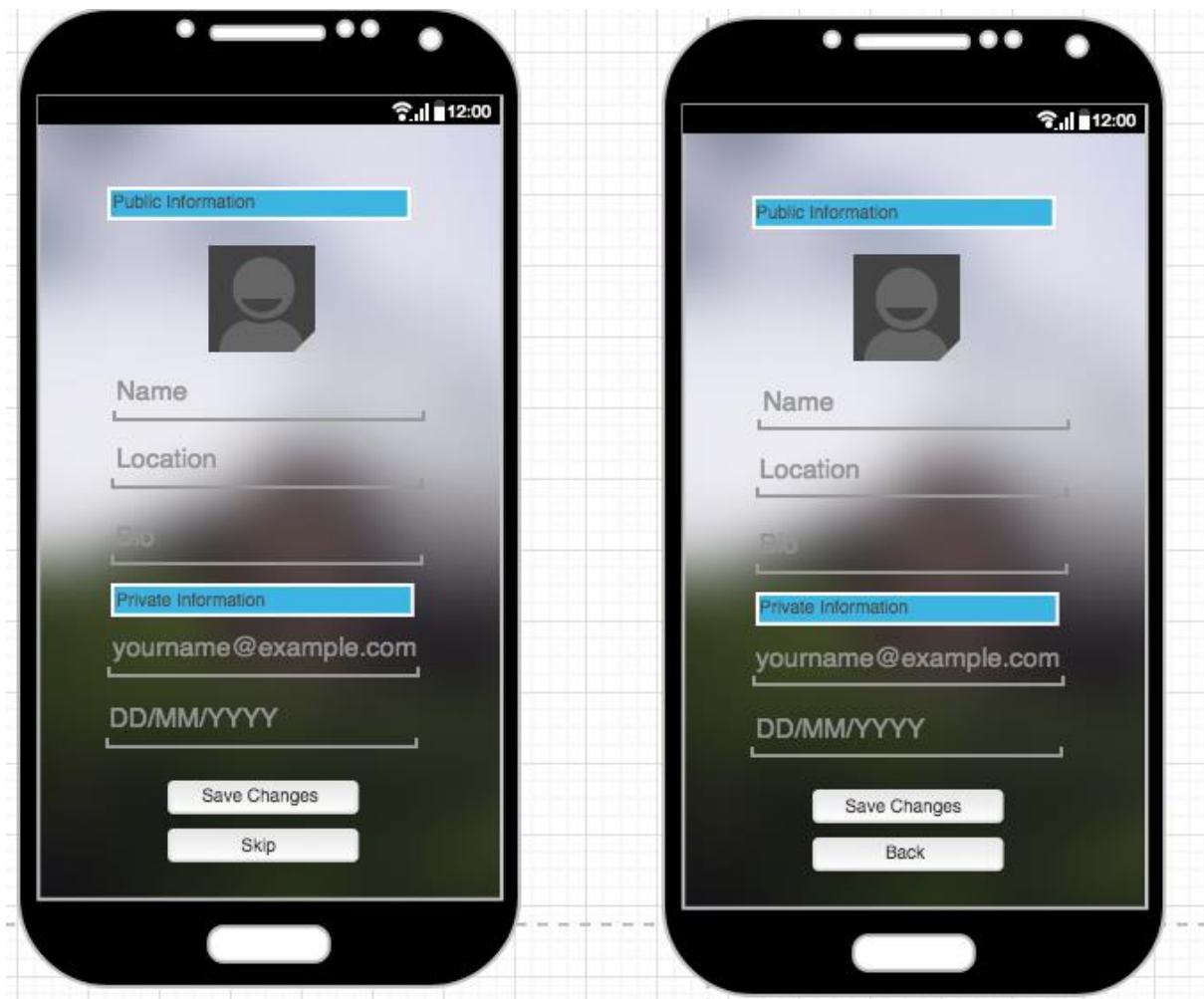


Figure 3 - Edit Profile screens from different views.

After submitting the registration, Augma system will redirect the user to Edit Profile screen as shown in the left side of Figure 3. The user is also able to access this screen from Profile screen, which is discussed in further parts of this section. User can upload a profile picture, fill in his real name, location, birth date and a short bio by using the corresponding input fields. The e-mail the user has entered during registration will be automatically shown in e-mail field. After filling in the input fields, user can save the data by pressing Save Changes button, or exit from this screen by pressing Skip or Back buttons, depending on from where the user accessed the screen.

Map

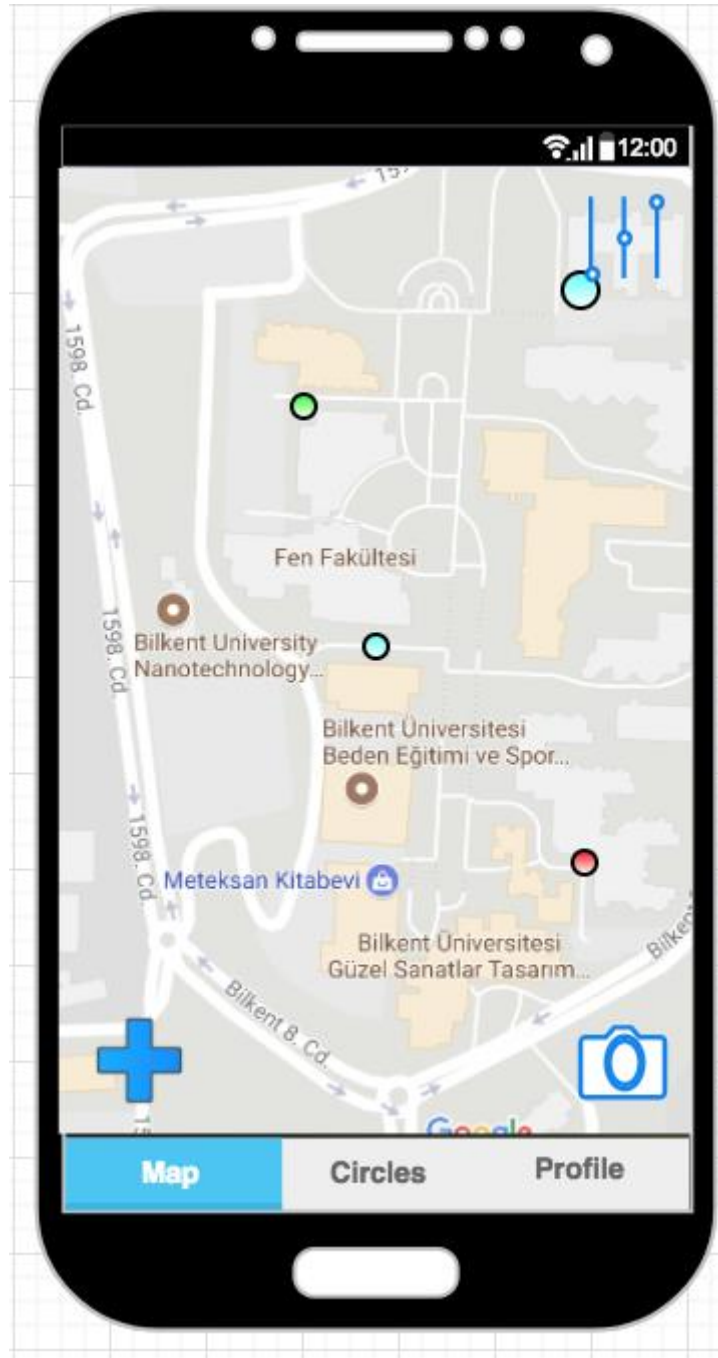


Figure 4 - Map screen

After the login, the user is automatically directed to Map screen as shown in Figure 4. Map is the main screen where the main functionalities of Augma are found. User can navigate through map by swiping on it and detect note locations. Plus icon located in the bottom-left corner can be used to add a new note. The user can also tap camera icon to look for nearby notes. Furthermore, filter icon located in the top-right corner can be used to filter

out the notes by their circles, so that the user can hide the notes of the circles that he does not want to see. At the bottom part of the screen, the navigation menu is located. By pressing the buttons on the menu, the user can switch between Map, Circles and Profile. This menu is found in most of the screens.

Circles

In this part, details of the screens that belong to circles are discussed under different topics.

Public and Custom Circles



Figure 5 - Public circles and custom circles screens

The user can display public and custom circles in Circles screen as shown in Figure 5. By using the search bar located at top, the user can search for circles by querying keywords. Tapping on a circle name directs user to the page where the circle details are found. Furthermore, the user is able to add a new custom circle by pressing the plus button in custom circles screen. Providing a developer is viewing public circles screen, he is also able to add a public circle by pressing the plus button which is only visible to developer accounts. The plus button in public circles screen is not shown in the figure to avoid ambiguity.

Add Circle

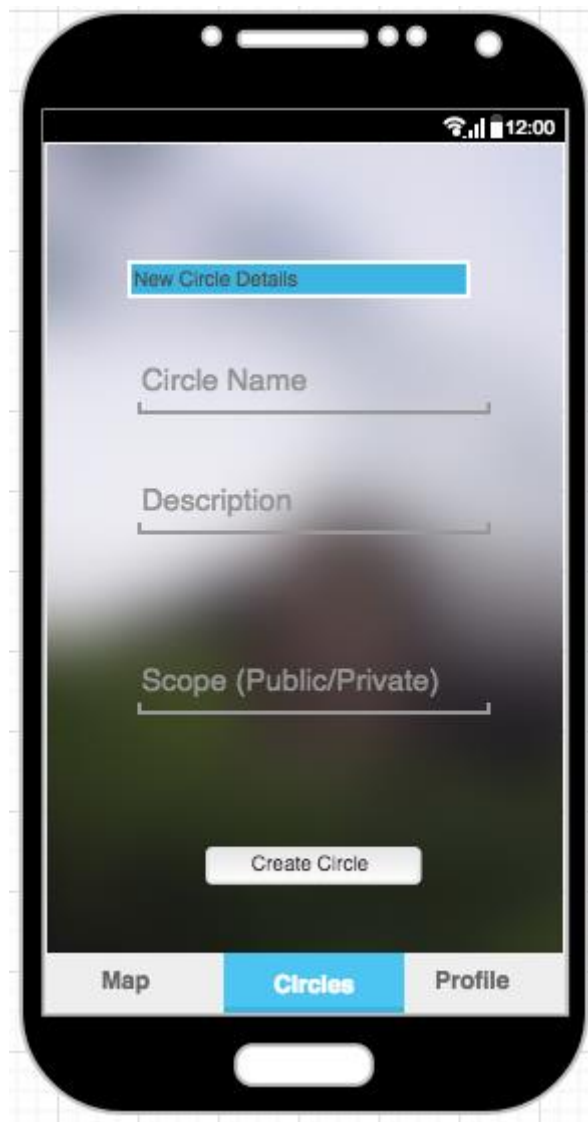


Figure 6 - Add Circle screen

If the user wants to add a new circle, he is prompted to enter its details. By filling circle name, description in the corresponding fields and selecting circle's scope, the user can submit a new circle, after pressing Create Circle button.

View Circle

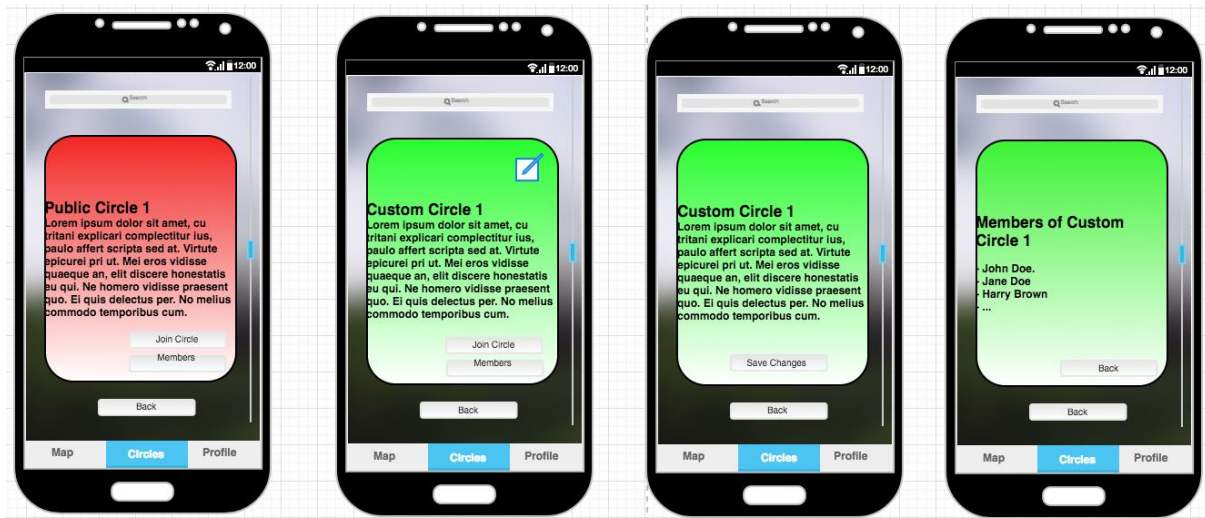


Figure 7 - Different variations of View Circle screens.

Details of a circle and buttons of other related operations can be found in View Circle screen as shown in Figure 7. If the user wants join a circle, he will press the Join Circle button in order to join. Pressing Members button will display a list of the members who have joined the selected circle before. An edit icon appears on the top-right corner of the details container, which can be used to edit the details of a circle. Note that this icon only appears if the viewed circle is owned by the logged-in user.

Notes

In this part, screens related to notes are discussed under different topics.

View Notes



Figure 7 - View notes screen. Preview of a note is shown.

The user will use View notes screen to explore the environment for notes that are left by other users. Preview of the nearby notes will be shown via the phone camera. The user can switch on/off AR mode by using the switch located at the top-right corner to determine whether the notes will be displayed in AR mode. The user can tap back sign located at the top-left corner to return back to the map. If the user taps a note preview, its full view will appear in Note Full View screen as shown in Figure 8.



Figure 8 - View Note in Fullview Screen

The user can read the full details of a note in View Note in Fullview screen. Note owner's Name and name of the circle to which the note is posted are also shown in this screen. The user is able to view rating of the note, which is calculated by subtracting downvotes from upvotes, and upvote/downvote the note if desired. There is also a report icon which appears at the bottom-right side of note details. The user will tap this icon if he wants to report the note. Moreover, tapping on the username opens the profile page of the user that has posted the note.

Report Note

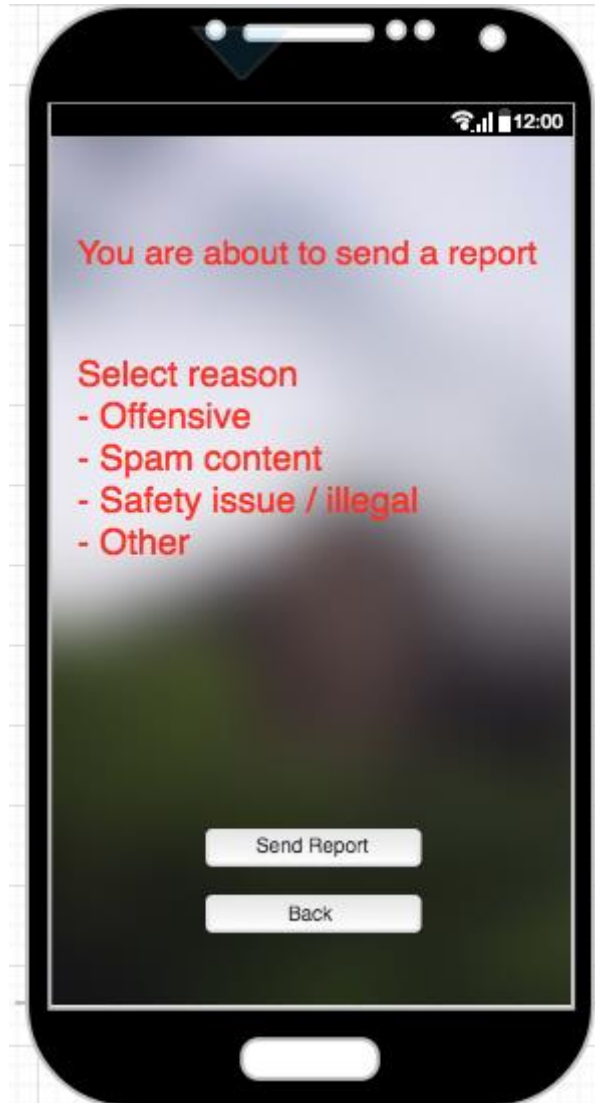


Figure 9 - Report Note screen.

If the user thinks that a note is violating the terms and conditions of Augma system and therefore, should not appear in the system, he is able to report a note in Report Note screen as shown in Figure 9. The user needs to select a reason for the report from the given reasons. The user can submit the report by pressing Send Report button to get it reviewed by Augma staff, or if he changes his mind, he can simply press Back button to return back to the full view of the note.

Add Note

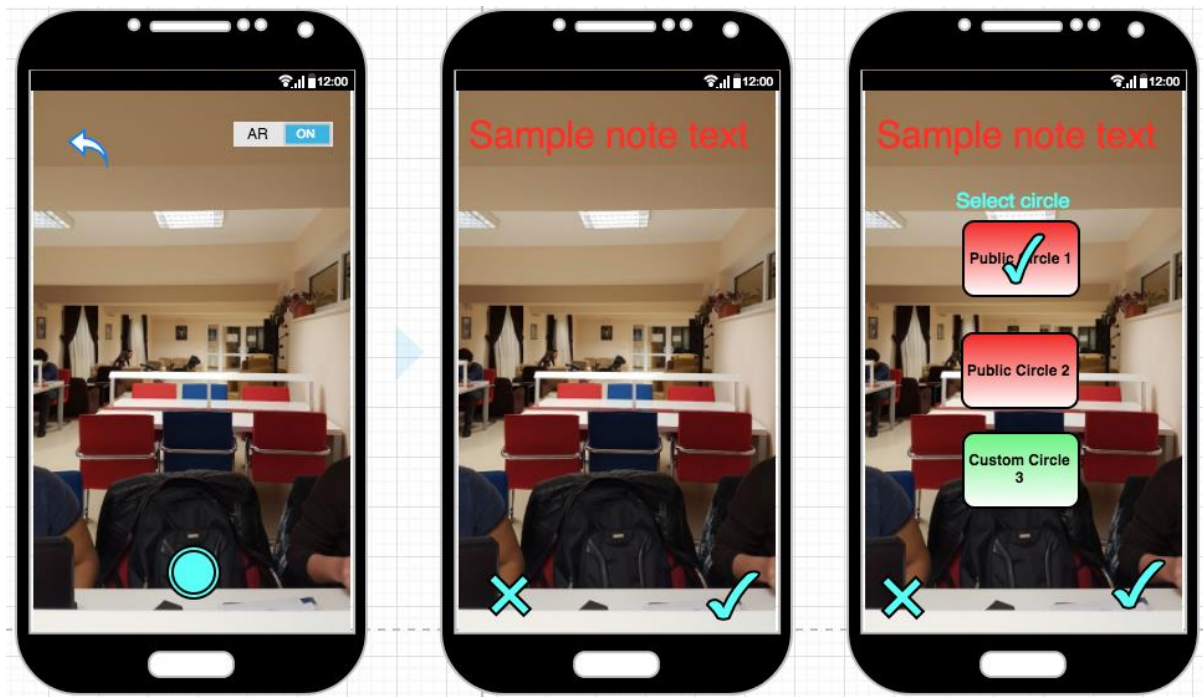


Figure 10 - Add Note screens.

The given screens in Figure 10 represent the addition process of a note. First, a user takes a photograph of the context. Augma system saves the user's location after this action. Then, the user is prompted to type the note text in the screen located in the middle. After typing the note, the user can proceed further by tapping Tick icon located at the bottom-right corner. After Tick icon is tapped, the user needs to select a circle from the given options to submit the note. Note that the user is already a member of the given circles. After the selection of the circle, addition of a note is finalized by tapping Tick icon again. If the user changes his mind, he can discard the note by tapping X icon, or go back to map by tapping Back icon in the leftmost screen.

Profile

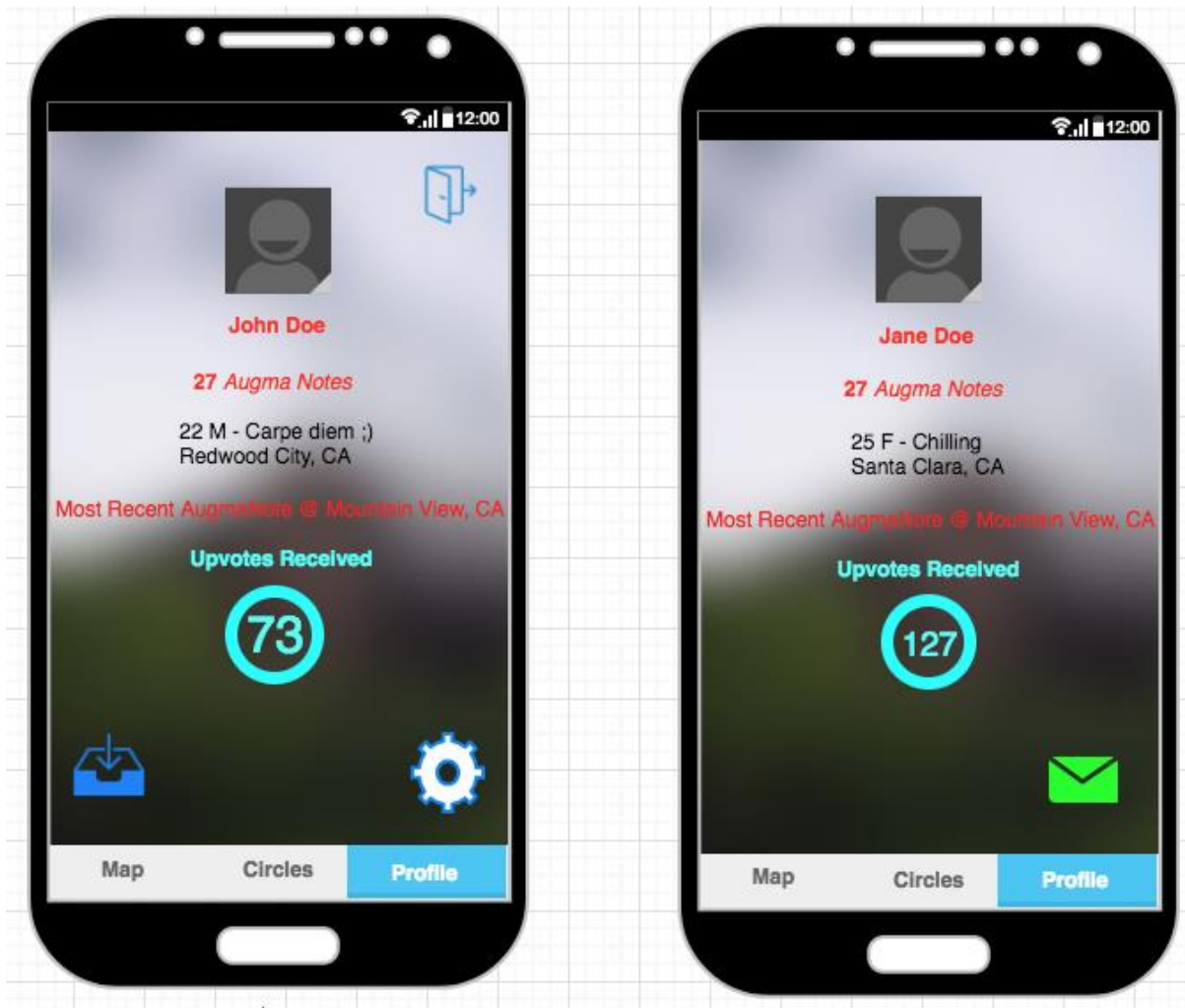


Figure 11 - Profile screens from different scopes.

Pressing Profile button in the navigation menu opens up the profile screen as shown in Figure 11. The user is able to display two types of profiles; the own profile of the user, or the profile of another user. In the example screens given in Figure 11, leftmost screen represents John Doe's profile screen, who is the user himself, whereas the rightmost screen belongs to Jane Doe, who is another user of Augma. The user can display how many notes posted by the user, user's name, the most recent note location and upvote count. If the user is viewing his own profile, he can tap Settings icon to edit his profile, Inbox icon to view the invitations, exit icon to log out from Augma. Note that Logout icon is found only in the user's own profile page. If the user is viewing another user's page, he can send an invitation via Invitation icon located at bottom-right corner. Details of the invitation screens are discussed in the next section.

Invitations

In this section, screens that are related to invitations are explained fully.

Invitations Inbox

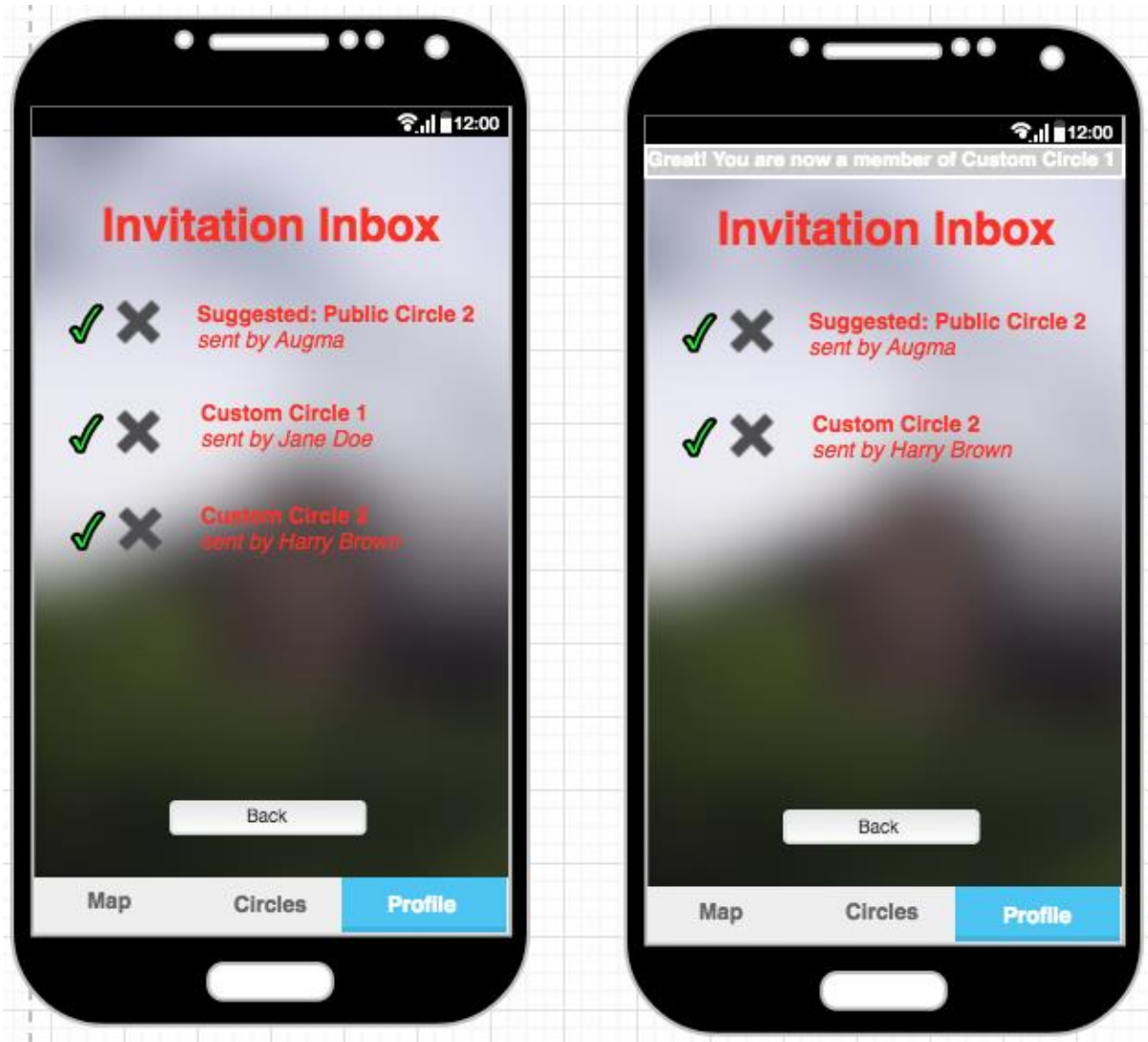


Figure 12 - Invitation Inbox screens.

The user can accept or decline invitations in Invitation Inbox screens as shown in Figure 12. The invitations in the inbox can be accepted or declined by tapping Tick or Decline icons. After accepting an invitation, it disappears and a message is shown at the top notifying the user about his action. The user can return back to Profile page by pressing Back button.

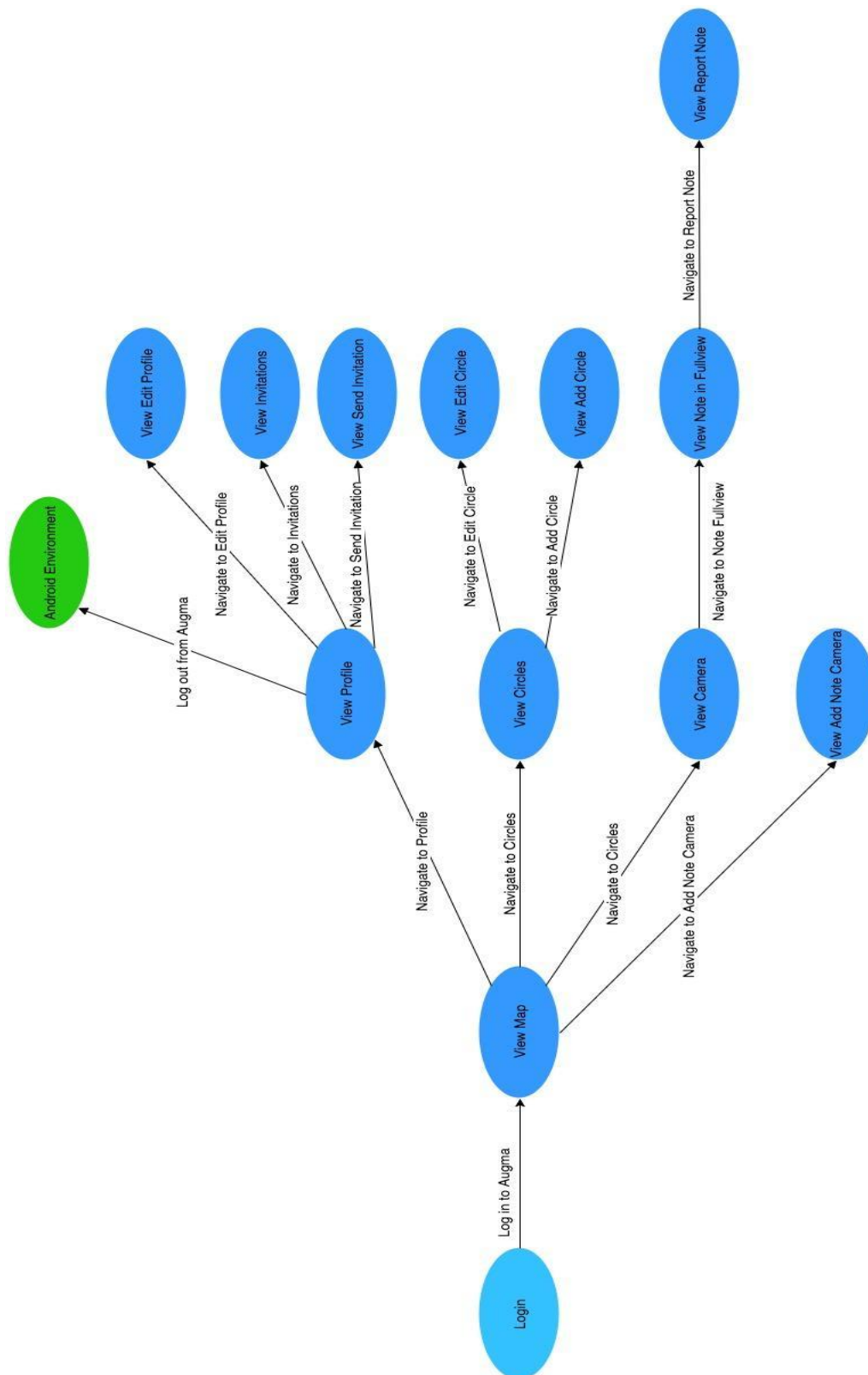
Send Invitation



Figure 13 - Send Invitation screen.

If the user wants to send a circle invitation to another user, he will use Send Invitation screen as shown in Figure 13. The user is prompted to select a circle to invite from the given options. The user can select an option by simply tapping the name of it. After the selection, the user can press Invite button to submit the invitation, or Back button if he wants to discard the invitation and return back to profile page of the user.

Navigational Path



The above figure represents the navigational paths of Augma. The diagram gives an overview of the navigations between screens and summarizes the discussion made in User Interfaces section. The entrance screen of the application is Login screen, which is shown with a different color, and the exit (logout) is made from View Profile screen.

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