FindMe – g04

Real Time Location Sharing App

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Contents

1 Introduction

This report represents the first project undertaken as part of the "Introduction to Mobile Computing" curriculum. The main goal of this project was to design and develop a mobile application that addresses a specific need or problem within the realm of mobile computing. In line with this objective we created FindMe, a mobile application designed to facilitate locating and tracking selected users in real-time.

In the subsequent sections, we offer an in-depth exploration of FindMe, encompassing the rationale behind its creation, the methodology employed to address the challenge, the structural framework, an evaluation of accomplished goals, individual contributions, and a user-oriented guide.

2 Motivation

The development of FindMe stemmed from the stemmed from the recognition of a pressing need in the realm of mobile computing: the efficient and intuitive location tracking and navigation of individuals. There is a crucial demand for a solution that seamlessly facilitates the process of locating and connecting with friends, family, or colleagues in real-time.

3 Solution

To ensure a seamless and user-friendly interface, our initial focus was on conceptualizing the optimal framework and key elements of the FindMe app. We initiated this phase by outlining the app's design and identifying essential widgets and features crucial for its functionality.

- **Splash Page:** Introduces users to the app with a brief logo display during startup.
- **Login and Registration Page:** Allows users to log in or create a new account with required credentials.
- **Home Page:** Serves as the central hub for navigation and accessing rooms, or search for one that has been created.
- **Create Room Page:** Enables users to set up new rooms with a custom password.

- **Enter Room Page:** After selecting the room at the home page, now users can join the room by entering the correct password.
- **Room Page:** Provides a collaborative environment for users to interact within specific room and members, such as selecting the user to follow (get direction and distance).
- **Profile Page:** Allows users to manage personal information, and logout.

After outlining the aps's design, we entered the prototype phase where we built our UI/UX Prototype using figma:
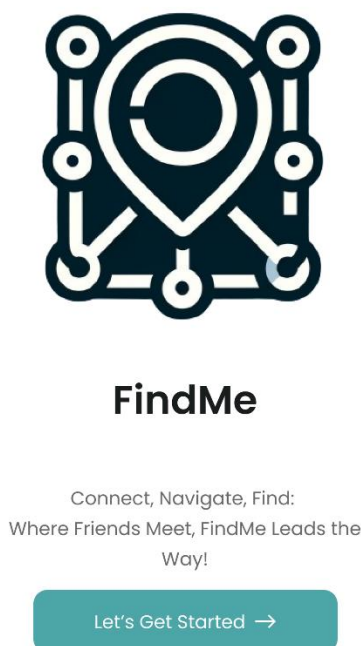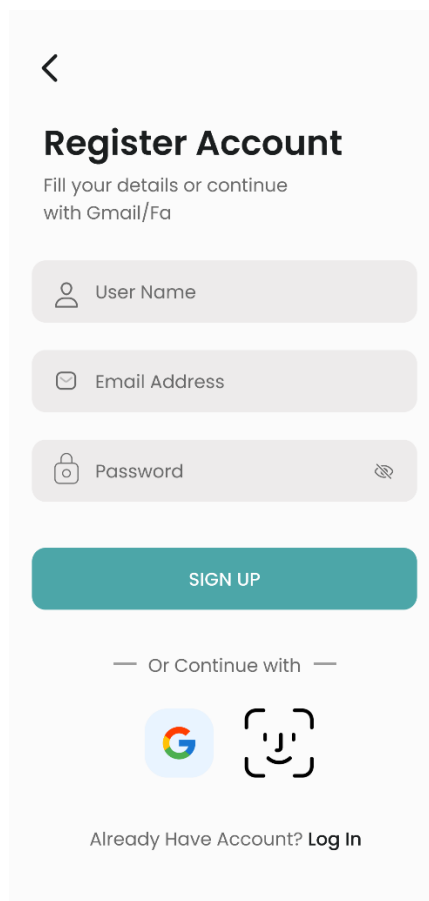

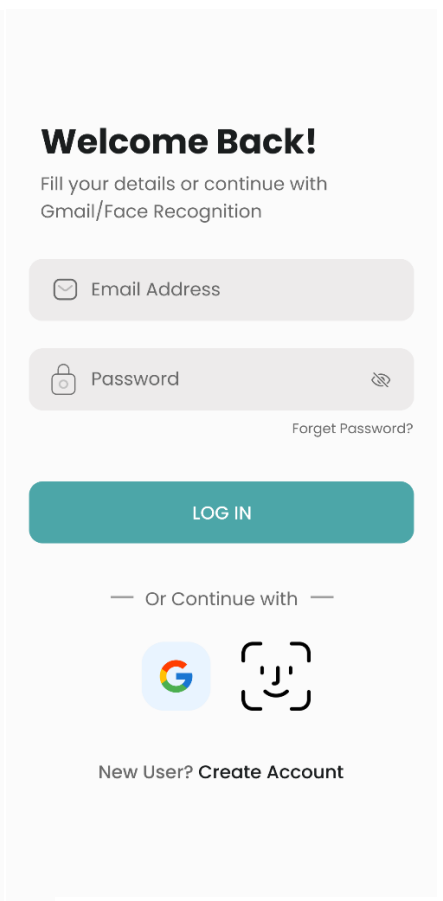*Figure 1 - Splash Page*

Figure 2- Register Page

Figure 3- Login Page
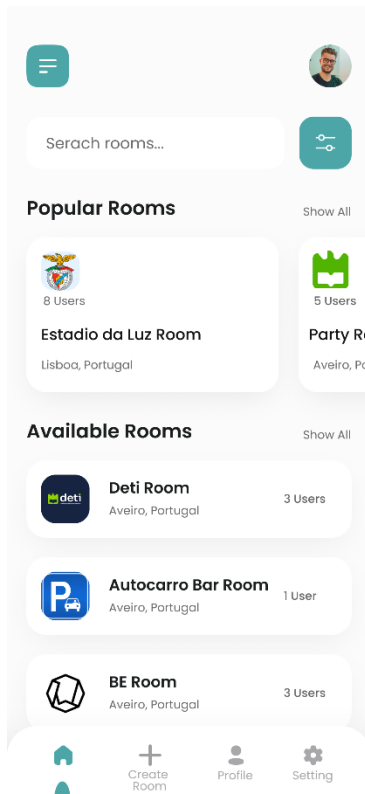
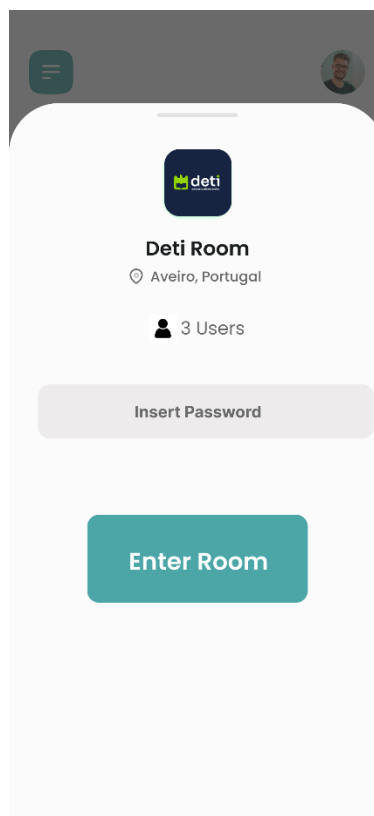universidade de aveiro

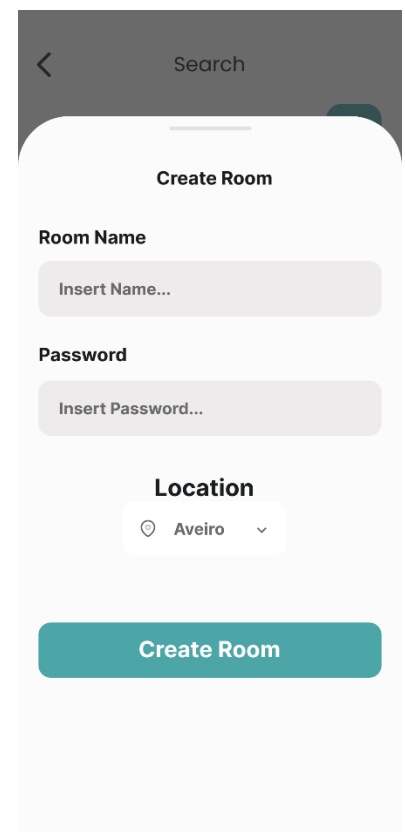*Figure 4- Home Page*

Figure 5- Enter Room Page
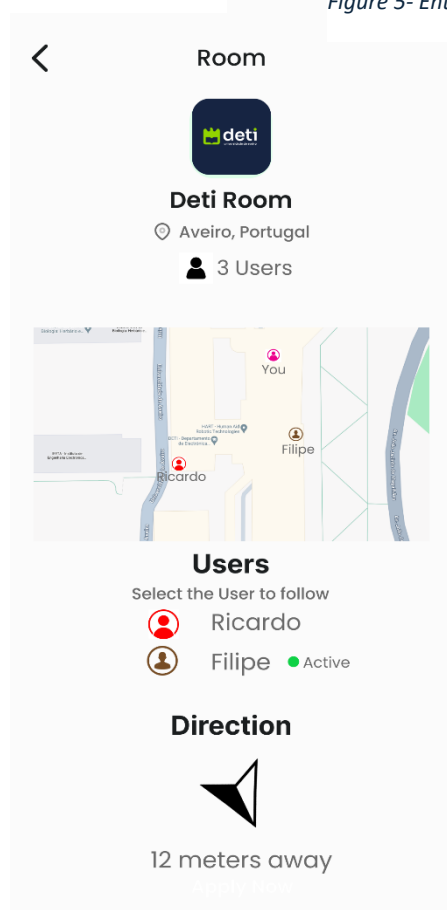

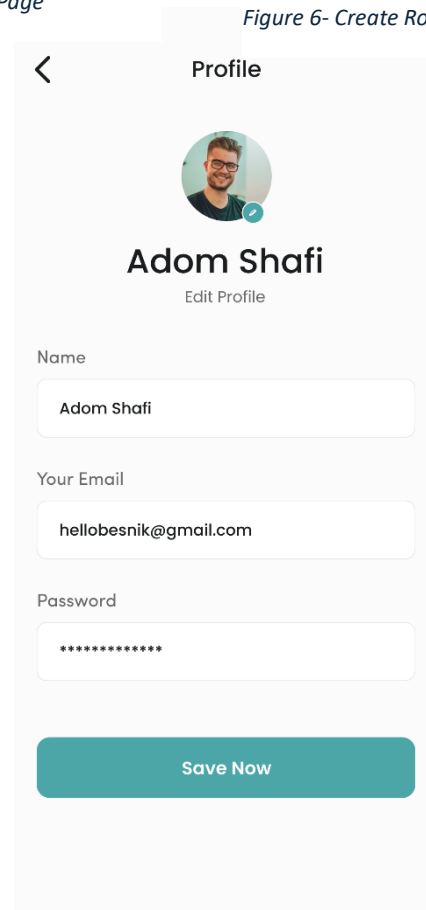*Figure 6- Create Room Page*

Figure 7- Room Page

Figure 8- Profile Page

3.1 Features

The main features implemented in our application are:

1. Location/GPS:

   - geolocator package was used and the permission_handler to access the device's location accurately.

2. Google Maps:

   - Through google cloud a project was created to get the permission to use the google maps map.

   - The google maps map was implemented using the google_maps_flutter and providing the API Key provided by the google cloud project.

3. Sensors- Compass:

   - Using the flutter_compass package, we were able to integrate real-time compass functionality into our application, enhancing user experience and providing accurate directional guidance.

4. Firebase:

   - Firebase was instrumental in providing real-time data synchronization, authentication services, and database management for our mobile application.

4 Architecture

Frontend:

The frontend of our project encompasses the user interface components and interactions that users engage with. Using Flutter, we designed and implemented various screens and widgets to create a seamless and intuitive user experience.

Backend:

The backend of our project involves the server-side logic and functionality that supports the frontend operations. We utilized Firebase Cloud Functions to implement server-side logic and handle tasks such as data processing, validation, and notifications.

Firebase Authentication:

Firebase Authentication was integrated into our project to provide secure user authentication and management.

Firestore:

A NoSQL cloud database provided by Firebase, was used to store and synchronize real-time data such as user profiles, room information, and location coordinates.

Google Maps Integration:

Google Maps integration allowed us to incorporate mapping functionality into our application. We utilized the Google Maps Flutter package to display interactive maps, markers, and routes, enabling users to visualize their location and navigate within the application.

GPS/Location Integration:

To access and utilize the device's GPS capabilities, we integrated the geolocator package. This enabled our application to retrieve the user's current location, track movement, and calculate distances between users.

Compass Integration:

The Flutter Compass package was integrated to leverage the device's built-in compass sensor. This functionality provided users with directional guidance, helping them orient themselves and navigate towards specified destinations within the application.
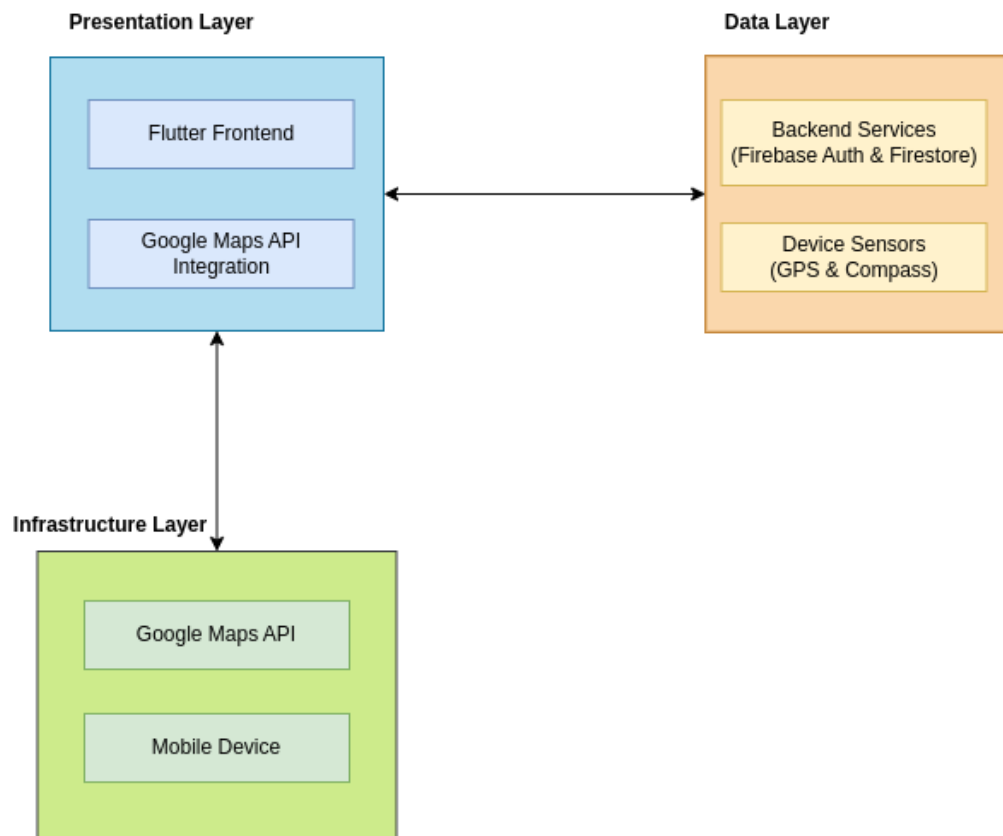
4.1 Architecture Diagram

Figure 9- Architecture Diagram

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4.2 Database

Firestore:

-**Collection:** users

      - Document: mail@gmail.com

            - Fields:

                   - email

                   - isSelected (if it is the active player for search in the room, only one user by room)

                   - latitude

                   - longitude

                   - roomId (roomId of the room he is inside)

                   - username

Figure 10- users collection

-**Collection:** rooms

      - Document: roomName

            - Fields:

                   - location

                   - name

                   - password (used by users to enter the room)

Figure 11- rooms collection

5 Overall Assessment

As a main objective, we aimed to develop a functional app that seamlessly connects users, provides accurate location tracking. Throughout our assessment, we were able to measure how well FindMe achieves these goals by ensuring technical stability across various devices and assessing the application's scalability to accommodate potential growth in user base.

5.1 Issues Found

During the development phase, we encountered minor UI inconsistencies as well as critical functionality concerns. One notable issue was related to the compass sensor, which occasionally exhibited erratic behaviour by altering the direction despite the phone being stationary. While this posed a challenge beyond our control, we opted to retain it within the app due to its essential role in functional. Initially we considered integrating a face recognition system to authenticate users. However, we prioritized other aspects of development due to its non-crucial role in the system, treating it as an additional authentication method. As time constraints became apparent, we delayed its implementation to later stages. Despite our intention to include it, the complexity and time required for integration led to its postponement, with other essential functionalities taking precedence during the development phase.

5.2 Contribution Assessment

Miguel Miragaia (50%)
Gonçalo Lopes (50%)
GitHub Repository - https://github.com/Miragaia/findme

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6 Tutorial

6.1 Splash Page

Users will be able to learn a bit about FindMe, and after they can continue to the login/register page.

6.2 Login Page

Users will be able to authenticate if they already got an account and access the app, or access the Register Page to create a new account.

6.3 Register Page

Users can create a new account or retrocede to the Login Page
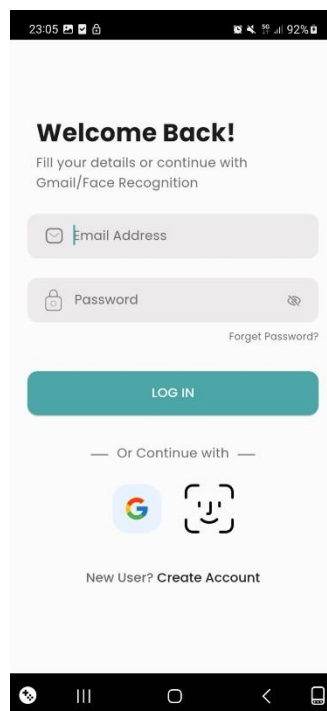

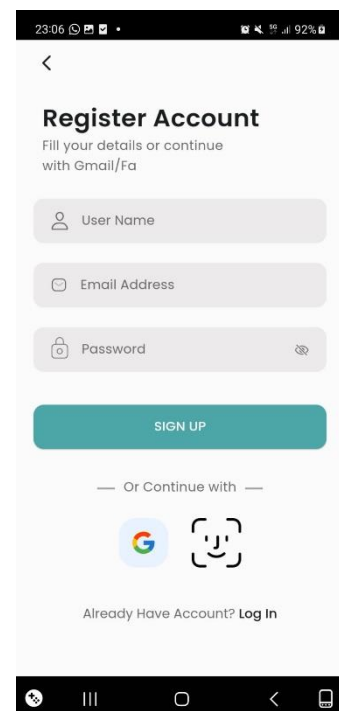*Figure 12- Splash Screen*

Figure 13- Login Screen

Figure 14- Register Screen

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6.4 Home Page 1

There will be a list of the accessible rooms for users to enter, the possibility to access the Create Room Screen, or if clicked at one of the listed rooms access the Enter Room Screen. Rooms are presented in a list and each one of them has a name, a location, and the number of users inside of it.
There is always the possibility to user the search bar to find a specific room.

6.5 Home Page 2

Using the search bar, if we try to search for a room it works, even if we don't search for the room full name.

6.6 Create Room Page

Clicking at the bottom bar "plus" icon we access the Create Room Screen where users can create a room filling all the inputs (name, password, location).
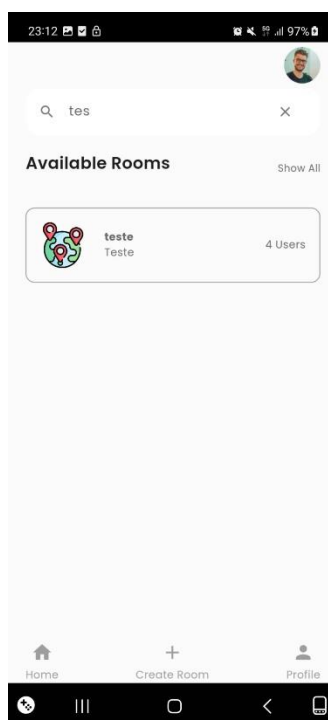

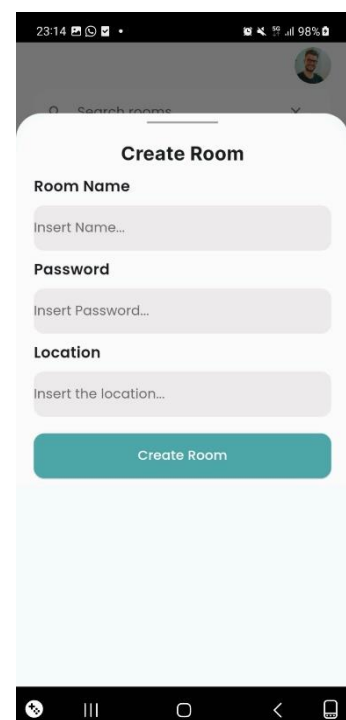*Figure 15- Home Screen 1*

Figure 16- Home Screen 2

Figure 17- Create Room Screen

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6.7 Enter Room Page

Clicking at one of the available rooms users are redirected to the Enter Room Screen where if they insert the correct passwords they redirected to the Room Screen.

6.8 Room Page

Users are presented with the Room page which has the room name, number of users inside the room, a map, a list of users, direction to friend and an arrow pointing towards the direction we should move to reach the active user, and the distance between them.
At the Users list we can select a user to be active, all the information above will be based on their coordinates, their marker turns green on the map so users can differentiate the active user amongst the other on the map.
The direction to friend adjusts based on current user coordinates and the selected friend coordinates.
The arrow is rotated based on the Compass sensor of the phone, that tells us which direction the phone is pointed towards, and the direction the arrow points is the direction we should move to find our friend.
Finally, its presented the distance between the user and the active friend.

6.9 Profile Page

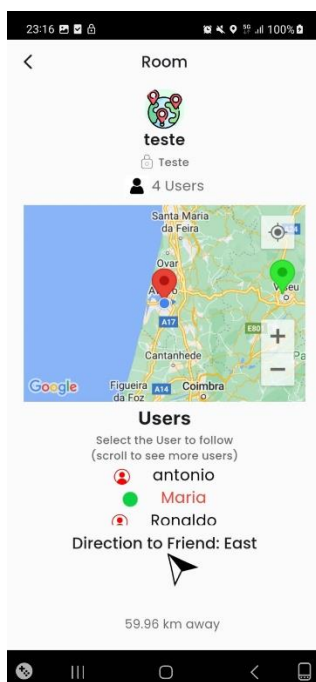User personal info and the possibility to sign out.
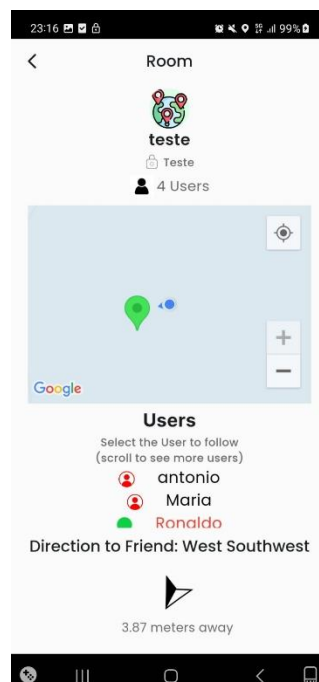

Figure 18- Room Screen

Figure 19- Room Screen

Figure 20- Profile Screen