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MAPMORY

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MAPMORY

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Abstract

Mapmory is a mobile application designed to address the growing challenge of preserving meaningful travel memories in a digital age where conventional photo galleries and journaling tools fail to capture the full richness of a travel experience. This project was developed in collaboration with Zafigo, an online travel and lifestyle platform, and targets travellers, digital nomads, and content creators who wish to document and revisit their journeys in a more immersive and contextually enriched manner. The application leverages GPS-based geolocation, weather API integration, and AI-generated storytelling to automatically enrich each memory entry with contextual data such as timestamps, weather conditions, and descriptive narratives. Its core interface features an interactive map on which memories are displayed as pins, each containing multimedia content including photos, videos, personal notes, and user-selected music, all anchored to the specific geographic location where they were captured The system was developed using React Native for cross-platform mobile compatibility, with Supabase and PostgreSQL serving as the backend and database infrastructure. The development followed Agile methodology, progressing through iterative phases of planning, design, development, testing, and deployment. Data gathered through a user questionnaire involving 58 respondents informed the system's functional and non-functional requirements, validating core features such as automatic location logging, AI-enhanced storytelling, and interactive map visualization. Testing was conducted across unit, integration, system, and user acceptance levels, confirming that Mapmory meets its intended functional objectives. The completed application successfully demonstrates how location-aware, AI-enhanced mobile technology can transform fragmented travel media into cohesive, emotionally resonant digital journals.

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1 INTRODUCTION

1.1 Introduction

This chapter will provide a summary of the Mapmory project. It is divided into six sections, which are project background, problem statement, project objectives, scopes and target users, and an overview of the report.

1.2 Project Background

Travel provides potent contexts for autobiographical remembering: detailed recollections that consist of sensory impressions, emotions, and spatial-temporal context. Research has shown that when travelers recall past journeys, factors such as memorability and nostalgia strongly influence their intention to re-visit destinations (Lu, Lai & Liu et al., 2022). Precisely, one research shows how memorable travel experiences create nostalgia and enhance emotional attachments to places, which begets deeper engagement with one's past travels. Another recent bibliometric review on nostalgia tourism underscores that modern-day travelers seek an authentic and meaningful experience rather than superficial travel logs, and want tools that support the preservation of more than just photos, such as things like context, emotion, and place matter deeply.

However, most current journaling and photo-storing tools fail to support users in preserving context such as location or weather, or even emotional tone. Without these enrichments, memories are more prone to fade or be recalled in an abstract manner rather than as a living experience. This is the gap between what people experience when traveling and what they retain over time. A system for automatic capture of context, organized spatially, and enriched by narrative has the potential to significantly improve how travel memories are preserved and revisited.

The idea for Mapmory came from the observation of Zafigo, an online travel and lifestyle magazine that curates stories, tips, and inspiration for travelers. Zafigo creates and publishes narrative content, but it does not have in place any mechanism that would enable readers to trace their travel themselves with great detail over time. From discussion with potential users, several pain points came into view, such as: memories fade; journals of travels and collections of photos become disorganized; no good way to put memories in geographical context or re-experience via map or multimedia.

Therefore, Mapmory is designed to fill this gap. Target users include travelers who wish to record their journeys with ease, revisit their own paths, and preserve what they saw, how they felt, when, and where. Benefits for the client, Zafigo, could include integrating or promoting the Mapmory application by featuring user stories, increasing brand engagement, and leveraging authentic travel content.

Mapmory is a mobile application that is aimed to create a smart and seamless way of documenting journeys for travelers. It would log memories automatically through GPS and IoT-based geofencing for location detection, and each entry is filled with contextual details, which includes timestamps, weather data, and AI-generated narratives. This would let users preserve and revisit their past experiences vividly. The core feature of the application is an interactive 3D globe map that shows memories as pins, each pins contains the images, clips, personal notes, and music of the user's choice and pinned to a specific location.

The objectives of this project are to design an interactive map that organizes the entries geographically, which means the project will create a map-based interface that users can view and access images, clips, and notes pinned to specific locations. Next, Mapmory also aims to design an application that captures and stores travel experiences with timestamps, weather data, and AI-generated storytelling. Mapmory will have memory logging as one of its main features, along with contextual data and AI narratives for vivid memory preservation. Finally, this system seeks to integrate media into a map-based digital travel journal enhanced by AI narratives. Mapmory will utilizes AI storytelling around its multimedia content, which would allow users to relive their past travels in an immersive way.

1.3 Problem Statement

This section will provide descriptions of Mapmory's problem statements. Problem statement is concise description of the problem or issues a project seeks to address. The problem statement identifies the current state, the desired future state and any gaps between the two (Birt, 2023).

1.3.1 Difficulty in Organizing Location-Based Memories

Most existing digital diaries and photo applications struggle to provide effective organization of location-based memories, leaving users with fragmented and scattered content that is difficult to revisit geographically. Although geotagging features exist, studies show that they are often underutilized or poorly integrated, leading to a lack of meaningful spatial context (Hutmacher et al., 2023). Users indicated frustration with assembling photo, note, and travel event connections into cohesive stories that are bound by place, such disorganized archival diminishes the personal value of travel memories. This highlights the need for smarter systems automatically capturing, organizing, and visualizing memories on maps, enabling travelers to intuitively relive experiences.

1.3.2 Loss of Travel Memories

Travelers often struggle with the loss of information about their travels, such as memories of time, weather, and even emotions fade or become incomplete. Research shows that human memory is fallible, and without proper contextual reinforcement, travel experiences are often forgotten or misremembered (Chen et al., 2022). Traditional tools, such as photo galleries or posts on social media, capture pictures but rarely retain the ambiance of the context in which the shots were taken. These memories become superficial, lacking depth and emotional resonance. This presents the clearest need for a digital intervention that could automatically enhance and retain travel memories with contextual information for users to retain vivid, meaningful recollections of their experiences.

1.3.3 Lack of Digital Journals with Map Integration

Most of the journaling and photo applications available depend on manual entry. The lack of smooth integration with maps prevents users from capturing life's moments that are spontaneous and real. Without automated detection of places or reminders triggered by movement, travellers often fail to document moments as they happen, leading to incomplete records of their journeys. Studies highlight that while geotagging exists, it is rarely paired with interactive map-based storytelling, limiting the ability to visualize and relive experiences geographically (Joomag, 2024). This underlines the necessity for digital journals to combine automation with map integrations in a way that will make preserving the memories of traveling more intuitive and immersive.

1.4 Project Objectives

This section will provide descriptions of Mapmory's project objectives. Project objectives are specific, measurable outcomes that a project aims to achieve within a defined timeframe. They clarify the project's purpose and become guidance toward successful completion. Articulating project objectives is crucial in project management, as they significantly influence decision-making and resource planning throughout the entire project life cycle (Atlassian, 2024).

1.4.1 To design an interactive map that organizes multimedia entries geographically

The platform will be a dynamic, interactive map-based interface, which is a central organizing point for remembering and revisiting memories, where users are able to view and access their photos, videos, and diary entries directly pinned onto geographic locations. By linking each memory to the exact place where it was created, the interface allows users to explore their journeys visually, offering a more intuitive and immersive way of recalling experiences compared to traditional linear lists or folders.

1.4.2 To develop an application that captures and stores travel experiences with timestamps, weather data, and AI-generated storytelling

This project will create an intelligent system that automatically logs moments of travel and further enhances them with rich contextual information, such as location, time, and weather conditions, while generating personalized AI-driven narratives for vivid and meaningful memory preservation. By reducing the need to create entries manually, the system will ensure that all important details are captured in real time without interfering with the travel experience. This allows users to enjoy their journey without distractions while the application seamlessly documents everything in the background. Adding AI-generated storytelling to that brings an emotional and descriptive layer to every entry, turning raw data into engaging narratives that users can almost relive long after the trip has ended.

1.4.3 To integrate media into a map-based digital travel journal enhanced by AI narratives

This project will combine different forms of multimedia content with AI storytelling in a single unified digital journal to provide users with an immersive and cohesive way to relive their travel experiences. The system integrates all the mediums into one platform, preventing the fragmentation that usually happens when memories are divided among different applications or devices, instead showing them in smooth narrative flow. Furthermore, AI storytelling completes this experience by adding contextual details and an evocative language to entries, retransforming the simple collection of media into a vivid and emotionally engaging travel story.

1.5 Scope and Target User

This section will discuss the project scope, product scope, and target users of Mapmory project. Project scope is the part of project planning that involves determining and documenting a list of specific project goals, deliverables, tasks, costs and deadlines (Lutkevich, 2021). Product scope refers to the specific features, functions, and characteristics a product must include to meet its intended purpose. It outlines the product's delivery, including design specifications, user requirements, and performance expectations. Product scope is crucial in project management, ensuring alignment between stakeholder expectations and final deliverables (BrainSensei, 2025). Meanwhile, the target users or target market is the specific group of consumers a product is aimed at, and it is essential for product managers to clearly define and understand this group to ensure that the product meets their needs and demands. A well-defined target market not only drives the success of a product but also informs critical decisions throughout the product's lifecycle (Agilemania, 2025).

1.5.1 Project Scope

Mapmory will be a mobile application for Android and iOS. It is aimed at travellers who value storing and preserve their travel memories. It will automatically log memories and include context like weather data, and the details of the location. The front-end will be developed using React Native, and the back-end will use Supabase and PostgreSQL. APIs for location tracking, weather data, and AI narratives will also be used to create a cohesive tool focused solely on vivid memory preservation.

It will cover two academic semesters, each lasting 14 weeks, with the initial phase focused on planning and design, while the next emphasizes developing, testing, then deployment. The project works with Zafigo, a digital platform for travel and living tips, which offers practical feedback to ensure the application fits actual user demands.

1.5.2 Product Scope

Mapmory will be a map-based travel journal for seamless capturing, organizing, and revisiting memories through multimedia integration. The core features will include a map interface showing entries pinned to specific locations, and the application will allow the automatic logging of moments enriched by contextual information such as time, weather, and geolocation, while AI-generated storytelling will transform simple logs into vivid narratives for richer memory preservation.

Moreover, the product will offer context-aware notifications to remind users when they are near previously visited spots, ensuring meaningful reconnections with past experiences. Users can also create group or shared memories, enabling friends or travel companions to create a collective memory map. Entries will feature privacy settings that let users mark memories as private, shared, or public to safeguard user privacy and control. Advanced integration of multimedia will be facilitated by auto-generated time-capsule highlight videos with music-enhanced playback, using songs that users have picked for given spots. The ability to attach emotions to memories, as known as emotion tagging, allows users to associate feelings with their memories and later filter entries by emotion. In addition, the system will recommend new travel spots, leveraging location and user history to suggest meaningful destinations.

There will also be supporting features, which include user account management such as sign-up, login, and profile customization, secure data storage and retrieval through Supabase, media upload and management for photos, videos, and text, and search and filtering options by location, date, media type, or emotion. The application will prioritize user-friendliness through a Figma-designed interface, along with high performance, reliability, and robust security measures such as safe authentication and controlled data access. Overall, these features define Mapmory as a comprehensive, context-aware, and socially connected mobile application for preserving and reliving travel experiences.

1.5.3 Target User

The Mapmory application is designed mainly for individuals and groups who value capturing, organizing, and revisiting their travel experiences in an interactive way. The application caters to the specific needs of diverse user categories:

1.5.3.1 Travellers

Travelers vary from casual to enthusiastic explorers who want to document their travel. Traditional photo albums or plain journaling applications lack in organizing memories by location, thereby making it difficult for travelers to have a meaningful re-connection to past experiences. With Mapmory, travelers can put photos, videos, and notes right onto an interactive map, enhanced by contextual data such as weather and timestamps, allowing them to relive not just what they saw but the atmosphere of a moment and, thus, preserve memories in a more immersive and emotionally connected way.

1.5.3.2 Digital Nomads

Digital nomads move from city to city while working online, staying in each location for weeks or months. Instead of brief visits like regular travelers, they return to certain spots again and again, and this is where Mapmory becomes valuable for tracking daily life across time. By labelling entries with moods or saving key moments as time capsules, users can see how their connection to a place changes.

1.5.3.3 Content Creators and Travel Bloggers

For influencers and travel bloggers, Mapmory supports narrative building that would assist in content creating. The application lets users build vivid stories enhanced with media and AI-written descriptions, giving depth to experiences. By arranging content based on location, creators present journeys in a clear format that still feels lively. This makes it simple to reuse content across blogs, videos, or platforms online. Additional options like shared timelines allow joint storytelling, helpful when bloggers team up with companies or destination promoters.

1.6 Overview of This Report

Chapter 1 – Introduction: This chapter contains the project overview including its background, problem statements, project objectives along with its scopes.

Chapter 2 – Literature Review: This chapter outlines a concise study regarding the definitions and review of travel journals, and technologies that will be used in designing Mapmory.

Chapter 3 – Methodology: This chapter discusses the techniques and approaches chosen for the project, which is Agile Methodology. In this chapter, the methodology of the study is described in detail, and the procedures and methods used to attain the project objectives are critically analysed. It also discusses the requirements of the project, which includes data gathering techniques, functional requirements, non-functional requirements, software requirements, and hardware requirements. Other than that, there is also an analysis section where data from the data gathering technique is analysed.

Chapter 4 – Design: This chapter discusses about the system design which includes the front-end and back-end platform elements. The design documents include principles for layout and schema organization of the database. The implementation of the system is also discussed in this chapter. It highlights the type of tools used to develop this project including execution platforms, and implementation tools. The real design of the system interface is also shown here.

Chapter 5 – Findings: This chapter outlines the various testing activities conducted to ensure the end-result of a project remain tallied with user requirements defined.

Chapter 6 – Conclusion: The final section of this project summarizes both outcomes and achievements of Mapmory project. This chapter examines the project goals to verify their accomplishment. Educational takeaways from the development stage are delivered to the stakeholders and the report evaluates the system's operational restrictions. Proposed improvement and development directions for the system extension form the last recommendation section of the project.

2 LITERATURE REVIEW

2.1 Introduction

This chapter critically analyses and evaluates published works in a certain field of study. This literature review's primary goal is to investigate and evaluate the body of research on travel journals, with a focus on those that utilize mobile devices. The development of the Mapmory project depends on the completion of this evaluation. Literature review is important when developing this project as it will help to identify the best practice and avoid common mistakes in designing the project, ensuring it firs the current trends and fulfils all the requirements of the client.

2.2 Investigation

For this project, the investigations are related to improving the concept of travel journals and digital memory systems, location-based services, context-aware applications, AI-generated storytelling and contextual enhancement, and the importance of location-aware memory systems.

2.2.1 Travel Journaling and Digital Memory Systems

A travel journal serves as a personal memoir of a traveller's journey, capturing moments, emotions, and experiences. Not only does it preserve one's memories, but it also allows them to reflect on their trip long after it is over. A travel journal can include written descriptions of places a person has visited, itinerary list, and photos that they took during the trip. One of the purposes of travel journals is to discover and learn more things, as traveling usually leads on to gain new experiences and discoveries. Another one of the main purposes is to preserve memories and experiences. As time passes, memories may fade, but a well-documented travel journal helps keep those memories alive (Journey, 2025).

With the increasing digitization of everyday life, the concept of travel journaling has evolved into digital memory systems, which are technological platforms that support the collection, storage, and retrieval of personal experiences in multimedia formats. Modern travel journals are now made available on the phone, each offering features that paper cannot match. Such as AI organization, interactive maps, multimedia storage, or real-time updates. These platforms enhance the accessibility and organization of personal memories, making it easier for users to retrieve and revisit the experiences.

2.2.2 Location-Based Services (LBS)

A location-based service (LBS) is a software service for mobile device applications that require knowledge about where the mobile device is geographically located. The application collects geodata, which is data gathered in Real Time using one or more location tracking technologies. (Froehlich, 2022)

Location-based services integrate data from various resources, including Global Positioning System (GPS) satellites, cellular tower pings and short-range positioning beacons, to provide services based on the user's geographical location. Location-based services can be broken into the following distinct categories which are pull and push. For pull, the application user initiates the location-based service processes. Meanwhile, push means the application initiates the location process based on a trigger or at regular intervals. The application then presents the user or device with relevant information based on their geographic location.

For location-based services to operate, the following four basic components are required:

I. an application that uses location-based services;
II. a positioning mechanism to collect geodata;
III. a mobile network to transmit or receive data; and
IV. analytics software running on a remote server to compute and deliver relevant data to the user based on geographic location.

2.2.3 Context-Aware Applications

The term "context-aware" was first introduced by Schilit and Theimer in 1994, describing the "ability to discover and react to changes in the environment" (Carrera-Rivera et al., 2022). A context-aware application is a system that uses context to provide information and services relevant to a user's task; context is any information that can be used to characterize the situation of an entity.

Context-aware computing has emerged as one of the central characteristics of ubiquitous computing, which merges ideas from human-computer interaction and artificial intelligence in the form of systems that automatically change their operations according to the context of the user. Such systems in pervasive computing environments use relevant information on the context of the user at any time and location to adapt their operation to the situation in the environment. Normally, the process of developing such applications involves the following three main components: context acquisition (collecting contextual information by sensors), processing (using reasoning techniques to obtain high-level contextual information), and acting (providing services to the user based on their current situation).

The three main features that a context-aware application can support are: presentation, which uses context to determine what services or information need to be presented to the user; execution, which is the automatic execution of services based on the outcome of a context evaluation; and tagging, which is the fusing of data from many sensors and sources for further analysis and interpretation. As suggested by Carrera-Rivera et al. (2022), these systems do not necessarily imply automatization or real-time processing but are about responding to context.

2.2.4 AI-Generated Storytelling and Contextual Enhancement

Lately, Generative AI has been adopted in creative and narrative-driven domains for the creation of rich, dynamic content that captures user context and emotional signals. According to Shinichi Sato (2023), their article investigates ways in which contemporary generative models-text, image, and multimodal-could be leveraged in the creation of narratives that would entertain, but also create a high level of human bonding and social good. It argues that if an AI-based storytelling system is fed input comprising contextual metadata like place, time, weather, and emotional state, then it stands in a better position to generate stories that are more meaningful, immersive, and resonant with users' experiences.

In practice, these systems work by processing unprocessed user inputs, like journal entries, GPS locations, or images, and expanding them using trained generative models, which can be adjusted to fit specific contexts. For example, a narrative generated might include weather conditions ("It was raining as you looked out over the sea"), temporal cues ("that dusk when…") or emotional adjectives ("nostalgic", "excited") either explicitly from user entries or inferred through emotion detection. Research suggests carefully shaped stories improve recall and deepen personal connection, this means people often retain more information about trips and experience stronger emotional ties afterward.

Improving digital memory through artificial intelligence helps tackle issues like fading recall and missing personal details. Research indicates adding context makes memories clearer and more accurate when remembered later (Wang & Li, 2022). Instead of isolated pieces, AI-generated narratives shape unclear inputs into connected accounts - using storytelling to improve structure.

2.3 Related Works

Three existing projects are chosen and will be analysed over in this part. This section will introduce the project including criteria, requirements, benefits, and consequences for each of the existing mobile applications.

2.3.1 Polarsteps

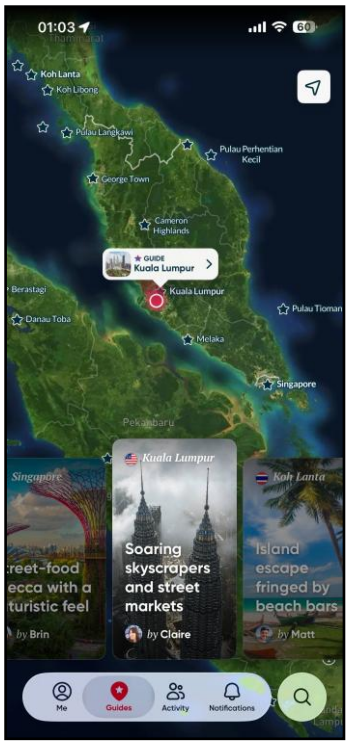

Figure 2.1: Polarsteps Guides Page

Polarsteps is an application for planning, tracking, and reliving adventures, helping travellers at every stage, and is a global community. It works by leveraging the user's device's GPS to track their movements in real time, creating a detailed and interactive map of their journey. Users can also find travel guides, build custom itineraries, and order physical Travel Books of their adventures. The application is designed to work offline, uses minimal battery, and offers users full control over their privacy.

There is no cost to download and use the Polarsteps application. It can also be used for free via a web browser. However, printing a travel book comes with a cost.

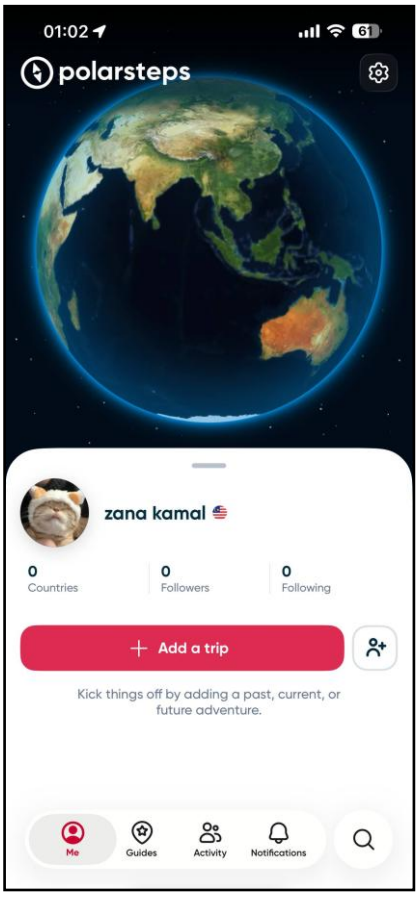

Figure 2.2: Polarsteps 'Me' Page

To use Polarsteps, user is required to create an account on polarsteps.com or via the application (Wanderlog, 2021). On the "Me" page, user can click the "Add a trip" button to get started with either a future trip, current trip, or past trip. There are three privacy option that can be chose by the user, whether the user wants only them to see the trip, only their followers can see and share the trip, or anyone can see and share the trip. "Steps" can also be added which show the places the user will visit on the trip. To complete the trip, arrival date and time can be added for each step, along with a description and photos once the user has visited the location. There is also an option to search for locations and view other people's public stories. Once the trip is scheduled, the application plots a route and creates a custom map. As the user travel, Polarsteps can also add the duration of time spent in each location to the account.

Figure 2.3: Polarsteps Activity Page

To follow someone on Polarsteps, simply click the “Follow” button on their profile. The follow button is located to the right of their username when searching or under their username and image when on their page. To find new people to follow, the user can search locations they are interested in the top left-hand side search bar.

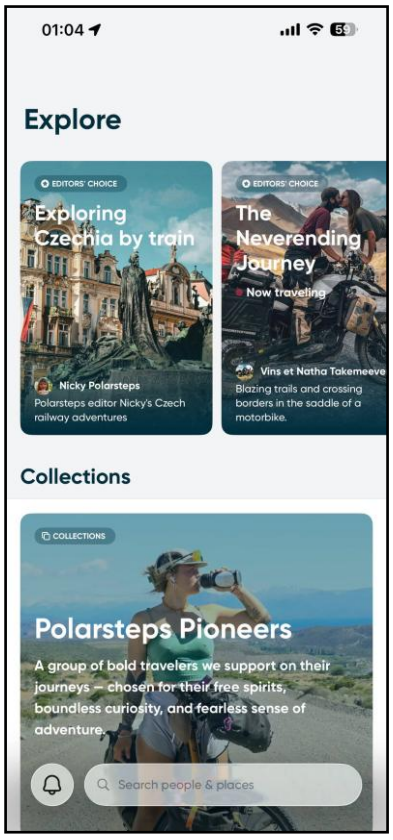

Figure 2.4: Polarsteps Search Page

There are few benefits of using Polarsteps as a travel memory keeper. Firstly, users have access to unique printed travel books. A fun feature offered by Polarsteps is the ability to print a travel book. This book will include all the countries and stops on the user's trip along with your notes and colour photographs. The book makes for a perfect souvenir of the user's trip or gift for a fellow traveller. Secondly, there are multiple privacy options. Polarsteps can be used as a completely private application or as a more social-media-style application, depending on the user's needs. Thirdly, even when tracking where users are going via GPS, Polarsteps uses very little battery power. This feature is useful for those traveling, and exploring all day without guaranteed access to phone chargers.

However, there are a few drawbacks of Polarsteps. Firstly, the application does not allow adding multiple travellers. While itinerary can be shared with other people, users cannot add other travellers to the account to let them add notes or upload images. If traveling with others, users will either need to each create their own Polarsteps itinerary or all use one person's account to add "Steps," notes, and images. Secondly, Polarsteps is not a full travel planner, it is more a digital scrapbook. On top of not offering suggestions on places to visit, users cannot store information such as flight details and accommodation bookings. Thirdly, the GPS tracking feature, which tracks the user's travel route without opening the application, is only available for Android users. This means that if using the application on Apple devices with iOS, the user will have to manually enter the route within the application.

2.3.2 Been

Figure 2.5: Been Select Page

Been is a travel tracking application on iOS that helps users document and visualize the countries and regions they have visited on a custom world map. Users can log their journeys, see travel statistics, get inspiration for future trips, and share their personalized travel maps with friends and family. The application has a simple interface, and an option for premium features for more detailed features like city and airport tracking. It also allows for account creation to sync data across devices.

Through the application, users can easily add countries to their list with a simple click, share data with friends and family, keep track of progress over time, and count countries and states visited. The Been application is a useful tool for anyone who loves to travel and wants an easy way to keep track of their experiences (Goz, 2022).

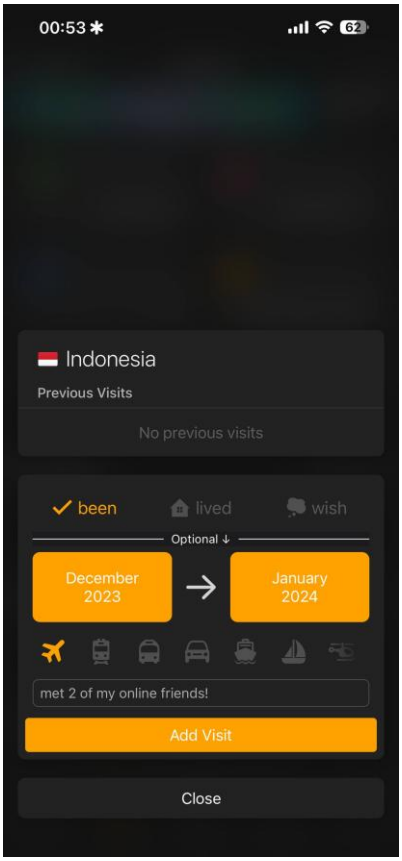

Figure 2.6: Adding a country to the list of countries visited using Been

According to Goz (2022), one of the best features of Been is it calculates numbers and percentages of the places the user visits. The user only needed to add the destination to the list, and Been will automatically update the number of countries the user has visited and the correlating percentages. Secondly, with Been, users can easily find the number of countries they have visited in each continent, as well as the percentage of that continent users have been to. It could be a fun way to keep track of travel progress or even set some travel goals for the coming year.

The benefits of the Been application are it is free to download and use, it has a simple user interface and design, its statistics can be shared via text and social media, and it has multiple map views. In sum, Been is a simple application that will make it easy for users to keep track of their travel statistics. But there are a few limitations to Been worth considering.

Some drawback of Been is users can only mark countries, not cities or more specific locations, and if users wished to do so, they are required to purchase the premium features. Another one of its drawbacks is that it is only available on iOS devices.

2.3.3 Apple Journal

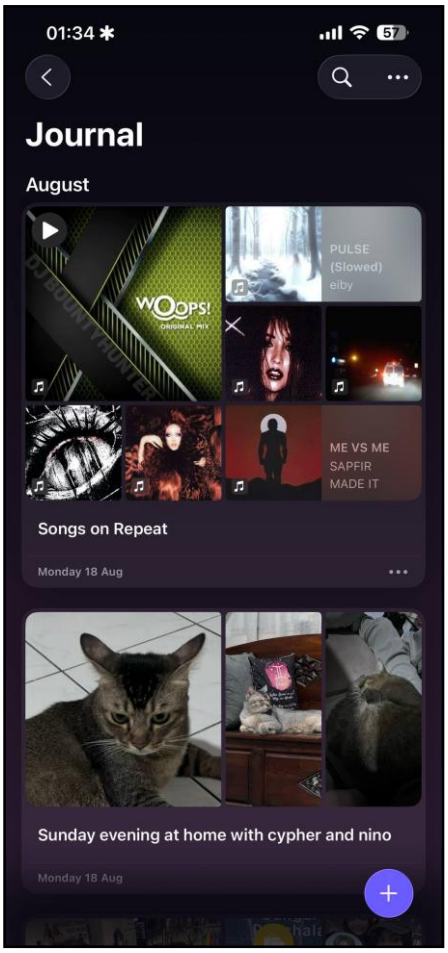

Figure 2.7: Apple Journal Homepage

Apple Journal is a mobile application available on iOS. It helps users reflect and practice gratitude through journalling. The mobile application lets users capture and write about everyday moments and special events in their lives, and include photos, videos, audio recordings, locations, and more to create rich memories. On-device machine learning provides private, personalized suggestions to inspire journal entries, and customizable notifications help users develop their writing habits. With the Journaling Suggestions API, third-party journaling applications can also suggest moments for users to write about.

There are some key features of the Apple Journal, the daily digital diary with AI. Firstly, Apple Journal uses on-device machine learning to create journal prompts and to understand more about the user and the way the user wants to use the Apple Journal. Machine Learning is essentially a system that will learn and adapt from how users use their device without any instructions. This is how AI works with Apple Journal as it will automatically give users prompts from memories, places they have been and location all from data on the device.

Figure 2.8: Recommended prompts on Apple Journal

Secondly, the main feature of Apple Journal is its AI Journal prompts. This helps users create a habit of journaling from their images, media, and memories. AI will bring up certain images, recent or in the past to journal about with written prompts. These prompts will automatically pull up the location or music the user has listened to around this time to enhance their memory and their journal entry.

Thirdly, the reminders to journal would create a better habit of reflection and journaling towards improving mental health, as journaling helps users express their emotions, reflect, show gratitude, and appreciate the moments they experience. Apple Journal will bring up the user's day's events with images and guide them towards writing about them.

On the other hand, AI cannot tell the difference between a good memory or a bad one, so the user may end up being prompted on a moment they would rather not. This is something many people have spoken about as a problem (Rogi, 2024).

2.4 Comparison

This is a concise analysis of THREE (3) different travel journaling mobile application involving Polarsteps, Been, and Apple Journal. Each of these platforms acquire the capacity to store travel memories with different approach in terms of its technicalities. The table below displays a distinctive view regarding each application, focusing further on their purposes, map and location integration, automatic context or enrichment, multimedia support, data security, unique features, and limitations.

Table 2.1: Comparison of Existing Projects

Criteria	Polarsteps	Been	Apple Journal
Purpose	Travel tracking and sharing app with trip visualization.	Simple app to mark visited countries or cities.	Digital journaling app for reflection and media-rich entries.
Map and Location Integration	Strong map tracking; auto GPS route logging.	Basic location marking; no detailed map paths.	Basic map tagging; no journey visualization.
Automatic Context or Enrichment	Auto GPS and itinerary tracking; limited AI updates.	Manual updates only; no context enrichment.	AI-based prompts and media integration from device activity.
Multimedia Support	Supports photos, videos, and notes.	Minimal; limited to text or photos.	Supports photos, audio, and location data.
Privacy or Data Security	Multiple privacy levels; offline support.	Basic privacy, but less advanced controls and less emphasis on end-to-end encryption.	Strong on-device privacy and encryption.
Unique or Advanced Features	AI-powered itinerary builder, Trip Reel, travel guides, ability to order physical travel books, offline tracking.	Simplicity: Very easy to mark places; minimal resource usage; less complexity; good for users who just want to track visited places without much overhead.	Journaling suggestion API, scheduled notifications, filtering entries by attachments or places, integration with Health or on-device features; insights view or calendar and statistics.

2.5 Discussion

Looking at Polarsteps, Been, and Apple Journal, among other similar applications, several of the key features and advantages have been identified which inform the development of Mapmory. Polarsteps focuses on map-based tracking, letting users view their route paths while traveling. The application allows easy sharing that makes trips more interactive between users. The design of the platform encourages engagement through visual storytelling. All in all, it provides useful insights for its users when compared to Mapmory's approach to maps and selective social features.

Meanwhile, Been focuses on simple design, and highlighting clarity so its users can spot visited countries easily. Inspired by Been's approach, Mapmory offers tracking worldwide, or even down to cities, using a timeline layout that improves navigation through past trips.

Next, Apple Journal focuses on privacy as it uses AI for suggestions, and also supports rich media entries. This encourages regular reflection through tailored alerts. Though, it lacks solid map integration. Its approach, especially around data safety and smart tools, informs how Mapmory shapes its system so people can create engaging stories that feel secure, responsive, yet natural.

The ultimate goal of Mapmory is to combine the strengths of the three applications-offering interactive maps, clarity and simplicity, and AI-enhanced journaling with strong privacy-to create a comprehensive, context-aware travel journaling application that captures users' experiences better for reliving and sharing.

Table 2.2: Comparison of Existing Projects and Mapmory

Criteria	**Polarsteps**	**Been**	**Apple Journal**	**Mapmory (Proposed)**
Interactive Maps	Yes	Limited	Limited	Yes
Social Sharing Features	Yes	No	No	Yes
Simple Navigation and Interface	Complex	Yes	Yes	Yes
AI-enhanced Features	Yes	No	Yes	Yes
Privacy	Strong	Basic	Strong	Strong

2.6 Conclusion

This chapter has provided a clear overview regarding the literature research over important topics that can aid to the development process of Mapmory. This part of the report also conversed about the existing applications of journaling that are mostly focused on traveling and memory logging, highlighting the benefits and drawbacks of each project. The upcoming project will significantly benefit from these studies, as they will help guarantee that it fulfils the requirements and anticipations of its future users.

3 METHODOLOGY

3.1 Introduction

This section explains the type of methodology utilized for a proper execution of workflow involving this project. According to Sreekumar (2023), methodology for research purposes describes the approach and procedures used to identify and analyse information over a specific subject in the research development arena. Researchers strategized their study in a way that allows them to achieve their goals with the chosen research tools. It includes everything from research design to techniques of data gathering, methods for the analysis of data, and the general structure within which the research is conducted. This chapter will outline clearly and explain in detail the approach followed, along with a discussion of how the important aspects of the methodology fit into the broader project objectives.

3.2 Agile Methodology

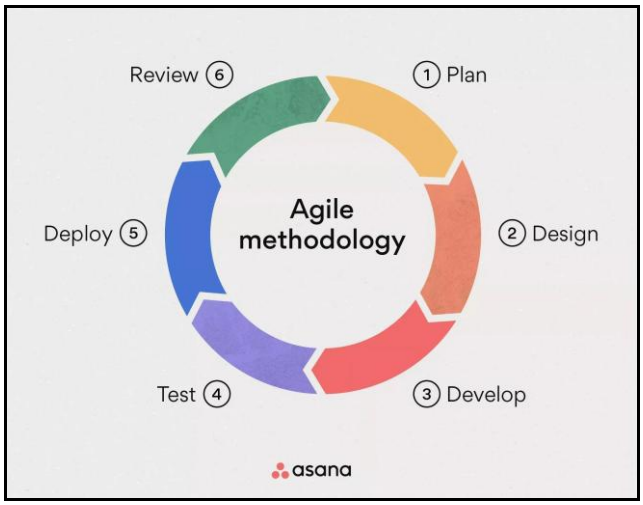

Figure 3.1: Agile Methodology Diagram (Laoyan, 2024)

Agile is a project management methodology whereby work can be broken into small, dynamic parts of development called sprints (Laoyan, 2024). It emphasises the importance of consistently focusing on technical quality and strong design in order to promote agility (University of Minnesota, 2022). Mapmory's creation uses Agile concepts through repeated refinements that build step-by-step. This keeps the work adaptable while improving constantly toward successful results

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3.3 Phases in Agile Methodology

This part of the report will describe each of the phases in agile methodology. The phases consist of the planning phase, design, development, and testing. The phases outlined will be discussed in detail, with a focus on how they align with the overall objectives of the project.

3.3.1 Plan

In the planning phase, the Mapmory project's problem statements, objectives, and scope are defined. In order to define the key features of this project, inputs from the client, Zafigo, and the end-users are taken on desirable application features, functionalities, and outcomes of the project. These insights will serve as the main foundation of defining Mapmory's requirements of a lot of aspects, which would lead to better understanding of the development and ensuring an effective outcome.

3.3.2 Design

In this design stage, a detailed design plan will be created, including the application's visual and functional aspects. It is a critical phase that shapes Mapmory's look and functionality as UI/UX prototypes, system architectures, and user flows will be designed. The deliverables will be wireframes and interactive prototypes, architecture diagram and database scheme, and feedback report from prototype testing.

3.3.3 Development

The development phase is a critical stage in Agile methodology. It is an iterative process divided into small cycles called sprints. Each sprint will last for 2-4 weeks, in which specific features and functionalities outlined during the design phase are focused on. Coding of the Mapmory system, which means front-end, back-end, and database developments according to the design made during the previous phase will take place in this phase. This phase mostly requires more time than other phases because continuous integration and frequent testing are conducted as to ensure that each feature is developed correctly and achieves the project objectives.

3.3.4 Testing

Testing will start right at the beginning of development, continuing through every sprint. In Agile, much focus is placed on automated testing, which would help speed up the testing process. The tests cover user experience, functionality, performance, and other vital aspects of Mapmory. Continuous testing ensures stability and functionality with added features. There are different types of tests that will be carried out: unit testing for each feature in Mapmory, system testing, and user acceptance testing as the last test of the system. User feedback obtained throughout this phase will be gathered and used to apply necessary modifications and enhancements.

3.3.5 Deployment

The deployment phase is about releasing and launching the Mapmory application on multiple platforms so Android and iPhone users can access it. The release process will be configured while ensuring smooth user availability.

3.3.6 Review

The review phase starts once the application gets deployed and is available for users. This phase involves looking at Mapmory's performance and user feedback to identify areas of improvement that will be useful to the technical flow, such as enhancing security procedures or putting restrictions on the user interface. The lessons learned from the phase are documented as it will be useful for the next system modifications.

3.4 Requirement

This section provides several methods for gathering information while focusing on the Important steps in developing a mobile application. Requirement gathering is an accurate process in the SDLC and lays the foundation for developing software that works. In a highly competitive market, success is drastically increased when software meets consumer expectations and corporate objectives of companies (Sire, T., 2024).

3.4.1 Data Gathering Techniques

Data gathering, also known as collecting techniques that refers to the procedures used to gather and examine various types of data. Standard methods of gathering data in this situation include looking through relevant papers, interviewing subject-matter experts, and making a list of observations that support the information acquired. Thus, questionnaire for the target users are the data collection strategies employed in this project. This section will go into further detail about these methods.

3.4.1.1 Questionnaire

The questionnaire is an important and freely used tool for data collection in empirical research. The questionnaire in simple words, is a bunch of questions used to collect information or data from the people in relation to the given problem (Rathi & Ronald, 2022). In this project, the questionnaire aims to understand users' behaviours, preferences, and pain points related to memory keeping, travel documentation, and digital journaling. The questions are designed to explore challenges such as difficulty in organizing location-based memories, loss of travel details over time, and the lack of integration between multimedia and mapping features.

Additionally, the questionnaire investigates user expectations regarding the design and usability of a mobile application like Mapmory, including features such as automatic location detection, AI-generated storytelling, and map-based visualization. Responses from participants help to identify which functions are most valuable, the level of importance of non-functional requirements such as reliability, security, and performance, and how potential users currently interact with existing tools. Collected data can act as a basis for defining system requirements, meaning that the proposed solution is user-centered and solves the identified problems effectively.

3.4.2 Functional Requirement

A functional requirement outlines the interactive and useable components of a system or product. A functional requirement outlines the features or functionalities that developers create to allow users to do specified activities in order to meet a predetermined goal. According to Beaton (2024), functional requirements are defined as system functions or components that specify the desired behaviour between inputs and outputs.

Table 3.1: Functional Requirement

Functional Requirement	Description
User Authentication and Profile Management	Users must be able to register, log in, and manage their profiles securely using email or third-party accounts.
Memory Logging	Users can create, edit, or delete memories that include text, photos, videos, and music. The system should automatically detect and log user locations using GPS and geofencing technology.
Interactive Map Interface	A visual map or globe-based interface should display pinned memories based on geographic locations.
Context-Aware Notifications	The application should notify users when they are near previously visited or saved locations to revisit or add new memories.
AI-Generated Storytelling	The system should use AI to generate short narratives or summaries based on location data, weather, and multimedia context.
Emotion Tagging	Users can tag each memory with an emotion (e.g., happy, nostalgic, adventurous) for easier filtering and retrieval.
Group and Shared Memories	The application should allow users to share memories with friends or create collaborative travel journals.
Privacy Control Settings	Users can set visibility preferences for each memory (private, shared, or public).
Auto-Generated Highlight Videos	The system should automatically compile highlight videos with selected music from users' memories.
Search and Filter Function	Users should be able to search and filter memories by date, location, emotion, or media type.
Data Synchronization and Backup	All user data should be securely synced and backed up to a cloud database for accessibility and recovery.

3.4.3 Non-Functional Requirement

A non-functional requirement is a set of requirements that characterises the limitations or functionalities of a system. It does not discuss the behaviours or functionalities found within a system; instead, it defines the standards by which a system's activities are evaluated. Nonfunctional requirements, or NFRs, are what software engineers and requirements analysts view as the boundaries and potential of a system's behaviour. Additionally, a non-functional need serves as a system quality that develops solutions in accordance with limitations and capabilities (Beaton, C., 2024).

Table 3.2: Non-Functional Requirement

Non-Functional Requirement	**Description**
Performance	The system should respond to user in less than 3 seconds, can handle large amounts of media data efficiently without noticeable lag.
Reliability	The application should maintain a consistent level of performance and availability with minimal downtime. The system should have backup and recovery mechanisms to ensure data persistence in case of server errors or connection loss.
Security	User data must be protected through authentication, data encryption, and secure API communication (HTTPS and JWT). Standard data protection practices must be complied.
Scalability	The system architecture should support an increasing number of users and data with minimal downtime. Using Supabase and cloud hosting services, these services will ensure horizontal scalability for future expansion.
Privacy	Users should have complete control over their content visibility. Personal data should not be shared with third parties without user consent.

3.4.4 System Requirement

System requirements in software development refer to the particular characteristics or attributes that a system must possess in order to perform as intended for a particular software application. These specifications serve as a guide for both developers and users by outlining the technical configurations, features, and restrictions needed for the software to function as intended.

3.4.4.1 Software Requirement

The software requirements specify the necessary platforms needed to design, develop, and test the Mapmory mobile application.

3.4.4.1.1 Development and Design Tools

Figure 3.1: Visual Studio Code

Visual Studio Code, or VS Code, is a lightweight yet powerful source code editor designed by Microsoft (Dominykas, 2024). This platform will be used to write the code and develop our system.

Figure 3.2: Figma

Figma is a powerful design tool that lets its users create and collaborate on user interfaces and prototypes for websites, applications, and much more (GeeksforGeeks, 2024). This platform will be used to design the user interface of the Mapmory mobile application.

3.4.4.1.2 Testing Tools

Figure 3.3: Postman

Postman is a powerful API development and testing tool that simplifies the process of building, testing, and managing APIs (GeeksforGeeks, 2025). In the testing phase of Mapmory, this tool will be used as a testing tool.

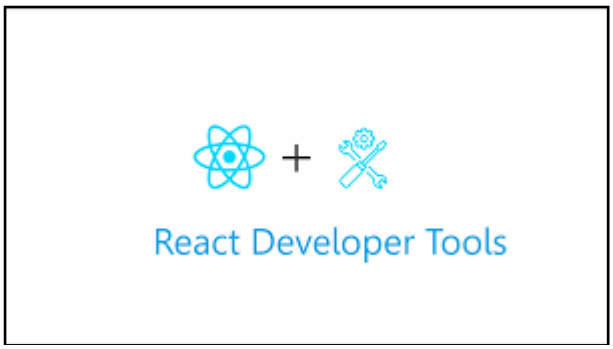


Figure 3.4: React Native DevTools

React Native DevTools is the new debugging tool for Expo and React Native applications, replacing Chrome DevTools (Kundaran, 2025). This tool will be used as a debugging tool in the testing phase.

3.4.4.1.3 Deployment Tools

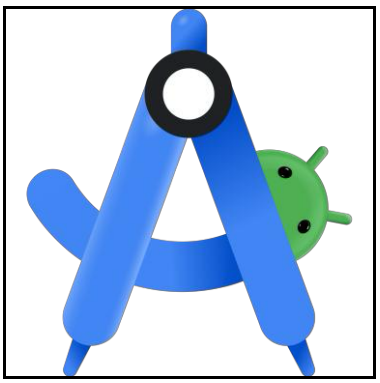


Figure 3.5: Android Studio

Android Studio is the official Integrated Development Environment (IDE) for Android App Development. It has complete tools for the process of the Android App Development (GeeksforGeeks, 2023). During deployment phase, this software will be used to make the Mapmory application available to end-users that use Android smartphones.

Figure 3.6: Xcode

Xcode is Apple's Integrated Development Environment (IDE) for all Apple's platforms, and it is free for all Apple users (Ekren, 2025). This software will be used during deployment phase to make the Mapmory mobile application available for end-users that use iPhones.

Figure 3.7: Google Play Store Console

The Google Play Developer Console is a web-based platform provided by Google that allows developers to publish and manage their applications on the Google Play Store (Mobile Action, 2025). This platform will be used when Mapmory is ready to be published for Android smartphone users.

Figure 3.8: App Store Connect

App Store Connect is Apple's online platform that lets developers upload application builds, configure their application's listing, and manage everything needed to release their application on the App Store (Mobile Action, 2025). This platform will be used when Mapmory is ready to be published for iPhone users.

3.4.4.2 Hardware Requirement

The hardware requirements define the physical devices and equipment necessary to support the development, testing, and deployment processes.

Table 3.3: Hardware Requirement

Category	Hardware	Description
Development Machine	Laptop	Minimum Intel i5/Ryzen 5 CPU, 8GB RAM, 256GB SSD, with stable internet connection.
Test Devices	Android Smartphone	Android 11 or higher, minimum 4GB RAM for testing app performance and UI compatibility for testing and optimization.
Server Infrastructure	Cloud Hosting (Supabase)	Cloud environment for database and API hosting, scalable based on user load.
Peripheral Devices	GPS-enabled smartphones	Required for accurate locat-ion-based logging and map functionalities.

3.5 Analysis

Data analysis is the systematic process of collecting, cleaning, transforming and interpreting data to discover useful information, identify patterns and support decision-making. This way, we are not just guessing, we are using solid evidence to back up our decisions (Smith, 2021). This chapter takes a deep dive into what is needed for Mapmory to work well.

3.5.1 Data Gathering Analysis

Data gathering analysis analyses data collected with the data gathering technique chosen. A questionnaire was distributed to a diverse group of individuals to collect data. The collected data was analysed and turned into graphs for better analysis.

3.5.1.1 Questionnaire Analysis

To gather user requirements, questionnaires have been generated using Google Form access. The user was asked a total of ten questions. A total of 58 users' feedback has been retrieved from the respondent Google Form.

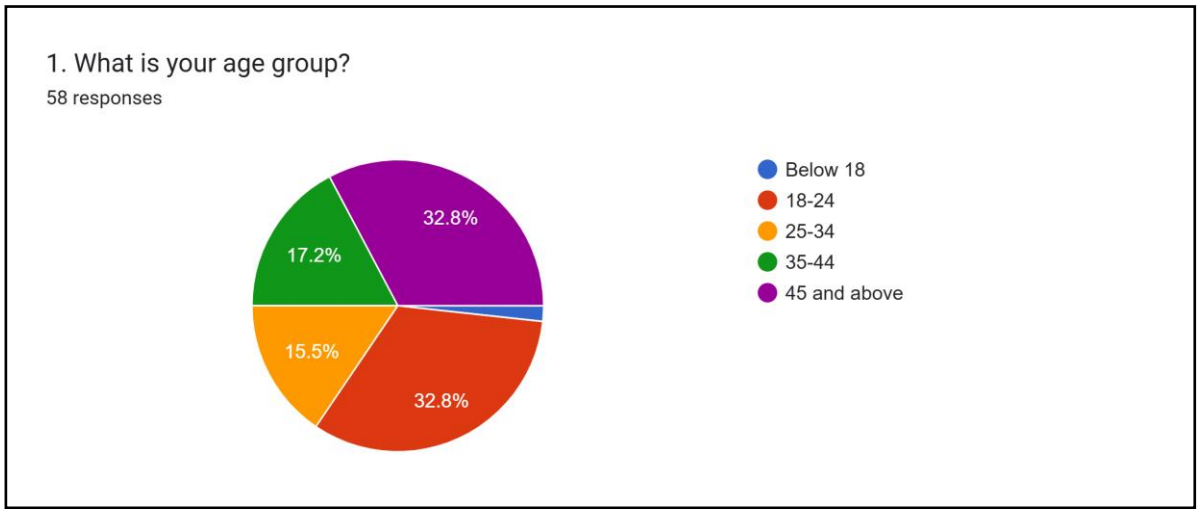


Figure 3.9: Question 1

Figure 3.9 is a part of the demographic questions. It asked about their age group which is categorized into five groups. Based on the data collected from this questionnaire, it can be concluded that most are from the “45 and above” group and the “18-24” group as both are 32.8%. 17.2% encompasses individuals aged thirty-five to forty-four years, while 15.5% encompasses individuals aged twenty-five to thirty-four years. A mere one prevent of respondents are aged below eighteen years. This indicates interest across generations, but skews toward younger adults and mature travelers.

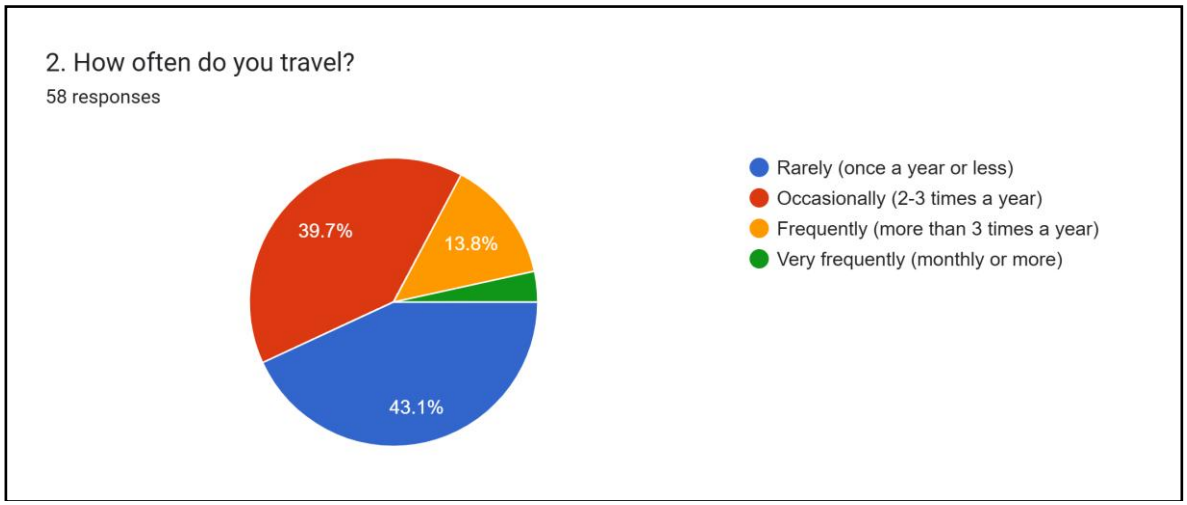


Figure 3.10: Question 2

Figure 3.10 asked about how frequent the respondent travels in a year. Based on the chart provided, it appears that 43.1% of respondents rarely travel, while 39.7% of them travels two to three times a year. 13.8% of them are individuals who travels more than 3 times a year, and out of 58 respondents, only 3.4% travels very frequently.

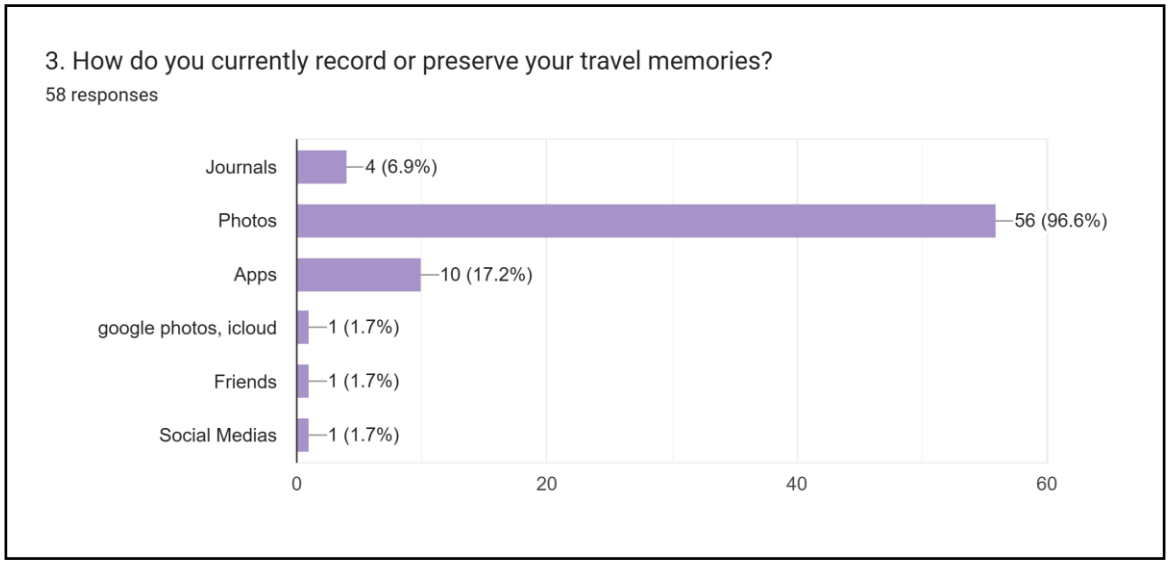


Figure 3.11: Question 3

Figure 3.11 asked the respondents about the method of travel memory preservation, and it is a multi-answered question. Based on the chart above, it is clear that the majority of the respondents use Photos or Gallery to store travel memories. 17.2% use applications to store them, while 6.9% use journals. There are also options added by the respondents, which are “Google Photos, iCloud”, friends, and social medias, each represents 1.7% of all respondents. This reveals a gap: people rely on passive photo collection but lack structured journaling tools, signalling opportunity for a photo-integrated application.

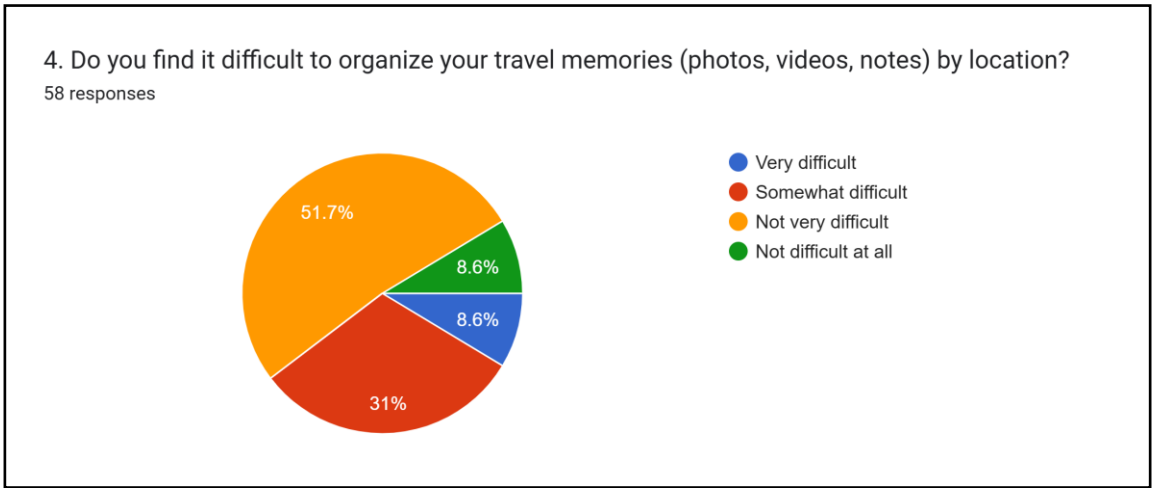


Figure 3.12: Question 4

Figure 3.12 is about the difficulty to organize travel memories. 51.7% of respondents find it not very difficult to organize their travel memories, while 31% find it somewhat difficult. This suggests location-based organization is not a critical pain point for most respondents, though the sizable minority who do struggle still represent a viable feature opportunity, especially if the solution is seamless and doesn't add friction for those already satisfied.

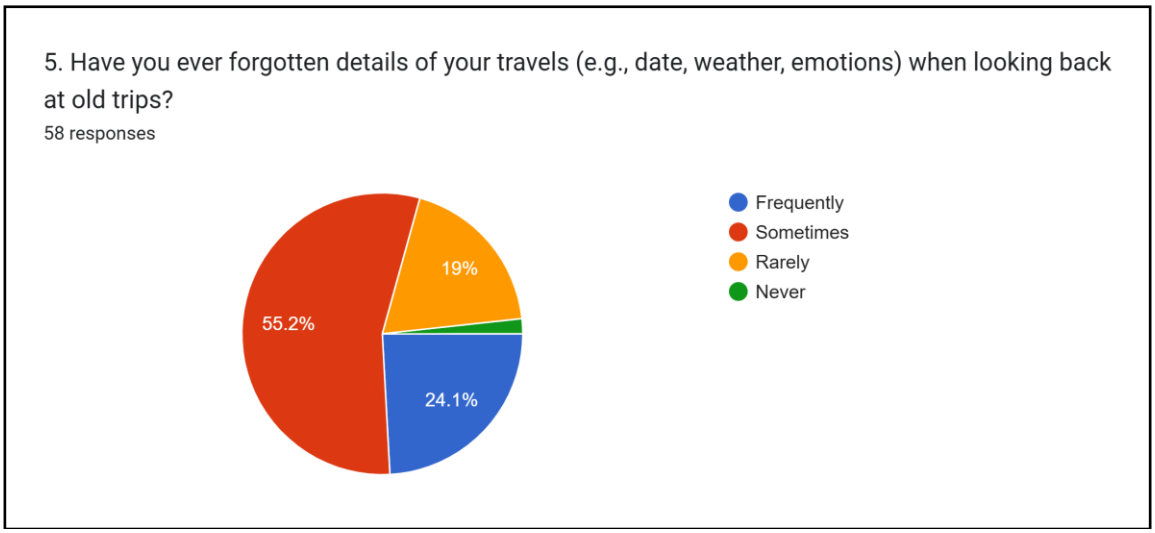


Figure 3.13: Question 5

Figure 3.13 is about whether the respondents has ever forgotten details of their travels. 55.2% sometimes forget details, and 24.1% frequently forget them. This means a strong need for an application that has automatic capture and contextual prompts to preserve rich and specific memories.

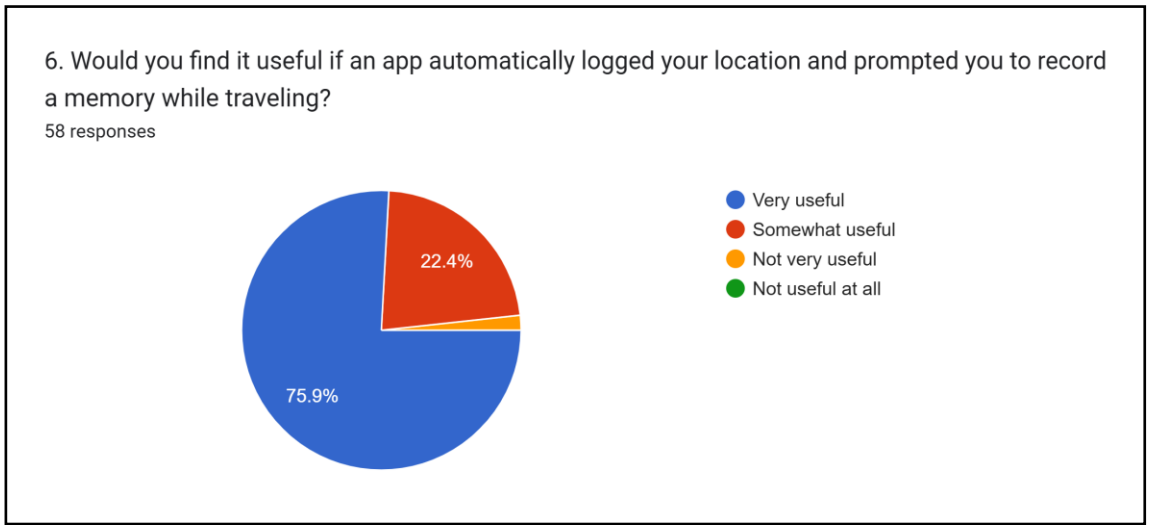


Figure 3.14: Question 6

Figure 3.14 asked the respondents if they would find it useful to have an application that logs their location automatically and prompts them to record their memory while travelling. 75.9% would find automatic location logging "very useful," with 22.4% "somewhat useful." This result validates a core feature of Mapmory, which is passive location tracking with active memory prompts.

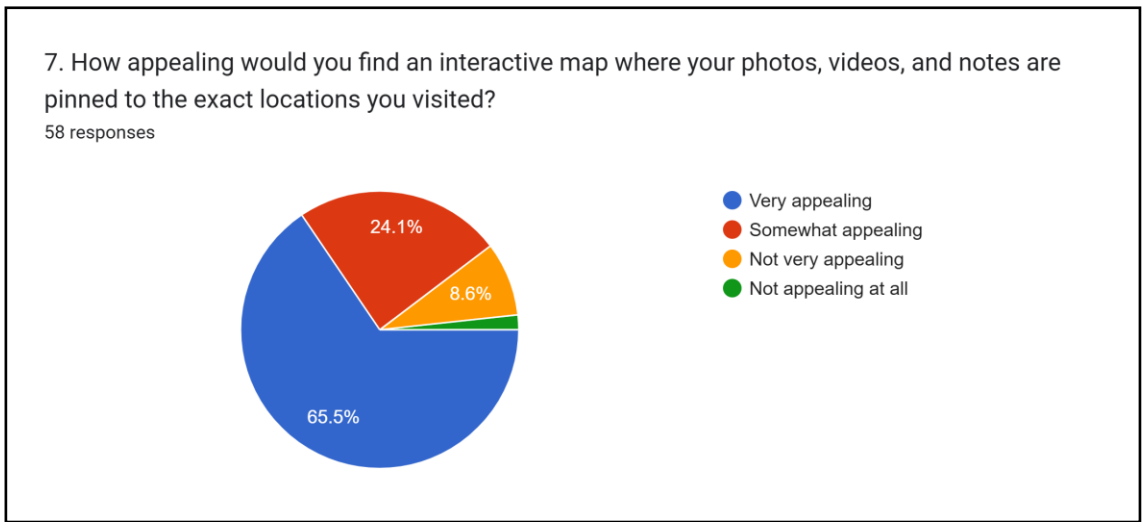


Figure 3.15: Question 7

Figure 3.15 is about the appeal of an interactive map where their medias are pinned to the exact locations they visited. 65.5% of the respondents find an interactive map "very appealing", and 24.1% of the respondents think it is "somewhat appealing." The 89.6% positive response strongly supports map-based memory visualization as a primary interface.

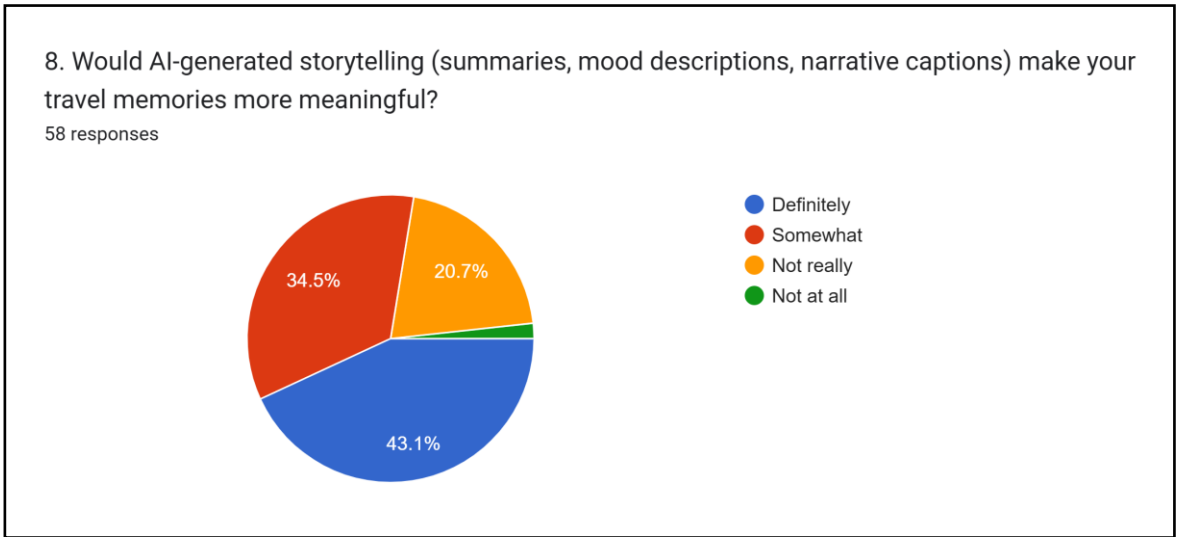


Figure 3.16: Question 8

Figure 3.16 is about whether the respondents think AI-generated storytelling would make their travel memories more meaningful. A strong majority of 77.6% find AI-generated storytelling valuable (43.1% "definitely," 34.5% "somewhat"), while only 22.4% are negative (20.7% "not really," 1.7% "not at all"). This indicates high user interest in AI features, significantly more positive than initially assessed.

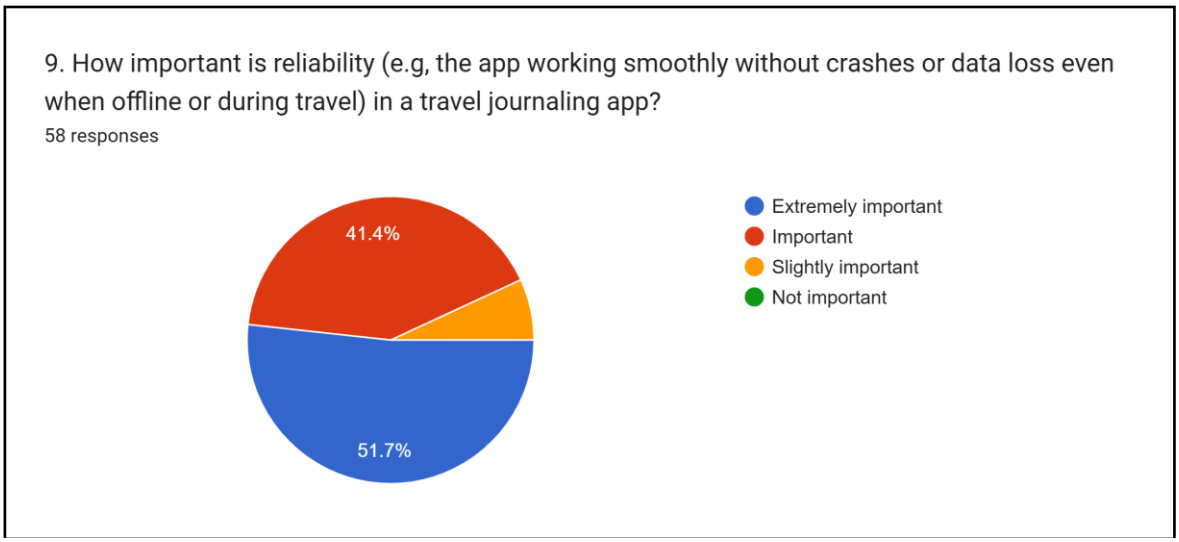


Figure 3.17: Question 9

Figure 3.17 is about the non-functional requirement, asking about how important reliability is in a mobile application. 93.1% rate reliability as "important" or "extremely important" (51.7% and 41.4% respectively). Based on this statistic, this means that stability and data integrity are critical for Mapmory.

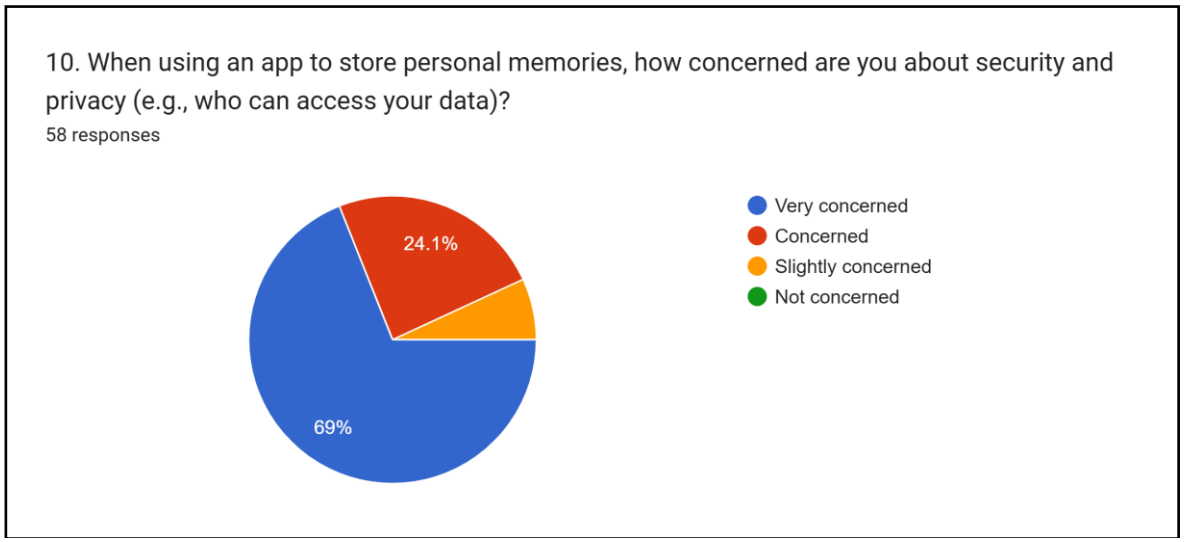


Figure 3.18: Question 10

Figure 3.18 asked about privacy concerns. 93.1% are "concerned" or "very concerned" (24.1% and 69% respectively) about data privacy. Robust privacy controls and clear data policies are essential for user trust of the Mapmory mobile application.

3.5.2 Use Case Model

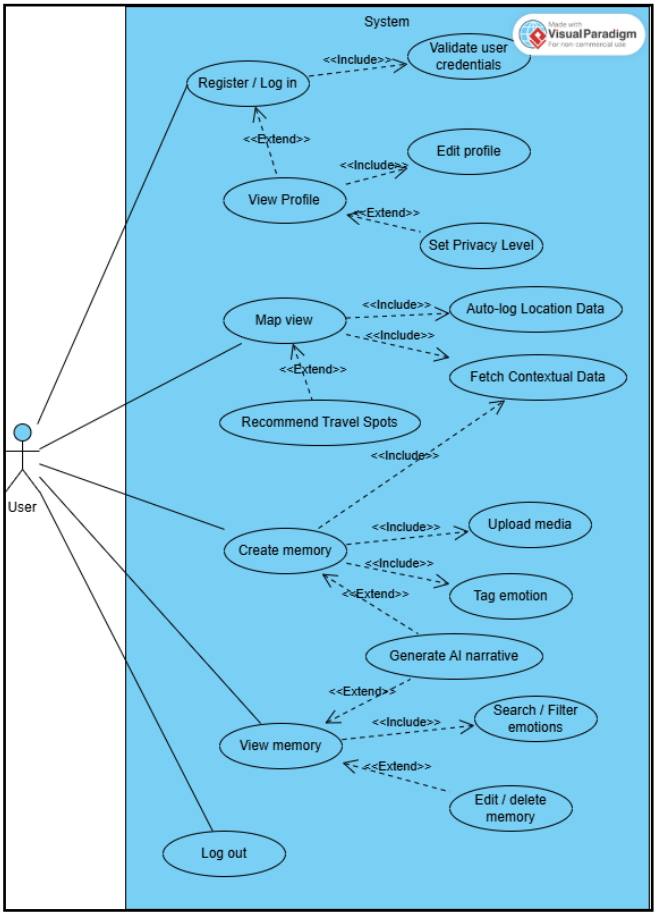


Figure 3.19: Mapmory's Use Case Diagram

Figure shows the use case diagram of the Mapmory system, representing the functional interactions between the user and the system. It shows the system boundary, the main user-initiated use cases and the supporting automated functions the system performs, with the user as the primary actor.

3.5.3 Flowchart

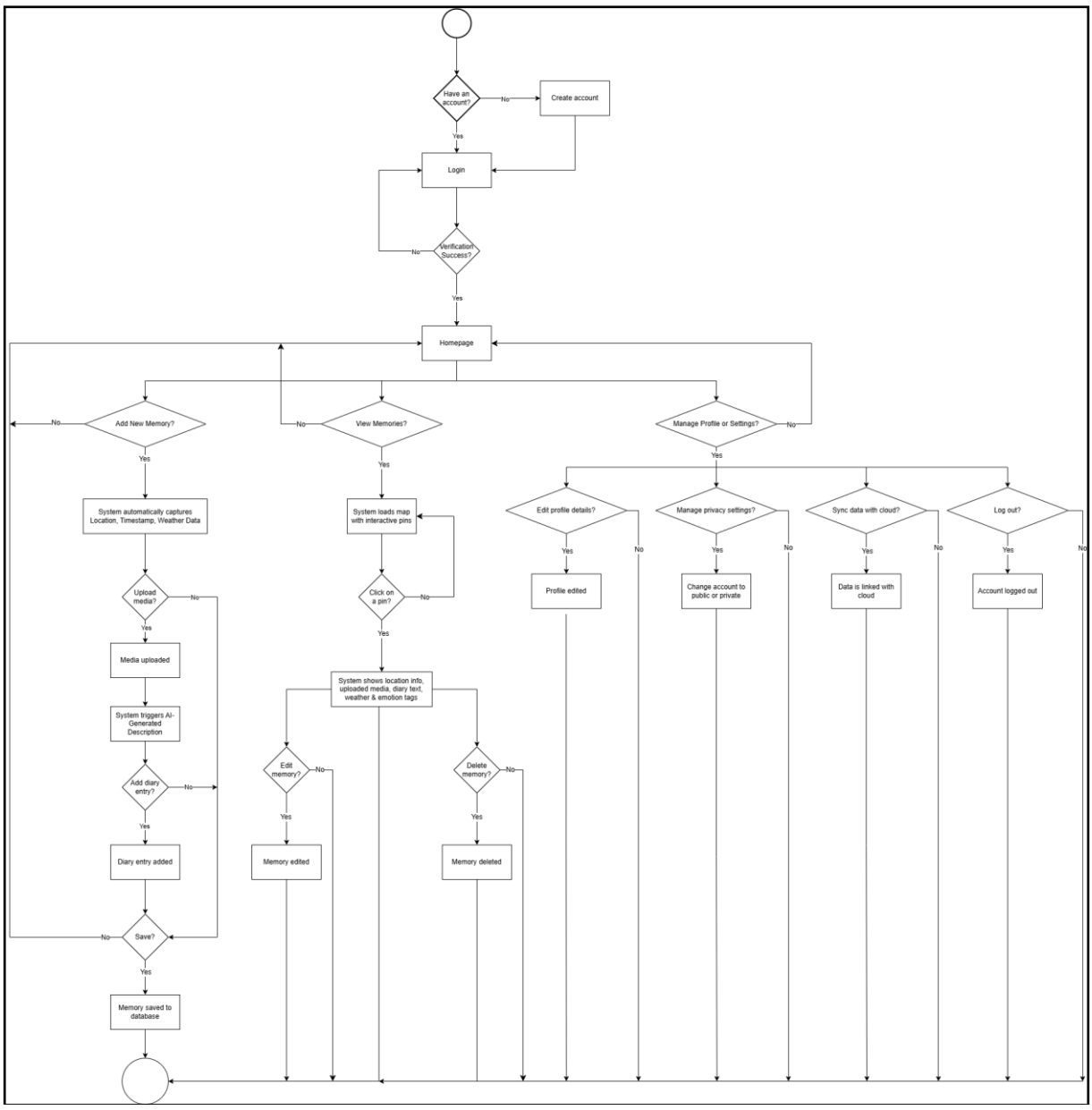


Figure 3.20: Mapmory's Flowchart

Figure shows the Mapmory system's flowchart. It illustrates the complete operational workflow of the application, beginning with user authentication and processing through core features such as adding new memories, viewing existing entries, and managing profile settings. After users log in or create an account, they will access the homepage where they may create a memory, which would trigger automatic capture of location, weather, and timestamp data, followed by optional media upload, AI-generated narrative, and save option. Next, users may view memories through an interactive map, where selecting a pin allows them to edit or delete existing entries. Other than that, there are profile management options such as editing user details, adjusting privacy settings, and syncing data with the cloud. Finally, users can log out to end their session. Overall, the flowchart demonstrates how Mapmory integrates automated context capture with user-driven interactions to deliver a seamless travel preserving experience.

3.6 Conclusion

This chapter has dived deep into the methodology chosen for the Mapmory system, which is Agile Methodology. It has also discussed the data gathering technique and requirements of the system, which includes functional requirement, non-functional requirement, software requirement, and hardware requirement. With the data gathered with the data gathering technique chosen which is questionnaire, data analysis was done to further understand users' concerns. A use case model and a flowchart were employed to determine crucial system interactions and workflows.

4 DESIGN

4.1 Introduction

The primary focus of this chapter is the design phase of Mapmory. It contains the interface design, database design, flow of the system, and implementation. The database design includes the data dictionary of Mapmory in detail, data flow diagram (DFD) that maps out the flow of information for any process (Patni, 2025), and entity relationship diagram (ERD) which represents the logical structure of the database (Kartik, 2025).

4.2 Interface Design

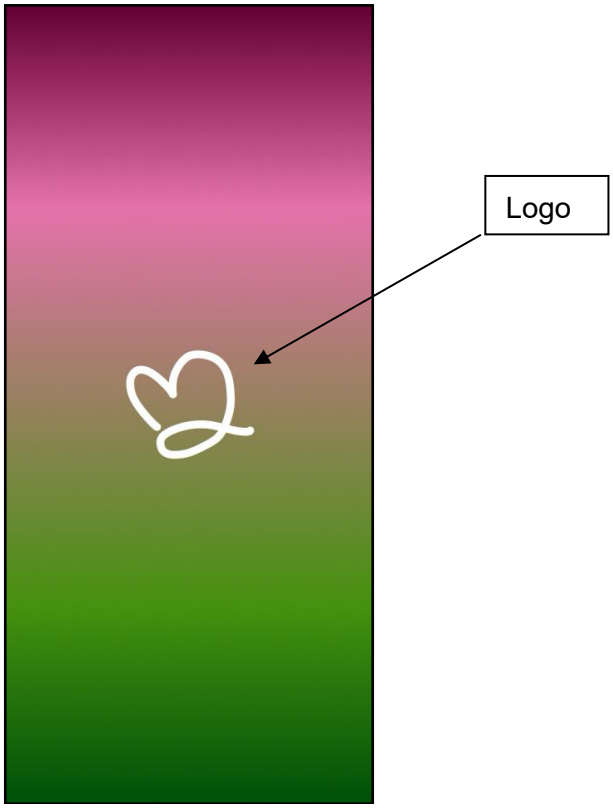


Figure 4.1 Splash screen

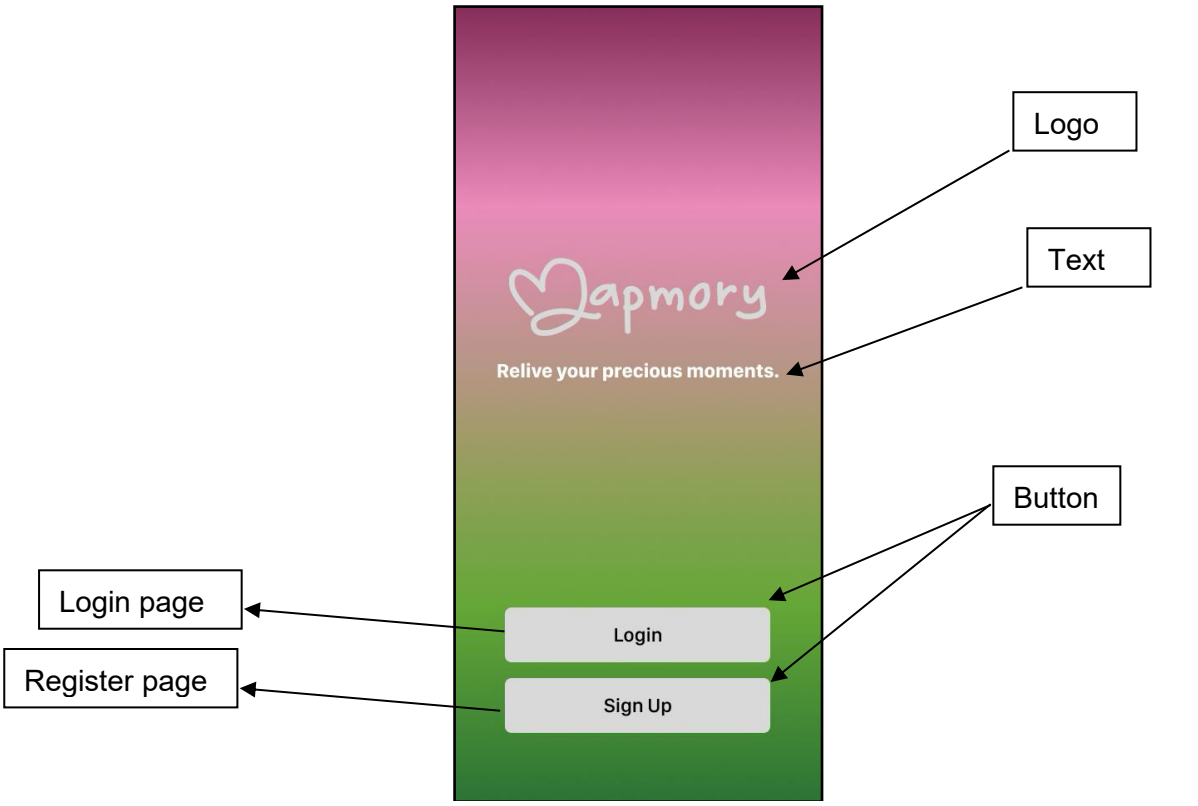


Figure 4.2 Welcome page

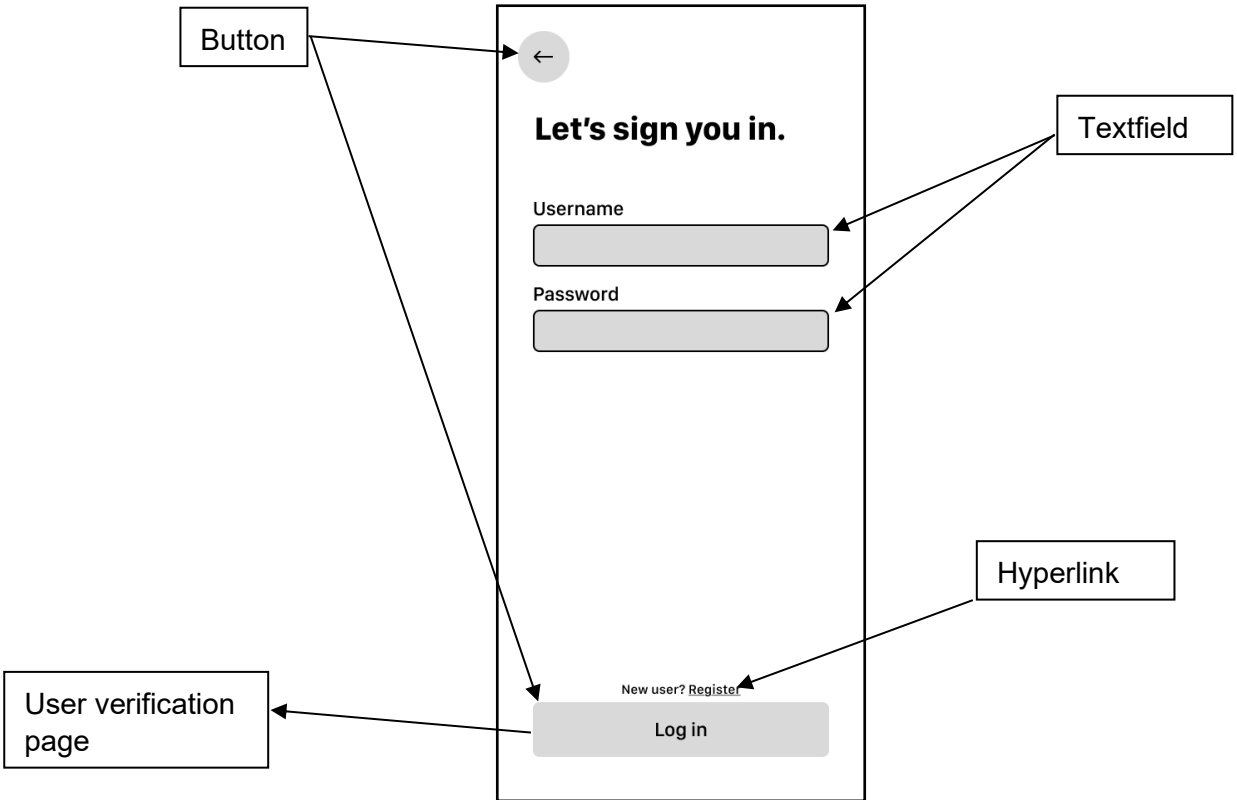


Figure 4.3 Login page

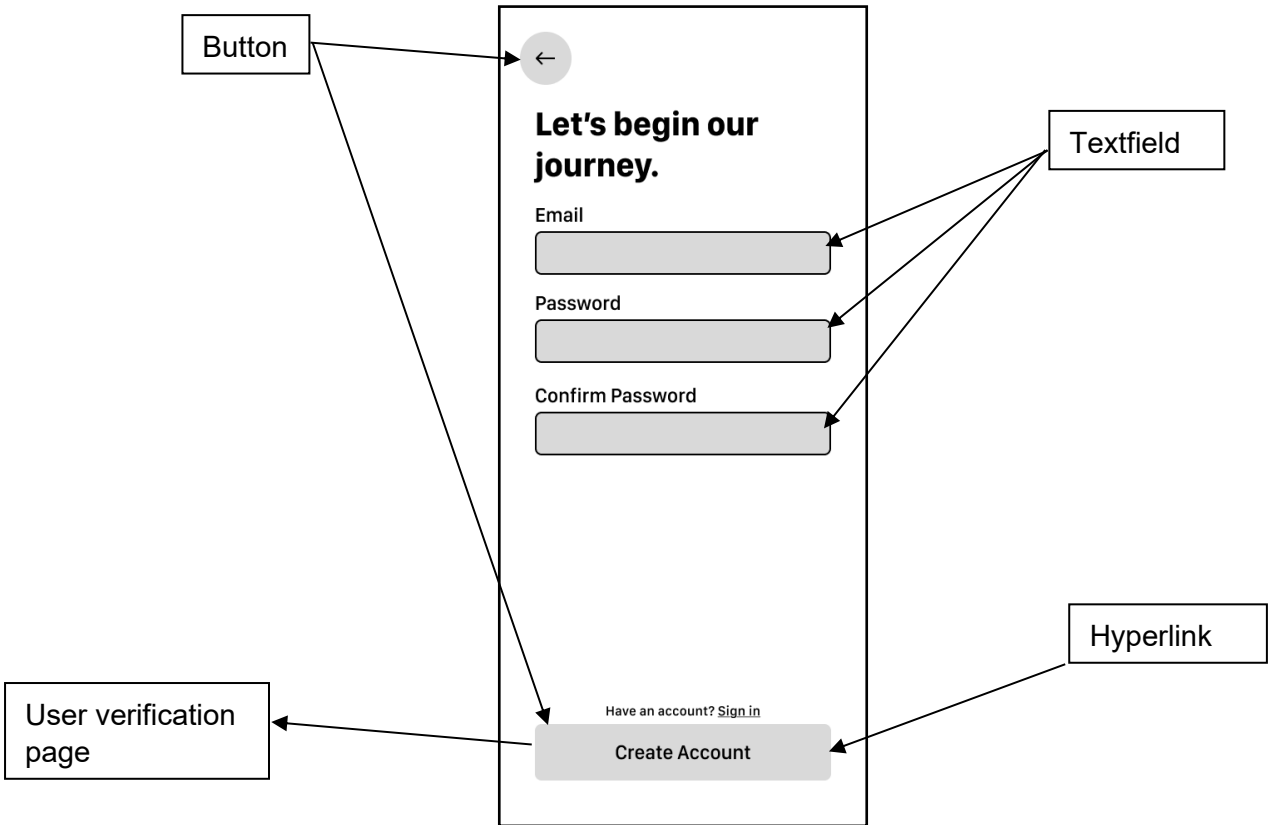


Figure 4.4 Registration page

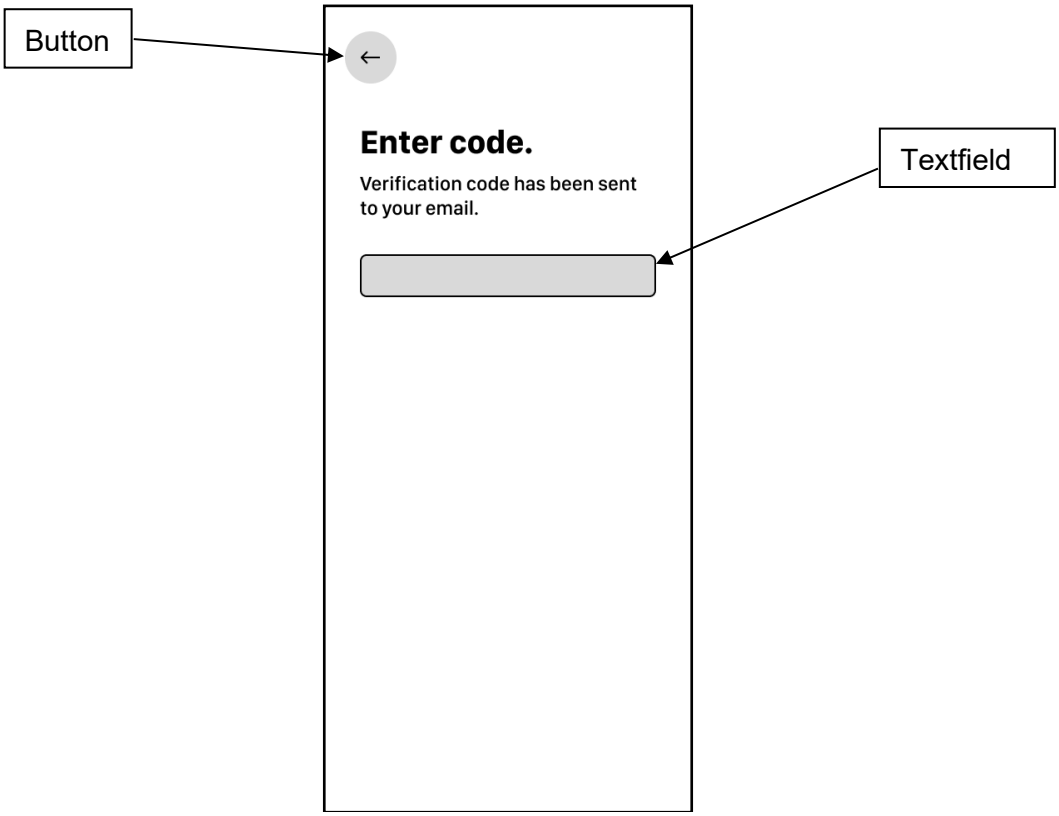


Figure 4.5 Verification page

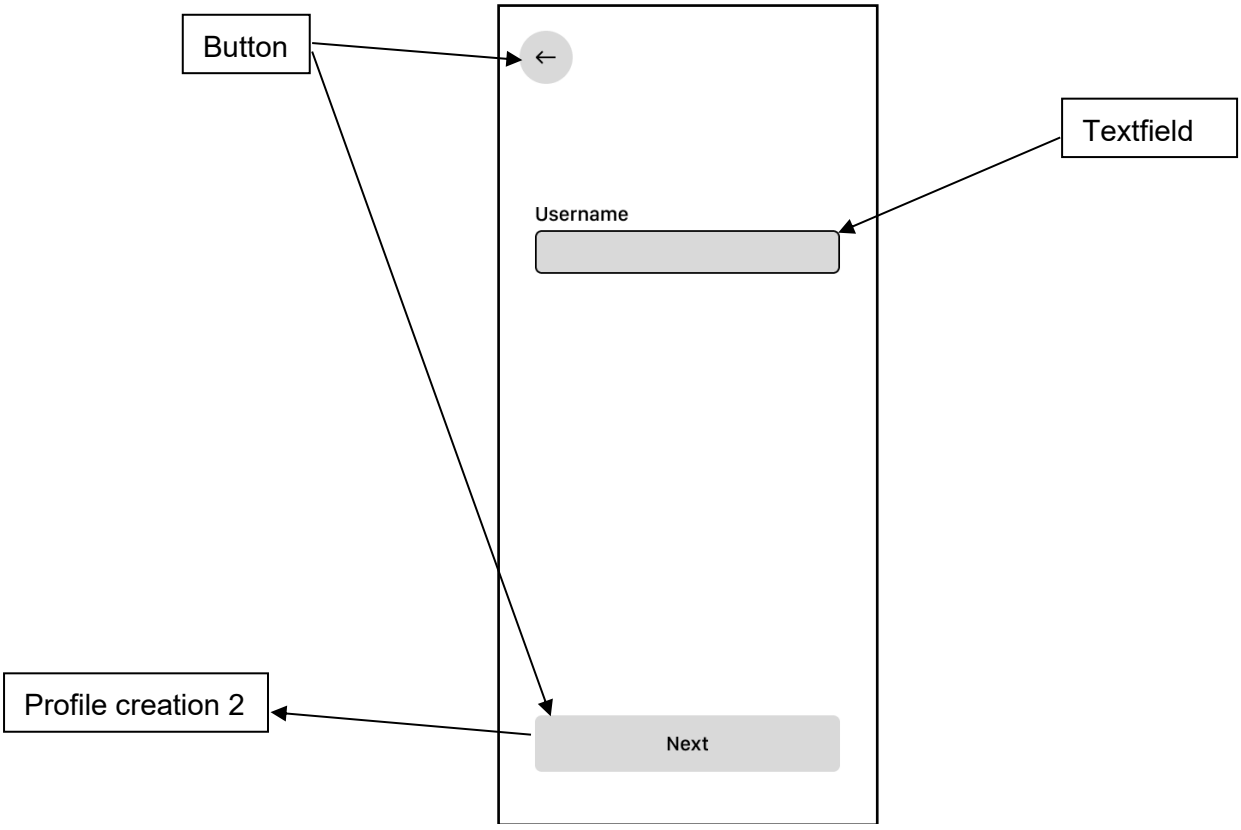


Figure 4.6 Profile creation 1

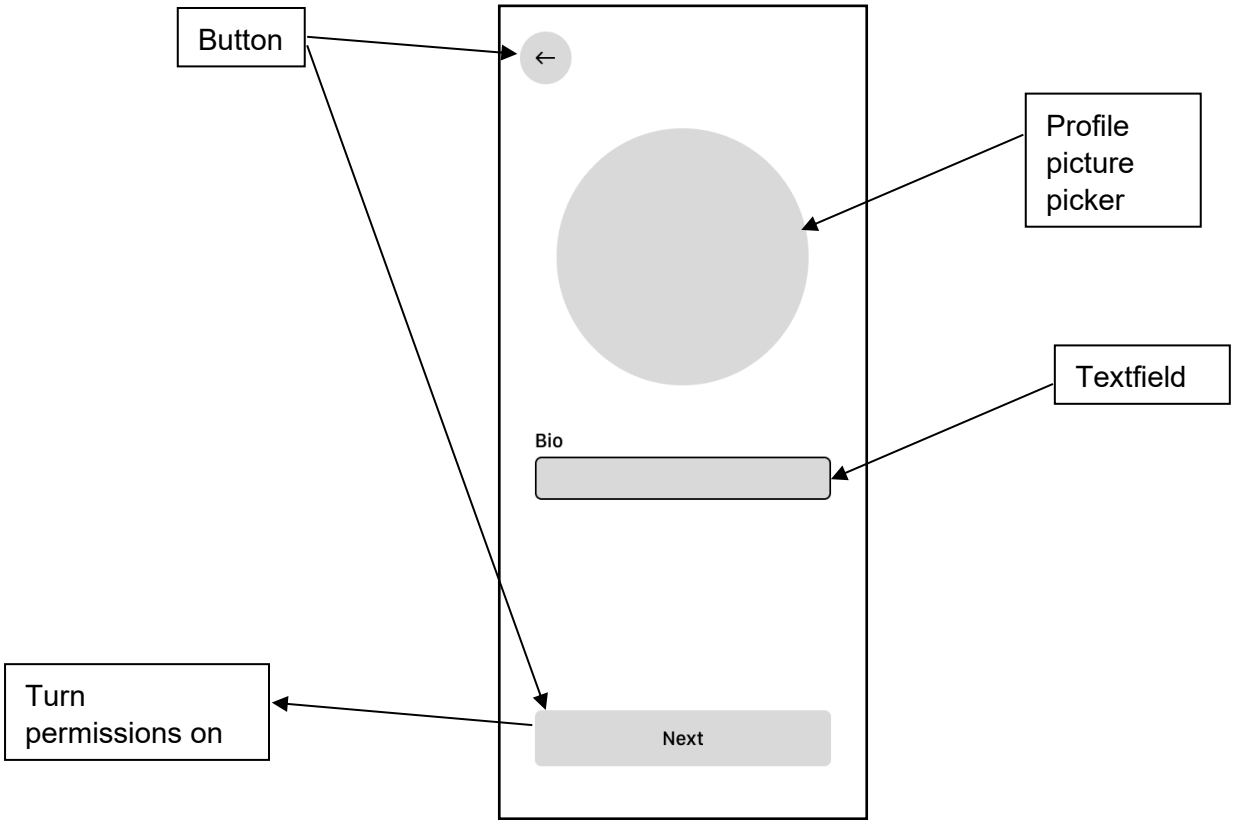


Figure 4.7 Profile creation 2

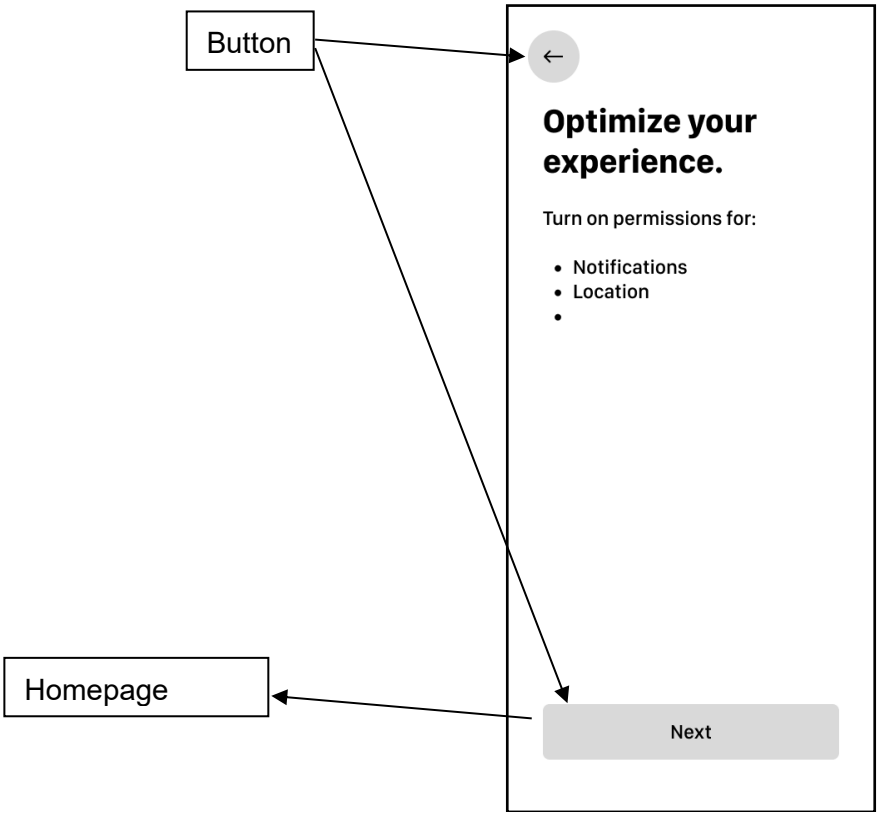


Figure 4.8 Turn permissions on

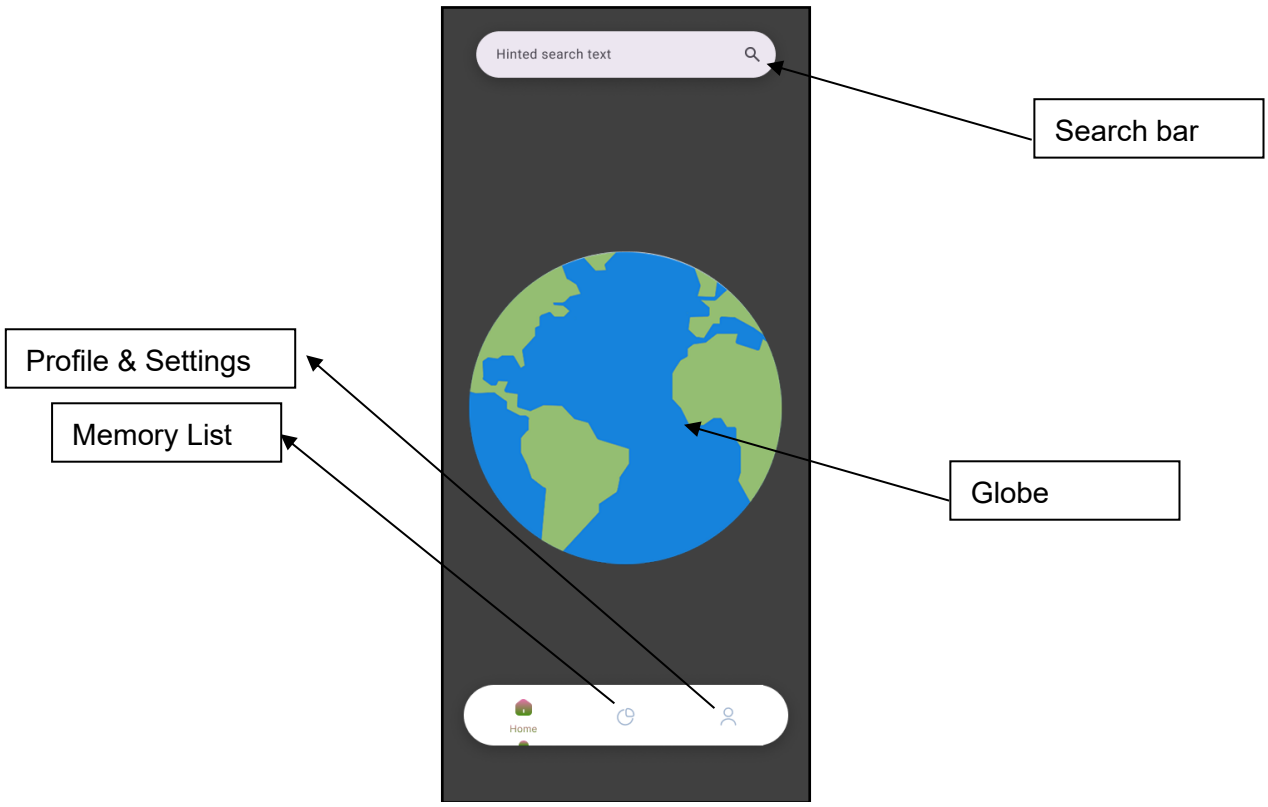


Figure 4.9 Homepage

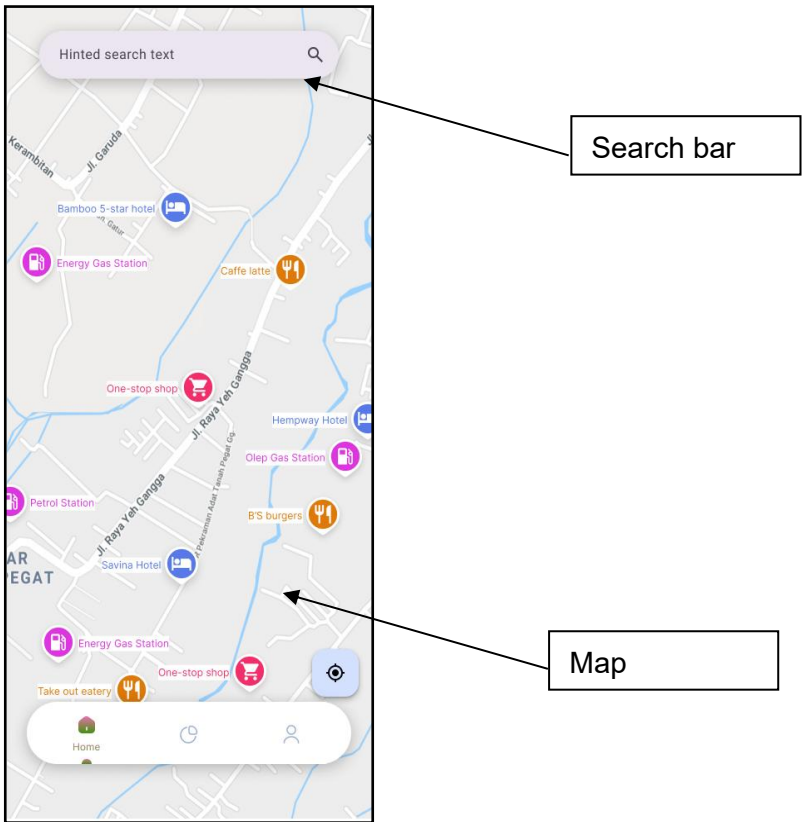


Figure 4.10 Homepage 2

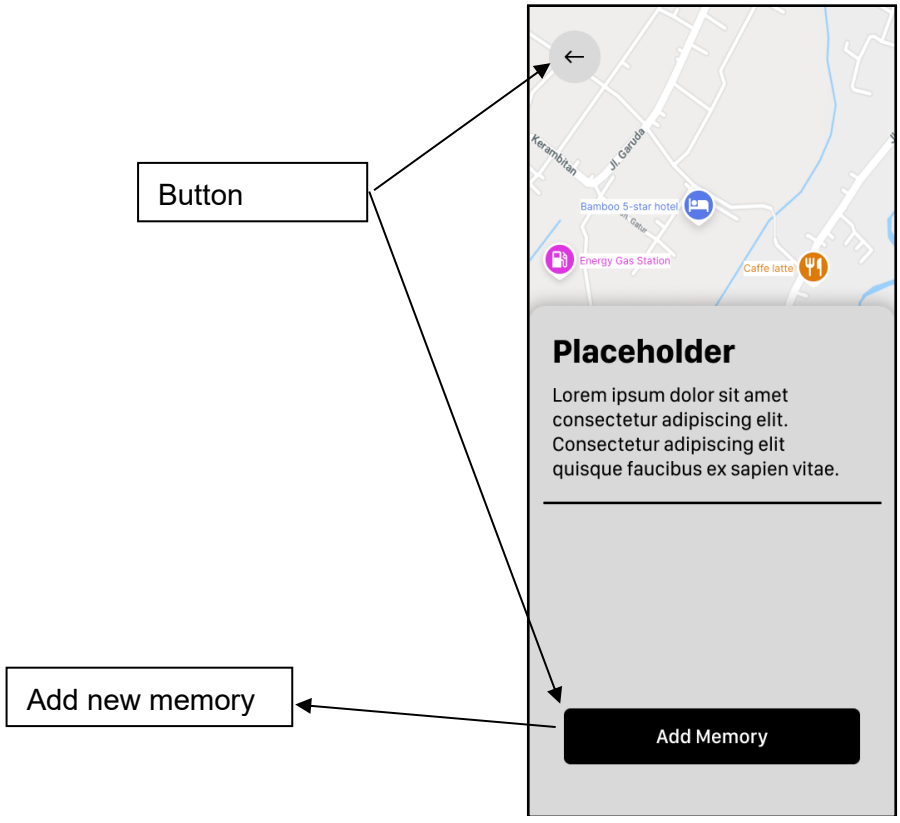


Figure 4.11 Place without a memory

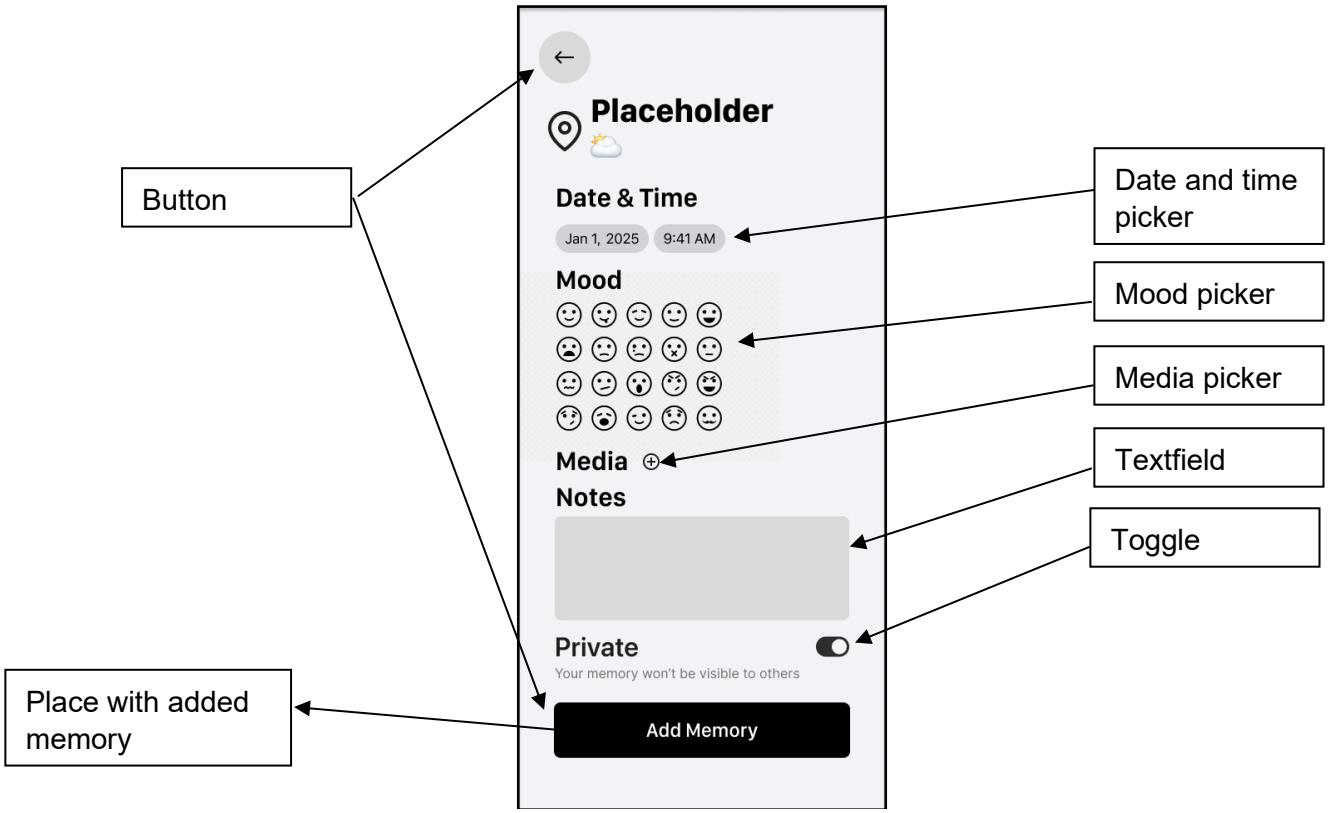


Figure 4.12 Add New Memory

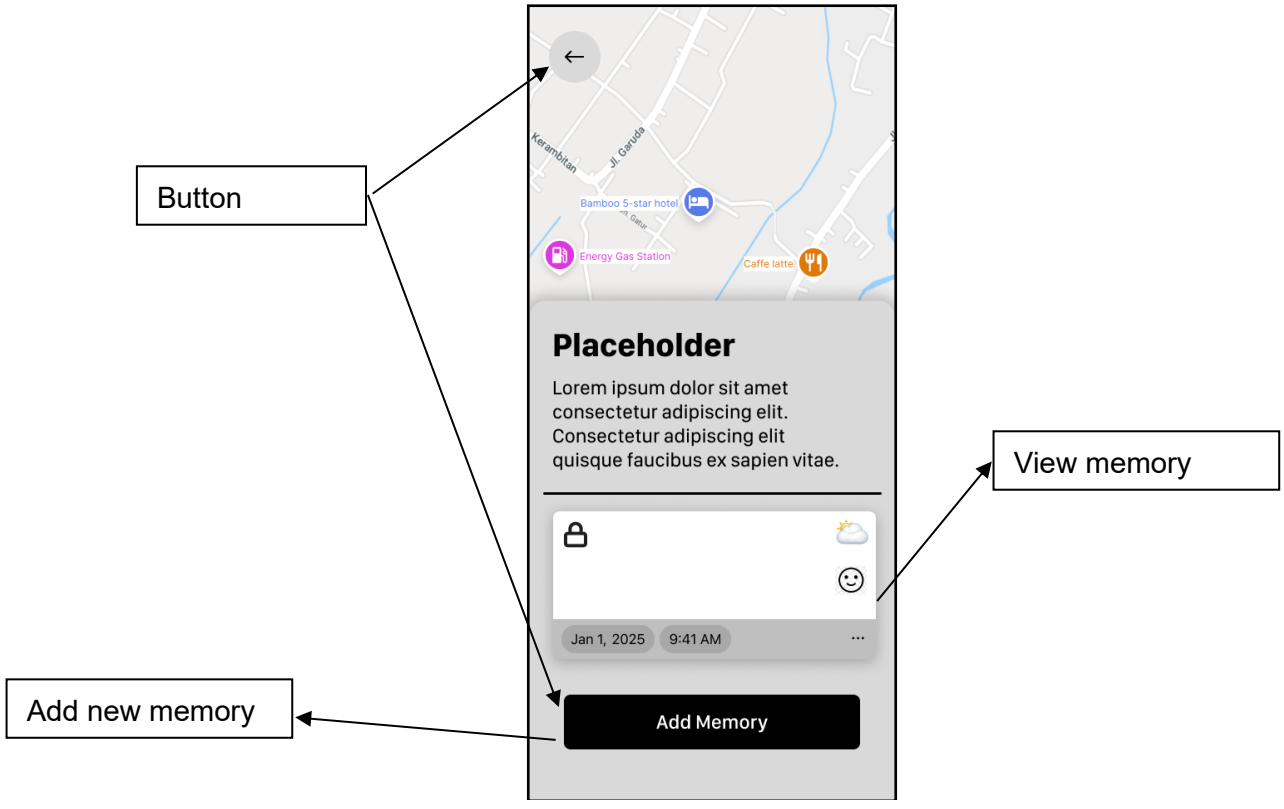


Figure 4.13 Place with added memory

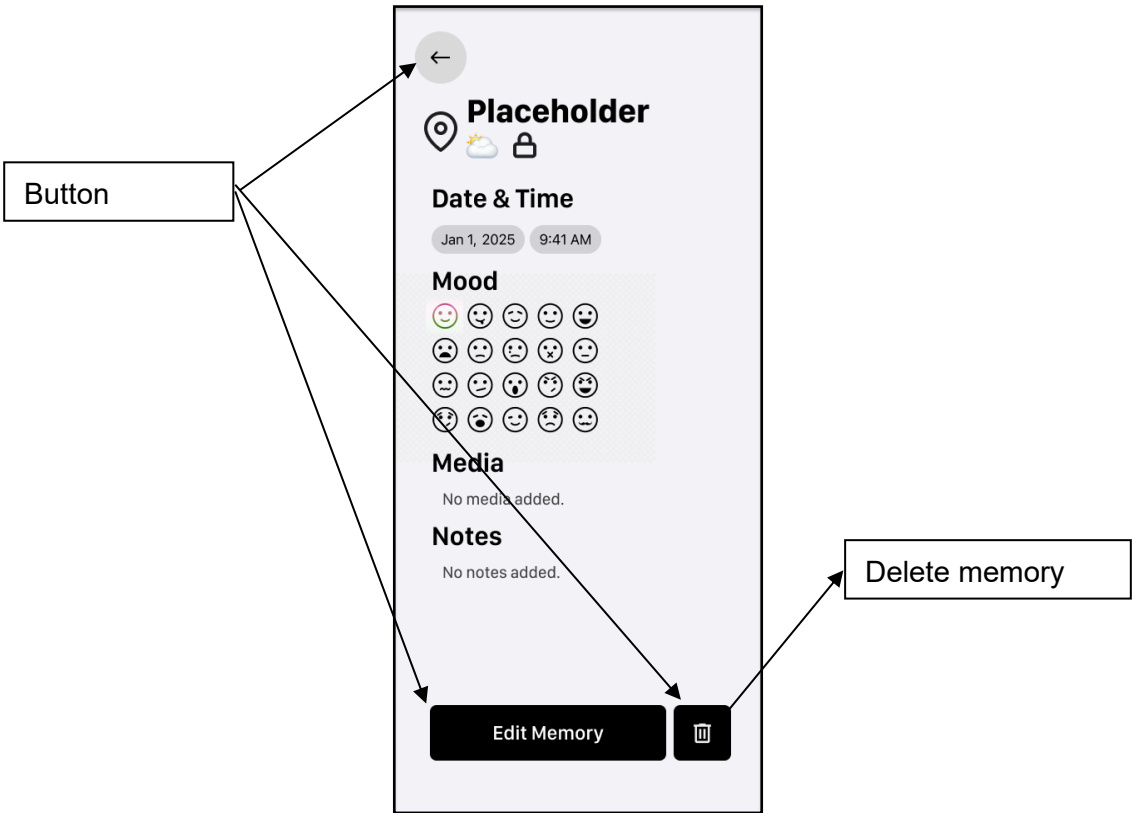


Figure 4.14 View memory

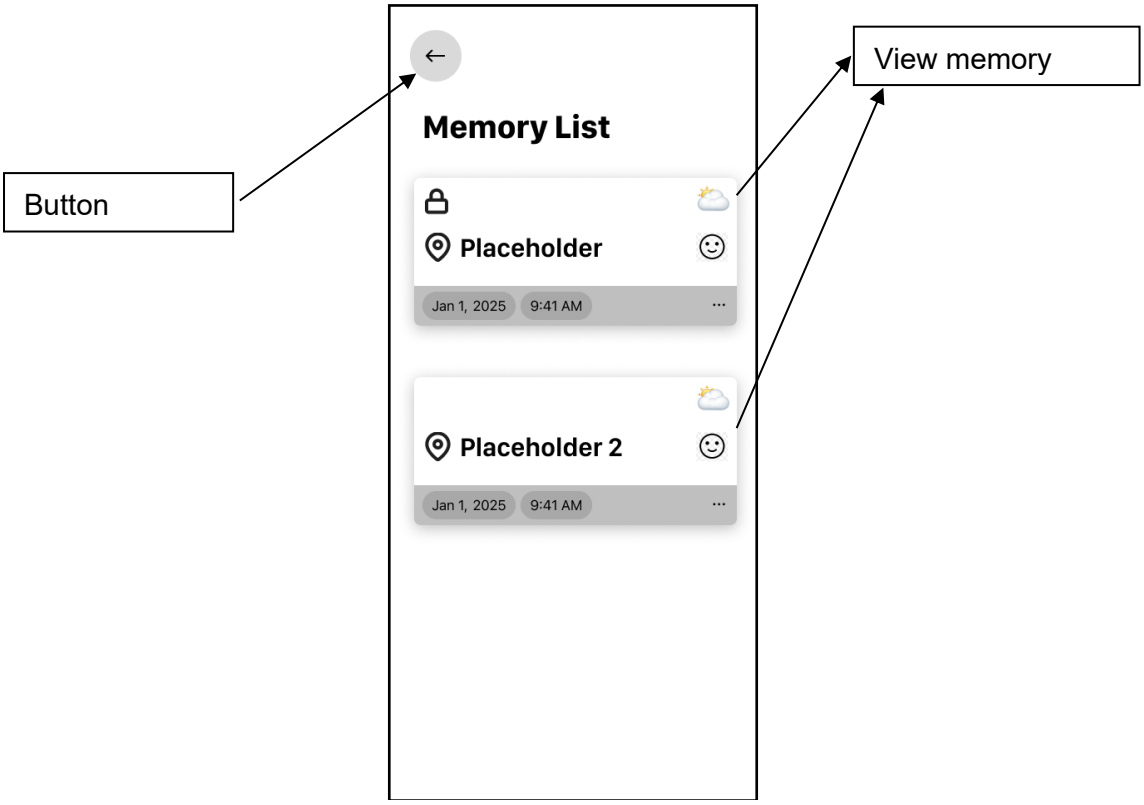


Figure 4.15 Memory List

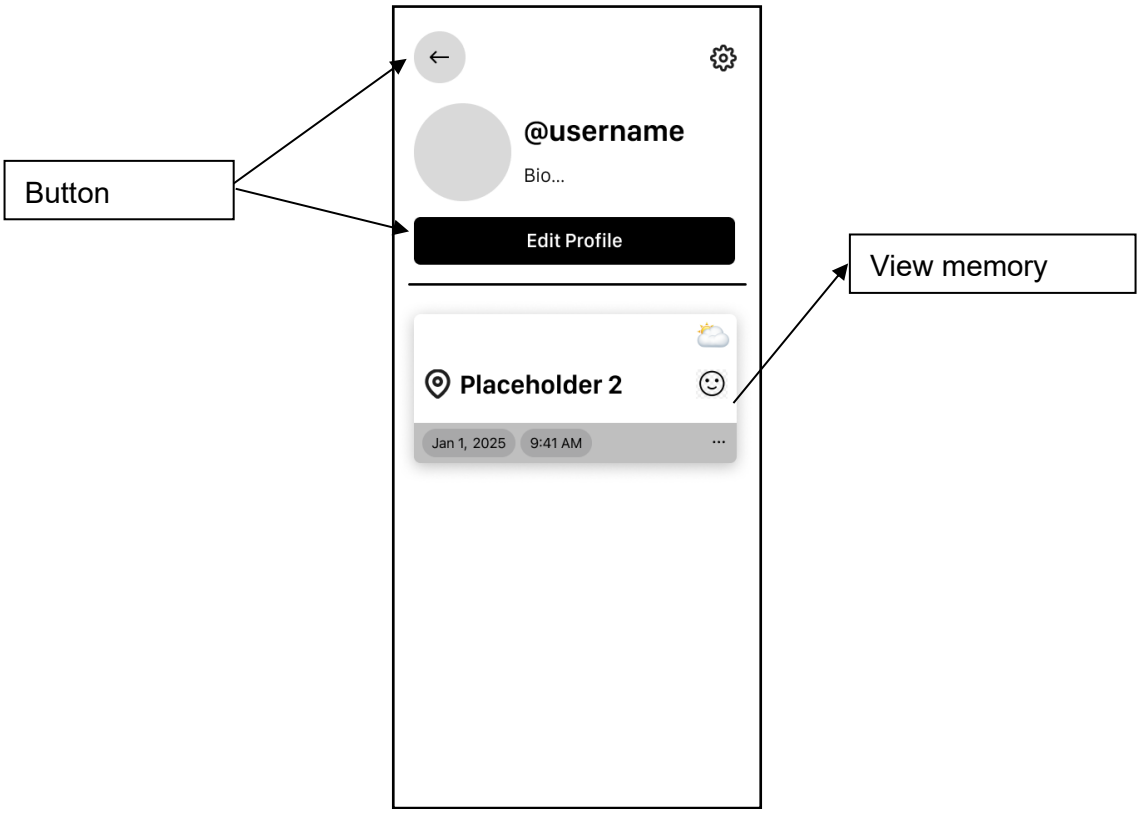


Figure 4.16 User profile

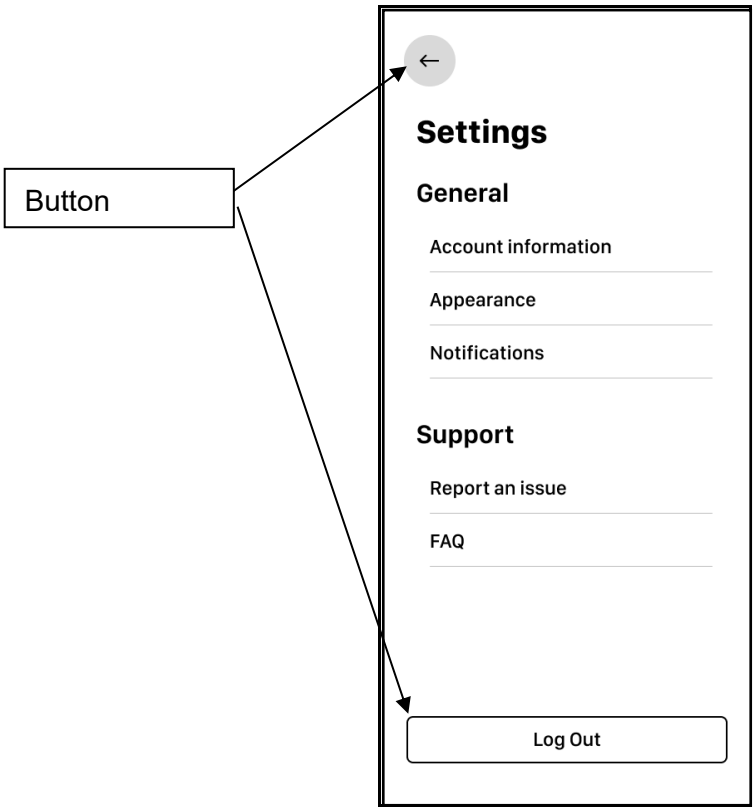


Figure 4.17 Settings

4.3 Database Design

4.3.1 Data Dictionary

The data dictionary defines the structure of Mapmory's database, describing each field, its type, purpose, and constraints. The database uses UUIDs for all primary keys to ensure secure, globally unique identifiers. Geolocation data, which are latitude, longitude, is stored as floating-point numbers, enabling accurate map visualization and clustering. Multimedia files are stored externally, with Supabase Storage, and referenced via secure URLs in the media_files or memories table. Emotion tagging, sharing permissions, and contextual metadata support Mapmory's intelligent, map-based journaling functionality.

4.3.1.1 Users Table

Table 4.1 Users Table

Field	Type	Description	Constraints or Notes
id	UUID	Unique user identifier	PK, default uuid_generate_v4()
username	TEXT	User's email address	Unique, NOT NULL
bio	TEXT	User's bio	Nullable
avatar_url	TEXT	Name shown in profile	Nullable
created_at	timestamptz	Account creation timestamp	NOT NULL
Updated_at	timestamptz	Last app activity	Nullable

4.3.1.2 Memories Table

Table 4.2 Memories Table

Field	Type	Description	Constraints or Notes
id	UUID	Unique memory entry identifier	PK, default uuid_generate_vd()
user_id	UUID	Owner of the memory	FK to users.id, NOT NULL
title	TEXT	Title of the memory	NOT NULL
description	TEXT	User written desciption	Nullable
latitude	FLOAT	Memory GPS latitude	NOT NULL
longitude	FLOAT	Memory GPS longitude	NOT NULL
mood	TEXT	Emotion tag	Nullable
media_url	TEXT	URL for photo or video files	Nullable
notes	TEXT	Extra notes for the memory	Nullable
is_private	BOOL	Whether the memory is private or public	NOT NULL
memory_date	timestampz	The date of the memory	NOT NULL
created_at	timestamptz	Timestamp of memory creation	Default now()
updated_at	timestampz	Timestamp of when memory was edited	NOT NULL
place_name	TEXT	Name of the location	Nullable
weather_info	JSONB	The weather data	Nullable
ai_narrative	TEXT	AI Narrative of the memory	Nullable

4.3.2 Data Flow Diagram (DFD)

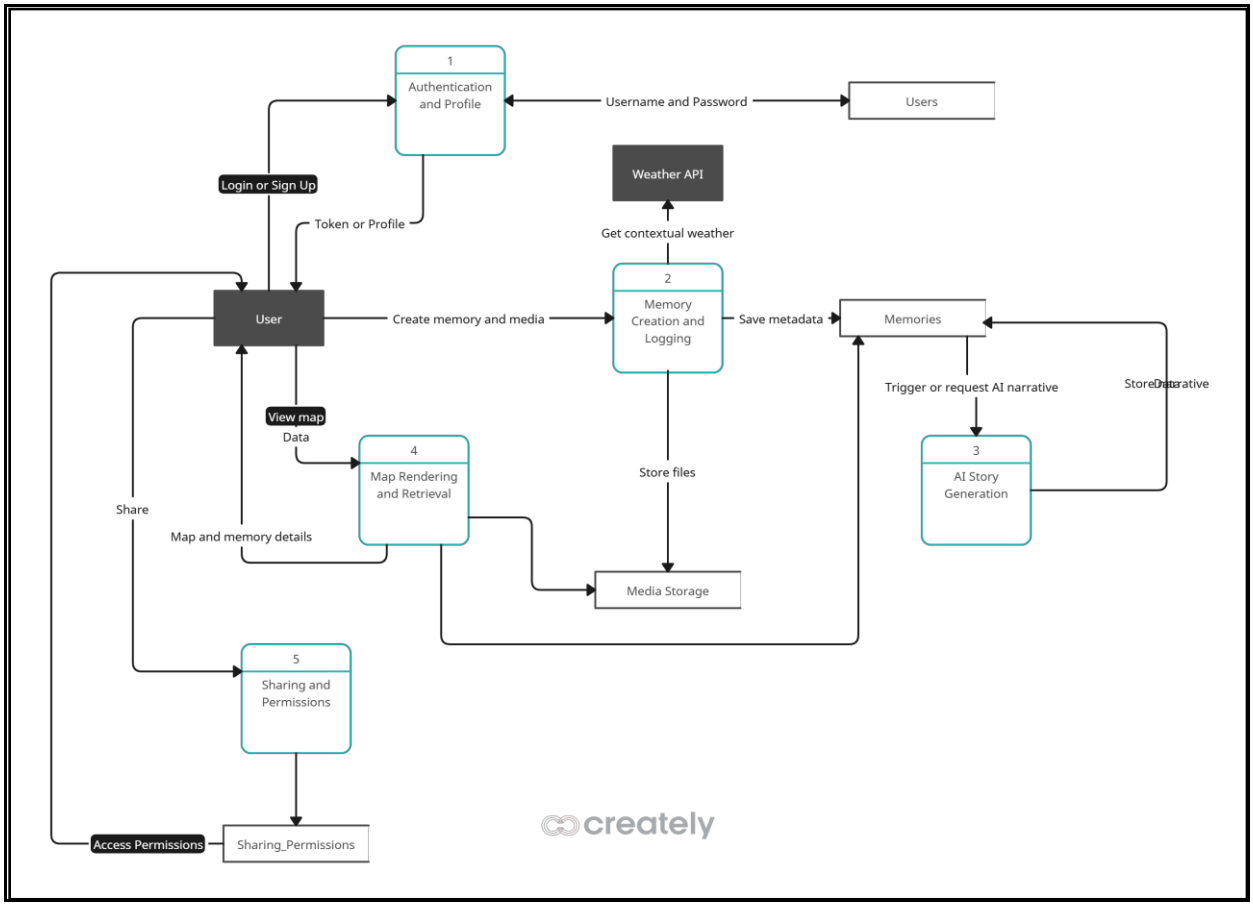


Figure 4.18 Data Flow Diagram

Figure 4.18 illustrates the data flow and feature interaction for the Mapmory application, centered around the User and key system components. The user begins by interacting with Authentication and Profile, which handles login or signup. Once authenticated, the user can create and log Memories, which are then linked to Map Rendering and Retrieval for location-based viewing. The system also integrates a WeatherAPI to enrich memories with contextual weather data, and Media Storage to save images or other media attached to memories. An AI Story Generation component processes memories to potentially create narrative summaries. Finally, users can access Sharing and Permissions to control access to their memories. This flow shows how user data, maps, media, AI, and social features connect within Mapmory.

4.3.3 Entity Relational Diagram (ERD)

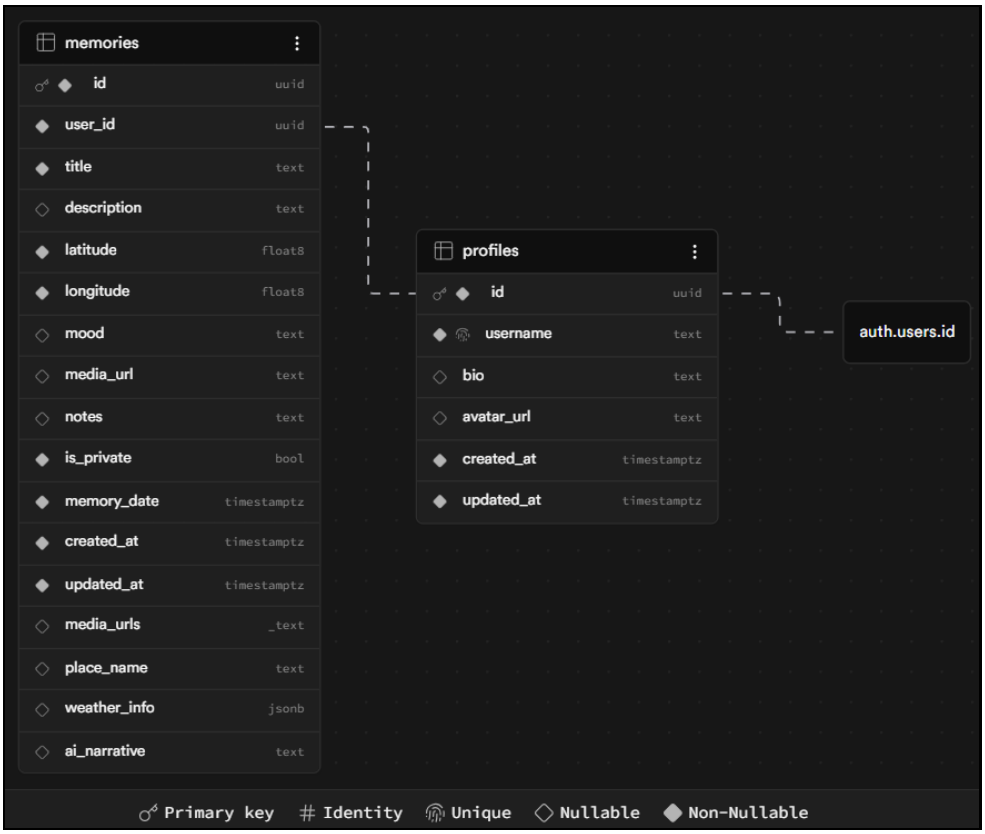


Figure 4.19 Entity Relational Diagram

Figure 4.19 shows the database schema for Mapmory, consisting of two main tables: profiles and memories, linked through the auth.users.id foreign key. The profiles table stores user account information, including a unique id (matching the authentication system's user ID), username, bio, avatar_url, and timestamps for creation and updates. The memories table represents each location-based memory entry, containing fields such as user_id (foreign key to profiles), title, description, geographic coordinates (latitude, longitude), mood, media_urls (as an array of text), notes, a is_private flag for privacy control, memory_date for when the memory occurred, and timestamps. Additional rich data includes place_name, weather_info stored in JSONB format, and ai_narrative for AI-generated story text. This structure enables each user to have many memories (one-to-many relationship), supporting the app's core functionality of storing and retrieving location-based personal memories with weather, media, and AI-generated content.

4.4 Implementation

This section examines the implementation of the Mapmory project. This section explains how the design of the project is turned into a fully functional mobile application through the development of the system. In this section, there are a few aspects which are execution platform on which the system will run, utilities of coding and testing, user interfaces design, and implementation of critical functionalities.

4.4.1 Execution Platform

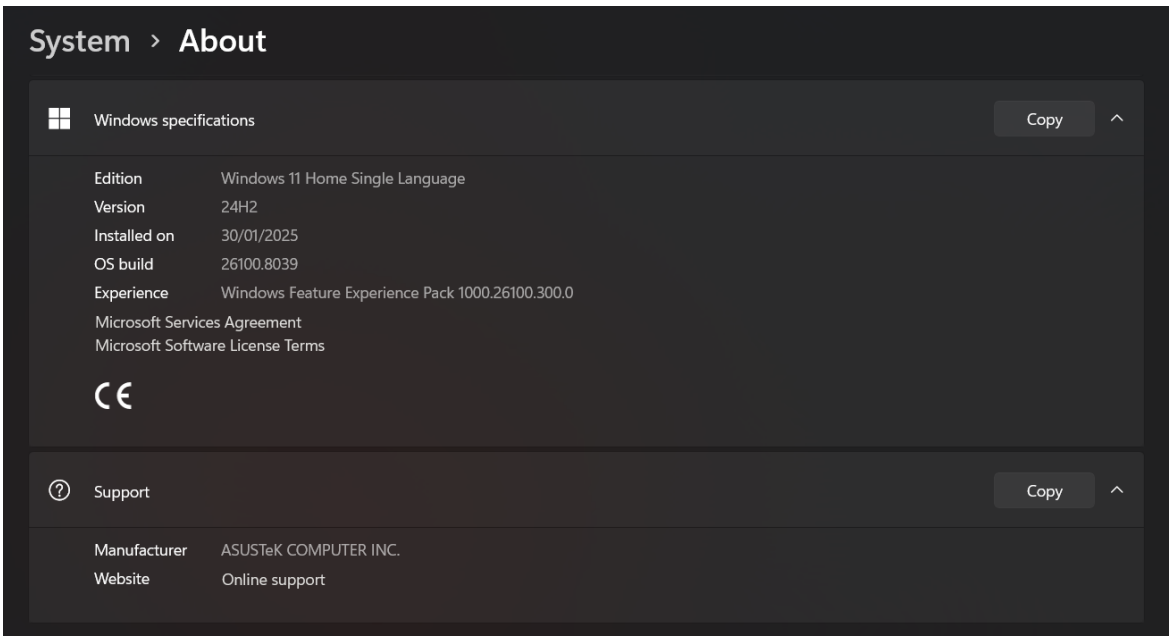


Figure 4.20 Windows 11 Interface

Mapmory uses Windows 11 for development and execution. Since Windows 11 is a strong and very popular operating system, the development and execution environment provides stability, with support from any kind of programming with different languages, frameworks, and tools. With all modern UI and performance-enhanced features, it provides a smooth execution platform. Hence, it is very good for resource intensive tasks throughout the development process.

Additionally, it provides support for many general development tools and applications necessary for the development of Mapmory, such as Visual Studio Code, Android Studio, and Postman. Its user-friendly interface provides great performance in terms of testing and deployment. In this instance, Windows 11 as an execution platform will undoubtedly guarantee the ideal setting for creating a high-performance inventory management system tailored to Mapmory's requirements.

4.5 Implementation Tools

4.5.1 Software

4.5.1.1 Programming Language

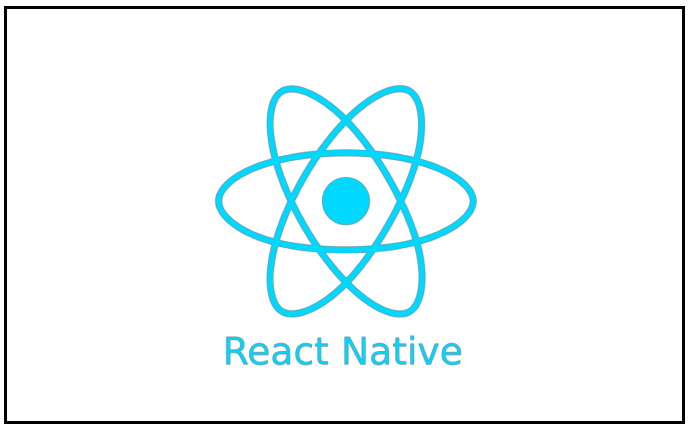


Figure 4.21 React Native

React native is the primary programming framework used for developing the Mapmory mobile application. It is an open-source framework created by Meta that enables developers to build natively rendered mobile applications for both Android and iOS using a single JavaScript codebase. React Native allows for efficient cross-platform development without the need to write separate code for each operating system, significantly reducing development time and effort. The framework supports component-based architecture, which facilitates modular and reusable UI elements, and integrates seamlessly with third-party libraries, such as React Navigation for routing and Expo for streamlined build and deployment workflows. Its compatibility with native device APIs, including GPS and camera access, made it a suitable choice for implementing the location-based and multimedia features central for Mapmory.

4.5.1.2 Visual Studio Code

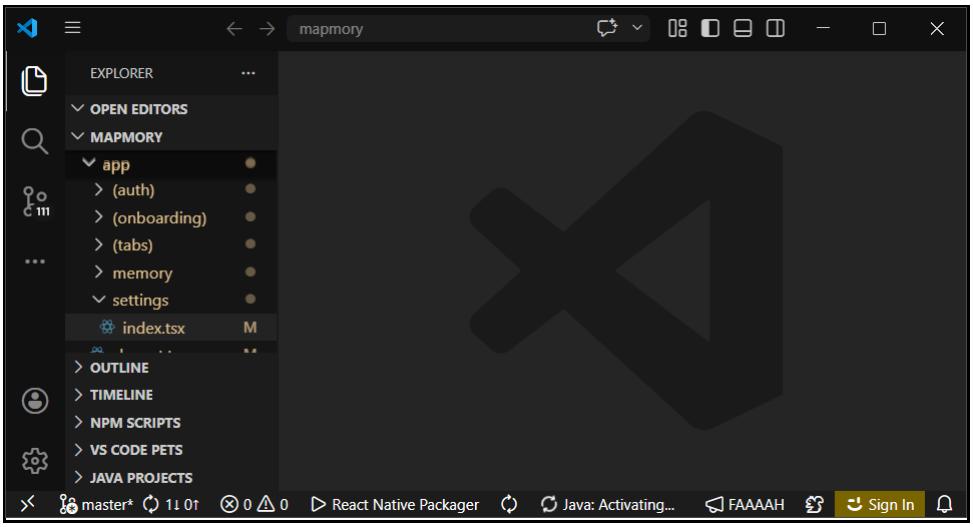


Figure 4.22 Visual Studio Code Interface

Visual Studio Code (VS Code) is the integrated development environment (IDE) used throughout the development of Mapmory. Developed by Microsoft, it is a lightweight yet feature-rich code editor that supports a wide range of programming languages and frameworks, including JavaScript and React Native. VS Code was chosen for its extensive library of extensions, including those for ESLint (code linting), Prettier (code formatting), and the React Native Tools extension, which provides debugging support directly within the editor. Its built-in terminal, Git integration, and IntelliSense code completion capabilities contributed significantly to development productivity and code quality management during the project.

4.5.1.3 Supabase

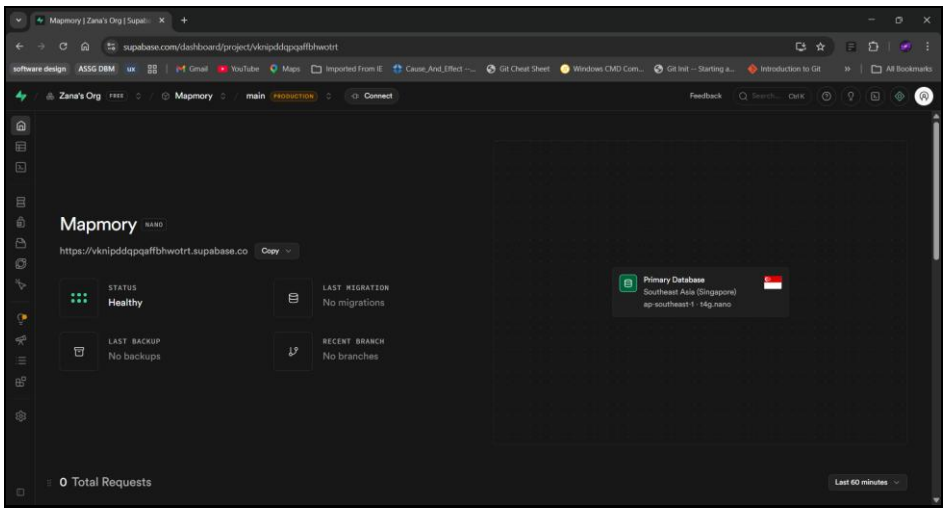


Figure 4.23 Supabase Dashboard

Supabase serves as the backend-as-a-service (BaaS) platform for Mapmory, providing a hosted PostgreSQL database, authentication services, and cloud storage. The Supabase Dashboard, shown in Figure 4.23, is a web-based management interface used throughout development to create and manage database tables, configure Row Level Security (RLS) policies, monitor API activity, and inspect stored media assets. In Mapmory, Supabase handles user authentication via email and password, persists all memory entries and user profile data in PostgreSQL, and hosts uploaded multimedia files through Supabase Storage. Its seamless integration with React Native via the official JavaScript client library made it the ideal choice for a secure, scalable, and rapidly configurable backend solution for this project.

4.5.1.4 Google Console

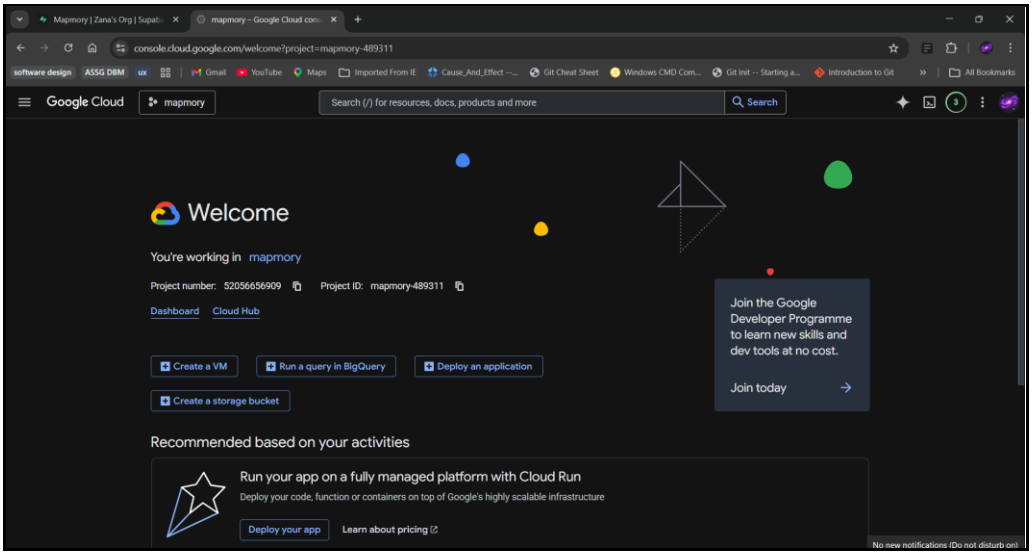


Figure 4.24 Google Console Dashboard

Google Console (Google Cloud Console) is the web-based management tool for setting up and monitoring the cloud services that support Mapmory. Created by Google, it offers easy access to a wide range of cloud services, including Google Maps API integration, Firebase services, and storage solutions. Google Console was crucial for managing API keys, checking usage limits, and setting up the authentication needed for location services and push notifications in the app. Its detailed analytics dashboard helped the team track API usage, fix service problems, and improve performance. The platform also provided strong access control and security features, keeping sensitive configuration data safe during development and deployment.

4.5.1.5 Expo

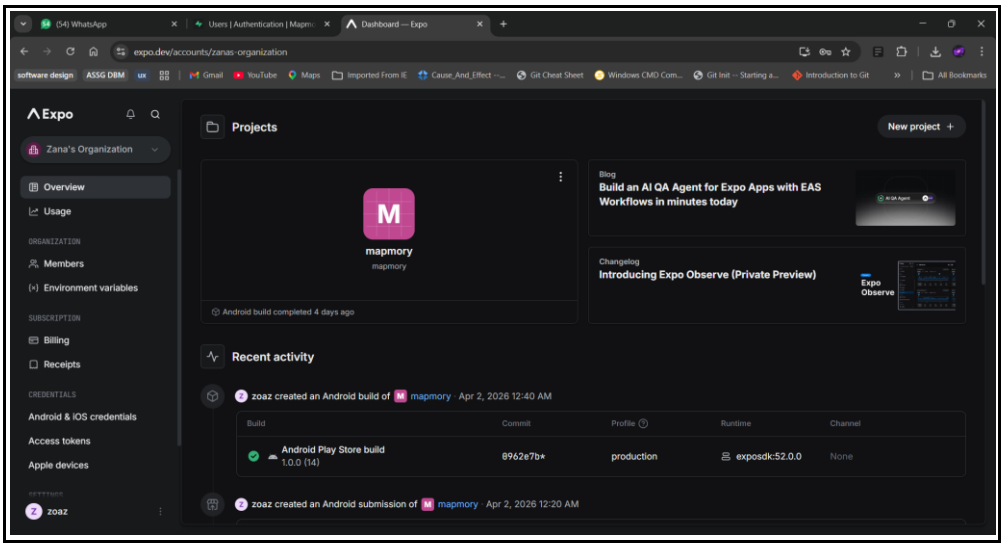


Figure 4.25 Expo Dashboard

Expo is the development platform and toolchain used to streamline the build, testing, and deployment workflows for the Mapmory mobile application. As an open-source ecosystem built around React Native, Expo eliminates the complexity of native build configurations by providing a managed workflow that handles compilation, signing, and over-the-air updates automatically. The Expo Dashboard, shown in Figure 4.25, serves as the central hub for managing application builds, distributing preview versions to testers via QR codes, and publishing updates to app stores. During development, Expo Go enabled rapid iteration by allowing instant testing of JavaScript changes on physical devices without recompiling native code. Its seamless integration with React Native and support for native device features, such as camera, location services, and push notifications, through pre-built modules significantly accelerated the development timeline and reduced configuration overhead.

4.5.1.6 Android Studio

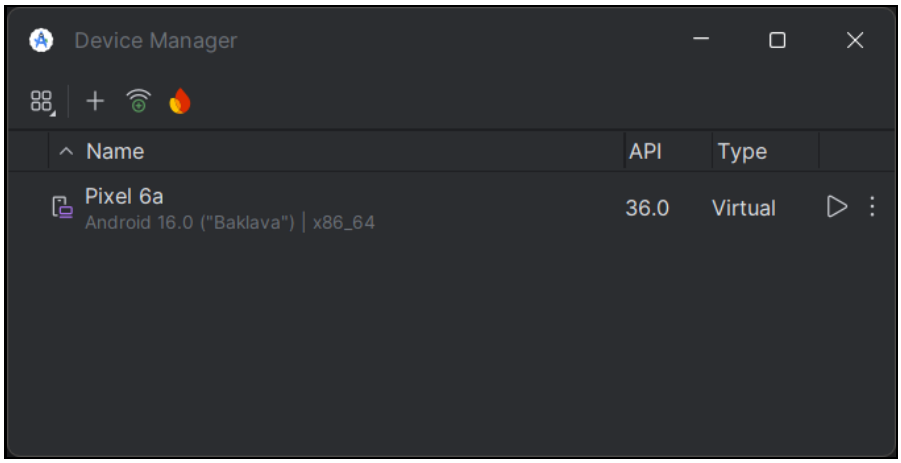


Figure 4.26 Android Studio Device Manager

Android Studio is the official integrated development environment (IDE) for Android development, utilized in the Mapmory project for native Android-specific configurations, debugging, and final build generation. Developed by Google, it is built on IntelliJ IDEA and provides a comprehensive suite of tools specifically designed for Android application development. Android Studio was employed for tasks requiring direct interaction with native Android code, including configuring custom native modules, managing Android manifest files, and resolving platform-specific dependencies that fell outside Expo's managed workflow. Its advanced emulator capabilities allowed for testing Mapmory across various Android device configurations and API levels, ensuring consistent performance and compatibility. The IDE's robust debugging tools, including the Android Profiler and Logcat, were instrumental in identifying and resolving native-level performance bottlenecks and memory issues during the final optimization phase of the project.

4.5.2 Hardware

4.5.2.1 Laptop

Figure 4.27 ASUS TUF Gaming F15 2021

The ASUS TUF Gaming F15 (2021), shown in Figure 4.27, served as the primary development machine for the Mapmory project. Equipped with an Intel Core i7-11800H processor, 16 GB of RAM, and a 512 GB SSD running Windows 11, the device provided sufficient processing power and memory to run multiple development tools concurrently, including Visual Studio Code, Android Studio, the Expo development server, and a browser session connected to the Supabase Dashboard. Its high-performance specifications ensured smooth execution of build processes, emulator sessions, and real-time debugging throughout both semesters of the project.

4.5.2.2 Android Phone

Figure 4.28 POCO F3

The Xiaomi POCO F3, shown in Figure 4.28, served as the primary physical Android test device for Mapmory. Running Android 11 with a Qualcomm Snapdragon 870 processor and 6 GB of RAM, it represents a realistic mid-range hardware environment typical of the application's target users. The device was used to validate hardware-dependent features that cannot be accurately replicated in an emulator, including real-time GPS geolocation capture, background location tracking, camera and gallery access for media uploads, push notification delivery, and touch gesture responsiveness on the interactive map. Testing on a physical device confirmed that Mapmory performs reliably under real-world usage conditions.

4.6 System Interface

This section presents the actual implemented system interfaces of the Mapmory mobile application. The screenshots below illustrate the final developed screens as they appear on a physical Android device, reflecting the design prototypes established in the Interface Design section of this chapter. Each screen has been developed to be consistent with the functional and non-functional requirements defined in Chapter 3, ensuring usability, visual clarity, and seamless navigation throughout the application.

4.6.1 Splash Screen

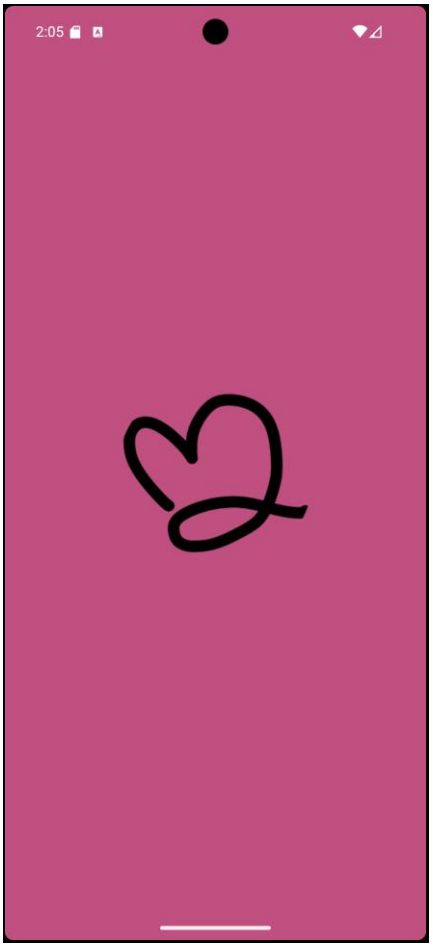


Figure 4.29 Splash Screen

Figure 4.29 shows the Splash Screen of the Mapmory application, which is displayed briefly on launch while the application initialises and checks the user's authentication status. It features the Mapmory logo centred on a clean background, establishing the application's visual identity from the first moment of interaction. The splash screen provides a polished entry experience before automatically redirecting the user to either the Welcome Page for new or unauthenticated users, or directly to the Homepage for users who are already logged in.

4.6.2 Welcome Page

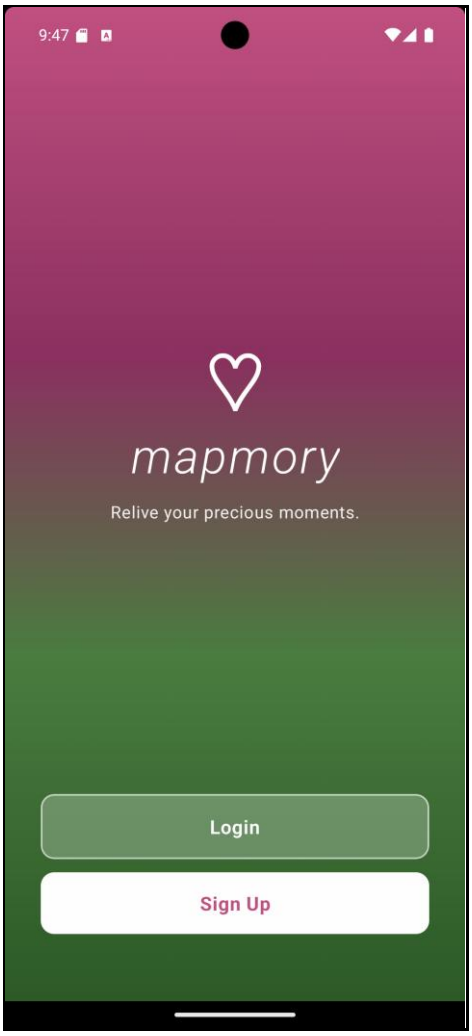


Figure 4.30 Welcome Page

Figure 4.30 shows the Welcome Page, which is the first interactive screen presented to new or unauthenticated users after the splash screen. It displays the Mapmory logo alongside a brief tagline that communicates the application's core value proposition. Two clear call-to-action buttons are presented: one to proceed to Sign Up for new users and one to Log In for returning users. The design is intentionally minimal and welcoming, ensuring that first-time users can immediately understand the application's purpose and navigate to the appropriate entry point without confusion.

4.6.3 Sign Up Screen

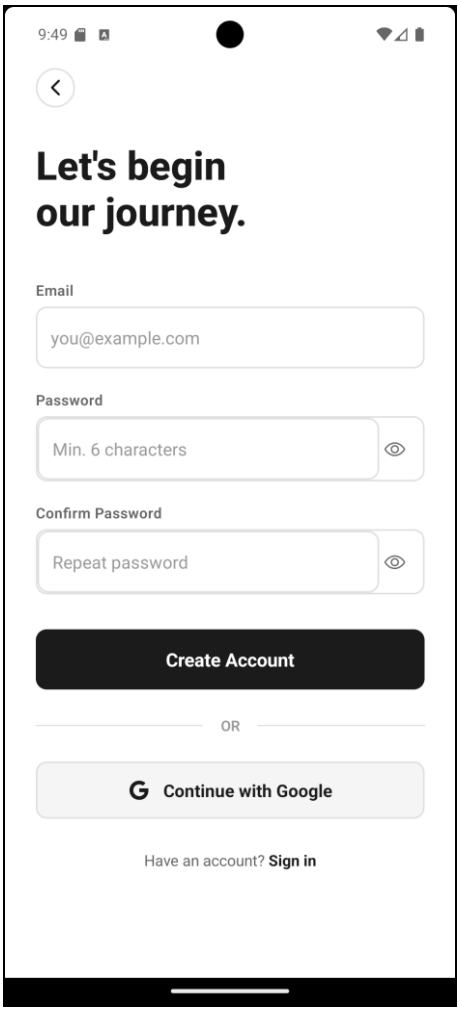


Figure 4.31 Sign Up Screen

Figure 4.31 shows the Sign Up Screen, which allows new users to create a Mapmory account by providing their full name, email address, and a secure password. Input validation is applied in real time to ensure that the email format is correct and that the password meets the minimum security requirements. Upon successful submission, a verification email is dispatched to the provided address. The screen also includes a navigation link to the Login Screen for users who already have an existing account, minimising friction in the onboarding flow.

4.6.4 Verification Screen

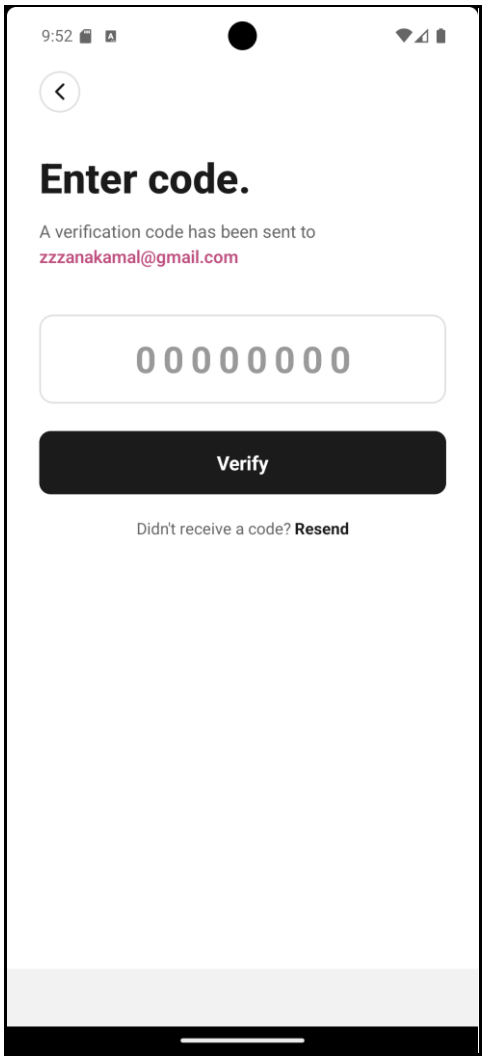


Figure 4.32 Verification Screen

Figure 4.32 shows the Verification Screen, which is displayed after a user completes registration and a confirmation email has been sent. The screen instructs the user to check their inbox and verify their email address by clicking the link provided in the email. This step is mandatory before the user can access the application, ensuring that all registered accounts are associated with valid and accessible email addresses. A resend option is available for users who do not receive the initial email.

4.6.5 Onboarding

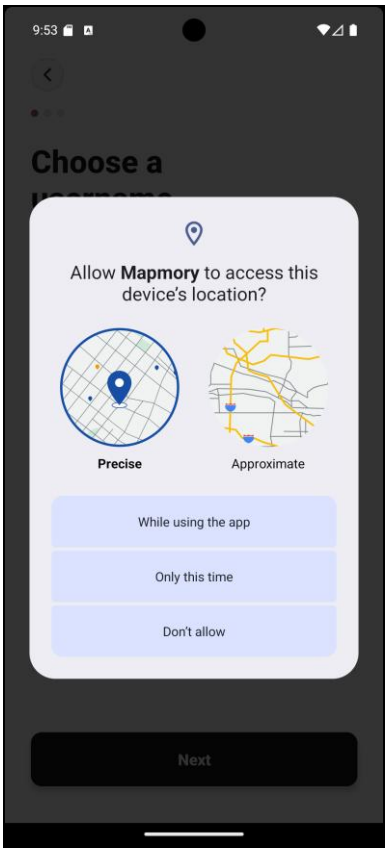


Figure 4.33 Onboarding 1

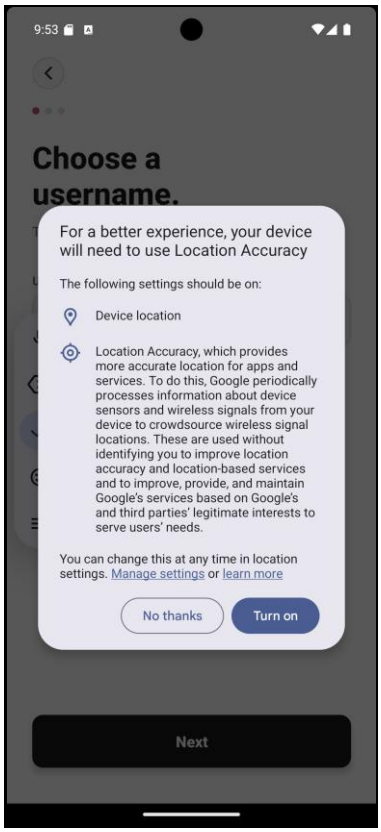


Figure 4.34 Onboarding 2

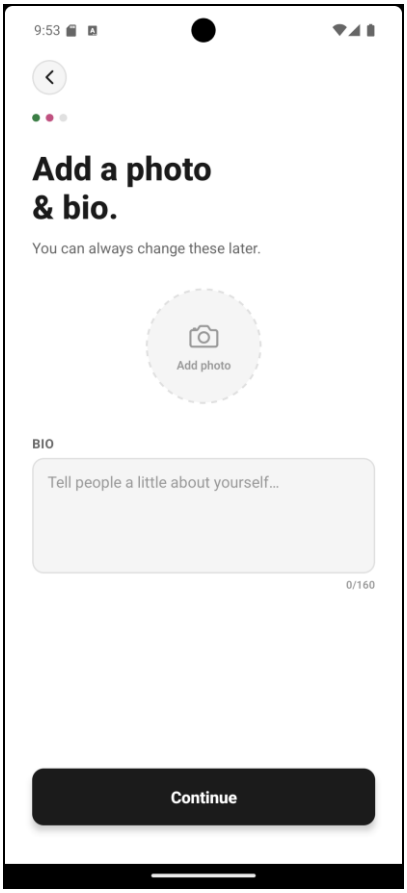


Figure 4.35 Onboarding 3

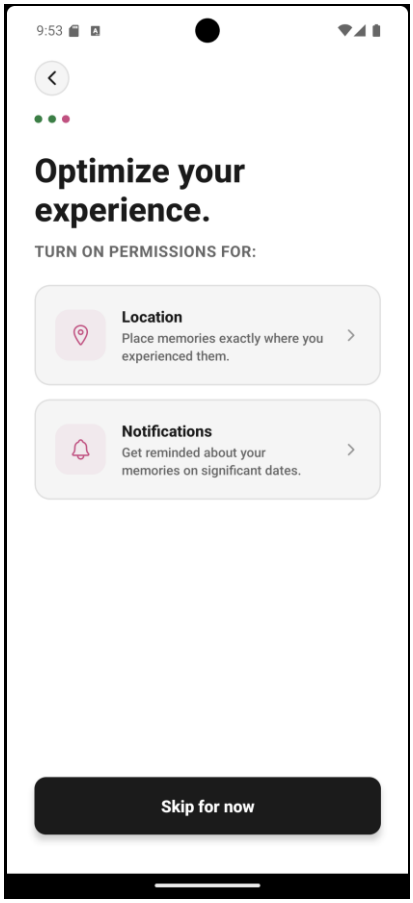


Figure 4.36 Onboarding 4

Figures 4.33 to 4.36 show the four-screen Onboarding sequence, which is presented to new users upon completing email verification and logging in for the first time. Each screen introduces a core feature of Mapmory through a concise headline, a supporting illustration, and a brief description. The four screens cover the interactive map interface, memory creation with contextual capture, AI-generated storytelling, and privacy controls respectively. Users can swipe through the screens at their own pace and skip directly to the main application at any point. The onboarding flow ensures that new users arrive at the Homepage with a clear understanding of the application's capabilities.

4.6.6 Login Screen

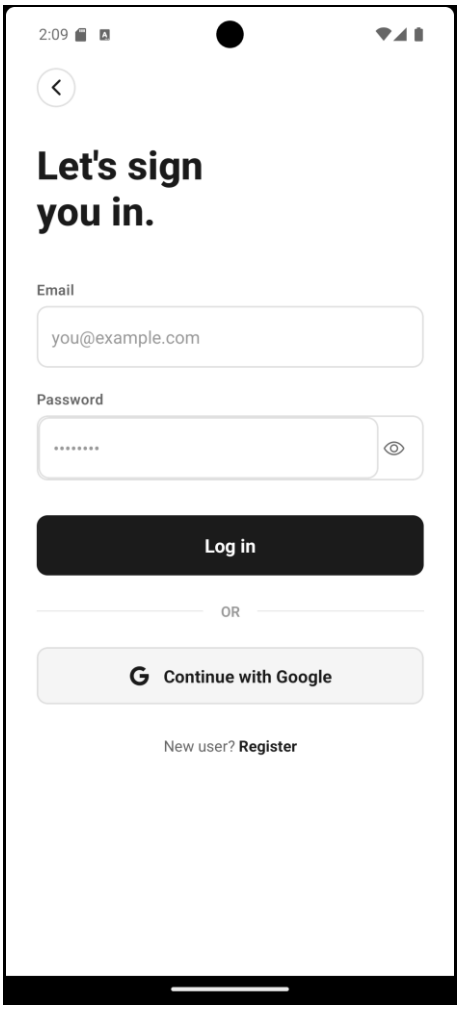


Figure 4.37 Login Screen

Figure 4.37 shows the Login Screen, which allows returning users to authenticate into Mapmory using their registered email address and password. The form includes real-time validation and a clear error message if the credentials provided do not match any existing account. A “Forgot Password” link is available to redirect users to the password reset flow. The screen also includes a link to the Sign Up Screen for users who do not yet have an account, ensuring straightforward navigation between authentication entry points.

4.6.7 Homepage

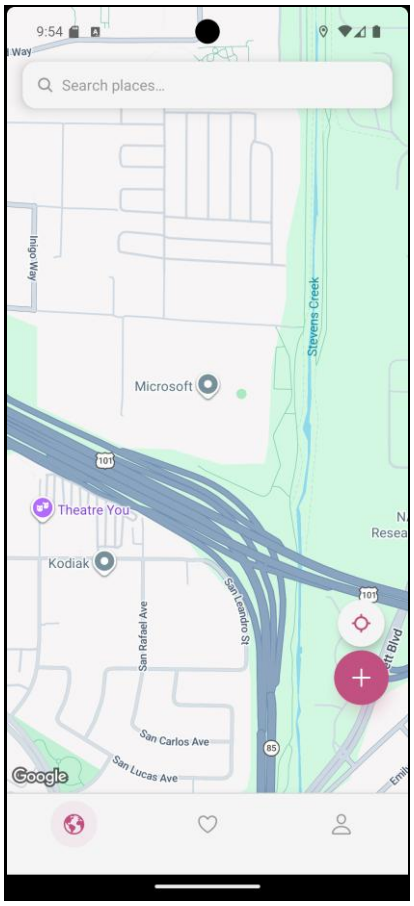


Figure 4.38 Homepage

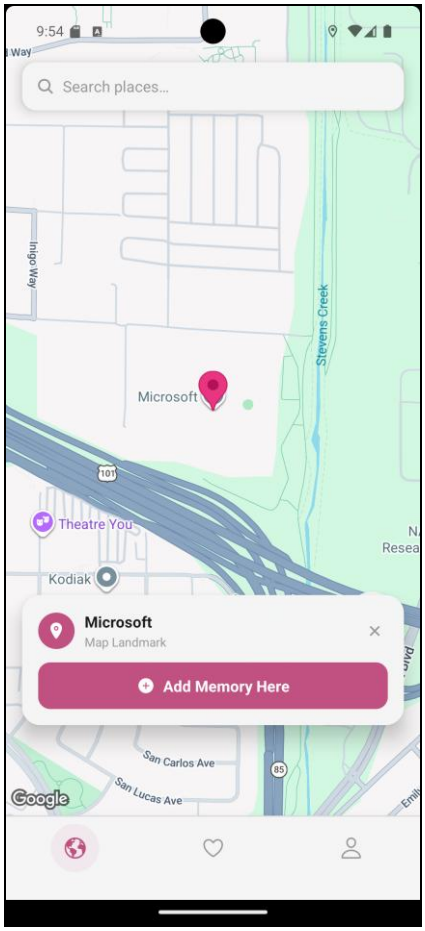


Figure 4.39 Location on Map

Figures 4.38 and 4.39 show the Homepage of Mapmory, which serves as the central hub of the application. Figure 4.38 displays the interactive globe map interface, on which all of the user's saved memories are rendered as coloured map pins positioned at their corresponding geographic coordinates. Users can pan and zoom the map freely to explore different regions of the world where they have recorded memories. Figure 4.39 shows what happens when a specific location is tapped: a preview card appears displaying the location name, and the user is given the option to view existing memories at that spot or create a new one. Together, these screens provide an intuitive and visually engaging spatial overview of the user's travel history.

4.6.8 Add Memory

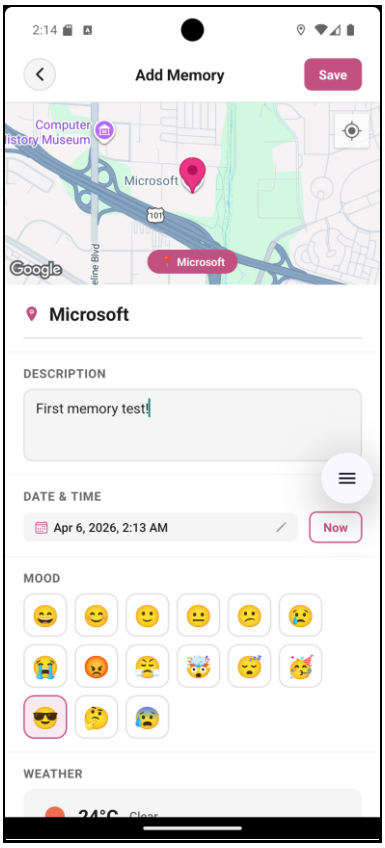


Figure 4.40 Add Memory

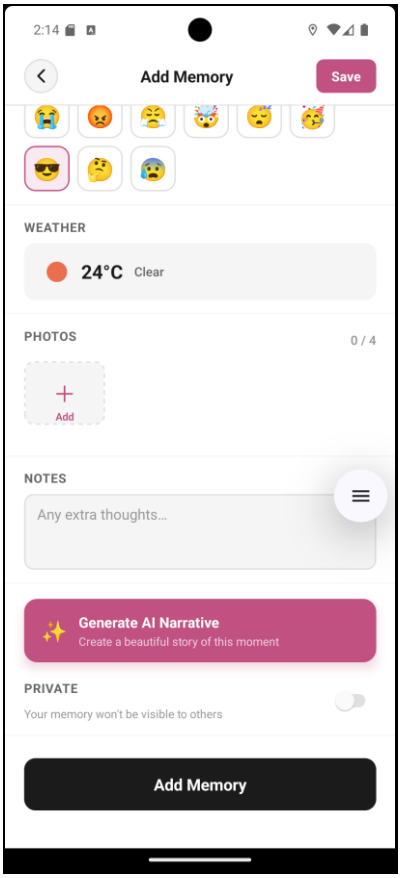


Figure 4.41 Add Memory 2

Figures 4.40 and 4.41 show the Add Memory screens. When a user initiates the creation of a new memory entry, the application automatically captures the current GPS coordinates, timestamp, and real-time weather data for the location, as shown in Figure 4.40. The user is then prompted to provide a title, select an emotion tag, and upload photos or videos from their device gallery. Figure 4.41 shows the second step of the form, where the AI-generated narrative is displayed for the user's review and optional editing, along with a privacy toggle to designate the memory as private, shared, or public. Once saved, the memory is pinned to the map and stored securely in the Supabase backend.

4.6.9 Created Memory

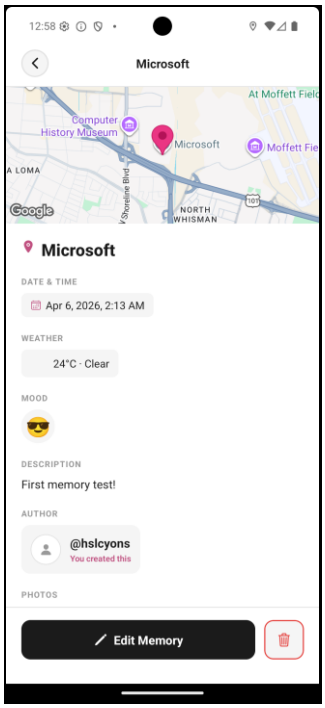


Figure 4.42 Created Memory

Figure 4.42 shows the Created Memory view, which is displayed when a user taps an existing memory pin on the map. The screen presents the full details of the saved memory entry, including the location name, date and time, weather conditions recorded at the time of creation, the uploaded media content, the emotion tag, and the AI-generated narrative. Users can scroll through the media gallery within the card and use the action menu to edit or delete the entry. This view provides a rich and immersive way to revisit a recorded experience in its full contextual detail.

4.6.10 Explore Page

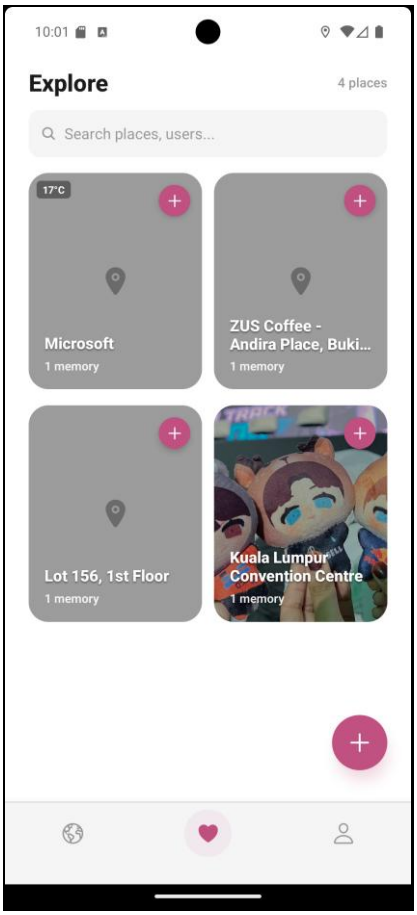


Figure 4.43 Explore Page

Figure 4.43 shows the Explore Page, which allows users to browse their full collection of memories in a structured list or grid layout, independent of the map interface. Memories can be filtered by date range, emotion tag, or media type, and a search bar enables keyword-based retrieval by location name or memory title. This screen is particularly useful for users who wish to locate a specific memory quickly without navigating the map, or for reviewing a chronological history of their travel entries.

4.6.11 Profile Page

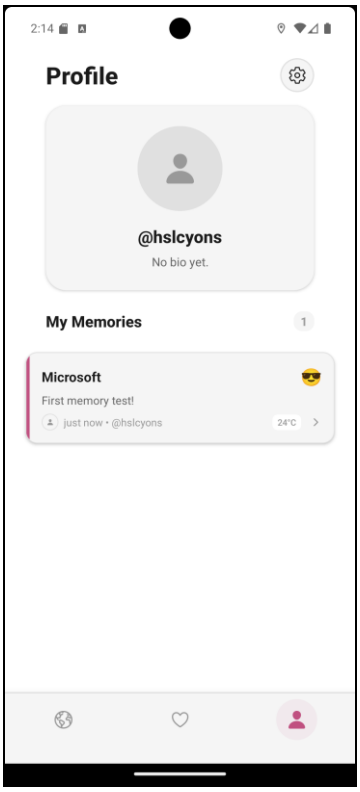


Figure 4.44 Profile Page

Figure 4.44 shows the Profile Page, which displays the user's account information, including their profile picture, display name, and a summary of their memory activity, such as the total number of memories created and the number of countries or locations visited. Users can edit their profile details directly from this screen by tapping the edit icon. The profile page also provides access to the Settings and FAQ pages through clearly labelled navigation options.

4.6.12 Settings

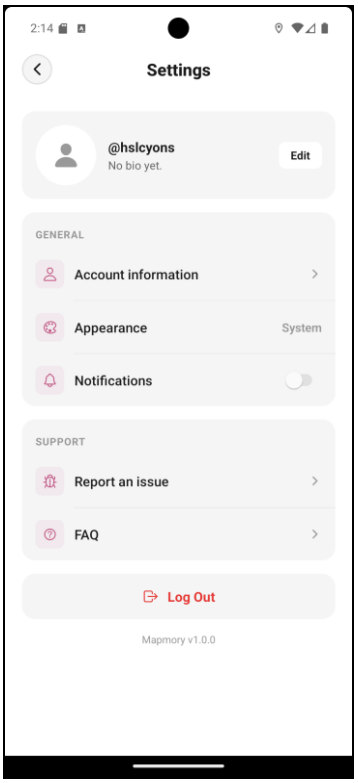


Figure 4.45 Settings

Figure 4.45 shows the Settings Screen, which gives users control over their account preferences and application behaviour. Key options available on this screen include changing the account password, managing notification preferences for context-aware location reminders, selecting a default privacy level for new memory entries, and logging out of the application. A danger zone section at the bottom of the screen provides a clearly separated option to permanently delete the user's account and all associated data, ensuring compliance with user data control expectations.

4.6.13 FAQ Page

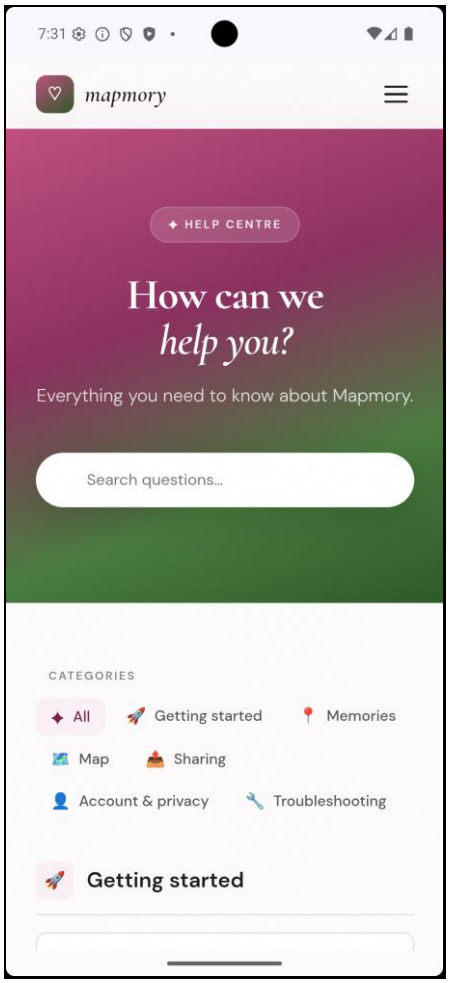


Figure 4.46 FAQ Page

Figure 4.46 shows the FAQ Page, which provides users with answers to frequently asked questions about Mapmory's features and usage. The questions are organised into expandable accordion-style cards grouped by topic, such as account management, memory creation, privacy controls, and AI features. This self-service support screen reduces the need for external assistance and helps new users quickly resolve common queries about how to use the application effectively.

4.7 Conclusion

This implementation chapter analyzed the development of the Mapmory system on various fronts, including but not limited to an execution platform, implementation tools, system interfaces, and critical functions. The system was developed on Windows 11 with Visual Studio Code used for coding, and it uses Android Studio for the Android emulator. The reviewed user interface components are fundamental for improving the design of user interaction and engagement while at the same time, the significant functions reviewed core functionalities such as user authentication and database management. This process will show how planning and organization are a critical part of software development and the practical use of coding techniques and tools.

5 FINDING

5.1 Introduction

This chapter presents the findings from the testing phase of the Mapmory mobile application. Testing is a critical stage in the software development lifecycle that ensures the system meets its functional and non-functional requirements as specified in Chapter 3. The testing approach adopted for Mapmory is consistent with the Agile methodology used throughout the project, where testing activities were carried out iteratively alongside development sprints rather than as a single final stage. The tests were designed to verify the correctness, performance, and reliability of each developed feature, from individual components to the integrated system and final user acceptance.

Four level of testing were conducted, which are unit testing, integration testing, system testing, and acceptance testing. The results of all testing activities are documented in this chapter, with test case tables, descriptions of outcomes, and analysis of feedback received.

5.2 Testing

Testing was conducted progressively throughout the development of Mapmory. Each sprint included a dedicated testing phase in which newly developed features were verified before integration with the rest of the system. This iterative approach minimised the accumulation of defects and ensured that corrections were made promptly.

5.3 Unit Testing

Unit testing is for verifying individual modules.

Table 5.1 Unit Testing

Test ID	Module	Test Description	Input	Expected Result	Status
UT01	Auth	Validate user login	Valid email & password	Login success, token generated	Pass
UT02	Auth	Invalid login credentials	Wrong password	Error message displayed	Pass
UT03	Auth	User registration	New user data	User created in database	Pass
UT04	Memory	Create memory	Valid data	Memory stored successfully	Pass
UT05	Memory	Retrieve memories	User ID	List of memories returned	Pass
UT06	Memory	Delete memory	Valid memory ID	Memory removed from database and map	Pass
UT07	Memory	Edit memory entry	Updated text and media	Memory updated and saved correctly	Pass
UT08	Map	Render map pins	List of memories with coordinates	All pins displayed at correct GPS positions	Pass
UT09	AI	Generate narrative	Location, weather, and timestamp data	AI narrative returned and stored in memory entry	Pass
UT10	Profile	Update user profile	New display name and avatar	Profile updated and reflected in UI	Pass

5.4 Integration Testing

Integration testing is used to confirm that components interact correctly.

Table 5.2 Integration Testing

Test ID	Module	Test Description	Expected Result	Status
IT01	Frontend-Backend	Login API call	Successful authentication	Pass
IT02	Backend-Database	Store user data	Data saved in database	Pass
IT03	Auth-Protected API	Access profile with token	Access granted	Pass
IT04	Memory-Database	Retrieve memory list	Correct data returned	Pass
IT05	Map-Memory	Display location data	Locations mapped correctly	Pass
IT06	Weather API-Memory	Fetch weather on memory creation	GPS coordinates passed to weather API	Pass
IT07	AI API-Memory	Trigger AI narrative generation	Memory metadata (location, weather, time)	Pass
IT08	Storage-Media Upload	Upload photo to Supabase Storage	Image file selected by user	Pass
IT09	Auth-Session Persistence	Verify session remains active after app restart	Valid user session token	Pass
IT10	Profile-Database	Update profile data	New display name submitted	Pass

5.5 System Testing

System testing was conducted to evaluate the complete application against all requirements.

Table 5.3 System Testing

Test ID	Feature Tested	Test Description	Expected Result	Status
ST01	User Registration and Login	New user registers with email and password, verifies account, and logs in successfully.	User account created, verification email sent, login redirects to homepage.	Pass
ST02	Interactive Map Display	User opens homepage; the map loads and correctly renders pinned memories at their geographic coordinates.	Map loads within 3 seconds; pins are displayed at correct locations.	Pass
ST03	Memory Creation with Context	User taps a location on the map to add a memory; application auto-captures GPS coordinates, timestamp, and weather data, then prompts media upload.	Memory entry saved with correct location, time, and weather metadata; media attached successfully.	Pass
ST04	AI-Generated Storytelling	Upon memory creation, the AI module generates a narrative based on available contextual metadata.	A coherent, contextually relevant narrative is generated and displayed within the memory entry.	Pass
ST05	Privacy Settings	User sets a memory to Private; the entry should not appear in any public or shared views.	Memory hidden from public and shared views; visible only to the owner.	Pass
ST06	Search and Filter	User applies filters by date and emotion tag to retrieve specific memories from the memory list.	Filtered results returned correctly; only entries matching all criteria are displayed.	Pass

ST07	Emotion Tagging	User attaches an emotion tag (e.g., Happy) to a memory entry during creation.	Emotion tag saved with the memory; visible on the memory card and functions correctly as a filter in the Explore Page.	Pass
ST08	Profile Management	User updates their display name and profile picture from the Profile Page.	Updated name and avatar reflected immediately across the application, including the map header and memory cards.	Pass
ST09	Context-Aware Notification	Application detects that the user has re-entered a previously visited location and triggers a location-based notification.	Push notification delivered successfully, prompting the user to add or revisit a memory at that location.	Pass
ST10	Data Persistence	User creates a memory, closes the application, then reopens it after several minutes.	All previously created memories retrieved from Supabase and displayed correctly on the map without data loss.	Pass

5.6 Acceptance Testing

Acceptance testing was done to gather feedback from both the client and end users.

5.6.1 Client Acceptance Testing

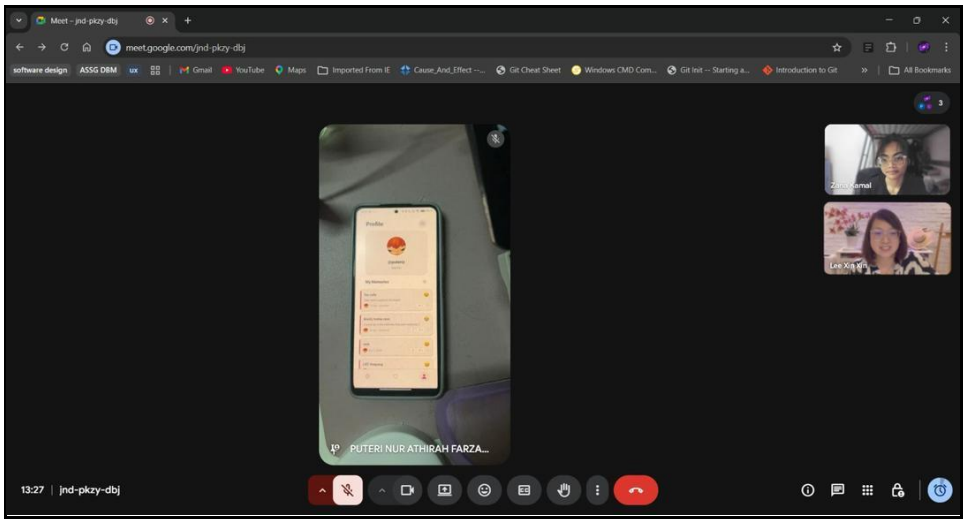


Figure 5.1 Google Meet with client

Client acceptance testing was conducted in collaboration with the project client, Zafigo. A formal review session was arranged in which the completed Mapmory application was demonstrated to the client's representatives. The client evaluated the application against the initial project requirements and expectations discussed during the planning phase. Key areas assessed included the quality of the interactive map interface, the accuracy of contextual data capture (GPS, weather, timestamps), the usability of the memory creation workflow, and the overall visual design of the application.

The client confirmed that Mapmory satisfactorily meets the agreed requirements. Positive feedback was received regarding the seamless integration of multimedia content with the map interface, and the AI-generated narrative feature was noted as a differentiating strength of the application. The client suggested that future versions could explore integration with the Zafigo platform to allow user-generated stories to be featured on the publication. These suggestions have been recorded in the Future Work section of Chapter 6. Overall, the client formally approved the application as meeting the project deliverables

5.6.2 User Acceptance Testing

User Acceptance Testing (UAT) was carried out to validate that the Mapmory application satisfies the needs and expectations of its intended end users. A post-usage questionnaire was distributed to a group of target users who were given access to the application on their personal devices. Participants were asked to interact with the core features of the application, including creating a memory, browsing the map, and viewing AI-generated narratives, and then complete a structured feedback form. A total of 20 users participated in the UAT session.

5.6.2.1 Post-Development Questionnaire Analysis

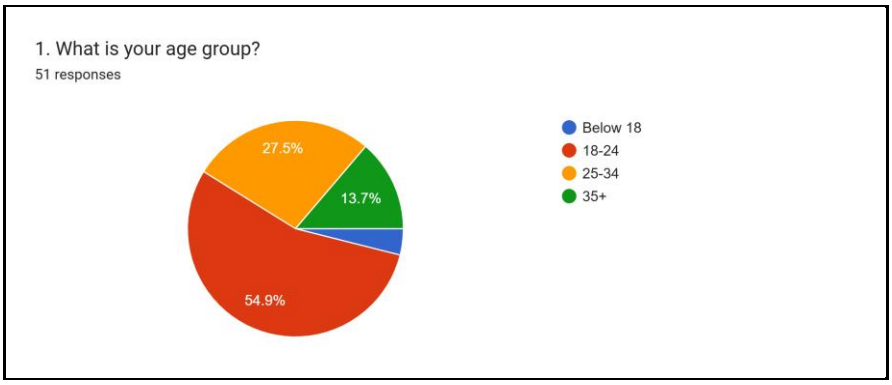


Figure 5.2 Question 1

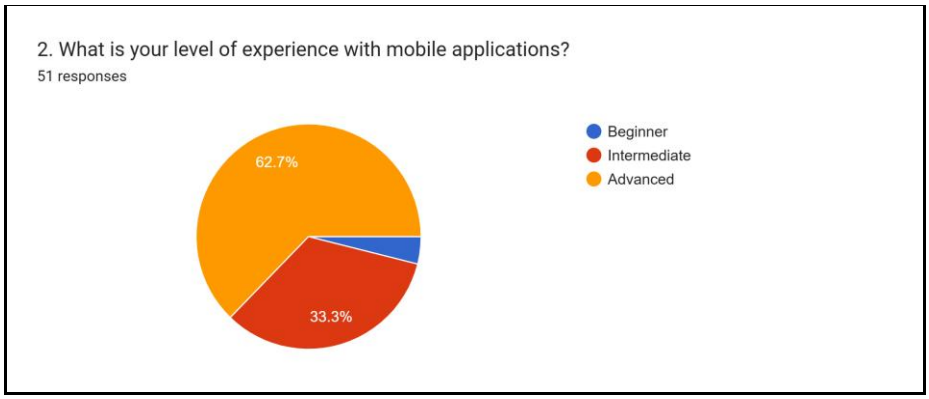


Figure 5.3 Question 2

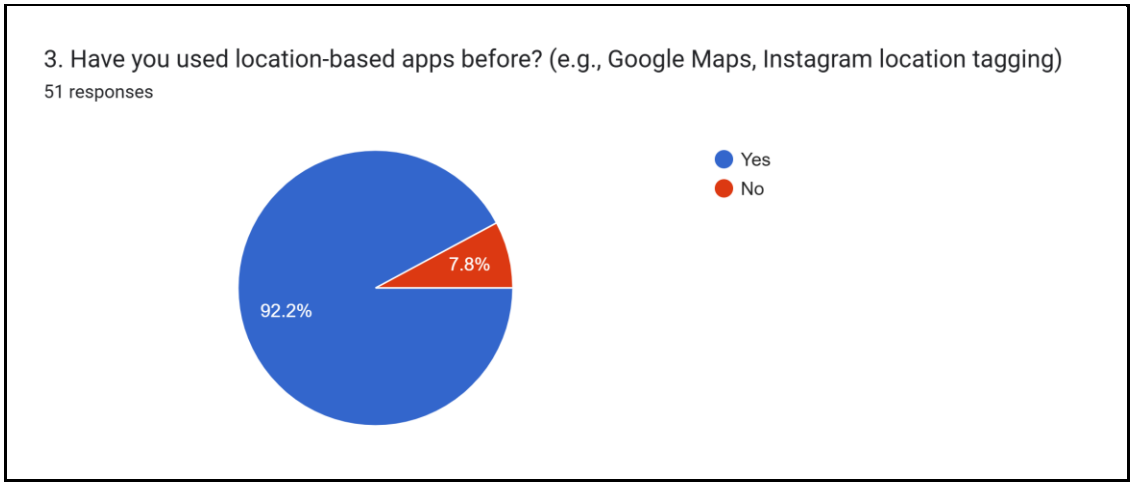


Figure 5.4 Question 3

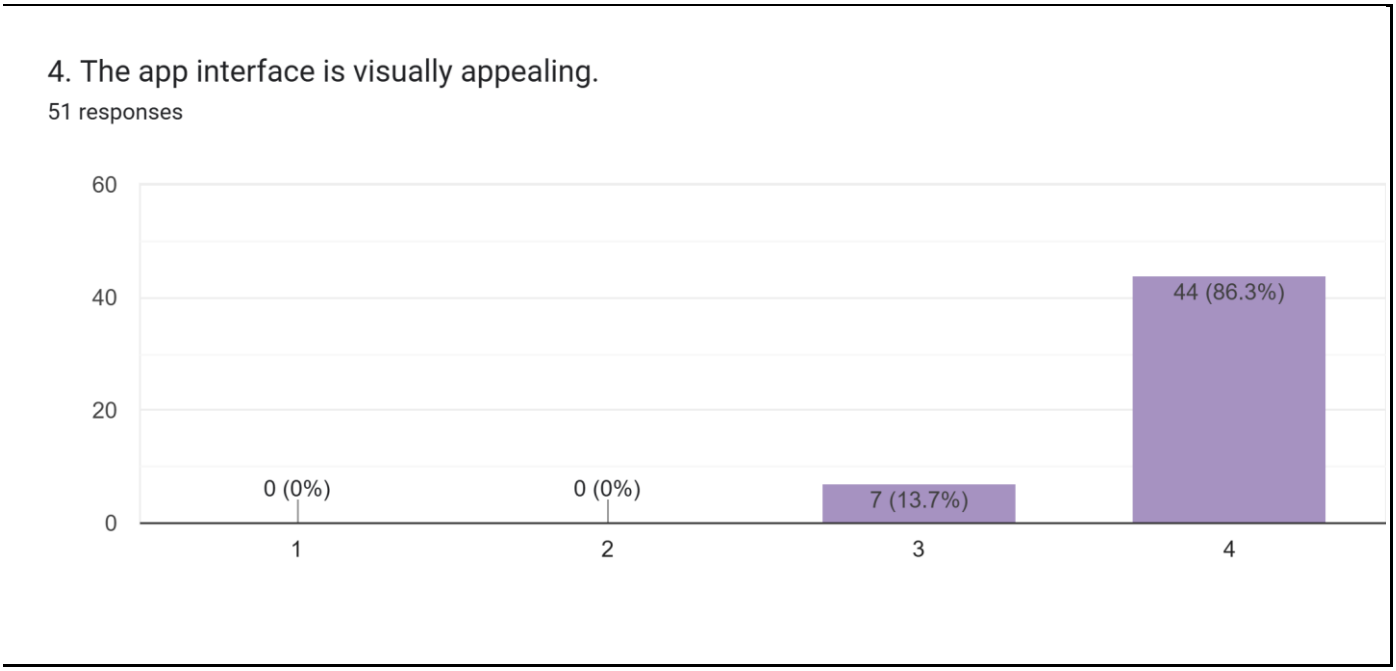


Figure 5.5 Question 4

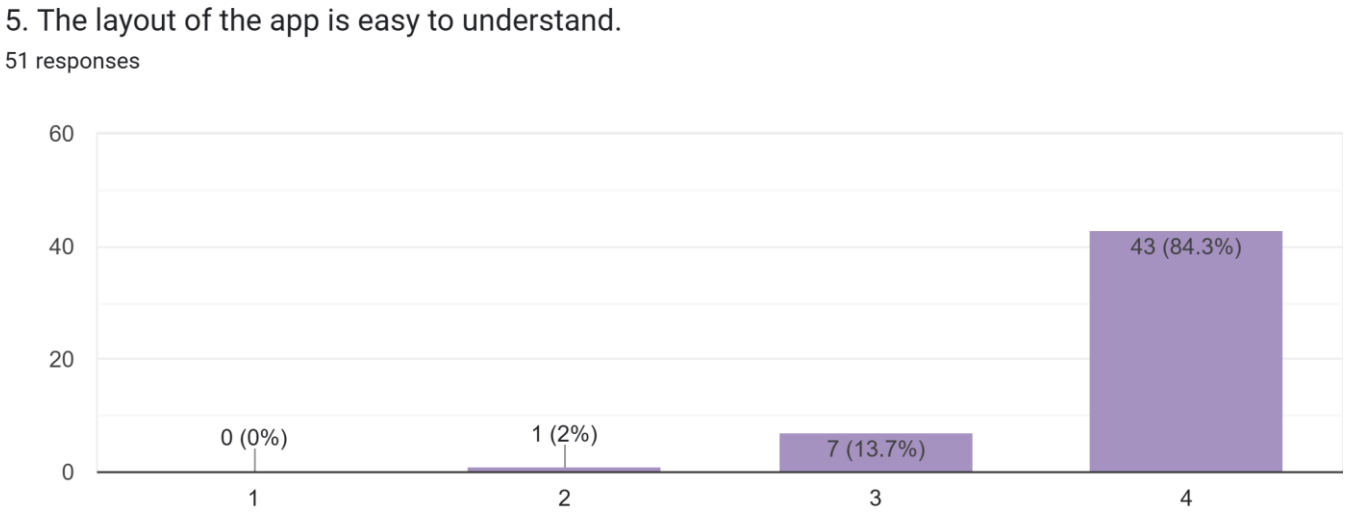


Figure 5.6 Question 5

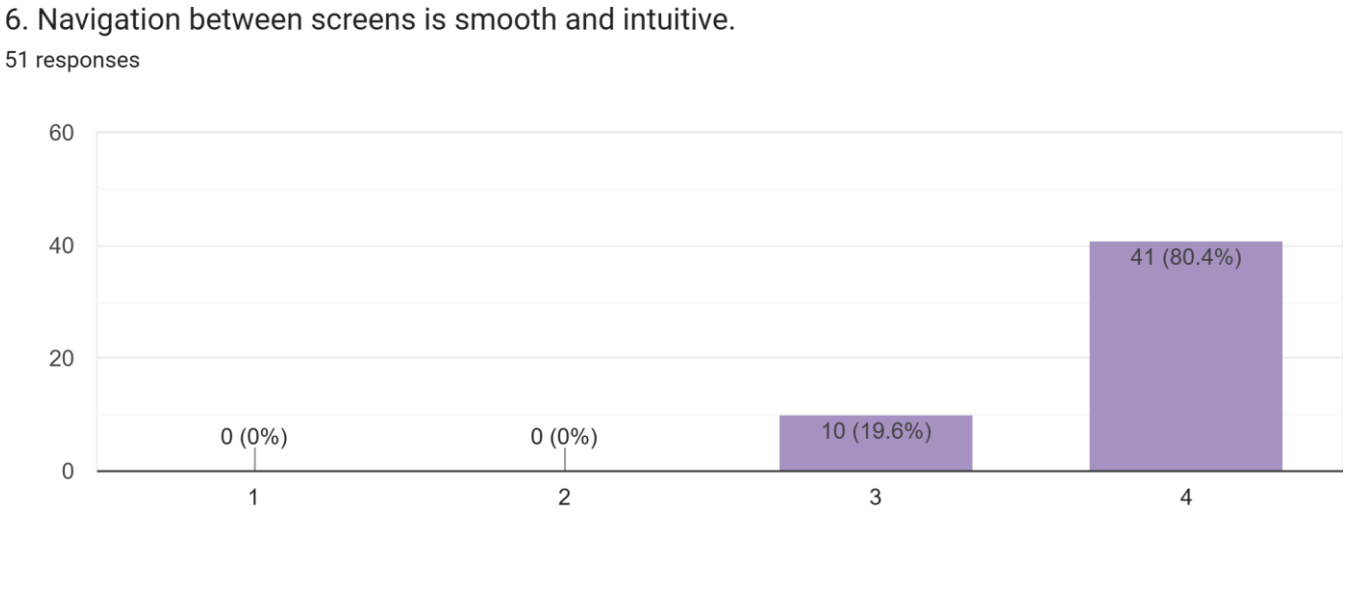


Figure 5.7 Question 6

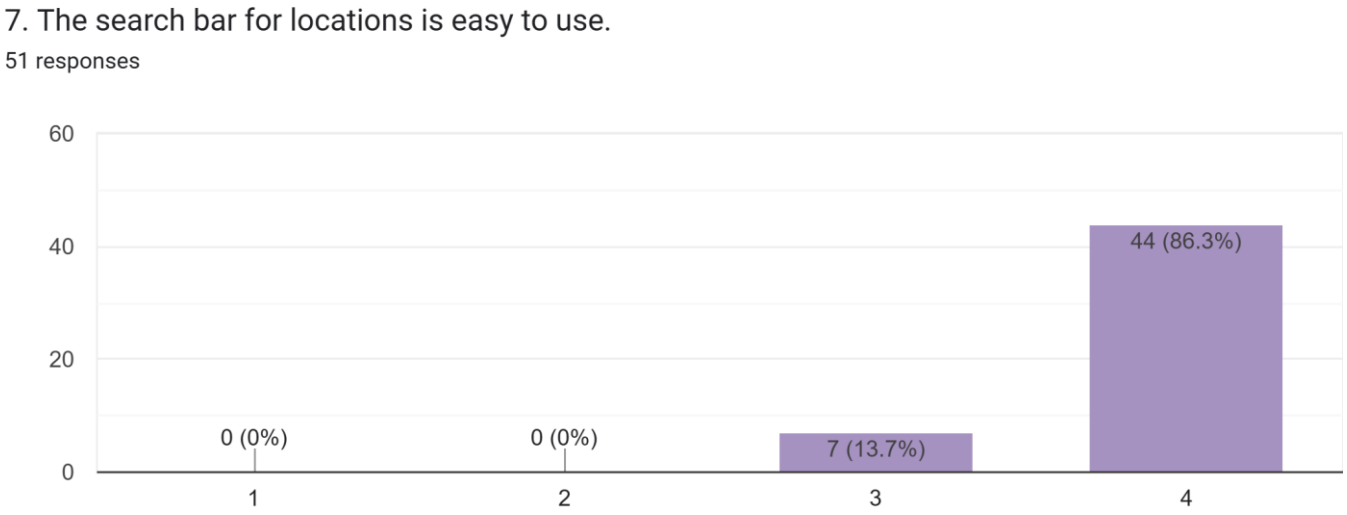


Figure 5.8 Question 7

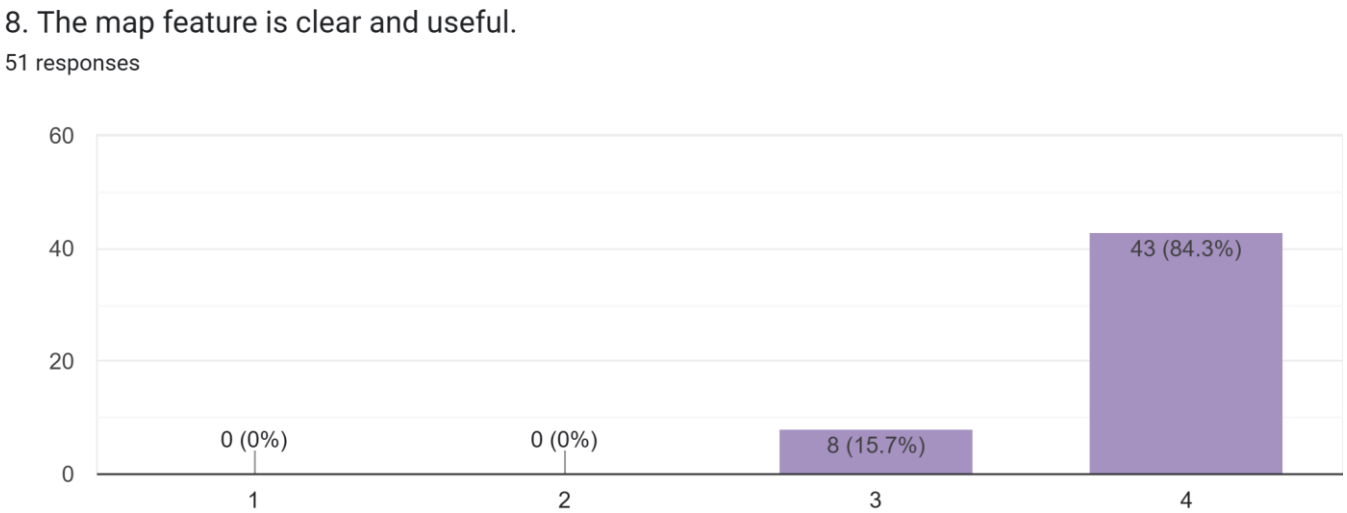


Figure 5.9 Question 8

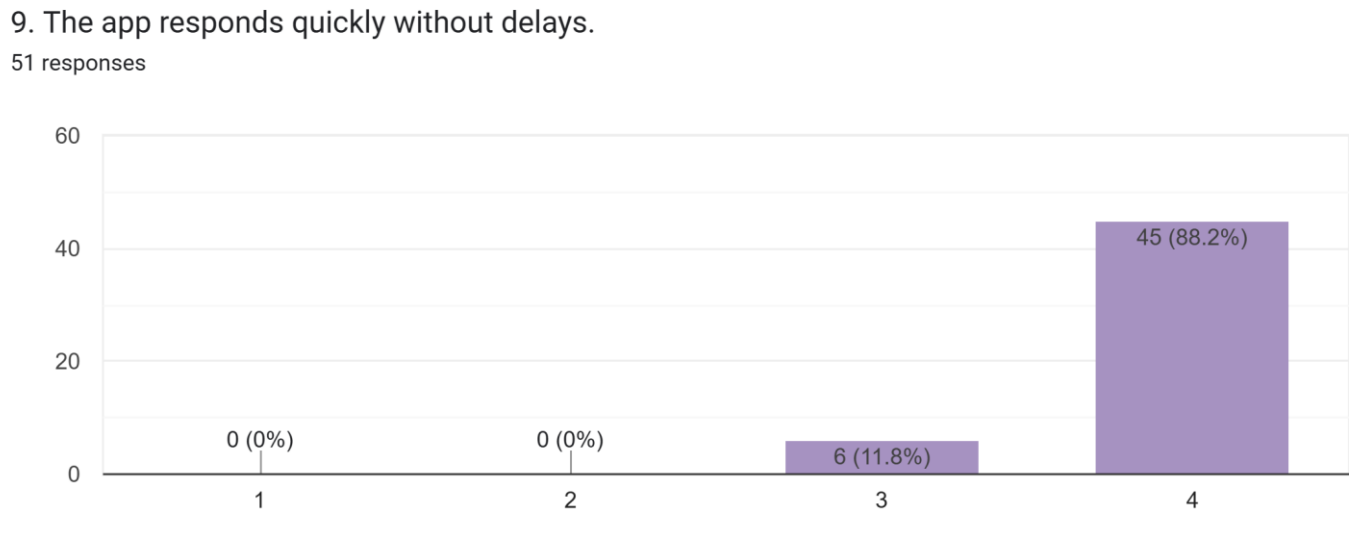


Figure 5.10 Question 9

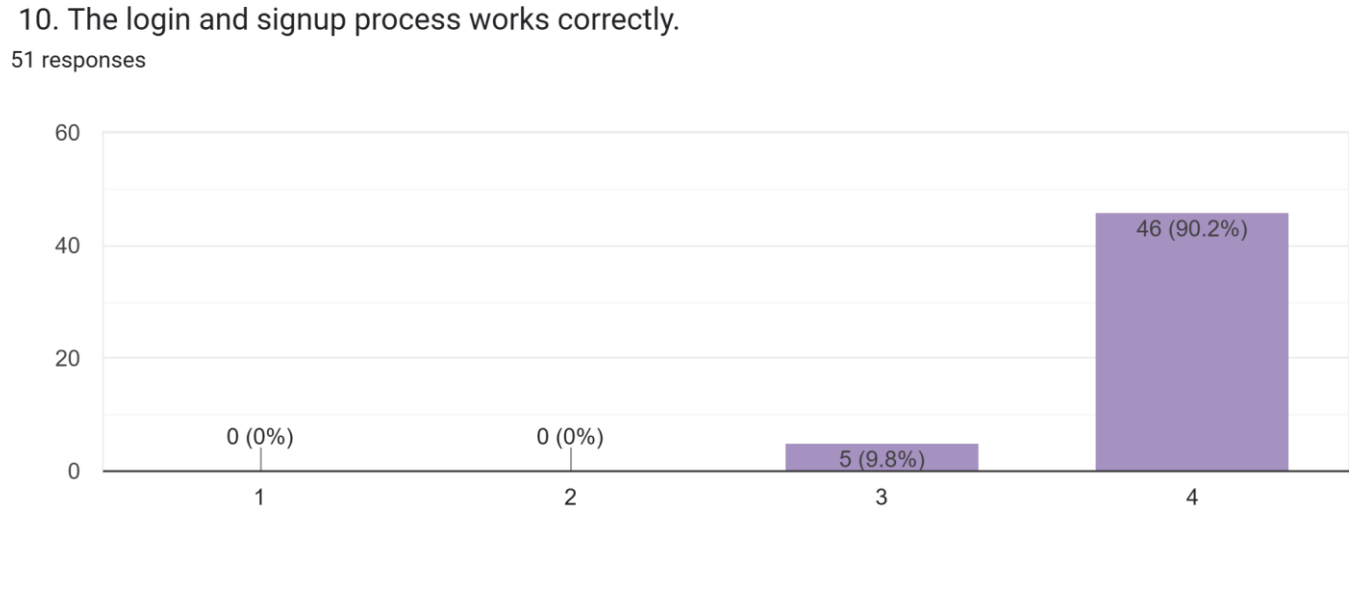


Figure 5.11 Question 10

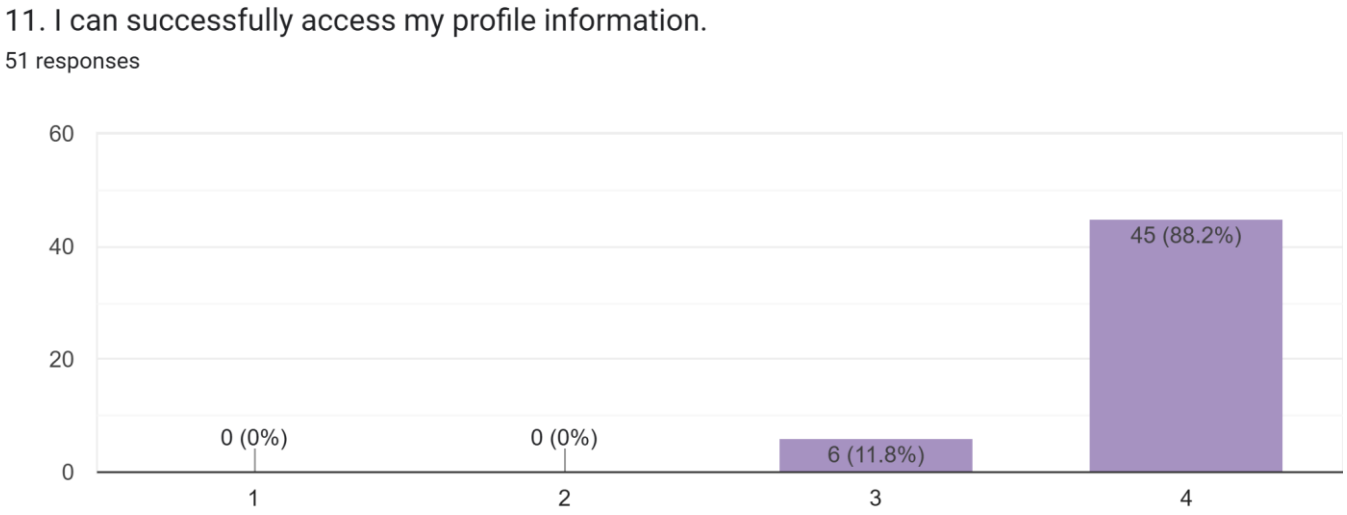


Figure 5.12 Question 11

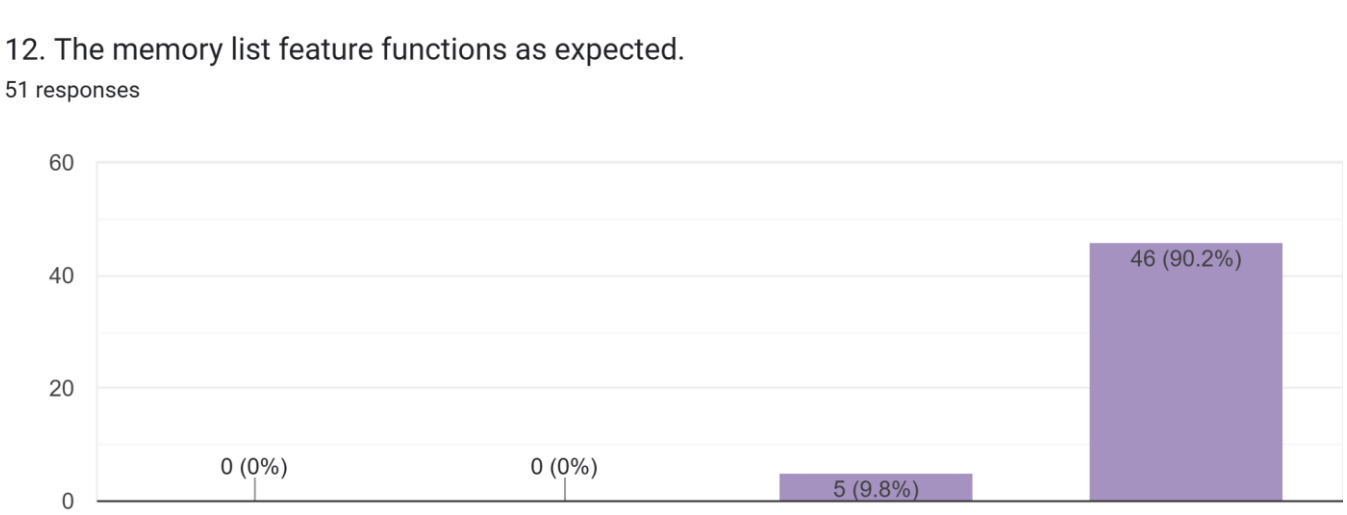


Figure 5.13 Question 12

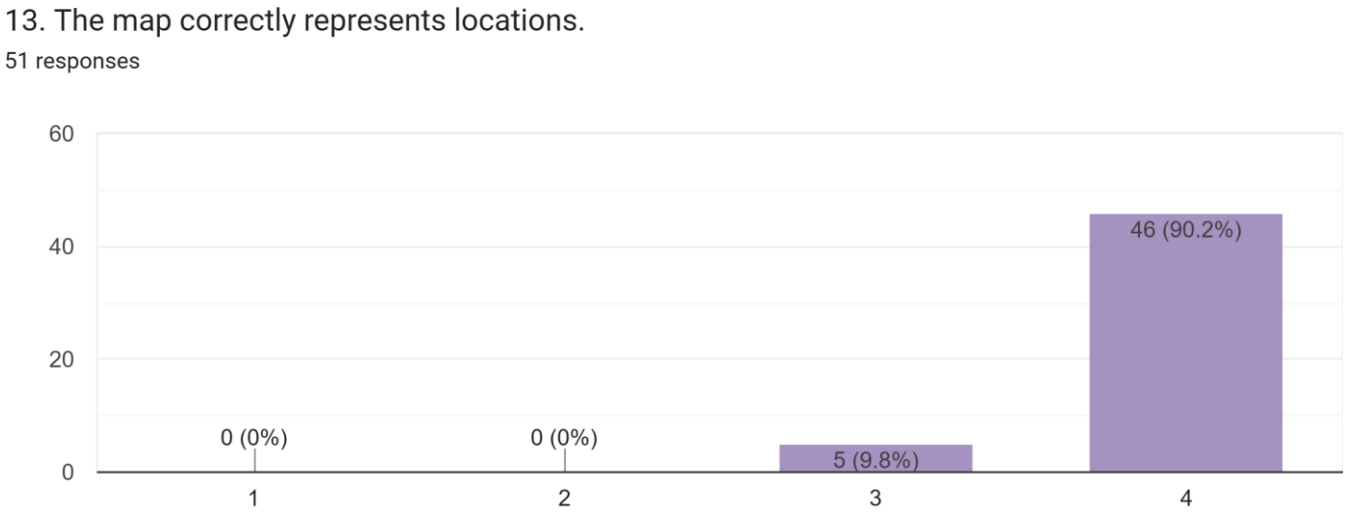


Figure 5.14 Question 13

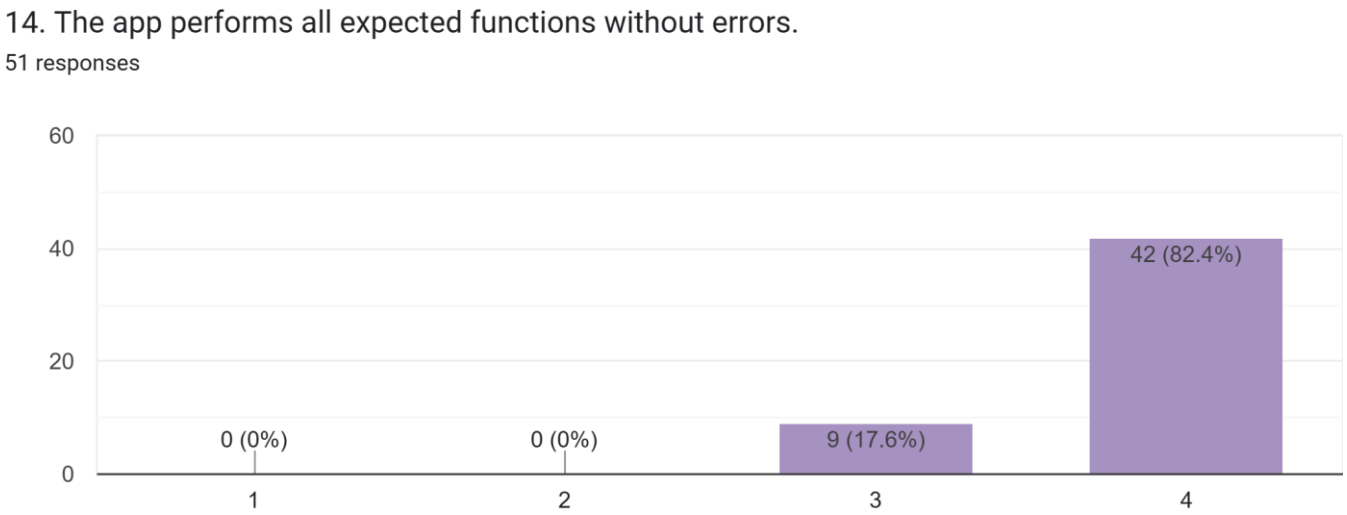


Figure 5.15 Question 14

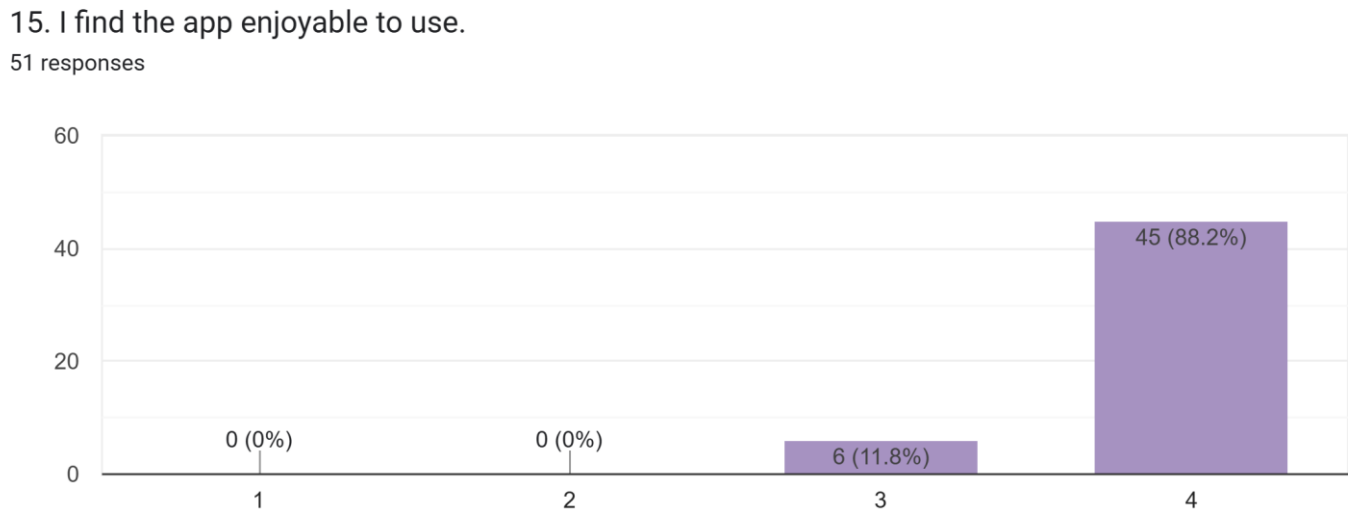


Figure 5.16 Question 15

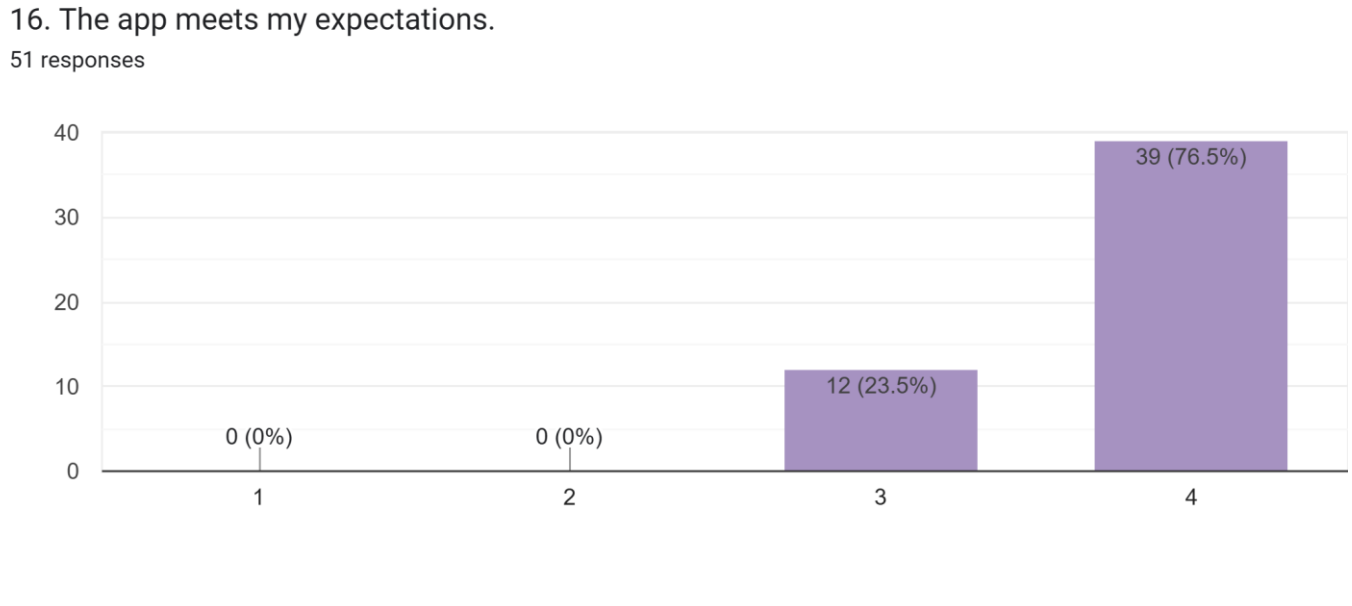


Figure 5.17 Question 16

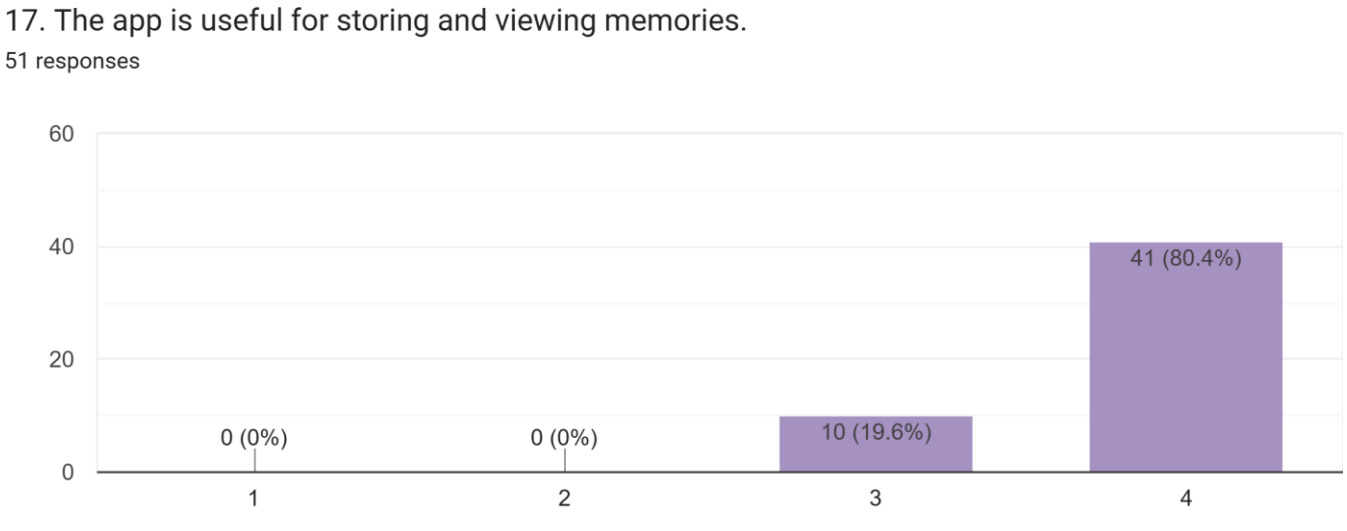


Figure 5.18 Question 17

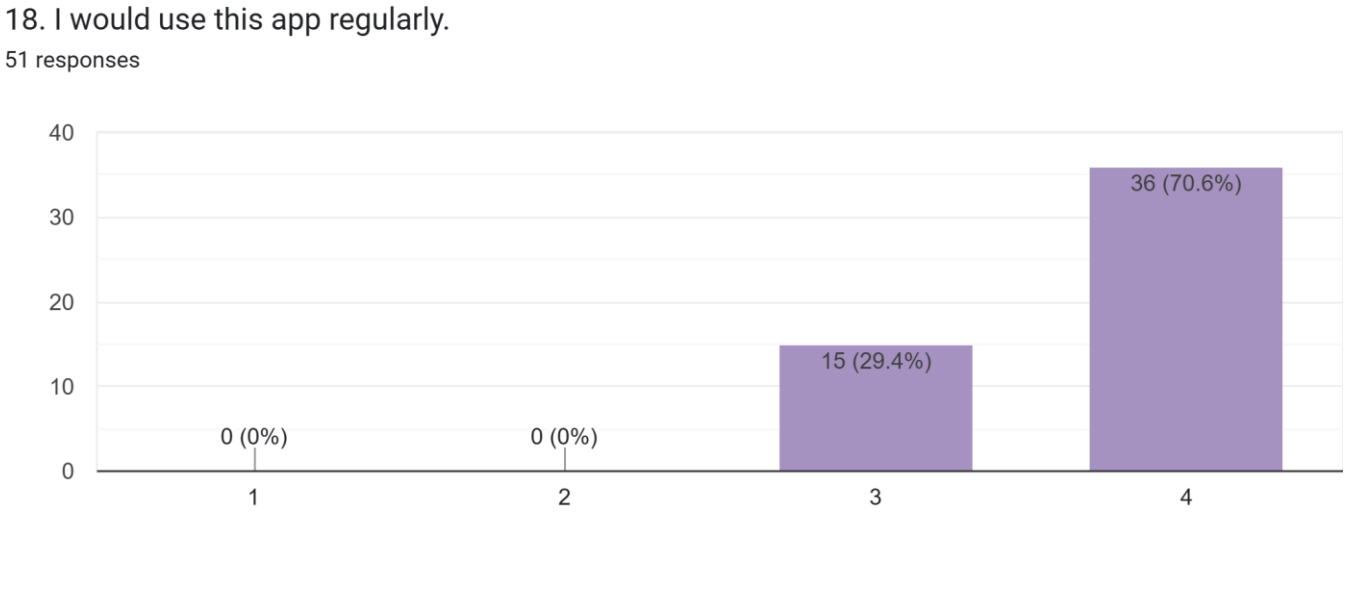


Figure 5.19 Question 18

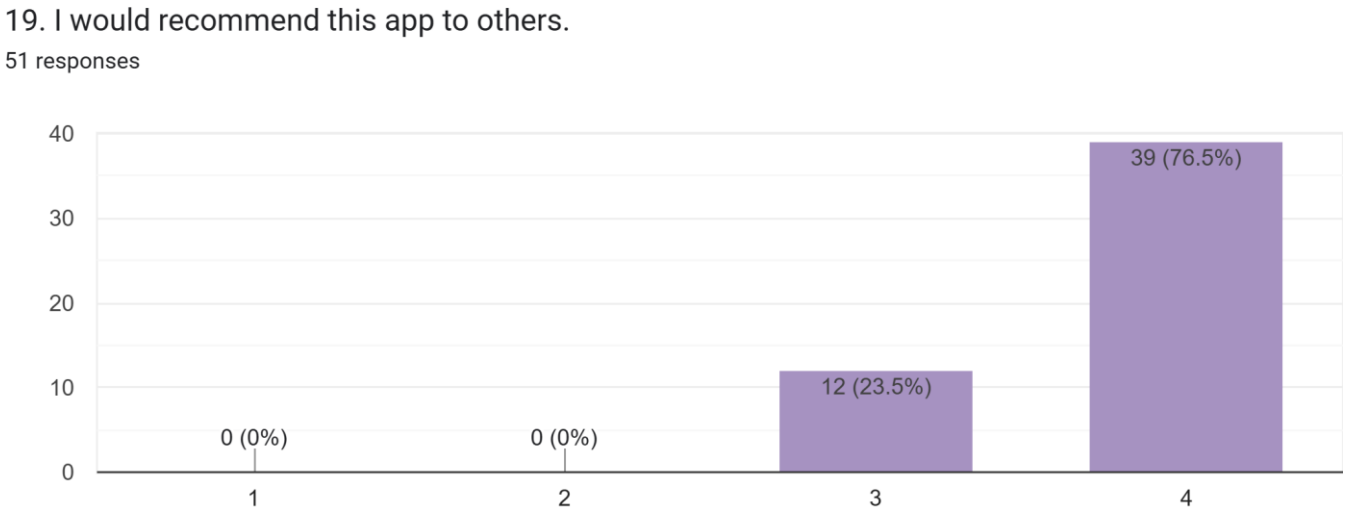


Figure 5.20 Question 19

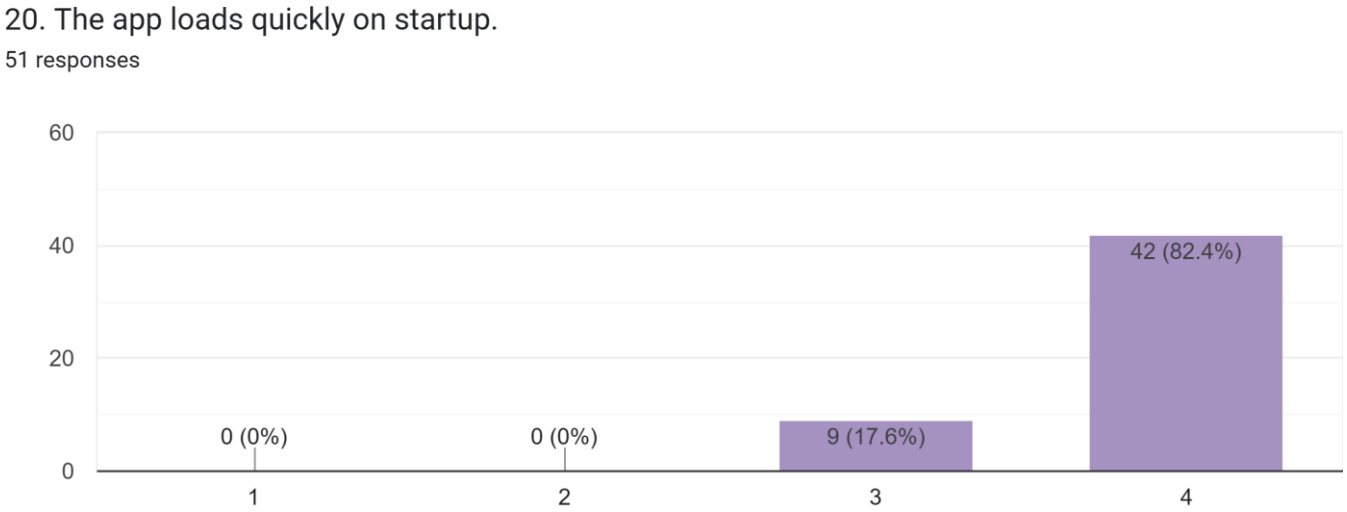


Figure 5.21 Question 20

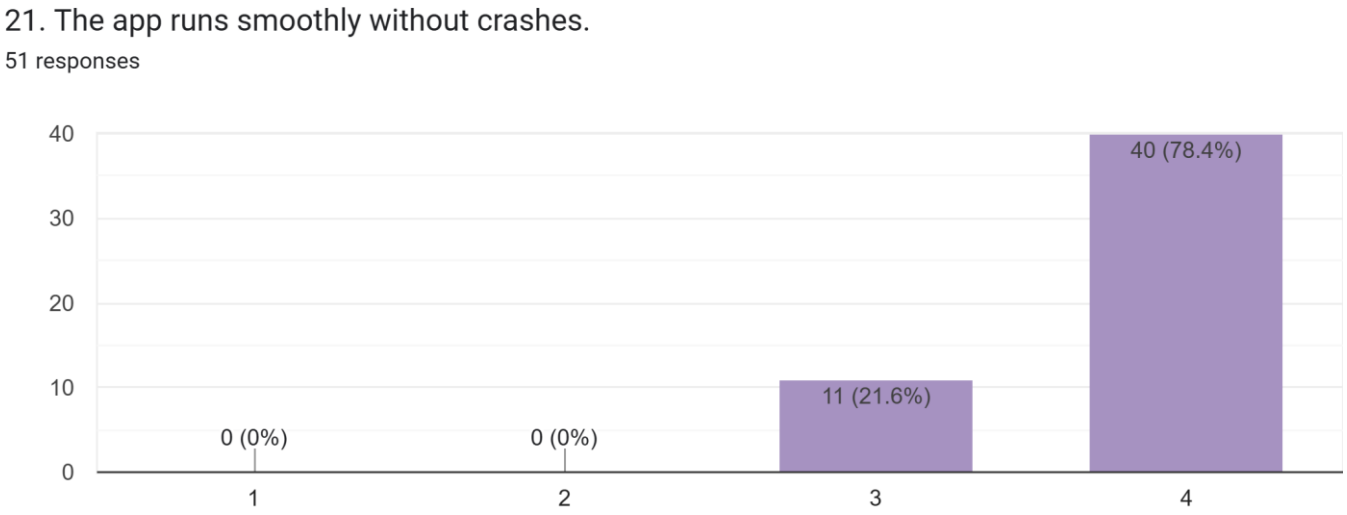


Figure 5.22 Question 21

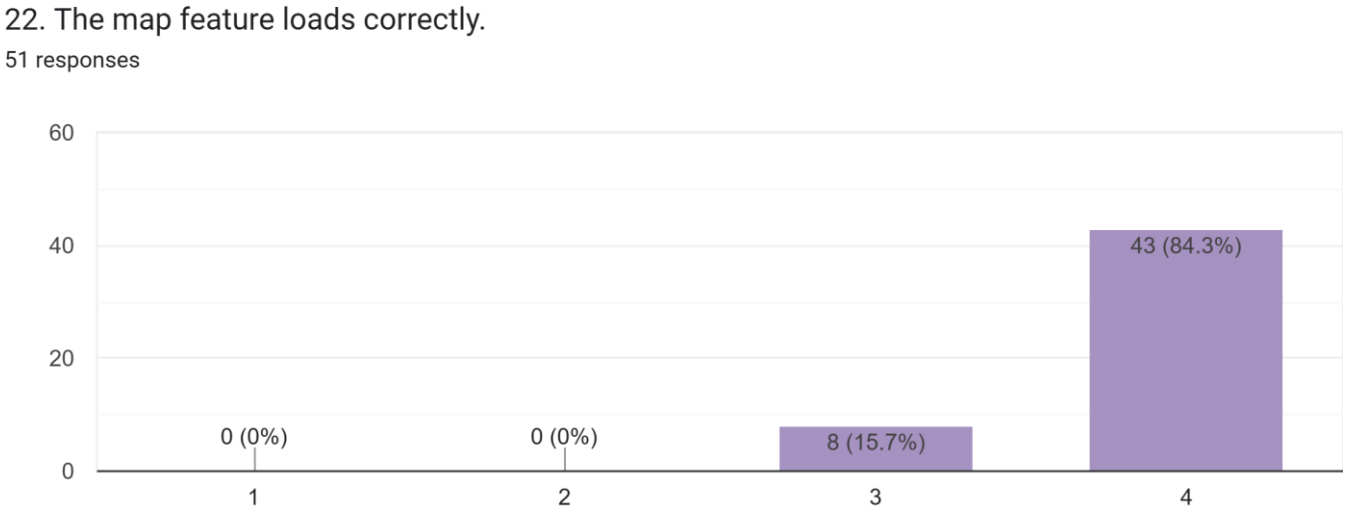


Figure 5.23 Question 22

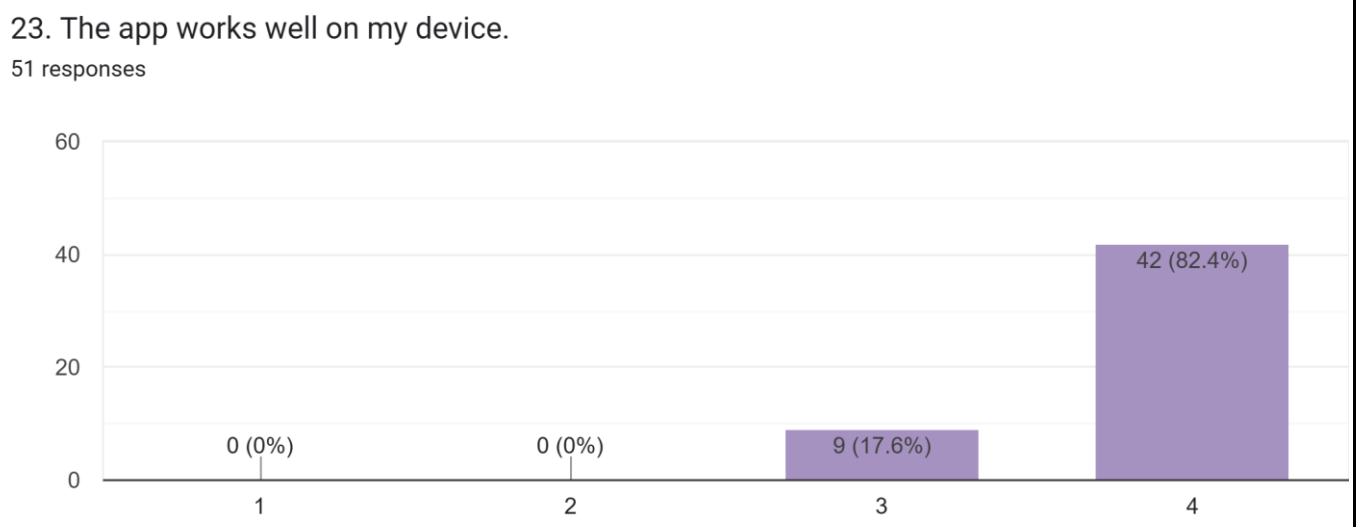


Figure 5.24 Question 23

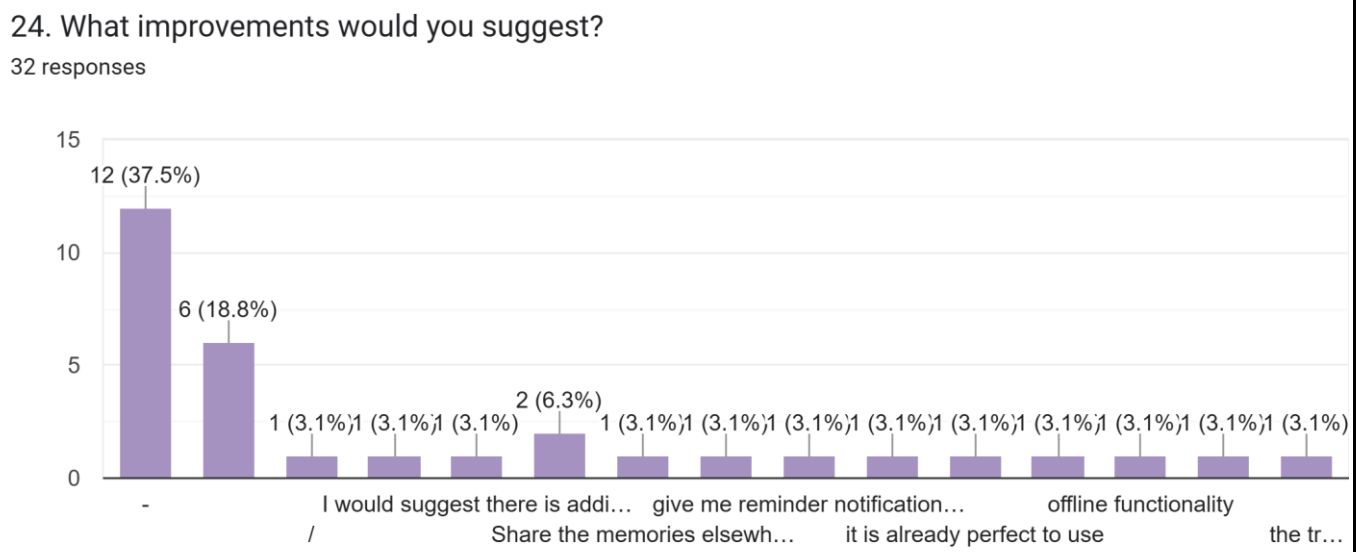


Figure 5.25 Question 24

Mapmory achieved an average score of 3.83 out of 4 (95.8% satisfaction) across 20 functional and UX questions. Users found the app visually appealing, easy to use, and highly useful for storing location-based memories.

Table 5.4 Key Metrics and Result

Metric	Result
Overall Satisfaction	3.83/4.00
Users who would recommend	3.76/4.00
Users who would use regularly	3.69/4.00
Login and profile access	3.94/4.00
Map accuracy and loading	3.86/4.00
Usefulness for memories	3.88/4.00

The app delivers a stable, visually appealing, and functionally reliable experience that fulfills its promise of helping users store and revisit location-tagged memories. User feedback is overwhelmingly positive, with no critical blockers identified.

5.7 Conclusion

This chapter documented the testing activities conducted throughout the development of Mapmory, covering unit testing, integration testing, system testing, and user acceptance testing. All test cases produced passing results, confirming that the application functions correctly and meets the requirements defined in Chapter 3. Unit tests verified the correctness of individual modules, while integration tests confirmed that components communicate effectively. System testing validated the end-to-end functionality of the application against all core requirements, and acceptance testing demonstrated that both the client and end users are satisfied with the delivered product.

The testing phase demonstrated that Mapmory is a stable, functional, and user-centred application. Feedback gathered during acceptance testing has been incorporated into the recommendations for future development, which are discussed in the following chapter.

6 CONCLUSION

6.1 Introduction

Throughout the two semesters of this project, Mapmory evolved from an initial concept addressing gaps in travel memory preservation into a fully functional Android mobile application. The development process adhered to the Agile methodology, allowing for iterative refinement and continuous alignment with user and client requirements. The final product successfully integrates interactive map-based memory logging, contextual data enrichment through GPS, weather, and timestamps, and AI-generated storytelling into a cohesive and user-friendly application built with React Native and Supabase.

6.2 Project Schedule

This section presents the project schedule for Mapmory, comprising the Work Breakdown Structure (WBS) and Gantt Chart developed to guide the allocation of tasks and timelines across both semesters of the project

6.2.1 Work Breakdown Structure

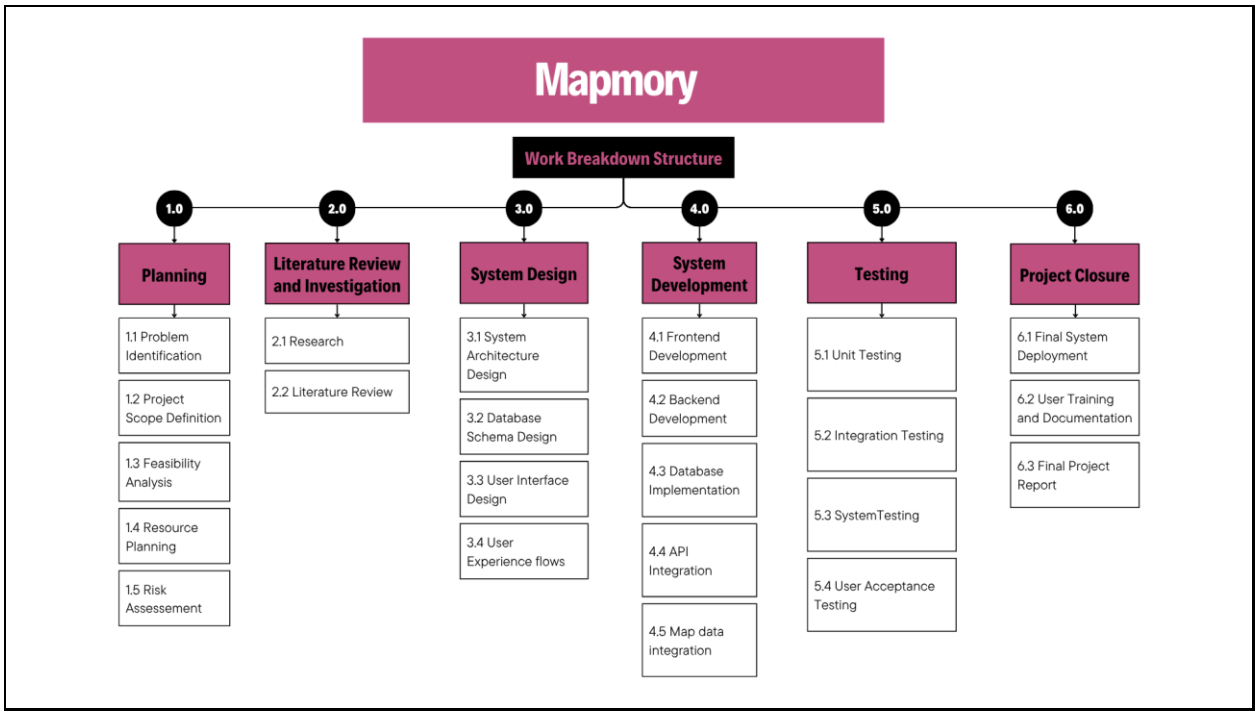


Figure 6.1 Work Breakdown Structure diagram

The Work Breakdown Structure (WBS) for Mapmory organizes the project into five key phases. It begins with Planning, covering problem identification, scope definition, feasibility analysis, resource planning, and risk assessment. Next, Literature Review and Investigation focus on background research and reviewing existing work. The System Design phase includes system architecture, database schema, user interface, and UX flows. This is followed by System Development, which involves frontend and backend development, database implementation, API integration, and map data integration. Finally, Testing ensures quality through unit, integration, system, and user acceptance testing. This structured approach ensures the project progresses logically from concept to a fully tested, functional mobile application.

6.2.2 Gantt Chart

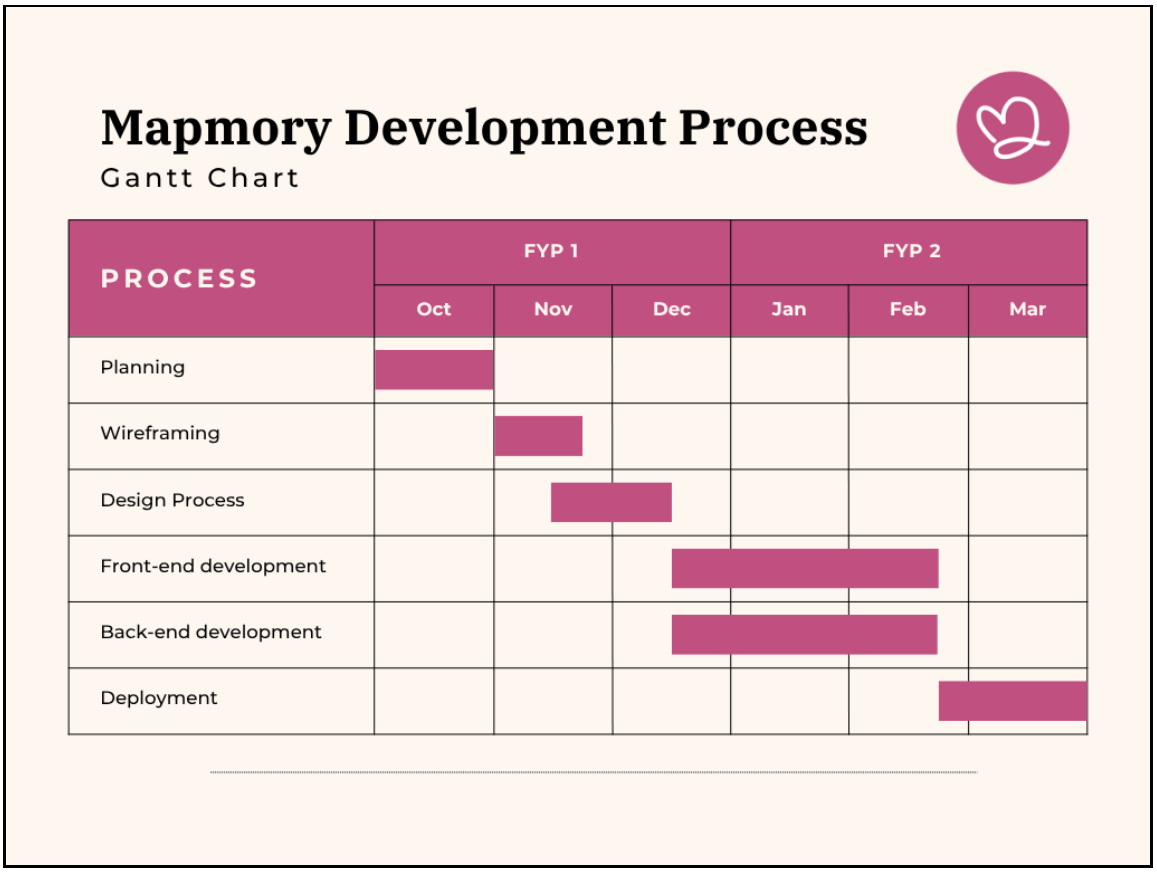


Figure 6.2 Gantt Chart

The Gantt chart for the Mapmory development process outlines a timeline spanning two academic semesters, FYP 1 and FYP 2, from October through March. During FYP 1 (October to January), the project begins with Planning, followed by Wireframing and the Design Process, which are all completed before the semester ends. Front-end development also starts in FYP 1 and continues into FYP 2 (February to March). In FYP 2, the remaining technical work takes place: Back-end development and Deployment, both of which are completed by March. This schedule shows a logical progression from planning and design in the first semester to full development and deployment in the second semester.

6.3 Risk Management

Risk management was conducted as an ongoing activity throughout both semesters of the Mapmory project. Key risks were identified at the outset of each semester and reviewed during each sprint retrospective to assess whether mitigation strategies remained effective.

Table 6.1 Risk Management

Risk Identification	Risk Analysis	Mitigation Plan
Third-party API dependency failure	External services for weather data, GPS, or AI narrative generation could become unavailable or alter their pricing and access policies	Selecting APIs with generous free tiers sufficient for the project scope, and by implementing error handling and fallback logic
Scope Creep	Additional feature requests could jeopardise delivery timelines	Strict adherence to the project scope defined in Chapter 1, with non-essential features deferred to the Future Work section
Data privacy and security vulnerability	Storage of user location data and personal media	Addressed through Supabase's Row Level Security (RLS) policies, HTTPS-enforced API communication, and JWT-based session authentication.

6.4 Achievement

This section evaluates the extent to which each of the three project objectives defined in Chapter 1 has been achieved through the development and delivery of Mapmory.

6.4.1 To design an interactive map that organizes multimedia entries geographically

The first objective was to design an interactive map that organises multimedia entries geographically. This objective has been fully achieved. Mapmory's core interface is a dynamic, interactive map on which all user memories are represented as geographic pins. Each pin is linked to the exact GPS coordinates at which the memory was created. Users can tap any pin to view the associated multimedia content, including photos, videos, personal notes, and the AI-generated narrative. The

map interface supports standard touch gestures such as pinch-to-zoom and pan, enabling intuitive exploration of past journeys. The geographic organisation of memories provides users with a spatial narrative of their travel experiences, making it significantly easier to revisit and contextualise specific moments compared to a traditional linear journal or photo gallery.

6.4.2 To develop an application that captures and stores travel experiences with timestamps, weather data, and AI-generated storytelling

The second objective was to develop an application that captures and stores travel experiences with timestamps, weather data, and AI-generated storytelling. This objective has been fully achieved. The Mapmory application automatically captures the current GPS coordinates and timestamp at the moment a memory entry is initiated. Real-time weather data for the recorded location is retrieved via a third-party weather API and stored alongside the memory. An AI module processes the available contextual metadata and generates a personalised narrative that enriches the entry with descriptive and emotionally resonant language. This automated contextual enrichment eliminates the burden of manual journaling while ensuring that memories are preserved with greater depth and accuracy than conventional photo storage methods would allow. The application also enables users to attach additional media, apply emotion tags, and configure privacy settings, further enhancing the richness and personalisation of each stored experience.

6.4.3 To integrate media into a map-based digital travel journal enhanced by AI narratives

The third objective was to integrate media into a map-based digital travel journal enhanced by AI narratives. This objective has been fully achieved. Mapmory supports the upload and storage of multiple media types within a single memory entry, including photographs and short video clips, all of which are stored securely via Supabase Storage and referenced through the database. Media content is rendered directly within the map pin view, allowing users to experience a rich, multimedia replay of their memories without leaving the map interface. The AI storytelling layer complements the media by providing narrative context that transforms isolated images and data points into cohesive, vivid travel stories. Together, these features realise the project's vision of a unified, immersive digital journal that preserves not just what users saw, but the atmosphere, emotion, and context of the moment.

6.5 Constraint and Limitation

Several constraints and limitations were encountered during the development and deployment of Mapmory. The first constraint was platform testing coverage. While Mapmory was designed for both Android and iOS using React Native, physical testing was primarily conducted on Android devices due to the unavailability of an Apple developer account during the project period. iOS-specific behaviours, such as

differences in GPS permission handling and background app refresh, could not be fully verified, and some visual inconsistencies may be present on iOS devices that were not detected during testing.

The second limitation was the reliance on third-party APIs for weather data and AI narrative generation. These services are subject to rate limits and usage policies that may restrict the frequency of API calls under high-load conditions. Additionally, the quality of AI-generated narratives is dependent on the volume and accuracy of contextual metadata provided, meaning entries with minimal data may yield less descriptive narratives.

The third constraint was the scope of social and collaborative features. While the product scope defined in Chapter 1 included group memory creation and shared travel journals, these features were deferred to future development due to time constraints. The current version of Mapmory focuses on individual memory logging and viewing, with sharing limited to privacy setting configurations. Finally, the application requires a stable internet connection for full functionality, as GPS-triggered weather lookups and AI narrative generation are cloud-dependent. Offline memory drafting with deferred synchronisation was not implemented in this version.

6.6 Future Work and Recommendation

Several directions for future development and enhancement have been identified based on the constraints encountered during this project, user feedback gathered during acceptance testing, and the broader product vision for Mapmory.

The first recommendation is to implement collaborative and group memory features. As identified in the product scope, the ability for users to create shared travel journals with friends or travel companions was deferred from the current version. Future development should prioritise this feature, enabling multiple users to contribute memories to a single shared map, which would significantly enhance the social value of the application.

The second recommendation is to develop offline functionality with background synchronisation. Implementing local data caching would allow users to draft memory entries without an internet connection, with the data synchronised to the cloud once connectivity is restored. This improvement would be particularly valuable for travellers in remote areas or international roaming conditions where data access is limited.

The third recommendation is to enhance the AI storytelling capability. Future iterations could incorporate more sophisticated natural language generation models fine-tuned on travel writing, allowing

the AI to produce longer-form narratives or personalised travel summaries at the end of each trip. Sentiment analysis of user-written notes could also be used to infer emotional tone and improve narrative quality.

The fourth recommendation is integration with the client platform, Zafigo. As suggested by the client during acceptance testing, future versions of Mapmory could incorporate an opt-in feature allowing users to submit curated public memories or travel stories directly to the Zafigo publication platform, creating a symbiotic content pipeline between the application and the client's editorial ecosystem. Finally, full iOS testing and deployment via the Apple App Store should be completed in the next development phase, ensuring that Mapmory is accessible to the full cross-platform audience it was designed to serve.

6.7 Conclusion

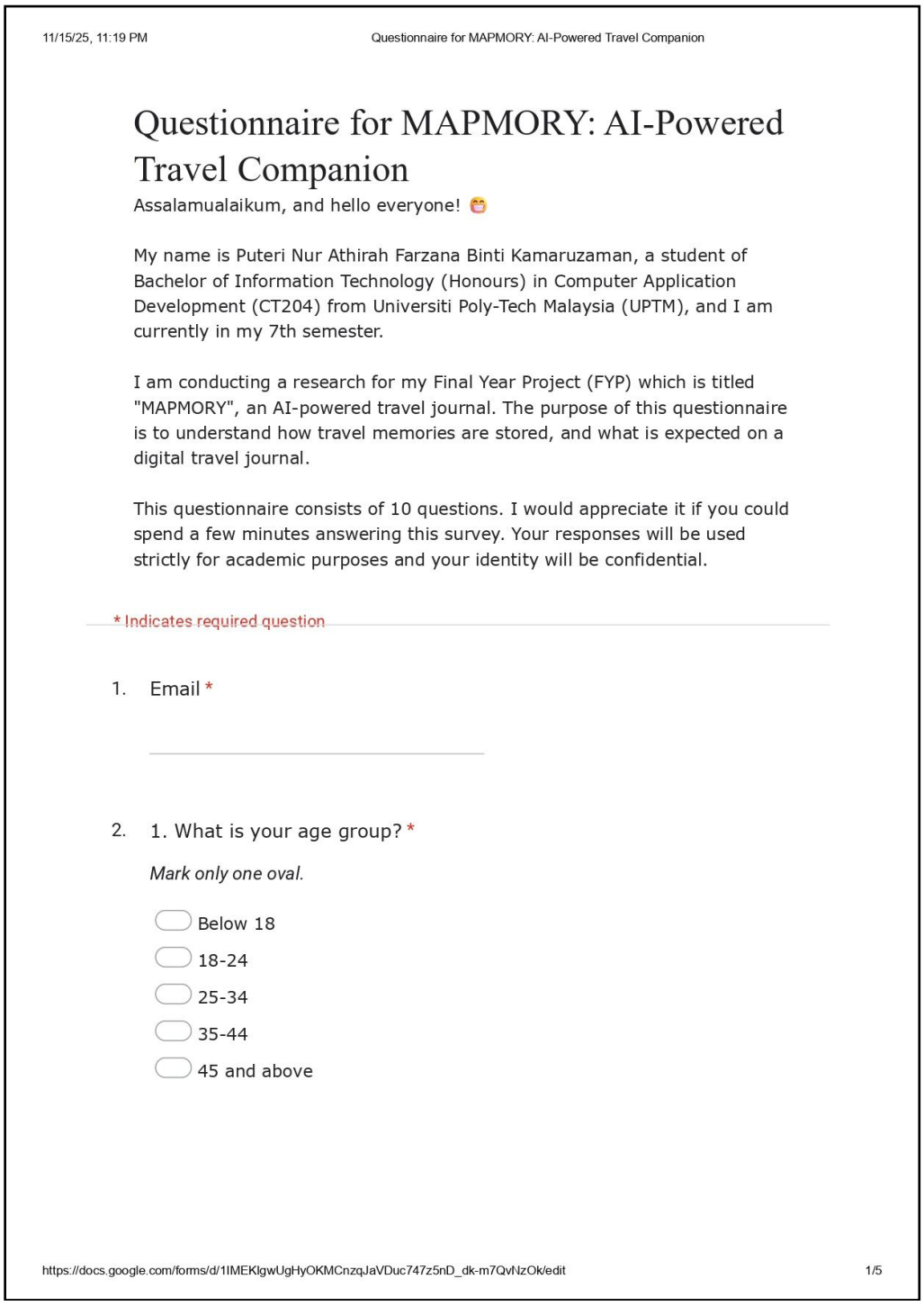
Mapmory was conceived to address a clear gap in how travellers document and revisit their experiences, one where contextual richness, geographic organisation, and emotional resonance are too often sacrificed to the limitations of conventional photo galleries and social media posts. Over the course of two academic semesters, this project successfully delivered an Android mobile application that realises its intended vision through the integration of GPS-based memory logging, real-time weather data, AI-generated storytelling, and an interactive map-based journal interface.

All three project objectives were fully achieved. An interactive map interface that organises multimedia entries geographically was designed and implemented. An application that automatically captures timestamps, weather data, and AI-generated narratives was developed and validated. Multimedia content was successfully integrated into a map-based digital travel journal enhanced by contextually generated AI stories. Testing across all four levels confirmed the system's functional correctness, reliability, and usability, and both client and user acceptance testing produced positive outcomes.

The development of Mapmory provided valuable practical experience in Android mobile development, cloud backend integration, API orchestration, and user-centred design. While certain features such as collaborative memory sharing and offline functionality were deferred to future iterations, the core deliverable represents a robust and meaningful foundation for continued development. With the recommendations outlined in this chapter, Mapmory has strong potential to grow into a fully featured travel journaling platform that can benefit a wide community of travellers and align with the content and engagement goals of its client, Zafigo.

Appendix A – Requirements Specification Document

Questionnaire



11/15/25, 11:19 PM Questionnaire for MAPMORY: AI-Powered Travel Companion

Questionnaire for MAPMORY: AI-Powered Travel Companion

Assalamualaikum, and hello everyone!

My name is Puteri Nur Athirah Farzana Binti Kamaruzaman, a student of Bachelor of Information Technology (Honours) in Computer Application Development (CT204) from Universiti Poly-Tech Malaysia (UPTM), and I am currently in my 7th semester.

I am conducting a research for my Final Year Project (FYP) which is titled "MAPMORY", an AI-powered travel journal. The purpose of this questionnaire is to understand how travel memories are stored, and what is expected on a digital travel journal.

This questionnaire consists of 10 questions. I would appreciate it if you could spend a few minutes answering this survey. Your responses will be used strictly for academic purposes and your identity will be confidential.

* Indicates required question

1. Email *

2. 1. What is your age group? *

Mark only one oval.

- Below 18
- 18-24
- 25-34
- 35-44
- 45 and above

https://docs.google.com/forms/d/1IMEKlgwUgHyOKMCnzqJaVDuc747z5nD_dk-m7QvNzOk/edit 1/5

3. 2. How often do you travel? *

Mark only one oval.

- ◯ Rarely (once a year or less)
- ◯ Occasionally (2-3 times a year)
- ◯ Frequently (more than 3 times a year)
- ◯ Very frequently (monthly or more)

4. 3. How do you currently record or preserve your travel memories? *

Tick all that apply.

- ☐ Journals
- ☐ Photos
- ☐ Apps
- ☐ Other: _____

5. 4. Do you find it difficult to organize your travel memories (photos, videos, notes) by location? *

Mark only one oval.

- ◯ Very difficult
- ◯ Somewhat difficult
- ◯ Not very difficult
- ◯ Not difficult at all

6. 5. Have you ever forgotten details of your travels (e.g., date, weather, emotions) when looking back at old trips? *

Mark only one oval.

- Frequently
- Sometimes
- Rarely
- Never

7. 6. Would you find it useful if an app automatically logged your location and prompted you to record a memory while traveling? *

Mark only one oval.

- Very useful
- Somewhat useful
- Not very useful
- Not useful at all

8. 7. How appealing would you find an interactive map where your photos, videos, and notes are pinned to the exact locations you visited? *

Mark only one oval.

- Very appealing
- Somewhat appealing
- Not very appealing
- Not appealing at all

9. 8. Would AI-generated storytelling (summaries, mood descriptions, narrative captions) make your travel memories more meaningful? *

Mark only one oval.

- Definitely
- Somewhat
- Not really
- Not at all

10. 9. How important is reliability (e.g, the app working smoothly without crashes or data loss even when offline or during travel) in a travel journaling app? *

Mark only one oval.

- Extremely important
- Important
- Slightly important
- Not important

11. 10. When using an app to store personal memories, how concerned are you about security and privacy (e.g., who can access your data)? *

Mark only one oval.

- Very concerned
- Concerned
- Slightly concerned
- Not concerned

This marks the end of the questionnaire. Thank you for your time, and have a great day ahead!

Appendix B – User Manual

Mapmory Mobile Application

User Manual

Prepared By:

PUTERI NUR ATHIRAH FARZANA BINTI KAMARUZAMAN
UPTM

1. Introduction

1.1 Purpose

This user manual provides step-by-step instructions on how to install, navigate, and use the **Mapmory mobile application** on Android devices.

1.2 Application Overview

Mapmory allows users to:

- Record memories based on location
- View them on a map
- Search global locations
- Manage user profiles

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2. System Requirements

- Android OS 8.0 and above
- Minimum 2GB RAM
- Internet connection

---

3. Installation Guide (APK Version)

3.1 Steps

1. Download the APK file
2. Enable **Install Unknown Apps**
3. Open APK → Tap **Install**
4. Launch the app

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4. Getting Started

4.1 Launching the App

- Open Mapmory
- Splash screen appears
- Redirect to welcome page

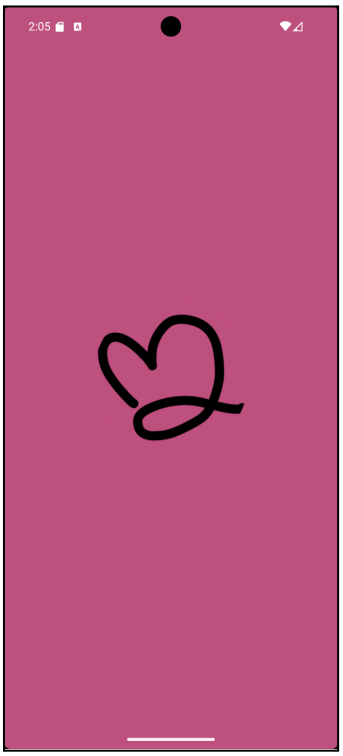

Figure 4.1: Splash Screen

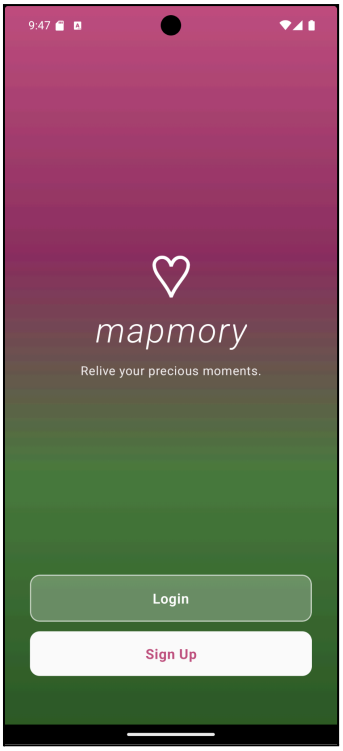

Figure 4.2: Welcome screen

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5. Authentication Module

5.1 Sign Up

1. Tap **Sign Up**
2. Enter username, email, password
3. Tap **Register**
4. Enter OTP for account verification process
5. Complete onboarding process

5.2 Login

1. Enter email and password
2. Tap **Login**
3. Redirect to Home Page

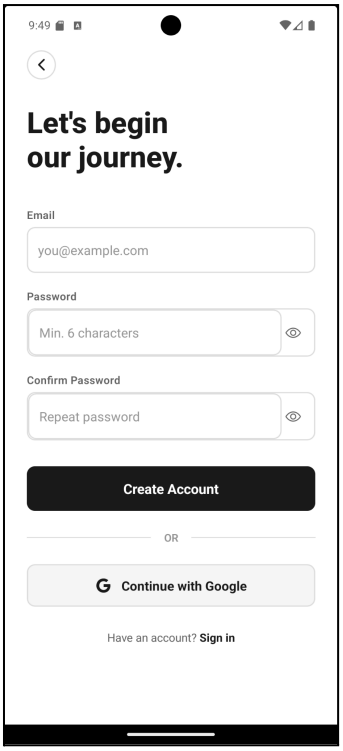

Figure 5.1: Sign Up screen

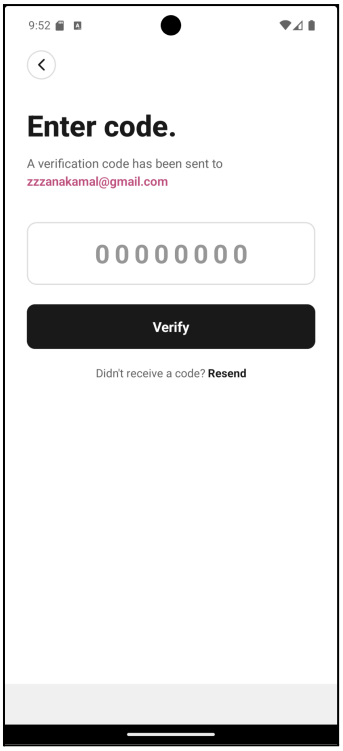

Figure 5.2: Verification Process

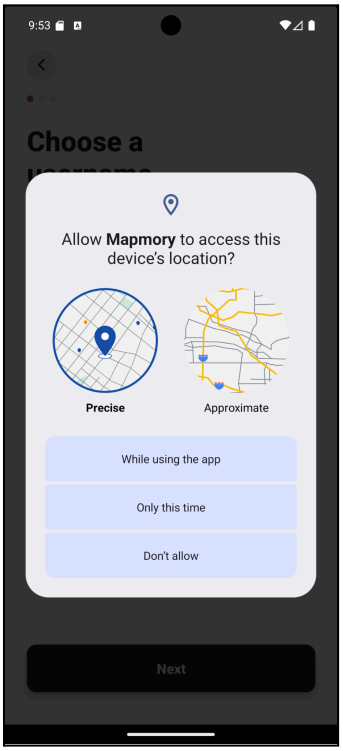

Figure 5.3: Onboarding

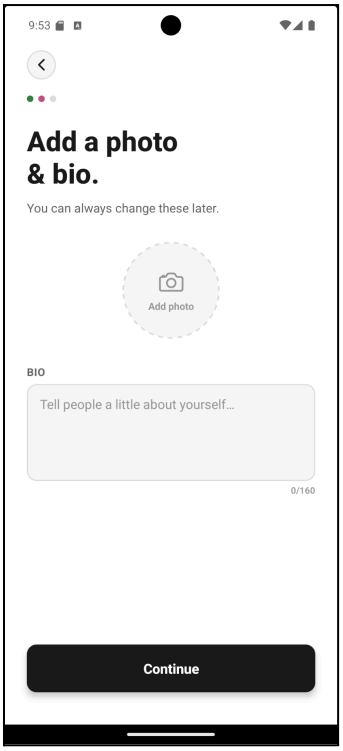

Figure 5.4: Onboarding

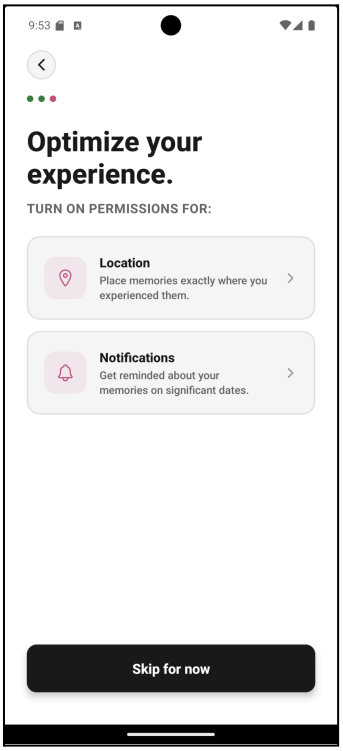

Figure 5.5: Onboarding

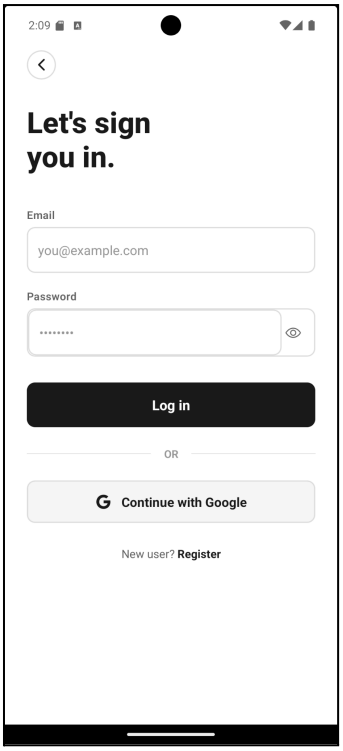

Figure 5.6: Login Screen

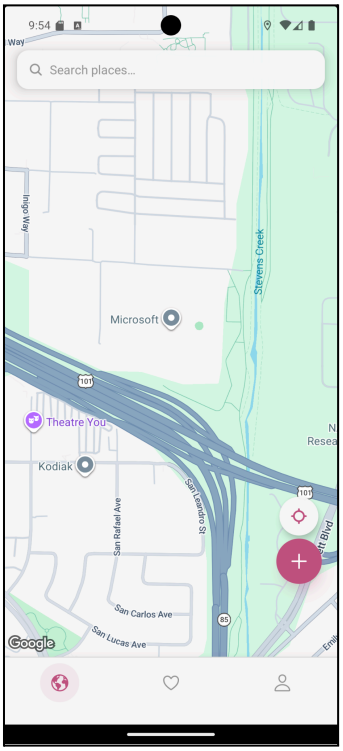

Figure 5.7: Successful login (Home screen displayed)

6. Home Page

6.1 Features

- Search bar (top)
- Map / globe view (center)
- Navigation bar (bottom)

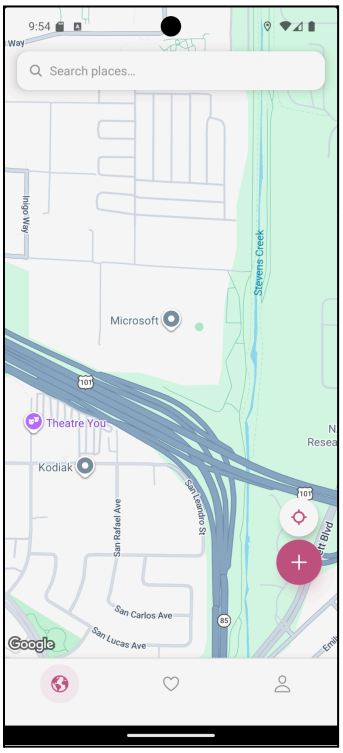

Figure 6.1: Home screen full view

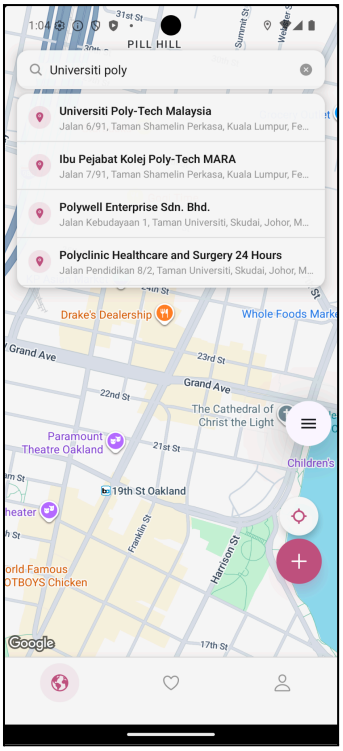

Figure 6.2: Search bar usage

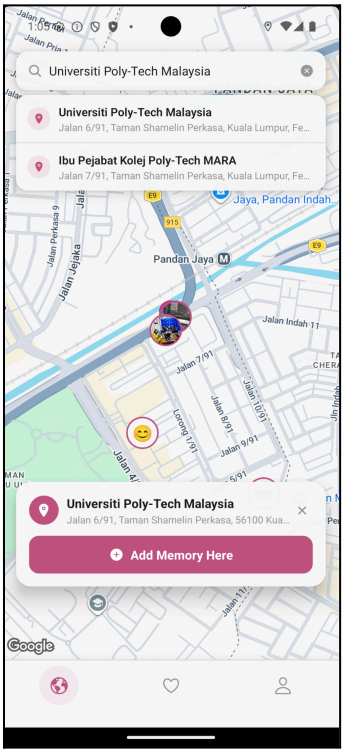

Figure 6.3: Search bar usage

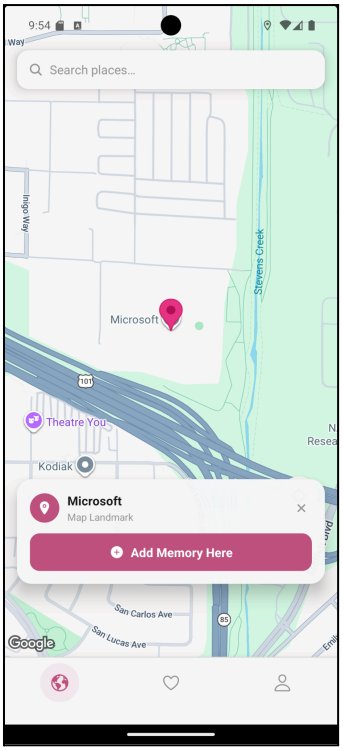

Figure 6.4: Map interaction

---

7. Memory Management Module

7.1 Viewing Memories

1. Tap **Memories**
2. View list of memories

7.2 Adding Memory

1. Tap **Add Memory**
2. Fill in details
3. Save

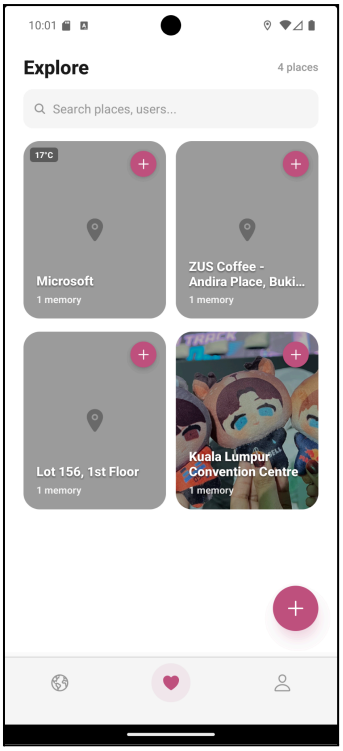

Figure 7.1: Explore screen

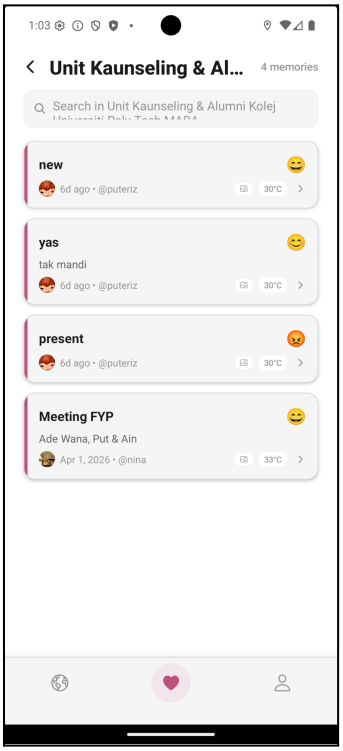

Figure 7.2: Memories created on a location

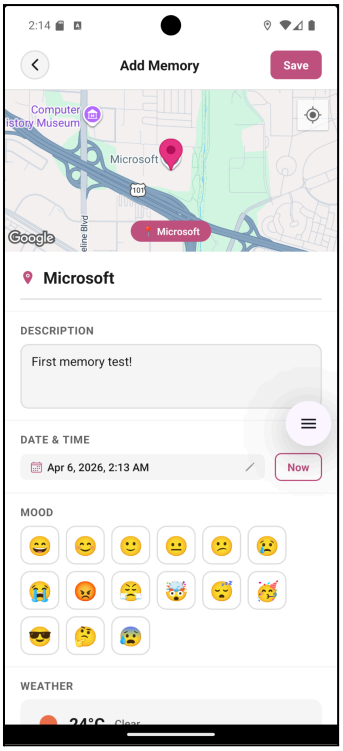

Figure 7.2: Add memory form

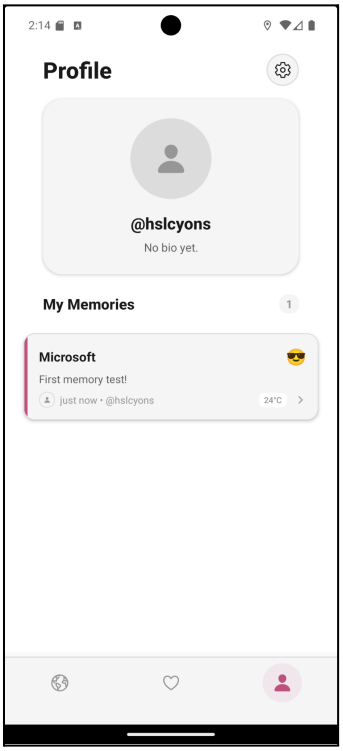

Figure 7.3: Example saved memory

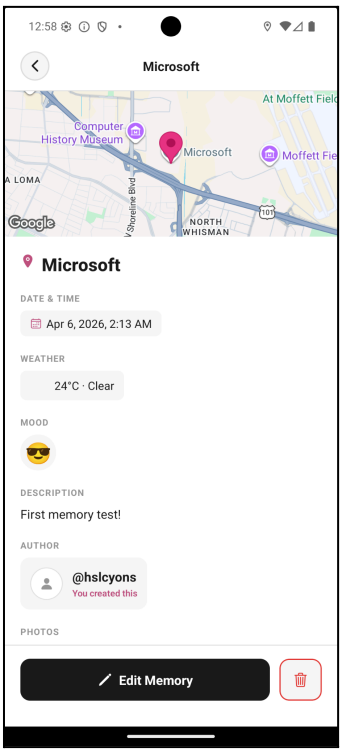

Figure 7.4: Memory details view

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8. Profile & Settings

8.1 Access

- Tap **Profile**

8.2 Features

- View user info
- Logout

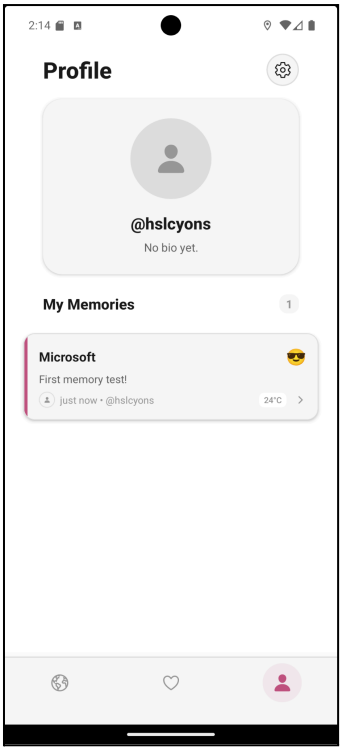


Figure 8.1: Profile screen

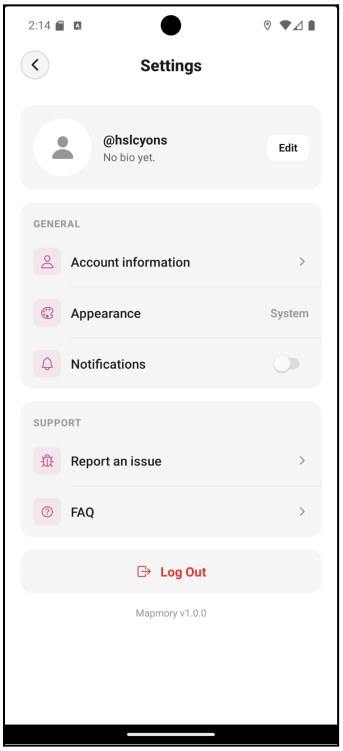


Figure 8.2: Logout action

9. API Integration

- Uses REST API
- JWT authentication
- Secure data exchange

---

10. Error Handling

Error	Solution
No Internet	Check connection
Invalid Login	Re-enter credentials
App Crash	Restart / reinstall

---

11. Troubleshooting

- Ensure APK installed correctly
- Restart device if needed
- Verify backend server is running

---

12. Future Enhancements

- Social sharing
- Media (Video/Music) attachments
- Cloud sync

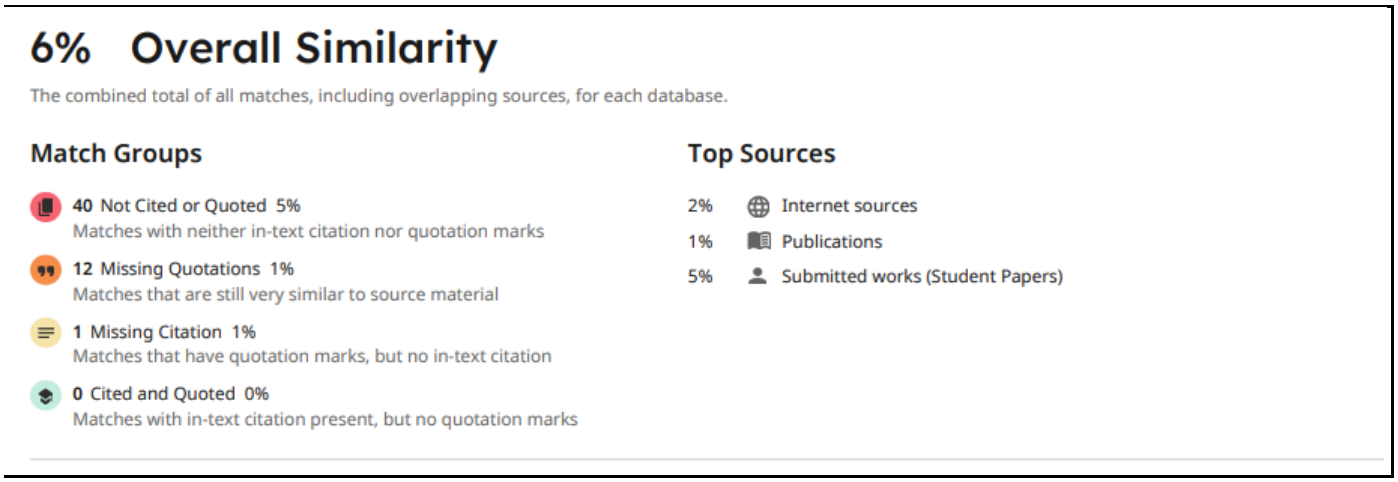
---

13. Conclusion

Mapmory provides a user-friendly platform for managing location-based memories efficiently.

Appendix C – Turnitin Result

Similarity



6% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

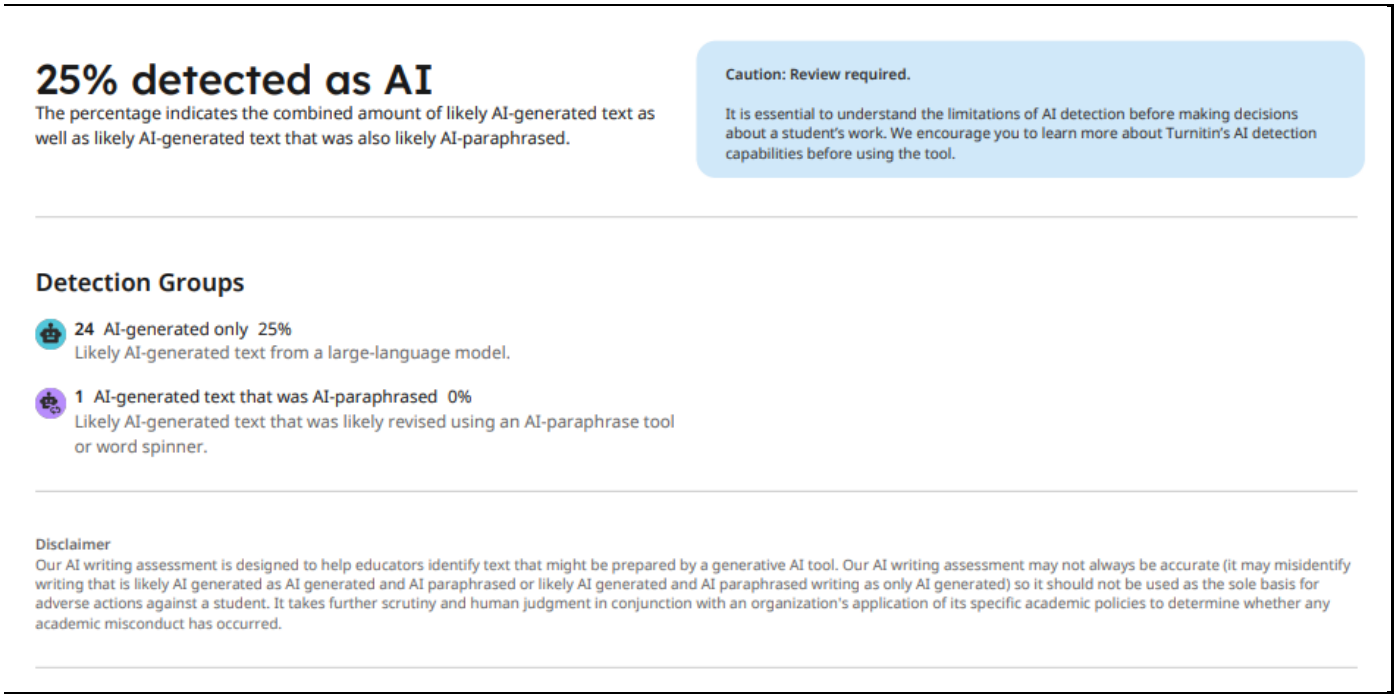
Match Groups

- **40** Not Cited or Quoted 5%
  Matches with neither in-text citation nor quotation marks
- **12** Missing Quotations 1%
  Matches that are still very similar to source material
- **1** Missing Citation 1%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

- 2% Internet sources
- 1% Publications
- 5% Submitted works (Student Papers)

AI



25% detected as AI

The percentage indicates the combined amount of likely AI-generated text as well as likely AI-generated text that was also likely AI-paraphrased.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

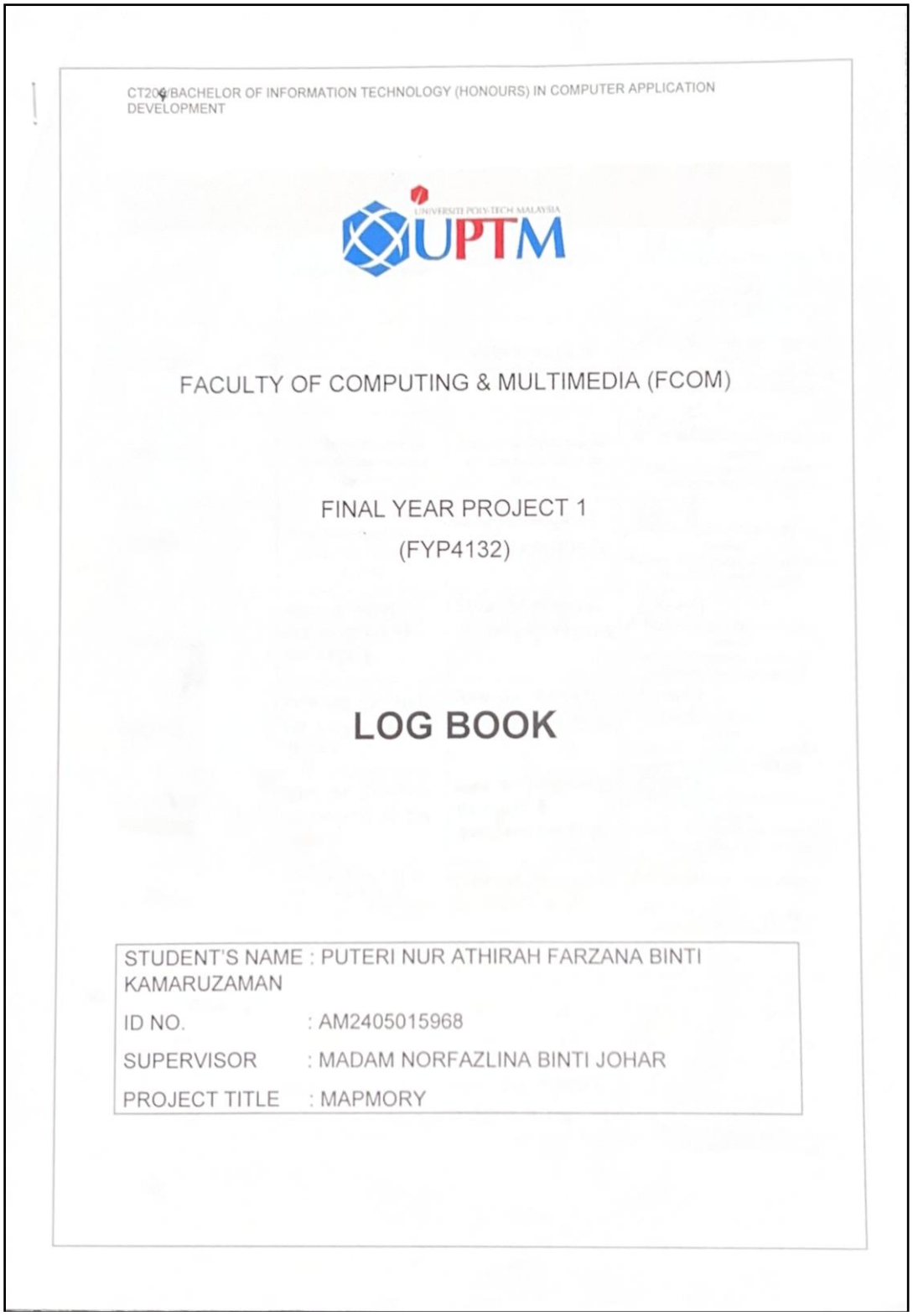
Detection Groups

- **24** AI-generated only 25%
  Likely AI-generated text from a large-language model.
- **1** AI-generated text that was AI-paraphrased 0%
  Likely AI-generated text that was likely revised using an AI-paraphrase tool or word spinner.

Disclaimer

Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (it may misidentify writing that is likely AI generated as AI generated and AI paraphrased or likely AI generated and AI paraphrased writing as only AI generated) so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Appendix D – Log Book



CT206/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

UNIVERSITI POLYTECH MALAYSIA

UPTM

FACULTY OF COMPUTING & MULTIMEDIA (FCOM)

FINAL YEAR PROJECT 1

(FYP4132)

LOG BOOK

STUDENT'S NAME	: PUTERI NUR ATHIRAH FARZANA BINTI KAMARUZAMAN
ID NO.	: AM2405015968
SUPERVISOR	: MADAM NORFAZLINA BINTI JOHAR
PROJECT TITLE	: MAPMORY

CT206 BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

Date/ Week		Agenda	Next Agenda	Signature (Supervisor)
07/08/2025	1	Find potential Supervisors	Finalize topic and title with SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
14/08/2025	2	Discuss the topic and title with SV	Ask the SV to check the Problem Statements and Objectives	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
21/08/2025	3	Ask the SV to check the Problem Statements and Objectives	Discuss the project proposal and have the SV check the progress	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
28/08/2025	4	Discuss the project proposal and have the SV check the progress	Show the progress of the report to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
04/09/25	5	Discuss about the progress of the report	Show the progress of the report to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
11/09/2025	6	Have the SV check the progress of the report	Show the progress of the report to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
18/09/2025	7	Have the SV check the progress of the report	Show the progress of the report & questionnaire to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
02/10/2025	8	Have the SV check the progress of the report & questionnaire	Show the progress of the report to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
09/10/2025	9	Have the SV check the report's progress	Show the progress of the report to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
16/10/2025	10	Have the SV check the report's progress	Show the report's progress to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
23/10/2025	11	Have the SV check thereport's progress	Show the report's progress to SV	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia

CT204/BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVELOPMENT

30/10/2025	12	Discuss about report & presentation slide	Consult with SV about report & presentation slide	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
06/11/2025	13	Consult with SV about report & slide	presentation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
10/11/2025	14	Presentation	-	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia

Date/ Week		Agenda	Next Agenda	Signature (Supervisor)
23/12	1	First meeting of the semester	Consult with Supervisor	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
30/12	2	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
6/1	3	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
13/1	4	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
20/1	5	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
27/1	6	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
3/2	7	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
10/2	8	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
17/2	9	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
24/2	10	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
3/3	11	Consultation	Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
10/3	12	Consultation	Last Consultation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia

CT204 /BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER APPLICATION DEVEOPMENT

01/04/26	13	Last Consultation	Presentation	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia
02/04/26	14	Presentation	–	NORFAZLINA BINTI JOHAR Lecturer Faculty of Computing & Multimedia Universiti Poly-Tech Malaysia

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