



CSC1118 Final Project Delivery

PinPoint Documentation

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Executive Summary

PinPoint is a social media application built around a central interactive map. Users can “pin” locations on this map and invite other users to join, streamlining the entire planning process into a single platform. PinPoint serves as an all-encompassing application, acting as a ‘One-Stop-Spot’ for individuals and businesses that work best to get our ideas across to customers.

This documentation outlines the full development process for PinPoint, including the project management, team structure, and task distribution, also detailing the time investment and collaborative process that shaped the final product.

Beyond the technical scope, we will also cover the business aspect of PinPoint. This refers to our target markets and user demographics. Alongside this, we will delve into PinPoint’s financial projections, covering both initial expenditures and potential revenue streams.

Finally, this report will discuss the various technical aspects of PinPoint. Key sections will discuss the application’s architecture, user-facing features and use cases, and provide insights into specific code implementations. We also highlight critical requirements and design considerations essential to ensuring the platform is scalable, user-friendly, and robust.

All references cited throughout this report were compiled using Zotero, a reference management tool that enabled consistent and accurate citation formatting (IEEE). Sources include articles, industry reports, and official documentation relevant to both the technical and business components of the project.

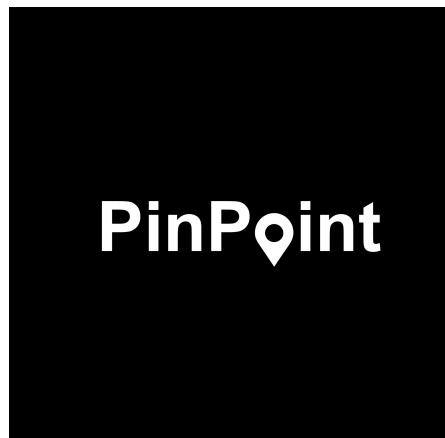


Fig 0.1 (PinPoint Logo)

1. Organisation & Management Report

1.1 Team Background

1.1.1 Michael

Currently pursuing a BSc. Computing for Business at Dublin City University (DCU), where he is aiming to maintain a first-class honours average throughout his studies. Michael has a great interest in business analytics and data visualisation. He was selected to study abroad at the Lucerne University of Applied Sciences and Arts (HSLU) along with 2 other students.

For his third year, he also secured a placement at Spanish Point Technologies, where he served as a Junior Developer for Data Analytics. Using various data visualisation software such as Power BI, Excel and other platforms such as Microsoft Azure and Fabric to promote technology use within businesses. Michael had worked closely with his clients and had great customer service during his tenure here. He was later offered a full-time position upon completion of his degree as a Data Analyst.

1.2.2 Robert

Currently pursuing a first-class honours BSc. in Computing for Business at Dublin City University (DCU), Robert brings a strong foundation in both computing and data science. With a keen interest in how technology intersects with societal needs, Robert is passionate about using data to solve complex, real-world problems.

He recently completed an internship at PwC Ireland, working across banking, wealth management, and fintech. There, he specialised in data analysis and visualisation using Python, Alteryx, and Power BI to deliver actionable insights and streamline workflows. As part of the Erasmus+ programme, Robert studied at the University of Michigan's School of Information, gaining international experience in data manipulation and information systems. He also serves as DCU's Faculty Representative for Engineering and Computing, representing over 2,400 students.

1.2 Team CV

Please see [Appendix A](#) to view the Team CV.

1.3 Proposed Development Team Structure

To minimise costs, team members have taken on multiple roles throughout the development process. These roles include, but are not limited to, project management, quality assurance, and lead development responsibilities.

Our primary focus was related to overseeing the project's progress and adhering to each deadline that we had set, from the initial concept development and design mock-ups to real-world implementation and user testing. We sought feedback from friends, family, and industry colleagues to refine the platform iteratively.

Given our similar backgrounds and shared interests, we aimed to split the workload as evenly as possible to avoid burnout when working on either the technical or documentation aspects of this project.

Looking ahead, we plan to involve additional developers and collaborate with marketing professionals to support PinPoint's growth. These partnerships will enable the platform to scale and better compete within the broader social media landscape.

1.4 Key Roles & Responsibilities

The PinPoint project team is structured to ensure clear leadership, division of responsibilities, and efficient collaboration across key technical and operational areas.

- **Chief Executive Officer (CEO): Robert Maloney**

Robert is responsible for the overall direction of the project and oversees the Backend Development Team. His role includes managing core infrastructure, database integration, and backend logic essential to the platform's performance.

- **Chief Operations Officer (COO): Michael Beirne-Ponomarev**

Michael is in charge of operational execution and leads both the Frontend Development Team and the Marketing Team. He ensures the usability and visual polish of the interface, as well as the alignment of marketing efforts with user engagement goals.

The structure promotes streamlined coordination between technical development and user-facing efforts, allowing for a cohesive and scalable delivery of the PinPoint platform and is depicted below in (Fig. 1.1)

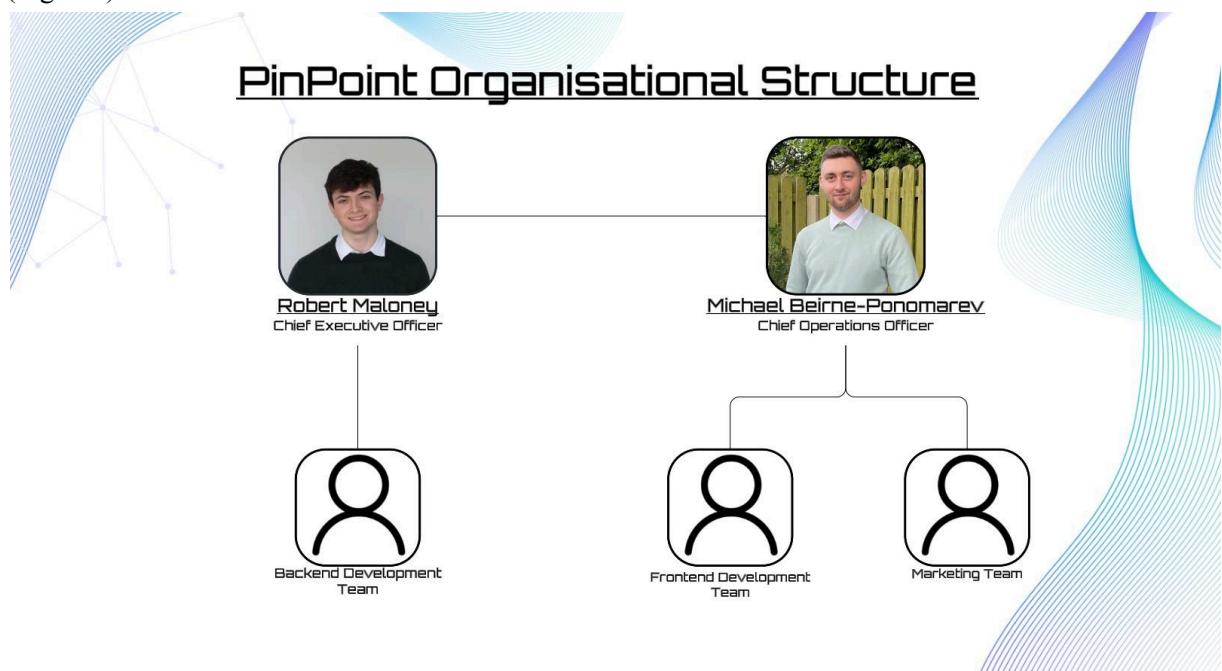


Fig. 1.1 (PinPoint Organisational Structure)

1.5 Activity Logs

Please see [Appendix B](#) to view our activity logs.

1.6 Time Allocation

As seen in (Fig. 1.2), the PinPoint project timeline spans two academic semesters and outlines key tasks, distributed between team members Robert Maloney and Michael Beirne-Ponomarev, with some tasks completed collaboratively.

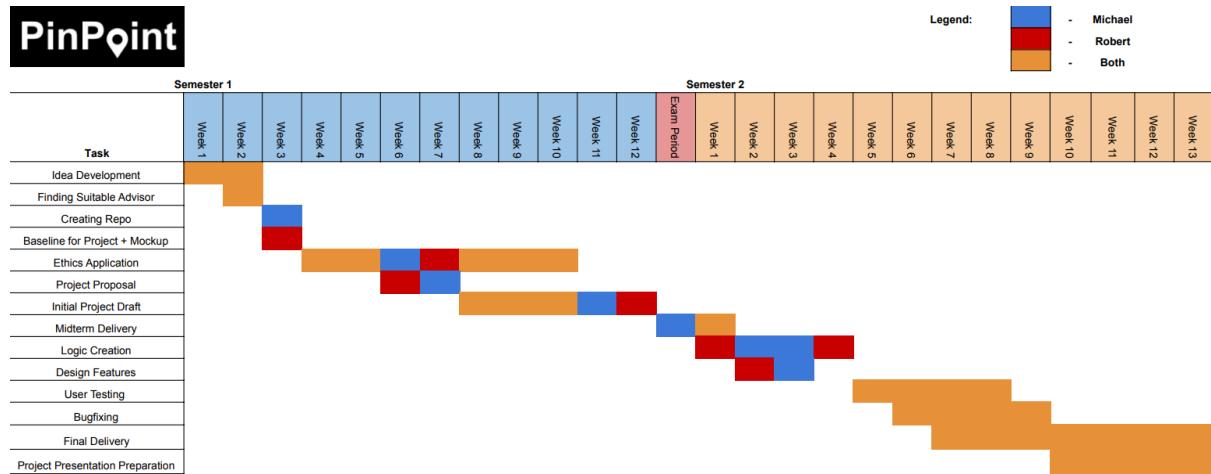


Fig. 1.2 (Project Gantt Chart)

1.6.1 Semester 1

- Idea Development and finding a Suitable Advisor were collaborative efforts initiated in the early weeks.
- Creating the Repository and Baseline for the Project + Mockup was primarily handled by Michael and Robert, respectively, establishing the technical foundation.
- Ethics Application and the Project Proposal were shared responsibilities, ensuring both technical and ethical considerations were integrated.

1.6.2 Semester 2

- Midterm Delivery and Logic Creation saw individual and joint contributions, with Robert focusing on logic implementation while Michael addressed UI/UX and operations.
- Bug Fixing, Final Delivery, and Project Presentation Preparation were joint efforts, demonstrating team cohesion during the critical delivery phase.

This timeline illustrates a balanced distribution of tasks, with each member contributing according to their strengths and collaborating on key milestones to ensure the project's success.

2. Business Case

2.1 Product / Service Description

PinPoint is a social media application centred around an interactive map, allowing users to “pin” locations and invite others to hang out. Initially launching as a web app, PinPoint is designed with future expansion into mobile platforms for both iOS and Android.

Users can create events by selecting a location, setting up a proposed time and adding a description or relevant links. Temporary group chats for these events can be created, which will be deleted after the pin is removed. Events can be set to public, visible to mutual friends, or kept private. You will be able to “favourite” locations you frequently visit and groups of friends you usually hang out with. Users can also favourite frequently visited locations and preferred groups of friends for easier planning.

While attending these events, you can upload photos to the dedicated pin that can be either shared publicly or kept private. Users who were at the event will receive these photos, which can be posted on a timeline, which can feature curated content, advertisements, and events posted by marketing managers to inform users of future happenings in their area.

PinPoint was inspired by the everyday challenges of organising events with friends, confusing group messages, unclear locations, or conflicting times. We created the platform we wished we had: one space to plan, connect, and share experiences.

PinPoint is an all-encompassing platform that users can make plans, talk to friends and share the adventures that they go on when attending these events. The sole purpose of PinPoint is to make it the ‘one-stop-spot’ for all social interactions.

2.2 Value Analysis

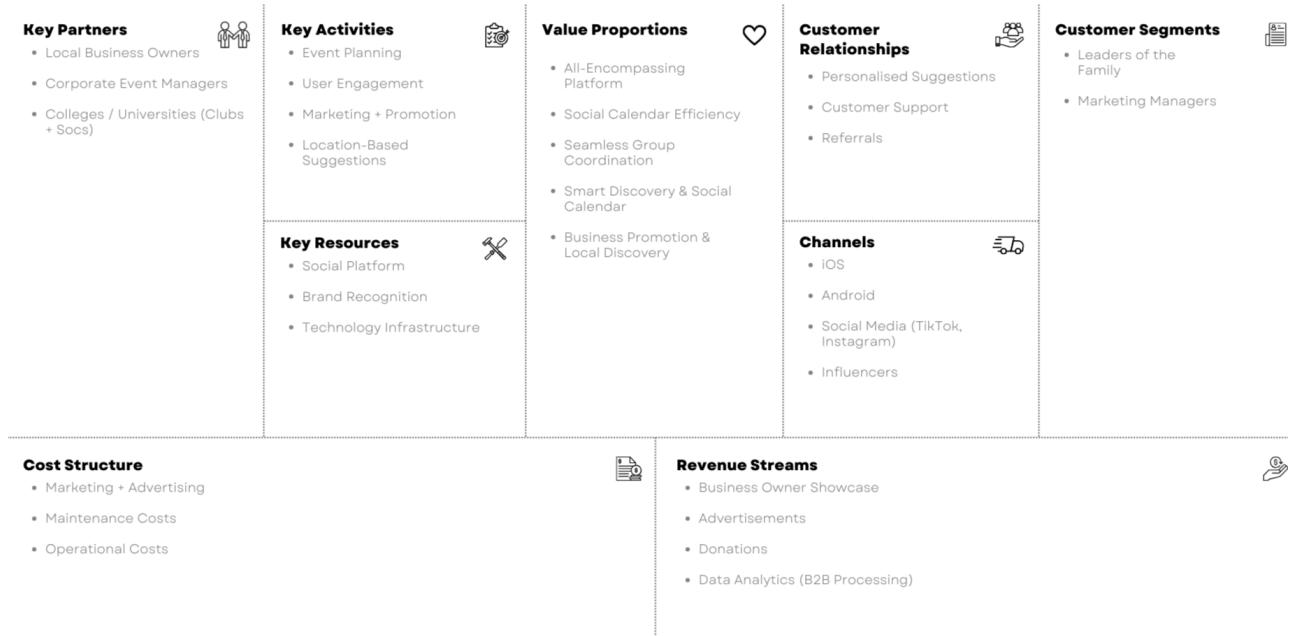


Fig. 2.1 (PinPoint Business Model Canvas)

2.2.1 Value to Users

PinPoint delivers distinct value to its users, partner businesses, and the platform itself. For users, it provides a seamless and centralised solution for discovering, planning, and managing social outings. Instead of juggling separate tools for maps, messaging, and event organisation, users can now coordinate meetups, explore nearby activities, chat in real time, and share photos, all within one intuitive interface [1]. Whether arranging a casual coffee or a larger group event, PinPoint simplifies the entire process, making it the go-to destination for social planning.

2.2.2 Value to Businesses

For businesses, PinPoint offers a highly accessible and hyperlocal promotional platform. Through features like sponsored pins, event tagging, and user engagement insights, small businesses and event organisers can effectively target nearby audiences without the high cost of traditional digital marketing [2]. Temporary chat spaces and real-time feedback also enable businesses to build authentic engagement with users, creating opportunities for promotions, loyalty-building, and follow-up interaction. The system is designed to empower local brands with meaningful visibility and measurable impact [3].

2.2.3 Value to the platform

For the platform itself, PinPoint is built with scalability and intelligence at its core. By leveraging user behaviour data, social connection graphs, and engagement trends, the platform can refine its recommendation engine, personalise user experiences, and inform venue-based insights. This analytical backbone not only improves functionality for users and partners but also opens future

revenue streams such as business analytics, smart scheduling, and targeted promotions, all while maintaining user trust and data transparency [4].

2.3 Market Analysis

2.3.1 Proposed Market

The target market for our platform will be people who attend social events and are looking to plan their events more efficiently and smoothly. Users will be able to use one application to find, create, and manage events among friends. The use of our location-based services from OpenStreetMaps and various social tools using Django will allow users to connect via group chats.

In today's society, social networking is vital across all adult age groups, facilitating the creation of shared memories. In Ireland, smartphone ownership is remarkably high, with 95% of adults owning a smartphone as of early 2025. This widespread smartphone usage presents a substantial market opportunity for PinPoint [5].

Beyond individual users, PinPoint also targets marketing managers who aim to promote events and increase venue attendance and students involved in campus clubs and societies. By focusing on family leaders and marketing professionals, PinPoint addresses a demographic that values streamlined event organisation and effective promotion.

We estimate our market size by researching our competitors, which are social media platforms, and have landed on the following, which covers the Total Addressable Market (TAM), Served Available Market (SAM), and Target Market (TM):

2.3.1.1 Total Addressable Market (TAM)

The TAM includes all young adults and marketing managers globally who use mobile social media platforms and would be interested in an application like PinPoint.

As of 2025, there are approximately 4.69 billion people who own a smartphone [6]. Assuming that 20% of these users may be interested in social and event-planning functionalities, the TAM would be approximately 938 million potential users.

$$TAM = 20\% \text{ of } 4,690,000,000 = 938,000,000$$

2.3.1.2 Served Available Market (SAM)

The Served Available Market (SAM) narrows the focus to regions with high smartphone penetration and active social media engagement, such as North America and Europe.

Assuming that 40% of the TAM in these regions may adapt to new applications like PinPoint, the SAM would be around 375 million users.

$$SAM = 40\% \text{ of } 938,000,000 (TAM) = 375,000,000$$

2.3.1.3 Target Market (TM)

The Target Market (TM) focuses on urban areas with a high concentration of students, young professionals, and businesses that promote events through social media.

Assuming a 25% adoption rate of the SAM within the first few years of launch, the TM would be approximately 93.75 million users.

$$TM = 25\% \text{ of } 375,000,000 (\text{SAM}) = 93,750,000$$

2.3.2 Key Value Proposition

PinPoint is a comprehensive solution for social and business event planning, bringing together every element needed to organise, manage, and enjoy events, all within one centralised platform. Its intuitive design and interactive map make it ideal for individuals and businesses alike.

2.3.2.1 All-Encompassing Platform

PinPoint allows users to manage their events and easily navigate via the app's intuitive interface. It will coordinate the group's events efficiently, as people can see who can or cannot attend. This feature will ensure that users will not fear missing out on events by suggesting different times or dates that would suit everyone.

PinPoint offers a comprehensive solution for both personal and business event planning. It brings you everything that is required to make plans, from chatting to sharing photos. Even the coordination of schedules is all in a single, user-friendly application. Whether it is a small get-together or a big event, such as a birthday party. PinPoint is the central hub for all event-planning processes.

2.3.2.2 Seamless Group Coordination

Built-in group chats and event pages keep everyone informed. Attendees can view event details, RSVP, and communicate in real time. This ensures all participants are on the same page and makes rescheduling easier and more transparent.

2.3.2.3 Smart Discovery & Social Calendar

With maps integration, users can discover nearby venues and events at popular hangout spots. This promotes spontaneous social plans and encourages community engagement, turning the map into a dynamic social calendar tailored to each user.

2.3.2.4 Business Promotion & Local Discovery

For businesses and event organisers, PinPoint provides an accessible alternative to traditional advertising. Through features like sponsored pins, local businesses can reach nearby users without the overhead of formal ad campaigns. Combined with user insights and real-time engagement, PinPoint offers a cost-effective tool for increasing visibility, driving foot traffic, and building brand awareness within local communities.

Businesses respond well to the idea of using certain “tags” that can attract a certain audience to these events, such that if a company is attracting a different audience than they would prefer. PinPoint will recommend these events to people who attend other events of a similar nature. This way, their business will gain better publicity, and they will find the correct audience for these events.

2.3.3 User Segments

Our platform targets specific customer segments to maximise its effectiveness. Through market research, we have identified several groups that align closely with PinPoint's core value proposition.

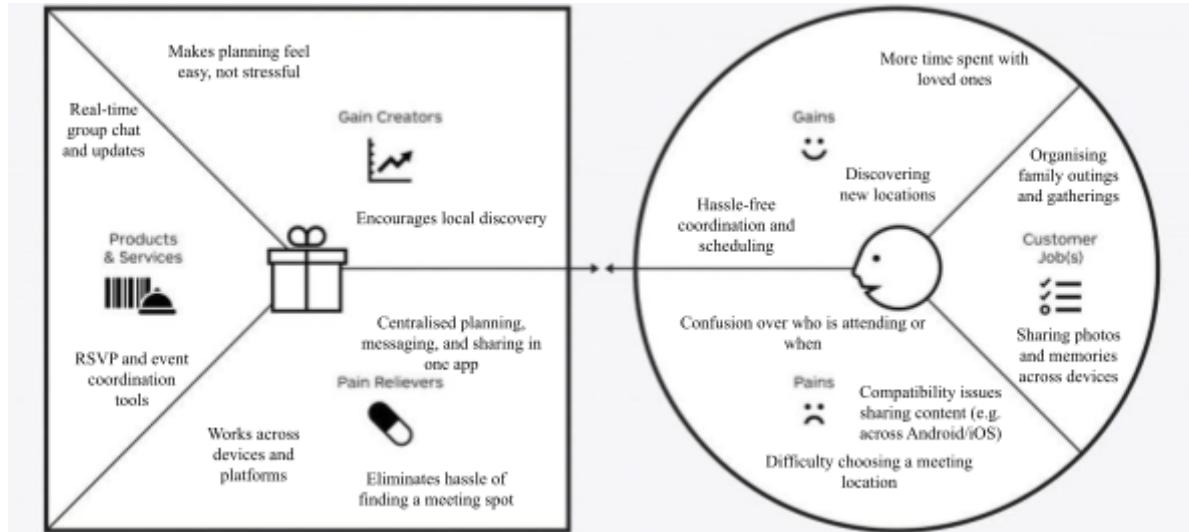


Fig. 2.2 (Leaders of the Family User Segment)

2.3.3.1 Leaders of the Family

A significant segment we identified is the "leaders of the family". These individuals typically organise family outings, holidays, and social gatherings. These users play a pivotal role in coordinating meaningful experiences for their families and are naturally inclined toward tools that streamline communication and planning. By catering to this group, PinPoint offers a reliable and convenient solution that fosters family engagement across generations.

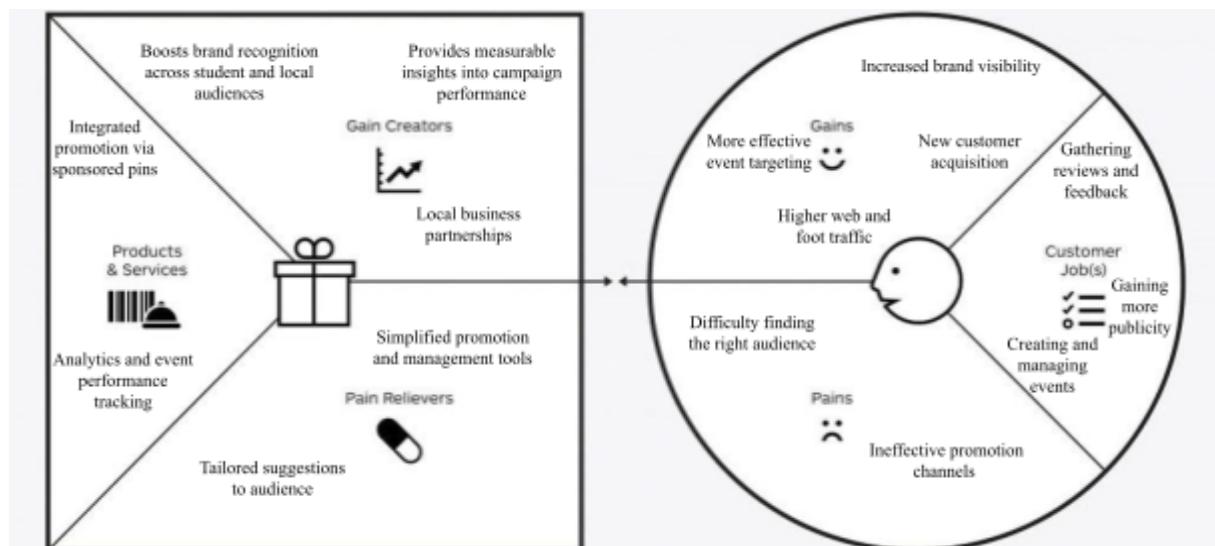


Fig. 2.3 (Marketing Managers User Segment)

2.3.3.2 Marketing Managers

Another essential segment includes marketing professionals tasked with promoting events. These users benefit from PinPoint's public event features, map integration, and intelligent tagging system,

which help target specific demographics. The app offers a streamlined and cost-effective way to spread awareness, attract the right audience, and analyse event engagement, making it an attractive tool for businesses of all sizes.

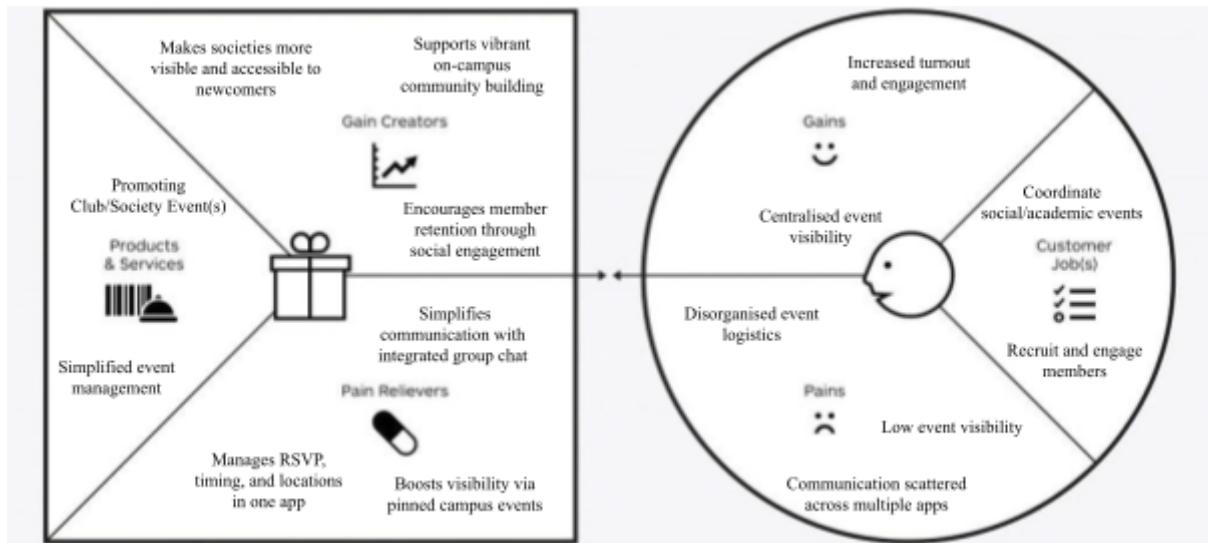


Fig 2.4 (Clubs and Societies User Segment)

2.3.3.3 Clubs and Societies in Universities

University clubs and societies represent another valuable user base. These groups often struggle with event coordination, visibility, and communication among members, new and old. PinPoint provides a central hub for managing meetups, promoting society events, and keeping members updated through temporary group chats. Public and private event options also allow societies to invite broader student participation or limit events to internal members. The platform's visual and interactive nature makes it especially appealing for student engagement on campus.

2.3.4 Primary Research Insights

As part of our CSC1115 module, we conducted primary research by surveying a diverse range of potential users. Our findings led us to expand our initial focus, revealing that the app appeals to a broader audience, including various family structures and age groups. Some notable insights include:

- **Families with Young Children** appreciated centralised communication and map-based discovery for planning spontaneous outings.
- **Older Families** valued the simplicity of an all-in-one solution for organising formal gatherings like family reunions.
- **Marketing Professionals** expressed interest in using the platform to promote events and analyse engagement metrics.
- **Clubs and Socs committee members** admired the idea of a single platform to notify users and communicate events.

Our primary research included the gathering of user stories, some of which can be found at [3.11 User stories](#). This feedback has been instrumental in refining our app's features to better suit the real needs of our users.

2.3.5 Industry Trends

When attempting to join any industry, it is vital to look into various market trends and to know what we might get ourselves into. With a social-based application, we can see there are a lot of competitors and other businesses venturing into this territory. We add further detail about our competitors in [2.4.3 Competitor Profiles & Benchmarking](#).

In such a volatile market, all aspects of social media applications will have to be a competitor to us, particularly ones that offer messaging and sharing to other profiles. One of the key trends is the rise of hybrid social platforms that blend digital convenience with real-world interaction. Platforms like BeReal reflected this desire by emphasising authenticity and real-time experiences. According to Forbes, it is a rise in platforms that move away from curated online personas and instead foster genuine local interaction [7].

Additionally, the event tech industry is increasingly incorporating geolocation tools and mobile-first solutions to help people discover what's happening nearby, whether it's a casual meetup, local gig, or community event. There's a growing demand for spontaneous, low-friction event planning tools that cater to micro-events or friend groups, rather than large-scale conferences [8].

The growing demand for real-time interaction and the integration of geolocation services. Consumers, especially younger demographics, are leaning toward more spontaneous and localised forms of engagement, moving away from traditional social networks and toward niche platforms that offer specific utility, such as discovering nearby events or coordinating group activities [9].

2.4 Feasibility & Commercial Viability

This section assesses the practical and financial viability of bringing the PinPoint to market. It outlines the essential resources, cost structures, and operational activities required for sustainable development and deployment. In addition, it presents an analysis of revenue models, market readiness, and commercial strategies that support the platform's ability to generate value. By evaluating competitor benchmarks and defining our unique advantage, we demonstrate the commercial potential and scalability of our proposed solution in a competitive landscape.

2.4.1 Key Resources / Activities / Costs

2.4.1.1 Key Resources

To build and sustain PinPoint, several key resources are essential to its success. The platform is initially being developed as a web application using Django, incorporating location-based features powered by OpenStreetMap, and designed with Bootstrap and custom CSS. To ensure long-term scalability, we will use a cloud-based architecture such as Google Cloud Platform (GCP), alongside productivity tools like G-Suite. These cloud resources will support the hosting of our application, database management, messaging queues, and backups, helping us maintain uptime and performance as our user base grows [10], [11].

Legal and compliance resources are another key requirement. As the application handles personal data, including location, messaging, and user-generated content, we must ensure strict compliance with GDPR and privacy regulations. Engaging GDPR consultants will ensure our terms of service,

data usage policies, and internal practices align with legal expectations. Costs for legal consultants have been forecasted in our financial plan and are expected to be incurred periodically throughout the first three years of operation [12].

Human resources remain at the heart of PinPoint's development. Two recent graduates with backgrounds in backend and infrastructure, and front-end design and responsiveness, are the two developers we intend to hire. It is a calculated decision to hire junior talent since it allows us to control expenses while attracting people who are keen to adopt contemporary development techniques and innovate. We also intend to hire a marketing analyst with a graduate degree. This choice is in line with our conviction that recent graduates contribute new ideas, a lot of enthusiasm, and a thorough comprehension of the social media landscapes of today. Our main target demographic spends a lot of time on Instagram, TikTok, and Snapchat, thus, the marketing graduate will be in charge of social media planning, growth campaigns, user acquisition tracking, and direct.

The program itself turns into a vital resource in addition to the personnel. PinPoint is a social platform as well as a utility. Connection-building tools include friend requests, user profiles, and interactive conversations. The site fosters community and becomes not just useful but also entertaining and habit-forming. We will be able to improve our social features, event finding tools, and use behavioural data to provide suggestions and pertinent information as our user base expands.

2.4.1.2 Key Costs

Key costs associated with developing and operating PinPoint will include development expenses, cloud hosting fees, and licensing for third-party tools and APIS. Additional costs will arise from marketing and promotional campaigns aimed at user acquisition. There may also be legal expenses related to compliance, especially in managing user data. Design and content creation, customer support, and routine platform maintenance will also contribute to ongoing costs [12].

When it comes to marketing and advertising, we must get it right to promote the growth of effective customer outreach, which would involve digital marketing strategies, leveraging social media platforms like Instagram, TikTok, and Snapchat, where our target audience spends significant time. This marketing approach will enhance visibility and engagement, directing users to the app stores for downloads. As social media channels evolve, our strategy will remain adaptable, ensuring continued relevance and exposure for our app. Costs for these will be related to the number of advertisements we place on these platforms. As well as this, we intend to hire a graduate marketing student, the reasoning behind this is that. Students like ourselves are eager to work, coming out of college and provide a fresh perspective on what they have studied in their degrees. On top of this, as a business, the costs will be significantly lower compared to hiring someone with a long amount of experience. As a start-up, this is something that we have to consider.

Maintenance costs will include the upkeep of servers and cloud storage, regular software updates, and prompt bug fixes to ensure smooth user experiences. As the app scales, customer support may require more resources, including live chat or ticketing systems. Maintenance also covers monitoring security, ensuring data protection protocols are updated, and optimising performance across different devices. Keeping the system clean, modular, and well-documented from the start will help manage these costs over time. To ensure that the maintenance of the application remains up-to-date and has a brilliant interface to work with, we intend to also hire two graduate developers, preferably with full-stack interests, but primarily one for backend & frontend development.

Operational costs go beyond technology and maintenance, encompassing the broader needs of the business. These include expenses such as team salaries, the office, along with its supplies or collaborative tools, administrative costs like business registration and banking, and legal consultation. If the platform expands to include in-person promotions or sponsored events, those too will fall under operational costs.

Initially, these will be kept minimal, but as the business grows, budgeting for operations will become increasingly important to support scaling and efficiency. We currently have an outline for these costs, with top-of-the-line laptops, drawing tablets for front-end developers and headphones for our developers to communicate with one another or take other important business calls [13], [14], [15].

2.4.1.3 Key Activities

To deliver consistent value, the platform must abide by a set of core activities that support growth, engagement, and technical performance. The development team will enhance event functionality, improve map responsiveness, and refine real-time chat. Regular software updates, bug fixes, and feature rollouts will keep the app evolving with user needs and market trends. Marketing activity will focus on brand building through digital channels, as well as partnerships with local businesses and event organisers. Community-based outreach, such as sponsorships or collaborations with university societies, will also play a role in early adoption [16].

Ongoing efforts will include deploying push notifications, creating behavioural recommendation systems, and optimising load speeds. Customer feedback will guide prioritisation of new features, and data from analytics will inform decisions on UI design and engagement strategies. Compliance reviews and data audits will be embedded in our routine to ensure the platform remains secure, reliable, and legally compliant.

2.4.2 Pricing Models & Revenue Streams

PinPoint will adopt a diversified revenue strategy that aligns with our user-first philosophy, allowing us to still generate an income while providing a freemium model to our application and providing scalable income streams to support our future growth [17]. Our primary model revolves around strategic partnerships with local businesses through a feature we will call the ‘Business Owner Showcase’. This paid promotional space will allow marketing managers and event organisers to make their events stand out on the app’s interactive map, attracting more foot traffic and ensuring higher visibility among a targeted audience.

To make this mutually beneficial, we will maintain ongoing communication with these partners to evaluate the success of their placements and make data-informed improvements. This ensures the platform remains a valuable, cost-effective marketing tool for local enterprises.

In addition to the showcase feature, PinPoint will implement a targeted advertising model that presents users with relevant promotions based on their preferences and behaviours. By leveraging user analytics, we can provide advertisers with in-depth insights into the demographics and interests of our audience, allowing for more effective and tailored ad placements. During early interviews and surveys, users expressed no strong objections to this model provided they retain control over their data, particularly the option to opt out of certain data collection practices. We view this feedback as essential and will prioritise transparency and consent in our ad policy. Concerning users’ data, we would also plan to provide data monetisation [18] with reports being created and sent to other

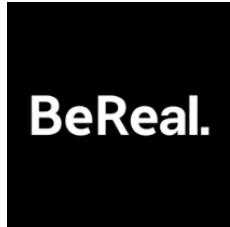
businesses. This is a very common practice in this industry, highlighting various data points to businesses about gaining insight into a user's activity. It will be used without any ill intent or malice. For example, we would focus on actionable insights we gather, such as 'Dublin 9 is a very popular area for students around September'

Advertisements will be calculated based on the number of monthly active users (MAU) vs the average revenue per user (ARPU). Initially, this is expected to be on the low side, but the numbers can exponentially increase, and hence our revenue stream will also reflect this [19].

Lastly, we will introduce an optional donation feature, although this implementation won't stay for the entirety of PinPoint's life cycle, it will give users the freedom to contribute financially if they find value in the platform. This non-mandatory model respects the user's experience while offering a way for satisfied users to support the service, creating an additional stream that reinforces our commitment to user satisfaction and community trust.

2.4.3 Competitor Profiles & Benchmarking

2.4.3.1 BeReal



Product Description	BeReal, a social media application which gained popularity in 2022, focuses on real-time photo sharing. Where each day at any given time is selected at random. Users are asked to take a photo of what they are doing in that exact moment, regardless of time zones. These photos are then shared with friends, where they can react to by taking a self-portrait image [20].
Net Worth	~€500m as of 2022 when acquired by Voodoo [20].
Pricing	Free to use application for users. Advertising with a minimum spending of \$10k. Private Investments.
Strengths	Focus on Authentic Experiences - No Editing. Collaborate with Friends when together. Daily Notifications - Daily User Engagement. Interactive UI - Particularly with location tracking for photos.
Weaknesses	Limited Feature Set - No event planning or discovery. Lack of Communication - Between individuals. Low Engagement - Not a lot of time is spent on the application.
Compared to PinPoint	While both apps aim to bring people closer together, BeReal focuses on daily snapshots of life rather than enabling users to coordinate in-person meetups. PinPoint builds on the same spirit of authenticity but adds practical features like event creation, group chat, and local venue discovery to turn social intentions into real plans.

2.4.3.2 Facebook Events



Product Description	Part of the larger Meta ecosystem, Facebook Events allows users to create, join, and share public and private events. It's widely used by organisations, businesses, and individuals for both personal and professional gatherings.
Net Worth	~€1 trillion [21].
Pricing	Free to use application for users. Revenue is generated through boosted posts.
Strengths	Enormous User Base. Calendar Syncing + Reminders through notifications. Strong Promotional Tools.
Weaknesses	Too large - Lots of clutter with ads and unrelated content. Lower trust among younger audiences. More Formal Events as opposed to one-off hangouts.
Compared	PinPoint avoids the noise and complexity of Facebook by

to PinPoint	focusing exclusively on event discovery and planning with close social circles. Its map-based interface, group chats, and business integration offer a modern, purpose-driven alternative to Facebook's ageing and ad-heavy event system.
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2.4.3.3 Google Maps (Event Discovery)



Product Description	Google Maps, commonly used for navigation and satnavs, also include event and venue discovery features, particularly for restaurants, nightlife, and local attractions. Businesses can post events and offers that are visible through map searches.
Net Worth	Contributes to Google's Net worth of ~€1.6 trillion.
Pricing	Free to users. Businesses can pay for promoted listings and local ads.
Strengths	Extremely detailed and reliable mapping. High trust in location accuracy and business reviews. Integrated with search and navigation.
Weaknesses	Not designed for social planning or peer-to-peer interaction. Lacks group coordination features like chat or RSVP systems. Focuses more on static business discovery than dynamic social experiences.
Compared to PinPoint	Google Maps is strong for individual venue discovery, but PinPoint adds the crucial layer of collaborative planning, social features, and event-specific group interaction. PinPoint encourages people to not just find places, but to make and manage plans together, something Google Maps does not offer.

2.4.4 Competitive Advantage

PinPoint's key competitive advantage lies in its ability to blend social networking with smart, location-based event planning. While many platforms focus on one aspect, either the social experience or the event logistics, PinPoint provides a seamless experience where users can not only discover and organise events but also connect, chat, and share memories all within one app. The fact that PinPoint is an all-encompassing platform makes it ideal for people who aren't 'tech-savvy' and find it difficult to navigate between various apps.

Its intuitive interface, group-based coordination tools, and real-time mapping set it apart from broader platforms like Facebook and overly formal systems like Eventbrite. For businesses, PinPoint provides a low-barrier way to gain visibility, connect directly with local consumers, and tailor promotions based on potential tags and users' behaviour.

By focusing on this local engagement, PinPoint can serve as a community-driven tool that prioritises spontaneity, relevance, and social convenience, which is something that current market players have not fully optimised for.

In a nutshell, we have created a ‘one-stop spot’ for all of our event creation needs and requirements. We have prioritised effective user interfaces and functionality, which will be delved into in depth in [3. Technical Delivery](#).

2.5 Financial Projections + Requirements (3 Year)

The following financial projections provide a forecast of PinPoint’s expected growth/ performance over the first three years of operations. These projections take into account user growth, revenue streams, operational costs and other expenditures. Our approach combines optimistic yet conservative assumptions to provide a more balanced outlook. Estimates were calculated using a dedicated Microsoft Excel sheet, where detailed breakdowns of revenue and expenditure were documented. Additional explanation can be found at [Appendix D - Financial Projections \(Additional Rationale\)](#).

Year 1	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
INVESTMENT INCOME													
Initial Investment	€ 15,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 15,000.00
Family + Friend Fund	€ 8,000.00	€ -	€ -	€ -	€ -	€ 5,000.00							€ 13,000.00
AIB Loan (7.45%)	€ -	€ 25,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 25,000.00
Investors	€ -	€ -	€ -	€ -	€ -	€ -	€ 50,000.00	€ -	€ -	€ -	€ -	€ -	€ 50,000.00
Enterprise Ireland (Grad Fund)	€ -	€ -	€ -	€ 15,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 15,000.00
TOTALS	€ 23,000.00	€ 25,000.00	€ -	€ 15,000.00	€ -	€ 5,000.00	€ 50,000.00	€ -	€ -	€ -	€ -	€ -	€ 118,000.00
OPERATING REVENUE													
Advertising	€ -	€ -	€ -	€ -	€ -	€ 200.00	€ 250.00	€ 500.00	€ 1,000.00	€ 1,400.00	€ 2,000.00	€ 3,000.00	€ 8,350.00
Business Showcase	€ -	€ -	€ -	€ -	€ -	€ 500.00	€ 1,000.00	€ 1,000.00	€ 1,500.00	€ 2,000.00	€ 2,000.00	€ 2,500.00	€ 10,500.00
Donations	€ -	€ -	€ -	€ -	€ -	€ -	€ 60.00	€ 60.00	€ 60.00	€ 150.00	€ 100.00	€ 500.00	€ 930.00
TOTALS	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
MONTHLY EXPENSES													
Rent - West Dublin	€ -	€ -	€ -	€ -	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 28,000.00
Insurance - Liability	€ -	€ -	€ -	€ -	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 2,000.00
Salaries - Junior Developer	€ -	€ -	€ -	€ -	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 24,800.00
Salaries - Junior UI Designer	€ -	€ -	€ -	€ -	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 32,000.00
Salaries - Junior Marketing	€ -	€ -	€ -	€ -	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 23,200.00
Legal GDPR Consultants	€ -	€ -	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ -	€ 4,000.00	€ -	€ -	€ 9,000.00
Loan Repayments	€ -	€ -	€ -	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 7,782.40
Cloud Compute - GCP (Compute, D	€ 85.47	€ 85.47	€ 85.47	€ 85.47	€ 85.47	€ 85.47	€ 85.47	€ 85.47	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 1,367.52
Licenses - G Suite + Adobe	€ 11.50	€ 11.50	€ 11.50	€ 11.50	€ 11.50	€ 11.50	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 550.08
Marketing - Advertising + Publicity	€ -			€ -	€ -	€ 500.00	€ -	€ 750.00	€ -	€ 1,000.00	€ -	€ 1,000.00	€ 3,250.00
IT Support - General Tickets	€ -	€ -	€ -	€ -	€ -	€ -	€ 250.00	€ -	€ 300.00	€ -	€ 250.00	€ -	€ 300.00
Travel	€ 100.00	€ 100.00	€ -	€ -	€ 500.00	€ -	€ 1,000.00	€ 500.00	€ -	€ 500.00	€ -	€ 250.00	€ 3,200.00
Equipment	€ 4,000.00	€ -	€ -	€ -	€ -	€ -	€ 1,600.00	€ -	€ -	€ -	€ -	€ -	€ 5,600.00
Miscellaneous	€ 50.00	€ 50.00	€ 50.00	€ 50.00	€ 50.00	€ 1,000.00	€ 300.00	€ 150.00	€ 150.00	€ 1,000.00	€ 300.00	€ 200.00	€ 1,500.00
VAT (Sales Tax)	€ -	€ -	€ -	€ -	€ -	€ -	€ 161.00	€ 301.30	€ 358.80	€ 588.80	€ 816.50	€ 943.00	€ 1,380.00
BURN RATE	€ 4,246.97	€ 246.97	€ 925.21	€ 6,425.21	€ 12,375.21	€ 14,186.21	€ 12,645.19	€ 11,752.69	€ 14,118.16	€ 16,395.86	€ 13,422.36	€ 14,459.36	€ 121,199.40
OVERVIEW	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
CUMMULATIVE EXPENSES	€ 4,246.97	€ 4,493.94	€ 5,419.15	€ 11,844.36	€ 24,219.57	€ 38,405.78	€ 51,050.97	€ 62,803.66	€ 76,921.82	€ 93,317.68	€ 106,740.04	€ 121,199.40	
CUMMULATIVE INCOME	€ 23,000.00	€ 48,000.00	€ 48,000.00	€ 63,000.00	€ 63,000.00	€ 68,700.00	€ 120,010.00	€ 121,570.00	€ 124,130.00	€ 127,680.00	€ 131,780.00	€ 137,780.00	
STATUS	€ 18,753.03	€ 43,506.06	€ 42,580.85	€ 51,155.64	€ 38,780.43	€ 30,294.22	€ 68,959.03	€ 58,766.34	€ 47,208.18	€ 34,362.32	€ 25,039.96	€ 16,580.60	€ 16,580.60

Fig 2.5 (Year 1 Projection)

Year 2													
INVESTMENT INCOME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Year Starting	€ 16,580.60												€ 16,580.60
Family + Friend Fund													€ -
AIB Loan (7.45%)													€ -
Investors													€ 40,000.00
Enterprise Ireland (Grad Fund)				€ 15,000.00									€ 40,000.00
TOTALS	€ 16,580.60	€ -	€ -	€ 15,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 40,000.00	€ 71,580.60
OPERATING REVENUE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Advertising	€ 2,500.00	€ 3,500.00	€ 4,000.00	€ 5,000.00	€ 8,000.00	€ 8,000.00	€ 8,000.00	€ 8,000.00	€ 8,000.00	€ 10,000.00	€ 10,000.00	€ 11,000.00	€ 86,000.00
Business Showcase	€ 1,500.00	€ 1,500.00	€ 1,500.00	€ 1,500.00	€ 1,500.00	€ 1,500.00	€ 3,000.00	€ 2,000.00	€ 3,000.00	€ 2,500.00	€ 3,000.00	€ 5,000.00	€ 27,500.00
Donations	€ 40.00	€ 40.00	€ 40.00	€ 40.00	€ 40.00	€ 40.00	€ 40.00	€ 40.00	€ 60.00	€ 60.00	€ 100.00	€ 100.00	€ 640.00
Data Monetization - B2B Analytics	€ -	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ 10,000.00
TOTALS	€ 4,040.00	€ 5,040.00	€ 5,540.00	€ 11,540.00	€ 9,540.00	€ 9,540.00	€ 11,040.00	€ 10,040.00	€ 16,060.00	€ 12,560.00	€ 13,100.00	€ 16,100.00	€ 124,140.00
MONTHLY EXPENSES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Rent - West Dublin	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 42,000.00
Insurance - Liability	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 3,000.00
Salaries - Junior Developer	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 3,100.00	€ 37,200.00
Salaries - Junior UI Designer	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 4,000.00	€ 48,000.00
Salaries - Junior Marketing	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 2,900.00	€ 34,800.00
Legal GDPR Consultants	€ -	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 5,000.00
Loan Repayments	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 9,338.88
Cloud Compute - GCP (Compu	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 2,051.28
Licenses - G Suite + Adobe	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 962.16
Marketing - Advertising + Public	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 1,000.00
IT Support - General Tickets	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ 1,200.00
Travel	€ -	€ -	€ -	€ -	€ -	€ 600.00	€ -	€ -	€ -	€ -	€ -	€ 300.00	€ 900.00
Equipment	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Miscellaneous	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 200.00	€ 3,700.00
VAT (Sales Tax)	€ 929.20	€ 1,159.20	€ 1,274.20	€ 2,654.20	€ 2,194.20	€ 2,194.20	€ 2,539.20	€ 2,309.20	€ 3,693.80	€ 2,888.80	€ 3,013.00	€ 3,703.00	€ 28,552.20
BURN RATE	€ 12,158.56	€ 12,388.56	€ 12,803.56	€ 18,883.56	€ 13,923.56	€ 14,323.56	€ 13,768.56	€ 13,538.56	€ 15,723.16	€ 14,118.16	€ 14,542.36	€ 16,532.36	€ 172,704.52
OVERVIEW	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
CUMMULATIVE EXPENSES	€ 12,158.56	€ 24,547.12	€ 37,350.68	€ 56,234.24	€ 70,157.80	€ 84,481.36	€ 98,249.92	€ 111,788.48	€ 127,511.64	€ 141,629.80	€ 156,172.16	€ 172,704.52	
CUMMULATIVE INCOME	€ 20,620.60	€ 25,660.60	€ 31,200.60	€ 57,740.60	€ 67,280.60	€ 76,820.60	€ 87,860.60	€ 97,900.60	€ 113,960.60	€ 126,520.60	€ 139,620.60	€ 195,720.60	
STATUS	€ 8,462.04	€ 1,113.48	€ (6,150.08)	€ 1,506.36	€ (2,677.20)	€ (7,660.76)	€ (10,389.32)	€ (13,887.88)	€ (13,551.04)	€ (15,109.20)	€ (16,551.56)	€ 23,016.08	€ 23,016.08

Fig 2.6 (Year 2 Projection)

Year 3													
INVESTMENT INCOME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Year Starting	€ 23,016.08												€ 23,016.08
Family + Friend Fund													€ -
AIB Loan (7.45%)													€ -
Investors													€ -
Enterprise Ireland (Grad Fund)													€ -
TOTALS	€ 23,016.08	€ -	€ 23,016.08										
OPERATING REVENUE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Advertising	€ 10,000.00	€ 10,000.00	€ 10,000.00	€ 10,000.00	€ 11,000.00	€ 11,000.00	€ 11,000.00	€ 12,000.00	€ 12,000.00	€ 12,000.00	€ 12,000.00	€ 13,500.00	€ 133,500.00
Business Showcase	€ 3,000.00	€ 3,000.00	€ 3,000.00	€ 3,500.00	€ 3,500.00	€ 4,000.00	€ 4,000.00	€ 5,000.00	€ 5,000.00	€ 4,000.00	€ 4,000.00	€ 5,500.00	€ 47,500.00
Donations	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Data Monetization - B2B Analytics	€ -	€ -	€ 5,000.00	€ -	€ 5,000.00	€ 5,000.00	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ 20,000.00
TOTALS	€ 13,000.00	€ 13,000.00	€ 18,000.00	€ 13,500.00	€ 14,500.00	€ 20,000.00	€ 15,000.00	€ 22,000.00	€ 17,000.00	€ 16,000.00	€ 24,000.00	€ 201,000.00	
MONTHLY EXPENSES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YR TOTAL
Rent - West Dublin	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 3,500.00	€ 42,000.00
Insurance - Liability	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 250.00	€ 3,000.00
Salaries - Developer	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 3,600.00	€ 43,200.00
Salaries - UI Designer	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 4,500.00	€ 54,000.00
Salaries - Marketing	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 3,400.00	€ 40,800.00
Legal GDPR Consultants	€ -	€ -	€ 5,000.00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 5,000.00
Loan Repayments	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 778.24	€ 9,338.88
Cloud Compute - GCP (Compu	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 170.94	€ 2,051.28
Licenses - G Suite + Adobe	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 80.18	€ 962.16
Marketing - Advertising + Public	€ -	€ -	€ -	€ -	€ -	€ 500.00	€ -	€ -	€ -	€ -	€ -	€ -	€ 500.00
IT Support - General Tickets	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ -	€ -	€ 300.00	€ 1,200.00
Travel	€ -	€ -	€ 500.00	€ -	€ -	€ 500.00	€ -	€ -	€ -	€ -	€ -	€ 300.00	€ 800.00
Equipment	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Miscellaneous	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 150.00	€ 3,150.00
VAT (Sales Tax)	€ 2,990.00	€ 2,990.00	€ 4,140.00	€ 3,105.00	€ 3,335.00	€ 4,600.00	€ 3,450.00	€ 3,450.00	€ 5,060.00	€ 3,910.00	€ 3,680.00	€ 5,520.00	€ 46,230.00
BURN RATE	€ 15,669.36	€ 15,669.36	€ 17,619.36	€ 20,784.36	€ 16,514.36	€ 17,579.36	€ 16,129.36	€ 18,039.36	€ 16,589.36	€ 16,659.36	€ 19,849.36	€ 207,232.32	
OVERVIEW	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
CUMMULATIVE EXPENSES	€ 15,669.36	€ 31,338.72	€ 48,958										

2.5.1 Year 1 Requirements / Explanations

Year 1 marks PinPoint's launch phase, fueled by a mix of personal investment, external funding, and financial planning. The business starts with €15,000 in personal savings from both owners, supplemented by €6,000 in donations from friends and family and a €25,000 AIB loan at 7.45% interest [22]. These funds are strategically allocated to essential startup costs: €4,000 for IT equipment [13], [14], [15], €1,397.52 per year for initial cloud computing and licenses [23], [24], and €3,500/month for office rent in West Dublin [25], [26]. By May, PinPoint secures an additional €15,000 from Enterprise Ireland's Graduate Fund [27], enabling the hiring of three junior employees. This includes a developer, UI designer, and marketing specialist with salaries totalling €10,000/month.

Revenue starts modestly once the application launches and users begin to test-drive the application. Advertising income begins in June (€200) and grows steadily to €3,000 by December, while the 'Business Showcase' earnings debut at €500 in June and reach €2,500 by year-end. Donations and sponsorships add occasional cash flow, particularly in Q4. However, expenses are front-loaded: Q1-Q2 focuses on setup costs (equipment, legal GDPR compliance, and salaries), while Q3 sees a €750 summer marketing push and €1,000 allocated for travel to a U.S. conference. By September, campus promotions drive another €1,000 in marketing spend, yielding a noticeable uptick in Q4 advertising revenue.

Despite the heavy initial investment, PinPoint ends Year 1 profitably at €16,580.60, which is a strong result for a startup's first year. Key to this success is the strict cash flow management and sticking to our financial plans, loan repayments are maintained and prioritised so we don't owe anyone any money, VAT is accounted for on all revenue, we will evaluate our annual performance and we have put aside €1,500 in terms of miscellaneous to give to our employees as a Christmas bonus to thank them and show gratitude for all the work and commitment they have done for us throughout the year, in hopes that it will lead to greater work ethic for the new year ahead. Proving the viability of PinPoint's model.

2.5.2 Year 2 Requirements / Explanations

Year 2 begins with a strong foundation, carrying forward €16,580.60 from Year 1's profitable operations. This year, we aim to reduce reliance on external funding. Strategic injections, including another sum from the Enterprise Ireland grant (€15,000) and a €40,000 investor lump sum in December, bolster cash flow for targeted growth initiatives. Notably, no additional loans or family/friend funds are required, underscoring the business's increasing self-sufficiency.

Revenue streams expand significantly this year. Advertising income scales from €2,500 in January to €11,000 by December, reflecting PinPoint's growing market presence (Year 2 total: €89,500). The Business Showcase segment remains steady, with consistent earnings (€1,500–€5,000/month) and a Q4 surge tied to holiday demand. A new revenue stream is also introduced, B2B data monetisation debuts in April and September, contributing €10,000 and signalling successful diversification beyond advertising.

Operating expenses remain stable and don't differ from Year 1, with fixed costs like rent (€3,500/month), salaries (€12,000/month for the core team), and loan repayments (€778.24/month) accounting for the bulk of outflows. Salaries are maintained to retain talent, though no new hires are made. Marketing spends are leaner (targeted €500 spikes in May and September), prioritising ROI

from Year 1's campaigns over broad outreach. One-time costs include €5,000 for GDPR compliance in April, ensuring regulatory readiness as data monetisation scales [28].

Year 2 closes with a €23,016.08 profit, validating PinPoint's sustainable model and the rise to earn a sustainable cash flow. The December investor infusion primes the business for Year 3's goals, while retained earnings mitigate future funding needs.

2.5.3 Year 3 Requirements / Explanations

Entering Year 3, PinPoint leverages its €23,016.08 opening balance and operational maturity to fund growth entirely through organic revenue, a milestone marked by zero new loans or investor injections. Advertising revenue soars to €10,000–€13,500/month (Year 3 total: €132,500), driven by brand recognition and optimised campaigns. The 'Business Showcase' segment grows in parallel (€3,000–€5,500/month), while B2B data monetisation doubles its Year 2 contribution to €15,000, with quarterly payouts from March onward.

Expenses reflect strategic scaling. Our team are no longer deemed at the junior levels and as a result, salaries rise as roles transition from "Junior" to mid-level [29] (e.g., Developer salaries increase to €3,600/month), rewarding performance and reducing turnover. Fixed costs persist, but marketing spends drop to a single €500 outlay in May, as traction from other users begins to replace paid pushes. Legal and compliance budgets repeat the Year 1 & 2 pattern (€5,000 in April) to maintain a high-level standard throughout our business's development, though equipment and travel costs plummet. We expect to improve new updated equipment in future years, as opposed to travel costs. We feel that we will not need to travel to expand further, and investors may visit us in our offices to discuss future opportunities.

The second half of Year 3 shines, with Q4 revenue peaking from holiday advertising and B2B contracts. This momentum, paired with negligible debt, positions PinPoint for aggressive reinvestment or expansion. Year 3's profit far exceeds prior years, €16,783.76, considering that we haven't asked or loaned any money for the 3rd year, which further cements the platform's transition from startup to stable enterprise.

2.6 Business Process Model Notation

To better understand how key user interactions are translated into processes, we have modelled key workflows using Business Process Model and Notation (BPMN) using Signavio Academia [30]. These diagrams illustrate how different actors (users and the system) interact to complete important tasks, such as creating events and responding to invitations. BPMN was chosen for its clarity in representing both decision points and role-specific actions, helping bridge the gap between business requirements and system design. The rationale behind our processes is further presented in [3.5 Use Case + Diagrams](#). Here we can understand each process in depth to understand how our business operates.

2.6.1 Register BPMN

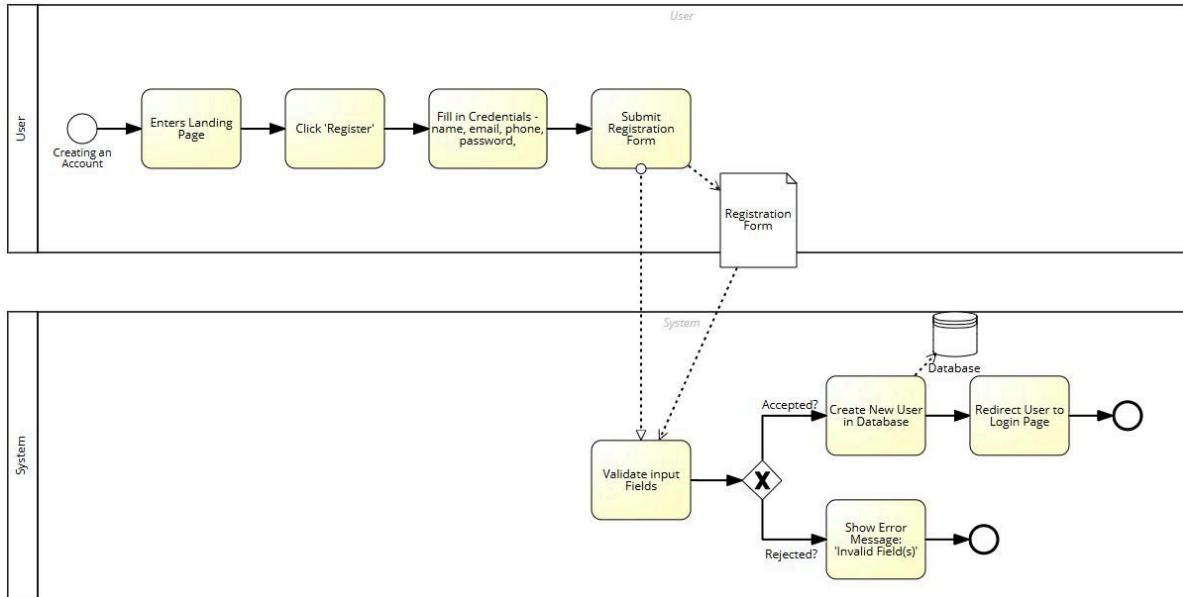


Fig. 2.8 (Register BPMN)

2.6.2 Login BPMN

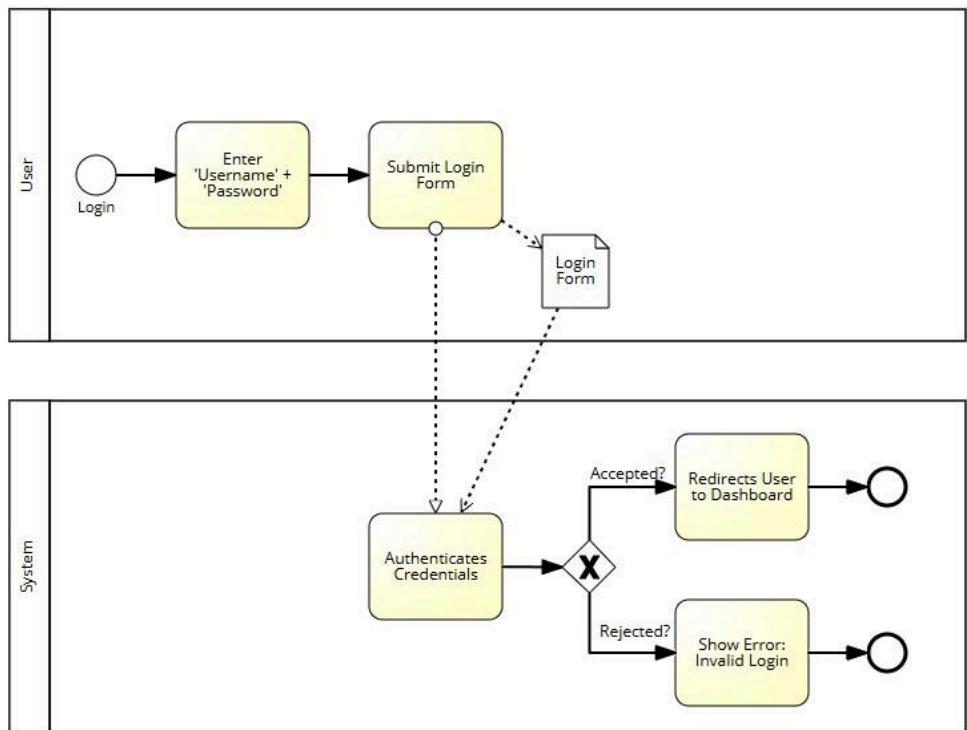


Fig. 2.9 (Login BPMN)

3.6.3 Map Navigation BPMN

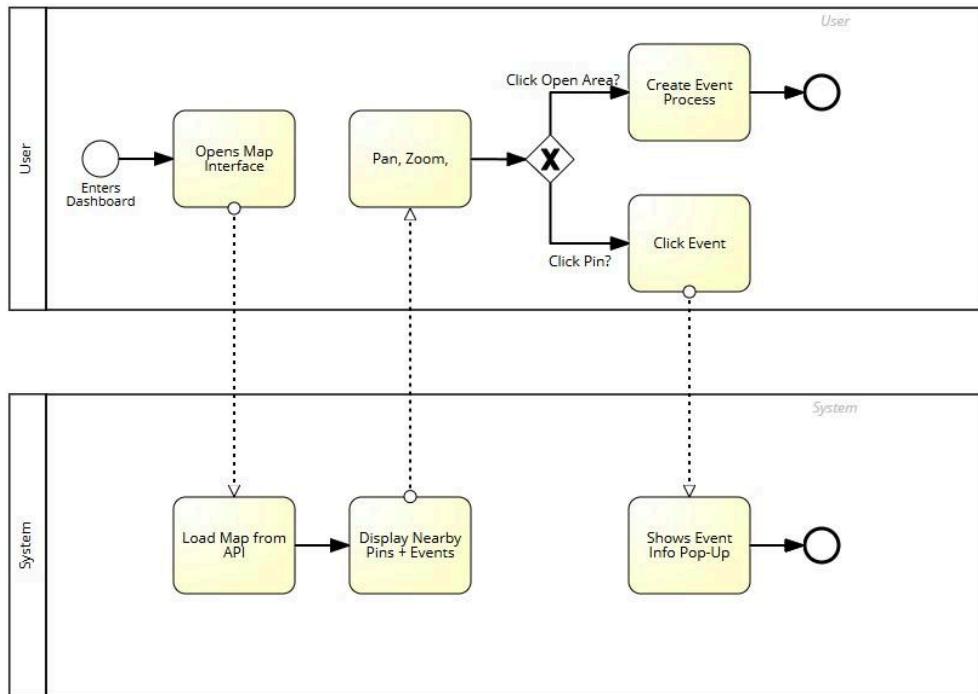


Fig. 2.10 (Map Navigation BPMN)

2.6.4 Event Creation BPMN

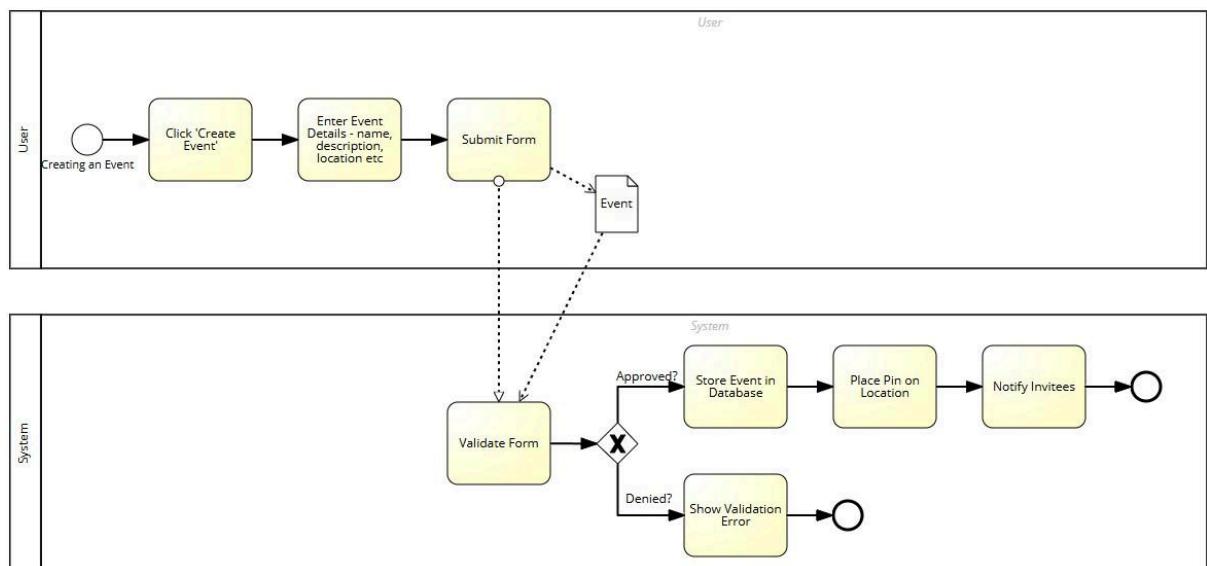


Fig. 2.11 (Event Creation BPMN)

2.6.5 Group Chat BPMN

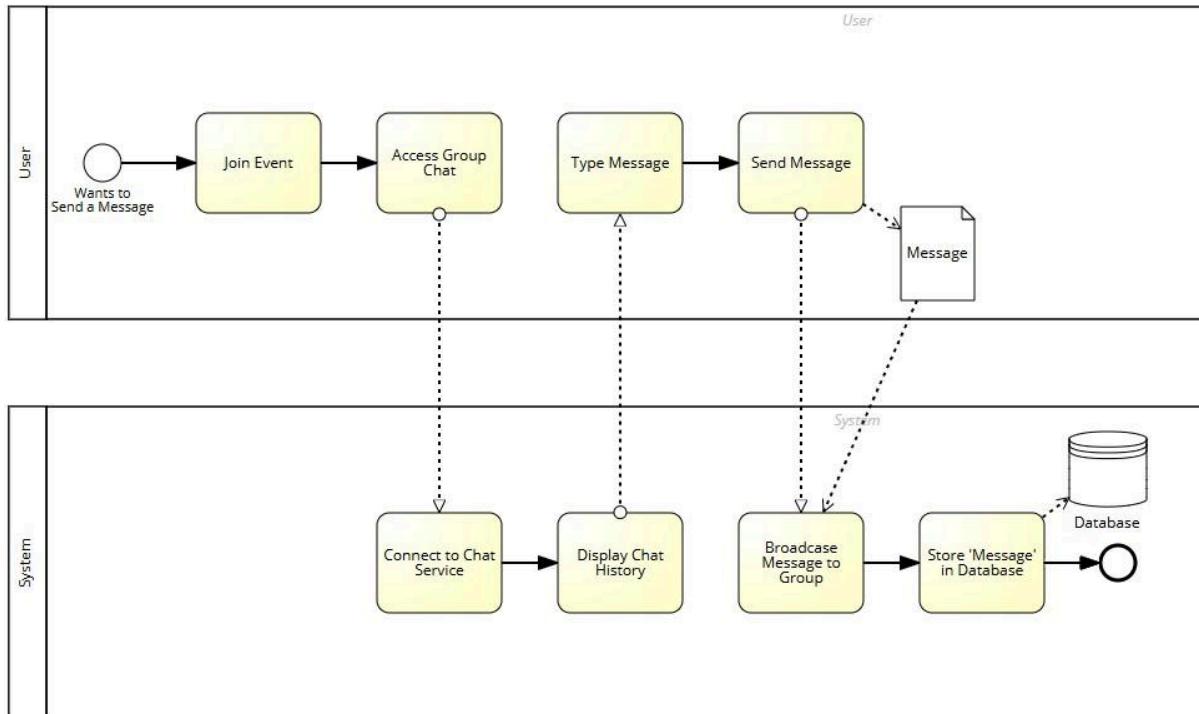


Fig. 2.12 (Group Chat BPMN)

2.6.6 Profile View BPMN

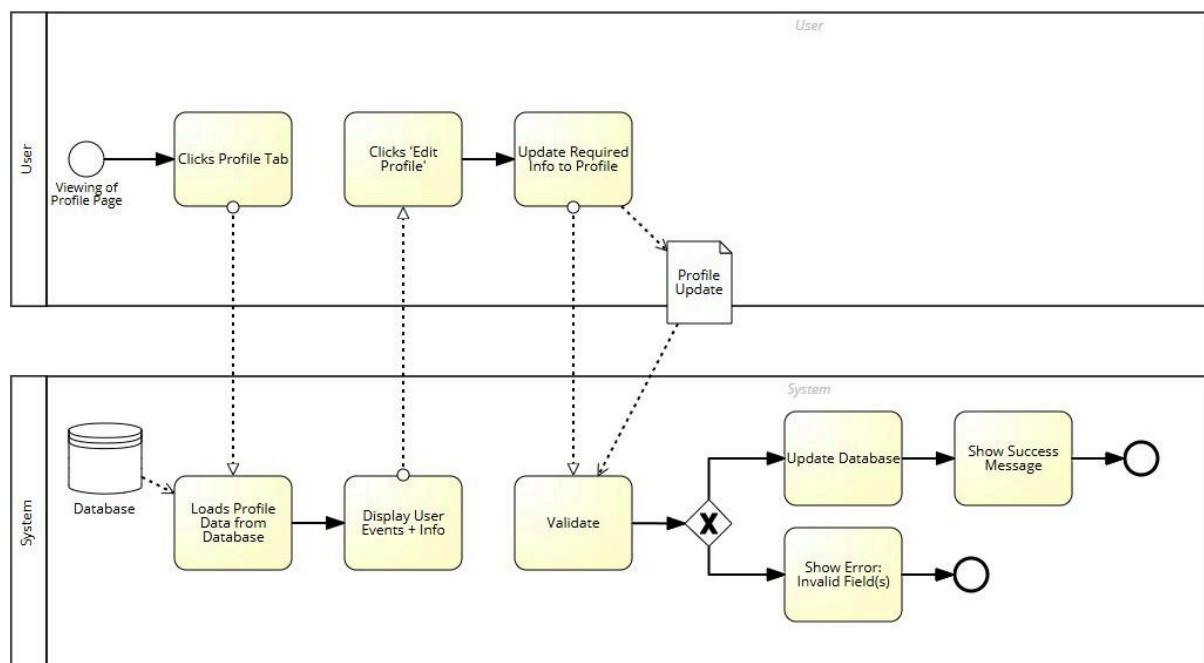


Fig. 2.13 (Profile View BPMN)

2.6.7 Add Friends BPMN

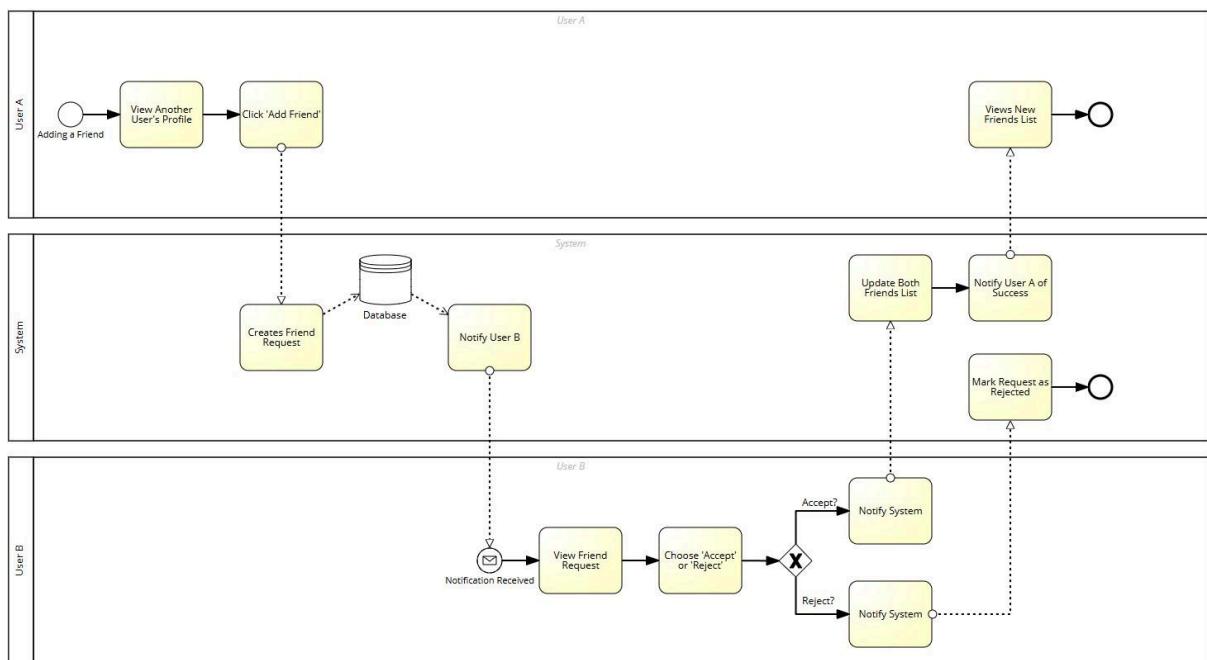


Fig. 2.14 (Add Friends BPMN)

3. Technical Delivery

3.1 Functional Specifications

This section outlines the core functionality of the PinPoint application, detailing the system's expected behaviour, key features, and how users interact with the system. It serves as the foundation for both development and user understanding.

3.1.1 Core Functional Requirements

Function	Description
User Registration	Allows new users to create accounts by submitting personal details. Includes validation and password confirmation.
User Login	Authenticates existing users via username and password. Includes session management and error handling.
Profile View	Displays user-specific data (name, username, events, friends). Allows updating personal info and privacy settings.
Friend Management	Enables sending, accepting, and rejecting friend requests. Friendships are mutual and update in real-time.
Map Navigation	Allows users to explore the map, zoom, pan, and interact with event pins. Shows events relative to the user's location.
Event Creation	Authenticated users can create events, specify details, and drop pins on the map. Events may be public or private.
RSVP Functionality	Invited users can RSVP to events, which updates the event participation list.
Event Display	Pins on the map represent events. Pins change colour based on event status (ongoing, upcoming, showcase).
Group Chat	Users attending the same event can message each other in a shared chat room. Chat updates in real-time using WebSockets.
Business Showcase	Enables business users or event leaders to promote their events through premium pins on the map.

3.1.2 Non-Functional Requirements

Function	Description
Responsiveness	The application must be fully functional across mobile and desktop.
Performance	Map interactions and chat must remain fluid.
Security	All user data must be securely stored and password-protected using Django's authentication mechanisms.

Accessibility	The dark theme must offer contrast; icons and fonts should be clear.
Scalability	The platform should be easily extensible to support more concurrent users and events.

3.2 Software Architecture

The PinPoint application is built on a standard Django web architecture, consisting of three key layers: the User Interface (frontend), the Web Server (application logic), and the Database. This layered approach enables a clear separation of concerns and supports both scalability and modularity.

The backend is developed using the Django web framework, which follows the Model-View-Template (MVT) architectural pattern:

- The Model layer handles database interactions using Django's Object-Relational Mapper (ORM).
- The View layer processes user input, manages business logic, and communicates with models and templates.
- The Template layer renders the HTML output shown to users.

The application was developed using the Django web framework for the backend, with HTML, CSS (& Bootstrap), and JavaScript powering the frontend. We implemented Django Forms to manage user input for core features such as registration, login, event creation, and profile updates. These forms ensure server-side validation and integration with Django's models.

We integrated Leaflet.js and OpenStreetMap for our interactive maps, chosen for being lightweight and open-source. As we progressed, we identified limitations with Leaflet in handling place search and predictive features. As a result, we plan to transition to a Google Maps API in a future release. This would enable more advanced location-based features, including venue autocomplete, real-time crowd insights, and enhanced UX. This change aligns with the long-term goal of making PinPoint a more intelligent and scalable social coordination tool.

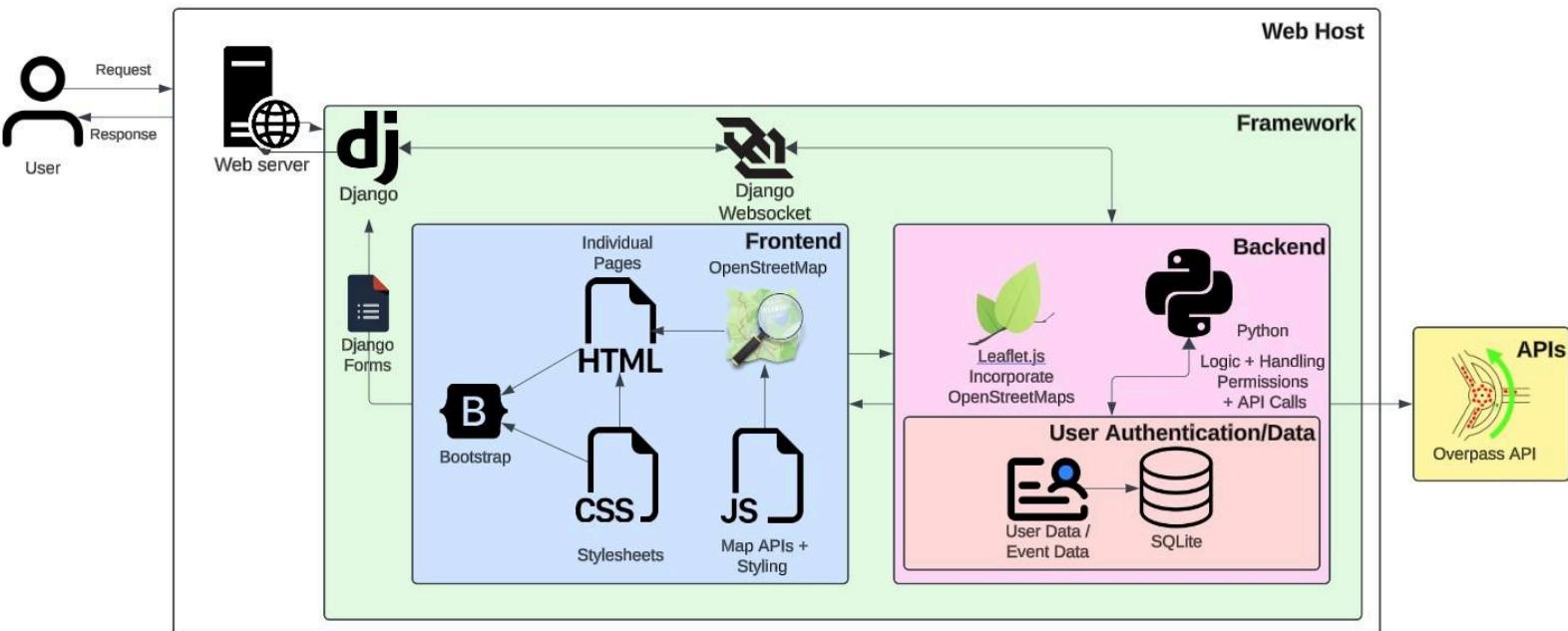


Fig. 3.1 (Software Architecture Diagram)

3.3 Logical Database Design + Storage

As we have been using SQLite for our database storage for all of our fields, the various models we have used must be linked to one another via foreign keys and directed correctly to each user, such that each use case can be carried out successfully.

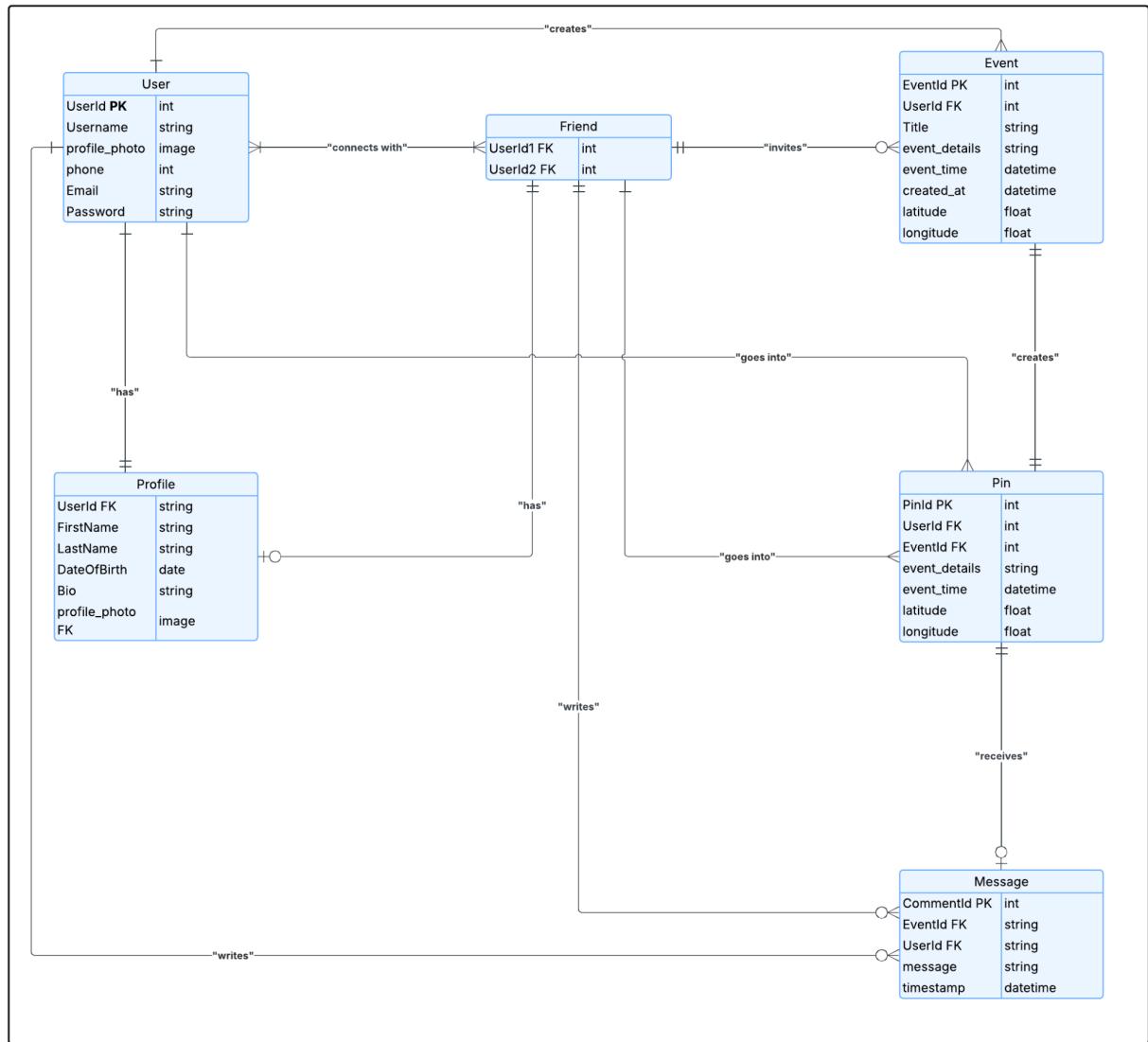


Fig. 3.2 (Logical Database Diagram)

3.4 UML Diagram

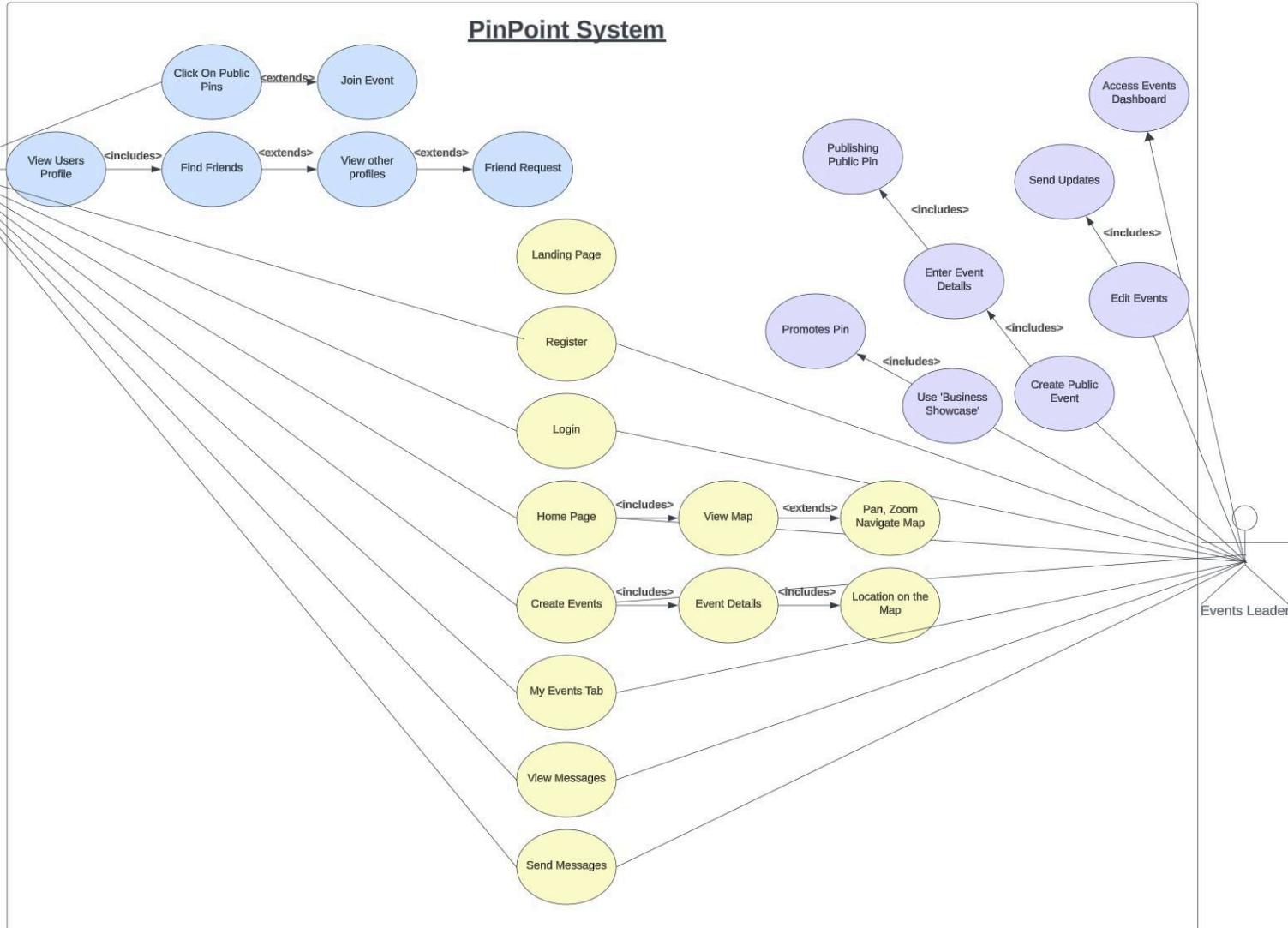


Fig 3.3. (Unified Modelling Language Diagram)

3.5 Use Case + Diagrams

3.5.1 Register

Description:

This function is one of the first things the user encounters upon opening PinPoint. The user will automatically be brought to the register/login page, where they can either fill in details of a preexisting account or click on the 'Register' button, which will lead them to the registration form if they are a new user. The user will then be prompted to enter their details such as name, username, phone number, email address and password twice. If this is curated correctly, they will be able to register for PinPoint.

Criticality:

Without this function, the application would be deemed pointless. Users must be registered for the application so that they can be identified. The main purpose of this project is to connect individuals so that they can create plans and attend events together. It may also be helpful to find various statistics on our users, such as their age range, to help improve our application in the future.

Technical Implementation:

The registration form is implemented in HTML and styled with CSS and Bootstrap. The form submission is handled by Django views, which process user input and interact with the backend using Django's ORM (Object-Relational Mapping). User details are securely stored in the SQLite database, within the built-in "User" model. Form validation includes checks for unique usernames/emails, password confirmation, and required field completion.

Dependencies:

This function operates independently of other features and does not rely on prior inputs or modules.

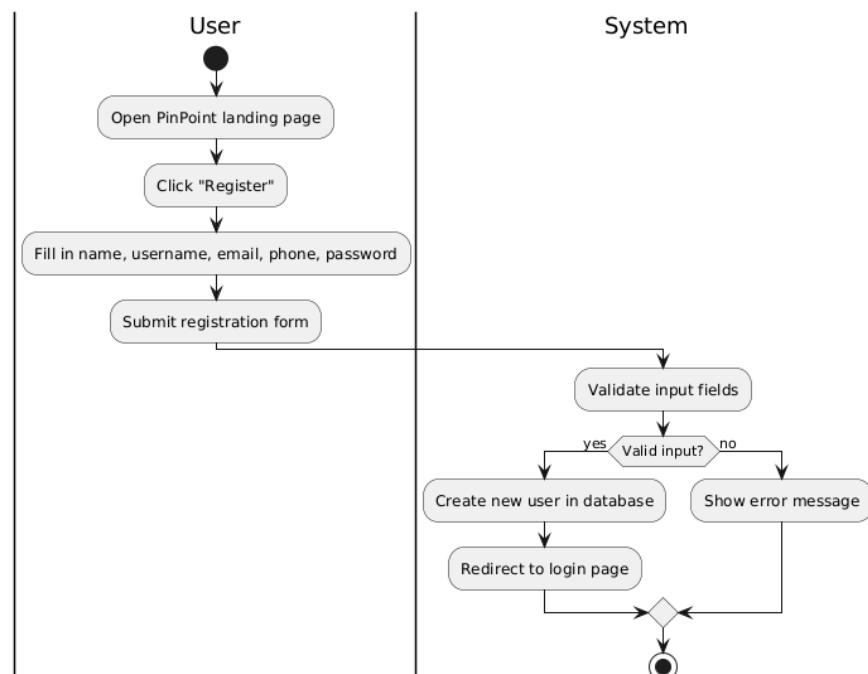


Fig. 3.4 (Register Use Case Diagram)

3.5.2 Login

Description:

This function allows the registered users to access their accounts. Users will enter their username and password on the login form, which will authenticate their credentials against the database. A "Forgot Password" option is included on the login page to aid in account recovery, allowing users to reset their password via a secure workflow. Successful logins will grant users access to the application, while invalid credentials will trigger a relevant error message, prompting users to re-enter their details.

Criticality:

This functionality is essential for maintaining user authentication and application security. Without login capabilities, access is compromised, and users would be unable to interact with any of the personalised or social features of PinPoint, rendering the application purposeless.

Technical Issues:

The login form is implemented using HTML, with styling consistent with the platform's overall aesthetic via CSS and Bootstrap. The backend authentication process is handled using Django's built-in authentication framework, which securely verifies user credentials. Sessions are managed to ensure authenticated users remain logged in as they navigate the platform, while unauthenticated requests are redirected to the login screen.

Dependencies:

The login function is directly dependent on successful user registration. It's dependent on for access to all authenticated areas of the platform, such as event creation, friend interactions, and personalised content.

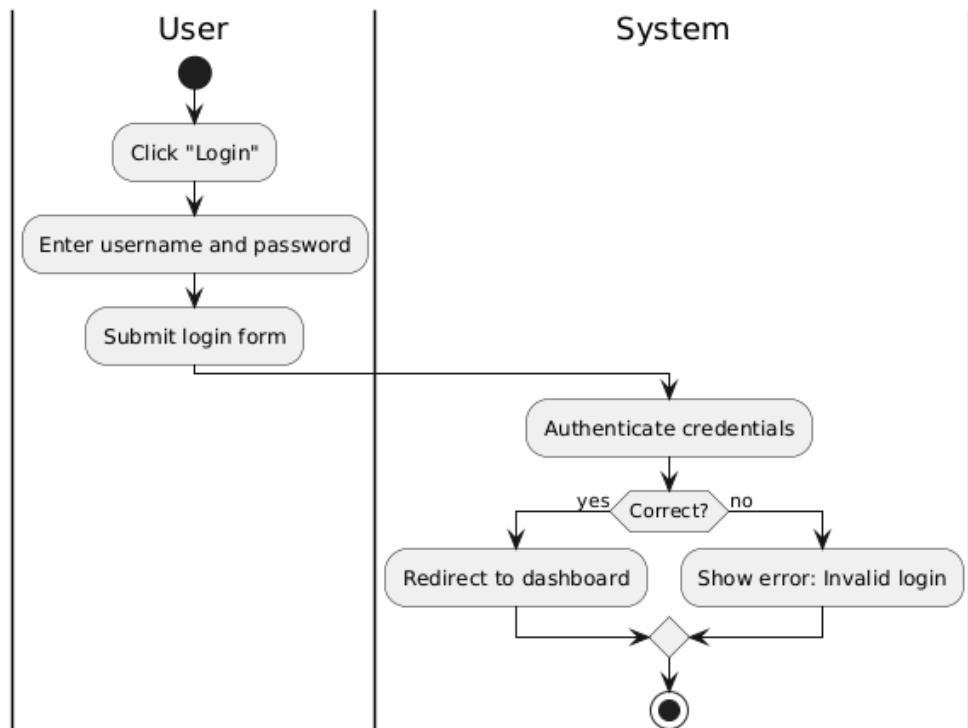


Fig. 3.5 (Login Use Case Diagram)

3.5.3 Map Navigation

Description:

The map navigation feature allows users to interact with PinPoint's dynamic map interface. Through this function, users can explore the surrounding area, discover events represented by pins, and view event-specific details by clicking on those pins. The interface supports zooming, panning, and filtering event pins by criteria such as category or time.

Criticality:

Map navigation is a core component of PinPoint's user experience. The application is designed around spatial event discovery, and without this functionality, users would be unable to visually locate events or understand their proximity, which significantly undermines the platform's value proposition.

Technical Implementation:

Map functionality is implemented using the Leaflet.js library, an open-source JavaScript mapping framework. Leaflet enables efficient rendering of interactive maps with custom markers, popups, and overlays. Event data is retrieved from the backend and plotted as pins on the map in real time.

Dependencies:

Requires a stable internet connection to load tile layers and update event data, and depends on the Leaflet library and associated server (OpenStreetMap). It also relies on up-to-date event data from the backend.

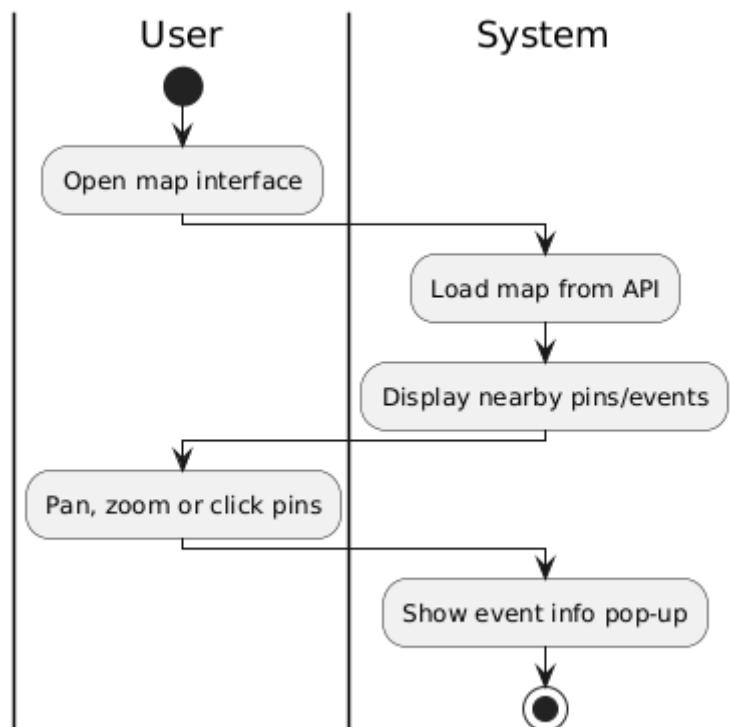


Fig 3.6. (Map Navigation Use Case Diagram)

3.5.4 Event Creation

Description:

The event creation function enables authenticated users to generate and place event pins directly on the map. Users can input essential event details, including event name, description, date, time, and invitees. Once submitted, the event is displayed on the map and becomes accessible to invited users or the public, depending on the visibility setting.

Criticality:

This feature is fundamental to the social purpose of PinPoint. Without the ability to create events, users cannot coordinate plans or visualise shared activities. Event creation is the primary driver of engagement and a key differentiator from more passive social apps.

Technical Implementation:

The event creation form is built using Django forms and styled with Bootstrap for consistency. Upon form submission, the backend validates the input and associates the event with coordinates selected through the Leaflet.js map interface. Events are stored in the database and rendered on the map as pins. Additional logic manages invitees, visibility (public/private), and start/end times, with different pin colours for ongoing or upcoming events.

Dependencies:

Requires user authentication to access event creation tools and depends on the Leaflet map for selecting and storing event locations. Relies on backend data models for user profiles and event management.

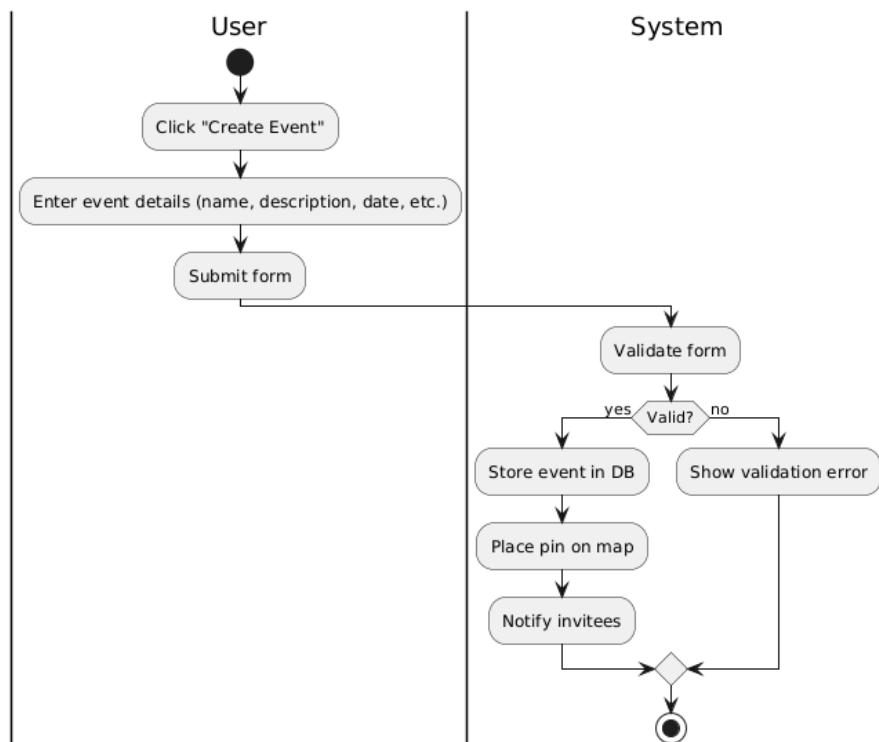


Fig 3.7. (Event Creation Use Case Diagram)

3.5.5 Group Chat

Description:

The group chat feature enables users who are attending an event to communicate through a dedicated chat interface. Within each event, attendees can exchange real-time messages, share updates, and coordinate logistics. The chat interface is accessible directly from the event detail view or the separate group chat view, encouraging interaction and collaboration among participants.

Criticality:

Group chats enhance user engagement and event coordination. It provides a seamless way for attendees to communicate within the context of a specific event, reducing reliance on external messaging apps and improving the overall user experience. This feature supports PinPoint's goal of making social planning more integrated and efficient.

Technical Implementation:

The chat system is built using Django Channels to support real-time communication over WebSockets. Messages are sent and received without the need to refresh the page, enabling fluid conversation between multiple users. Messages are stored in the backend using Django models, associated with specific events and user profiles, along with the timestamp of the message. The frontend uses JavaScript to manage message rendering and reading the chats history before updating the chat interface dynamically.

Dependencies:

Requires user authentication to ensure user identification. Group chats depend on event creation, as each chat room is linked to a specific event instance. Relies on Django Channels and WebSocket support for real-time message delivery.

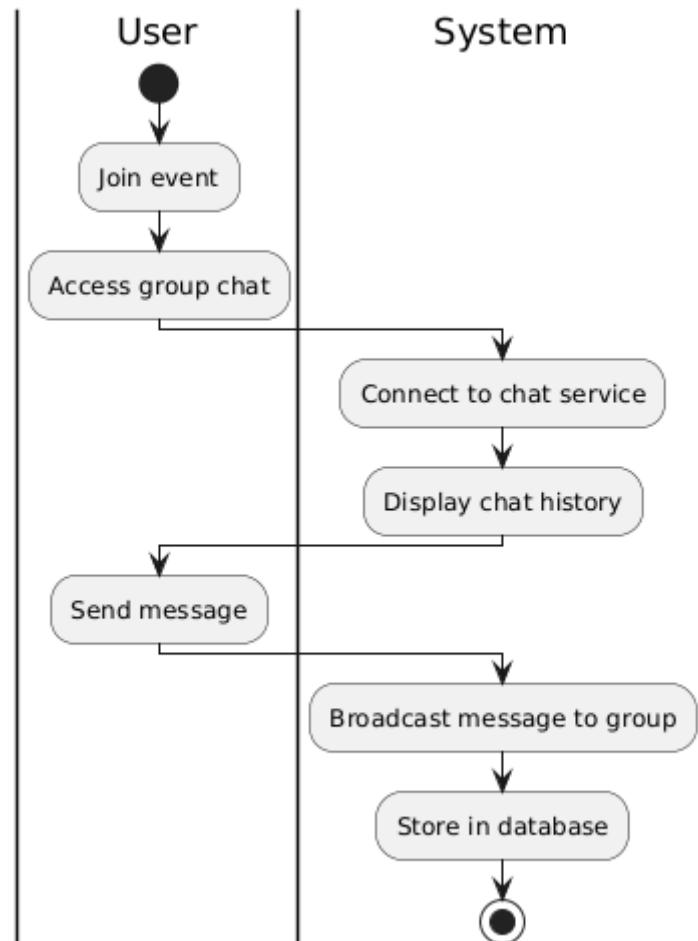


Fig 3.8. (Group Chat Use Case Diagram)

3.5.6 Profile View

Description:

The profile view provides each user with a personalised page displaying their account details, including name, username, and profile picture. Users can access this page to edit their personal information.

Criticality:

The profile view is essential for personalising the user experience and fostering a sense of ownership and trust within the application. It empowers users to manage their identity, review their activity, and customise how they appear to others, all of which contribute to user satisfaction and retention.

Technical Implementation:

User data is retrieved from the database and rendered using Django templates. The interface is dynamically populated with event and pin data associated with the logged-in user. Editable fields (e.g., name, username, profile image) are managed through Django forms, with robust form validation and secure database transactions to protect data integrity. The frontend is styled to maintain visual consistency with the rest of the application.

Dependencies:

Requires successful user registration and authentication.

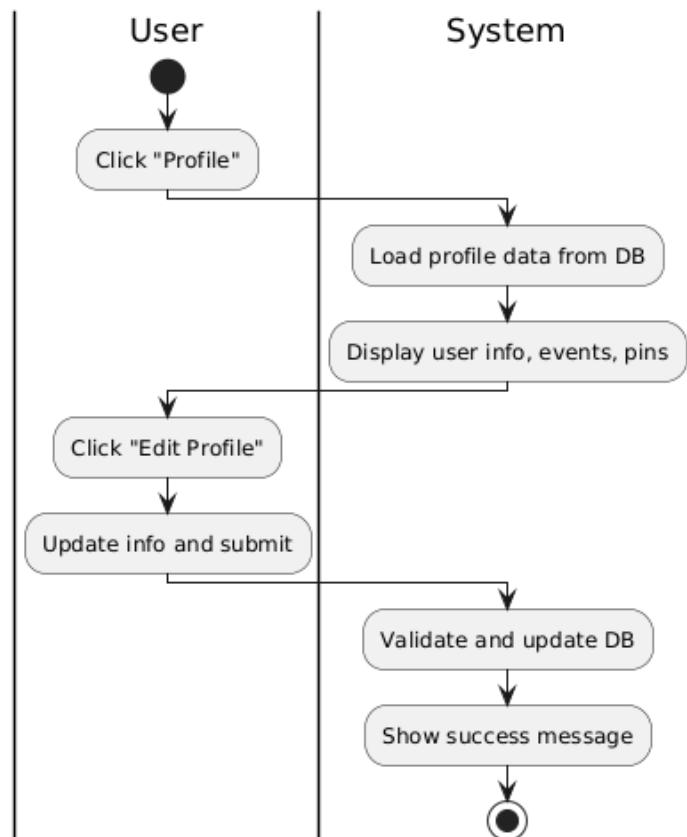


Fig 3.9. (Profile Use Case Diagram)

3.5.7 Add Friends

Description:

The add friends feature enables users to connect by sending, accepting, or rejecting friend requests. Once connected, users can view each other's profiles, invite friends to events, and engage in group chat functionalities. Friendships are mutual and stored in the database, contributing to the user's network within the platform.

Criticality:

This feature plays a crucial role in enhancing social interaction and community-building on PinPoint. By allowing users to form direct connections, it supports features like group event planning, private interactions, and personalised event recommendations. Without this, user engagement and retention would be significantly reduced.

Technical Implementation:

The system uses a custom Django model to manage friend relationships and friend requests, including their status (pending, accepted, rejected). The frontend interface updates dynamically to reflect the current state of each friendship action. This includes showing appropriate buttons such as "Add Friend", "Request Sent", or "Accept/Reject Request". Changes are handled seamlessly for a responsive user experience.

Dependencies:

Requires user authentication and a valid user profile. Depends on the profile view functionality for interaction points. Integrates with other features such as event invitations and group chat to provide a seamless social experience.

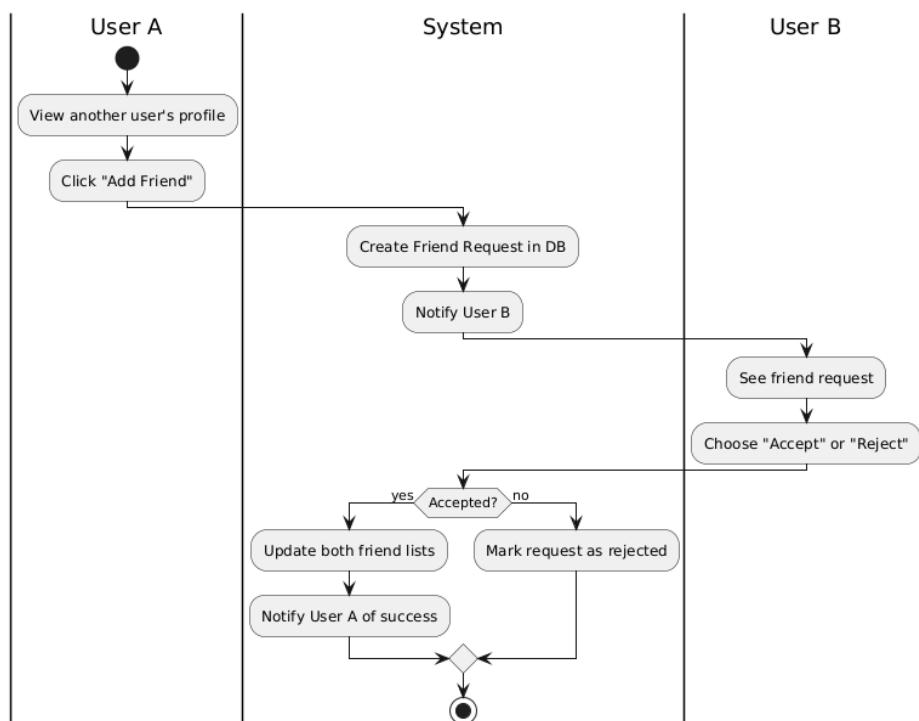


Fig 3.10. (Add Friends Use Case Diagram)

3.6 Data Flow Diagram

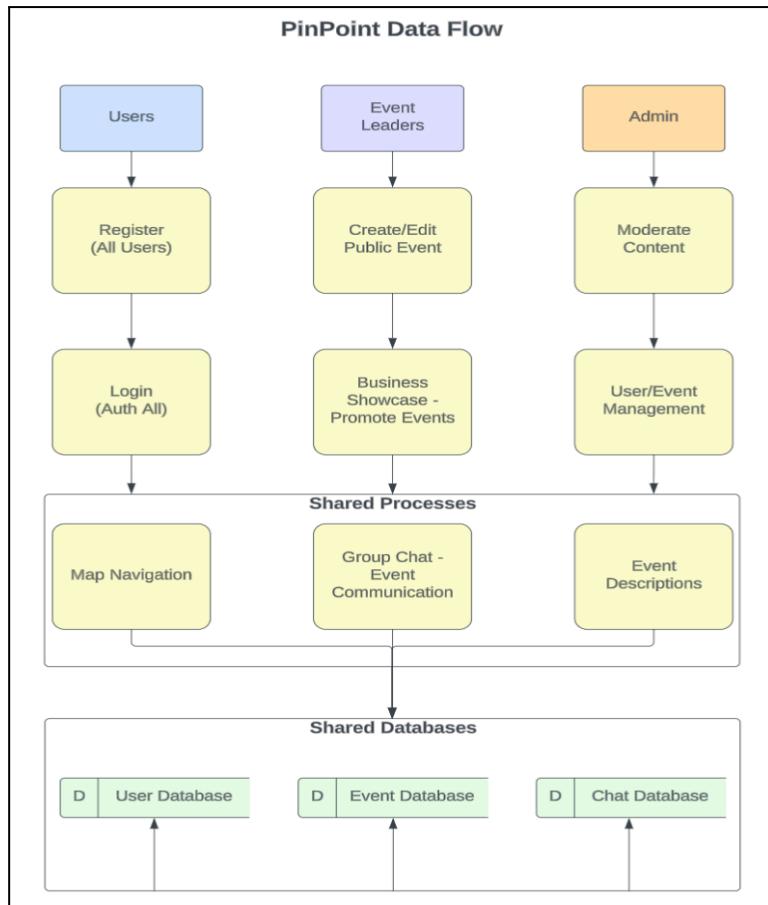


Fig 3.11. (Data Flow Diagram)

3.6.1 Data Flow Explanation

PinPoint interacts with three external entities (user, event leader and admin). Each of these plays a distinct role in the application ecosystem. Users are the regular individuals who register, login, explore and joining events or group chats to connect with their friends. Event leaders are a privileged subset of users who have additional features such as creating and managing public events and promoting through the ‘Business Showcase’. Admins are the system moderators who moderate the content, manage user/event approvals, and ensure platform compliance.

Some features and operations are shared across all users. Map navigation allows users to interact with the event map, including zooming, panning, and clicking event pins for more information. The group chat features event communication by enabling users attending the same event to message each other in a shared chat room with real-time responses. Additionally, all users can view event descriptions, and those with appropriate privileges can edit events they have created.

To support these processes, the system uses several internal data stores. The ‘User Database’ holds personal information such as names, phone numbers, email addresses, and profile pictures. The ‘Event Database’ maintains records of each event’s details, including the title, location, date and time, and description. Finally, the ‘Chat Database’ stores the conversations associated with each event, including message content and timestamps, ensuring seamless and structured communication within the platform.

3.7 Zachman Framework

3.7.1 Zachman Framework (Owner)

This table represents the application from our viewpoint as the owners. It focuses on what the system means in terms of user value, organisational goals, and strategic needs.

Interrogative	Description
What (Data)	List of events, users, locations, RSVPs, and friend connections.
How (Function)	User actions: Create event, RSVP, Add Friend, Message.
Where (Network)	Map interface, events shown based on location.
Who (People)	Users, organisers.
When (Time)	Events occur at scheduled times.
Why (Motivation)	To help users plan social gatherings and discover events easily.

Fig. 3.12

3.7.2 Zachman Framework (Technical Designer)

This table presents the system from the viewpoint of the technical designer. It defines how the system is built, structured, and deployed in technical terms, focusing on software and infrastructure.

Classification	Description
What (Data)	Django models: User, Event, RSVP, Message, FriendRequest.
How (Function)	Django views, WebSocket consumers, API endpoints.
Where (Network)	Hosted on local/dev server; Leaflet for map rendering.
Who (People)	Developers, system admins, frontend & backend contributors.
When (Time)	Real-time chat.
Why (Motivation)	Deliver a scalable app that meets user needs.

Fig. 3.13

3.8 External Software Interfaces

PinPoint integrates with several third-party tools, libraries, and APIs to enhance functionality, user experience, and development efficiency. Below is an overview of the key external software interfaces used in the project:

3.8.1 Leaflet.js

- **Purpose:** A lightweight JavaScript library for rendering interactive maps.
- **Why We Chose It:** Leaflet is open-source, customisable, and highly efficient for responsive maps.
- **How We Used It:** Leaflet is embedded into the frontend via JavaScript and connects dynamically with the Django backend to fetch and render event pins based on location data. Events are represented as clickable markers that display event details in popups.

3.8.2 SQLite

- **Purpose:** A lightweight, file-based relational database.
- **Why We Chose It:** SQLite is simple to configure and ideal for development and early-stage deployment. It requires no separate server and integrates seamlessly with Django.
- **How We Used It:** SQLite serves as the default backend for Django's ORM. It stores all models, including users, events, messages, and friendship data. Future production deployments may migrate to PostgreSQL for scalability.

3.8.3 Django

- **Purpose:** A high-level Python web framework used to develop the backend logic.
- **Why We Chose It:** Django provides built-in support for user authentication, database interaction, templating, and routing, which significantly accelerates development time and ensures security.
- **How We Used It:** Django handles all core application logic, routing, session management, and serves both the frontend templates and REST endpoints for dynamic data.

3.8.4 Django Channels

- **Purpose:** An extension to Django that enables handling and WebSocket support for real-time features.
- **Why We Chose It:** Needed to support group chat functionality within events. Channels allow the backend to handle multiple simultaneous WebSocket connections.
- **How We Used It:** Used to manage real-time message delivery within event-based chatrooms. The consumers.py file defines WebSocket behaviour for sending/receiving messages, which are then stored via standard Django models [31].

3.8.5 Bootstrap

- **Purpose:** A frontend framework for responsive UI design.
- **Why We Chose It:** Bootstrap offers a wide range of pre-styled components, reducing the need for custom CSS and ensuring consistency across views and devices.
- **How We Used It:** Integrated through the HTML templates rendered by Django. It is used across all forms and UI elements, including the login/register pages, event cards, navigation bar, and profile views.

3.8.6 Google Calendar Export (.ICS)

- **Purpose:** Allows users to export event details directly to Google Calendar, enhancing event visibility and personal scheduling.
- **Why We Chose It:** Google Calendar is one of the most widely used scheduling platforms, and providing an export function increases user convenience and engagement.
- **How We Used It:** Within the event details, users are offered an “Add to Google Calendar” button. This generates a pre-formatted .ics file that complies with calendar standards and opens in the user's Google Calendar for quick import. The event metadata (title, time, description, location) is embedded automatically.

3.9 Performance Requirements

With PinPoint, we aimed to stress test our application as much as we possibly could. Across various critical features to ensure reliability and responsiveness under realistic usage conditions. One of the core areas tested was the map interface, which is central to the PinPoint experience. On average, the page responsible for loading the interactive map and a user's events returned load times ranging from 0.79 seconds to 1.4 seconds. This is considered efficient to us, especially given that it must dynamically retrieve user-specific data such as their location, event pins, and have OpenStreetMaps through leaflet.js and not just render a static HTML page.

When integrating external services such as the Overpass API for location-based venue discovery, response times ranged from 1.2 to 2.8 seconds, depending on the complexity of the query and the specificity of the search term, whether it was a way, node or a relation item on the map. Although you would think almost 3 seconds is a long time for a user to be waiting, it would remain within acceptable limits for a real-time application, especially considering the variability in external API performance.

PinPoint performs well when handling key user actions. In testing, the “event creation” page loaded quickly, with response times between 0.97 and 1.1 seconds. This shows that the backend handles user logins and pages with form requests efficiently. The test confirms that the backend infrastructure, including Django's ORM and view logic, efficiently handles user requests and interactions with database-driven forms.

As well as this, we also tested chat responsiveness under simulated group conversations and found real-time updates via WebSockets to be near-instantaneous, with delays typically under 250 milliseconds, which is well within acceptable thresholds for seamless communication. Although this was locally tested it is a good thing to mention for performance.

Overall, PinPoint has demonstrated strong performance in both static and dynamic scenarios. These results show that the platform is well-suited for real-time user engagement while maintaining a responsive experience.

3.10 UI Design & Rationale

The user interface for PinPoint was designed with clarity, familiarity, and ease of use in mind. The overall visual and interaction design aims to make users feel immediately comfortable while offering a unique experience centred around event discovery and planning. To see the evolution of our UI as well as the final product, please see [Appendix E - UI Screenshots and Progress Pictures](#).

3.10.1 Design Tools Used

Initial mockups were created by Robert in Penpot during Week 5 to present to our supervisor, which laid the foundation for the application's final design. These designs influenced the layout and visual direction of the frontend templates developed in HTML/CSS using Bootstrap. These mockups can be seen below as (Fig. 3.14).

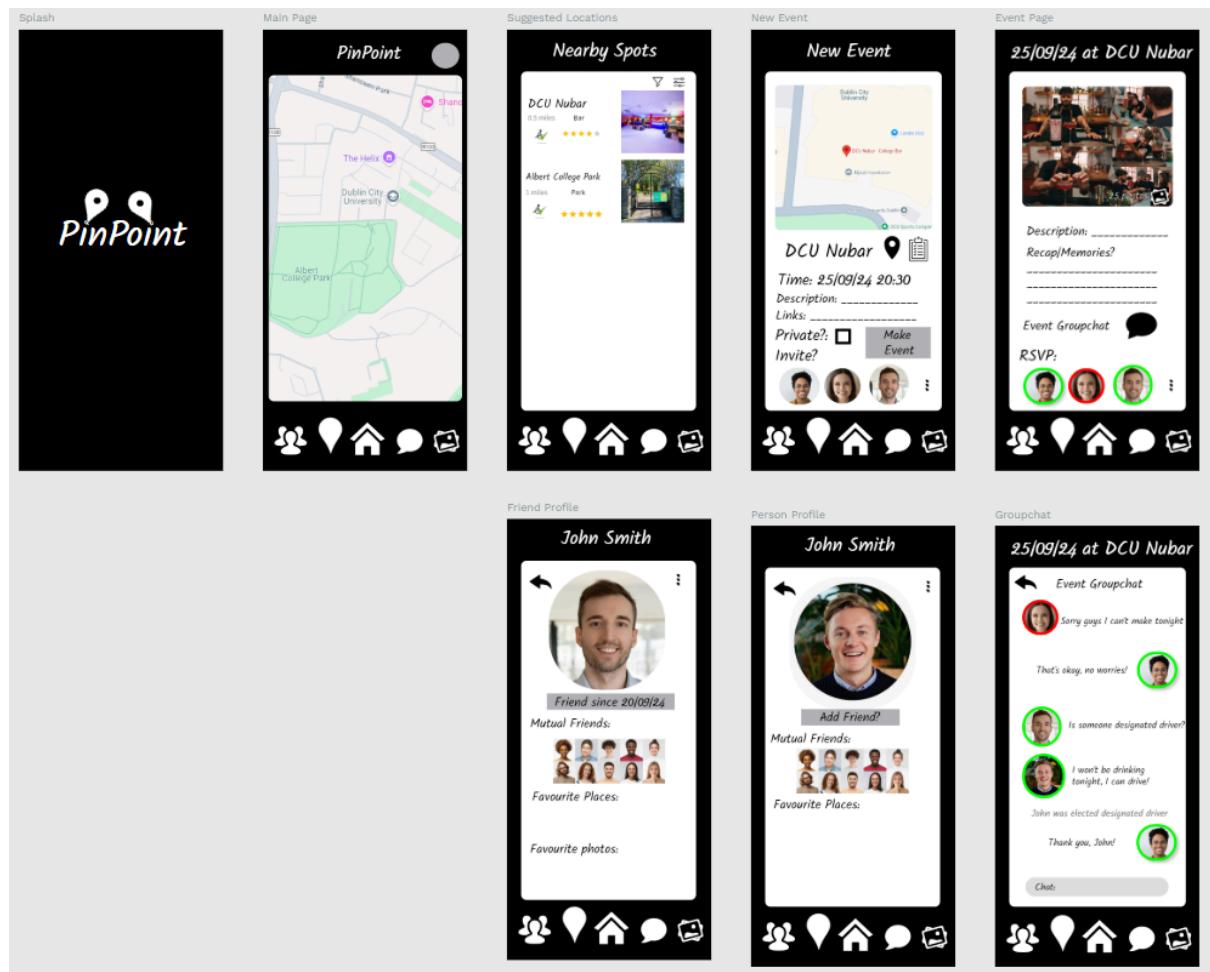


Fig 3.14 (Pinpoint Mockups)

3.10.2 Accessibility Considerations

A dark theme was used throughout, chosen for its reduced eye strain and wide appeal among mobile users. The high-contrast colours ensure that text and icons are legible against background elements. We ensured the interface is fully responsive, allowing for seamless use on both desktop and mobile devices.

3.10.3 Design Consistency & Rationale

The PinPoint interface was designed to feel both intuitive and familiar, taking cues from widely used social media platforms to reduce the learning curve for new users. To maintain a consistent user experience across the app, we reused:

- Navigation bar structure, available on every screen for predictable access.
- Button and icon styles, ensuring a cohesive visual language.

Included below in (Fig. 3.15) are examples of PinPoint's UI. Icons were selected to represent their respective functions (e.g. a home icon for the home screen, a message bubble for chat), reducing ambiguity and supporting accessibility. Interactions with the map behave similarly to conventional mapping tools, allowing users to pan, zoom, and select pins with ease. This familiarity reinforces a smooth onboarding experience and makes exploring events feel natural and engaging.

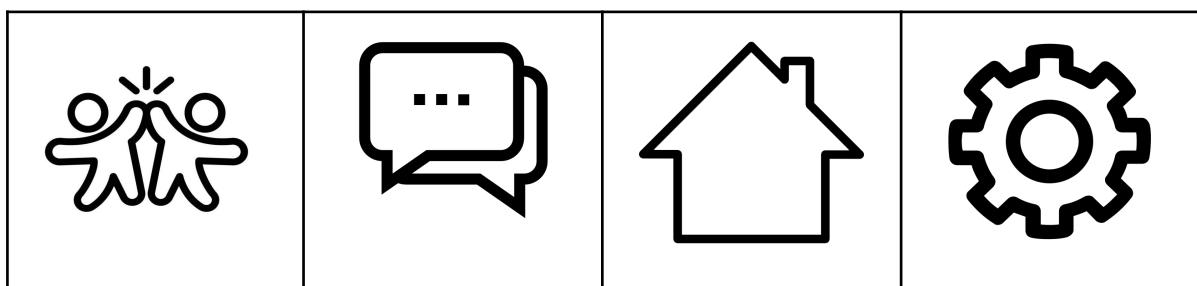


Fig 3.15 (Left to right: Friends, Chat, Home, Settings)

3.11 User stories

3.11.1 A Parent Planning a Child's Birthday Party

**As a parent planning a birthday party for my 3-year-old in the local park,
I want to easily create an event and invite family members,
so that everyone can find the location and details without confusion, especially older
relatives who aren't very tech-savvy.**

We designed PinPoint with accessibility in mind, ensuring that even less tech-savvy users can easily navigate the platform. The event creation form is straightforward and guided, requiring only essential information. By allowing users to drop a pin directly at the event's location within the park, the event becomes immediately visible on the map to all invited guests. Additionally, we use clear, recognisable icons and a clean layout to ensure the app is user-friendly for users of all ages. This means family events are easy to coordinate, and no one is left confused or excluded.

3.11.2 A DCU Society Events Officer

**As an events officer for a DCU society,
I want to create a public event for welcoming new members,
so that interested students can find it on the map, and existing members can be directly
invited.**

PinPoint supports both public events and private invitations, enabling societies to promote their events widely while still maintaining control over who gets directly notified. When creating an event, organisers can set its visibility to ‘public’ so any nearby user can see it on the map, while also inviting specific attendees, like existing society members, through the platform. The RSVP system allows the committee member to track interest and plan accordingly. This dual approach helps societies grow by reaching new students while keeping their community engaged.

3.11.3 An International Student Discovering New Places/Events

As a new international student unfamiliar with the area,
I want to explore events and places around me on a map,
so that I can connect with others and discover opportunities near my accommodation.

To help new users, events are clearly pinned on the map, and tapping a pin reveals event details, organiser info, and RSVP options. Users can use tags such as “Leisure”, “Restaurant”, “Amenities” and “Landmark” to browse nearby places [32]. This approach ensures international students can quickly connect with local communities and settle in more comfortably, promoting both inclusion and discovery.

3.12 Source Code Highlights

This section presents excerpts from the PinPoint source code that demonstrate important technical moments, clean implementation, and logic.

The selected snippets illustrate how we handled core functionality such as event management, real-time chat and user interaction with the map. Each highlight is included with a brief explanation of its purpose, how it fits into the overall architecture, and why it represents good coding practice in terms of clarity, efficiency, and maintainability.

3.12.1 Event Creation View

```
@login_required
def public_event_create(request):
    if request.method == "POST":
        form = EventForm(request.POST)

        if form.is_valid():
            event = form.save(commit=False)
            event.created_by = request.user
            event.is_public = True

            # Handle tags
            try:
                import json
                tag_data = request.POST.get('tags', '[]')
                event.tags = json.loads(tag_data)
            except:
                event.tags = []

            event.in_showcase = request.POST.get('in_showcase') == 'True'
            event.save()
            form.save_m2m()
            return redirect('event_detail', event_id=event.id)
    else:
        latitude = request.GET.get('latitude', '')
        longitude = request.GET.get('longitude', '')
        place_name = request.GET.get('name', '')
        form = EventForm(initial={
            'latitude': latitude,
            'longitude': longitude,
            'location_name': place_name,
            'name': place_name,
            'is_public': True,
            'tags': '[]'
        })
        form.fields['invitees'] = request.user.friends.none()

    return render(request, 'public_event_create.html', {'form': form})
```

```
@login_required
def event_create(request):
    if request.method == "POST":
        form = EventForm(request.POST)
        form.fields['invitees'].queryset = request.user.friends.all()
        if form.is_valid():
            event = form.save(commit=False)
            event.created_by = request.user
            event.save()
            form.save_m2m() # Save invited users
            return redirect('event_detail', event_id=event.id)
    else:
        latitude = request.GET.get('latitude', '')
        longitude = request.GET.get('longitude', '')
        place_name = request.GET.get('name', '')
        form = EventForm(initial={
            'latitude': latitude,
            'longitude': longitude,
            'location_name': place_name,
            'name': place_name,
            'is_public': False
        })
        form.fields['invitees'].queryset = request.user.friends.all()

    return render(request, 'event_create.html', {'form': form, 'favourites': favourites})
```

Event Create, Event Create)

This Django view enables authenticated users (particularly for event leaders) in PinPoint to create public events. When handling a POST request, it validates the submitted form and sets key fields like `is_public` to `True`, associates the event with the user, and processes the preset tags from `models.py` from the request as JSON.

It also checks if the event should appear in the showcase via a form toggle.

On GET requests, it pre-fills location details and disables the invitees field since public events don't target specific users.

Below is similar code; however, it is intended for personal use with friends or family.

When accessed via a GET request, it pre-fills the form with location data passed from the map that was clicked on. The form also limits the list of invitees to the user's friends. On a POST request, the form is submitted and validated.

If valid, the event is saved with the current user as the creator, and any invited users are stored through `save_m2m()`, which is an abbreviation of the many-to-many format.

After creation, the user is then redirected to the event detail page so that they can see what event they have just created. This view ensures that only authenticated users can access event creation and simplifies the process using pre-filled data and friend filtering.

Fig 3.16 (Top to bottom: Public

3.12.2 Map Rendering



```
function initializeMap(lat, lon) {
    map = L.map('map').setView([lat, lon], 13);

    L.tileLayer('https://s.tile.openstreetmap.org/{z}/{x}/{y}.png', {
        maxZoom: 19,
        attribution: '&copy; <a href="https://www.openstreetmap.org/copyright">OpenStreetMap</a>
contributors'
    }).addTo(map);

    // Save user's location globally
    userLat = lat;
    userLon = lon;

    // User location marker and accuracy circle - Moved from out of function to inner
    userMarker = L.circleMarker([userLat, userLon], {
        radius: 8,
        color: '#3388ff',
        fillColor: '#3388ff',
        fillOpacity: 1
    }).addTo(map);

    accuracyCircle = L.circle([userLat, userLon], {
        radius: 1500,
        color: '#3388ff',
        fillColor: '#3388ff',
        fillOpacity: 0.2
    }).addTo(map);

    // Add event pins
    const today = new Date();
    events.forEach(event => {
        const markerIcon = new L.Icon({
            iconUrl: event.in_showcase
                ? '{% static "icons/showcase_pin.png" %}'
                : event.ongoing
                    ? '{% static "icons/ongoing_pin.png" %}'
                    : '{% static "icons/pin.png" %}',
            iconSize: [32, 32],
            iconAnchor: [16, 32],
            popupAnchor: [0, -32]
        });

        const marker = L.marker([event.lat, event.lng], { icon: markerIcon }).addTo(map);
    });
}
```

This JavaScript function sets up the interactive map using Leaflet.js, centring it on the user's location, provided they allow location to be used (lat, lon).

It loads OpenStreetMap tiles and stores the user's coordinates globally for later use.

A circle marker pinpoints the user's exact location, while an accuracy circle visually represents a 1.5km radius around them - this circle is what is defined as nearby.

The function also loops through a list of events, placing event-specific markers on the map.

Each marker uses a custom icon depending on the event's status (ongoing, showcase, or standard), making it easy for users to visually distinguish between different event types.

Fig 3.17 (Map Rendering Snapshot)

3.12.3 Django Channels

● ● ●

```
class ChatConsumer(AsyncWebSocketConsumer):
    async def connect(self):
        self.event_id = self.scope['url_route']['kwargs']['event_id']
        self.room_group_name = f"chat_{self.event_id}"

        await self.channel_layer.group_add(
            self.room_group_name,
            self.channel_name
        )
        await self.accept()

    messages = await self.get_chat_history(self.event_id)
    await self.send(text_data=json.dumps({
        "type": "chat_history",
        "messages": messages
    }))

    async def disconnect(self, close_code):
        await self.channel_layer.group_discard(
            self.room_group_name,
            self.channel_name
        )

    async def receive(self, text_data):
        data = json.loads(text_data)
        user = self.scope["user"]

        if not user.is_authenticated:
            await self.close()
            return

        if 'message' in data and data['message']:
            message = data['message']
            await self.save_message(user, message, self.event_id)
            await self.channel_layer.group_send(
                self.room_group_name,
                {
                    'type': 'chat_message',
                    'message': message,
                    'username': user.username
                }
            )
```

The ChatConsumer class, which is found in consumers.py, handles real-time messaging for events using Django Channels.

Upon connection, it joins a WebSocket group based on the event ID (event_id), allowing users to receive and send messages related to a specific event.

When a user connects, the system fetches and sends the chat history to the client.

The receive method processes incoming messages, ensuring that only authenticated users can send messages. New messages are saved to the database and broadcast to all participants in the event's chat group via the WebSocket.

If a user disconnects, the consumer removes them from the group, ensuring proper session management.

Fig 3.18 (Channels Utilisation Snapshot - from consumers.py)

3.12.4 RSVP Handling Logic



```
{% if user != event.created_by %}
    <form method="POST" action="{% url 'rsvp_event' event.id %}" class="mt-4">
        {% csrf_token %}
        <div class="input-group">
            <select name="status" class="form-select">
                <option value="yes">Yes</option>
                <option value="no">No</option>
                <option value="maybe">Maybe</option>
            </select>
            <button type="submit" class="btn btn-primary">RSVP</button>
        </div>
    </form>
{% endif %}

<div class="card p-3 bg-secondary mt-4">
    <h5 class="mb-3">RSVP Responses</h5>
    <p class="mb-2"><strong class="text-success">Yes:</strong>
        {% for rsvp in all_rsvps %}
            {% if rsvp.status == "yes" %} {{ rsvp.user.username }}{% if not forloop.last %}, {% endif %}{% endif %}
            {% endfor %}
        </p>
        <p class="mb-2"><strong class="text-danger">No:</strong>
            {% for rsvp in all_rsvps %}
                {% if rsvp.status == "no" %} {{ rsvp.user.username }}{% if not forloop.last %}, {% endif %}{% endif %}
                {% endfor %}
            </p>
        <p><strong class="text-warning">Tentative:</strong>
            {% for rsvp in all_rsvps %}
                {% if rsvp.status == "maybe" %} {{ rsvp.user.username }}{% if not forloop.last %}, {% endif %}{% endif %}
                {% endfor %}
            </p>
    </div>
```

This HTML section displays an RSVP form for users who are not the event creator.

The form allows users to select their attendance status (Yes, No, Tentative) and submit it via a POST request.

Upon submission, the status is updated, and the form is processed by the rsvp_event URL. Below the form, the RSVP responses for the event are displayed in a styled card.

It categorises users based on their RSVP status. Yes, No, or Maybe and dynamically lists the usernames of attendees in each category, ensuring proper formatting with commas between names and colour coordination between selections.

The display ensures that users can quickly see who has confirmed their attendance, declined, or shown tentative interest in the event.

Fig 3.19 (RSVP - Managing Selection - from event_detail.html)

3.13 Technical Challenges

3.13.1 Real-Time Messaging with Django Channels

Implementing group chat via WebSockets required learning and configuring Django Channels, including asynchronous consumers and proper routing.

3.13.2 Event Validation & Expiry

Events needed to be filtered based on status (upcoming, ongoing, expired), which involved handling of timezone-aware datetime objects and consistent formatting between frontend and backend. Incorrect time comparisons initially led to improper display logic.

3.13.3 Friend Request Logic

Designing mutual friendships and handling the request lifecycle (sent, pending, accepted, rejected) required a custom model with status tracking. Preventing duplicate requests, handling simultaneous actions, and integrating cleanly into the profile UI presented challenges.

3.13.4 User Experience Across Devices

Ensuring a consistent and accessible experience across devices (especially mobile) involved continuous adjustments to layout, font sizing, and button interactions using Bootstrap. Features like event creation and chat required additional mobile usability considerations.

3.13.4 OpenStreetMap issues

One notable challenge with using OpenStreetMap (OSM) is its limited support for place search, autocomplete, and rich point-of-interest (POI) data. Unlike platforms such as Google Maps, OSM does not provide robust geocoding, reverse geocoding, or venue metadata like opening hours and ratings.

3.14 Scalability & Evolution Considerations

3.14.1 Database Optimisation

While the current system uses SQLite for simplicity, the project can be easily migrated to PostgreSQL, which offers greater scalability, concurrency handling, and geospatial indexing (via PostGIS) for advanced map features [33].

3.14.2 Message Queue Integration

For scaling real-time notifications (e.g. event invites, chat pings), integrate RabbitMQ with Celery to decouple background tasks from user-facing processes [34].

3.14.3 Real-Time Monitoring Tools

Integrate services like Sentry to monitor application performance, errors, and resource usage [35].

3.14.4 Hosting & Deployment

The project could support containerisation (e.g. via Docker) for eventual deployment to scalable infrastructure (such as AWS), making environment setup and horizontal scaling feasible [36].

3.14.4 Place Search

Switching from OpenStreetMap's public services to Nominatim or the Google Maps API would offer greater control and scalability for geocoding and place search, but introduces new infrastructure and performance challenges [37], [38].

3.14.5 Third-Party Event Platforms

To enhance functionality, we could integrate third-party event platforms such as the Ticketmaster or Eventbrite APIs. This would allow PinPoint to display major public events directly on the map, giving users a seamless way to discover and RSVP to concerts, festivals, or exhibitions. When a user obtains a ticket via these platforms, PinPoint could automatically create a temporary group chat for attendees of the same event, enabling social coordination without manual effort. This feature would scale socially as the number of users and partnered events grows.

3.14.6 Verification/ Safety Measures

In future updates, we aim to enhance user safety by introducing verification measures for event organisers. Users who wish to be recognised as organisers will be required to verify their identity, potentially through the use of work email addresses to confirm their affiliation with a legitimate company, club, or society. Additionally, we plan to implement features that allow users to block or report both events and other users. These measures will help ensure that our app remains a secure and trustworthy platform for everyone.

Appendices

Appendix A - Team CV



1

MICHAEL BEIRNE-PONOMAREV + ROBERT MALONEY

PROFESSIONAL OBJECTIVES

Dedicated and goal-driven. We always strive to reach the top. Interested in learning new abilities and wanting to apply new methods to our work and be able to complete the task at hand. We enjoy working with others and getting to have the opportunity to make new connections with people around the world.

OUR SKILLS

Web Design – HTML, CSS, JS	Data Analysis + Visualisation
Python3 Coding + Anaconda3	Microsoft Azure
Office365	Adobe Photoshop/Premiere Pro
IT Hardware	Networks and Internet
PowerBI	SQL
Machine Learning	Blockchain
Networking	Entrepreneurship

EDUCATION

UNIVERSITY:

DUBLIN CITY UNIVERSITY – MICHAEL + ROBERT

STUDYING B.Sc. IN COMPUTING FOR BUSINESS

(September 2021 – Present Day)

UNIVERSITY:

HOCHSCHULE LUZERN – MICHAEL

ERASMUS FOR COMPUTING FOR BUSINESS

(September 2023 – January 2024)

UNIVERSITY:

UNIVERSITY OF MICHIGAN – ROBERT

ERASMUS FOR COMPUTING FOR BUSINESS

(September 2023 – January 2024)

CURRICULUM VITAE

Fig A.1 (Team CV p1)

EMPLOYMENT HISTORY

SPANISH POINT TECHNOLOGIES - MICHAEL
(MARCH 2024 – AUGUST 2024)

1. During this time, I served as a junior developer, and was responsible for dealing with various clients who were required to visualise their data for different purposes.
2. While working here I have learned several different programs and languages. Microsoft Azure, Power BI and K-Query just to name a few.
3. Heavily enhanced productivity for the business with creating automation Azure packages for clients attending bootcamps – This saved 80% of business time when it came to manually creating a package for clients.
4. Held a strong connection with my team and any clients which I served personally. Clients would ask me by name to complete work for them as they found me to be a 'courteous' and 'responsive' individual when it came to contacting me during or outside office hours.

PRICEWATERHOUSECOOPERS - ROBERT
(JANUARY 2024 – AUGUST 2024)

1. Implemented Python libraries like Pandas to transform raw data into actionable insights for internal and external company use, increasing data processing efficiency and improving decision-making speed.
2. Employed Alteryx for data cleansing and analysis, reducing manual data editing time in Excel.
3. Created interactive charts and graphs using Power BI for client meetings.
4. Managed a sample SQL database for the floor, ensuring data accuracy and efficient access for team use, which reduced query resolution time by 30%.

LAB LEAD, DCU - ROBERT
(SEPTEMBER 2024 – PRESENT DAY)

1. Independently assisted students with queries, troubleshooting, and conceptualising solutions as a Lab Lead.
2. Adapted instructional material to suit class needs, enhancing student engagement and understanding resulting in a 25% improvement in overall student feedback ratings compared to previous years.

CURRICULUM VITAE

Fig A.2 (Team CV p2)



3. Led lab sessions for CA106: Web Development and CA229: Developing Internet Applications.

ACCOMPLISHMENTS

Erasmus – As part of our bachelor's degree, we were selected out of many candidates to travel to another university in Switzerland / United States respectively. Here we continued our studies and got to connect with other students from all over the globe. We embraced the cultural differences between people, and we received the experience of a lifetime from this.

Web App Project - Our team was instructed to create an application. We had created an online store; we aimed to utilise all our knowledge in web designing and Django with the use of various external libraries. This was done efficiently and to a high standard.

VOLUNTEERING

FACULTY REPRESENTATIVE, DCU – ROBERT

Elected by students in the Engineering and Computing Faculty, representing over 2,400 students across 9 programs. Currently fostering communication within the faculty and advocating for its interests within the university, while maintaining positive and professional relationships throughout the process.

COURSE REPRESENTATIVE, DCU – MICHAEL + ROBERT

Selected by the students in our course to become the class representatives. Being the voice of our course. Dealing with any queries or concerns that other students may have. We are responsible for contacting professors with queries or asking about assignment details. We attempt to do this efficiently and respectfully to keep both the lecturers and the students' content.

Fig A.3 (Team CV p3)

Appendix B - Team Logs

Team logs can also be accessed through the following link -

Robert's Activity Log

Week (Week Start)	Activity
1 (09/09/2024)	Michael and I are developing ideas and options for what we want to make. We are brainstorming ideas and reviewing the modules we completed throughout our college curriculum.
2 (16/09/2024)	We decided to develop a Location-Based Social Media platform, building upon our knowledge from CSC1113 and CA229. We are actively looking into the necessary technologies needed for this. Michael and I are also looking into the selection of project advisors available to us and looking into their history and interests. See Week 2 Progress Pictures
3 (23/09/2024)	We decided to make a social media platform that focuses on event planning. We have made contact with Sahroui Dhelim and are meeting with him to discuss our idea of a location-based social media platform.
4 (30/09/2024)	We decided on Sahroui because of his interest in location-based services and social media. He has marked himself as our supervisor on the project dashboard. We also made progress on our ethics proposal. See Week 4 Progress Pictures
5 (07/10/2024)	We showed him the mockup prototype I created in the design tool, "PenPot". He seemed to like our idea and tenacity. We were told to finalise the idea and decide on a framework. We submitted our ethics proposal and began working on our presentation. Our ethics approval was denied. We plan to meet with Sahroui to discuss what needs to be changed.
6 (14/10/2024)	We met with Sahroui and talked about the changes that we need to make to our ethics approval form. We are also working on our presentation. We made some alterations to some aspects of it and re-submit it
7 (21/10/2024)	We had our project presentation this week. We were content with the response to our project, and it gave us great insight for how to progress from that point forward.
8 (28/10/2024)	We met with Sahroui to discuss the feedback left on our dashboard. He informed us on where to start with our prototype, telling us about the Django leaflet and how we could use it. See Week 8 Progress Pictures

Fig B.1 (Team Logs p1)

9 (04/11/2024)	Our Financial Plan for CSC1115 is due this week so we are fleshing out the assignment. CSC1115 helps inform the work we do on our final year project so I find it useful.
10 (11/11/2024)	Due to some more pressing deadlines in other modules, work on the final-year project has taken a bit of a backseat. I plan to work on it more once we break for Christmas.
11 (18/11/2024)	Working on the mid-term delivery.
12 (25/11/2024)	Michael and I met up to make progress on our Mid-term report. We are happy with where we are at right now.
Break (2/12/24 - 12/01/25)	<p>We had our final assignment for CSC1115 which included a live pitch and review of our idea thus far. I found it helpful to gather all the info about our project on the business end.</p> <p>Initialised some code on the project. This included a basic Django app with leaflet installed after having a few issues with versions.</p>
1 (13/01/2025)	<p>We had a meeting with our supervisor this week to discuss our Mid-term Delivery before it is due. We also showed him our progress over the break and where to go from this point.</p> <p>Our midterm delivery was submitted.</p>
2 (20/01/2025)	I added intractability and style to the application. This included the ability to select a point on the map. Attached below is a capture of how the banner and footer look as of now, aiming to make a sleek social media design. Below is also the pin pop up once the map is interacted with.
3 (27/01/2025)	I have added the ability to view a user's own profile and added event creation functionality.
4 (03/02/2025)	Did some research on some api's that we could use.
5 (10/02/2025)	<p>We had a meeting with Sahroui and were advised about completing the requirements listed on our functional specification and what to work on next. We need to add several functions including, being able to see others' pinpoints and inviting other users and adding more details to the event creation functionality.</p> <p>I have added more details to the event creation process.</p>
6 (17/02/2025)	Progress on the final project delivery was slow this week as We had several other assignments due this week, CSC1117 assignment 2 and CSC1099 research paper, and I chose to dedicate more time to them to perfect them.
7 (24/02/2025)	At the moment I am preoccupied with completing my research presentation as part of CSC1099. My next goal for the app is the ability to invite other users. Once that is a feature, I would like to have a look at a social-media "friends" system.

Fig B.2 (Team Logs p2)

8 (03/03/2025)	I have added the ability to invite other users as well as made some style changes.
9 (10/03/2025)	Progress made on project report.
10 (17/03/2025)	Started working on the friend system of pinpoint. Introduced events as pins on the map. During a conversation with one of my peers, I learned about “.gitignore” files and felt it would be good practice to introduce one into our repo. After some research and a discussion with Michael, I found a template that would suit our project and added it to our repository.
11 (24/03/2025)	I pushed the features I was working on to the master branch. We met with our project supervisor to receive some feedback on our final report. He gave us some tips and ideas on what else to add.
12 (31/03/2025)	Due to unfortunate circumstances in my family and other deadlines I was limited in the progress I could make this week. I made Michael aware of the situation and he understood completely. In my time, I corrected and made additions to a checklist of features we would like to add.
13 (07/04/2025)	I am adding some quality of life features to PinPoint. This includes a tutorial, a “Forgot Password?” feature and highlighting errors during account creation. I did some work on the user profiles from your own and other users' views.
14 (14/04/2025)	Our documentation is being finalised and has been sent to our supervisor for review. Our prototype is also nearing completion

Fig B.3 (Team Logs p3)

Michael's Activity Log

Week (Week Start)	Activity
1 (09/09/2024)	<p>Robert and I are brainstorming various ideas of what kind of application we would like to create for our Final Year Project.</p> <p>Leaning toward a social-media type application but am unsure of what the market needs.</p>
2 (16/09/2024)	
3 (23/09/2024)	<p>We decided to work on an event planning application - A robust all-in-one application for all planning needs.</p> <p>We have made contact with Sahroui Dhelim, we decided he would best fit our supervisor roles as he had an interest in Location-Based Services. He has agreed to schedule us in to talk about the project in further detail.</p>
4 (30/09/2024)	
5 (07/10/2024)	<p>This week, we had our first meeting with Sahroui to discuss our project. We showed him the mockup prototype Robert had created using "PenPot" and talked about how we could implement this in a real-world scenario. He told us to finalise the idea and decide about what kind of framework we would like to use.</p> <p>Heard that we wouldn't need to complete an ethics form for this project however, we have had a little bit of a back and forth about whether it is required or not. I shall ask about this to confirm this.</p>
6 (14/10/2024)	<p>We had another meeting with Saharoui in particular to discuss what was required of us to submit the ethics application. We decided collectively that it would be better to apply for ethical approval since we will be required to carry out primary research and for user testing. This will be carried out as soon as possible - Two different forms new and old version although they are similar. This is to be submitted during the week ahead.</p>
7 (21/10/2024)	
8 (28/10/2024)	<p>In this meeting, we had asked primarily about the Mid-Term Delivery and what was required of us. Alongside this, we also constructed our plan to complete this project.</p> <ul style="list-style-type: none"> • Implementation plan and technical details don't provide enough details to understand how things will be done, what needs to be learned • Prototype by the end of Sem1 • Evaluation consisting of a user study in Sem2 • Look into what is involved in creating the prototype e.g. OpenStreetMap to be used for implementation?

Fig B.4 (Team Logs p4)

	<ul style="list-style-type: none"> • What is the value or need for this approach? There are many social media apps - what is the differentiator? - this is localised and offers a different experience - Other items to consider: <ul style="list-style-type: none"> ◦ Most basic is the event picker and the map display ◦ Leaflet library, JavaScript ◦ Have a map in Leaflet, with a coordinate on the map and store it in a database ◦ Mongo DB?
9 (04/11/2024)	Creating the first-year financial plan with Robert for CSC1115. This will be beneficial later with feedback from the financial plan and the fact that we may need it for one of our deliveries later.
10 (11/11/2024)	<p>Robert and I have spoken about where we stand on the project, although we both have various assignments and module requirements to-do and we are happy with the progress we have made.</p> <p>Decided to focus on the current modules and to put the project on the 'Back-Burner' until all other modules have been completed.</p>
11 (18/11/2024)	
12 (25/11/2024)	Working on the Mid-Term Delivery with Robert, ensuring that all of the required information was present and that we hit all the targets that were expected from us.
Break (2/12/24 - 12/01/25)	<p>Spoke with Robert about implementing the map, however, he had a little bit of an issue installing the package onto his system. We managed to debug and solve this, it was only a Python version issue.</p> <p>Pushed the map into the repo along with some minor styling changes we had discussed about in the previous weeks.</p>
1 (13/01/2025)	<p>Implemented different styles and attempted to connect both Django and Leaflet to the application so that it can be interactive to the users and not a fixed map that is essentially a still image.</p> <p>Submitting the Mid-Term Delivery in a couple of days.</p> <p>Had a supervisor meeting, for any last minute changes that we could make for the 'Mid-Term Delivery'. Supervisor seemed to be content with only minor changes with the system architecture. To begin to add some initial implementation to the application. Pindrops Primarily</p>
2 (20/01/2025)	Creating the summary for the Expo Booklet. Making sure that both Robert and I were content with the description and that we could actually show off what we had written down.
3 (27/01/2025)	Submitting the Expo Summary and filling out the Google Form for our project.

Fig B.5 (Team Logs p5)

4 (03/02/2025)	<p>Reviewed Robert's code on the event creation and the home pages. I decided to implement some styling features and ensure that users can login and log out. Making permissions so that the user must be logged in, to use the application.</p> <p>To tackle the structure of our final project documentation in the coming weeks.</p>
5 (10/02/2025)	<p>Showed off our current project to our Supervisor and he was impressed with the progress we had made. We asked about what our future steps or any improvements that could be made.</p> <p>Check other progressive web applications.</p> <ul style="list-style-type: none"> ● Display Nearby Events - Using Icons to show off ● Work on what comes after choosing an event - Attendees List?
6 (17/02/2025)	<p>Robert is currently implementing the event invites to the project. I am tasked to begin the Final Documentation and figuring out what is actually required of us.</p>
7 (24/02/2025)	
8 (03/03/2025)	<p>Invitations now work on our application</p> <p>Have a good structure for the final report</p> <p>Plan to set up an advisor meeting soon to go over what exactly is being looked for in the report</p>
9 (10/03/2025)	<p>Beginning the implementation of Real-Time messaging, looking into django packages that support this</p> <p>Django Channels??</p>
10 (17/03/2025)	<p>Attended the Q&A about the final presentation.</p> <ul style="list-style-type: none"> - Formal - Ensure we are unique - Plenty of info within the appendices if used - Quality > Quantity - ~40 mins Presentation, Split accordingly <ul style="list-style-type: none"> - 10 min present - 20 min demo - 10 min Q&A <p>Team CV is done as per spec.</p> <p>The Financial Plan is also in progress, with Year 1 now complete</p>
11 (24/03/2025)	<p>Real-time messaging completed,</p> <p>Financial Plan for Years 2 + 3 Completed.</p> <p>Final Report: Coming along nicely.</p>
12 (31/03/2025)	<p>More Progress on Final Report,</p> <p>Met with supervisor late last week - very impressed with the project.</p> <ul style="list-style-type: none"> - He will find out more info on final report - Will need UML Class Diagrams
13	Business aspect of final report fully completed.

Fig B.6 (Team Logs p6)

(07/04/2025)	References need to be finalised and ordered Technical Aspects to be completed by week ending. Development of application - Robert adding nearby features and then I will need to review for bugs and finalise the comms tab
14 (14/04/2025)	Report is being finalised with it being a week before deadline. Code is in the same boat. Fully developed 'Business Showcase' to align with business aspect of the doc Final adjustments in terms of style are completed Submitting final report this week.

Fig B.7 (Team Logs p7)

Appendix C - Primary Research Survey

Section 1: Demographic

What is your age group?

25 responses

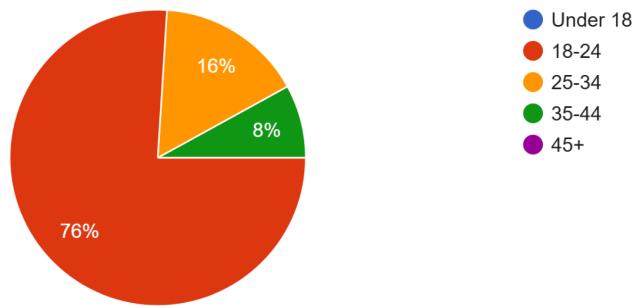


Fig C1.1 (Question 1: Age Group)

What is your current occupation?

25 responses

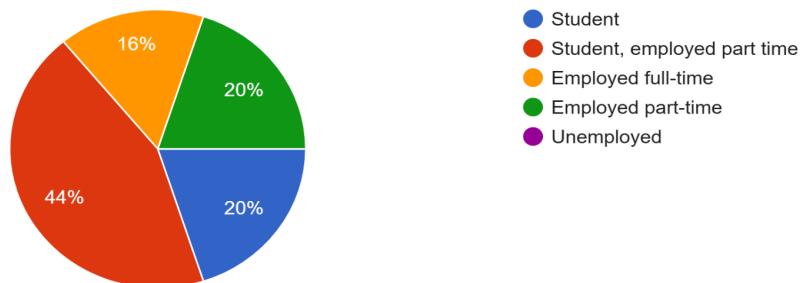


Fig C1.2 (Question 2: Occupation)

Section 2: Social Media & Event Planning Habits

How often do you use social media?

25 responses

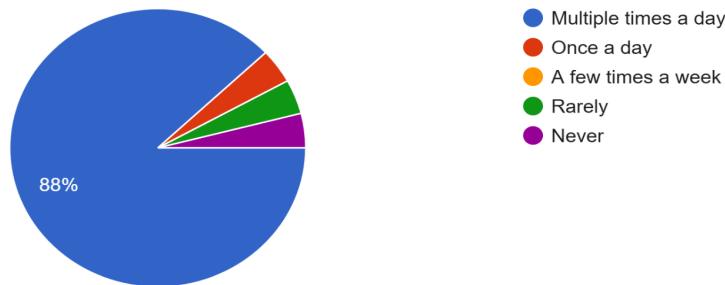


Fig C2.1 (Question 1: Social Media Usage)

Which social media platforms do you use most often? (Select all that apply)

25 responses

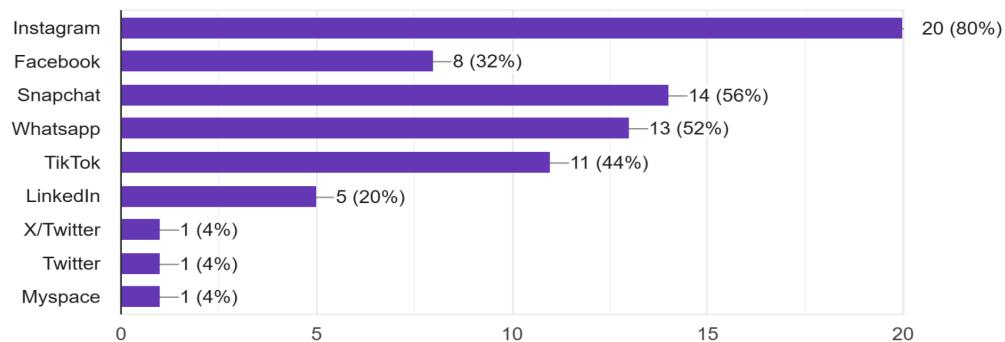


Fig C2.2 (Question 2: Social Media Types Used)

How often do you make plans to meet up with friends or family?

25 responses

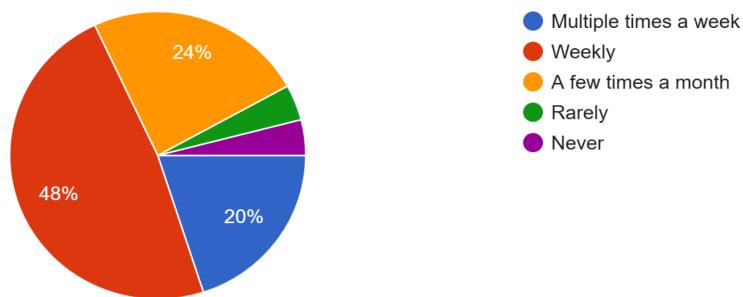


Fig C2.3 (Question 3: How often do you make plans?)

What methods do you usually use to plan hangouts or events with friends? (Select all that apply)
25 responses

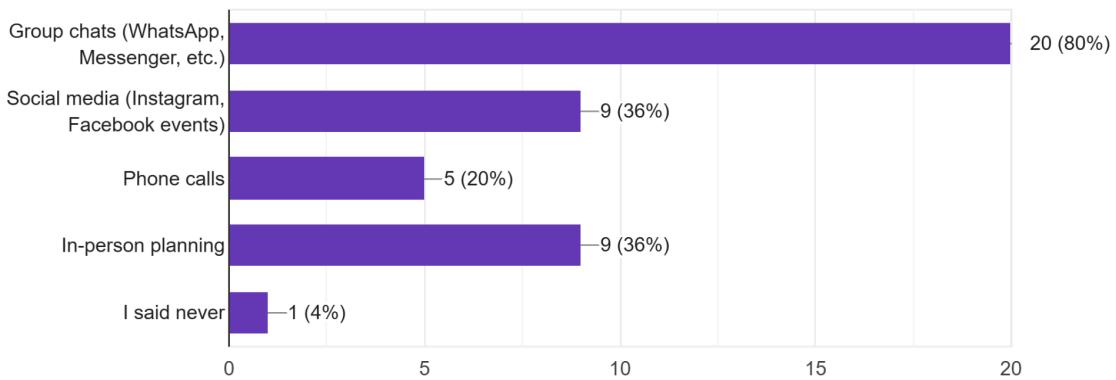


Fig C2.4 (Question 4: Methods to Hangout)

Section 3: Interest in an Event-Planning App

Would you find a platform helpful that allows you to pin locations, invite friends, and plan events all in one place?
25 responses

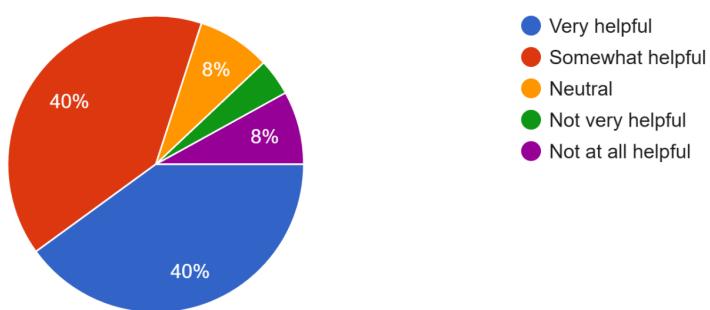


Fig C3.1 (Question 1: Usefulness of PinPoint)

What features would be most useful for an event-planning app? (Select up to three)

25 responses

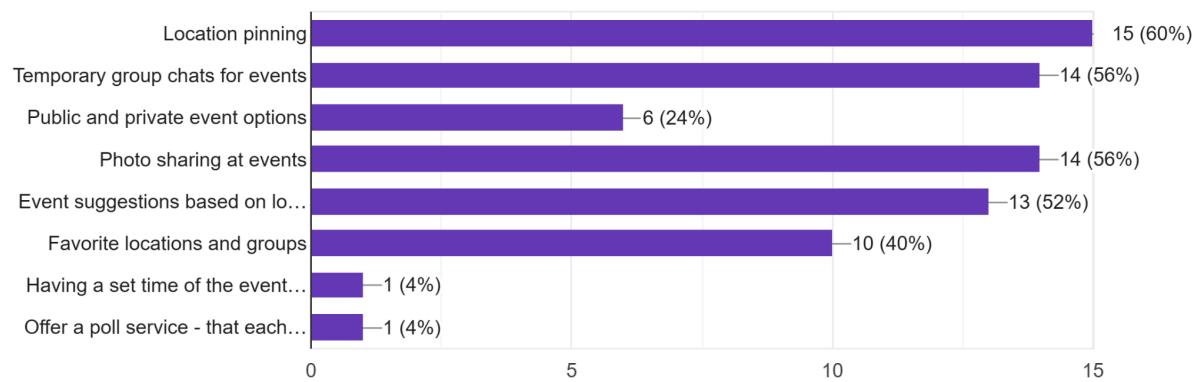


Fig C3.2 (Question 2: Features Questionnaire)

How important is it to have personalized recommendations for new places or events?

25 responses

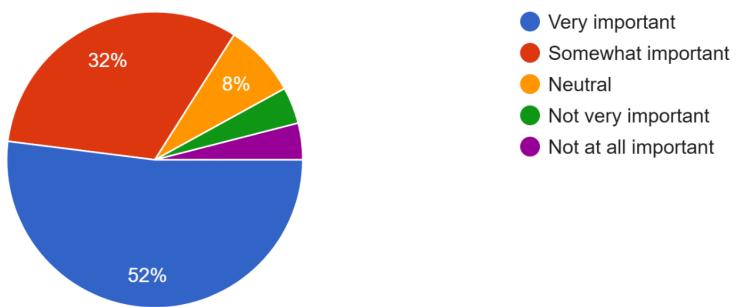


Fig C3.3 (Question 3: Importance of Recommendations)

Section 4: Willingness to Try & Feedback

If an app like this were available, would you be likely to try it?
25 responses

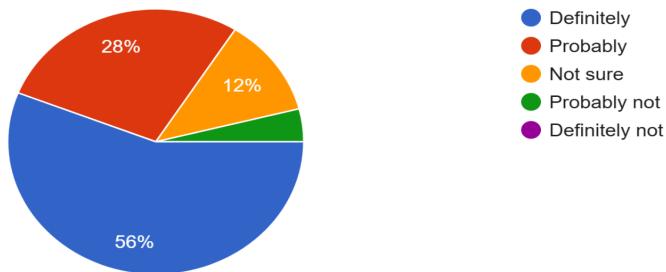


Fig C4.1 (Question 1: User Interest in PinPoint)

What would encourage you to use this app over existing social media or messaging apps?
25 responses

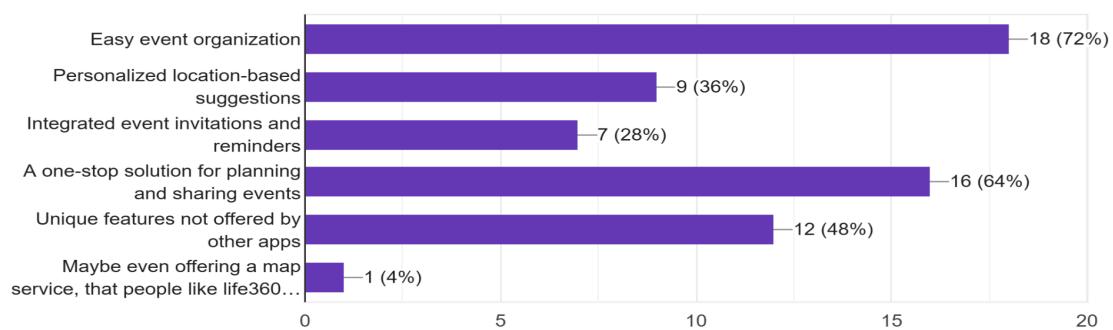


Fig C4.2 (Question 2: What would encourage users to use PinPoint?)

Would you be interested in seeing event promotions or special offers from local businesses on this platform?
25 responses

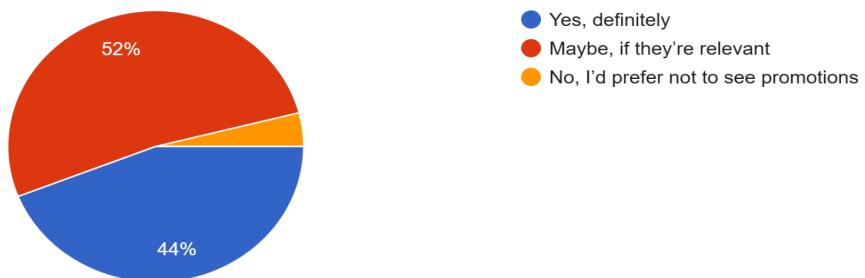


Fig C4.3 (Question 3: Event Promotions)

Appendix D - Financial Projections (Additional Rationale)

We have also allocated a miscellaneous contingency budget to cover emergencies or the arrival of other essential equipment that may be required due to unforeseen circumstances. This financial cushion ensures we can quickly respond to challenges without disrupting our usual operations. Regarding proactive measures, we decided early on that effective tax and insurance planning should be a key component of our financial strategy. We are committed to complying with all tax regulations and ensuring adequate insurance coverage to protect our assets and mitigate risks. This approach helps us maintain financial stability and safeguards against potential liabilities.

Having these strategies in place will yield tremendous benefits for our growth as an organisation, and if executed correctly, we will see a return in our revenue streams, allowing us to further invest in the future of the company. We will always aim for customer satisfaction and engage with any queries or suggestions that arise from the community. It is essential to acknowledge this, as it will help maintain customer relationships for the long term.

We recognise the importance of continuous development for our team. To facilitate this, we have obtained a sizable office space to accommodate future growth. As part of our miscellaneous funding, if expenditures allow at the end of the financial year, we will invest in our employees' participation in online courses, primarily those offering certification, such as those provided by 'Grow with Google', to ensure our employees remain competitive and proficient in their roles. By investing in our workforce, we not only enhance employee satisfaction but also improve overall organisational performance, positioning us for future success.

After completing our financial plan, we realise how various expenditures and income accumulate over our first year.

A crucial key to our success will be a contingency plan, providing a necessary safety net for any unforeseen expenses. We accounted for this at the very beginning, knowing there would be hidden costs, yet we were uncertain of what these costs would entail. For this reason, we always aimed to set aside this revenue rather than put it in our own pockets, reinvesting it back into the business if the contingency plan were to be utilised.

According to our financial plan, by the end of the final quarter, we anticipate turning over and making a profit as we enter the new year with five employees on our team, each with different technical backgrounds, an office space to operate from, and investors willing to support us on our journey with our application. If our projections are accurate, we will begin to generate a significant turnover in terms of revenue, allowing us to repay some of the money gifted to us by family and friends.

As part of our growth strategy, we will seek expansion opportunities that align with our core mission. This includes exploring new markets, diversifying our product offerings, and enhancing our existing services to attract a broader audience. Strategic investments in expansion will help us strengthen our market position and drive revenue growth.

We acknowledge that while the financial landscape can present many challenges along the way, careful planning and budgeting help mitigate any issues we encounter.

In the first year, it is challenging to maintain any revenue, as we are uncertain how many users we will attract to our application through advertising or word of mouth. Additionally, there are significant expenditures in the first year to initiate the business, such as finding a place to rent. This includes any equipment required to develop the application, along with many other hidden costs that are not openly discussed, such as furnishing the office space and IT costs.

Appendix E - UI Screenshots & Progress Pictures

Section 1: Progress Pictures

Week 2 Progress Pictures

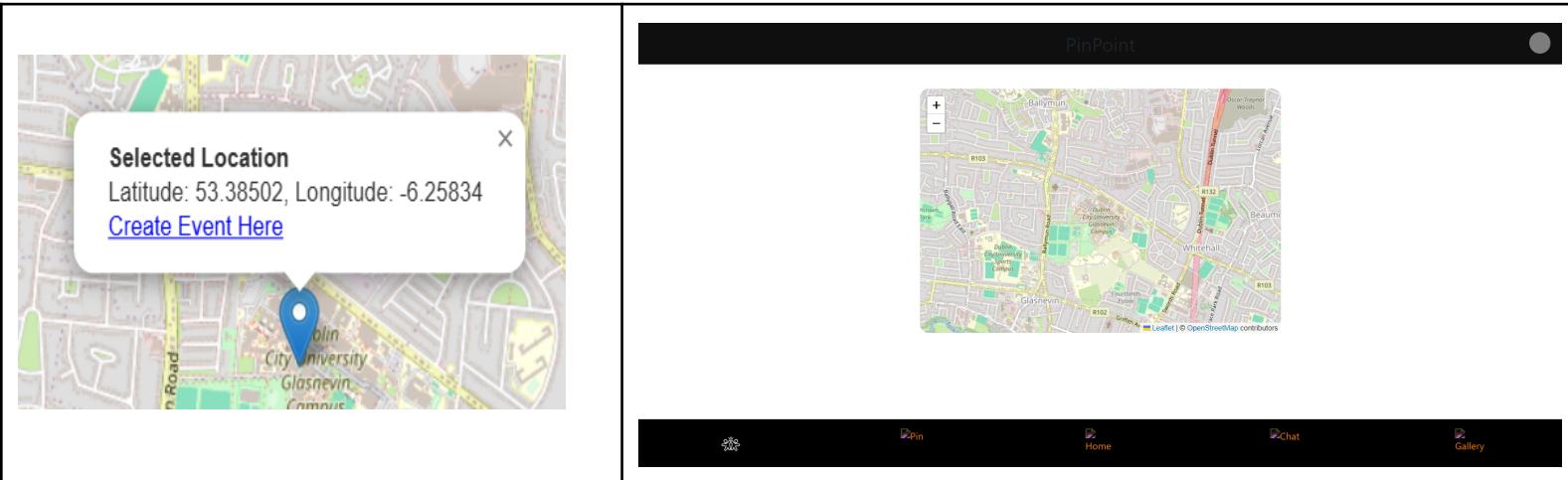


Fig. E.1 (Left to right: Event pop-up on map, Home Page)

Week 4 Progress Pictures



Fig. E.2 (Left to right: Profile View, Home Page)

Week 8 Progress Pictures

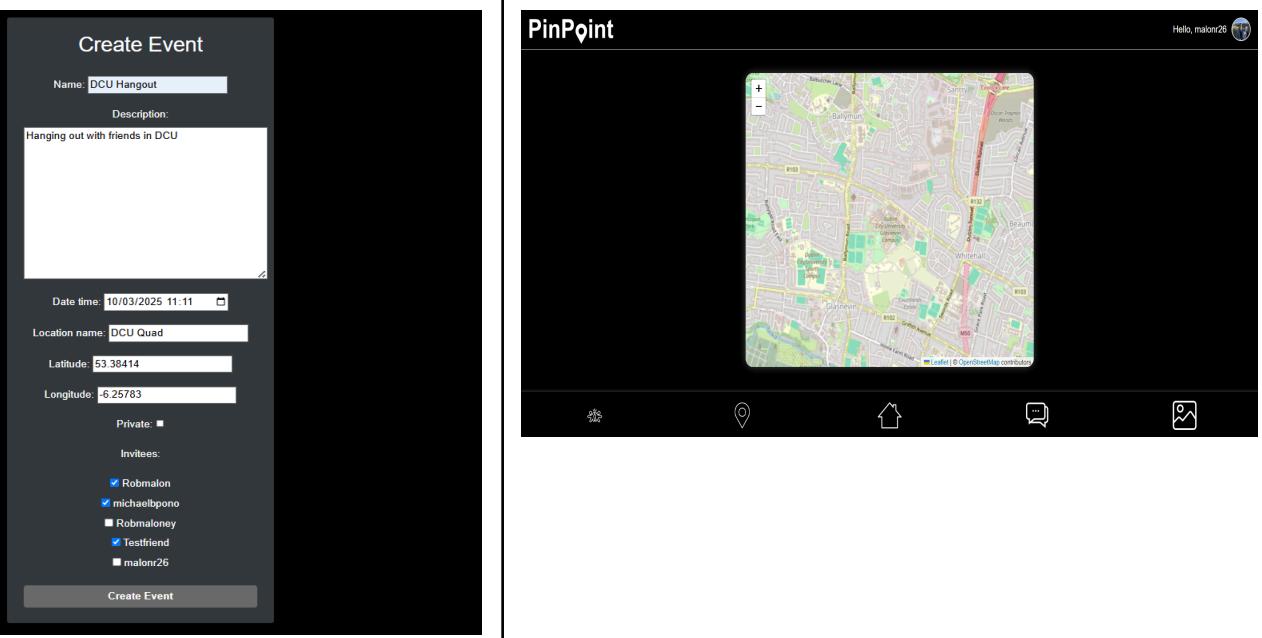


Fig. E.3 (Left to right: Create Event Page, Home Page)

Section 2: Final Designs

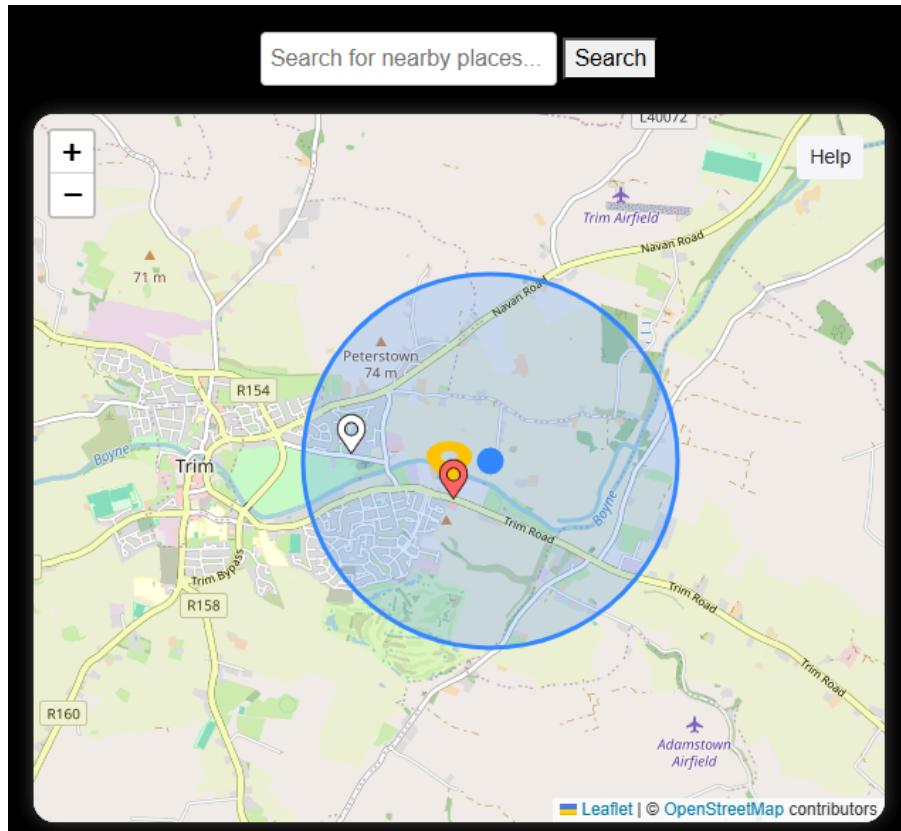


Fig. E.1 (User with their events on the Page)

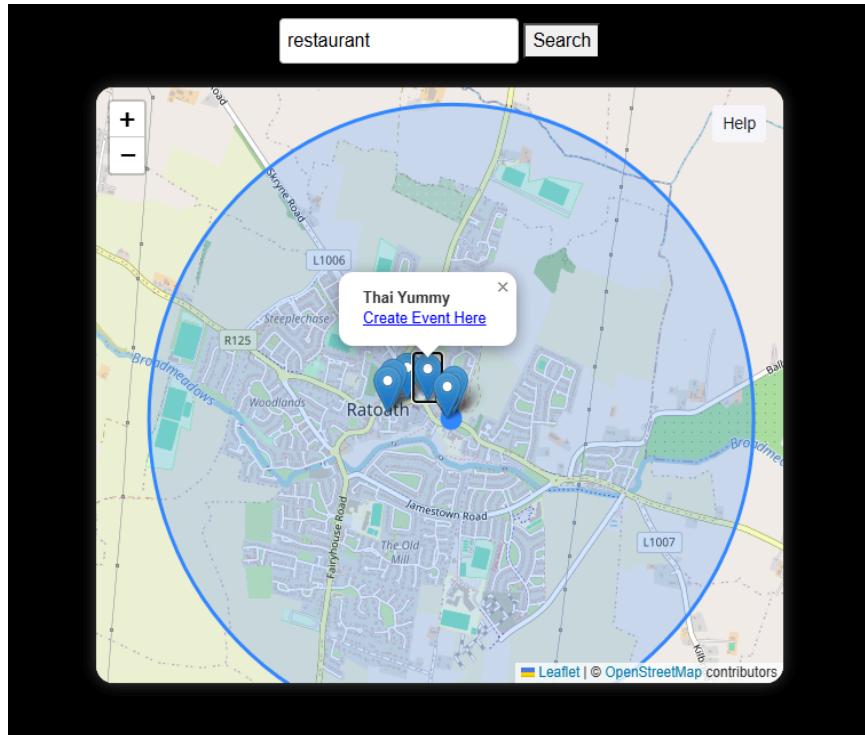


Fig. E.2 (Nearby “Restaurant” on Map)

A screenshot of a web page displaying a list of events. At the top, there are two tabs: "Upcoming Events" (which is active) and "Past Events". Below the tabs, there are two event cards. The first event is "Dinner at F.X. Buckleys" scheduled for Sat Apr 19, 19:00 – 20:30 at 1A Pembroke Street Lower, Dublin 2. The second event is "Jillian's Going Away Breakfast" scheduled for Sat May 03, 09:30 – 11:00 at 8 Main St, Ratoath, Co. Meath. Each event card includes a "View" button.

Fig. E.3 (Upcoming Events)

A screenshot of a web page displaying a list of events. At the top, there are two tabs: "Upcoming Events" (which is active) and "Past Events". Below the tabs, there are three event cards. The first event is "Hangout in Nubar" on Thu Apr 17, 14:18 – 18:20 at DCU Nubar. The second event is "DCU Snow Sports AGM" on Thu Apr 17, 18:30 – 19:30 at GLA.CG05. The third event is "John's Birthday Party!" on Tue Apr 15, 19:00 – 23:00 at 17 Santry Road, Santry, Co. Dublin, D09 X965. Each event card includes a "View" button.

Fig. E.4 (Past Events)

Event Details (Owner View):

- Description:** No description provided.
- Start Time:** Tue, Apr 22 2025 08:20
- End Time:** Tue, Apr 22 2025 10:20
- Location:** Porchfields
- Coordinates:** (53.55632, -6.77363)
- Created by:** michaeladmin

RSVP Responses

- Yes:** michaelbpono
- No:**
- Tentative:**

Action Buttons:

- Chat Link
- Back to Events
- Edit Event
- Delete Event

Event Details (Invitee View):

- Description:** No description provided.
- Start Time:** Tue, Apr 22 2025 08:20
- End Time:** Tue, Apr 22 2025 10:20
- Location:** Porchfields
- Coordinates:** (53.55632, -6.77363)
- Created by:** michaeladmin

RSVP Responses

- Yes:** michaelbpono
- No:**
- Tentative:**

Action Buttons:

- Chat Link
- Back to Events

Fig. E.5 (Left to right: Event Description Owner, Invitee)

Upcoming Events **Past Events**

Running Time
Tue Apr 22, 08:20 – 10:20
Porchfields

Enter Chat

Fig. E.6 (Upcoming Events Chat)

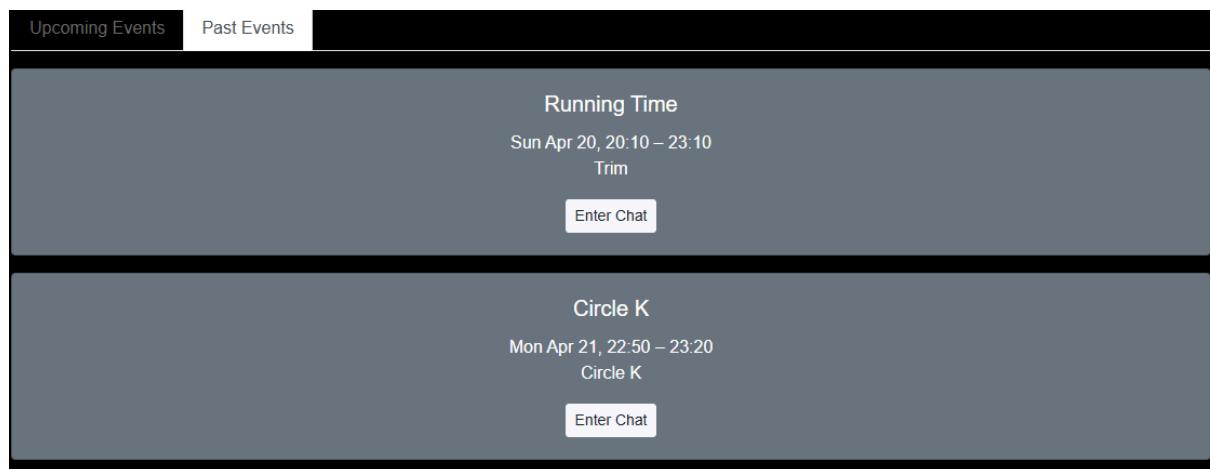


Fig. E.7 (Past Events Chat)

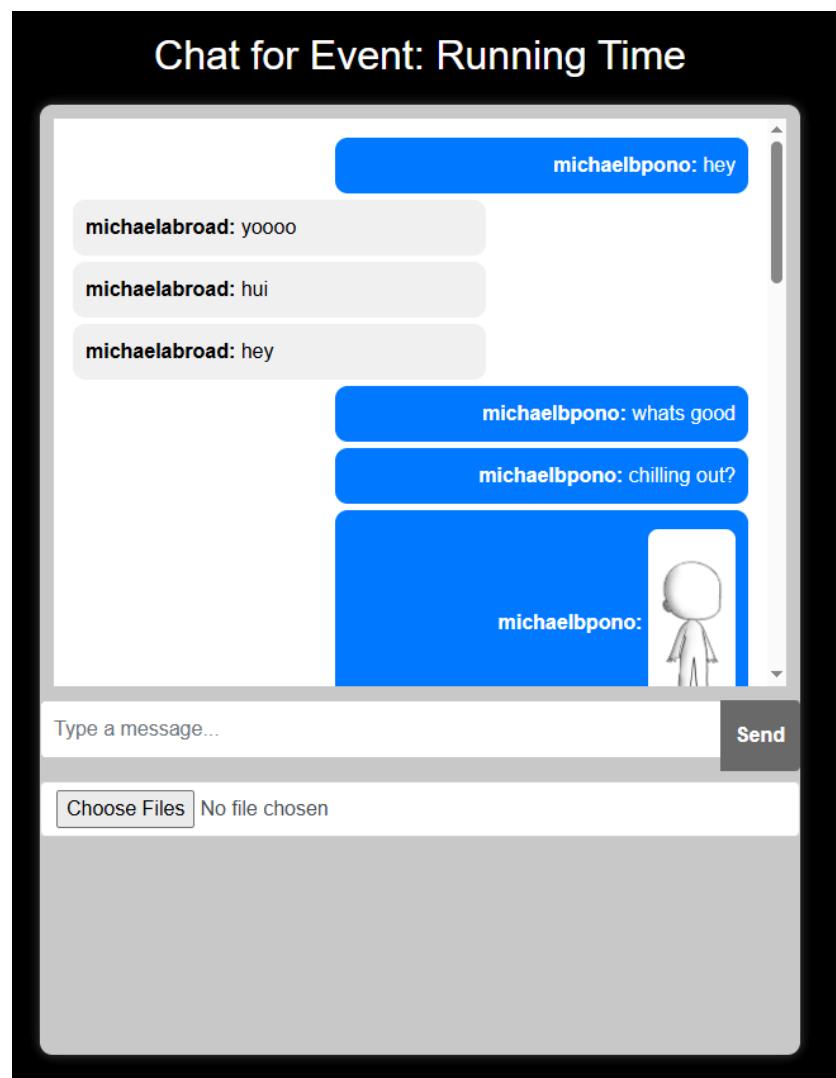


Fig. E.8 (Event Chat)

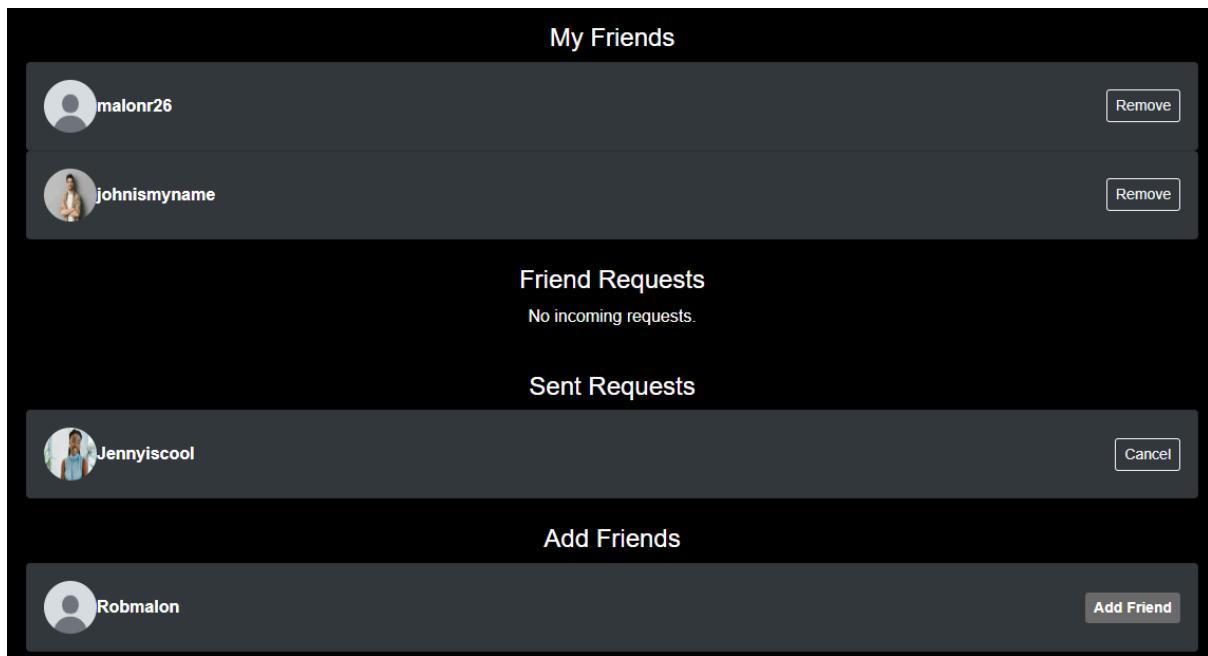


Fig. E.9 (Friend's Tab)

The left side of the image shows the 'My Profile' screen. It features a large circular placeholder for a profile picture, a count of '2 friends', and two buttons: 'Edit Profile' and 'Logout'. The right side shows the 'Edit Profile' screen. This screen includes fields for 'Username' (set to 'michaelbpono'), 'Email' (empty), 'Phone' (empty), 'Profile photo' (choose file, currently 'No file chosen'), 'Password' (empty), and 'Password confirmation' (empty). Below the password fields are four validation tips: 'Your password can't be too similar to your other personal information.', 'Your password must contain at least 8 characters.', 'Your password can't be a commonly used password.', and 'Your password can't be entirely numeric.' A 'Save Changes' button is located at the bottom of the edit screen.

Fig. E.10 (Left to Right: Profile, Edit Profile Tab)

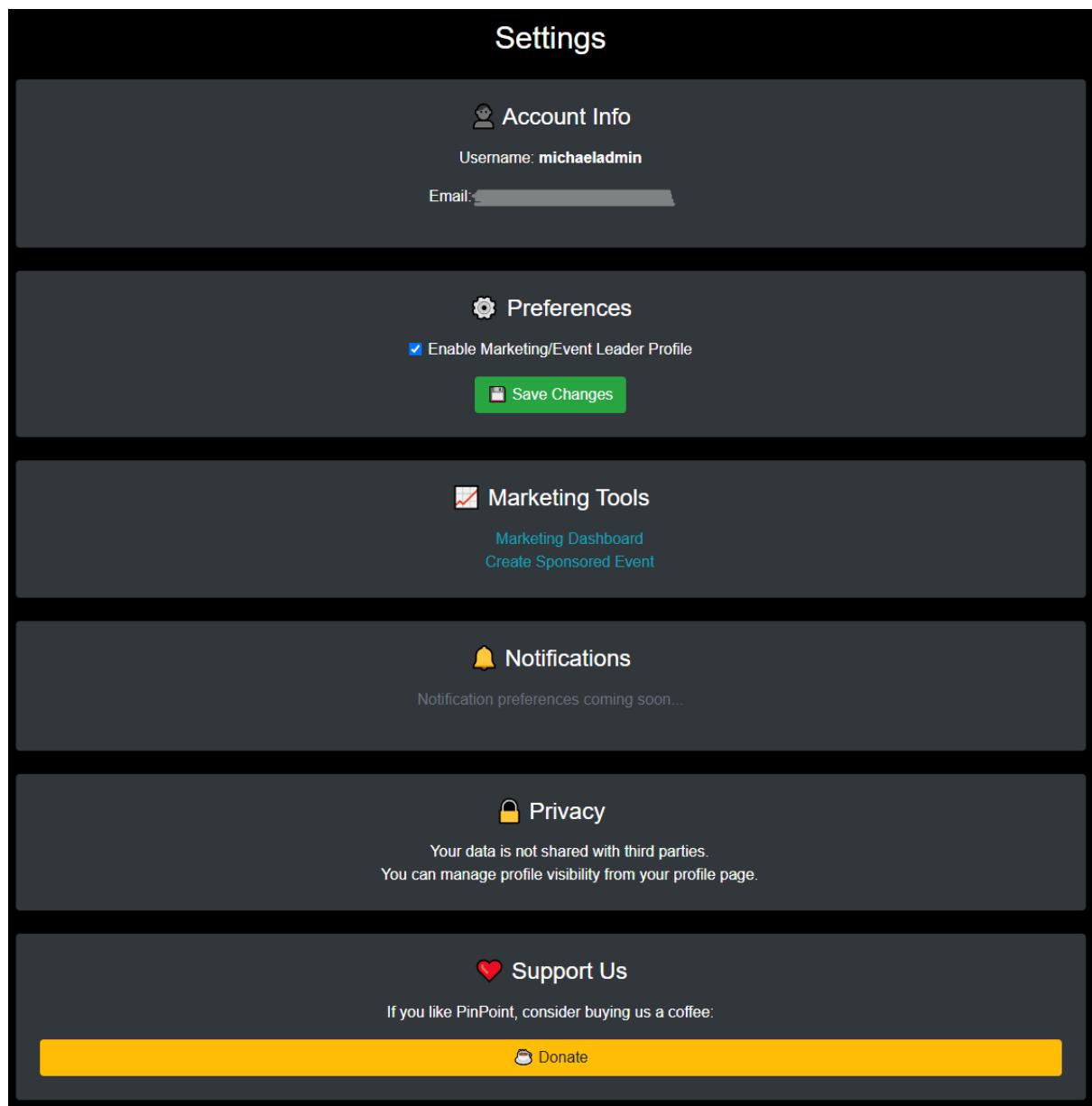


Fig. E.11 (Settings Tab)

Create Public Business Event



Click on the map to select a location for your event

Event Details

Event Name

Description

Location Name

Start Time

End Time

Business Showcase

Add to Business Showcase
Promote this event in the Business Showcase. Showcased events appear with special pins on the map.

Event Tags

Add custom tag...

Create Public Event

Fig. E.12 (Public Business Events Tab)

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References

- [1] A. Girdhar, “All You Need to Know About All-in-One Apps | What are All-in-One Apps?,” Appy Pie. Accessed: Apr. 20, 2025. [Online]. Available: <https://www.appypie.com/blog/all-in-one-apps>
- [2] “Integrating Digital Marketing into Your Event Strategy.” Accessed: Apr. 20, 2025. [Online]. Available: <https://daracreative.ie/integrating-digital-marketing-into-event-strategy/>
- [3] “Digital Marketing for Small Business: A Handy Guide,” Salesforce. Accessed: Apr. 20, 2025. [Online]. Available: <https://www.salesforce.com/in/small-business/marketing/digital-marketing-smb-guide/>
- [4] Rohit Sharma, “Data-Driven Personalization : Revolutionizing User Experience,” *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.*, vol. 10, no. 5, pp. 868–877, Nov. 2024, doi: 10.32628/CSEIT241051075.
- [5] “70% spend too much time on devices | Deloitte Ireland.” Accessed: Apr. 20, 2025. [Online]. Available: <https://www.deloitte.com/ie/en/about/press-room/social-media-entertainment-dct-survey.html>
- [6] “Smartphone Usage Statistics for 2025 (Surprising),” Backlinko. Accessed: Apr. 20, 2025. [Online]. Available: <https://backlinko.com/smartphone-usage-statistics>
- [7] B. Garlin, “The Biggest Social Media Trends Shaping 2025,” Forbes. Accessed: Apr. 20, 2025. [Online]. Available: <https://www.forbes.com/councils/forbescommunicationscouncil/2025/02/03/the-biggest-social-media-trends-shaping-2025/>
- [8] “9 Event Trends That Will Shape 2025 | Cvent.” Accessed: Apr. 20, 2025. [Online]. Available: <https://www.cvent.com/en/blog/events/event-trends>
- [9] D. Eastlake, “Gen Z ditch Meta and turn to Tumblr as a social media safe space.” Accessed: Apr. 20, 2025. [Online]. Available: <https://www.thetimes.com/uk/technology-uk/article/gen-z-ditch-meta-tumblr-social-media-cgk0k2r0>
- [10] “Google Cloud Estimate Summary.” Accessed: Apr. 20, 2025. [Online]. Available: https://cloud.google.com/products/calculator/estimate-preview/CiRiMGE2MTMwZC0yZThjLTQ4MWYtODhmMC0wMmMxMjE0Yzg2OWEQAQ%3D%3D?_gl=1*4zgvis*_up*MQ..&gclid=Cj0KCQiAoae5BhCNARIsADVLzZd-BnXyM0xLzh9wqZJTQRsS7FjImgo5RCRxw7wj7SFKc9sUpDVXgJcaAm8zEALw_wcB&gclsrc=aw.ds
- [11] “Compare flexible pricing plan options | Google Workspace.” Accessed: Apr. 20, 2025. [Online]. Available: https://workspace.google.com/pricing?utm_source=google&utm_medium=cpc&utm_campaign=emea-ie-all-en-dr-bkws-all-all-trial-b-t1-1011339&utm_content=text-ad-none-none-DEV_c-CRE_668771020733-ADGP_Hybrid%7C+BKWS+-+BRO%7C+Txt+-+Brand+-+G-Suite+-+Business-KWID_4
- [12] “The Essential Role of a GDPR Consultant for Your Business | BlockSurvey,” blocksurvey.io. Accessed: Apr. 20, 2025. [Online]. Available: <https://blocksurvey.io/gdpr/why-your-business-needs-a-gdpr-compliance-consultant>
- [13] “Acer Aspire 3 Laptop | A314-23P | Silver | Acer Ireland Official Online Shop,” Acer Store. Accessed: Apr. 20, 2025. [Online]. Available: <https://store.acer.com/en-ie/acer-aspire-3-laptop-a314-23p-silver>
- [14] “HUION Inspiroy Frego Small Wireless Drawing Tablet, 6.3 x 3.9 inch Bluetooth Graphics Tablet, Portable for Design, Writing, Photo Editing, Teaching, Compatible with Windows, Mac, Android and Linux: Amazon.co.uk: Computers & Accessories.” Accessed: Apr. 20, 2025. [Online]. Available: https://www.amazon.co.uk/WH1409-Wireless-Graphics-Drawing-customizable/dp/B0D6FXHX7P/ref=sr_1_3?crid=15T806FTKUUGL&dib=eyJ2ljoMSJ9.DTP8khcyOz9uSi7pHuydYEaFeyKo2MJ-3pSYyOZ6qu9xpdl-IpumztMYZdUxVjVhHYTQ6SRm8yneWVeBLQi0XD8EGU3qPjWPAxFTT5cotRBDB4fPj-5o_I90o8qT&th=1
- [15] “Jabra Evolve 20 Mono Headset – Microsoft Certified Headphones for VoIP Softphone with Passive Noise Cancellation – USB-Cable with Controller – Black : Amazon.co.uk: Musical

- Instruments & DJ.” Accessed: Apr. 20, 2025. [Online]. Available:
https://www.amazon.co.uk/Jabra-Evolve-Mono-Headset-Cancellation/dp/B00OD74W5U/ref=sr_1_6?crid=25675UVLZS585&dib=eyJljoMSJ9.8uEJq2VZK4QWIWkZRYHwLtU_BD51M7MyGSCeWigJS2yT-K9MQgoObhsodVXTfOfM6TEq1PpF6_9cqJtGHJiHEmc-eBTWKzusU5_JZLWwJUyYIL80395ycpb_Q5Vl6NrR-0f&th=1
- [16] “Keeping Your App Ahead: The Power of Continuous Support and Updates | by Maxim Gorin | Medium.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://maxim-gorin.medium.com/keeping-your-app-ahead-the-power-of-continuous-support-and-updates-6230b8f25851>
- [17] J. C. Arguelles, “Which App Pricing Models Is Best For You?,” Appetiser: Web and Mobile App Development Melbourne, Australia. Accessed: Apr. 20, 2025. [Online]. Available:
<https://appetiser.com.au/blog/app-pricing-models/>
- [18] “B2B Marketing Analytics Implementation Guide”.
- [19] “What is average revenue per user (ARPU)? | Stripe.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://stripe.com/ie/resources/more/what-is-average-revenue-per-user-why-it-matters-and-how-to-calculate-it>
- [20] “Voodoo acquires BeReal to take authentic social network to new heights | Voodoo.” Accessed: Apr. 20, 2025. [Online]. Available: <https://voodoo.io/news/voodoo-acquires-bereal>
- [21] “Meta Platforms (META) Market Cap & Net Worth,” StockAnalysis. Accessed: Apr. 20, 2025. [Online]. Available: <https://stockanalysis.com/stocks/meta/market-cap/>
- [22] “Quick Quote Calculator,” AIB. Accessed: Apr. 20, 2025. [Online]. Available: <https://aib.ie>
- [23] “Creative Cloud pricing and membership plans | Adobe Creative Cloud.” Accessed: Apr. 20, 2025. [Online]. Available: <https://www.adobe.com/ie/creativecloud/plans.html>
- [24] “Compare flexible pricing plan options | Google Workspace.” Accessed: Apr. 20, 2025. [Online]. Available:
https://workspace.google.com/pricing?utm_source=google&utm_medium=cpc&utm_campaign=emea-ie-all-en-dr-bkws-all-all-trial-b-t1-1011339&utm_content=text-ad-none-none-DEV_c-CRE_668771020733-ADGP_Hybrid%7C+BKWS+-+BRO%7C+Txt+-+Brand+-+G-Suite+-+Business-KWID_4
- [25] “Office space in Dublin,” Dublin.ie. Accessed: Apr. 20, 2025. [Online]. Available:
<https://dublin.ie/invest/move-your-business/commercial-space/>
- [26] “Commercial property for rent in 3013 Lake Dr, Citywest, Co. Dublin,” Daft.ie. Accessed: Apr. 20, 2025. [Online]. Available:
<https://www.daft.ie/commercial-property-for-rent/3013-lake-dr-citywest-co-dublin/46721>
- [27] “GradStart | Enterprise Ireland.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://www.enterprise-ireland.com/en/supports/grad-start>
- [28] A. Saxena, “How much does GDPR compliance cost in 2025?,” Sprinto. Accessed: Apr. 20, 2025. [Online]. Available: <https://sprinto.com/blog/gdpr-compliance-cost/>
- [29] “Salary: Junior Software Developer in Ireland 2025 | Glassdoor.” Accessed: Apr. 20, 2025. [Online]. Available:
https://www.glassdoor.ie/Salaries/junior-software-developer-salary-SRCH_KO0%2C25.htm?utm_source=chatgpt.com
- [30] S. PRESS, “What Is SAP Signavio?” Accessed: Apr. 20, 2025. [Online]. Available:
<https://blog.sap-press.com/what-is-sap-signavio>
- [31] “Consumers — Channels 4.2.0 documentation.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://channels.readthedocs.io/en/latest/topics/consumers.html#basic-layout>
- [32] “Tags - OpenStreetMap Wiki.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://wiki.openstreetmap.org/wiki/Tags>
- [33] “SQLite vs MySQL vs PostgreSQL (Detailed Comparison),” RunCloud Blog. Accessed: Apr. 20, 2025. [Online]. Available: <https://runcloud.io/blog/sqlite-vs-mysql-vs-postgresql>
- [34] “RabbitMQ and Celery: Background Task Processing - Alibaba Cloud.” Accessed: Apr. 20, 2025. [Online]. Available:
<https://www.alibabacloud.com/tech-news/a/rabbitmq/4oc45nlvhy9-rabbitmq-and-celery-background-task-processing>

- [35] Datadog, “Getting Started with Datadog,” Datadog Infrastructure and Application Monitoring. Accessed: Apr. 20, 2025. [Online]. Available: <https://docs.datadoghq.com/integrations/sentry/>
- [36] azel, “What is Containerization? Unleashing the Game-Changer for Software Development and Deployment,” Gart. Accessed: Apr. 20, 2025. [Online]. Available: <https://gartolutions.com/the-power-of-containerization/>
- [37] “Google Maps Platform,” Google for Developers. Accessed: Apr. 20, 2025. [Online]. Available: <https://developers.google.com/maps>
- [38] “Nominatim.” Accessed: Apr. 20, 2025. [Online]. Available: <https://nominatim.org/>