Fpt University

TRƯỜNG ĐẠI HỌC FPT

CAPSTONE PROJECT REPORT

Report 1 – Project Introduction

– Hanoi, August 2025 –

Table of Contents

I. Record of Changes....3
II. Project Introduction....4
1. Overview....4
1.1 Project Information....4
1.2 Project Team....4
2. Product Background....4
3. Existing Systems....5
3.1 Petfinder....5
3.2 Tinder....7
3.3 BarkBuddy....9
3.4 Overall Existing Systems Conclusion....10
4. Business Opportunity....11
4.1 Market & Current Problems:....11
4.2 Pawnder's Solution....11
4.3 Competitive Advantage....12
4.4 Trends & Growth Potential....12
5. Software Product Vision....12
6. Project Scope & Limitations....13
6.1 Major Features....13
6.2 Limitations & Exclusions....15

I. Record of Changes

Date	A*, M, D	In charge	Change Description
19/09/2025	A, M	DucNV	Project Introduction- 1. Overview is added
19/09/2025	A	CuongNTT	Project Introduction- 2. Product Background is added
20/09/2025	A	VietDQ	Project Introduction- 3. Existing Systems is added
20/09/2025	A	TuanLQ	Project Introduction- 4. Business Opportunity is added
21/09/2025	A	SangNM	Project Introduction- 5. Software Product Vision is added
22/09/2025	A	CuongNTT	Project Introduction- 6. Project Scope & Limitations is added
25/09/2025	M	DucNV	Project Introduction- part 4 and part 5 are modified
18/01/2026	M	CuongNTT	6. Project Scope & Limitations- part 6.1 are modified
18/01/2026	M	TuanLQ	6. Project Scope & Limitations- part 6.2 are modified

*A - Added M - Modified D - Deleted

II. Project Introduction

1. Overview

1.1 Project Information

- Project name: Pawnder: Pet Dating App
- Project code: DPDA
- Group name: SEP490_G151
- Software type: Mobile Application

1.2 Project Team

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2. Product Background

The pet industry is experiencing rapid growth worldwide, with pets becoming increasingly popular companions for millions of households. In recent years, pets are more often viewed as integral members of the family, influencing lifestyle choices and daily social interactions. Globally, the pet market continues to expand as spending on pet care, products, and services grows year-over-year.

Empirical evidence substantiates this shift in user demand toward more responsible and regulated breeding practices. A large-scale survey conducted by Woodhead *et al.* involving 986 dog owners in Australia indicates that the majority of respondents assign high importance to breeding dog welfare, while a substantial proportion support the implementation of stricter regulatory frameworks to safeguard animal welfare during breeding activities [1]. Furthermore, the study identifies a persistent information gap, as many respondents report limited access to reliable and transparent information regarding breeding standards, partner selection criteria, and breeder credibility. As a consequence, breeding-related decisions are frequently made through informal online communities or personal networks, which are widely perceived as inefficient and associated with elevated risks [1].

From the perspective of breeders, convergent challenges have been documented. The *Australian Dog Breeders Study* published by MDPI reveals that breeders increasingly recognize pet owners' expectations for comprehensive and well-documented pet information, encompassing health records, behavioral attributes, and breeding histories [2]. Nevertheless, the study emphasizes that existing mechanisms for connecting breeders and pet owners remain fragmented and insufficiently standardized, thereby constraining effective information exchange and limiting the accuracy and reliability of breeder–owner matching processes [2].

At the market level, these behavioral and perceptual trends are mirrored in the economic expansion of breeding-related services. The global pets breeding management market was estimated at approximately USD 2.1 billion in 2024 and is projected to reach nearly USD 3.8 billion by 2035, corresponding to a compound annual growth rate (CAGR) of around 6.0% [3]. This sustained growth

reflects increasing investment in data-driven, technology-enabled solutions aimed at improving transparency, efficiency, and welfare outcomes within breeding ecosystems.

Collectively, these findings delineate a pronounced gap between the escalating demand for transparent, welfare-oriented, and information-rich breeding practices and the limited availability of technological platforms capable of systematically supporting such requirements. Addressing this gap represents a significant opportunity for digital solutions that integrate structured data management, transparent interaction mechanisms, and trusted connectivity between pet owners and breeders.

Today, pet owners face several challenges in managing and connecting around their pets. They often struggle to find reliable platforms to connect with other pet owners in their local area, share meaningful stories within communities that truly understand pet ownership, and ensure safe opportunities for pets to socialize. In particular, activities such as finding suitable playmates, companions, or even coordinating responsible breeding connections are commonly handled through informal online groups, word-of-mouth networks, or chance encounters. These approaches are often inefficient, unverified, and may involve potential risks.

This gap presents a clear opportunity for a more specialized solution. Pet owners increasingly seek a platform that goes beyond basic photo sharing or casual interaction, offering practical tools tailored to real pet-related needs. Pawnder is designed to address this opportunity by providing a dedicated digital environment that supports structured pet profiles, interaction, and information sharing.

Pawnder reimagines how pet owners interact with each other and manage their pets in the digital environment. Inspired by familiar interaction patterns such as the swipe-to-match concept, the platform provides an intuitive yet practical way for users to explore connections and engage within a pet-centered community. Each pet is represented through a dedicated profile containing structured information such as breed, age, personality, and preferences, enabling more informed and meaningful interactions.

By combining social networking with targeted interaction features, Pawnder positions itself as more than a conventional pet application. The platform helps pet owners save time, reduce uncertainty, and build trusted connections within a focused ecosystem. Ultimately, Pawnder responds to the growing demand in the pet-tech space for a dedicated platform that supports responsible interaction, community building, and future technological expansion.

From an information technology perspective, the challenge of Pawnder lies not only in building a connection platform, but also in processing and standardizing pet data, which is inherently unstructured. Pet images uploaded by users vary significantly in terms of shooting angles, lighting conditions, and image quality, posing challenges for feature recognition and extraction. To address this, Pawnder applies artificial intelligence–based image recognition techniques in combination with a structured data system, aiming to ensure consistency, scalability, and reliability in pet profiles.

Reference :

[1] Woodhead, L., et al., *Perceptions of dog breeding practices, breeding dog welfare and companion dog acquisition in a self-selected sample of Australian adults*, Animal Welfare, vol. 27, no. 4, pp. 343–361, 2018.

[2] Australian Dog Breeders Study, *A Quantitative Exploration of Australian Dog Breeders' Breeding Practices*, Animals (MDPI), 2025.

[3] Euromonitor International, *Pet Care in Asia Pacific – Market Overview and Forecast*, 2024.

3. Existing Systems

3.1 Petfinder

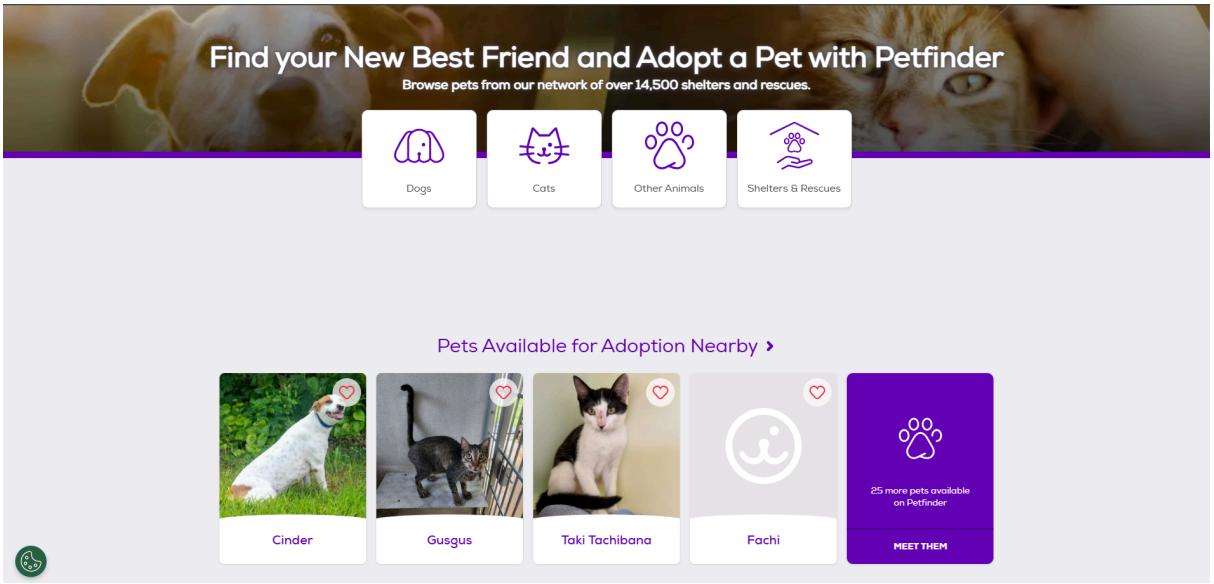

Figure 3.1. Systems Petfinder

- **Description**: Petfinder is a large-scale online platform designed to support pet adoption by connecting potential adopters with shelters, rescue organizations, and individual pet owners. The system primarily focuses on listing pets available for adoption (mainly dogs and cats) and providing descriptive information such as breed, age, personality, and health condition to support adoption decisions.
- **Link**: https://www.petfinder.com/
- **Actors**:
    - **Pet seekers:** Individuals searching for pets available for adoption based on predefined criteria such as breed, location, and age.
    - **Pet Provider:** Shelters, adoption centers, or individual pet owners who upload and manage pet profiles for adoption purposes.
    - **Platform Administrator:** Responsible for managing system content, approving listings, and maintaining overall platform operation.
- **Features**:
    - **Pet Discovery and Search:** Allows pet seekers to search and filter available pets based on attributes such as species, breed, age, and geographic location.
    - **Pet Profile Management:** Displays detailed pet profiles created and maintained by pet providers, including descriptive and health-related information.
    - **Adoption Connection Workflow:** Facilitates communication between pet seekers and pet providers through contact information or inquiry mechanisms.
    - **Multi-platform Availability:** Accessible via both web and mobile applications.
- **Pros**:
    - **Supports Structured Adoption Workflows:** Petfinder provides a structured process for adoption by centralizing pet listings from multiple shelters and organizations, reducing reliance on informal channels.
    - **Large and Diverse Pet Database:** Aggregates a significant number of pet profiles from various regions, increasing adoption opportunities and visibility for shelters.

- **Clear Role Separation:** Distinguishes clearly between pet seekers and pet providers, enabling focused system interactions aligned with adoption use cases.
- **User-friendly Interface:** Simplifies pet discovery through intuitive search and filtering mechanisms, lowering the barrier for first-time adopters.

- **Cons**:
  - **Adoption-centric System Design:** The platform is primarily designed for pet adoption and does not support ongoing social interaction or relationship-building between pets.
  - **Limited Species-specific Experience:** Petfinder does not provide specialized interaction models or features tailored specifically for cats or other individual species.
  - **Manual Profile Creation:** Pet profiles rely on manually entered information, with no AI-based image analysis or automated data standardization mechanisms.
  - **No Intelligent Pet-to-Pet Matching:** The system does not support matchmaking or compatibility analysis between pets, as its focus is on adoption rather than social or breeding-related use cases.

3.2 Tinder

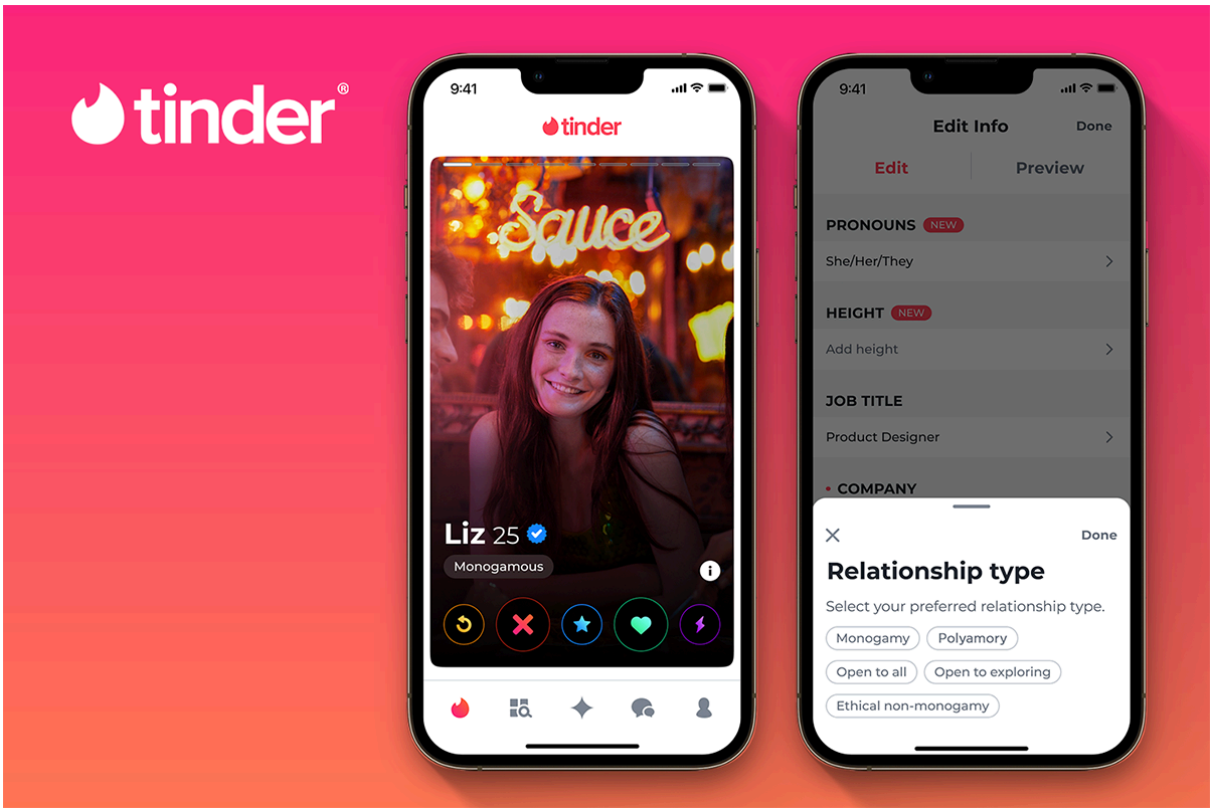

Figure 3.2. Systems Tinder

- **Description**: Tinder is a globally popular dating application that enables people to discover and connect with others through an intuitive swipe left/right interaction model. The platform is designed to facilitate fast user-to-user matching and communication, primarily within the context of human social relationships. Tinder's core experience is driven by profile

presentation, user interaction signals (likes, passes), and system-level recommendation and ranking mechanisms.

- **Link**: https://tinder.com/
- **Actors**:
    - **End User:** Individuals who create personal profiles, browse other profiles, and perform swipe actions to express interest.
    - **Platform Administrator/ Moderation Team:** Responsible for enforcing platform policies, managing reports, and maintaining platform integrity and safety controls.
    - **Subscription User (Secondary User):** End users who access premium features through paid plans.
- **Features**:
    - **User Profile Management:** Allows users to create and maintain personal profiles including photos and basic personal information.
    - **Swipe-based Interaction Mechanism:** Users swipe right to express interest or swipe left to skip; a match occurs when two users mutually express interest.
    - **Matching& Messaging:** Enables communication between matched users through an in-app chat mechanism.
    - **Discovery and Recommendation Support:** Supports user discovery based on factors such as location proximity and stated preferences, combined with platform-level ranking/recommendation logic.
- **Pros**:
    - **User Profile Management:** Allows users to create and maintain personal profiles including photos and basic personal information.
    - **Swipe-based Interaction Mechanism:** Users swipe right to express interest or swipe left to skip; a match occurs when two users mutually express interest.
    - **Matching & Messaging:** Enables communication between matched users through an in-app chat mechanism.
    - **Discovery and Recommendation Support:** Supports user discovery based on factors such as location proximity and stated preferences, combined with platform-level ranking/recommendation logic.
- **Cons**:
    - **Human-centric Domain:** Tinder is designed for human dating, so its matching objectives and data structures are not directly transferable to pet matchmaking without domain adaptation.
    - **Profile Data Dependence:** Profile accuracy depends largely on user-provided information, which may vary in reliability and does not inherently include structured biological or pet-specific attributes.
    - **Limited Domain-specific Safety & Verification for Pet Use Cases:** While Tinder includes safety and moderation controls for human interactions, it is not designed around pet-related risks (e.g., breeding safety, health history, pet identity verification).
    - **No Pet-specific Data Standardization Pipeline:** Tinder’s system does not include mechanisms such as image-based pet profiling or automated standardization of pet attributes, which are critical for pet-oriented matching.

3.3 BarkBuddy

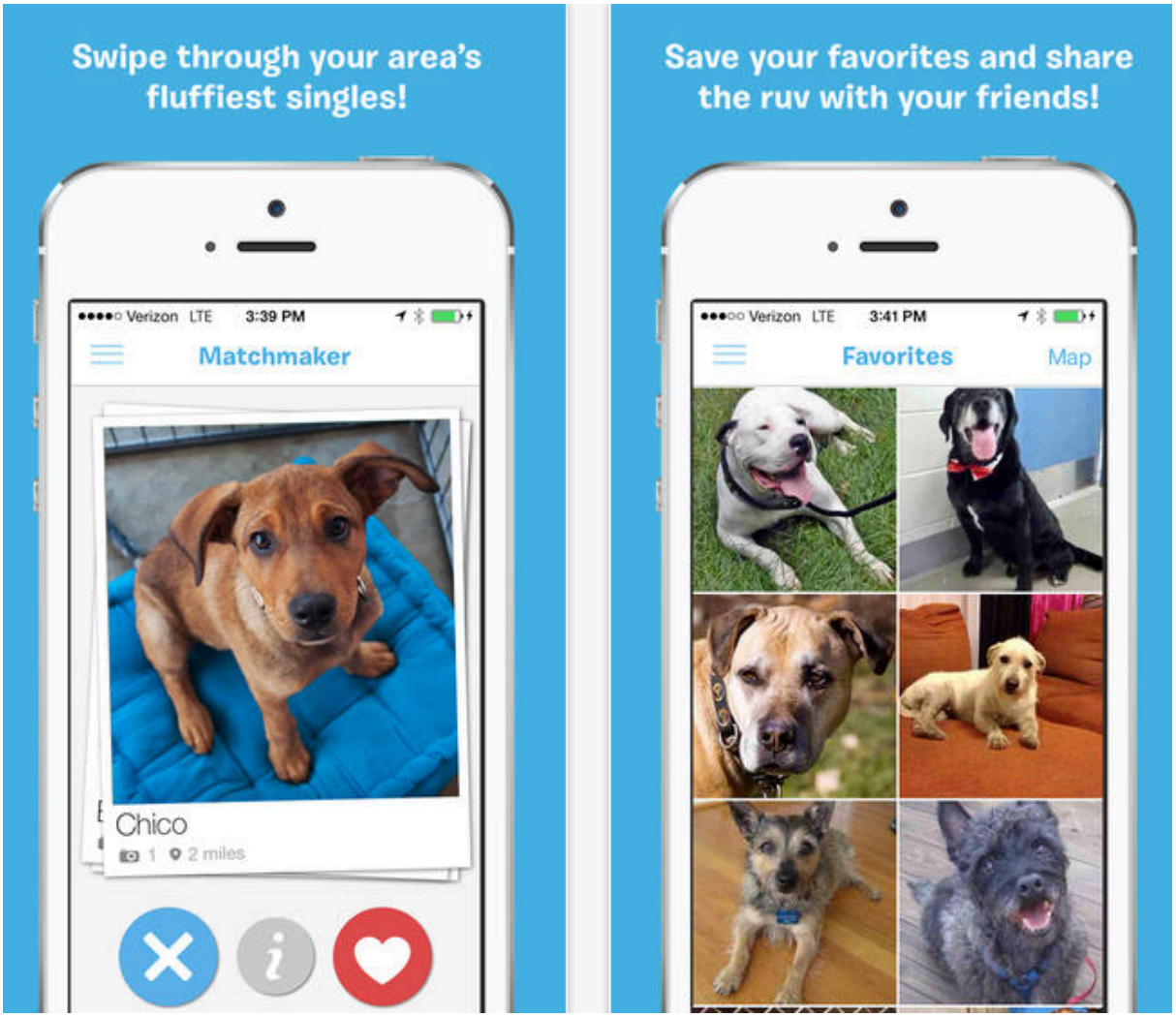

Figure 3.3. Systems BarkBuddy

- **Description**: BarkBuddy is a mobile application developed by BarkBox, designed to support dog adoption through a swipe-based interaction model similar to popular dating applications. The platform allows users to browse dog profiles from nearby rescue shelters and adoption centers, with the primary goal of increasing engagement and adoption rates through a simplified discovery experience.
- **Link**: https://barkbuddy.com/
- **Actors**:
    - **Pet Seeker (Primary User):** Individuals searching for dogs available for adoption and expressing interest through swipe-based interactions.
    - **Pet Provider (Secondary User):** Rescue shelters or adoption centers responsible for creating and managing dog profiles within the system.
    - **Platform Administrator:** Responsible for managing platform content, system maintenance, and operational oversight.
- **Features**:
    - **Swipe-based Pet Discovery:** Enables users to browse dog profiles using a left/right swipe interaction to express interest or skip.

    - **Pet Profile Presentation:** Displays detailed dog profiles including breed, age, photos, and basic personality descriptions provided by shelters.
    - **Location-based Discovery:** Supports finding adoptable dogs based on geographic proximity to the user.
    - **Adoption Connection Workflow:** Connects interested users with nearby shelters or rescue organizations to initiate the adoption process.
- **Pros**:
    - **Engaging Interaction Model:** The swipe-based interface lowers user effort and increases engagement, making the adoption browsing process more approachable and interactive.
    - **Clear Adoption-oriented System Design:** BarkBuddy focuses specifically on facilitating dog adoption by streamlining the discovery and initial connection stages between adopters and shelters.
    - **Pet-focused User Experience:** Unlike general-purpose social platforms, BarkBuddy is tailored to pet-related use cases, aligning its features and content with the adoption context.
    - **Simple and Intuitive Interface:** The application emphasizes ease of use, enabling users to quickly explore multiple adoption options without complex workflows.
- **Cons**:
    - **Adoption-centric Scope:** BarkBuddy is designed exclusively for adoption workflows and does not support ongoing social interaction or pet-to-pet matchmaking beyond adoption use cases.
    - **Species Limitation:** The platform focuses solely on dogs and does not provide equivalent support for cats or other pet species.
    - **Manual Profile Data Dependency:** Pet profiles are created and maintained by shelters, relying on manually entered information without AI-based image analysis or automated data standardization.
    - **Limited Use of AI at the System Level:** While the platform supports location-based discovery and basic preference filtering, it does not integrate AI as a core component for pet profile analysis, compatibility assessment, or intelligent pet-to-pet matching.

3.4 Overall Existing Systems Conclusion

The analysis of existing systems highlights that current platforms address pet-related needs from different perspectives, including adoption-focused workflows (Petfinder, BarkBuddy) and interaction-driven matching models (Tinder). Each system effectively solves a specific problem within its domain, such as facilitating pet adoption or enabling fast human-to-human connections through intuitive interaction mechanisms.

However, from a system-level and data-processing perspective, these platforms exhibit several common limitations when considered in the context of pet social interaction and matchmaking. Pet adoption platforms primarily rely on manually created pet profiles and focus on discovery and connection rather than ongoing interaction or compatibility assessment between pets. Meanwhile, human dating applications demonstrate strong matching workflows and scalable interaction models but are not designed to handle pet-specific data structures, biological attributes, or domain-specific safety considerations.

Although some existing systems incorporate artificial intelligence in areas such as content recommendation, ranking, or moderation, AI is typically applied as a supporting feature rather than

being embedded into the core data-processing pipeline. In most cases, pet profile data is not standardized through automated image-based analysis, which limits the system's ability to support intelligent, data-driven pet-to-pet matching at scale.

This analysis reveals a clear functional and architectural gap in the current landscape: the absence of a specialized platform that integrates AI-assisted pet profile standardization with pet-centric interaction and matching mechanisms at the system level. Pawnder is positioned to address this gap by focusing on structured pet data generation, domain-specific interaction design, and AI-supported information assistance, particularly for cat owners. By combining lessons learned from existing systems with a pet-focused system architecture, Pawnder aims to provide a more reliable, scalable, and context-aware solution for pet social interaction and matchmaking.

4. Business Opportunity

4.1 Market & Current Problems:

The pet industry, particularly the cat segment, is experiencing rapid growth in Vietnam and other developing countries, as pet owners increasingly regard cats as integral members of their families. Along with this trend, the demand for reliable digital platforms that support interaction, connection, and information sharing among cat owners has grown significantly. However, despite this increasing demand, the current digital ecosystem still presents several fundamental limitations.

- **Lack of a dedicated, cat-focused information system:** Existing platforms do not provide a specialized information system designed specifically for cat-related interaction. As a result, interactions among cat owners are fragmented and not supported by a structured, domain-focused platform.
- **Manually created and unreliable pet profiles:** Pet profiles are primarily created through manual input, leading to inconsistent, incomplete, and unreliable data. This limits the accuracy of information and reduces trust in the profiles used for interaction and connection.
- **Absence of data verification and validation mechanisms:** The lack of systematic data verification and validation increases potential risks during the process of connection and matching, as users have limited means to assess the credibility of pet-related information.
- **Lack of integrated information support modules:** Current platforms do not integrate dedicated modules to support users with pet-related information or answer common questions, forcing users to rely on external sources that may be inconsistent or unreliable.
- **Fragmentation of pet-related functionalities across multiple platforms:** Pet-related services and functionalities are scattered across various independent platforms, resulting in a disconnected user experience and increased effort for pet owners to manage information and interactions.

4.2 Pawnder's Solution

Pawnder addresses existing challenges through a multi-layer technology pipeline:

- **Data Collection Layer:** Users upload pet images and basic information to the system.
- **AI Processing Layer:** The system applies image recognition models to analyze images and extract key features such as breed, coat color, and physical characteristics.
- **Data Standardization Layer:** The extracted information is transformed into structured pet profiles to support data storage and efficient querying.
- **Intelligent Matching Layer:** The matching algorithm recommends compatible pets based on extracted features, behavioral attributes, and geographic location.

- **Social Interaction Layer:** Users can communicate, share content, and build a community within a controlled and monitored environment.

4.3 Competitive Advantage

- Existing channels (e.g., Facebook, Zalo groups) primarily provide basic connections, lacking data verification mechanisms pets.
- International applications (e.g., Petfinder) mainly focus on simple pet adoption or dating, with limited system-level support for automated feature extraction and intelligent matching based on image data.
- Pawnder differentiates itself as an all-in-one, data-driven platform that integrates AI-based profiling, intelligent matching, and a modular system architecture, optimized for local user behavior in the Southeast Asian market.

4.4 Trends & Growth Potential

- **AI adoption**: Users are increasingly open to AI-driven personalization in daily life.
- **Pet humanization**: Owners are willing to invest more in entertainment, care, and experiences for their pets.
- **Expanding pet services ecosystem**: Growth in grooming services, training centers, and breeding networks creates strong partnership opportunities for Pawnder.
- **Data-driven decision-making**: Pet owners are becoming more conscious of safety, compatibility, and reliability when choosing playmates or breeding partners, increasing demand for platforms that provide structured data, verification mechanisms, and intelligent matching support.

5. Software Product Vision

For pet owners seeking an easier, more reliable, and modern way to find suitable companions or breeding partners for their pets, **Pawnder** offers a comprehensive solution through an intelligent mobile application. Leveraging the power of artificial intelligence, Pawnder automatically analyzes pet photos to generate highly accurate profiles — including breed identification, physical characteristics, coat colors, and even predicted behavioral traits. Based on this information, the system intelligently suggests and matches pets with high compatibility, taking into account breed, biological factors, personality traits, needs, and geographic proximity.

Unlike traditional methods that depend on word of mouth, scattered online forums, or incomplete and unverified information, Pawnder provides a unified, transparent, and data-driven platform. This helps users save time, build trust, and minimize risks when choosing playmates or breeding partners for their pets. By digitizing and standardizing pet information, Pawnder creates a safe, controlled, and user-friendly environment where pet owners can confidently make decisions backed by accurate insights.

In addition to its product vision, Pawnder aims to build a system architecture that is scalable and adaptable over time. User and pet behavioral data are collected and analyzed to progressively improve the accuracy of the matching system. AI components are designed in a modular manner, allowing models to be replaced or upgraded in the future without affecting the overall system. This approach ensures that Pawnder not only performs effectively in the present, but also maintains a robust technological foundation for long-term development.

Our vision is to create a world where pet lovers are seamlessly connected through intelligent recommendations and trustworthy information—where every pet has access to compatible friends, healthy social interactions, and better opportunities for companionship. With Pawnder, we aim to strengthen the global pet-loving community, fostering a more connected, responsible, and caring ecosystem empowered by smart technology.

6. Project Scope & Limitations

6.1 Major Features

Among the system features, the team focuses on several core functionalities that involve significant technical challenges, including automatic pet profile generation using AI, intelligent matching algorithms, and a multi-role access control system (User – Expert – Admin). The remaining features primarily support user experience and contribute to the overall completeness of the system.

Feature ID	Features Description
General	
FE-01	Authentication: Allows users to register and log in using email and password, and recover forgotten passwords.
Admin Web	
FE-02	Content Management System: Administrators can manage pets, attributes, events, policies, prohibited words, reports, and payments to maintain the quality and security of the platform.
User	
FE-03	AI-powered Pet Profile Creation: Users can automatically create attractive and detailed pet profiles using AI technology based on uploaded photos.
FE-04	AI Chat Assistant: Users can chat with an AI assistant to receive personalized advice on pet care and behavior.
FE-05	Smart Pet Matching and Recommendations: Matches pets based on compatibility weights with swipe interactions and provides AI-based recommendations based on interests and location.
FE-06	Real-time Chat and Matching Management: Users can chat with matched users in real time, manage matchmaking connections, block unwanted users, and seamlessly coordinate pet meetups.
FE-07	Expert Consultations with AI Assessment: Users can consult certified pet experts and submit chats to AI for professional assessments, effectively combining AI with human

	expertise.
FE-08	Appointment Scheduling System: Users can schedule, manage, and track pet meetups and consultations with check-in and completion.
FE-09	Pet Events & Contests: Users can participate in pet contests, submit entries, and vote for pets in community events.
FE-10	Payment & Subscriptions: Users can purchase and manage premium subscription packages for advanced features.
FE-11	Reporting & Safety: Users can report inappropriate content or users and receive real-time notifications to maintain a safe community experience.
Expert	
FE-11	Expert Consultation Management: Experts can manage consultation requests, review AI conversations, chat with users, and provide professional feedback.

Figure 6.1. Major Features

6.2 Limitations & Exclusions

6.2.1 Limitations

ID	Name	Description
LI-01	Virtual Interaction Only	The system supports interactions and connections exclusively within a digital environment. Pawnder does not provide real-world intervention services such as direct pet breeding, veterinary consultation, or medical evaluation for pets.
LI-02	Manual Dependency in Data Verification	Although the system provides mechanisms for standardizing pet profiles, data accuracy remains partially dependent on user-submitted information. Pawnder has not yet implemented third-party data verification mechanisms (e.g., veterinary clinics or professional organizations).

LI-03	Rule-Based Matching Instead of AI-Driven Decision Making	Within the scope of the current project, the matching process is implemented based on predefined rules and criteria. Artificial intelligence is not applied for automated decision-making, adaptive matching, or user behavior optimization.
LI-04	Limited Geographic Availability	Location-based functionalities (e.g., regional matching) are supported only within predefined geographic areas and have not been deployed at a global scale.
LI-05	Online-Only System Operation	The system requires an active internet connection to operate. Offline functionality is not supported in the current version.
LI-06	Species Scope Limitation	The system currently focuses primarily on cats. Other pet species (such as dogs, birds, reptiles, etc.) are not supported in the present implementation.
LI-07	No direct integration with veterinary systems in the current implementation.	The application currently only facilitates connections between pet owners for breeding purposes conducted outside the platform and does not yet provide direct support or services from veterinary clinics or animal health professionals.

6.2.2 Exclusions

ID	**Name**	**Description**
EX-01	Language support	Currently, the app is only available in Vietnamese.
EX-02	Offline Support	E application does not support a mobile app
EX-03	Insurance	Pet insurance features are not included
EX-04	Third-party Integrations	No integration with external pet adoption platforms (e.g., Petfinder, BarkBuddy) for automatic data sync.
EX-05	E-commerce	The system does not support buying/selling pet products, accessories, or services.