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PetCare Management System

Puteri Balqis Kamaruzaman[1], Mazidah Mat Rejab [1]*

[1] *Fakulti Sains Komputer dan Teknologi Maklumat,*
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

*Corresponding Author: mazidah@uthm.edu.my
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Abstract

The PetCare Management System addresses inefficiencies in pet adoption processes faced by animal shelters. Traditional methods, such as relying on WhatsApp for inquiries and Instagram for promotion, are time-consuming, leading to delays, lost information, and reduced adoption success rates. This project develop a system that automates key operations, integrating features like user registration, adoption tracking, rescue reporting, and location-based event services. Developed using the Waterfall methodology, requirements gathering, system design, implementation, testing, deployment, and maintenance ensure a structured and efficient development process. Designed for shelters like Cares JB, it centralizes adoption, rescue, and event management to improve efficiency. The system includes a mobile web-based application, ensuring functionality and usability through alpha and beta testing. By streamlining operations, it reduces administrative burdens, improves response times, and provides a seamless experience. The system increases adoption success, enhances rescue efforts, and benefits both shelters and animals.

1. Introduction

The process of pet adoption involves transferring the responsibility of a pet from one owner to another, often facilitated by animal shelters and rescue organizations. However, many shelters face significant challenges in managing adoptions due to the inefficiencies of manual systems. For instance, communication with potential adopters is often conducted through platforms like WhatsApp, leading to delayed responses, lost data, and an overall poor user experience. Additionally, adoption events are dispersed across various social media platforms such as Instagram, complicating the process for interested adopters to discover and participate. Such inefficiencies result in prolonged animal stays at shelters, which can negatively impact both the welfare of the animals and the satisfaction of potential adopters.

Cares JB organization relies heavily on WhatsApp for adoption queries, Instagram for event promotion, and phone calls for rescue reports, leading to weakened communication and cohesive efforts. The absence of a centralized platform hinders their ability to streamline operations, respond to inquiries promptly, and effectively manage rescue efforts. These operational difficulties emphasize the need for a comprehensive solution that integrates communication, adoption management, and event coordination into a single platform.

The proposed PetCare Management System seeks to address these challenges by providing an integrated, mobile, and web-based platform that enhances the efficiency of pet adoption. This system will simplify the adoption process, allowing administrators to manage adoption requests, organize events, and respond to rescue reports more efficiently. For users, the system offers the ability to explore available pets, submit adoption applications, track application statuses, report rescues, and access location-based services for adoption events.

By automating these processes, the system aims to minimize communication delays, improve adoption rates, and reduce animal shelter stays.

2. Literature Review

This section will provide an overview of the existing pet adoption practices, challenges, and systems. It discusses the importance of pet adoption, evaluates current management methods, and explores how technology, including mobile apps and location-based services, can improve efficiency and adoption rates. It also compares existing pet adoption platforms to identify gaps that the proposed PetCare Management System aims to address.

2.1 Pet Adoption

Adopting a pet is an ethical alternative to purchasing one from pet stores or breeders, offering both the animals and their adopters a meaningful connection. Adoption extends a pet's life, granting them a second chance while providing owners the emotional and physical benefits of caring for an animal in need [1]. Rescues, shelters, and re-homing centers prioritize the health and well-being of animals, making adoption a responsible choice that discourages unethical breeding practices. Unlike breeders who may neglect animals' physical and emotional welfare, shelters ensure pets are vaccinated, spayed/neutered, micro chipped, and treated for parasites [2]. In Malaysia, pet ownership is on the rise, with 51.1% of Malaysians owning pets, and an additional 26.2% of non-pet owners expressing interest in adoption. This reflects a growing appreciation for pets as an integral part of daily life [3]. Adopting from shelters not only saves animals from harsh conditions but also prevents them from ending up in unethical puppy mills, which prioritize profits over animal welfare and often result in pets with long-term health issues [4]. Adoption provides a lifeline for animals facing neglect, cruelty, or abandonment, while promoting a compassionate and sustainable approach to pet ownership. It empowers individuals to contribute positively to animal welfare and ensures pets are placed in safe, loving homes.

2.2 Pet Adoption Management System

A pet adoption management system is a digital solution that enhances the efficiency and effectiveness of the adoption process for both shelters and adopters. By automating critical tasks like communication, payment processing, reporting, and post-adoption follow-ups, these systems significantly reduce manual workloads and improve operational workflows [5]. Features such as automated adopter-pet matching, tracking adoption histories, and generating detailed reports enable shelters to optimize their operations while providing a seamless experience for adopters. Digital platforms, including websites, social media, and adoption apps, further streamline the process by enhancing communication and outreach. Websites act as comprehensive resources, providing detailed profiles of adoptable pets, while platforms like Facebook and Instagram use engaging visuals and stories to attract potential adopters [6]. Adoption apps make the process more accessible by allowing users to browse available pets, submit applications, and complete adoption steps online. These platforms also support remote adoptions by offering simplified online applications, document uploads, and virtual interviews. Detailed pet profiles, including behavior traits, medical history, and compatibility with different household types, help adopters make informed decisions [6]. Additionally, the ability to monitor user behavior on these platforms ensures that shelters can continually improve the user experience.

2.3 Study of Existing System

The current pet adoption process at Cares JB relies on manual methods, including WhatsApp for adoption inquiries, Instagram for event promotion, and phone calls or in-person visits for rescue reports. While these methods enable basic communication, they are inefficient, leading to delayed responses and difficulties in managing multiple inquiries. The absence of a centralized system hampers effective tracking and coordination, resulting in missed opportunities and a slower adoption process. Adoption events require users to sift through Instagram posts for event details, which can be time-consuming and may limit participation. Overall, this approach hinders the organization's ability to streamline operations, enhance response times, and increase adoption rates, highlighting the need for a more efficient and automated solution, as shown in Figure 1: As-Is diagram of the current process.

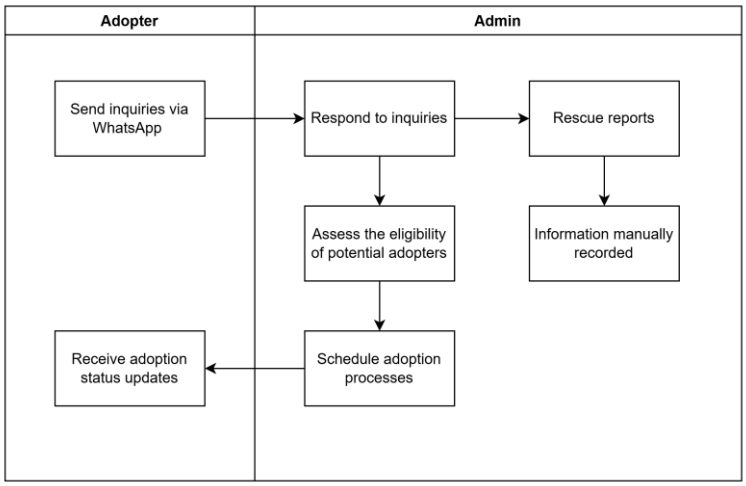

Fig 1 *As-Is diagram for the current process*

2.4 Comparison with the Existing System

The table provides a detailed comparison of three existing applications such as Pet Finder, Pets Adoption, and PETO against the innovative features of the upcoming PetCare system. All applications support essential functionalities such as pet adoption, event details, and reporting, PetCare distinguishes itself with advanced features aimed at enhancing user experience and functionality. PetCare also introduces a standout feature of PetCare is its location-based services, which help users discover nearby pet adoption events. Additionally, PetCare introduces a post-adoption status feature, enabling users to update and track the adoption process, further extending its scope of service. This analysis informs the development of PetCare, emphasizing user oriented features and highlighting potential areas for improvement in existing applications, as shown in Table 1: Comparison between existing system and proposed system.

Table 1 *Comparison between existing system and proposed system*

Features of the system	Pet Finder	Pets Adoption	PETO	PetCare
Register and Login	✓	✗	✓	✓
Pet adoption	✓	✓	✓	✓
Post-adoption status	✗	✗	✗	✓
Report rescue	✗	✗	✗	✓
Location-based services	✓	✓	✗	✓
Notifications	✓	✗	✓	✓
Edit Profile	✓	✗	✓	✓
Logout	✓	✗	✓	✓

3. Methodology/Framework

This section details the methodology employed in the development of the PetCare system, highlighting Waterfall Model due to its linear and sequential nature, which provides clear phase distinctions and comprehensive documentation. Waterfall Model methodology facilitates a smooth and adaptive development process, allowing for ongoing enhancements and ensuring alignment with the system's objectives.

3.1 Waterfall Model

The Waterfall Model is one of the earliest software development methodologies, introduced by Winston W. Royce in 1970. It follows a sequential design process where each phase must be completed and reviewed before moving to the next. This structured approach is well-suited for projects with clearly defined requirements and expected deliverables, such as the PetCare Management System. Because of its straightforward and disciplined process, the Waterfall Model facilitates easier management and tracking of progress. It also encourages thorough documentation at each stage, which is important for stakeholder communication and maintaining quality standards. The model's rigid structure helps identify potential problems early on, minimizing risks and rework during later stages. However, it is less effective for complex projects or those with changing requirements, making it more appropriate for short-term projects with stable and well-defined criteria [4].

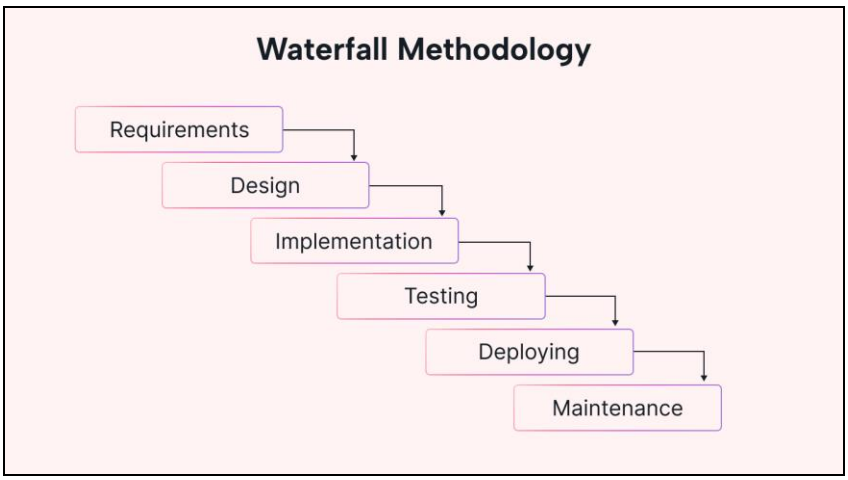

Fig 2 *Waterfall Model [7]*

3.2 Requirement Phase

The requirements phase is the foundation for the entire system by gathering comprehensive information about user needs and system expectations. For the PetCare Management System, requirements were collected through multiple channels. The existing system from the Cares JB organization was reviewed to understand their current processes and pain points. Additionally, direct engagement with stakeholders provided valuable qualitative insights. To complement these efforts, a Microsoft Form survey was distributed to Cares JB management team regarding essential system features such as pet adoption workflows, veterinary services, and rescue reporting. The information collected was consolidated into a detailed System Requirements Specification (SRS), which guided the subsequent phases of the project. The project timeline and tasks were also structured into a Gantt chart to monitor progress and deadlines.

3.3 Design Phase

In the design phase, the requirements are translated into technical specifications and architectural plans. This phase is divided into High-Level Design (HLD), which outlines the overall system structure, and Detailed Design (DD), which focuses on the internal workings, such as database schema and algorithms. Visual modeling tools, particularly draw.io, were used extensively to create UML diagram including use case, activity, and sequence diagrams. These diagrams helped clarify system interactions and data flows. Equally important was the focus on UI/UX design, where detailed wire frames and mock-ups were developed by analyzing competitor applications to identify best practices and usability improvements. The design decisions also included selecting appropriate development tools and technologies, such as Visual Studio Code for coding and MySQL for data management. This design process ensured that the system architecture would be robust, maintainable, and user-friendly.

3.4 Implementation Phase

During the implementation phase, the system was constructed following an object-oriented programming approach to facilitate modularity and scalability. Development began with core functionalities such as user registration, login, pet adoption processing, event updates, and reporting features for rescued animals. Building the system incrementally allowed for testing and refinement of each module before moving to the next. The development environment was Visual Studio Code as the framework for creating a responsive mobile application that could run across multiple platforms with a single code base. Back-end logic was implemented

using PHP and JavaScript, supported by MySQL database to handle structured data storage and real-time update respectively. This approach balanced flexibility with efficient resource use, aligning with project goals.

3.5 Testing Phase

The testing phase was vital to ensure the PetCare Management System's functionality, reliability, and usability. Initially, alpha testing was conducted internally by developers and system analysts to detect technical defects, inconsistencies, and usability issues. Once the application passed this stage, it advanced to beta testing, where a representatives from Cares JB, interacted with the system in a real-world environment. This phase provided critical feedback on practical usability and helped identify any remaining gaps or bugs. Testing was carried out systematically according to a predefined test plan, covering each module of the system. The iterative feedback process allowed the development team to address identified issues promptly and improve the system's overall user experience before deployment.

3.6 Deployment Phase

The deployment phase marks the transition of the PetCare Management System from development into active use. This stage involved installing and configuring the system on target platforms and distributing the mobile application to end users. Additionally, initial training sessions were provided to organizational staff to ensure they could effectively use and manage the system. Close monitoring was maintained during early deployment to detect and resolve any unforeseen issues that might impact system performance or user satisfaction. The goal of this phase was to deliver a stable and fully functional application that met stakeholder requirements and operated efficiently in a live environment.

3.7 Maintenance Phase

Maintenance is an ongoing phase focused on supporting and improving the PetCare Management System after deployment. During this stage, continuous monitoring and feedback collection are conducted to identify any issues such as bugs, performance bottlenecks, or changing user needs. Regular updates and patches are applied to enhance system security, fix defects, and optimize performance. The maintenance phase ensures the system remains relevant, reliable, and effective throughout its life cycle by adapting to new requirements and technological advances.

4. Result and Discussion

This section outlines the development process of the PetCare Management System. Section 4.1 details the system requirements analysis, while Section 4.2 covers the system analysis, including the use case diagram, class diagram, and the system interface design.

4.1 System Requirements Analysis

This section outlines the analysis and design process for developing the PetCare Management System. It provides an overview of the system development workflow, details the functional requirement that shown in Table 2 and non-functional requirements shown in Table 3. This section also elaborates on the system analysis and system design.

Table 2 *Functional Requirements Analysis*

No	Modules	Functionalities
1	Register	The system shall enable adopter to register for the PetCare Management System by submitting their personal information, including name, email address and password.
2	Login	The system shall provide authorized adopters and administrators the ability to log in with their credentials to access their profiles and utilize the system functionalities.
3	Profile Management	The system must allow adopters to update their profile information and ensure the data remains up-to-date.
4	Manage Pet Adoption	The system shall allow admins to manage pet adoption comprehensively by adding and updating details about available pets in the shelter. It shall also enable users to browse through the listed pets, view detailed information about available pets, and select those they are interested in for adoption.
5	Adoption Progress Tracker	The system shall allows adopters to track their adoption status and view key details, with dynamic updates on their progress. It displays admin-approved and pick-up dates, while admins have the ability to review, approve, or reject applications, ensuring a seamless and transparent adoption process.

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Table 2 *Functional Requirements Analysis (Cont)*

No	Modules	Functionalities
6	Manage Pet Adoption Events	The system shall enable adopters to locate nearby pet adoption events using location-based services, providing a map that displays upcoming events within their area.
7	Report Rescue Management	The system shall allow users to report rescue cases of mistreated, injured, or abandoned pets by submitting rescue reports with all essential information.
8	Generate Report	The system shall allow admins to review summaries of pets remaining in the shelter, view the total number of adoptions, and filter the adoption list by month to track adoption activities.
9	Logout	The system shall allow both adopters and admin to securely log out, ensuring the protection of their accounts and data from unauthorized access.

Table 3 *Non-Functional Requirements Analysis*

No	Requirements	Description
1	Operational	The system shall ensure seamless operation through ensuring easy navigation, efficient workflows, and device compatibility, allowing users and administrators to perform tasks such as pet browsing, adoption tracking, and rescue reporting without interruption.
2	Performance	The system shall maintain optimal performance, with response times under 3 seconds for important operations such as viewing pet details or submitting applications, even during peak usage.
3	Security	The system shall protect adopters personal information, such as names, contact information, and login passwords, by using encryption techniques for data transmission and storage.
4	Availability	The system shall maintain a high degree of availability, with 99.9% uptime to ensure constant access for adopters and administrators at all times, particularly during pet adoption campaigns.
5	Dependability	The system shall provide dependable functioning by assuring accurate data processing, low downtime, and rapid error recovery in order to increase user confidence and favor seamless operations.

4.2 Use Case Diagram

A use case diagram serves as a primary tool for capturing system or software requirements during the development of a new software program. Use cases define the expected behavior without detailing the specific implementation methods. Once defined, use cases can be represented both textually and visually, typically in the form of a use case diagram. A fundamental aspect of use case modeling is its focus on designing a system from the end user's perspective.

Fig 3 *Use Case Diagram*

4.3 Class Diagram

A class diagram provides a static view of an application, representing the objects in the system and their relationships. It illustrates classes, their attributes, methods, and interactions, offering an overview of the software structure. By organizing class names, attributes, and functions into compartments, it helps visualize, document, and construct software. As it includes classes, interfaces, associations, and constraints, it is classified as a structural diagram. The class diagram for the developed system is presented in Figure 4.

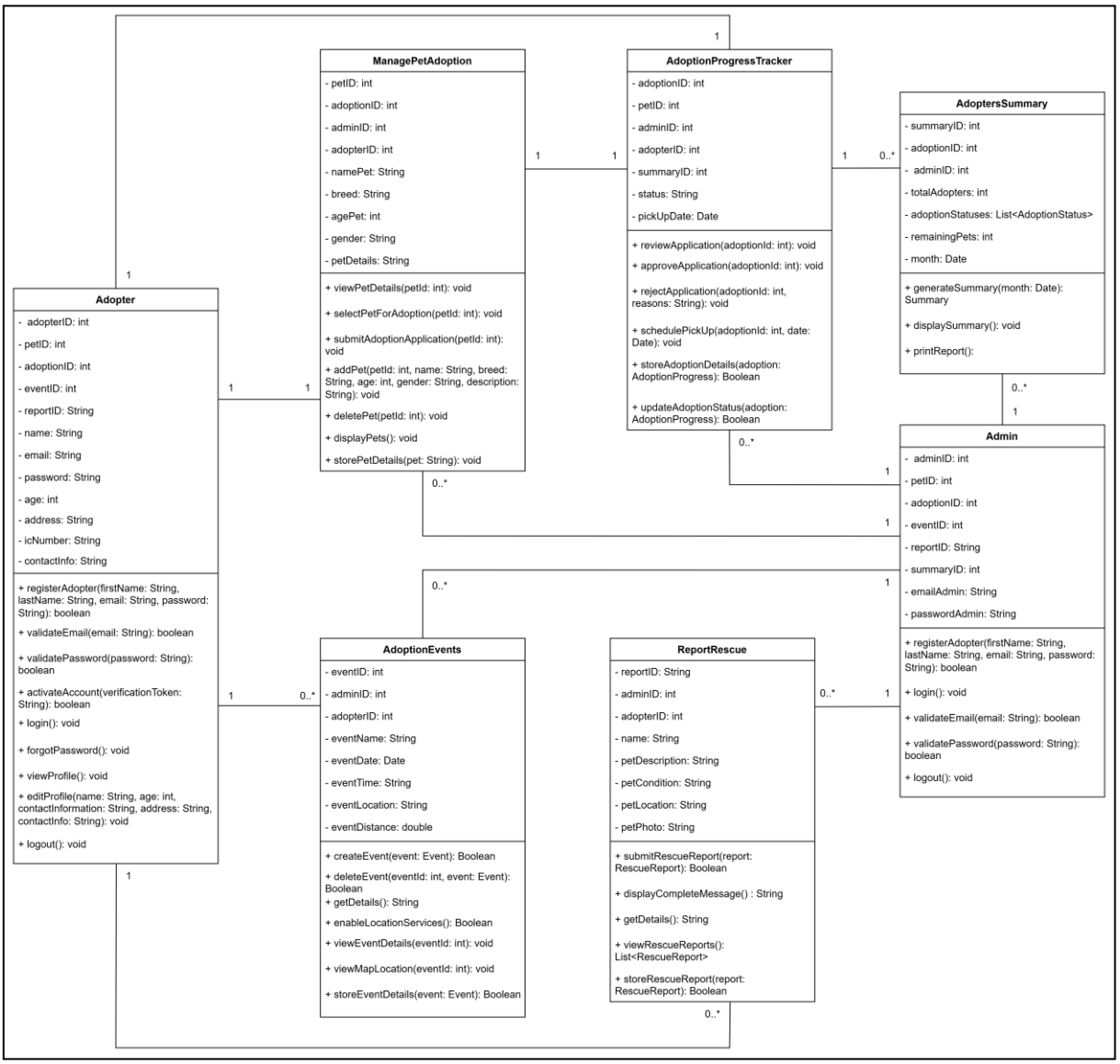

Fig. 4 *Class Diagram*

4.4 Implementation

The development of the PetCare Management System utilizes Visual Studio Code as the primary integrated development environment (IDE), alongside XAMPP for local server and database management. Visual Studio Code is used to design and implement the system's interface modules, which are developed using HTML, CSS, JavaScript, and PHP. Meanwhile, XAMPP facilitates the execution of SQL statements and manages the connection between the user interface and the MySQL database, ensuring seamless data storage, retrieval, and overall system functionality.

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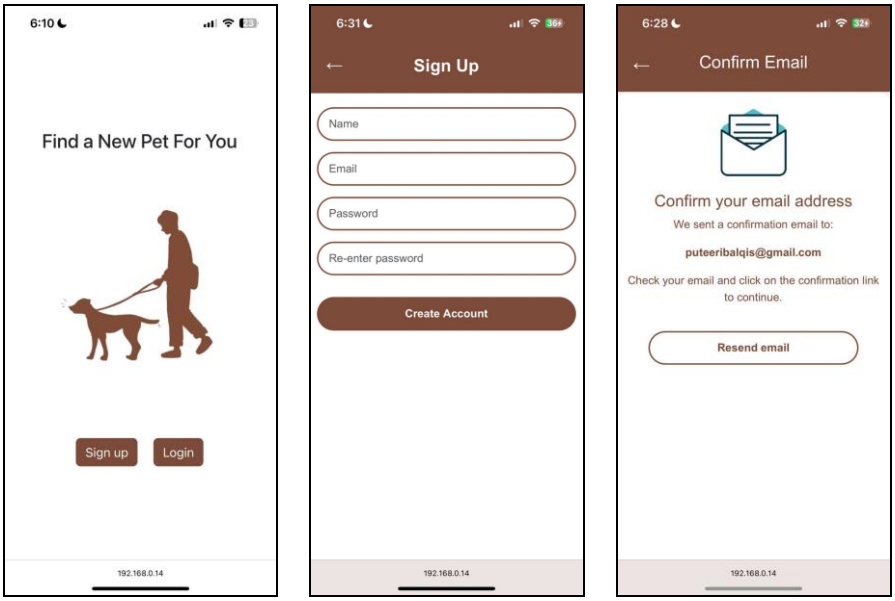
4.4.1 Register Account (Adopter)

The adopter registration interface provide a user-friendly form where new adopters can input their personal details, including name, email address, and password. It features clear field labels, real-time validation to highlight any input errors, and a create account button to proceed.

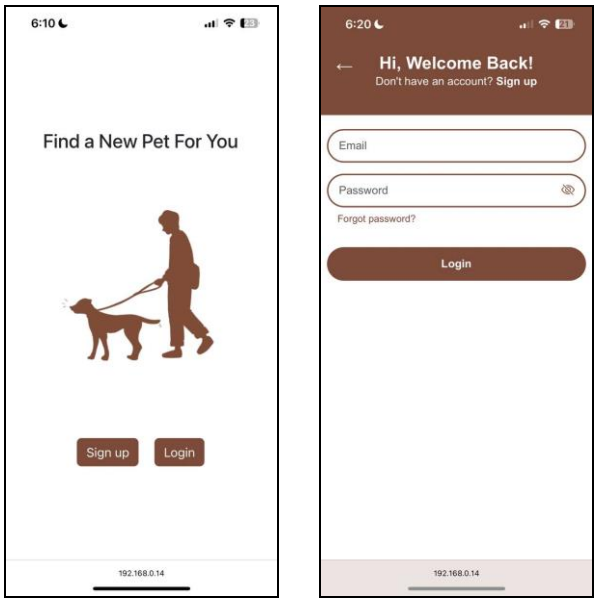


(a) **(b)** **(c)**

Fig. 5 *(a) Welcome Interface; (b) Register Interface; (c) Email Verification Interface*

4.4.2 Login (Adopter)

The adopter login interface begins on the homepage, where adopters click a login button to be directed to the login page. On this page, adopters can input their registered email addresses and passwords to access their personal dashboards. A forgot password option is also available for adopters who need to recover their accounts.



(a) **(b)**

Fig. 6 *(a) Welcome Interface; (b) Login Interface*

4.4.3 Manage Profile Information (Adopter)

The profile management interface provides a seamless way to view and update personal details. Upon accessing their profile page, adopters can click the edit button to modify fields such as age, address, IC number, and contact information. Editable fields are enabled for input, allowing adopters to make the necessary updates. Once changes are complete, adopters can click the save button to securely store their updated information.

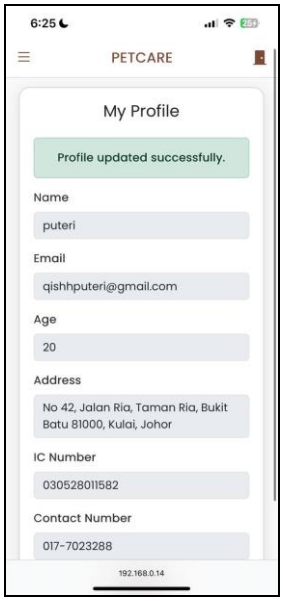
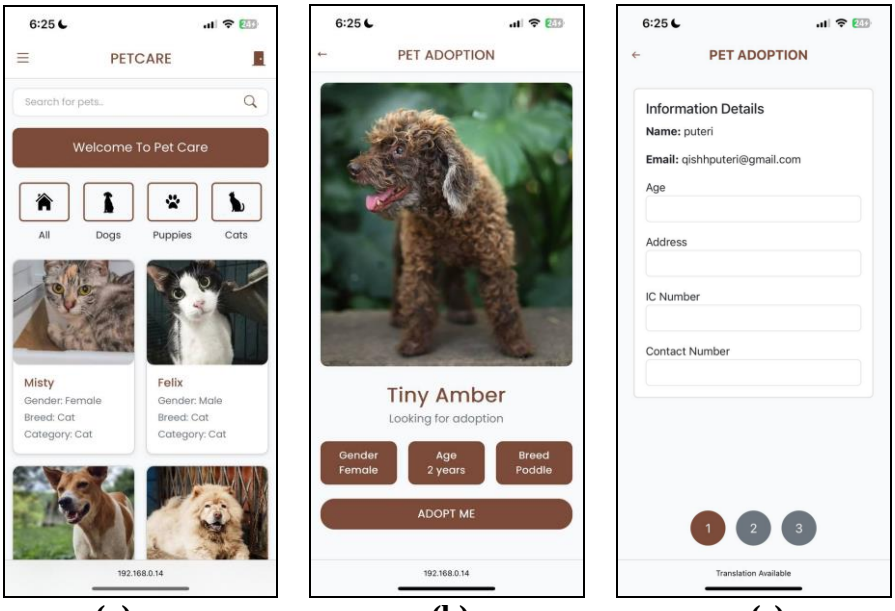


Fig. 7 *Profile Management Interface*

4.4.4 Manage Pet Adoption (Adopter)

The pet adoption interface for adopters allows users to browse through a comprehensive list of available pets in the pet adoption section. Adopters can view detailed information about each pet and click the adopt me button to submit an adoption request. Before the request is processed, adopters are required to complete the adoption form page. Once the form is submitted, the system confirms the request, and adopters can then view their adoption details on the Pet Tracker page.



(a) **(b)** **(c)**

Fig. 8 *(a) Pet List Interface; (b) Pet Details Interface; (c) Adoption Form Details Interface*

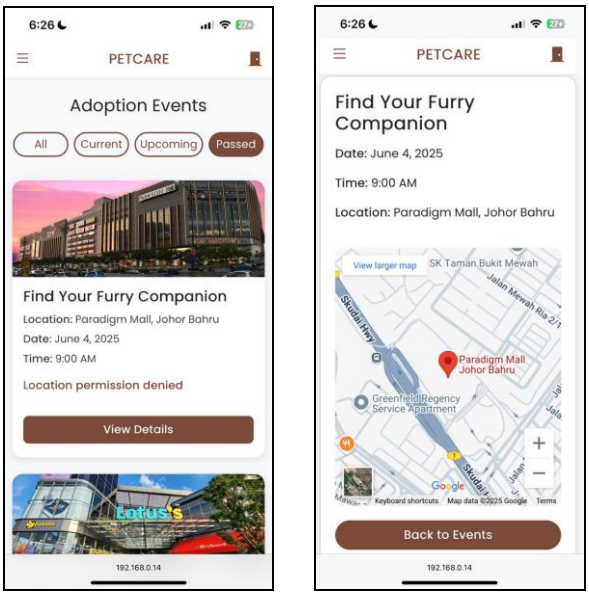
4.4.5 Track Adoption Progress (Adopter)

The pet adoption progress tracker interface provides real-time updates on their application status. After submitting an adoption request, adopters can view their application status as "Pending" on the Pet Tracker page. Once approved by the admin, the status changes to "Success," displaying the pick-up date alongside detailed adopter and pet information, streamlining the adoption journey.

Fig. 9 *Pet Tracker Adoption Interface*

4.4.6 Manage Pet Adoption Events (Adopter)

The pet adoption event interface enables to discover upcoming events through a location-based services feature. By granting location access, adopters can view a list of nearby events along with details like event name, date, time, location, and distance. Adopters can select an event to see comprehensive information and use the map interface for better navigation, making it easy to plan attendance.



(a) **(b)**

Fig. 10 *(a) Adoption Events Interface; (b) Event Details Interface*

4.4.7 Manage Report Rescue (Adopter)

The report rescue interface for adopters provides a straightforward way to report mistreated, injured, or abandoned pets. Adopters can access the report rescue option to submit detailed reports by entering the rescuer's name, description, date of rescue, location and uploading photos for better clarity. The system validates the provided information and confirms submission.

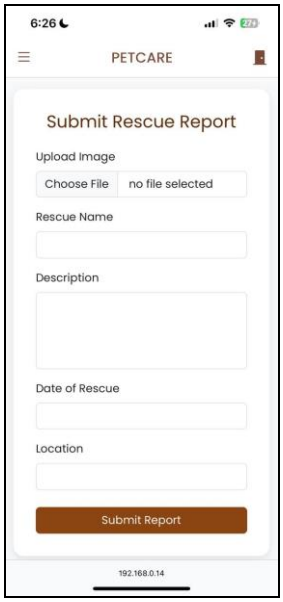


Fig. 11 *Report Rescue Interface*

4.4.8 Login (Admin)

The admin login interface provides direct access to the login page, where admins can enter their registered email addresses and passwords. Upon successful authentication, admins are redirected to their dedicated dashboard to manage system operations.

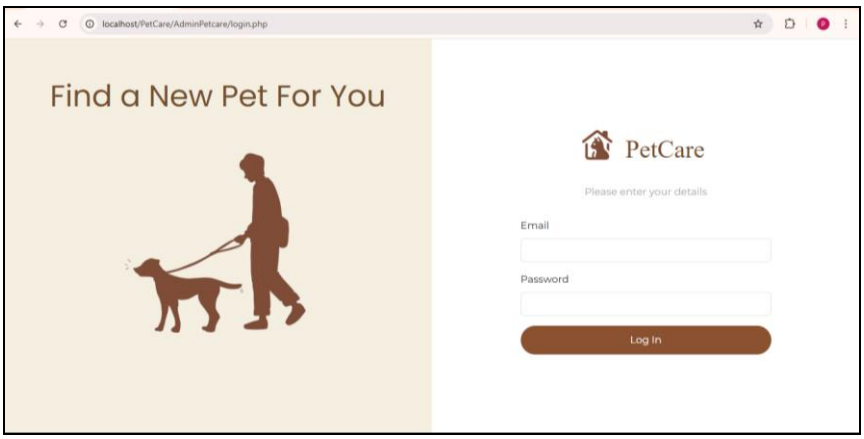


Fig. 12 *Login Interface*

4.4.9 Manage Pet Adoption (Admin)

The pet adoption management interface for admins provides a centralized manage pets section, enabling them to efficiently add, update, and delete pet details. Admins can input information such as name, breed, age, gender, category, description and upload images when adding new pets. Updates to existing pet details are saved using a save button.

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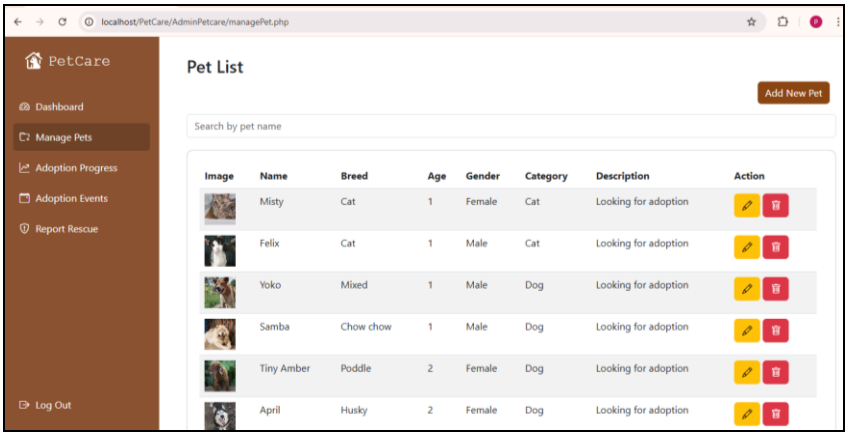

Fig. 13 *Adoption List Interface*

4.4.10 Track Adoption Progress (Admin)

The pet adoption progress tracker interface for admins allows them to review adoption applications in detail, including adopter and pet information. Admins can approve eligible adopters by setting a pick-up date and change adoption status. For applications that do not meet the criteria, admins can update the status to unsuccessful, ensuring a transparent review process.

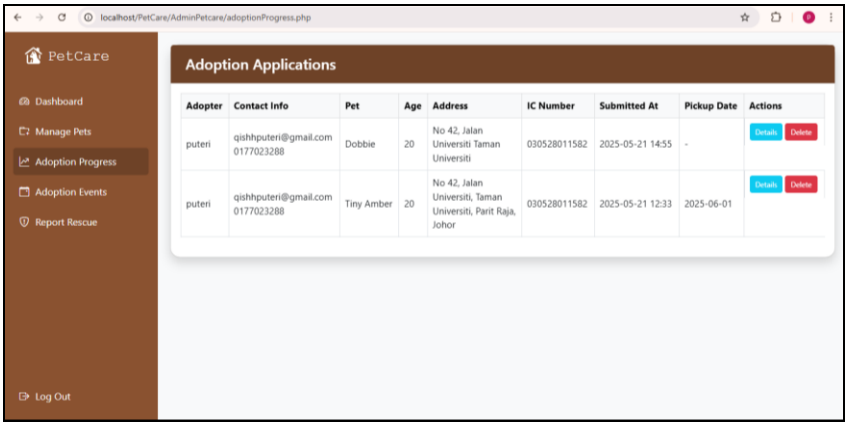

Fig. 14 *Adoption Applications Interface*

4.4.11 Manage Pet Adoption Events (Admin)

The pet adoption event management interface allows admins to efficiently create, update, and manage adoption events. Through the adoption events section, admins can input event details such as image, event name, date, time, and location, which are then displayed on pet adoption event interface for adopters.

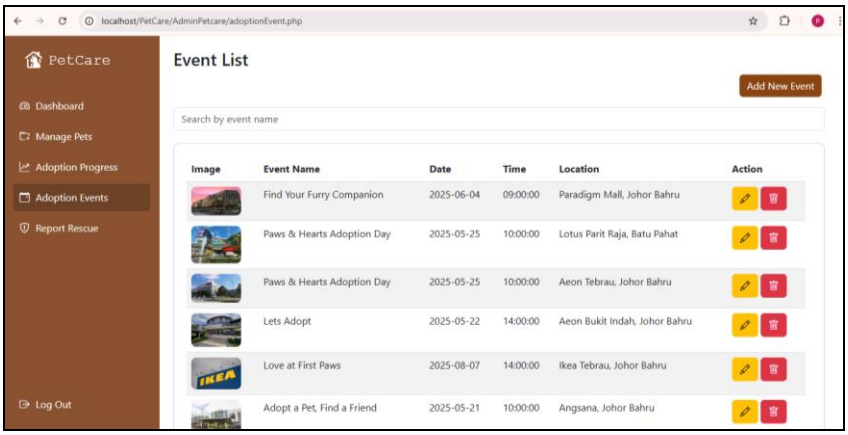

Fig. 15 *Event List Interface*

4.4.12 Manage Report Rescue (Admin)

The report rescue interface for admins allows them to access and review detailed rescue reports submitted by adopters. Admins can view essential information, including rescuer's name, pet descriptions, date of rescue, location, and uploaded photos, to validate reports.

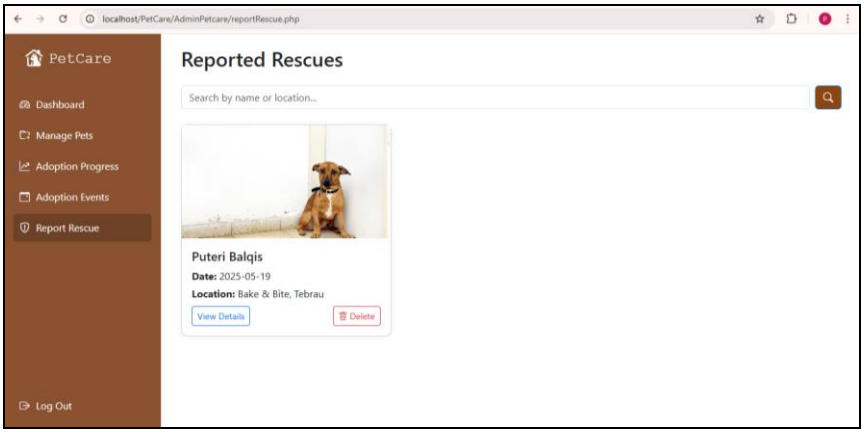

Fig. 16 *Report Rescue Interface*

4.4.13 Generate Report (Admin)

The Generate Report serves as a feature within the admin dashboard. This interface allows administrators to generate adoption reports based on filtered time periods. Admins can select specific months and years to narrow down the data set, ensuring that the report reflects accurate and relevant information. The generated report contains pet adoption list, detailing all adoption records submitted within the selected time frame.

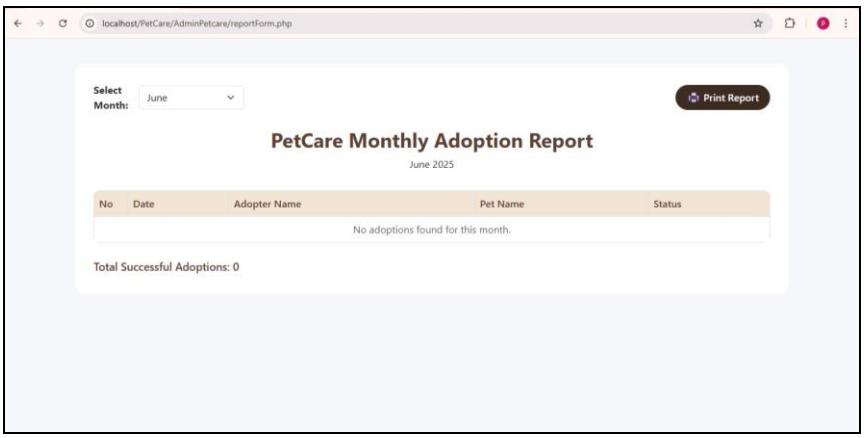

Fig. 17 *Generate Report Interface*

4.5 Testing

The testing phase represents a final stage in the development of the PetCare Management System. Its main objective is to rigorously evaluate all system functionalities to detect and resolve any existing issues or defects. This phase plays a vital role in ensuring that the system performs as intended, aligns with the project's goals, and fully meets user requirements and expectations.

4.5.1 Alpha Testing

Alpha testing for the PetCare Management System is conducted internally within the organization and involves a selected group of end-users evaluating the system in a controlled environment. This phase serves as the initial comprehensive testing stage to ensure that the system meets the specified business requirements and functions correctly. Typically carried out by in-house team members, alpha testing focuses on verifying the system's overall functionality and performance. It aims to identify and address any critical issues or defects

before proceeding to external testing or deployment, ensuring that the PetCare Management System operates as intended and delivers a reliable user experience.

Table 4 *List of Test Case*

Functional Module	Test Case	Description	Expected Result	Test Result (Pass/Fail)
Register	Submit valid registration form	Input correct and valid name, email, and password	The system successfully registers the user and redirects them to the login page	Pass
	Mismatched password	Provide a password that does not match the confirmation password	The system should display an error message when the passwords do not match.	Pass
	Click email confirmation link	Adopter clicks the verification link sent via email to activate the account	Redirected to login page and account is activated	Pass
	Enter invalid email format	Adopter inputs an incorrectly formatted email address	Validation error displayed: "Invalid email format"	Pass
	Leave required fields empty	Adopter submits the form without entering one or more required fields	Form submission blocked with field-specific validation error messages	Pass
Login	Login with valid credentials	User enters correct email and password	Redirected to dashboard	Pass
	Login with incorrect credentials	User enters incorrect email or password	Error message displayed: "Invalid email or password"	Pass
	Leave required fields empty	User submits the login form without filling email or password	Form blocked with validation error: "Fill out this field"	Pass
	Enter valid email for password reset	Adopter enters a registered email address on the forgot password page	Confirmation message shown and system sends reset link to email	Pass
	Reset password	Adopter clicks the reset link from email and enters password less than 8 characters	Error message displayed: "Password must be at least 8 characters"	Pass
Manage profile information	View profile information	Adopter views their profile details	All profile information is displayed	Pass

Table 4 *List of Test Case (Cont)*

Functional Module	Test Case	Description	Expected Result	Test Result (Pass/Fail)
Manage profile information	Edit profile fields	Adopter updates edit fields name, age, address, IC number, contact number	Message displayed: "Profile updated successfully"	Pass
Manage Pet Adoption	Add new pet details	Admin fills in pet information and submits form	Pet is successfully added and appears in the adoption list	Pass
	Edit existing pet details	Admin updates pet details	Pet details updated and saved successfully	Pass
	Delete pet record	Admin removes pet from public list	Pet no longer appears in the adoption list	Pass
	Submit adoption form below 18	Adopter fills out the form but is below 18 years old	Form submission blocked with error: "You must be at least 18 to adopt"	Pass
	Leave form field empty	Adopter skips required fields in any of the 3 pages	Form submission prevented with field-specific validation error	Pass
	View available pets	Adopter browses the pet list page	Pet list with name, image, age, description and "Adopt Me" button displayed	Pass
Track Adoption Progress	View adoption request details	Admin views the detailed adoption request submitted by adopter	Full details of adoption form displayed, including adopter and pet information	Pass
	Change adoption status	Admin decides whether adopter is eligible and updates status accordingly	Status updated and for success adopters, pick-up date field becomes visible	Pass
	View adoption progress in pet tracker	Adopter checks the status of submitted adoption requests in the pet tracker page	Current status shown such as pending, reviewing, success, cancelled and unsuccessful	Pass
	Cancel adoption request	Adopter clicks "Cancel" button in tracker to cancel adoption	Status updated to "cancelled"	Pass
Manage Pet Adoption Events	Add new adoption event	Admin fills in event details including name, date, location, and uploads image	Event is added and appears in the event list with image and map	Pass

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Table 4 *List of Test Case (Cont)*

Functional Module	Test Case	Description	Expected Result	Test Result (Pass/Fail)
Manage Pet Adoption Events	Edit existing event details	Admin updates information such as date, location, or description	Event is updated and changes are reflected in the event list	Pass
	Delete an adoption event	Admin deletes an existing event	Event is removed from the system and no longer visible to adopters	Pass
	View list of adoption events	Adopter visits event page to see upcoming pet adoption campaigns	Event cards displayed with event details and location map	Pass
Manage Report Rescue	Submit a rescue report	Adopter fills out details and submits rescue report form	Report submitted successfully and saved in the system	Pass
	Leave required fields empty	Adopter leaves a required field empty and tries to submit	Form submission blocked with field-specific validation error messages	Pass
	View rescue report details	Admin views submitted rescue reports including all form data and uploaded image	Full rescue details displayed with image preview	Pass
Generate Report	Filter by month and year	Admin selects a specific month and year to filter adoption data	Filtered report data displayed based on selected date	Pass
	Generate report successfully	Admin clicks generate button after selecting month and year	Pet adoption report generated and displayed on screen	Pass

4.5.2 Beta Testing

Beta testing for the PetCare Management System involves allowing real users to interact with the application in a live environment before its official deployment. This stage is essential to detect any remaining issues and ensure that the system performs as expected under real-world conditions. Beta testing is typically classified into two types: open and closed. In an open beta, a wider group of users including potential adopters may access the system, usually with a notification that the application is still in testing, along with a channel for submitting feedback. In a closed beta, access is restricted to a selected group, such as staff members from Cares JB or invited testers, who are invited to evaluate the product [10]. This process helps validate system readiness and refine the application based on actual user experience.

4.5.3 User Acceptance Testing for Adopter

The survey results from 15 respondents indicate a highly positive experience with the adopter features of the PetCare system. Registration and login were rated as "Very Easy" by 86.7% and "Easy" by 13.3%, showing minimal difficulty in access. All respondents (100%) confirmed they could easily find and view pets available for adoption, and that the 'Adopt Me' feature and adoption form worked as expected. The process from viewing pets to submitting the form was clear, with 80% strongly agreeing and 20% agreeing. The 'Cancel Adoption' function also performed well, with 60% strongly agreeing and 40% agreeing. The profile page functionality and adoption status tracking were also praised, with 80% strongly agreeing and 20% agreeing in both cases. Similarly, the event list and distance feature was well-received with the same percentage breakdown. Regarding design, 93.3% rated the interface as excellent, and one respondent rated it as good. Finally, 93.3% strongly agreed they were satisfied with the overall app experience, highlighting the app's usability, clarity, and effectiveness.

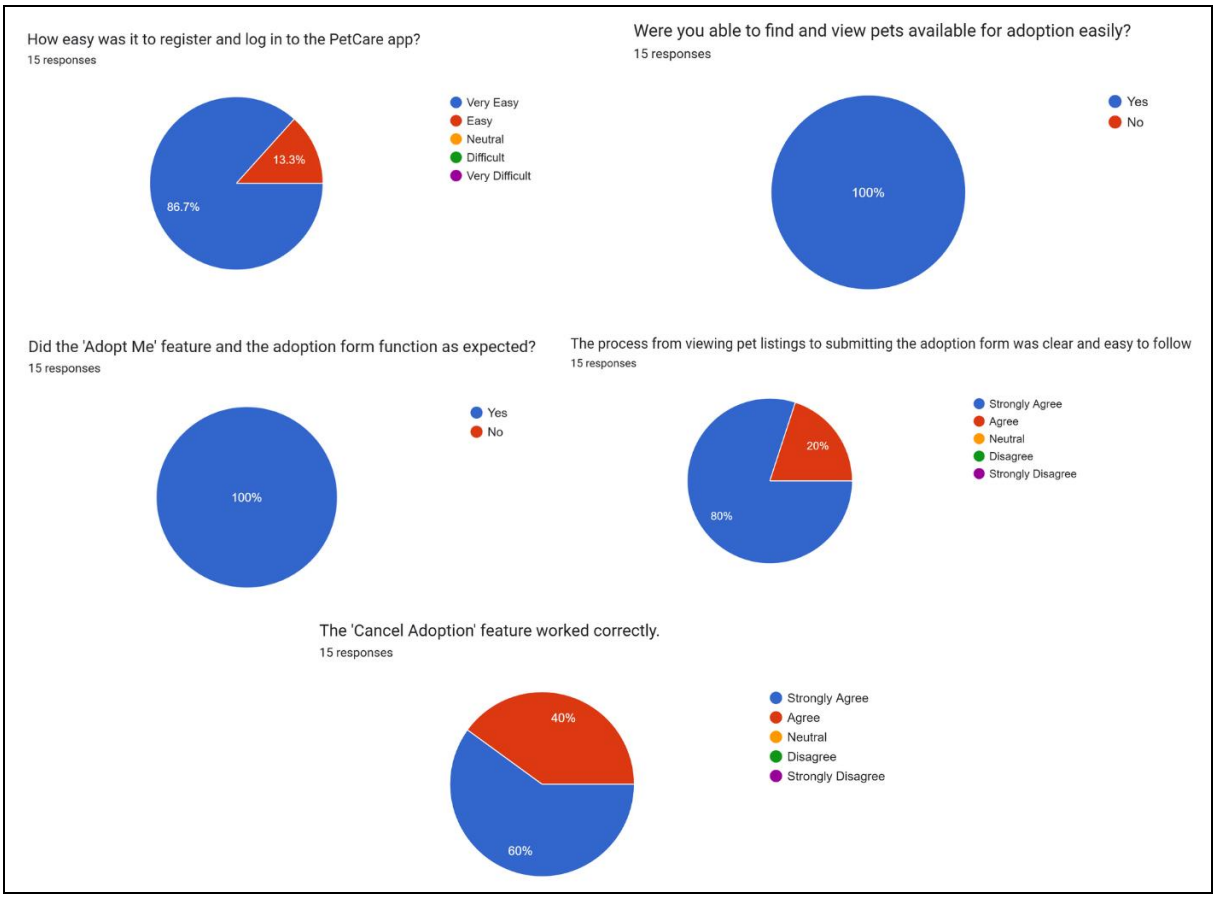

Fig. 18 *User Acceptance Testing Result for Adopter*

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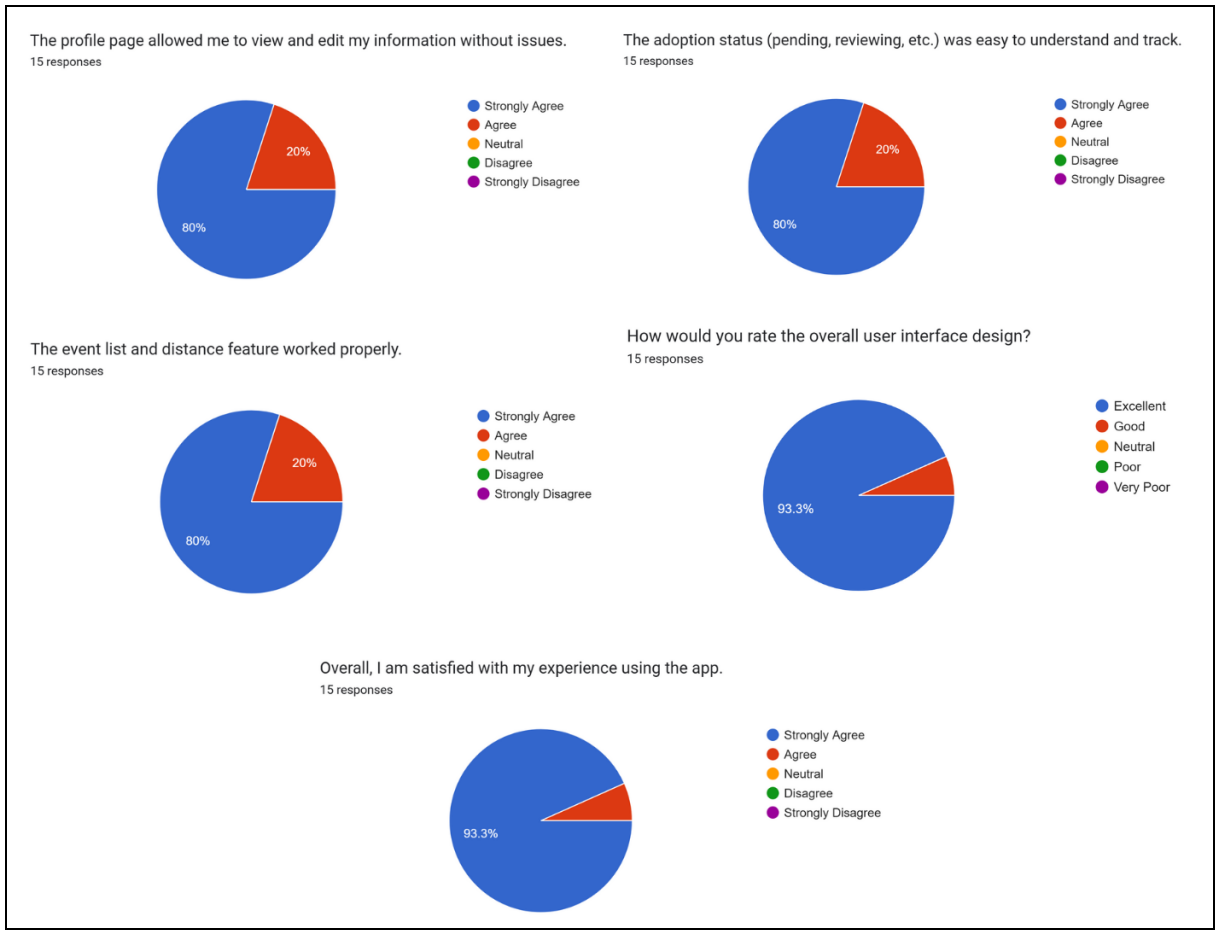

Fig. 19 *User Acceptance Testing Result for Adopter*

4.5.4 User Acceptance Testing for Admin

The survey results from 5 respondents indicate a highly positive experience with the admin features of the PetCare system. The login process was rated as "Strongly Agree" by 80% and "Agree" by 20%, indicating a smooth and secure experience. The pet management features were similarly rated, with 80% strongly agreeing and 20% agreeing on their ease of use. All respondents were able to view the adoption application list, and 80% strongly agreed that this function was accessible and effective. Reviewing adopter application details was also clear and well-structured, with 60% strongly agreeing and 40% agreeing. The feature to update adoption status, manage adoption events, and navigate the admin dashboard all received 80% strong agreement and 20% agreement. For the rescue report review, 60% strongly agreed and 40% agreed that it showed all necessary user information. The report generation feature functioned effectively with the same 80/20 split, and overall, 80% strongly agreed and 20% agreed that they were satisfied with the admin features and controls. This consistent pattern across all features highlights the admin interface as functional, user-friendly, and well-received.

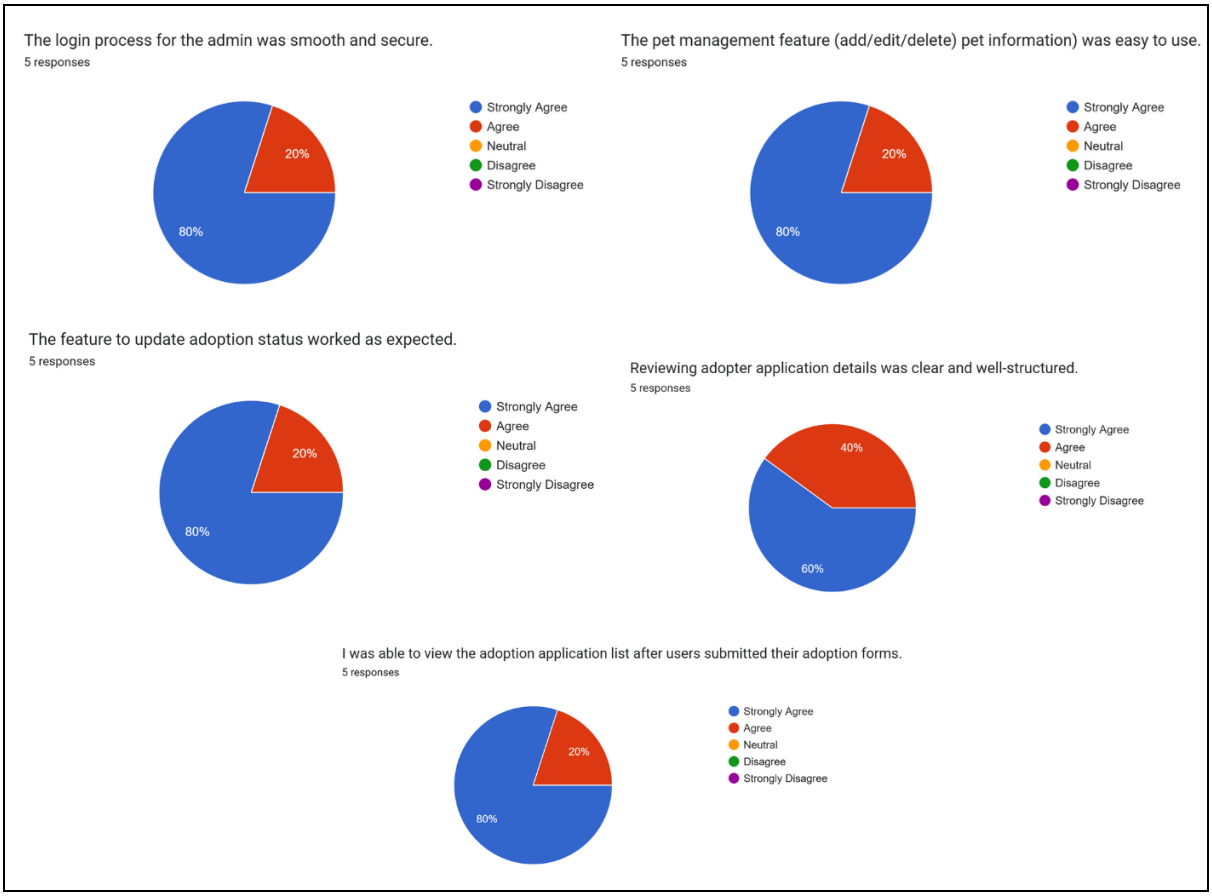

Fig. 20 *User Acceptance Testing Result for Admin*

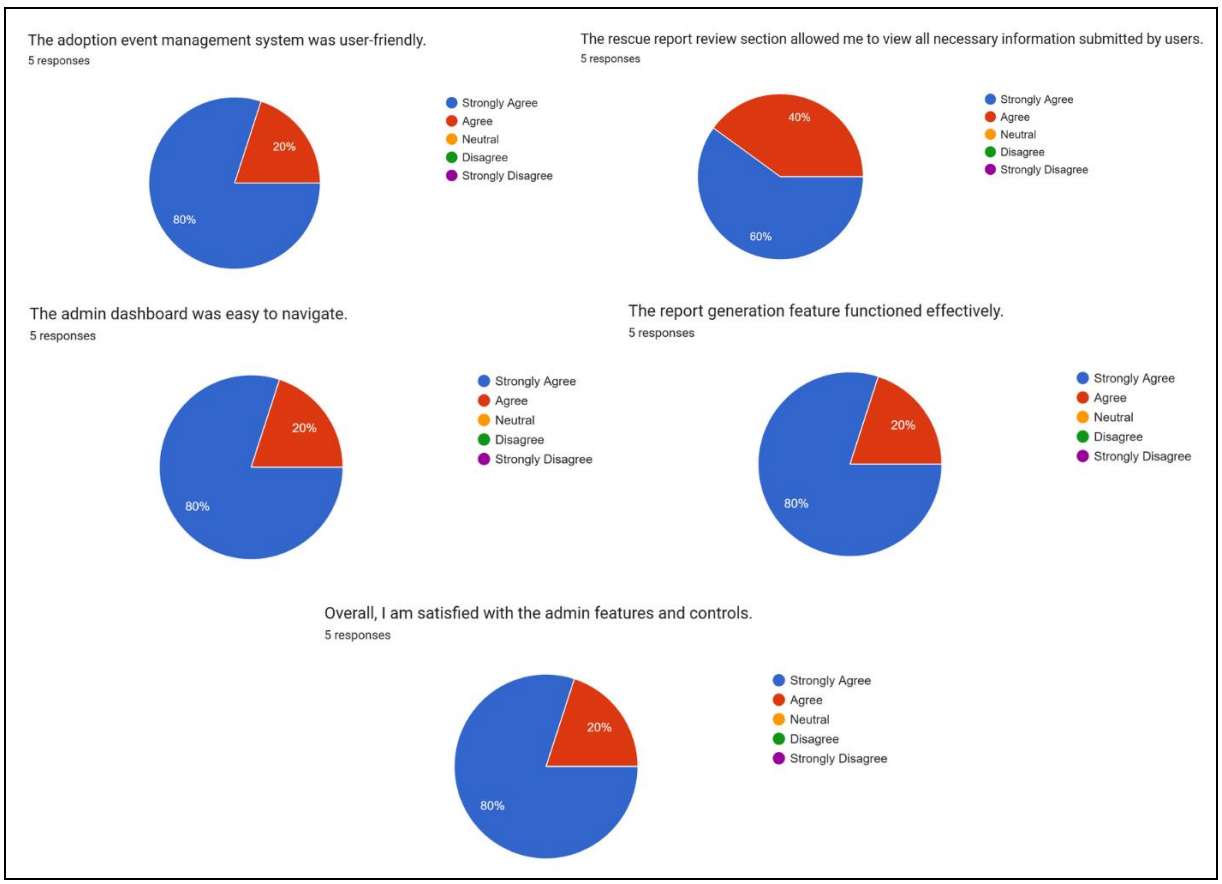

Fig. 21 *User Acceptance Testing Result for Admin*

5. Conclusion

In conclusion, the PetCare Management System offers a comprehensive solution to streamline the pet adoption process, address inefficiencies in communication, and improve shelter operations. By integrating key features such as adoption tracking, event management, and rescue reporting, the system simplifies and automates many of the manual tasks traditionally handled through multiple platforms. This centralized approach enhances operational efficiency, reduces response times, and improves adoption success rates. Through agile development practices and iterative testing, the system ensures flexibility and responsiveness to user needs. Ultimately, the PetCare Management System aims to support shelters in providing better care for animals while offering a more efficient and user-friendly experience for adopters.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Puteri Balqis Binti Kamaruzaman, Ts. Dr. Mazidah Binti Mat Rejab;* ***data collection:*** *Puteri Balqis Binti Kamaruzaman, Ts. Dr. Mazidah Binti Mat Rejab;* ***analysis and interpretation of results:*** *Puteri Balqis Binti Kamaruzaman, Ts. Dr. Mazidah Binti Mat Rejab;* ***draft manuscript preparation:*** *Puteri Balqis Binti Kamaruzaman, Ts. Dr. Mazidah Binti Mat Rejab. All authors reviewed the results and approved the final version of the manuscript.*

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