PetPals : A Pet Care Companion Mobile Application for Pet Owners

Nur Yasmin Syahirah binti Md Yusaini
Universiti Kuala Lumpur
Malaysian Institute of Information Technology
Kuala Lumpur, Malaysia
yasmin.yusaini@s.unikl.edu.my

Nor Azlina binti Ali*
Universiti Kuala Lumpur
Malaysian Institute of Information Technology
Kuala Lumpur, Malaysia
azlinaali@unikl.edu.my

*Correspondent author: azlinaali@unikl.edu.my

***Abstract*—PetPals is an innovative mobile application designed to revolutionize pet care management for pet owners. In today's dynamic pet care landscape, where pets are cherished members of the family, the need for accessible and efficient solutions has never been greater. PetPals aims to address this need by providing a comprehensive platform that enables users to manage various aspects of their pets' lives conveniently. From pet profile management and vet clinic locator to pet insurance management and real-time pet assistance, PetPals offers a range of features tailored to enhance the pet ownership experience. Through the integration of machine learning algorithms and intuitive user interfaces, PetPals empowers users to track their pets' growth, access timely veterinary care, and receive expert guidance on pet-related queries. With PetPals, pet owners can confidently navigate the challenges of pet care, ensuring the health and happiness of their furry companions.**

***Index Terms*—pet care, veterinary, pet owners**

I. Introduction

The project introduces a revolutionary mobile application aimed at redefining pet care through seamless technology integration into the daily lives of pet owners (Jones et al., 2022). PetPals emerges as an innovative mobile application revolutionizing pet care management.It addresses common challenges faced by pet owners, including disorganized health-care management, difficulty in locating vet services, and a lack of pet care guidance, offering a comprehensive solution. At its core, PetPals streamlines healthcare record management through its real-time monitoring feature, enabling pet owners to effortlessly track vaccinations and medications. The app serves as a centralized hub, facilitating easy access to vet services during emergencies. Notably, its standout feature, a 24/7 AI-powered chatbot, enhances accessibility by providing instant responses to pet-related queries, thereby fostering a more informed and engaged pet ownership experience.

II. Research Objectives

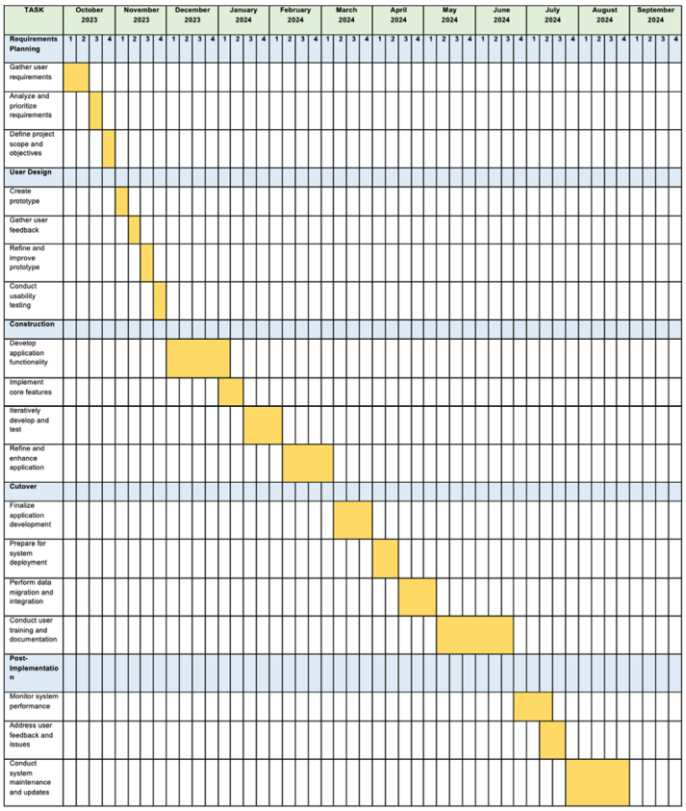
There are several objectives for this project that have been identified to ensure that they are met:

1) To study the requirements of PetPals by carrying out a case study on existing pet care companion applications in Malaysia.
2) To design and develop PetPals mobile application that supports virtual pet care ecosystem.
3)To assess the acceptance of PetPals mobile application by carrying out user acceptance testing after the development completed.

III. Project Timeline

The project timeline outlines the expected timeframes for each phase of the RAD methodology. This includes the anticipated durations for requirement gathering, user design, construction, and cutover. The timeline acts as a roadmap, guiding the project team through the entire development process.

Fig. 1. Gantt Chart



IV. Literature Review

This chapter serves as a comprehensive synthesis of the literature review concerning the PetPals Mobile Application development. Within this section, a meticulous compilation of journals, articles, and books has been undertaken, aiming to elucidate the intricate workings of the materials and devices integral to the initiative of PetPals. Through a thorough examination of existing literature, this chapter endeavors to provide a detailed understanding of the underlying principles and mechanisms driving the functionality of PetPals' components.

A. Design of a Mobile Application for the Control of Pet Care

The literature review explores the integration of technology in pet care, driven by the rise in pet ownership and the need for convenient pet management solutions. It highlights:

- The potential of mobile applications to monitor pets' health and activities effectively.
- The global trend of adopting technology in pet care.
- Empirical evidence supporting the superiority of mobile applications over web-based platforms in simplifying pet care.
- Practical examples showcasing the transformative impact of mobile technology on traditional pet care practices.

The review underscores the role of mobile applications in enhancing animal welfare and empowering pet owners to make informed decisions.

B. Characteristics of Pet Owners: Motivation and Need Fulfillment

The study "Characteristics of Pet Owners: Motivation and Need Fulfillment" by Lustig and Cramer investigates the relationship between pet ownership, motivational dominances, and the fulfillment of human needs. Key findings include:

- Correlations between motivational dominances and the specific needs fulfilled by pets.
- Influence of personality traits on pet selection.
- The multifaceted roles of pets in meeting social, emotional, and practical needs.

Grounded in reversal theory, the paper provides insights into the dynamic nature of human motivation and behavior, contributing to a deeper understanding of human-pet interactions.

C. The Benefits of Human–Companion Animal Interaction: A Review

"The Benefits of Human–Companion Animal Interaction" by Barker and Wolen reviews research since 1980 on the advantages of human-companion animal interaction. It covers:

- Physiological benefits, such as potential cardiovascular improvements.
- Psychological benefits, including mood enhancement, loneliness reduction, and social behavior improvement.
- Regulation of caloric intake in seniors and fostering empathy in children through pet ownership.
- Mixed outcomes of animal-assisted activities on cardiovascular responses and benefits for individuals with psychiatric disorders, Alzheimer's disease, or dementia.

The paper calls for more rigorous experimental research grounded in theoretical stress models to better understand the psychosocial effects of pet ownership and animal-assisted activities.

V. Methodology

A. Introduction

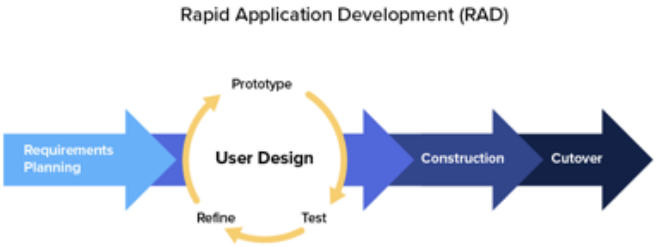


Fig. 2. Rapid Application Development

The research methodology employed in this research is Rapid Application Development (RAD) model. The RAD (Rapid Application Development) model is a software development methodology that prioritizes rapid prototyping and iterative development to quickly produce high-quality software systems. This model emphasizes collaboration and feedback from end-users throughout the development process, allowing for continuous refinement and improvement of the software product.

B. Research Methodology Structure

There are 4 phases in the Rapid Application Development model, which is Requirements Planning, User Design, Construction and Cutover. Each phase involves close collaboration between developers and end-users, with the goal of delivering a functional software product in a shorter timeframe compared to traditional development approaches.

1) Requirements Planning: In this phase, the focus is on understanding and documenting business needs and requirements for the PetPals mobile application. This involves identifying key stakeholders and gathering detailed requirements for modules such as User Registration, Login, Profile Management, Veterinary Clinic Locator, Pet Health Management, Pet Profile Management, Pet Breed Prediction, AI-driven Chatbot Integration, and Pet Growth Analytics and Reporting. The overall objectives, scope, and constraints of the project are defined to ensure a clear and shared understanding among all stakeholders.

2) User Design: This phase involves refining requirements and building a working prototype through iterative activities. Initial prototypes are developed for each module, and wireframes and mock-ups are created for user interfaces. User Acceptance Testing with pet owners gathers feedback to refine

and enhance prototypes. This cycle continues until the design meets user expectations and is ready for development.

3) Construction: During this phase, the actual development of the PetPals mobile application takes place. Coding and implementation of each module are carried out, ensuring seamless integration. Unit and integration testing are conducted to verify functionality, and any issues are promptly addressed.

4) Cutover: The final phase involves preparing the Pet- Pals application for deployment. This includes finalizing the application, conducting system testing, and configuring the deployment environment. User training and documentation are provided, and the application is launched. Initial user feedback is collected to make necessary adjustments, ensuring the application meets user needs effectively.

VI. Prototype/ Product Development

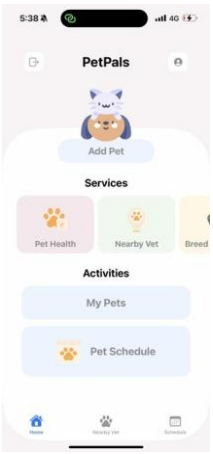


Fig. 3. PetPals Mobile Application

The screenshot depicts the home page of the PetPals mobile app for pet owners. Serving as the central hub for users, the Home Page provides easy access to various functionalities and services. Users can navigate to different sections, including the Profile Page to view and edit user profile information, the Add Pet Page to register a new pet, the Pet Health Page for accessing pet health features, the Nearby Vet Page to locate and get details about nearby veterinary services, the Breed Prediction Page to use AI for predicting the breed of a pet, and the PetGPT AI Chatbot Page to interact with a chatbot for pet-related queries. Additionally, users can manage their pets through the My Pets Page, view and manage the schedule for pet-related activities via the Pet Schedule Page and securely log out using the Logout Button. This layout ensures intuitive navigation and easy access to key features for pet owners, enhancing the user experience. While the app offers a robust set of features, potential limitations might include reliance on internet connectivity for certain functionalities and the accuracy of AI predictions, which may vary. Continuous updates and user feedback are essential for addressing these aspects and further improving the app.

Fig. 4. Admin Website

The screenshot depicts the Dashboard interface for the PetPals app's admin prototype, offering a comprehensive overview of app metrics, including the number of users, registered pets, and veterinary visits. Additionally, the interface features charts displaying veterinary visit statistics and pet type distribution, providing administrators with clear and detailed insights into the app's performance and user engagement.

VII. Results and Findings

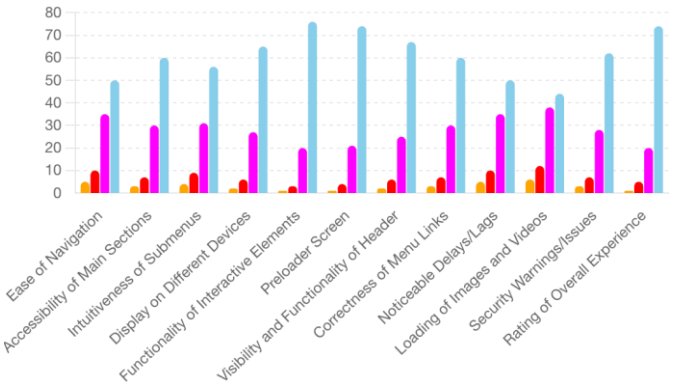


Fig. 5. Results in Bar Chart

The bar chart above illustrates the survey results and findings based on various categories of usability, feature finding, design, clarity, loading times, navigation issues, responsiveness, touch responsiveness, performance, security, and overall experience. Here are the key points derived from the data:

Usability

- Most users rated *Ease of Navigation* highly, with 90.6% giving it a 5.
- *Feature Finding* received exceptionally high marks, with 100% of users rating it as 5, indicating that users found it easy to find the features they were looking for.

Design and Clarity

- The *Design* of the app was well received, with 88.7% of users giving it a rating of 5, and 9.4% rating it as 4.

- *Clarity* in the app was rated very highly, with 100% of users indicating that the information was clear and well-organized.

Loading Times and Navigation Issues

- Users were generally positive about *Loading Times*, with 81.1% rating them as very fast (5), and 17.0% rating them as fast (4).
- A very small percentage of users (1.9%) reported *Navigation Issues*, while 98.1% indicated no issues.

Responsiveness

- The app's *Responsiveness* was highly rated, with 83.0% of users giving it a 5 and 15.1% rating it as 4.
- Similar to general responsiveness, *Touch Responsiveness* was also rated highly, with 86.8% of users giving it a 5 and 11.3% rating it as 4.

Performance and Security

- The overall *Performance* of the app received high marks, with 88.7% of users rating it as 5, and 9.4% rating it as 4.
- *Security* was another area of strength, with 84.9% of users feeling very secure and 13.2% feeling secure.

Overall Experience

- The *Overall Experience* of the app was rated very positively, with 90.6% of users giving it a rating of 5, and 5.7% rating it as 4.

Overall, the survey indicates strong positive feedback in most areas, particularly usability, feature finding, and over- all experience, with minimal issues noted in navigation and security.

VIII. Recommendations

The successful development of the PetPals Mobile Application represents a major step forward in delivering comprehensive pet care solutions to users. To further improve its effectiveness and user satisfaction, the following recommendations are suggested:

1) Continuous User Experience Enhancement
   - Regular updates to improve usability and introduce new features.
   - Maintain modern UI design and optimize user interaction.
2) Telehealth Integration
   - Schedule and conduct virtual veterinary consultations within the app.
   - Manage digital prescriptions and receive alerts for refills and instructions.
3) Advanced Health Tracking
   - Integrate with pet wearables for real-time health monitoring.
   - Use AI to analyze symptoms and provide initial assessments.
4) Personalized Recommendations
   - Offer personalized product suggestions based on pet data and user preferences.
   - Recommend local pet services with booking capabilities.
5) Training and Behavior Management
   - Access to structured training programs and tutorials.
   - Provide AI-driven behavioral insights and improvement recommendations.
6) Enhanced Analytics and Reporting
   - Use predictive analytics for proactive pet health care.
   - Generate custom reports on pet health, activity, and behavior.
7) Community and Support
   - Create a pet adoption network with local shelters.
   - Provide a platform for reporting lost pets and connecting with local communities.

IX. Conclusion

The research identified key challenges in pet healthcare management, including inefficiencies in current methods, limited accessibility to veterinary services, and a deficiency in real-time pet guidance and awareness. These issues hinder effective pet care and reduce the overall quality of life for pets.

To address these challenges, PetPals was developed as an innovative Pet Care Companion Mobile Application. Utilizing the Rapid Application Development (RAD) methodology, the project focused on creating a flexible and responsive solution that adapts to user needs. This approach ensured the efficient achievement of project goals, resulting in a feature-rich application that serves as a centralized hub for pet care.

Key Features

The developed PetPals Mobile Application includes several significant features:

- Efficient management of pet healthcare.
- Enhanced accessibility to veterinary services.
- Real-time pet guidance and awareness features.

The app offers intuitive navigation and easy access to essential functionalities, making PetPals a comprehensive and convenient solution for pet owners. Whether managing pet health, finding vet services, or seeking pet care advice, PetPals enhances the pet ownership experience.

Challenges and Limitations

Despite the successful implementation of PetPals, the project faced challenges such as technological constraints and the need for continuous user feedback to refine functionalities. Future iterations should focus on addressing these limitations and expanding the application's capabilities.

Conclusion

By integrating advanced technological solutions in pet care, PetPals effectively addresses the identified challenges. The application enhances the pet ownership experience by improving the management of pet health records, providing seamless access to veterinary services, and offering real-time pet guidance. Continued development and user-centered design will ensure that PetPals remains a valuable tool for pet care management, fostering a healthier and more engaged pet-owning community.

REFERENCES

[American Veterinary Medical Association, 2023] American Veterinary Medical Association (2023). The impact of pet tech innovations on pet healthcare management. *Journal of Veterinary Science and Technology*, 14(3):102–115. Retrieved from https://www.avma.org/journal-veterinary-science-and-technology/2023/impact-pet-tech-innovations.

[Andrade Arenas et al., 2023] Andrade Arenas, L. M., Conde Lo´pez, D., Gavila´n Colca, L., and Cabanillas-Carbonell, M. (2023). Design of a mobile application for the control of pet care.

[Barker and Wolen, 2008] Barker, S. B. and Wolen, A. R. (2008). The benefits of human–companion animal interaction: A review. *Journal of veterinary medical education*, 35(4):487–495.

[Lustig and Cramer, 2015] Lustig, K. A. and Cramer, K. M. (2015). Characteristics of pet owners: Motivation and need fulfillment. *Journal of Motivation, Emotion, and Personality*, 4:45–52.