eDog: An Interactive Dog Care Application Using An UI/UX Approach

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***Abstract*—This project is a mobile application designed to assist dog owners in efficiently managing their pets' care routines. It addresses the challenges faced by busy dog owners who often struggle to keep track of essential tasks such as feeding schedules, veterinary appointments, grooming, and other dog care activities. Furthermore, while mobile applications can be an ideal solution for quick services, the poor UI/UX design and features of some existing apps often leads to user dissatisfaction. By leveraging a user-centered design methodology and adopting Agile development practices, this project ensures iterative improvements to user needs throughout the development process. The application features reminders, notifications for upcoming tasks, and a pet log to monitor vital details. The use of Agile methodology facilitates the incremental delivery of these features, enabling continuous feedback and refinement to align with user expectations. This project aims to enhance the quality of life for both dog owners and their pets through an accessible, user-friendly, and engaging digital platform. By integrating UI/UX principles and iterative Agile practices, the project simplifies pet care management, addresses usability challenges, and fosters stronger bonds between owners and their dogs while maintaining a flexible and innovative approach to development.**

Keywords—Dog care application, UI/UX

I. INTRODUCTION

According to GlobalPETS (2024), pet ownership is on the rise in Malaysia, with 51.1% of the population now having pets. Among these, dogs rank as the second most popular choice for a companion animal. This is because dogs have been found to have a beneficial effect on cognitive function, lowering stress, increasing happiness, and reducing feelings of loneliness (Arford, 2023).

Health care is essential for any living thing (L et al., 2020), hence it crucial for pet owners to take care of or maintain detailed records for their pet dog. This involves monitoring their daily diet, regularly assessing their health condition to catch any early signs of illness, staying up to date with vaccinations to prevent disease, and noting any allergies or sensitivities.

Technology has become an indispensable part of modern life, and mobile phones, in particular, are everywhere. With mobile apps, people can stay informed, organized, and connected more easily than ever before (Leen et al., 2023). Based on López et al. (2022), mobile apps have made a significant impact on human healthcare, providing essential support for the personalized control and care each individual requires. Similarly, apps are now being used to assist in dog care.

The design of user interfaces and the interaction experience are vital for internet products and services. Users are highly influenced by the interface experience and how it feels to use the product. The quality of the interface design and the fluidity of interactions directly impact user satisfaction (Qi & Xu, 2024).

Thus, a well-designed dog care app focused on UI/UX can streamline daily routines, empowering owners to efficiently manage their pet through intuitive features and engaging user experiences.

II. LITERATURE REVIEW

This section focuses on three existing applications which are Notepet: Pet Care & Medication, Clio: Dog Cat Pet Care Tracker, and Pet Care Tracker - Dog Cat. The purpose of this analysis is to look into and evaluate their general UI/UX design, the features they provide, and how well these features support pet care management. Furthermore, the review focuses the strengths that make each app stand out and examines the weaknesses or limitations that could impact user experience and functionality.

A. Notepet: Pet Care & Medication

Notepet: Pet Care & Medication is a pet management app developed by Zeitic.co that helps pet owners efficiently organise their pets' care routines. This application provides a simple interface for tracking medications, measurements and taking extensive notes about their pets. It has various easy features that allow pet owners to easily manage schedules through a clean and simple interface. Furthermore, Notepet allows users to create customisable reminders based on their needs, ensuring that they receive timely notifications to complete important chores.

B. Clio: Dog Cat Pet Care Tracker

Clio: Dog Cat Pet Care Tracker, created by The Lazy Hippo Development, is designed to simplifies pet care for owners. This user-friendly application is a comprehensive tool for managing many areas of pet health and well-being, such as nutrition tracking, exercise level monitoring, and behavioural pattern observation. This app able to deliver reminders to user through notification to ensure that critical duties like feeding, vaccines, and veterinarian appointments are never neglected. It also allows users to log behavioural and activity data, which can assist uncover potential problems early on.

C. Pet Care Tracker - Dog Cat

The Pet Care Tracker - Dog Cat App, developed by Mutex Apps Ltd, serves as a comprehensive platform for managing pet health and care. It is designed to meet essential needs, ensuring pets receive optimal attention. The app features a user-friendly calendar system, functioning like an agenda, to streamline pet care management. Users can benefit from personalized schedules, daily reminders, and detailed health records. Additionally, it includes activity logs, enabling thorough tracking of pets' routines and health for better care.

D. Comparison of Existing App and Proposed App

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UI/UX Design / Features	Notepet: Pet Care & Medication	Clio: Dog Cat Pet Care Tracker	Pet Care Tracker - Dog Cat	Proposed App
Consistent in design, style, and layout	✓	✓	✓	✓
Clear navigation	✗	✓	✓	✓
Feedback mechanism	✗	✓	✓	✓
Confirmation dialogue	✓	✓	✓	✓
Reminder notification	✓	✓	✓	✓
Visual Appeal and Cohesiveness	✗	✓	✓	✓
Validation	✓	✓	Inconsistent	✓
Interface design	Too basic; needs improvement in visuals	Modern and user-friendly	Modern and user-friendly	Modern and user-friendly

Figure 1: Comparison of Existing App & Proposed App

III. Materials and Methods

Figure 2: Agile Methodology Development Process (Laoyan, 2024)

Agile methodology is used for this project.

A. Tools & Technologies Used

The project utilizes Figma, Android Studio and Firebase to support its design, development, and backend infrastructure.

a) Figma: Figma used to design the user interface, allowing for the creation of interactive, high-fidelity prototypes that visualize the app's layout and user experience.

b) Android Studio: Android Studio served as the main development environment for writing and testing the application code, providing tools and resources tailored specifically for Android app development.

c) Firebase: Firebase was used as the backend service, offering a real-time database, authentication to manage data and support the app's dynamic functionality.

B. Gather Requirements

A survey was conducted to obtain information about dog care habits, app design preferences, and functionality. After finished collecting data, the requirements of the app are:

- The overall design, style and layout should be consistent.
- Clear navigation throughout the app
- Customizable reminder notification
- Visually appealing
- Contain feedback mechanism
- Clear labels and icon
- Simple and minimalistic interface
- Warm and welcoming colour scheme

C. Use Case Diagram

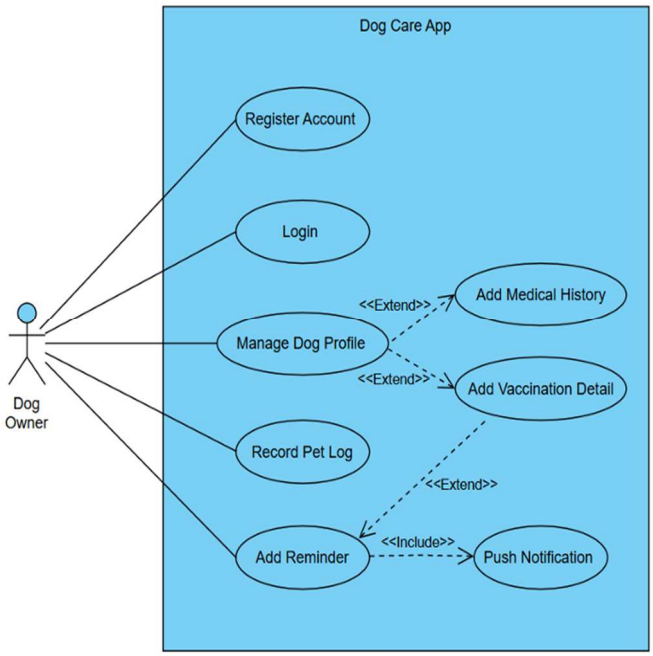

Figure 3: Use Case Diagram

The use case diagram illustrates the Dog Care App's key features, focussing on interactions between the Dog Owner and the system. The Dog Owner can register an account, log in, manage dog profiles, record pet logs, and set reminders. The Manage Dog Profile function includes the ability to add medical history and vaccination records, indicating that these aspects are optional when managing a profile. The Add Reminder feature includes Push Notification, which ensures that users receive notifications regarding their scheduled reminders.

D. Activity Diagram

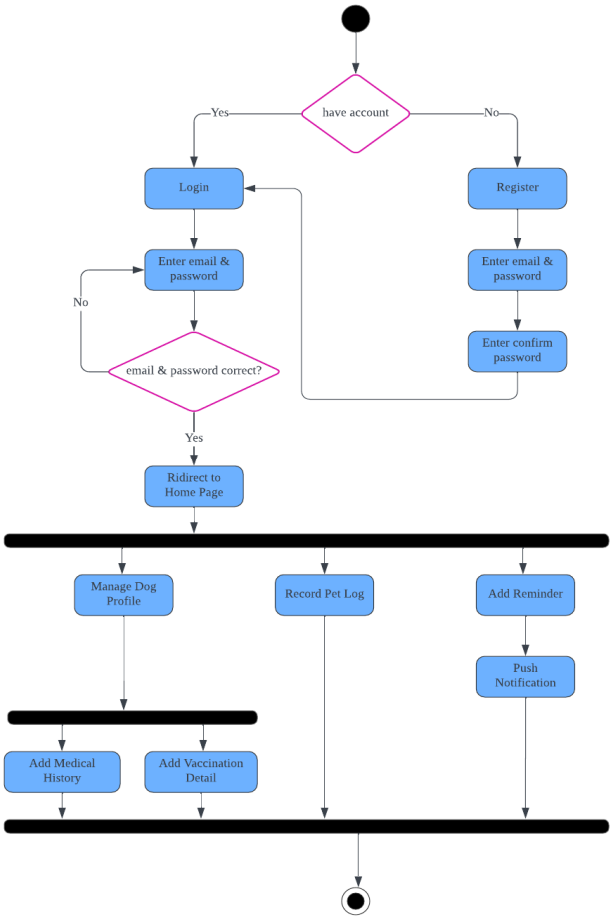

Figure 4: Activity Diagram

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The activity diagram describing the process of the dog care app. The process begins when the user logs into an existing account (for returning dog owners) or creates a new account (for first-time users). After successfully registering, new users are routed to the login page. After logging in, the user is taken to the Home Page, where they can edit their dog's profile, keep pet logs, and set reminders.

E. Wireframe Design

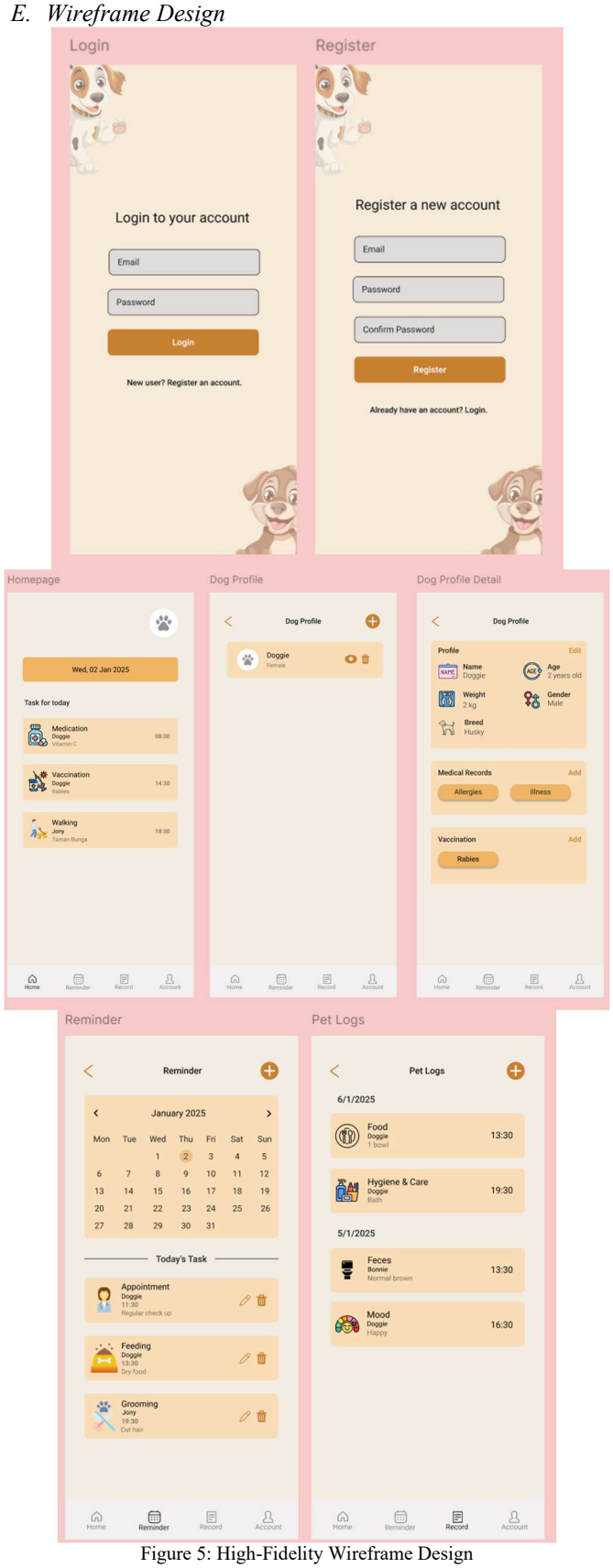

Figure 5: High-Fidelity Wireframe Design

IV. RESULTS

After finished implementing the dog care app, functional testing and usability testing was conducted.

A. Usability Testing

The usability testing was carried out with 30 users who own pet dogs. The table below is the result and the feedback from respondents after feedback:

Table 1: Usability Testing Result

Description	Results
All features such as register account, logging, manage dog profile, reminder, push notification and pet logs work well (*Appendix A*)	All 30 respondents chose "Yes", showing that these features of the apps are functional.
UI /UX Design (*Appendix B*): • Ease of navigation. • Consistency in app design, style and layout. • The success, delete confirmation and validation message is helpful. • Interface design are modern ans user friendly.	Majority respondents rate these between 4 and 5 which are showing high level of user satisfaction. These results confirm that the UI/UX effectively meets user expectations and enhances their experience.
Overall App Experience (*Appendix C*): 1. Satisfaction of overall experience while using the app 2. Willingness to recommend the apps to others. 3. Ease of completing dog care tasks. 4. Effectiveness of the app meets dog owners' needs. 5. Stability and the smoothness of the app. 6. Rating of app's visual design	1. All respondents are very satisfied. 2. 96.7% are willing to recommend the dog care apps. 3. Majority respondents rate the ease between 4 and 5. 4. 100% agree that the dog care app meets dog owners' needs. 5. 29 respondents run smoothly without bugs, only 1 respondent experiences minor bugs. 6. Majority respondents rate the visual design between 4 and 5.
Suggestions & Improvement (*Appendix D*)	Respondents made a variety of suggestions for improving the dog care app. These include allowing users to customize or add new choices to the activity and mood fields in the pet log section. Visual improvements were also suggested, such as adding more icons and visual

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	components and trying to make the homepage more creative. Some users recommended enhancing the app's capabilities by adding the option to remotely monitor pets (e.g., a CCTV-style capability). In addition, recommendations were made to improve the app's design by allowing background colour changes, changing wallpapers, and adding dog photos

V. CONCLUSION & FUTURE WORK

A. Achievements

Table 2: Objective & Its Achievements

Objectives	Achievements
To identify the challenges dog owners face in managing their dog's care routines	A research survey was conducted to identify the common habits of dog owners in managing their dog's care routines. The survey provided insights into how owners track their dog's activities, the frequency of missed or forgotten care tasks, and the app features or designs that users may find frustrating. These findings helped shape the development of the dog care app to better meet user needs.
To develop a mobile app system that offers customizable reminders for dog care tasks	The dog care app was designed and developed based on insights gathered from the research survey. It was built using Android Studio and Firebase. The app includes key features such as managing dog profiles, recording pet logs, and setting reminders. Notifications are triggered based on the date and time when creating a reminder
To test the effectiveness of the app's UI/UX design in improving user experience for dog owners using usability testing and user satisfaction surveys	Usability testing was conducted with 30 dog owners to gather feedback on the functionality, design, and overall user experience of the dog care app. The responses helped identify areas for improvement and confirmed the app's strengths.

B. Limitations

Several limitations were identified during the implementation and testing phase of the dog care app. The limitations are:

a) *Response time of the notification:* The reminder notification was sometimes pushed with slight delays. This has no significant effect on general functionality, it may affect the timing of some care tasks in particular situations.

b) *Dependency on Stable Internet Connection:* The dog care app uses Firebase Realtime Database and Authentication services, which require an active internet connection for user authentication, data retrieval, and syncing. As a result, the app's primary capabilities are inaccessible while the mobile device is offline. Users in places with low or inconsistent connectivity may experience issues such as delayed data updates or an inability to use the app fully.

c) *Lack of Prior Experience with Similar Apps During Testing:* All 30 respondents involved in the usability testing were dog owners but had no prior experience using a dedicated dog care mobile application. While this provided fresh user perspectives, it may have also limited their ability to compare features or assess the app's functionality in relation to existing solutions.

d) *Limited Customization and Personalization Options:* During usability testing, some respondents requested further customisation options, such as changing the background colour, choosing wallpapers, or adding dog images. The app's present layout is set, with limited visual personalisation, which might limit user engagement or sense of ownership.

e) *Limited Flexibility in Mood and Activity Input:* To ensure data entry uniformity, the mood and activity fields are currently implemented using predefined dropdown selections. However, during testing, some users requested the ability to add custom mood and activity types based on their own preferences.

C. Future Works

Addressing the limitations identified in the dog care app is essential for future updates to enhance user experience and ensure the app fully meets the needs of dog owners. The proposed future works to improve the app are:

a) *Optimize Notification Delivery Time:* To ensure users never miss important reminders, future improvements will focus on refining the scheduling logic. Reminders will be queued immediately after data entry or updates, eliminating unnecessary delays. Local caching of reminder data, system time consistency checks, and instant re-synchronization after modifications will further enhance reliability. These improvements directly benefit users by delivering timely alerts that align closely with their actions, creating a smoother and more dependable reminder experience.

b) *Support Offline Functionality:* Since the app relies on Firebase Realtime Database, an active internet connection is currently required. To improve usability in low-connectivity environments, offline persistence will be enabled using Firebase's built-in capabilities. With this enhancement, users can continue to add, view, and update dog profiles, pet logs, and reminders even while offline. Once a connection is restored, local changes will

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automatically sync with the server. This functionality reduces user frustration, increases trust in the app, and makes it more practical for everyday use, especially in areas with unstable network coverage.

c) *Include Comparative Usability Testing with Experienced Users:* Future usability testing may include users who have used similar dog care or pet management apps. This will enable for more comprehensive comparisons, assisting in benchmarking features and usability standards against other existing systems and identifying competitive advantages or shortcomings.

d) *Enhance Customization and Personalization Features:* To increase engagement and satisfaction, future versions will include broader personalization features such as theme selection, custom wallpapers, and the ability to upload personal dog images. These options foster a sense of ownership and emotional connection, making daily interactions more enjoyable. Personalization also supports accessibility by allowing users to tailor the app's appearance and layout to their individual needs and preferences.

e) Allow Custom Input for Mood and Activity Tracking: The app can be enhanced with an option to add custom mood and activity types alongside the existing dropdown selections. This will provide users with more flexibility and enable more personalized and meaningful tracking of their dog's routines and behaviours.

f) *Integrate Remote Monitoring for Pet Well-Being:* Based on user feedback and suggestions for app improvements, a potential future feature is remote monitoring of the pet's well-being via live video streaming (similar to CCTV). This would allow users to monitor their pets in real time while away from home, ensuring their safety and comfort. The integration might include IP cameras or smart pet cams, allowing customers to access live feeds from within the app for a more comprehensive and connected pet care experience.

In conclusion, these future works aim to address the current limitations and further improve the app, ensuring it is a comprehensive, user-friendly, and efficient tool for dog owners to manage their pet dogs.

In summary, the development of the dog care app has successfully met its primary objectives, providing a user-friendly interface and essential functionalities tailored to dog owners. Despite these accomplishments, several limitations were identified and these limitations are addressed through proposed future work.

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