



FUR FAMILY

A PET IN NEED IS A FRIEND INDEED

Fur Family

Date:17/7/23

Done by Team 69

Abstract

The petcare industry has been steadily growing over the years and has become a prevalent industry with an increasing number of individuals embracing pet ownership. This also comes with a significant growth in demand for solutions for their pet care needs and problems that arise with owning a pet. To meet this growing demand, more online shops, softwares and online pet help services are also being created globally. To meet these needs for our Singapore's pet owners, we present Fur Family, an innovative mobile application designed to help the Singapore pet owners care for their pets.

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Introduction

We are working towards providing a comprehensive platform that caters to the needs of pet owners, offering a wide range of resources and services. By combining convenience, accessibility, and using a holistic approach to petcare, we hope to achieve an app that encompasses the most important needs of a pet owner and allows them the convenience of a one-stop solution, while personalising each user's experience and enhancing the overall well-being of pets and their owners.

Aims

Overall, we aim to enhance the overall experience of pet owners by offering features such as pet supply recommendations, grooming and pet care information, clinic bookings and foster a sense of community among pet owners, encouraging knowledge sharing and support through interactive forums at the convenience of their mobile gadgets.

In addition, we aim to bring the process of booking veterinary clinic appointments on mobile platforms, ensuring convenient access to timely healthcare services for pets and also assist pet owners by offering convenience when they require purchasing products for their pets by sharing shops situated near their location.

Objectives

Our group objectives are as follows:

1. Conduct an extensive market research to identify potential competitors and flaws in their current products and strategies.
2. We also aim to promote responsible pet ownership by offering educational content such as pet care information and grooming tips to enhance the well-being of pets. Curate informative content on pet grooming, including articles and tutorials to educate and empower pet owners in maintaining their pets' hygiene.
3. Integrate a secure and efficient appointment booking system, allowing pet owners to schedule veterinary clinic visits with ease and receive timely reminders.
4. Integrate a convenient live location system for the purpose of providing nearest pet stores or clinics located near the user.
5. Establish meetings/partnerships with pet experts to provide reliable guidance and recommendations on pet nutrition and pet care.

Deliverables

1. Develop a user-friendly and intuitive interface for the mobile application, ensuring easy navigation and accessibility for pet owners of all technical levels

2. Regularly update and improve the application based on user feedback and emerging trends in the pet care industry, ensuring a constantly evolving and relevant platform.
3. Develop an initial prototype along with wireframes, which outlines the main functionalities and features along with justification for each feature.

Market Research

In this section, we will focus on market research, which is essential in developing a successful pet care application. Market Research involves researching and analysing data from the target market, hence this section will look at the current pet app market landscape, analysing different pet care apps to gain insight from their features and interface to help us understand the needs of pet owners and what they look for in pet care apps to help us in creating an app that meets their requirements effectively.

Below is a comprehensive overview of 7 pet care apps, namely;

Dogo[Dogo, 2018], Pawlyclinic[Pawlyclinic,2023], 11pets[11 Pets Ltd,2015], Pawshake[Pawshake Inc,2013], Monkoodog[Stepett Technologies,2020], VitusVet[VitusVet,2015], Clio[The Lazy Hippo Development, 2022].

By researching these apps, we plan to identify key trends and features common in successful pet apps, as well as any downfalls in the apps that could be potential challenges in our own app.

Dogo

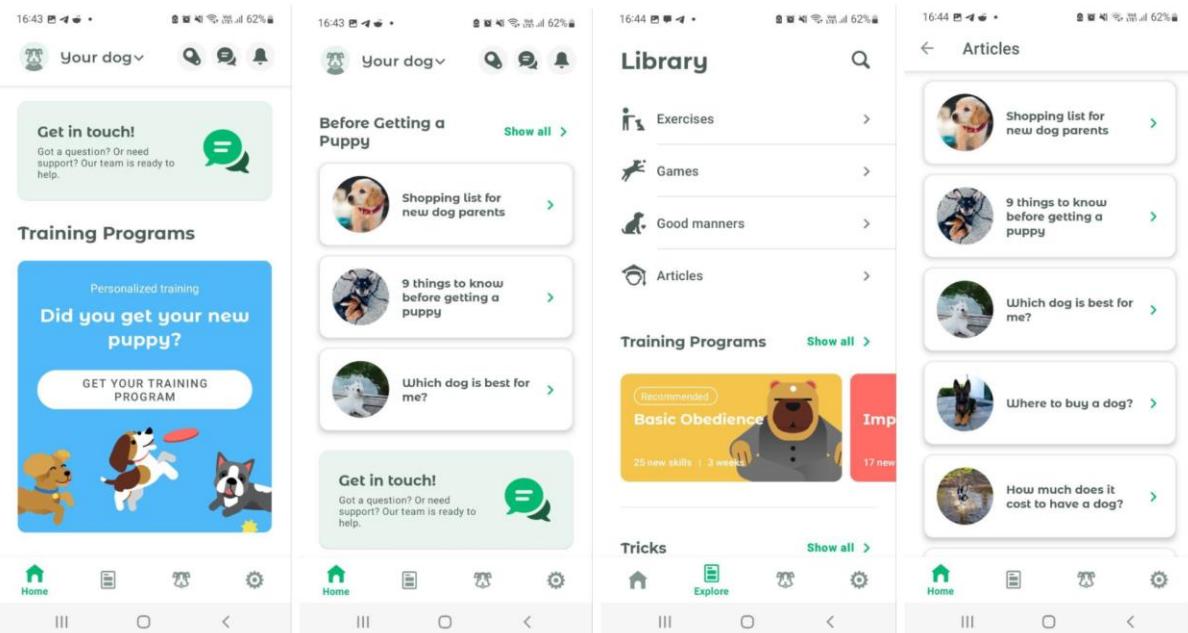


Figure 1: Dogo application user interface

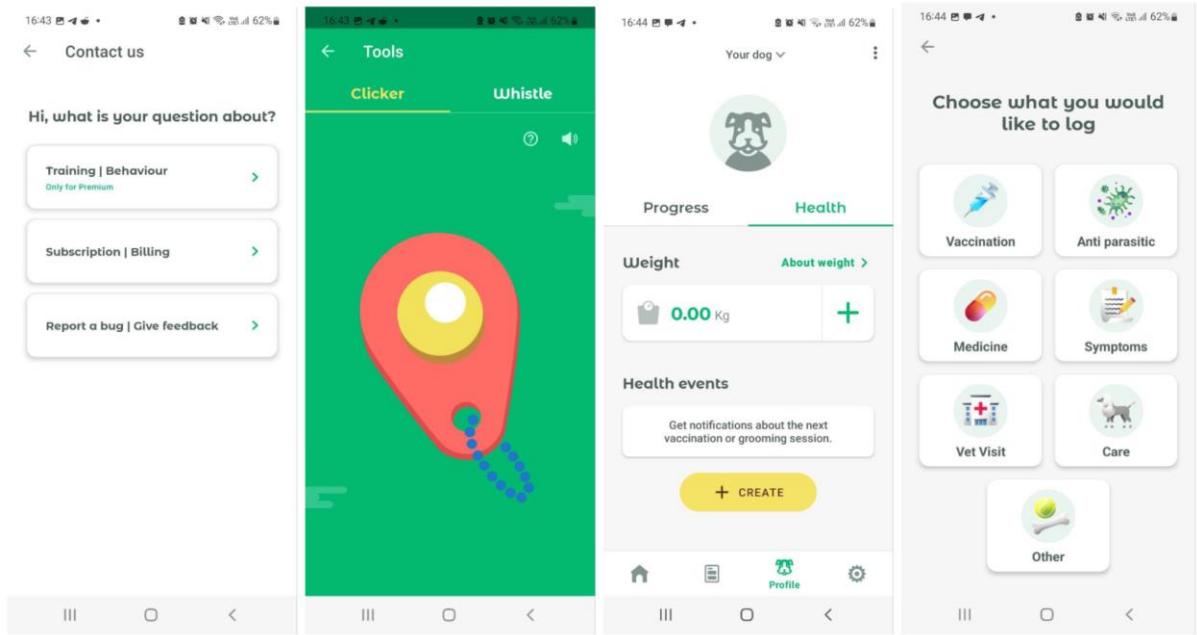


Figure 2: Dogo application user interface

Dogo is a dog training app based in Berlin, Germany which aims to help dog owners in raising and training their dogs. Dogo is mainly focused on dog training hence offers many specifically tailored programmes for pet owners to train their dogs in different tricks including videos and instructions. Users can also connect with actual dog trainers and get feedback on their dog's performance. They also sell a built-in dog clicker and whistle to aid in dog training which can be paired to the app to view users' dog's progress. Dogo users can save and access their dog particulars, connect with other dog owners to share videos and pictures and communicate with the Dogo community. It also provides articles for new dog owners, those looking to buy a dog, and things to note before buying a dog. However this application is subscription based and requires in-app purchases to access key features.

Pawlyclinic

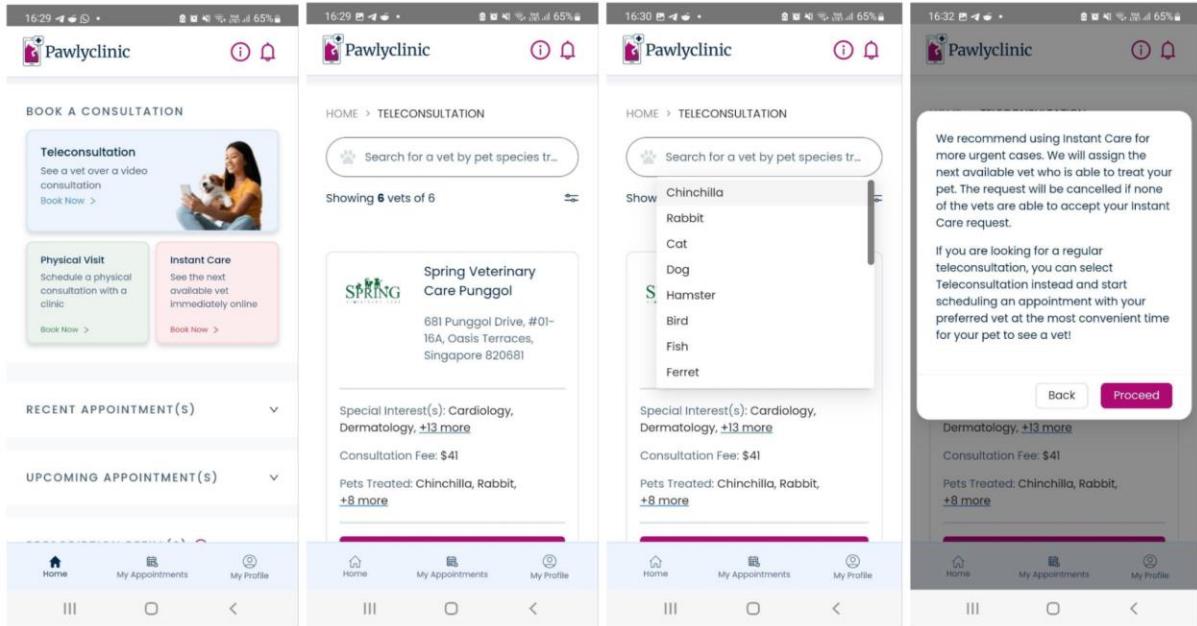


Figure 3: Pawlyclinic app user interface

Pawlyclinic is an app based in Singapore that focuses on helping pet owners connect with veterinarians. They provide a list of vets that users can visit physically and allows users to make appointments through the app. Users can also search for vets based on the type of pet that they own. Users can also make a teleconsultation appointment which could be very helpful for very busy pet owners or those unable to visit the vet for personal reasons. Lastly, there is an instant care option which is used in emergencies to link pet owners to the next available vet to get the pet vet care as soon as possible. The teleconsultation and instant care functions are very useful functions that not many pet apps offer. However, the app only has connections to 6 veterinarians which is an extremely small number compared to the actual number of vets in Singapore hence making this app very inaccessible to many users since these 6 vets are not enough to cover all areas of Singapore, thus disinteresting pet owners from using this app.

11pets

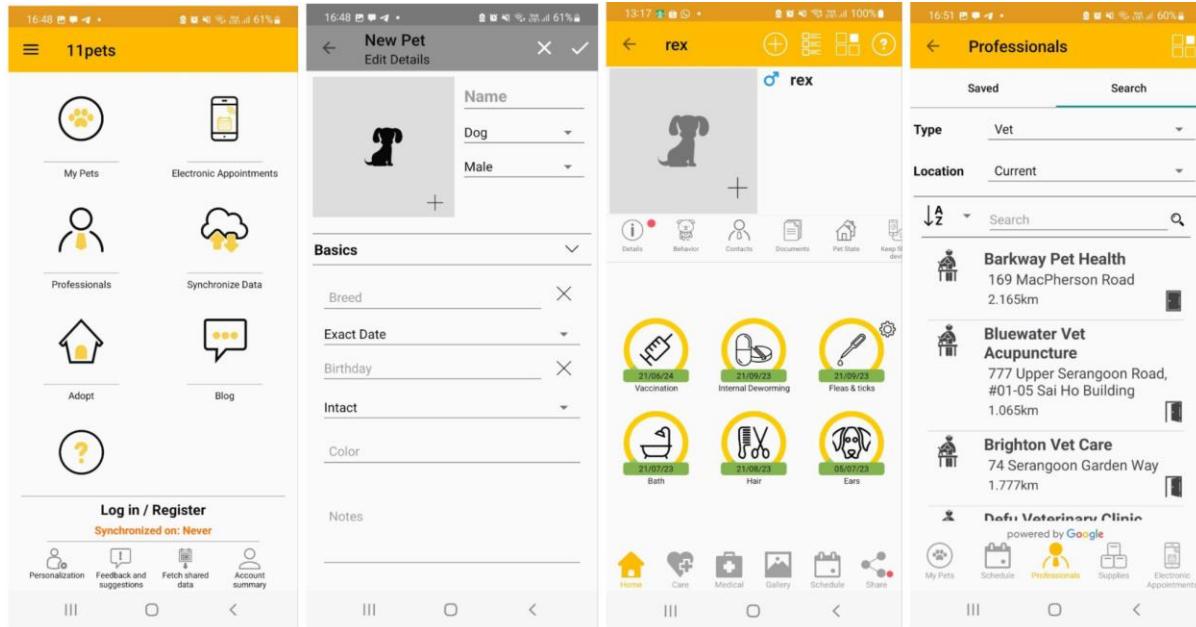


Figure 4: 11pets app user interface

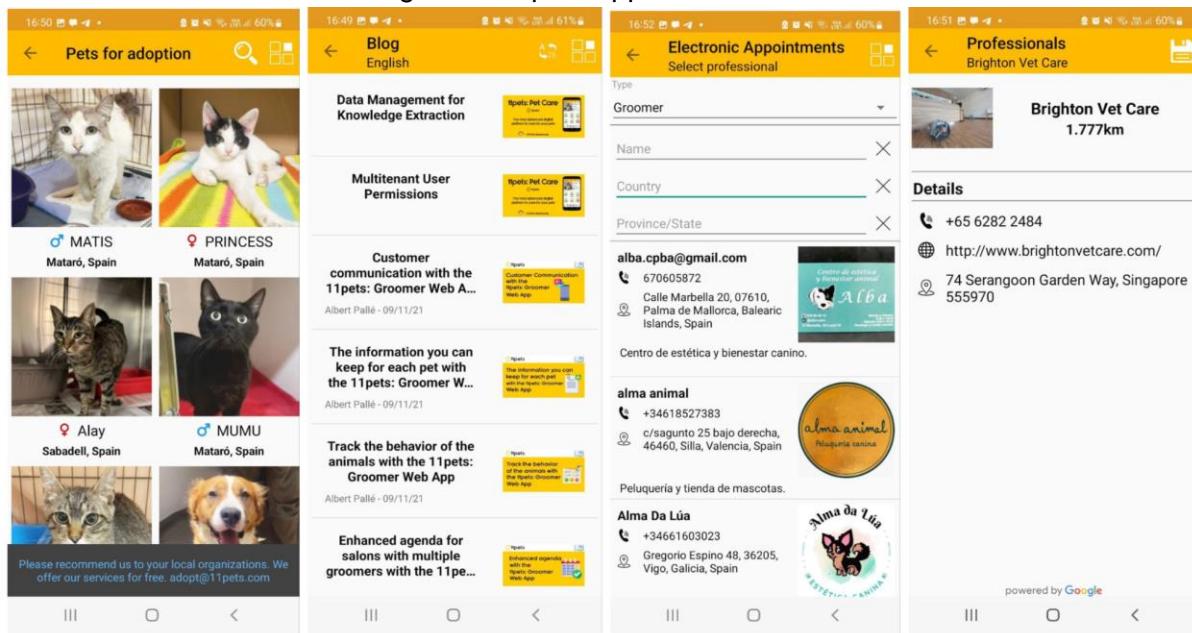


Figure 5: 11pets app user interface 2

11pets is an all rounded pet care app with many features. It allows users to create pet profiles with their pets complete medical history. The users can access schedules in accordance to the reminders they have set. The app also has a page of Vets and groomers to help owners find nearby services. Users can also share their pets data with a veterinarian or pet sitter. The application shows animals up for adoption within users' area. The app is free to use and can be accessed without internet connection. However, the app works better in other countries. In Singapore, the app does not have any groomers and limited vets are shown, the app does not allow users to connect with the vets, it only provides information on how to contact the vet.

Pawshake

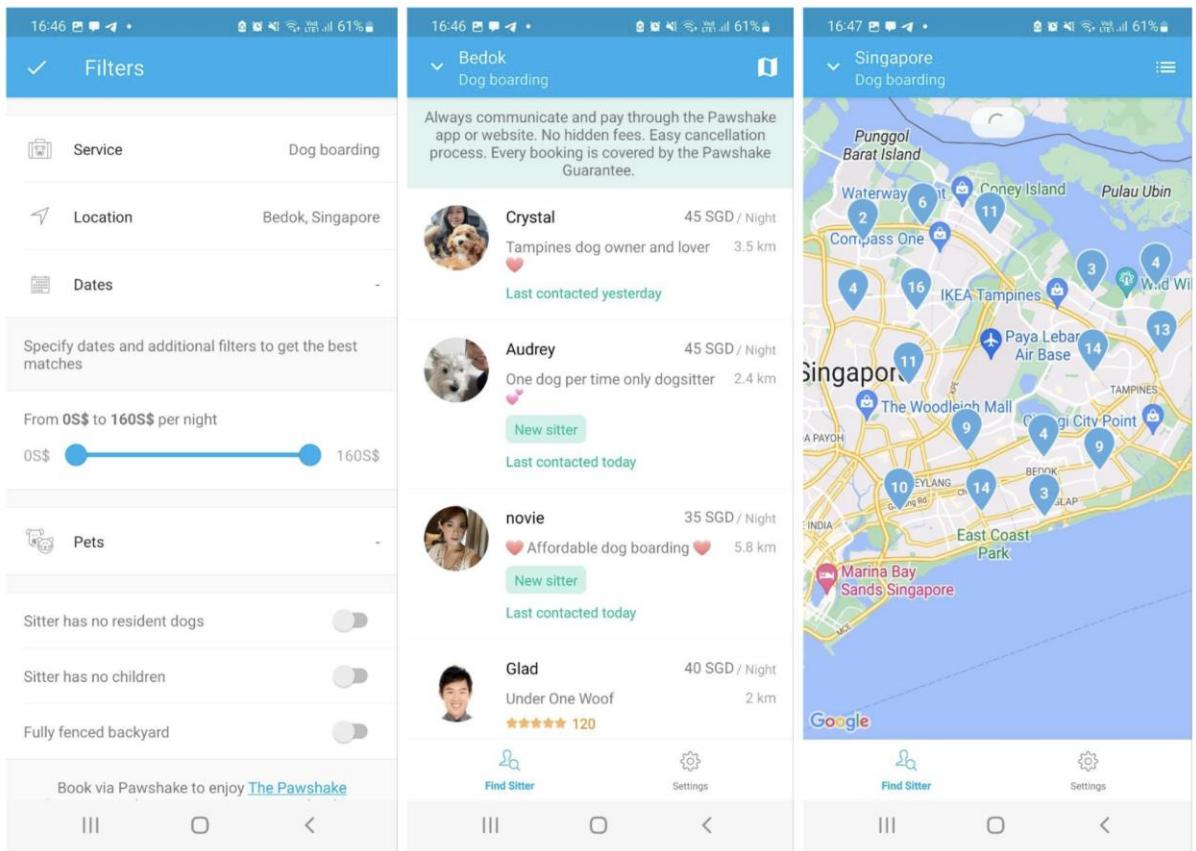


Figure 6: Pawshake app user interface

Pawshake is an app that focuses on pet boarding. It allows users to filter searches based on location, price and pet. It generates a list of potential boarders available. It has a map function to let users view available pet boarders in the area. The app is rather standard and doesn't have other features which could be a downside as pet owners require many other features. However the map function and app filters are very useful for this app.

Monkoodog

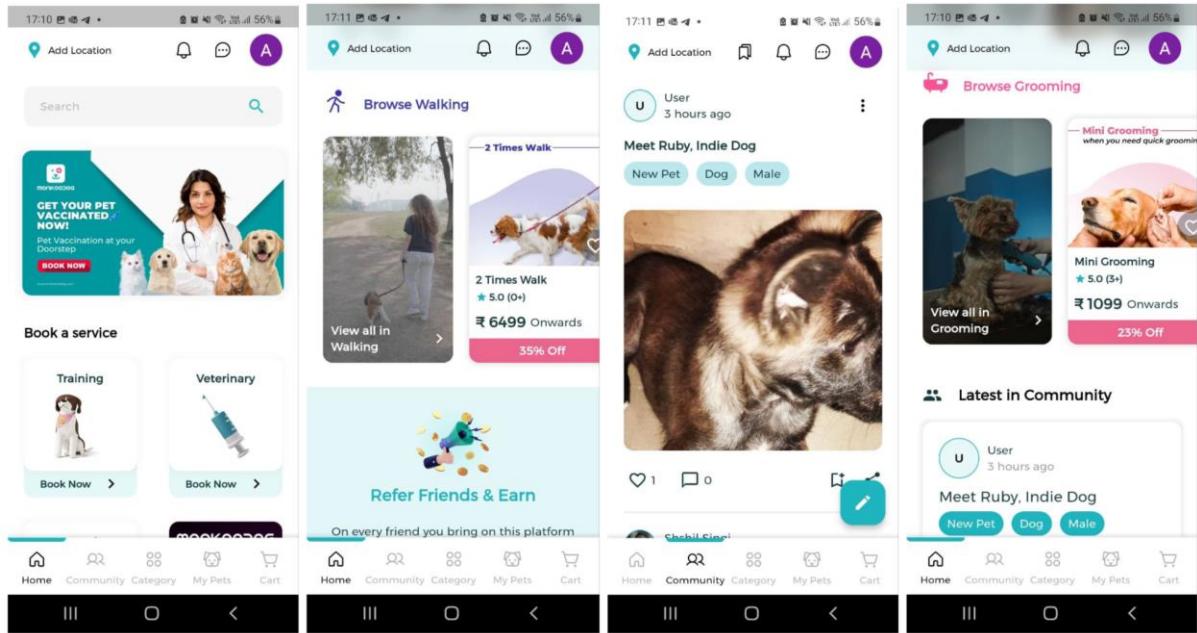


Figure 7: Monkoodog app user interface

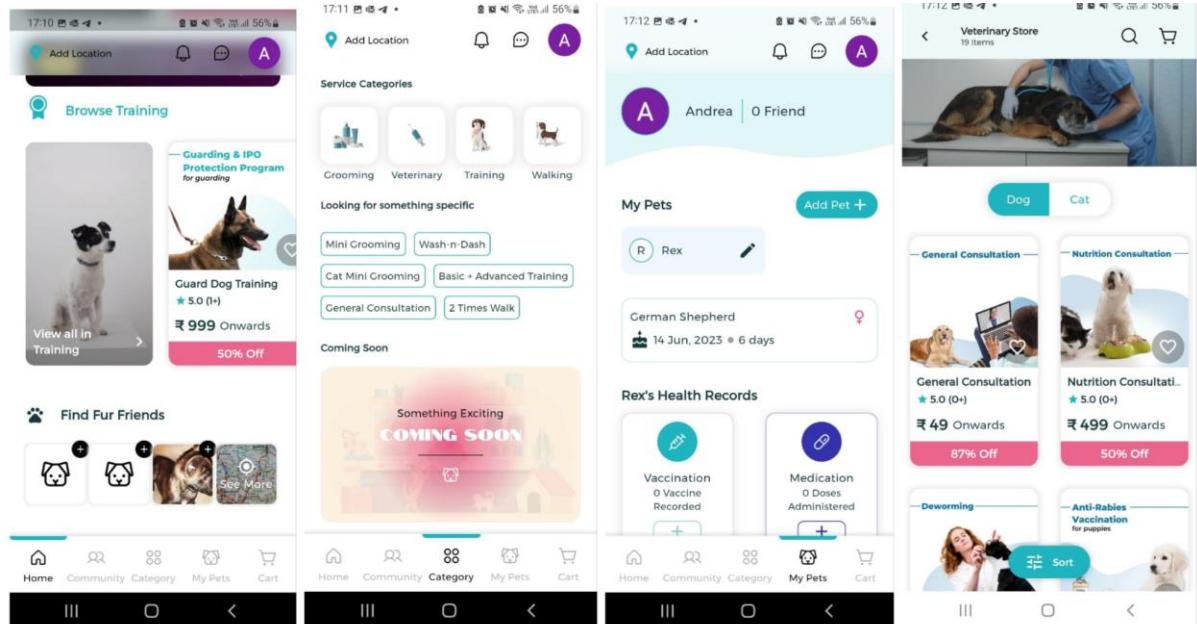


Figure 8: Monkoodog app user interface 2

Monkoodog is an all-rounded dog care application. It mainly provides a site for users to buy dog care services. Users can create a pet profile and include their dog's vaccinations and information. Users will get regular updates on their dogs' health, reminders on upcoming appointments. Users can directly book an appointment with a veterinarian. There are also informative courses that users can buy such as dog grooming courses and dog training courses to inform themselves. Users can buy pet grooming, training or walking services on the app by connecting with the respective sellers. They can also socialise with other users on the app with the 'Pet Finder' feature to communicate with other dog owners. The app has a complicated user interface because of the many features and is not user friendly. It only caters

to dog owners. Furthermore, this application is not usable in Singapore as it does not connect with Singaporean vets or groomers and is based overseas.

VitusVet

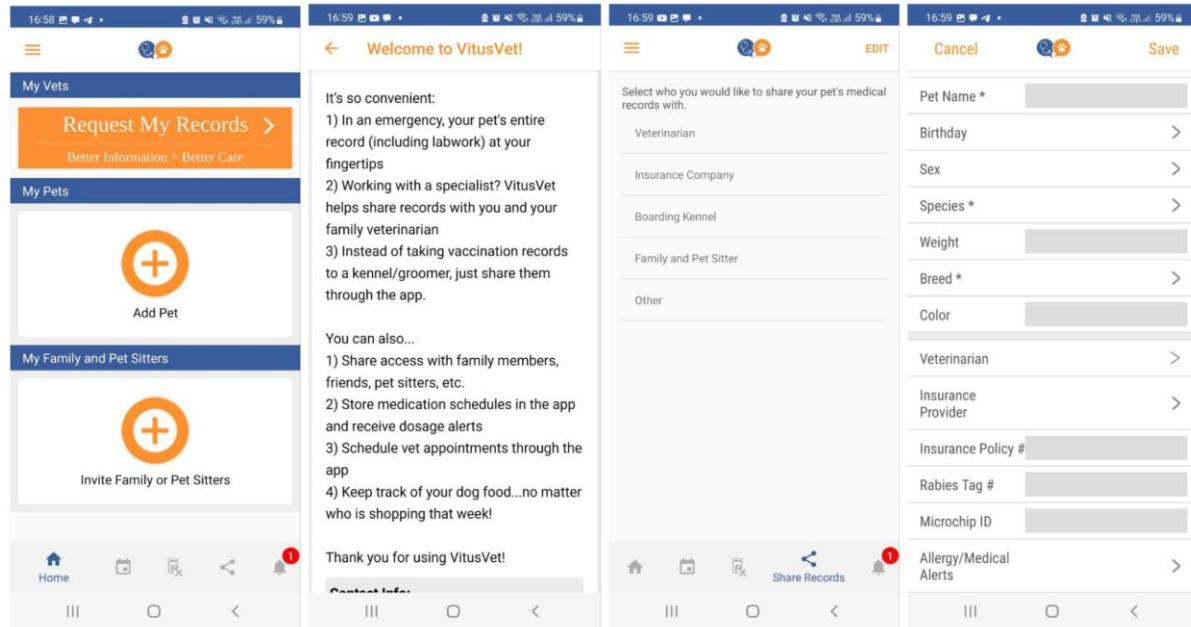


Figure 9: VitusVet app user interface

VitusVet is an app focused on helping pet owners keep medical records of their pets. It lets the users create a pet profile allowing them to include all medical documents, vaccines and other records. It also lets users share this data with a chosen veterinary or groomer of the user's choice. This app is useful for pet owners however it is limited to being an app solely for keeping medical records and does not serve any other purpose. Furthermore, it works the best in America but not so in other countries such as Singapore. It does not have many vets or groomers in Singapore and does not allow users to connect to Singaporean vets.

Clio

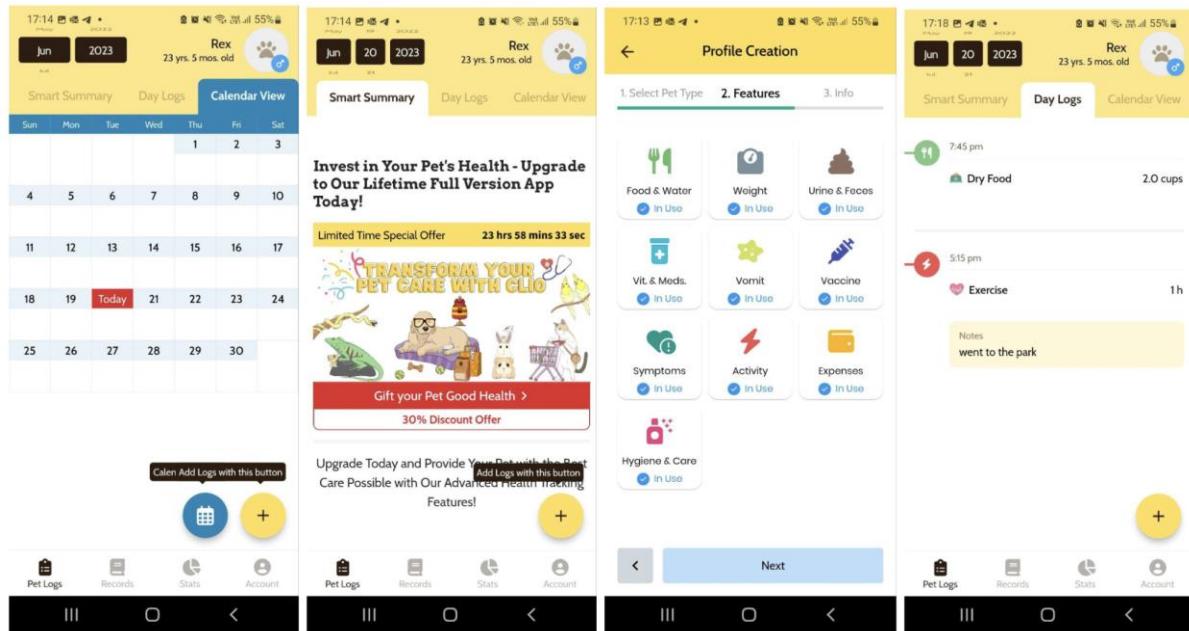


Figure 10: Clio app user interface

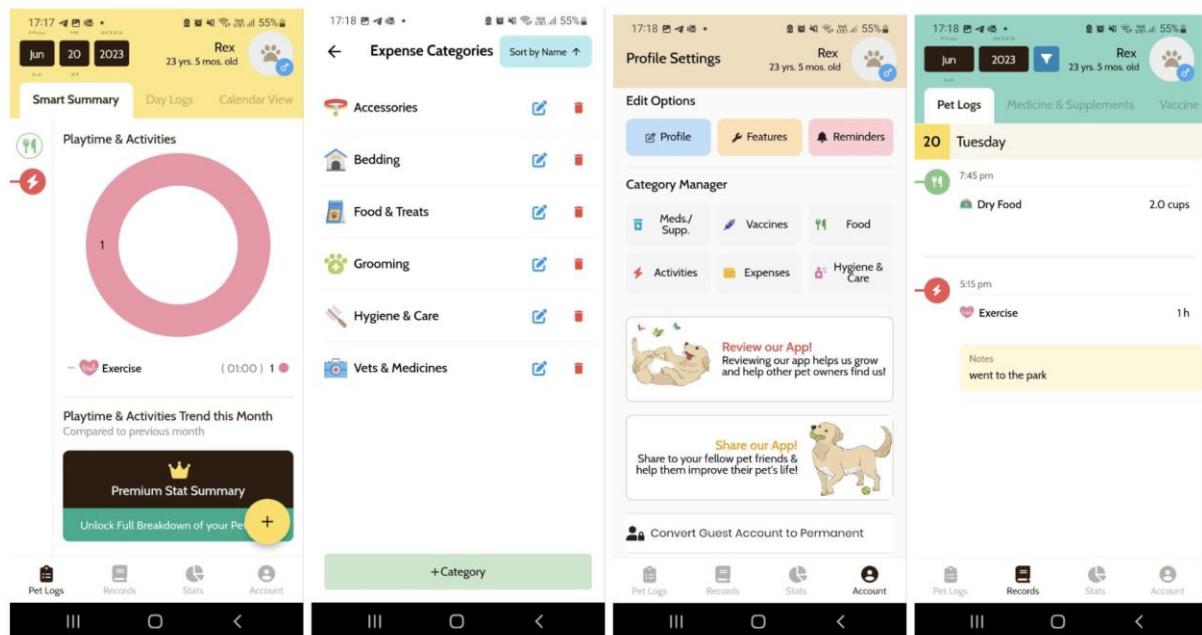


Figure 11: Clio app user interface 2

Clio is an all-rounded app made for pet owners. It lets users create a pet profile and includes their medical history and has a vaccine tracking feature. The app allows users to track their pets health metrics, nutrition, behaviour, activity and well-being, set reminders for checkups and any other logs the user would like to create. These can all be seen in the calendar after they have been created. The app also allows for multiple pet profiles for users that have more than 1 pet. Clio is extremely comprehensive and has a very clear user interface making it very easy for users to log any information about their pets. In this aspect, the app has performed

excellently. However, the app is unable to connect users to vets or groomers or other services which is essential for pet owners and is used only for tracking their pet.

Overall results:

Features	Dogo	Pawyclinic	11pets	Pawshake	Monkoodog	VitusVet	Clio	Our app
Creating pet profile with pet and owner's particulars	✓	✓	✓	✓	✓	✓	✓	✓
Being able to log pet's medical history	✓	✓	✓		✓	✓	✓	✓
App reminders of upcoming appointments	✓	✓	✓		✓	✓	✓	
Able to log <u>owners</u> personal reminders, pet activity or miscellaneous logs	✓		✓		✓		✓	
App gives insights on pet based of log entries							✓	
List of vet services		✓	✓			✓		✓
List of grooming services			✓					✓
List of pet boarding services				✓				✓
List of pet training services	✓				✓			
Able to book appointment directly through the app	✓	✓		✓	✓			
Teleconsultation services	✓	✓			✓			
Emergency vet services		✓						
Able to share information with vets/groomers			✓			✓		
Pet informative articles/resources	✓				✓			✓
List of adoption methods or services			✓					
Selling of pet items, food, toys, pet related items	✓				✓			✓
Being able to communicate with others in the pet community	✓		✓		✓		✓	✓

Figure 12: Analysis of market research app features

Through market research and analysis of different pet care apps, we have determined that most of the current pet care apps have many features useful for pet owners, however they all individually lack certain features to make it a complete pet care app. By analysing all the 7 pet care apps and seeing which features were the most essential and feasible, as well as seeing what pet owners are looking for in an app in our survey in the requirements elicitation section, we have determined that there are certain features all the best pet care apps require. These features include being able to create a pet profile that can include pets medical history, having a list of vets, groomers and boarding centres for users to find these services near them, having a means to log their pets activities, being able to find information about pet care, selling pet related items, and lastly being able to communicate with other pet owners in a blog or forum. These were the main features we have identified from all the apps that are the most crucial in developing a pet care app.

There are other features that certain apps have implemented such as being able to connect with vets and groomers directly through the app or having teleconsultation services.

However, we saw that these features were unfeasible for now and are things we hope to implement as the app upgrades in the future.

Literature

Creating a mobile pet application that caters all facilities poses several challenges. These challenges include:

1. User interface design:

Designing an intuitive and user-friendly interface that accommodates various pet-related features and functionalities.

2. Integration with external systems:

Coordinating integrations with external systems such as GPS tracking, online payments, and veterinary databases to provide comprehensive services.

3. Data management:

Managing a large volume of pet-related data, including user profiles, pet profiles, medical records, and appointment history while ensuring data security, privacy, and efficient retrieval.

4. Real-time updates and notifications:

Providing timely updates and notifications to users for tasks like feeding, medication, and upcoming appointments, which require a robust backend infrastructure and reliable push notification systems.

5. Compatibility across devices and operating systems:

Ensuring consistent performance and user experience across different mobile devices and operating systems (iOS, Android, etc.).

6. Quality assurance and testing:

Thoroughly testing the application to identify and address any issues related to registration, login, data synchronisation, and third-party integrations.

7. Scalability and performance:

Ensuring the application can handle increased traffic and data load as the user base grows to maintain a seamless user experience.

8. Regulatory and legal compliance:

Complying with regulations and laws regarding data protection, privacy, and pet-related services.

9. User trust and safety:

Implementing safety measures to protect user data, secure payment transactions, and verify user identities to build user trust and ensure a safe environment.

10. Continuous improvement and updates:

Monitoring user feedback, introducing new features, and addressing user concerns to stay competitive and meet evolving user expectations.

Successfully overcoming these challenges requires careful planning, collaboration among development teams, user feedback, and continuous iteration and improvement throughout the development process.

Requirement Elicitation

Stakeholder Analysis

Who are our stakeholders:

1. Pet Owners
2. Collaborators
3. Sponsors

1. Pet Owners:

With increased pet ownership on the rise and seen as a trend ("Singapore pet products", 2022), the application has the potential to become popular amongst users. During our research, we observed plenty of pet applications pre-existing in the market. However, these applications only cater to specific features. Hence, our team believes in catering an application with multiple features focused more on the Singapore market based on Singaporean lifestyle and needs.

2. Collaborators and Sponsors:

Our team is also looking forward to working with pet care service providers in the future. If our application is proven to be successful. A feature that we would look into implementing would be for pet owners to book the necessary services directly using our application. In addition, our team is excited about working with well-renowned veterinary professionals to publish their pet care tips and articles for pet owners. By bringing various stakeholders and business partners into this project, this application can bring in more revenue for the company, keeping it sustainable and making it a profitable venture for our partners.

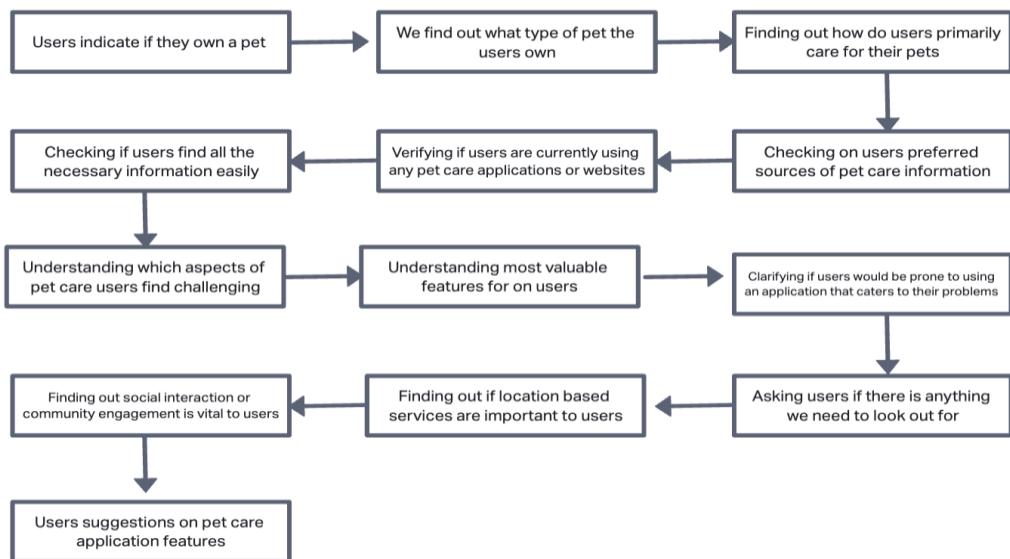


Figure 13: Flow of Survey

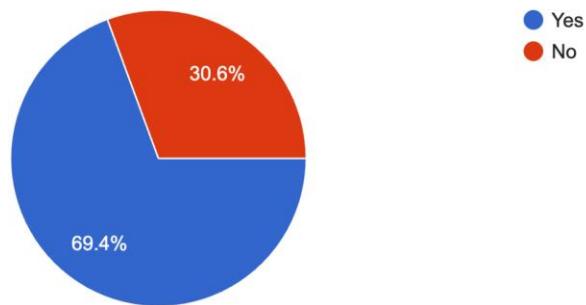
Survey Results

Our team surveyed to find out if our understanding of the user's requirement was accurate. We would like to note that although some of the audience currently do not own pets, their insights are just as valuable as they might own a pet in the future.

Survey flow:

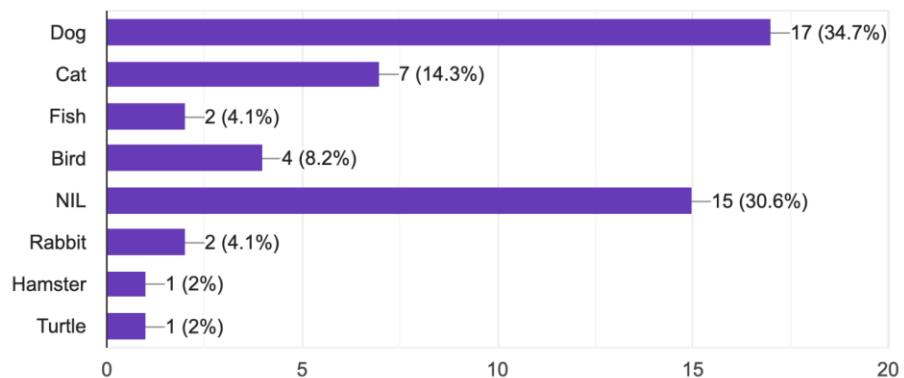
Do you own a pet ?

49 responses



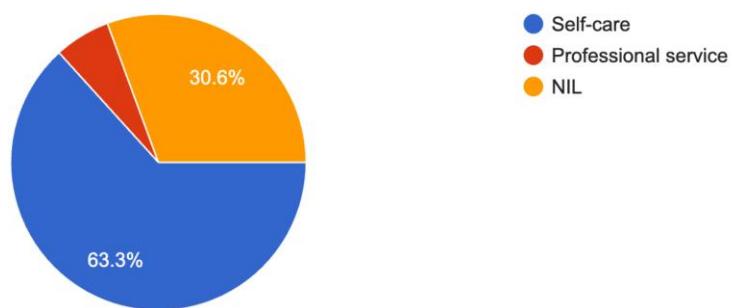
What type of pet(s) do you own?

49 responses



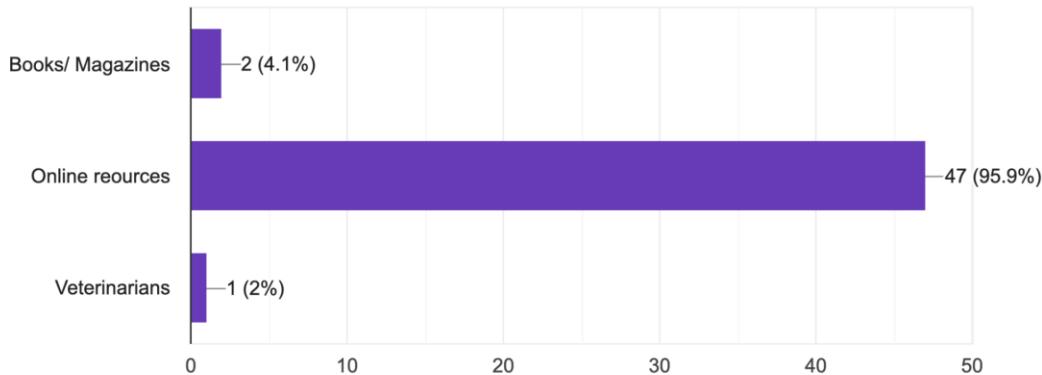
How do you primarily care for your pets?

49 responses



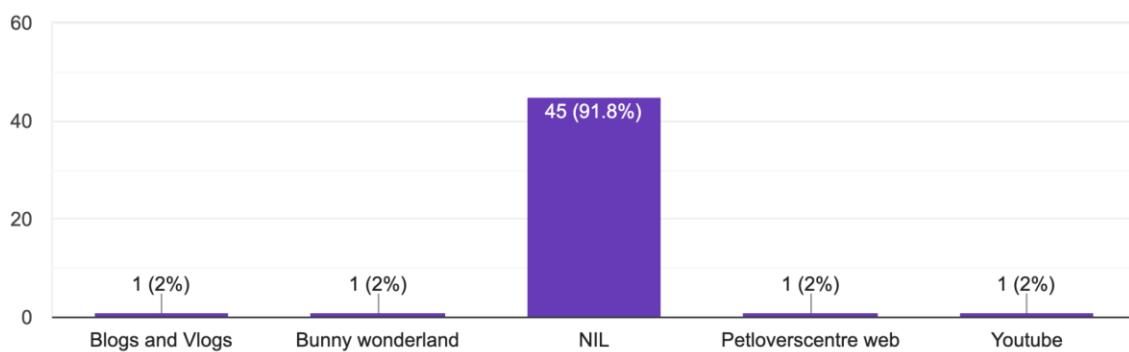
What are your preferred sources of pet care information?

49 responses



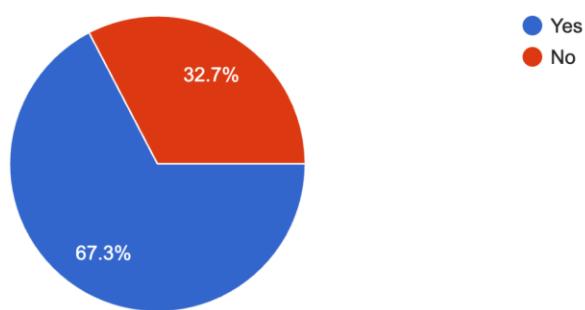
Do you currently use any pet care applications or websites? If yes, please specify which ones. If no, please enter nil.

49 responses



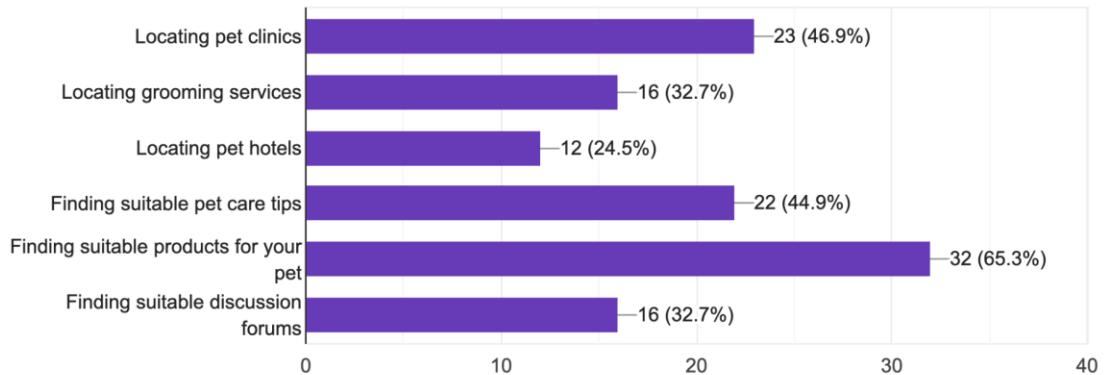
Are you able to find all the necessary information needed for pet easily?

49 responses



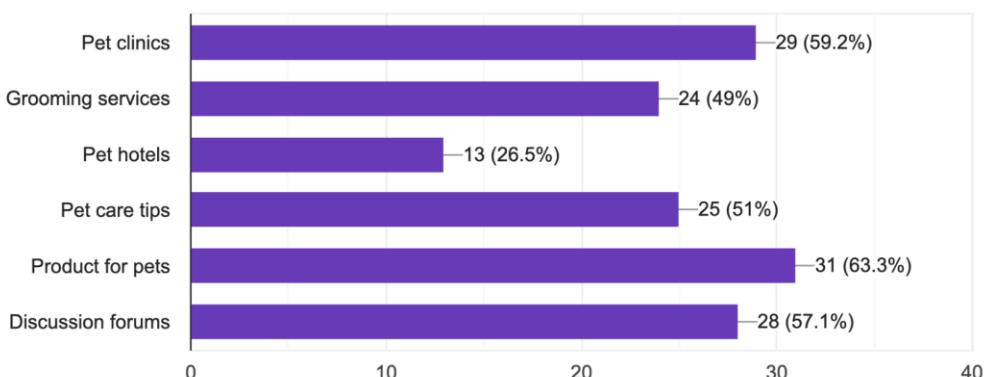
What specific aspects of pet care do you find challenging ?

49 responses



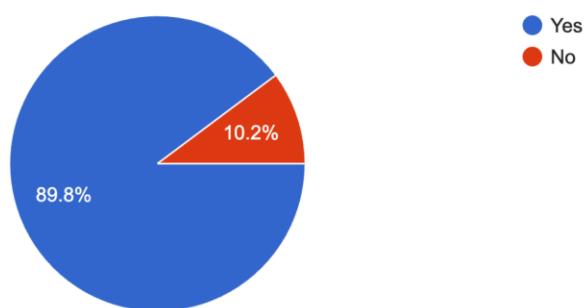
What features would you find most valuable in a pet care application?

49 responses



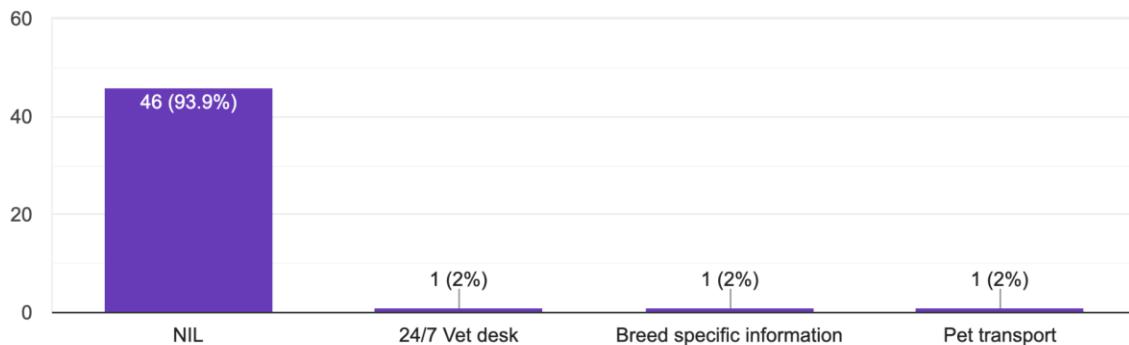
Will you be willing to download a pet care application that provides multiple features (such as veterinarians, grooming salons, pet products, etc)?

49 responses



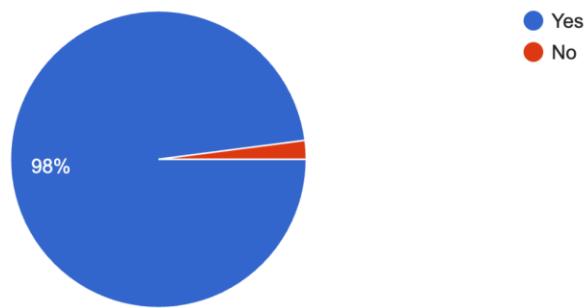
Are there any specific customisation options you would like to see in a pet care application? If yes, please specify. If no, please enter nil.

49 responses



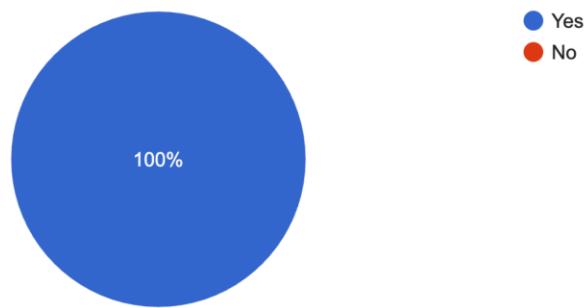
Is finding pet care services (such as veterinarians, grooming salons, pet stores) near your location important to you?

49 responses

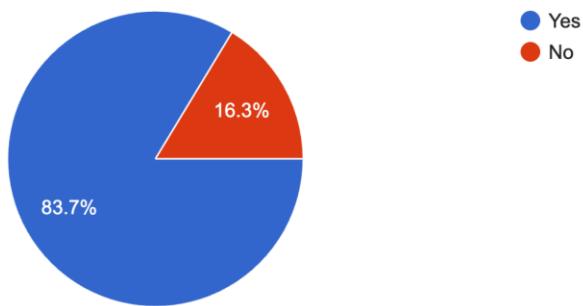


Would you find value in a pet care application that provides location-based recommendations for nearby pet services?

49 responses

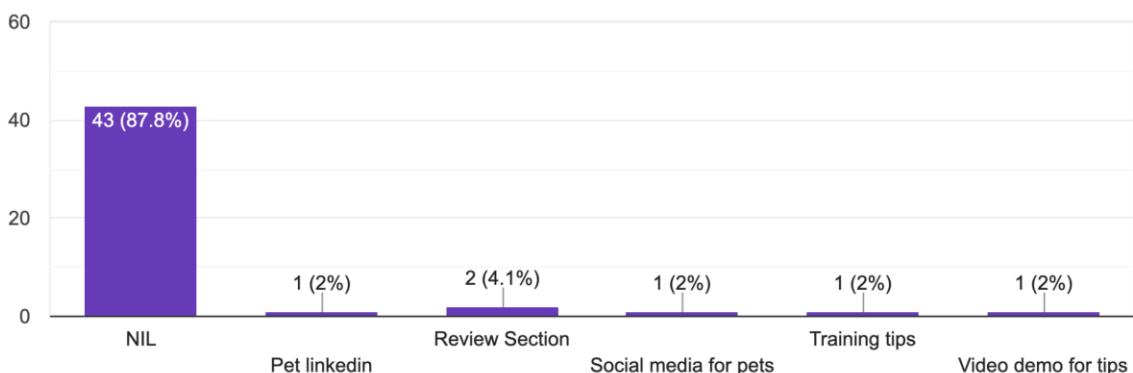


Is social interaction or community engagement within a pet care application important to you?
49 responses



Are there any other features or functionalities you would like to see in a pet care application? If yes, please specify. If no, please enter nil.

49 responses



Survey Analysis

The key takeaways from the survey are:

1. Based on the survey, the majority of the respondents do not use any pet care applications or websites. 95.9% of them prefer online resources. Which provides our team with the opportunity to explore this market.
2. In the survey conducted, 65.3% of the surveyees found finding suitable products for their pets the most challenging. We believe for pet owners to be willing to use our application this challenge has to be tackled. Hence we will be featuring top-selling products for pets in our application.
3. A key highlight of our application will be providing location-based recommendations for nearby pet services because 100% of our responders found it a valuable feature.
4. With a promising 89.8% of respondents stating that they will be interested in downloading the application that we are making, it shows the needs and possibility of this application being a successful venture. This is also a promising number for sponsors and investors as it shows that this application will be a success.

Conclusion

Based on the stakeholder and survey analysis, my team has concluded that the following functional requirements are necessary to meet the user's expectations. They are as follows:

1. Allow users to register and create a profile for their pet
2. Providing pet care information based on pet breeds
3. List of pet care services based on the region that they reside in.
4. Community and Social Features for users to interact, share experiences, and seek advice from other pet owners.

Specifications and Requirements

Functional requirements

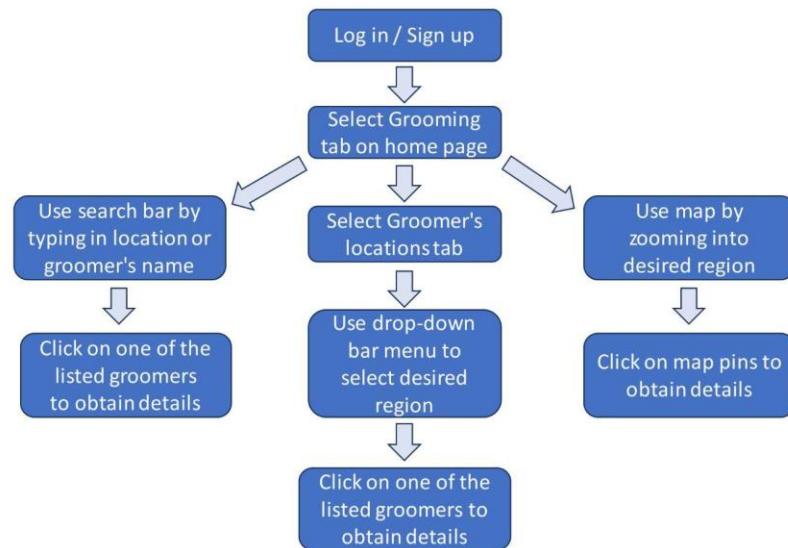


Figure 14 . Flowchart depicting the application's general flow while using the application

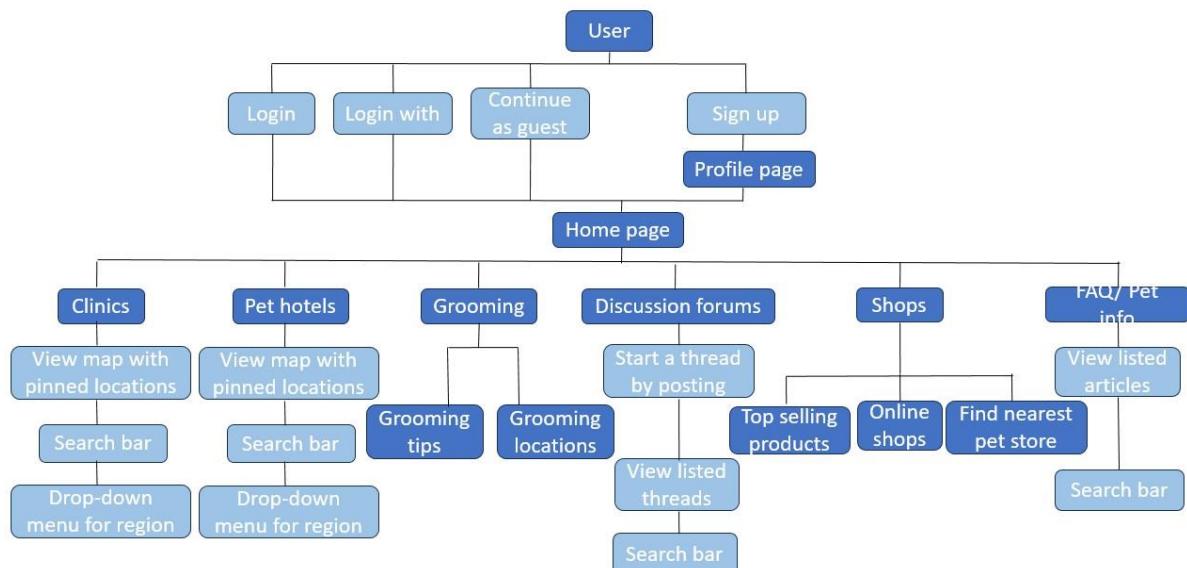


Figure 15. Flowchart depicting tab navigation and their available features

Use case	To search for a suitable grooming location	
Actors	Users	
End Result	User successfully finds a suitable grooming location.	
Main Flow	Steps	Actions
	1.	From the home page, User selects Grooming page.
	2.	User selects Groomers locations
	3.	User searches the location via the search bar by typing in the groomer's name and obtains the details
Alternate Flow 1	1.	User searches the location by zooming in on the map to their desired location and clicking on map pins to obtain details.
Alternate Flow 2	1.	User searches the location by clicking on the drop-down menu within the search bar and selecting a region.
	2.	After selecting a region, User selects a groomer under the list shown and views its details.

Figure 16. Use case description

Non-functional requirements

1. Performance:

The application should have a low response time to users' requests i.e. 300 ms response time for home page interactions.

2. Scalability:

The application should scale well to 10000 visits at a time with optimal operations.

3. Usability:

Users should be able to navigate the application intuitively by ensuring the application's interface has high learnability and memorability.

4. Security:

The application should be secure as it stores sensitive information like users' passwords. It has to be able to defend against malware attacks or unauthorised user authentications.

Specification

Purpose

Fur Family is an application curated for pet owners, providing users with a comprehensive platform that offers a range of functionalities to assist in their pet care needs. Users should be able to easily access information and services regarding grooming, vets, pet hotels, guides on pet care and a discussion forum where fellow pet owners can share personal experiences or seek advice. This project aims to have a user-friendly interface with real-time updates.

System overview

The project will be for mobiles and we will use React Native for frontend development, Python and Javascript for backend development and MongoDB for data storage.

For the frontend development

We will use **React Native** for the following reasons:

1. React Native allows for cross-platform development. We will only need one codebase to create this project for both iOS and Android.
2. React Native is a free and open-source software with a huge community of active contributors so we can easily access and use pre-built components. Support can also be easily found if needed.
3. React Native uses Javascript which our team is familiar with.
4. React Native is developer-friendly and allows for third-party plugins and libraries. This includes Google maps API which our project needs.

For backend development

We will use **Python** for the following reasons:

1. Python is a versatile language.

2. Python has many established libraries with pre-written code. This shortens the development time needed since there is no need to code from scratch.
3. Python has high readability and clean syntax.
4. Python has a large community of active contributors so support can be easily found if needed.

We will use **Javascript** for the following reasons:

1. Since we are using React Native and hence Javascript for the frontend development, using Javascript for backend will allow for code sharing and greater consistency.
2. Javascript has a large community of active contributors so support can be easily found if needed.

For storing user data, we will use **MongoDB**:

1. Flexible data model: MongoDB is a NoSQL database that offers a flexible schema, allowing you to store and retrieve complex, dynamic data structures. This can be advantageous for mobile apps that deal with constantly changing data or require frequent updates to the schema.
2. Scalability: MongoDB is designed to scale horizontally, making it suitable for apps with rapidly growing data or high read/write requirements. It can handle large amounts of data and distribute it across multiple servers, providing better performance and scalability.

Web Scraping

We will be web scraping data with Python using Beautiful Soup. The data sources will be websites that provide information about grooming centres, vets, pet hotels and guides. Specific data requirements will be the name, address, contact details of the various centres and general information from guides.

Scope

We aim to implement the following features in our application, which is designed to provide pet owners with access to multiple functionalities in a single platform. The features include:

1. Pet Profile: Users can create a personalised profile for their pets, including details such as name, age, breed, features, medical records, and photos.
2. Discussion Forum: A communication platform where users can share and discuss various topics related to their pets or concerns, fostering a community for pet owners.
3. Location-Based Services: The application will provide filtered results for pet hotels, clinics, grooming services, and pet stores based on the user's selected region. This feature enhances convenience by helping users find relevant services and products in their area.
4. Pet Care Tips: A comprehensive database where users can search for breed-specific tips and access pet care information from the comfort of their homes.
5. Pet Products: The application will showcase popular pet products and provide links to websites where users can easily find suitable products for their pets.

By incorporating the features above, our application aims to offer a user-friendly and well-rounded platform that caters to the various needs of pet owners, promoting convenience, community engagement, and access to relevant information and services.

We would like to highlight that for our project, we will not be focusing on the following aspects: We will not be implementing appointment bookings or reminders for upcoming appointments. Additionally, personal reminders on pet activity and insights based on log entries will not be included. Training tips, tele-consultation services, and emergency vet services will also not be part of our project. We are not implementing these as we feel that we do not have the time and competency to implement these yet, but we aim to add them into future versions of the app.

Limitations

With this application, it is limited to only users in Singapore as Singapore does not have an application similar to this and to make this app work globally or regionally it will require larger datasets and different datasets for each region. An example of a different dataset is grooming tips due to the differences in weather. Products being sold also will differ with regions.

Planning

When planning the development of our pet care application, we thought thoroughly about the software's technologies and tools we would need to support our team in efficiently planning out our project to achieve our goals. The following software's were chosen by our team to be used greatly throughout the planning stage as they were the most familiar to use and the most efficient:

Communication: Telegram and Discord

These were used as our primary communication tools throughout the project since the team was highly familiar with these 2 applications. Telegram was used as our means to chat, arrange team meetings and discuss, while Discord was used more for team calls when doing assignments or for discussion since it is a secure and has a user-friendly interface that allows us to all call together and has numerous functions to allow for easier discussions such as the share screen function.

Discussion and Documentation: Google Docs

Google Docs was used as it is the most easily accessible way for us to have real time collaboration on a document together and the team was already familiar with its interface hence we used that when planning reports or documenting any work that needed to be done. Prototyping: InVision and Uizard

For prototyping our application, we used InVision for early prototyping, to make a rough outline of what our app would be. Then we proceeded to use Uizard to make a more detailed wireframe for our app as it provided more flexibility and a wide range of tools compared to InVision and also allowed for user interactivity hence we could see the flow of our application since buttons in the wireframe were responsive.

User Testing: Google Forms

We chose to use google forms to create a survey to get feedback from the public about their needs and wants for a pet care application. This allowed us to get more feedback on what we should or should not include in our app, as well as give us insight on features we had not yet thought of that users would want in our application.

Planning: Microsoft Excel

This was used in creating the Gantt chart for our project which helped us plan out our time over the entire project, giving us a structure to follow to keep us in check as the project continues.

Development:

These technologies we used greatly helped us in our planning for the project and allowed us efficient communication, prototyping and collecting of user feedback to ensure we have a smooth development in the second half of the project during the developmental stage. We kept ourselves accountable and followed a Gantt chart to ensure we had a structure and a focus for every weekly meeting. Although we could not follow our Gantt chart to a tee, it was

simple to make adjustments and work to get back on track with our original time frame.

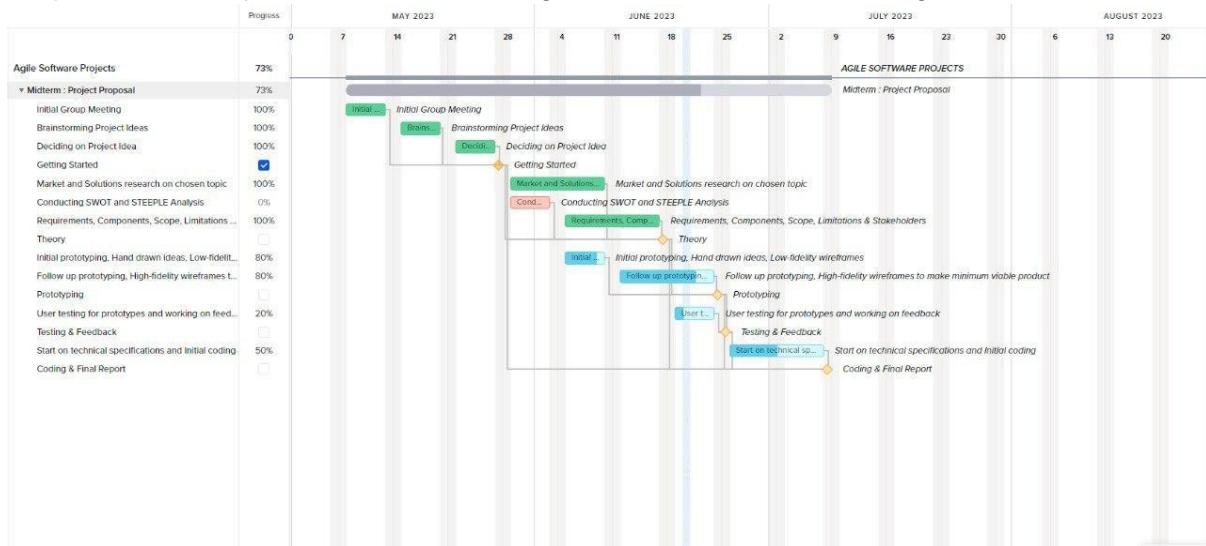


Figure 17. Gantt chart showing teams timeline

Motivations

User Centric Design

The application uses a user-centric approach and is curated based on the needs and preferences of pet owners. During this process, we will be collating, understanding and acting on users' feedback to ensure that the app delivers functionalities that meet their requirements and provide a seamless experience.

Approach - Agile methodology

We decided on the Agile methodology as our approach towards this pet care application. This methodology focuses on the repeated cycle of project planning and project execution. The following are reasons for choosing Agile:

1. Flexibility:

Due to the novelty of our concept, our app will likely face evolving requirements as users explore this new platform. Agile is befitting since it allows for flexibility and adaptability throughout this process, which is important for future innovations.

2. High product quality with lower risk:

Agile consists of frequent contacts with users, understanding their expectations and requirements through feedback. These iterative and small 'sprints' ensure that the app will meet users' expectations since errors can be detected and tackled early. This means lower project risks and fast delivery.

3. High time-to-market:

Agile allows us to release working components of the app that meets the requirements to the market frequently with improvements made. This ensures that users' feedback is quickly acted upon and allows quick real-world feedback on new releases so that we can again work on it.

4. User-centric approach:

Agile's iterative nature synergises with our user-centric design since it allows us to deeply involve the users via continuous intake of feedback and incorporate their suggestions. This allows a strong connection and collaboration with users which is vital for our pet care application's success is dependant on the extent that we are able to meet the needs and expectations of the users.

Scrum

We will be using Scrum as our agile project management framework. Scrum helps us break down our large and complex project into small "sprints" that each produces a complete draft of a final deliverable, within a short period of time. The following are reasons and how we plan to use the Scrum framework:

1. Sprint planning:

We have decided to split our project into different parts such as implementing features for grooming centres' locations and information-gathering for pet care information. Each sprint will cover a different product backlog, and we will be organising each sprint and timeboxing based on priority and difficulty of the task. This helps us to make our project more manageable.

2. Daily scrum meetings:

We will have 10 minute stand-ups every other day to share the progress of each team, ensuring that everyone is up-to-date and aware of the current progressions and potential problems. We will be sharing in 3 parts - what was completed, what issues we faced and what will be worked on. This accountability allows the team to help each other and work towards a project goal that we all want.

3. Sprint review and retrospective:

We plan to have a sprint review and retrospective weekly, after each sprint, to present our completed work progress and to discuss via feedback. Retrospectives are especially vital to understand what was achieved and what can be made better for our next sprint. This allows for continuous improvement.

Prototyping

Wireframes

Low-fidelity wireframe

We had many ideas for our application. Hence instead of diving straight into sketching the wireframes, we first did a hand-drawn sketch of what we wanted our application to look like. This way we eliminated ideas that were not practical or feasible. Once we were certain of how the application should look, we proceeded to create our wireframes.

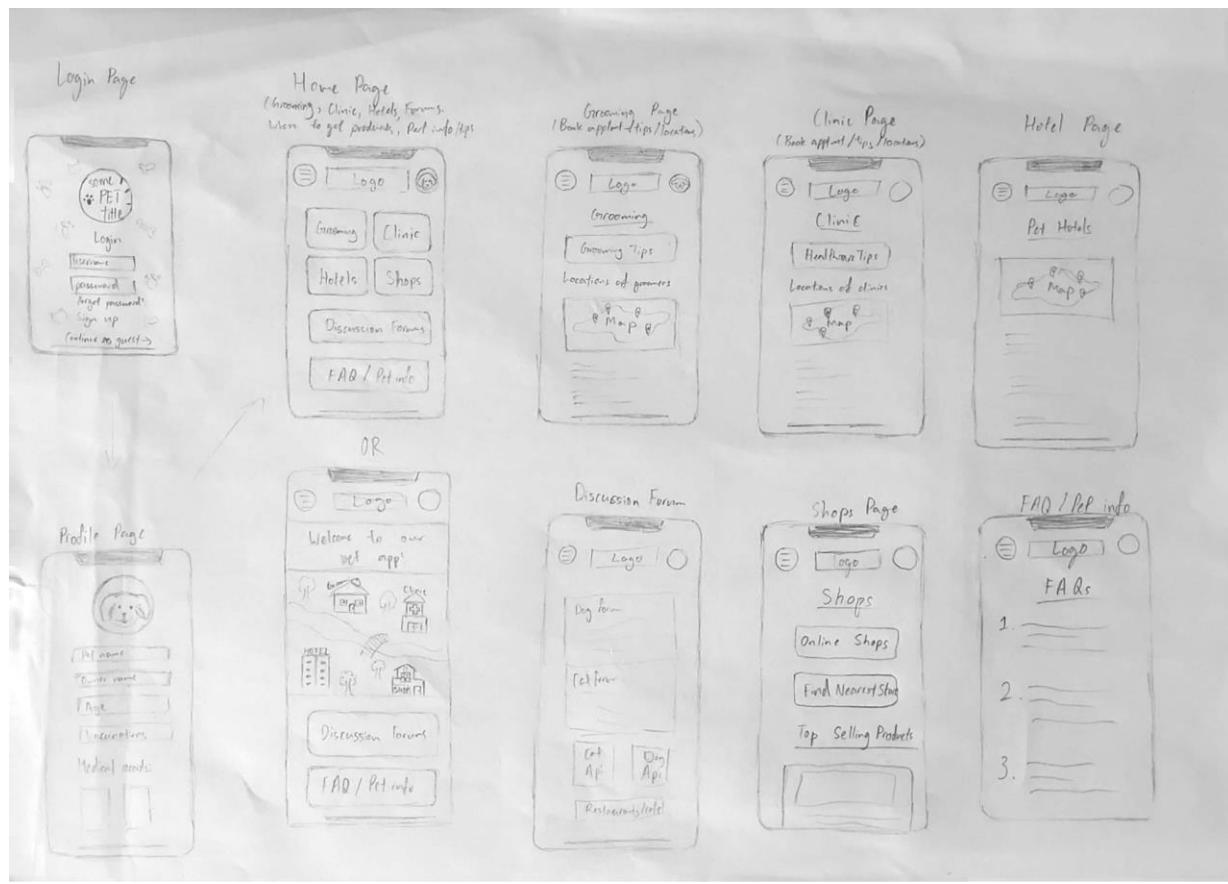


Figure 18. Low-fidelity wireframe

Medium-fidelity wireframe

After finalising the outline of our application, we converted the sketches to digital diagrams with the help of Invision. Before designing our prototype, we drafted our wireframes of the basic features of the application.

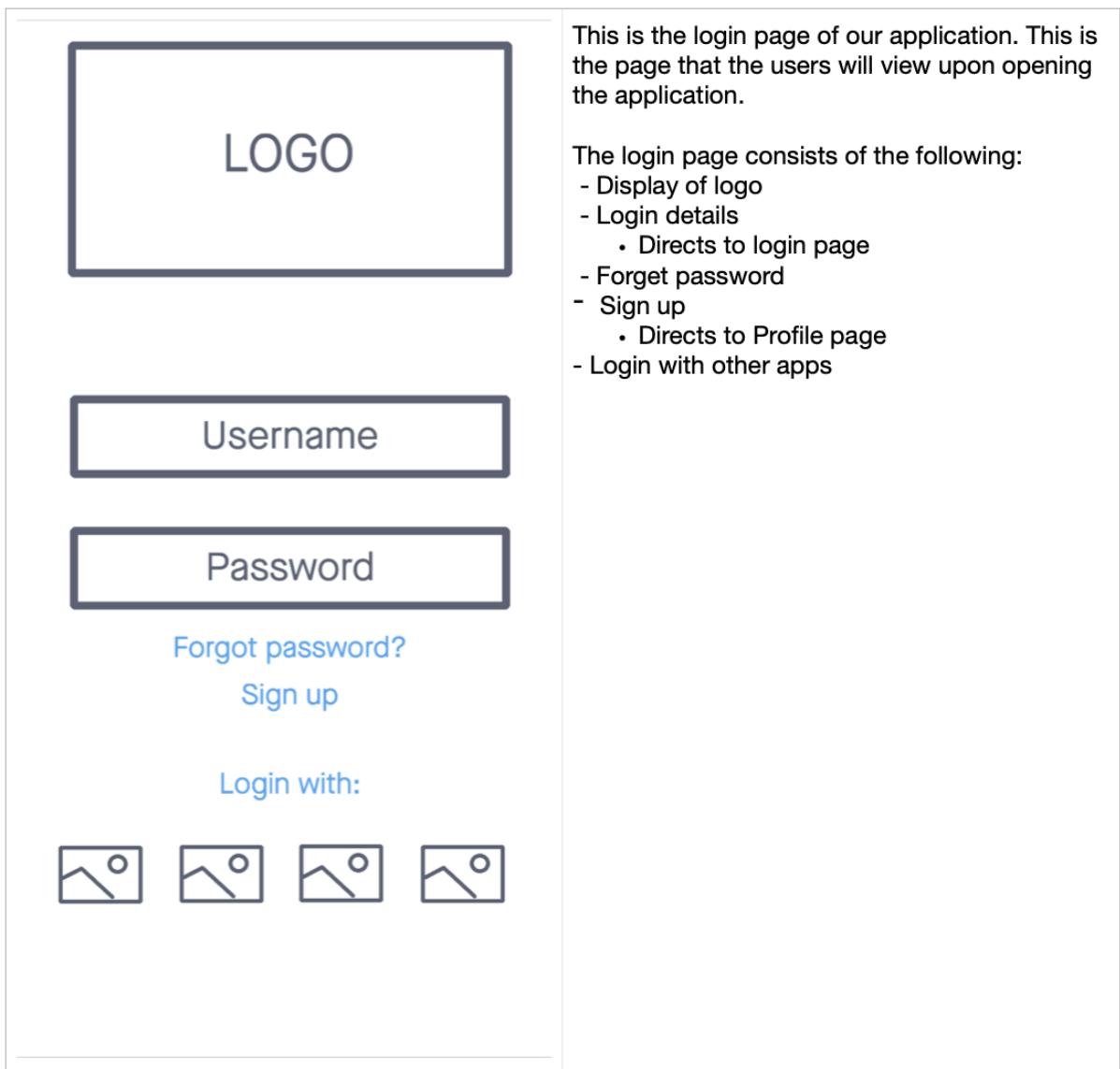


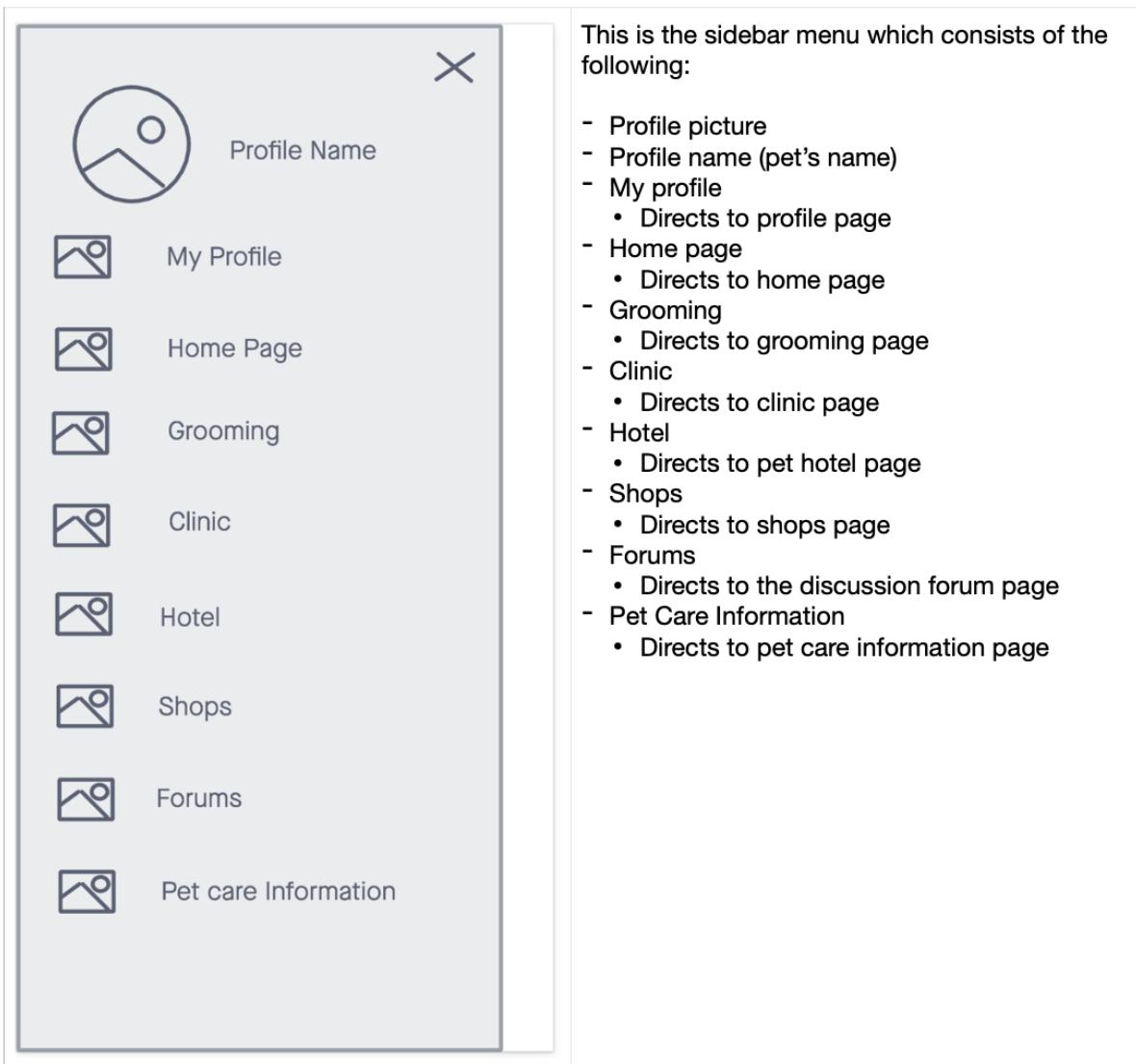
Figure 19: Wireframe of login page

The wireframe illustrates a user interface for a pet profile. At the top left is a circular placeholder labeled "Pet image". Below it is a rectangular input field labeled "Pet name". To the right, a descriptive text block states: "This is the profile page which consists of" followed by a bulleted list of features:

- A pet image icon which allows users to set a picture of their pet as their profile picture
- A 'pet name' box to enter the name of their pet
- A 'pet type' box to enter the type of pet owned by the user
- A 'pet breed' box to enter the breed the pet belongs to
- A 'age' box to enter the age of pet owned
- A 'colour' box to enter the colour of the pet
- 'Medical record' boxes to upload the pet's existing medical records and vaccination records

Below these fields, there is a section titled "Medical Records" containing two square icons, each featuring a plus sign (+) in the center.

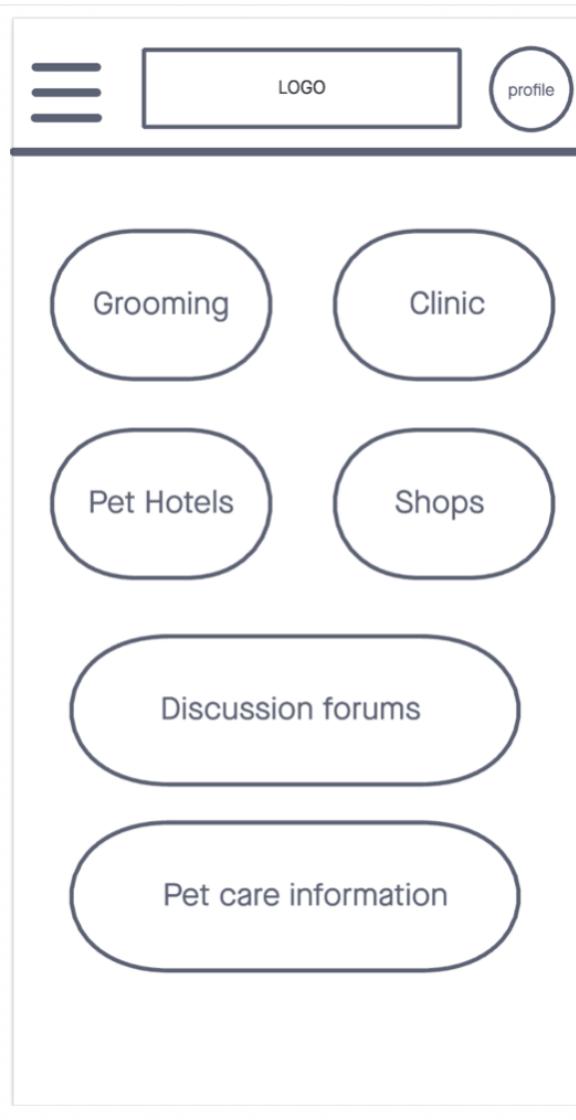
Figure 20: Wireframe of profile page



This is the sidebar menu which consists of the following:

- Profile picture
- Profile name (pet's name)
- My profile
 - Directs to profile page
- Home page
 - Directs to home page
- Grooming
 - Directs to grooming page
- Clinic
 - Directs to clinic page
- Hotel
 - Directs to pet hotel page
- Shops
 - Directs to shops page
- Forums
 - Directs to the discussion forum page
- Pet Care Information
 - Directs to pet care information page

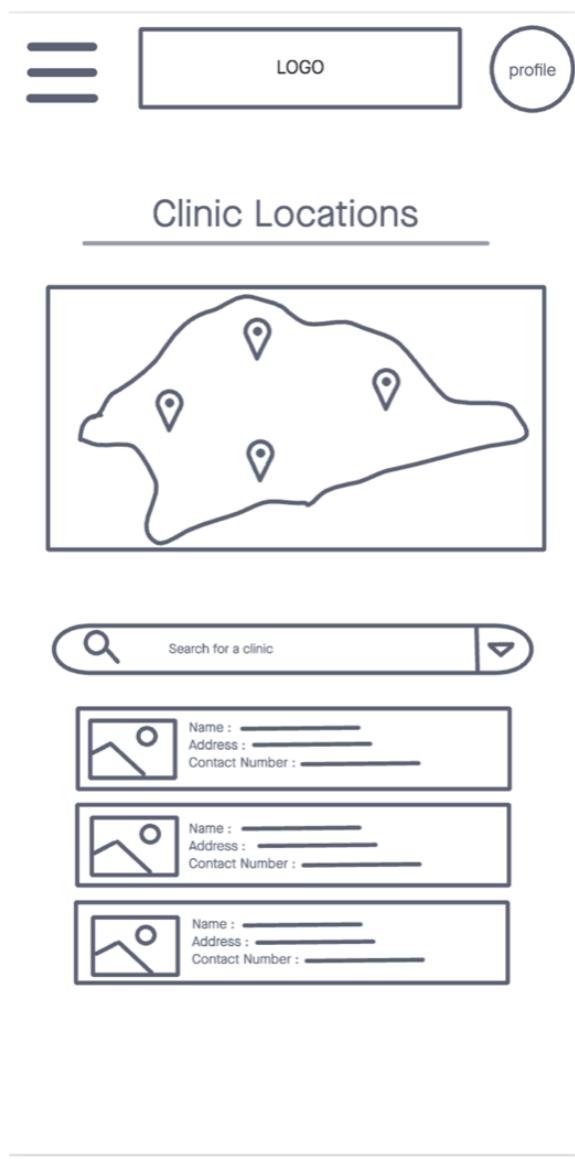
Figure 21: Wireframe of sidebar menu



This is the homepage which consists of

- Sidebar menu at the top
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Grooming
 - Directs to grooming page
- Clinic
 - Directs to clinic page
- Pet hotels
 - Directs to pet hotels page
- Shops
 - Directs to shop page
- Discussion forums
 - Directs to the discussion forum page
- Pet care information
 - Directs to pet care information page

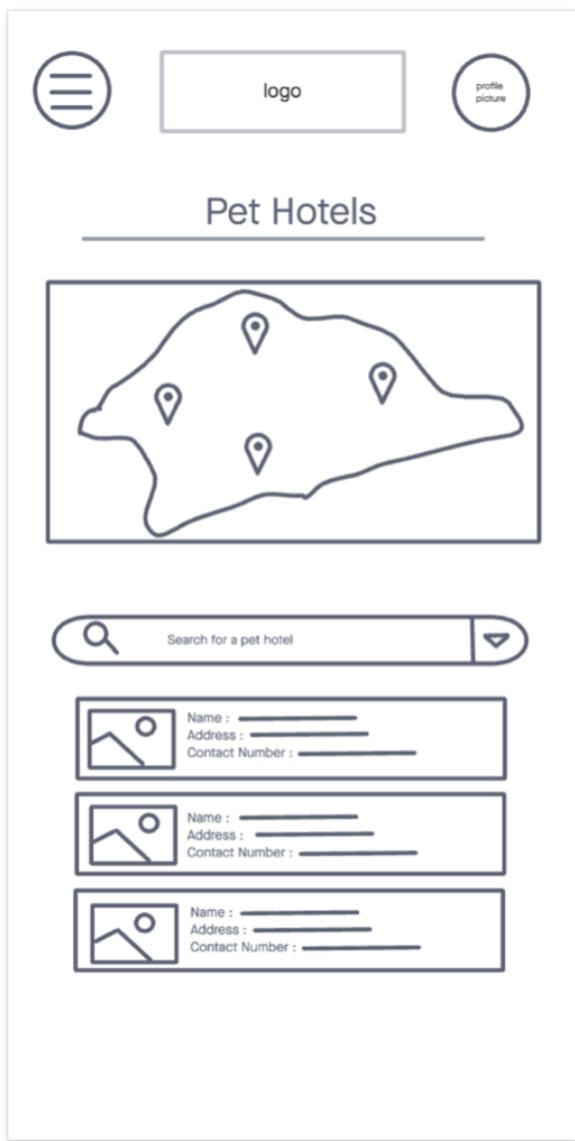
Figure 22: Wireframe of homepage



This is the clinic page which consists of the following:

- A sidebar menu
- List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Map with pins indicating clinic locations
- Search bar
 - Search clinic name to retrieve details
- Default list of clinic informations

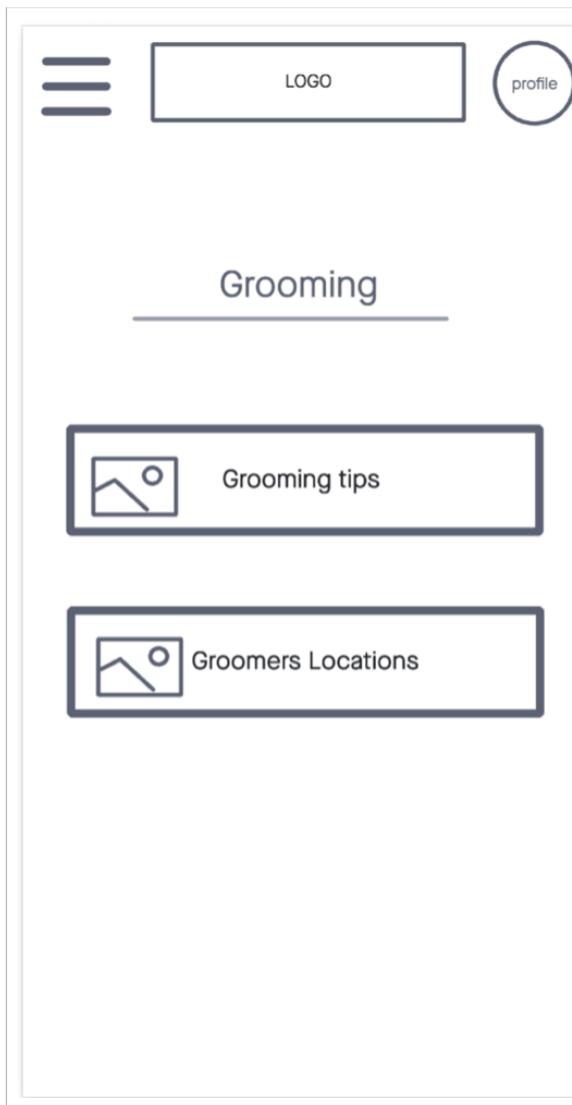
Figure 23: Wireframe of clinic page



This is the pet hotel page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Map with pins indicating hotel locations
- Search bar
 - Search hotel name to retrieve details
- Default list of hotel informations

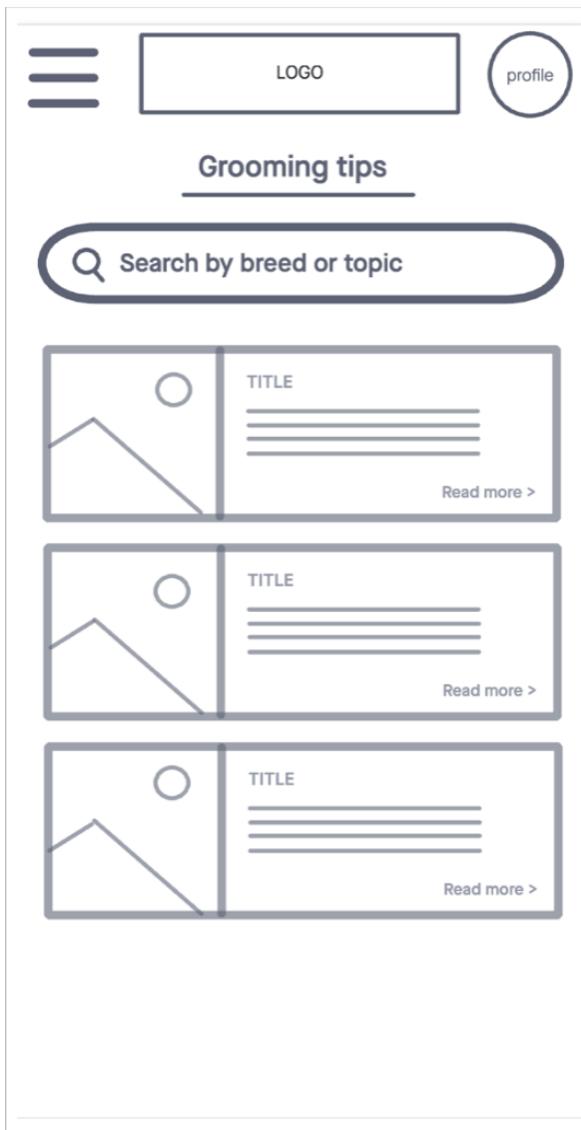
Figure 24: Wireframe of hotel page



This is the grooming page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Groomers Location button
 - Directs to groomer location page
- Grooming tips button
 - Directs to grooming tips page

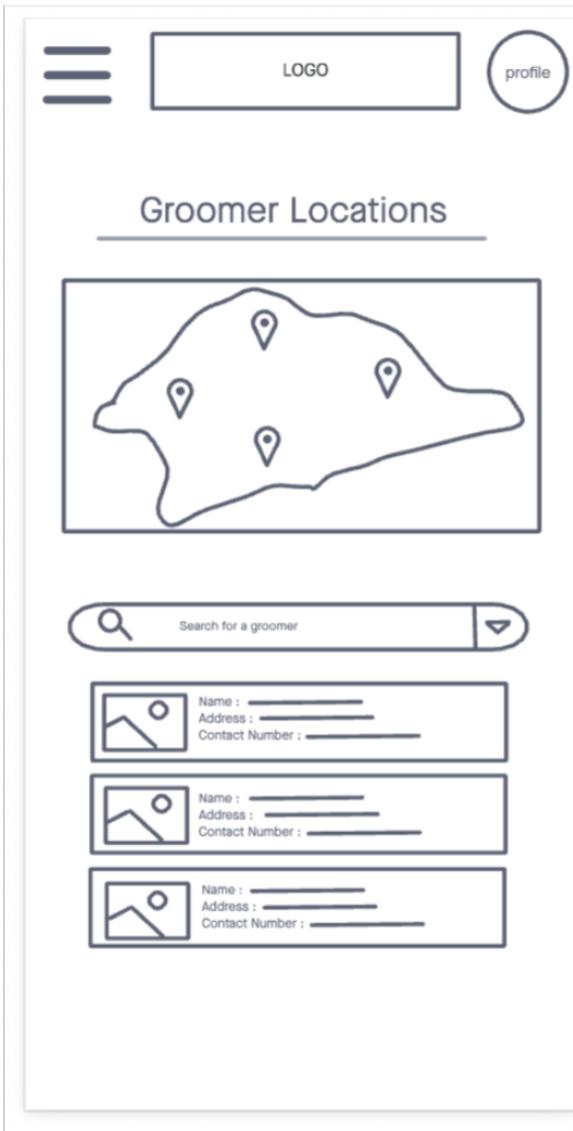
Figure 25: Wireframe of grooming page



This is the grooming tips page which consists of the following:

- A sidebar menu
- Logo
- Profile picture
 - Directs to profile page
- Header
- Search button
 - Filters articles based on search results
- List of articles about grooming
 - Directs to article page

Figure 26: Wireframe of grooming tips page



This is the groomer location page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Map with pins indicating clinic location
- Search bar
 - Search groomer's name to retrieve details
- Default list of hotel informations

Figure 27: Wireframe of grooming locations page

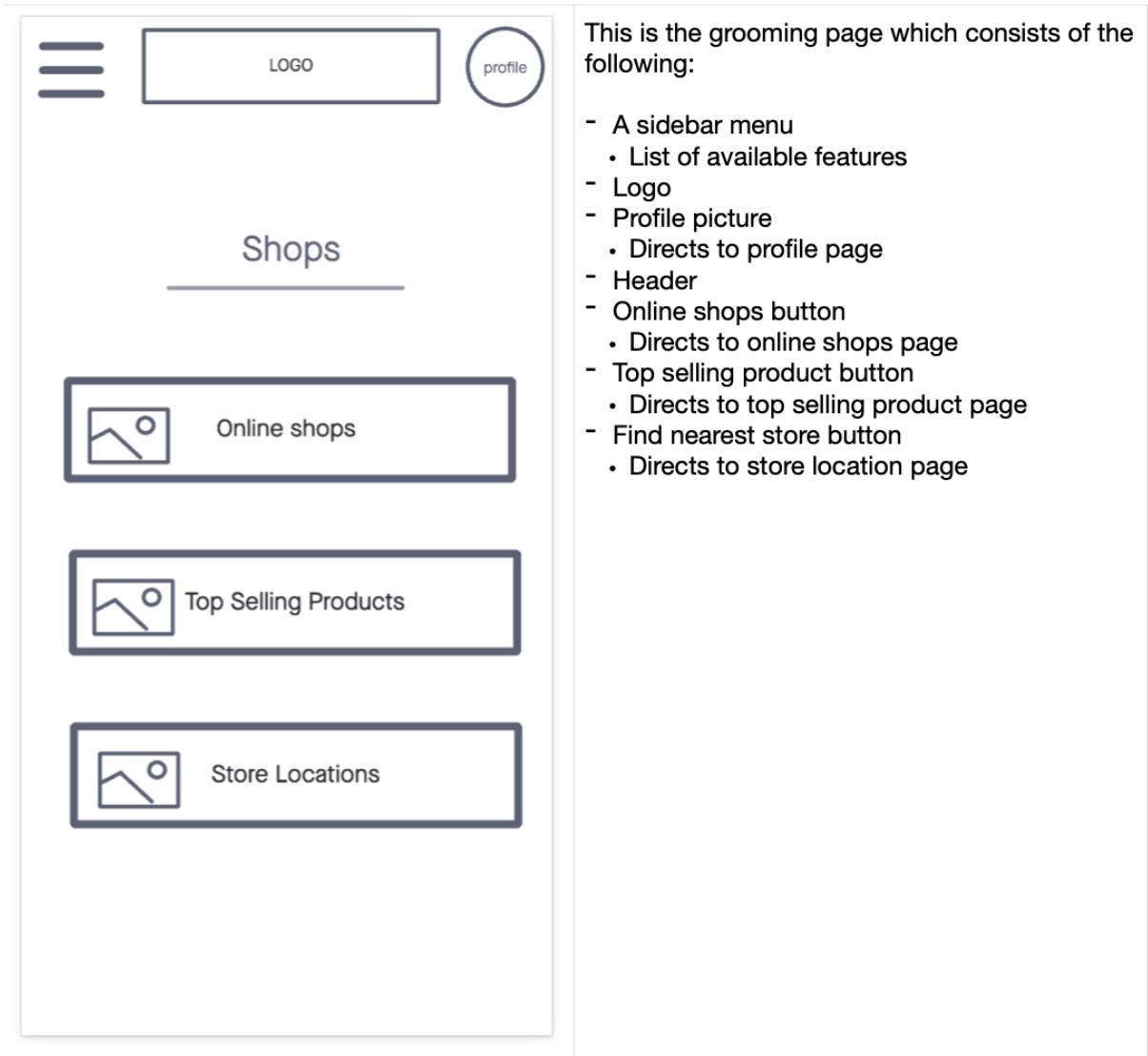
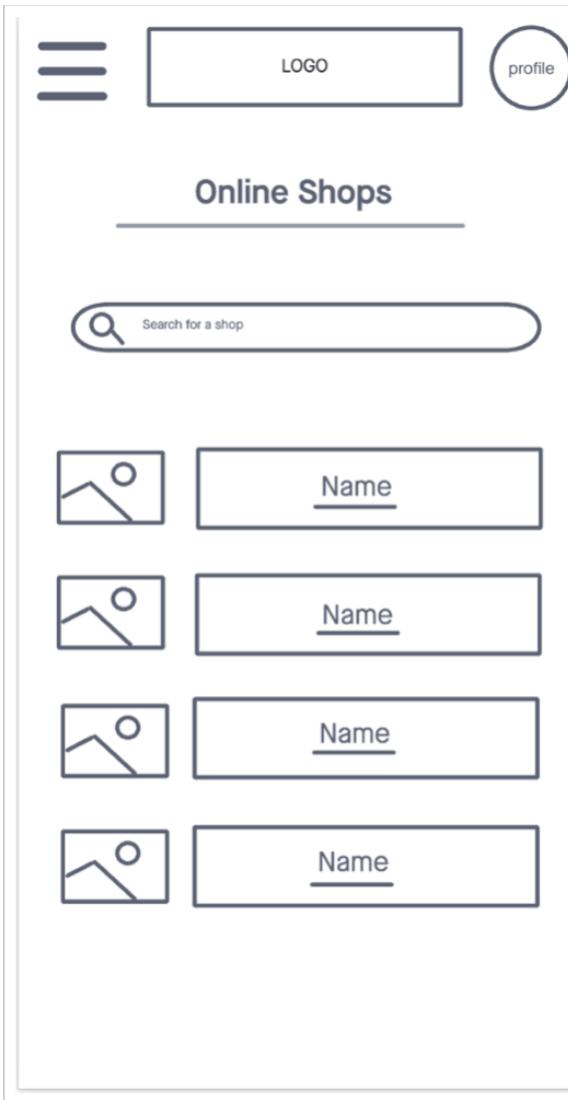


Figure 28: Wireframe of shops page



This is the online shop page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Search bar
 - Search shop's name to retrieve details
- List of online shops available

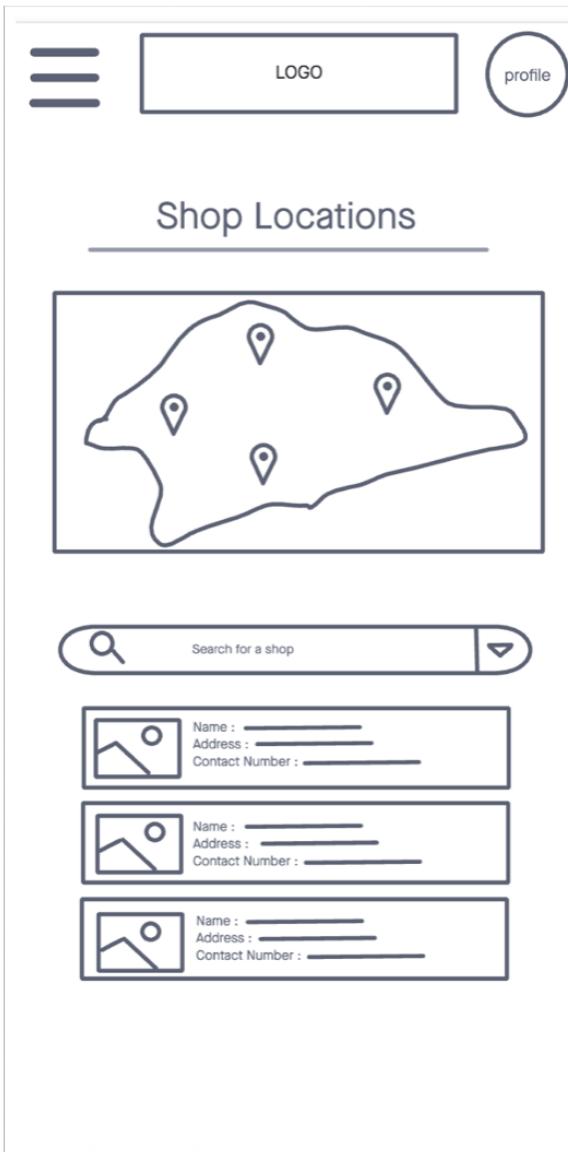
Figure 29: Wireframe of online shops page



This is the best selling product page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Best selling product header
- Display of product details
- Visit store button
 - Directs to product's website

Figure 30: Wireframe of best-selling products page



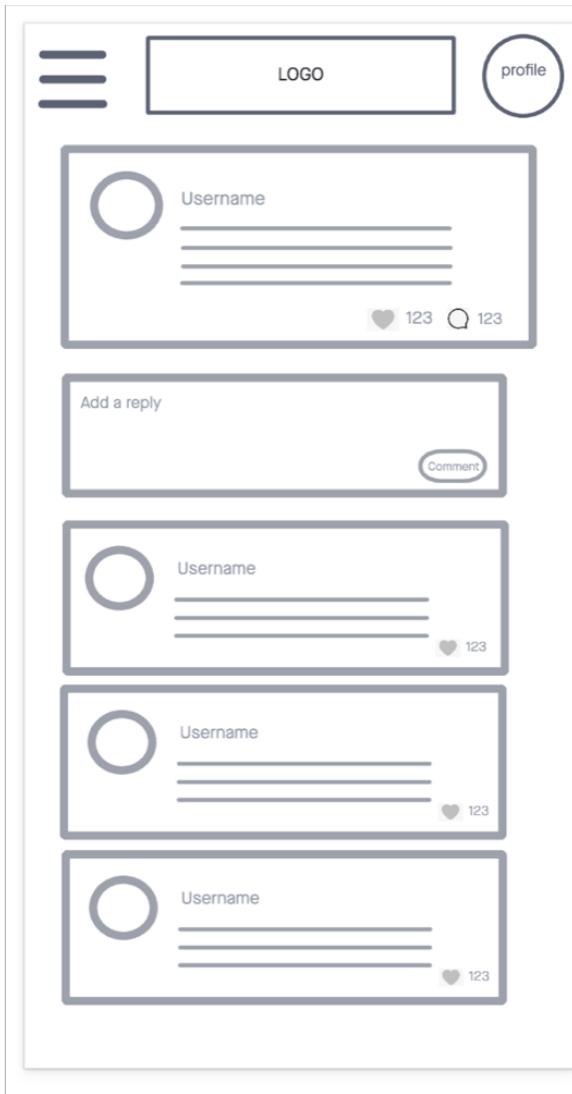
This is the pet store location page which consists of the following:

- A sidebar menu
 - List of available features
- Logo
- Profile picture
 - Directs to profile page
- Header
- Search bar
 - Search store name to retrieve details
- Map with pins indicating clinic location
- Default list of shop informations

Figure 31: Wireframe of shops location page



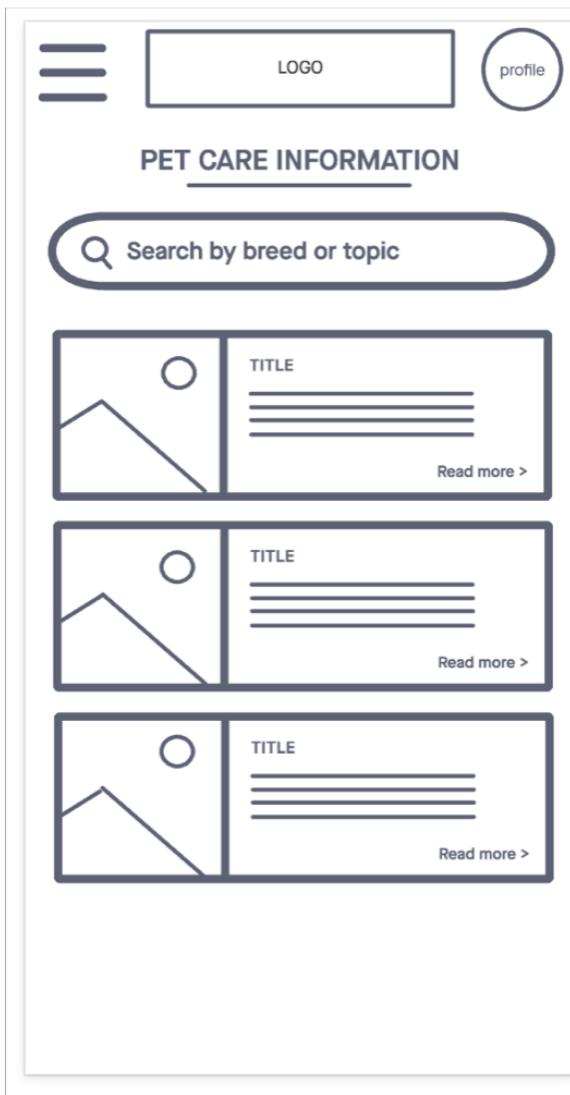
Figure 32: Wireframe of discussion forums page



This is the forum page which consists of the following:

- A sidebar menu
- Logo
- Profile picture
 - Directs to profile page
- Question posed by a user
 - Heart icon and comment icons
- List of replies for the questioned posed
 - Heart icon for each of the replies

Figure 33: Wireframe of forum page



This is the pet care information page which consists of the following:

- A sidebar menu
- Logo
- Profile picture
 - Directs to profile page
- Header
- Search button
 - Filters articles based on search results
- List of articles
 - Directs to article page

Figure 34: Wireframe of pet care information page

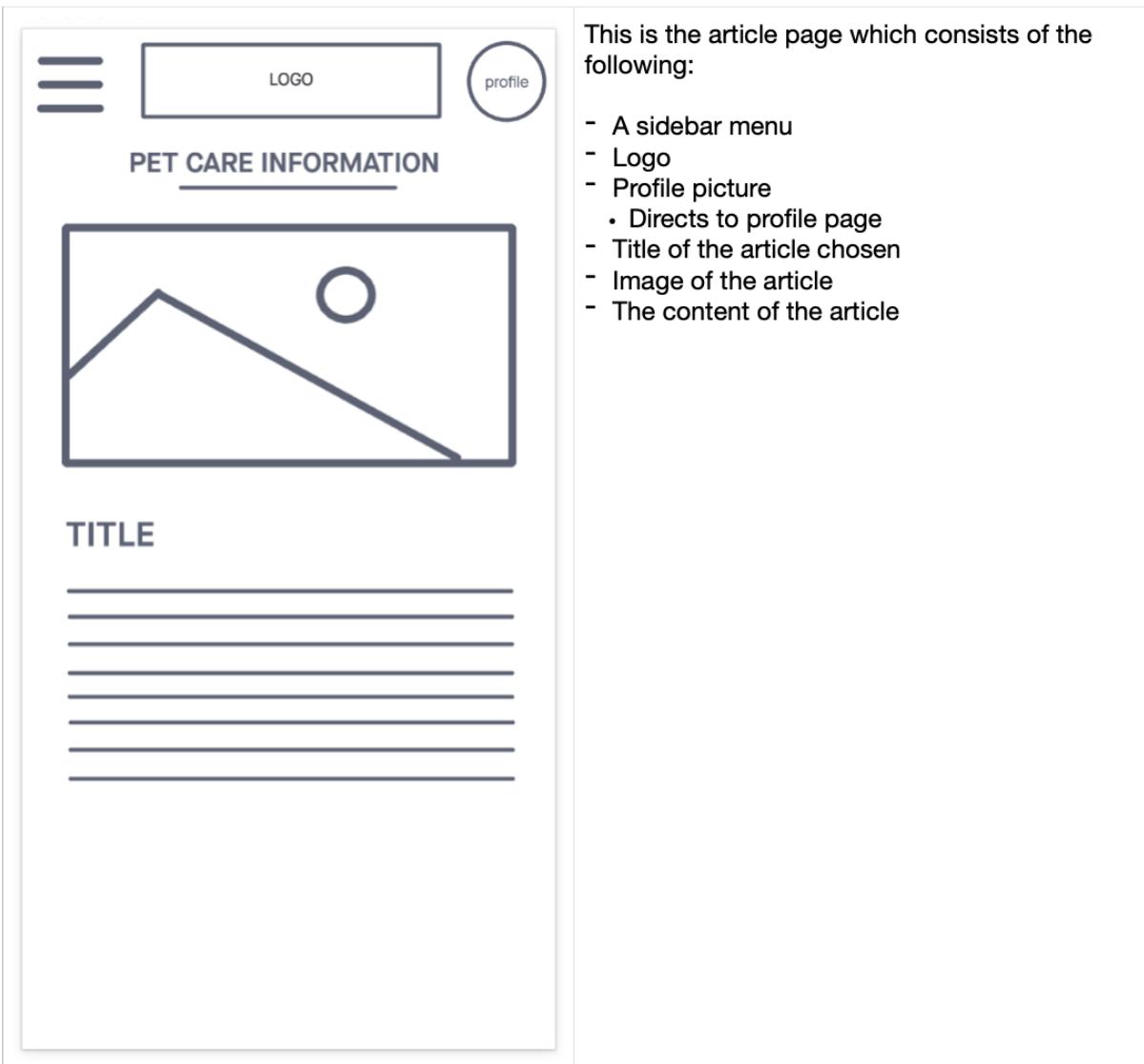


Figure 35: Wireframe of article page

Prototype and Validation of Design

Before proceeding to design our first prototype using Wizard, we made a few alterations to our wireframe above. This is to ensure that our design is ideal to optimise user experience. The screenshots and brief explanation of the UI are as follows:

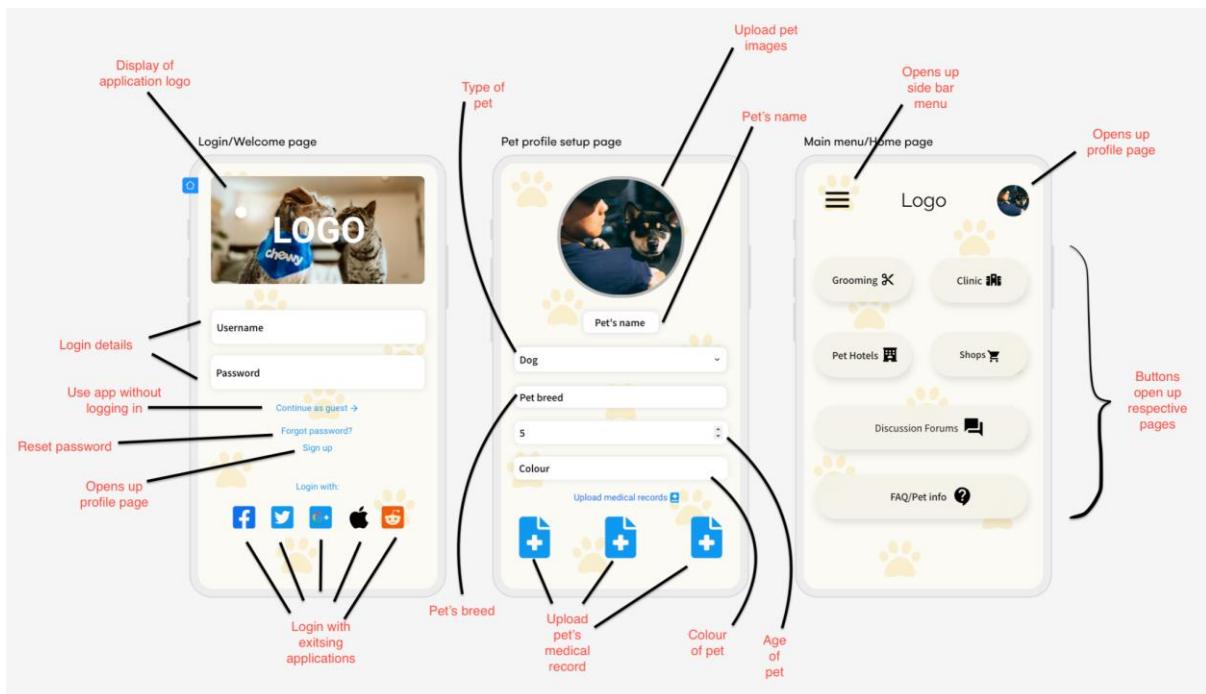


Figure 36: High-fidelity wireframe of welcome,profile and home pages

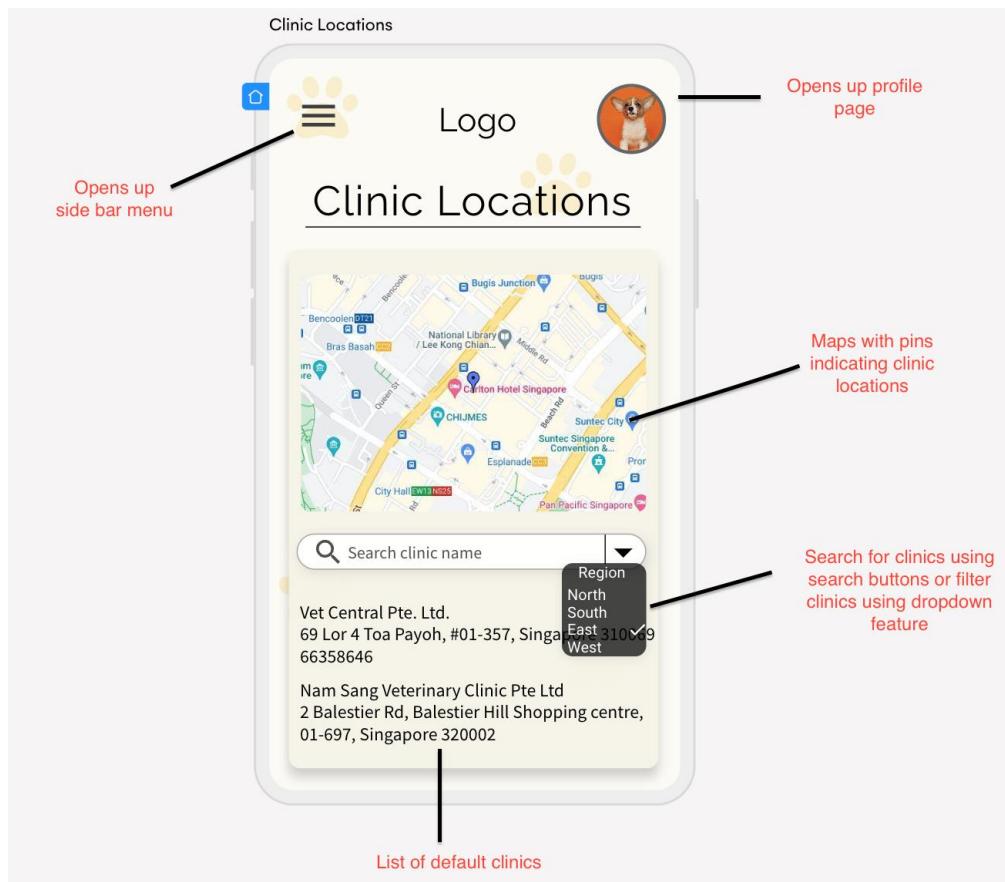


Figure 37: High-fidelity wireframe of clinic page

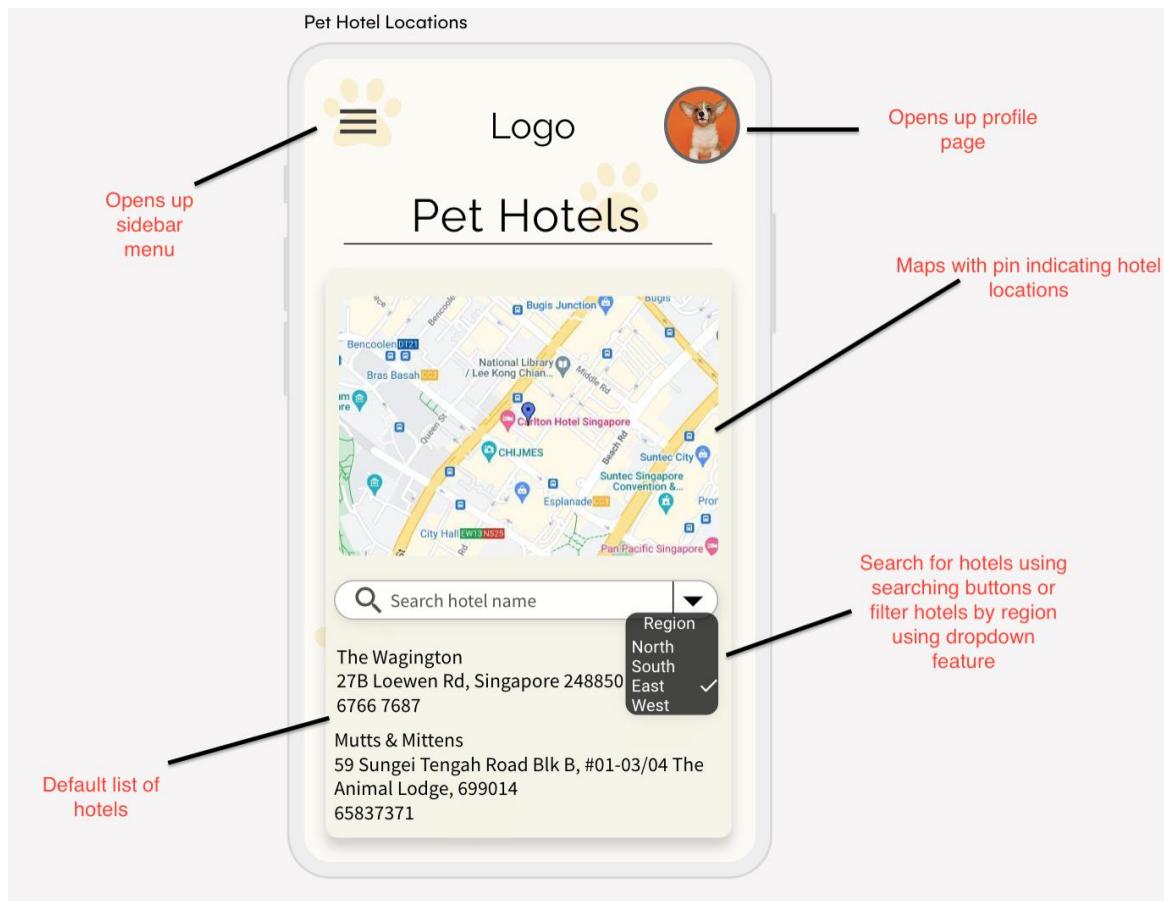


Figure 38: High-fidelity wireframe of hotel page

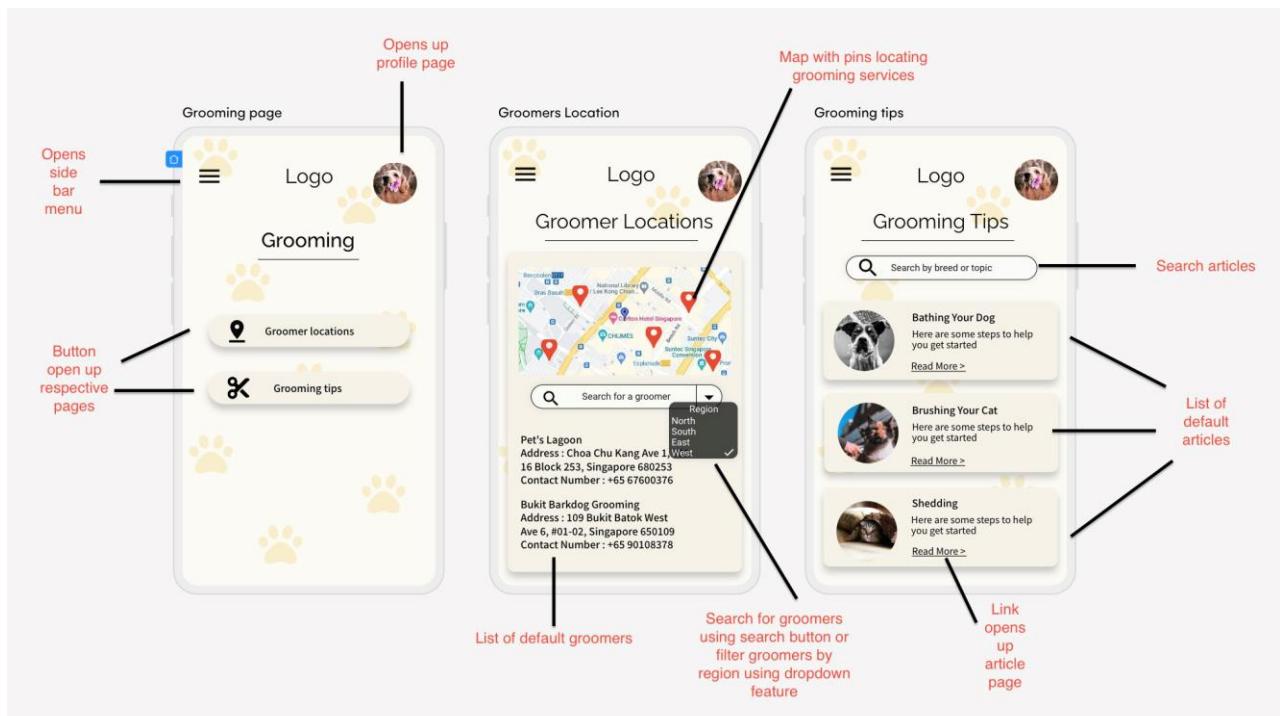


Figure 39: High-fidelity wireframe of grooming pages

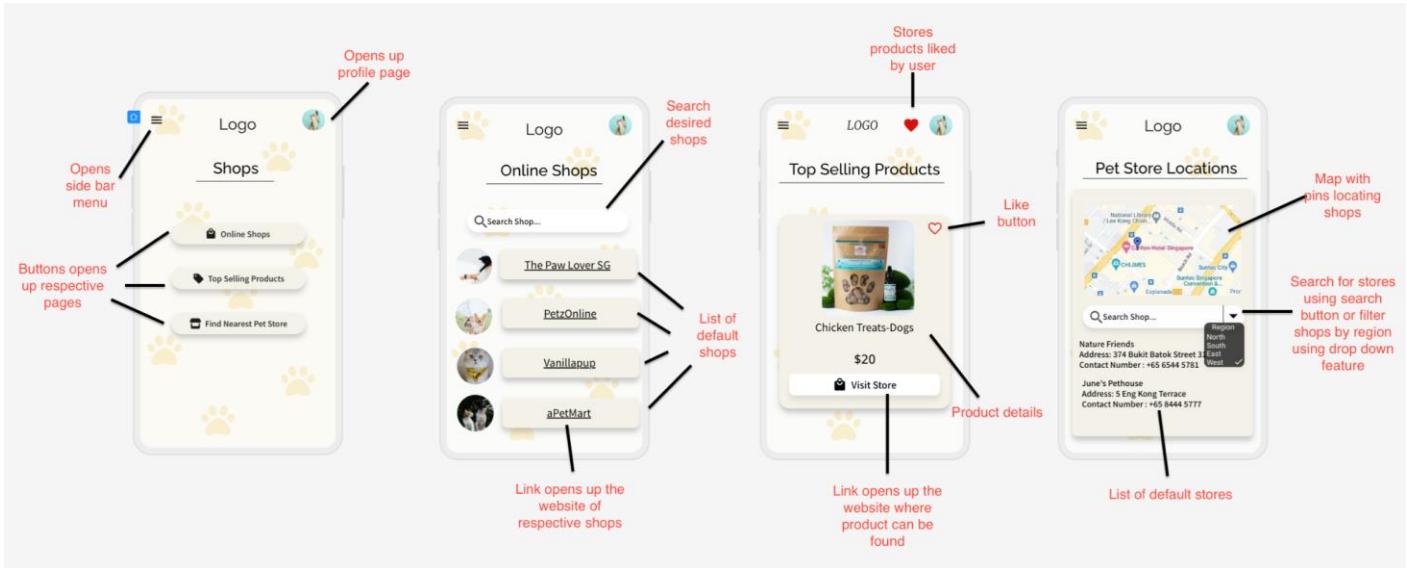


Figure 40: High-fidelity wireframe of online shop and store location pages

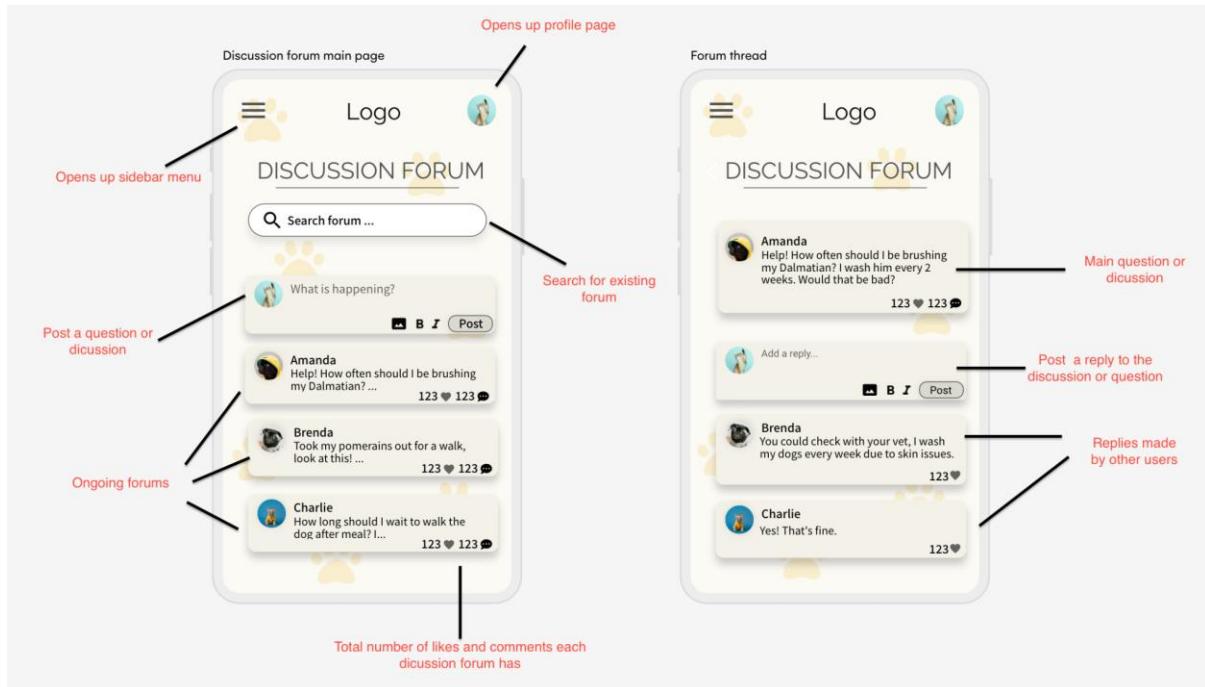


Figure 41: High-fidelity wireframe of discussion forum pages

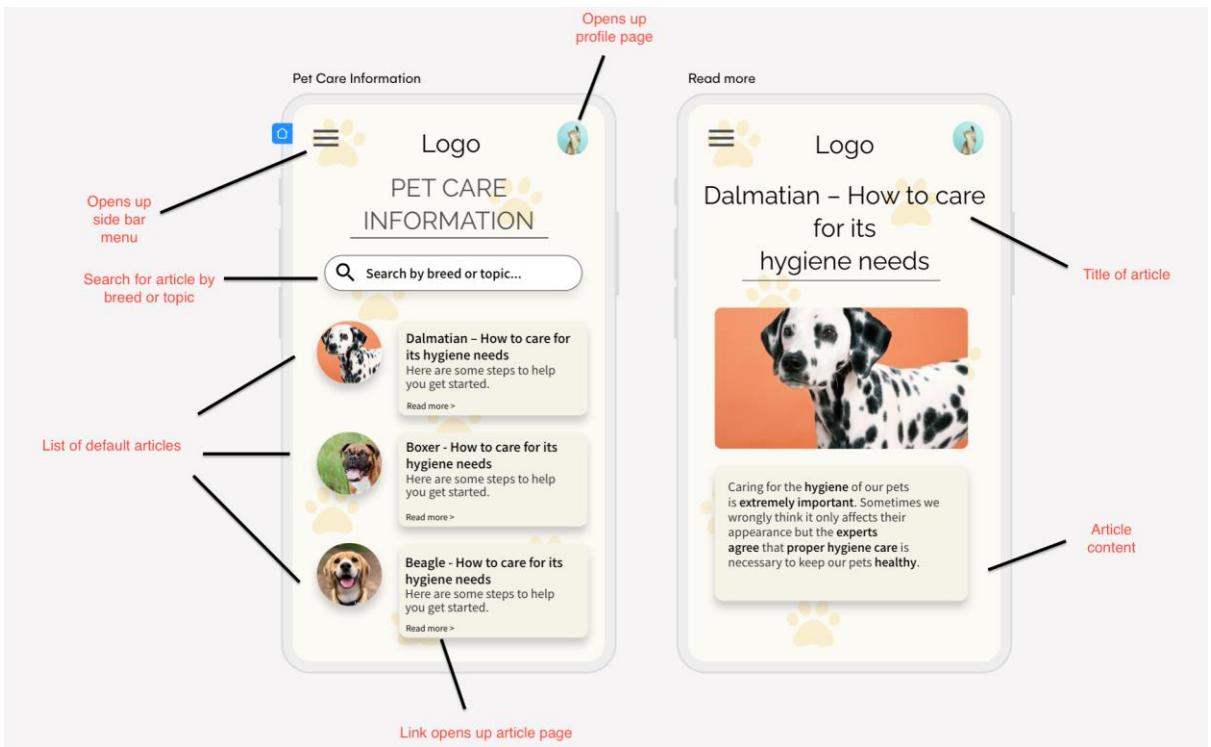


Figure 42: High-fidelity wireframe of pet care information pages

Strength and Weakness of our proposition

The list below are the strengths and weaknesses of our application. They have been carefully evaluated after analysing our first prototype. Our team will make the necessary improvements needed to satisfy users' needs. This will be done by sharing our prototype to users and collecting their feedback.

Strengths:

1. User-Friendly Design and Familiarity

We are following a layout and navigation pattern that is commonly used in many applications. We aim to provide users with a familiar interface. This makes it easy for them to understand and navigate through the different features our application provides. The goal of any user interface design is to make it intuitive and user friendly, and our approach achieves that by leveraging existing design conventions.

2. Personalisation

Our team believes that the inclusion of a profile page where users can add and manage information about their pets adds a personal touch to the application. The profile page allows users to add and manage information about their pets, including uploading pet photos and saving medical records. This personalisation feature enhances user engagement and helps in tailoring the application to individual pet owners' needs. This personalisation enhances user engagement and helps establish a deeper connection between the user and the application.

3. Comprehensive information

The pet care information page serves as a central hub by offering articles and resources on various pet care topics, allowing users to access helpful information in one place. By providing a comprehensive collection of information, we offer users a valuable resource that can help them make informed decisions and improve the well-being of their pets. This approach demonstrates our commitment to providing a holistic and educational experience for pet owners.

4. Community Engagement

The inclusion of a discussion forum fosters a sense of community among pet owners. This feature allows users to connect, share experiences, and seek advice from one another. By creating a space for interaction and knowledge-sharing, we aim to encourage engagement and create a supportive environment for pet owners.

Weaknesses:

1. User Validation

It is important to validate our design decisions by conducting user research and gathering feedback throughout the development process. This ensures that the application truly meets the needs and expectations of our target audience.

2. Integration and Data sources

It is important to ensure the availability and reliability of data sources for the various functionalities, such as booking appointments or accessing external resources like pet store websites as it is vital for a seamless user Experience.

3. Data Privacy and Security

Since our application involves storing user profiles and potentially sensitive pet-related information, it's important to prioritise data privacy and security.

All in all, the design chosen is an ideal combination of key factors such as familiarity, personalisation, convenience and community engagement. We also used the results of the survey conducted during the earlier part of our research when crafting our prototype, to make a user-friendly experience that caters to various requirements by understanding the needs and preferences of pet owners.

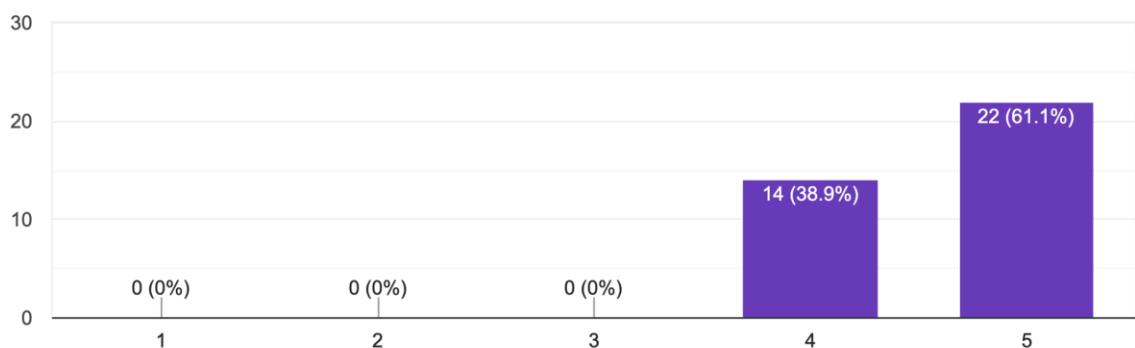
Assumption testing

In the early stages of our project, we conducted a survey to help us understand what users would seek in a pet care application. We then used the results obtained to build our prototype.

For this section of our proposal, we conducted a second survey. We gain user insights by showing them the current state of the prototype. This will highlight the key areas we need to focus on and let us know if we are working on the right track to providing users with a pet care application that fits all their needs and satisfaction.

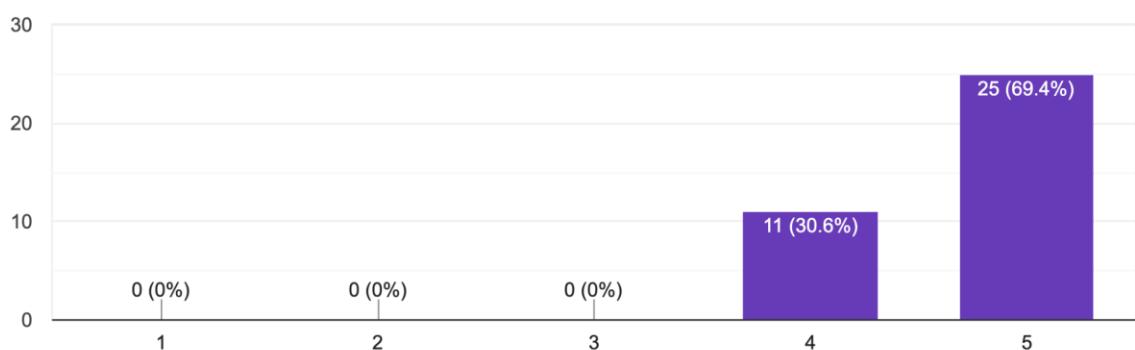
The user interface of the pet app is visually appealing

36 responses

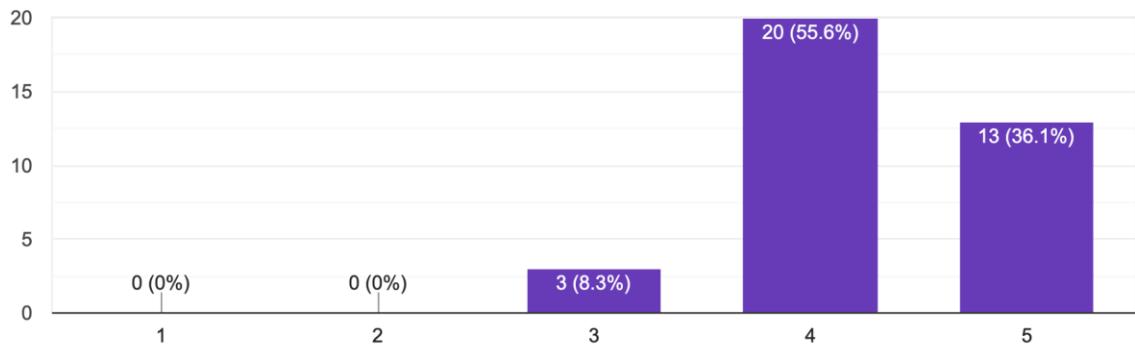


The icons and labels used in the pet app clear and intuitive

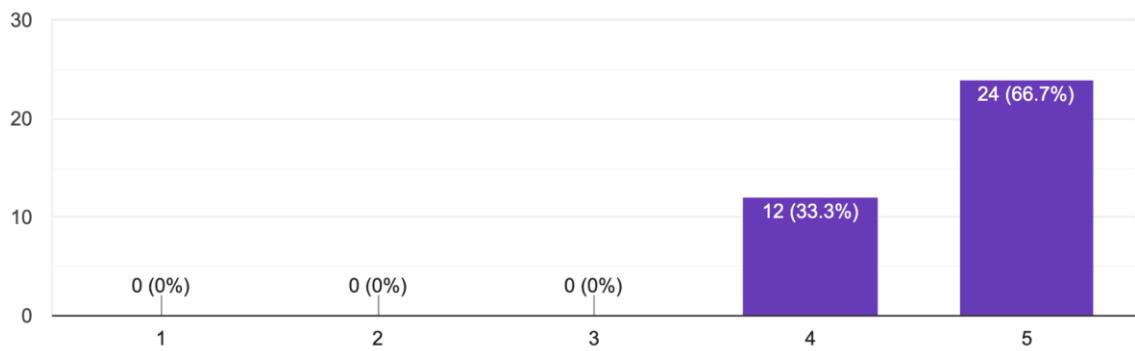
36 responses



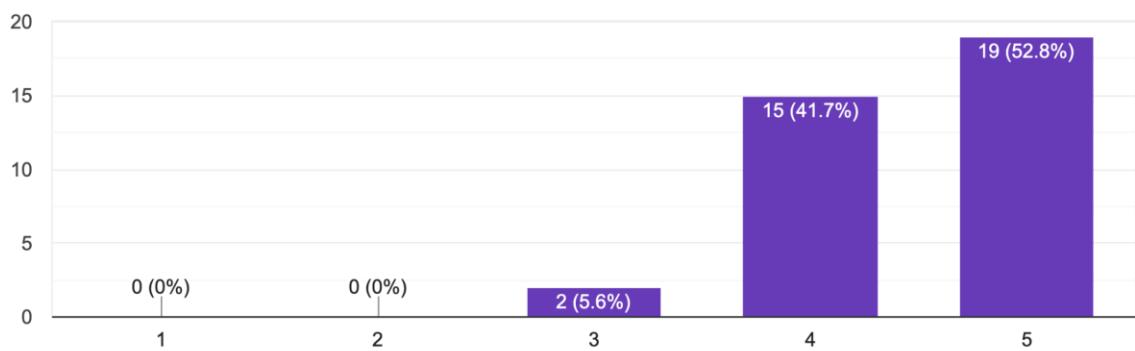
The colour scheme of the pet app is pleasing and suitable for a pet-related application
36 responses



The user interface of the pet app easy to navigate
36 responses

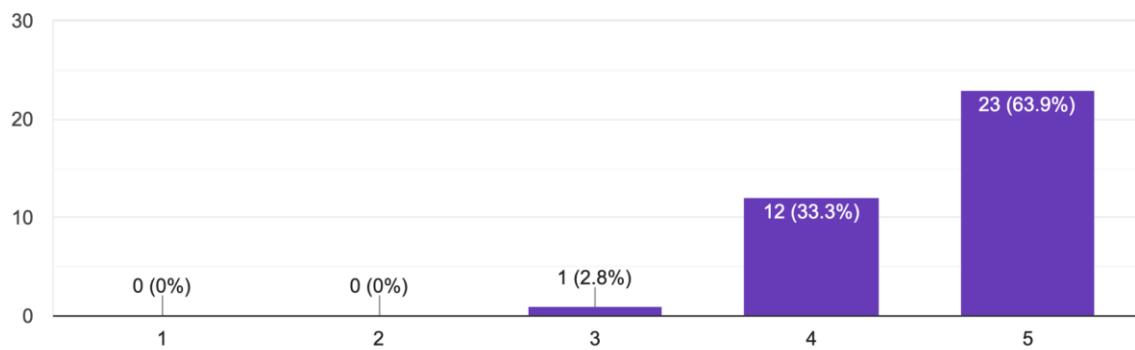


I am satisfied with the organisation and layout of the pet app's user interface
36 responses



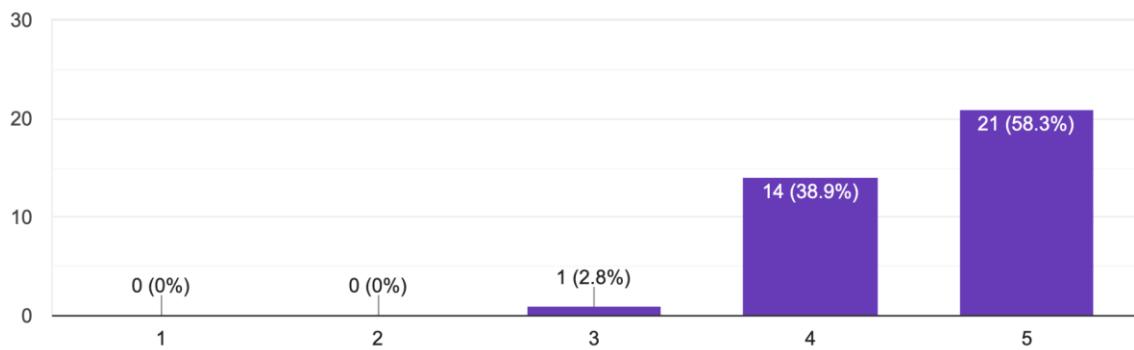
I will be interested in using this pet app

36 responses



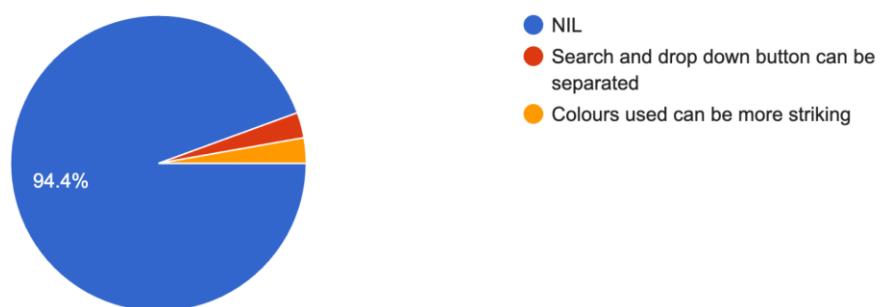
I would recommend the pet app to others based on its user interface

36 responses



Do you have any additional comments or suggestions regarding the user interface of the pet app?

36 responses

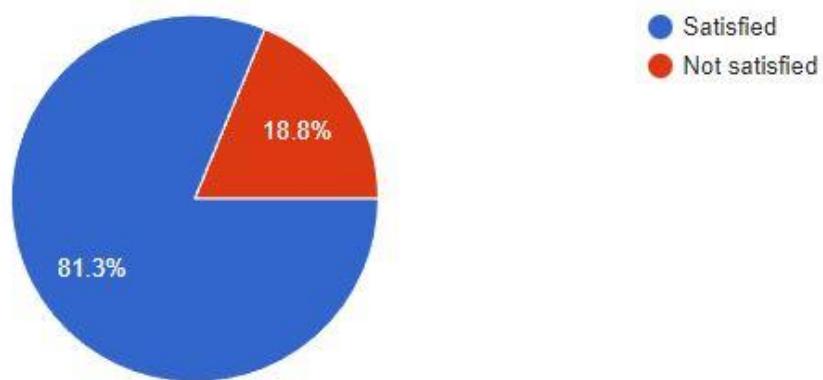


From the survey results obtained, our team has decided to focus more on the colour scheme of our prototype. We will also aim to use the Google maps API to allow users to specifically only show locations/shops that are related to our app. This will eliminate the need for a drop down feature and make the location pages easier to use and navigate.

We also asked for users to give any feedback on our pages and there were two pages that received user feedback. These two pages are our home page and the discussion forum page. The feedback can be seen in the two images shown below.

Login, profile and home page

16 responses



if not satisfied, please give your reason why

3 responses

home page ui not intuitive

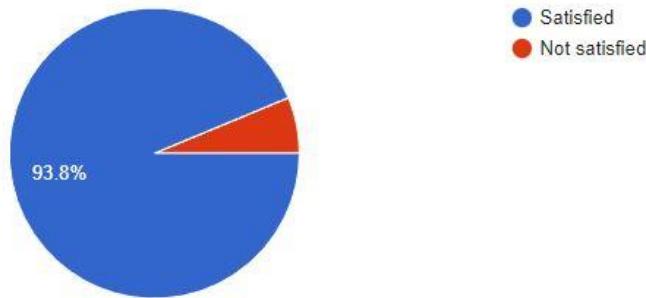
home page is messy

home page not good

Discussion forum

16 responses

 Copy



if not satisfied, please give your reason why

1 response

Would be good if there is an additional page to chat privately with other users with the same type of pets

After reviewing the users feedback, we have looked at alternative options for the home page, one of the options we have leaned forward to is the bottom tab navigation bar. Many popular apps like twitter, instagram and telegram are using the bottom tab navigation bar currently and we may follow their approach as well. As for the user feedback on the discussion forum, we will try to implement the feature the user has suggested but will only do so as an additional feature and not something we guarantee as a feature of our forum.

SWOT Analysis

Strengths

1. User- Friendly Design and Familiarity:

We are following a layout and navigation pattern that is commonly used in many applications. We aim to provide users with a familiar interface. This makes it easy for them to understand and navigate through the different features our application provides. The goal of any user interface design is to make it intuitive and user friendly, and our approach achieves that by leveraging existing design conventions.

2. Community Engagement:

The inclusion of a discussion forum fosters a sense of community among pet owners. This feature allows users to connect, share experiences, and seek advice from one another. By creating a space for interaction and knowledge-sharing, we aim to encourage engagement and create a supportive environment for pet owners.

Weaknesses

1. Server Infrastructure:

Mobile applications rely on server infrastructure to store and process data. These servers consume energy and contribute to greenhouse gas emissions. The environmental impact can be significant, particularly if the application experiences high levels of usage and data storage requirements.

2. Dependency on External Partners:

The availability and quality of services offered through the application, such as pet hotels, clinics, and groomers, are subjected to change. This may result in inconsistency as the services offered rely on the cooperation and reliability of external partners. Any issues with partner availability, quality of service, or changes in their operations could impact the user experience and the overall reputation of our application.

Opportunities

Looking forward, our application provides multiple opportunities and platforms for pet owners. Here are a few listed below:

1. Virtual Veterinary Consultations:

A mobile pet application can facilitate virtual veterinary consultations, enabling pet owners to seek advice from veterinarians remotely. This can be particularly useful for non-emergency situations, routine check-ups, or initial assessments.

2. Lost and Found Services:

A mobile pet application can include a lost and found feature, allowing users to report lost or found pets. It can utilise location services to help reunite lost pets with their owners, increasing the chances of a successful reunion.

Threats

Being an online mobile application, it is exposed to the world wide web. Thus, it poses a few threats as mentioned below.

1. Data Privacy and Security:

Mobile applications that collect and store user data, including personal information and pet-related details, may be vulnerable to data breaches or unauthorised access. It is crucial for app developers to implement robust security measures and adhere to data privacy regulations to protect user information.

2. Regulatory and Legal Compliance:

Mobile pet applications must adhere to relevant laws and regulations governing pet care, data privacy, and veterinary practices. Failure to comply with these regulations can result in legal issues, penalties, or damage to the app's reputation.

STEEPLE Analysis

Social

The social factors needed to be taken into consideration are as follows:

Positive

1. Community Building:

Mobile pet applications facilitate connections among pet owners, fostering a sense of community. Users can share experiences, seek advice, and form relationships with like-minded individuals who share a passion for pet care.

2. Awareness and Education:

These applications raise awareness about responsible pet ownership, animal welfare, and proper pet care practices. They provide educational resources, tips, and information, empowering users to make informed decisions for their pets' well-being.

Negative

1. Dependency on Technology:

Excessive reliance on mobile pet applications may lead to reduced face-to-face interactions and dependence on technology for pet care. It is important to balance virtual interactions with real-life engagement for holistic pet ownership.

Technology

The technological factors needed to be taken into consideration are as follows:

1. Connectivity and IoT:

Technology is always advancing hence we will have to work with new emerging technologies, such as artificial intelligence, machine learning for personalised pet

recommendations and Internet of Things, to enhance the functionality and user experience of the pet care app. On the other hand, as technology advances, there will be a certain group of people who will not have the capacity to keep up with technological changes such as the elderly group who are unequipped with certain skills required. Hence, we will need to consider this and ensure our app is user friendly enough for even those not very proficient in technological skills.

2. Data security and privacy:

With advancing technology, online security issues are also on the rise thus with the increasing concern for data security, it is essential to prioritise the privacy of user accounts and ensure there is secure handling of personal data within the app. We will have to ensure we implement robust security measures that comply with relevant data protection regulations and will provide users with a certain level of security that can reassure users and build trust.

Economic

The economic factors needed to be taken into consideration are as follows:

1. Market competition and pricing:

We will need to analyse the competitive landscape of existing pet care apps, their pricing models, and the value they offer. This will help us understand the pet care app market to determine how to charge suitable subscription fees, in-app purchases, or partnerships with pet care providers. If we were to choose not to include subscription fees then we need to find an alternative way such as including advertisements or creating partnerships to generate revenue to sustain the app. This research of the market can also help us differentiate our app in terms of features, user experience, or pricing to attract and retain users in a competitive market.

2. Economic impact of the pet care industry:

We will need to assess the size and growth of the pet care industry, including pet food, veterinary services, grooming, and pet accessories. A shortage of any items used in production will have to cause a change in prices of products. Understanding the market within the industry will help determine the monetization strategies for the app.

Environment

The environmental factors needed to be taken into consideration are as follows:

Positive

1. Reduced Paper Usage:

Mobile pet applications can help reduce the need for physical paperwork, such as printed health records, receipts, or appointment reminders. By digitising these documents, applications can contribute to a reduction in paper consumption and, subsequently, the demand for paper production.

2. Resource Conservation:

By providing information on sustainable pet care practices, mobile pet applications can raise awareness about environmental considerations related to pet ownership. This may include promoting eco-friendly pet products, responsible waste disposal, and sustainable pet food choices, ultimately contributing to resource conservation efforts.

Negative

1. Increased Energy Consumption:

The use of mobile applications requires energy to power smartphones and other devices, contributing to overall energy consumption. Additionally, continuous usage of these applications may drain device batteries more quickly, leading to increased charging and energy consumption.

Politics

The political factors needed to be taken into consideration are as follows:

1. Animal welfare policies:

The information being shared in our pet care application might contribute to raising awareness about animal welfare issues and impact public opinion on the treatment and care of domestic pets. It could prompt political discussions and advocacy for more stringent animal welfare policies, regulations , or enforcement measures.

2. Public-private partnerships:

The Singapore government or local authorities may see value in collaborating with our pet care application to enhance our services or promote responsible pet ownership. The partnerships could range from marketing campaigns to incorporating our application features to existing government initiatives. This in return will contribute to the growth and recognition of our application.

Legal

The legal factors needed to be taken into consideration are as follows:

1. Intellectual property:

Our application would consist of third-party information. For example, the pet care information section are articles and contents web-scrape from websites. Hence, we

must ensure that we are not infringing on any existing trademarks, copyrights, or patents when doing so. This can easily be ensured by conducting proper research and ensuring that our application's content branding and features do not violate any intellectual property rights.

2. Privacy and data protection:

Our application would allow users to upload pet-related details, which raises privacy concerns. The Personal Data Protection Act is a key legislation in Singapore which governs the collection, use, and disclosure of personal data. Hence, we must comply with the requirements of the PDPA such as obtaining consent for data collection, implementing appropriate security measures to protect data, allowing individuals to access and correct their personal information.

Ethics

The following ethical factors are possible that we may need to consider when creating our application. They are 'Accuracy and Reliability of Information' and 'User Engagement and Community Guidelines'.

1. Accuracy and Reliability of Information:

When providing information on pet care, we have to ensure the accuracy and reliability of the information (DSIM, 2019). Hence, the information provided needs to be from credible sources and experts in the field. We will do our best to avoid promoting false or misleading information that could harm pets or misguide pet owners.

2. User Engagement and Community Guidelines:

A key feature our application is aiming to provide is a discussion forum. We must establish clear community guidelines and monitor user-generated content in discussion forums. We have to provide a safe environment for our users. By encouraging respectful and positive interactions among users and discouraging any form of harassment, discrimination, or offensive behaviour. We will have to monitor the discussion forums from time to time (El Hatimi, 2023).

Critical Evaluation

Concept:

Before deciding on any features for our app, we conducted market research to understand the market for petcare apps and to analyse pre existing successful petcare applications. We chose to study 7 successful petcare apps, all from different countries to view their different functions. We performed this analysis by personally creating accounts in these apps to fully understand how a user of the app would feel and to know which features we would want in our app. This also ensures that our research of the app is accurate and is not solely based on public users opinions. We could then create a table of features from all the apps and compare it to the plan we had for our apps features, being able to see if we had missed out on any features that we would like to implement.

Proposed solution:

The change we aim to bring in our application which other existing applications lack is the ability to introduce broad features and functionality in a single application in Singapore. We have chosen to go with React Native as our framework of choice as it allows building cross-platform mobile applications using JavaScript and React and provides a native-like experience while allowing code reuse across different platforms. By focusing on these aspects of the technical implementation, we can ensure a robust, performant, and scalable mobile pet application using React for the front-end and MongoDB for the back-end.

Future implementation:

As we progress towards finalising our prototype in the coming weeks, we have set the following goals for implementation:

1. Map AI: We plan to enhance the map feature in our application by using the user's live location and providing nearby services.
2. Find Users Near Me: We aim to develop a location based service that allows users to find and connect with other app users who are within their vicinity.
3. Favourites and Easy Access: We aim to permit users the ability to favourite clinics, shops, products, articles, and more.
4. Appointment Booking: We will target integrating functionality that allows users to book appointments for their desired services directly through the application.
5. Adoption Centers: We aim to include information about adoption centres such as locations, available pets for adoption and guidance on how users can put their pets up for adoption if desired.

Conclusion

In this report, we have declared our aims and objectives and conducted extensive research on 7 pet care applications that helped us determine the features to implement. We also did requirement elicitation by conducting stakeholder analysis through a survey to help us understand the features the public wants for a petcare app. We then used this to formulate our requirements and specifications, elaborating the features we are implementing and showing the flow of the app. In scope we have covered what we are able to implement in this project and the features that we hope to implement in the future. We have also included our planning and motivations for the entire project. In prototyping and assumption testing, we have shown our various levels of fidelity wireframes and have conducted a survey to collect users feedback, allowing us to choose clearly the designs that we should go forward with. Lastly, we have conducted SWOT,STEEPLE analysis and critical evaluation to ensure an all rounded project.

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Appendices

Agile Workflow

All tasks Board Filter

A Task name	Assigned to	Start	Group Meetings	Platform
Come out with 5 project ideas	All	May 10, 2023 → May 12, 2023	May 11, 2023	School
Narrow down project ideas and finalise project idea		May 12, 2023 → May 14, 2023	May 14, 2023	Online
Writing research questions/Modalities and methodologies	All	May 17, 2023 → May 18, 2023	May 18, 2023	School
Gather and implement tools for group work	All	May 20, 2023 → May 21, 2023	May 21, 2023	Online
Create low-fidelity wireframes	All	May 24, 2023 → May 24, 2023	May 24, 2023	Online
Create a medium-fidelity wireframe on Invision		May 25, 2023 → May 28, 2023	May 25, 2023	School
Create high-fidelity wireframes on Uizard		June 7, 2023 → June 11, 2023	June 11, 2023	Online
Start Midterm-report	All	June 17, 2023 → July 17, 2023	July 17, 2023	Online
Revisit inision wireframes to standardise everything	All Pavit	June 15, 2023 → June 18, 2023	June 15, 2023	School
Share Uizard project with Andrea to have background image add	All Andrea	June 15, 2023 → June 18, 2023	June 18, 2023	Online
Standardise/format draft report for submission	All	June 19, 2023 → June 19, 2023	June 19, 2023	Online
Work on midterm-report feedback	All	June 22, 2023 → July 17, 2023	June 22, 2023	School
Start Coding our mobile website	All	June 29, 2023	June 29, 2023	Online
Finalise Wireframes	All	July 1, 2023 → July 6, 2023	July 6, 2023	School
Finalise Midterm-Report	All	July 13, 2023 → July 13, 2023	July 13, 2023	School
Submit Midterm-Report	All	July 16, 2023 → July 16, 2023	July 16, 2023	Online

+ New COUNT 16

We used Notion to keep track of our progress as the project went on. As seen from the picture above, the tasks are listed on the left along with which team member is assigned for the task. The duration of the task is listed under the start column. In addition, the group meetings column lists all the meetings we planned to complete the respective tasks and the platform where we carried our tasks.

The board view as shown below, provides a better view of the tasks that were carried out until midterm-report submission.

The board view provides a clear visual summary of the project's progress. The 'In Progress' column highlights the current focus areas, while the 'Done' column shows the completed work. This makes it easier to visualize our main goals and objectives.

This makes it easier to visualise our main goals and objectives.