UNIVERSITY OF PLYMOUTH

NSBM Green University

Faculty of Computing

PUSL2021

Computing Group Project

Interim Report Submission

Module Lecturer: Mr. Chamindra Aththanayake
Mr. Isuru Sri Bandara

	Group Number	**AB**
	Student ID (Plymouth)	Name (as appeared on DLE)
1	**10898774**	**Egoda Hettiarachchi**
2	**10898739**	**Iddamalgoda Bandara**
3	**10898908**	**Galagedara Senevirathne**
4	**10898913**	**Sammu Silva**
5	**10898507**	**Jayaweera Jayaweera**

Table of contents

Section 01: Introduction

Section 1.1: Overview of the project

Our Pet Care App will help you to keep an eye on your pet's health and diet, which has never been easy work. Through the power of artificial intelligence, we offer features that help users to set daily goals, track food consumption, and essential information about their pet's well-being.
One of the key aspects of our app is personalized nutrition management. We determine the ideal meal servings for your pet by taking into account their age, weight, and height. This guarantees that they eat the appropriate quantity of food based on their requirements. Using this app, pet weight growth and loss can be simply tracked. And we also offer a food tracking function that offers insightful information about user's pets' general health and fitness.

With our app, it's effortless to set up the suggested daily food intake limit and arrange individual meal portions. Users can conveniently track their pet's eating schedule and receive timely reminders on their phone or windows, ensuring pets are fed at the right time. Our system will ensure that pets never miss a meal. The only thing pet owners need to do is simply set the feeding time and the notification window that suit their routine.
Our app has capabilities for managing nutrition in addition to healthcare. The user can quickly schedule an appointment with a veterinarian using the app if their pet requires medical treatment. This integrated facility ensures that the user's pet's health remains a top priority, providing the user with peace of mind.

To access the benefits of our mobile application, users need to register an account. During registration, for the purpose of creating a personalized profile, we gather necessary information, such as a username, password, email address, or phone number. After registering, users can quickly access their accounts by entering the credentials of their preference.
Users are greeted with an elegant dashboard after signing in. From there, clients can enter certain health-related details, which will allow our AI system to supply the data required for their pet's welfare. By creating a dedicated profile for your pet, you gain a centralized platform where all the crucial information is readily available, allowing you to spend quality time with your pet without any worries.

Section 1.2: Purpose of the project

Pet owners who put their pets' pleasure and health first will find our Pet Care App to be a useful tool. Our software makes pet care easier with its user-friendly features, integrated healthcare facilities, and personalized diet management. Users can discover the ease and comfort that come with using our app to make sure their pet gets the finest care and attention.

Section 1.3: Objectives & justifications.

1. To provide a single platform that links veterinarians, pet-related service providers, and owners of pets. The purpose of this platform is to facilitate convenience and cooperation by bringing together all parties involved in pet care.
2. To provide pet owners with an application where they can enter information about their pets' lives and get prompt assistance for taking care of them. The intention is to lend a helping hand that can promptly tend to the requirements of animals and give them the attention they need.
3. To offer a fast and efficient way to find the correct solutions with minimal time investment. The project's goal is to give consumers the shortest route to precise solutions while guaranteeing the wellbeing of their pets by optimizing the procedure.
4. To make it possible to maintain track of medical records, provide quick access to all pet medical history and reminders for impending treatments. This guarantees that owners are always aware of the medical requirements for their dogs and have access to their medical records at any time.
5. To create an AI bot that will transform veterinary medicine for cats and dogs. These sophisticated bots can independently analyze symptoms, respond to inquiries about pet health, and provide medical information. The bot can help set up direct communication between users and vets in case professional assistance is needed.
6. To make veterinary telehealth services easier to use, giving consumers updates about doctors' availability and advice on which conditions to seek medical attention for. Via the app or phone conversations, consumers may establish direct connections with veterinarians.
7. To keep users informed about the amount of food and water their pets consume, as well as the suggested meals and diets, and when their pets should be fed.
8. To create an AI bot that tracks eating and drinking habits and vital indicators and quickly alerts users to any unexpected or worrying trends that need attention.
9. To prioritize pet data confidentiality by introducing user login and making sure that the user is the only one who has secure access to all information. This safeguards the security and privacy of pet information.

10. To give pet owners a helpful, affordable, and effective tool for taking care of their animals. The project's goal is to provide pet owners with an easy-to-use platform that streamlines pet care procedures, enabling them to take better care of their cherished animals.

Section 1.4: Project scope

The project aims to develop a mobile app for pet care, focusing on daily goals, food intake, and health information. The app uses artificial intelligence to provide users with necessary information and assistance. Key features include setting daily goals, personalized food management, weight monitoring, meal reminders, and healthcare integration. Users can register by providing their information, create a profile, and monitor their pet's health and nutrition through an intuitive dashboard. This app aims to be a valuable tool for pet owners, allowing them to spend quality time with their pets without worrying about their well-being. The app provides a convenient and centralized platform for pet owners to manage their pets' well-being.

Section 02: Background

Section 2.1: Literature study

An app for pet owners that lets them order prescription refills, access their pet's medical records, schedule veterinary appointments, and get medication reminders. Additionally, it offers tools for managing weight and scheduling vaccinations as well as tracking and monitoring the health of pets.

The initial app is Bark Happy where it helps the pet owners to interact with other pet owners nearby. Users can set up playdates, locate dog-friendly locations, and exchange experiences and pictures. Additionally, the app offers details on pet-related services like veterinarians and pet-friendly establishments.

The second application is Whistle which provides features for tracking activities and pet health. It comes with a GPS-enabled pet tracker that lets owners keep an eye on their pet's whereabouts in real time. Along with tracking activity levels and offering insights into fitness objectives, the app lets users create personalized reminders for appointments, medication, and feeding times.

The third app is Rover, its main function is to link pet owners with nearby dog walkers and pet sitters via an app. Visitors can schedule services, read reviews, and look through profiles. The app also has scheduling, messaging, and payment processing features.

The fourth app is Pet Coach which gives users access to a network of veterinarians and pet experts. Users can post pictures, ask questions, and get tailored advice for the health and welfare of their pets. The app addresses many different subjects, such as behavior, general pet care, and nutrition.

Our application is unique where it employs artificial intelligence to assist pet owners in keeping an eye on their pet's nutrition and overall health. It gives users the ability to monitor food intake, set daily objectives, and get vital information about their pet's health. In addition, the app provides personalized nutrition management by figuring out how much food is appropriate for each age, weight, and height. Users can monitor their pet's weight gain or loss and get timely feeding reminders. In addition, the app allows users to manage their healthcare by scheduling veterinary appointments. Users must register and set up a personalized profile in order to use the app. By giving users access to essential information in one place, the app lets users spend more time with their pets.

Section 2.2: theoretical framework

The following is a theoretical framework for the pet care app that makes use of artificial intelligence to improve diet planning and pet health monitoring:

Technology Acceptance Model (TAM): The Pet Care App's acceptance and adoption by users can be ascertained through the application of the TAM. It looks at things like perceived utility and usability that affect users' intentions to use the app to keep an eye on their pet's nutrition and overall health.

Personalization and Tailoring: The way the app uses artificial intelligence to offer individualized pet nutrition recommendations can be explained by incorporating theoretical ideas related to personalization and tailoring. Customized meal servings based on the pet's age, weight, and height can increase user satisfaction and engagement.

Behavior Change Theories: Theoretical frameworks like the Health Belief Model (HBM) and the Transtheoretical Model (TTM) can be used to comprehend how the app can help pet owners modify their behavior. These frameworks look at things like goal setting, self-monitoring, and feedback, which can spur users to track their pet's food intake and establish daily objectives.

Information Processing and Decision-Making: It is possible to apply theoretical ideas about information processing and decision-making to explain how the app offers crucial data regarding the health of pets. This can assist users in making well-informed decisions about nutrition, health, and scheduling of veterinary visits for their pets.

User Experience Design: To guarantee a smooth and simple app interface, the theoretical framework can include user-centered design and user experience (UX) principles. This includes considering interaction design, visual design, and navigation strategies that improve user engagement and satisfaction.

Ethics and Data Privacy: The ethical issues and data privacy concerns related to the gathering and utilization of user and pet data within the app should also be taken into account by the theoretical

framework. This entails guaranteeing data encryption, user consent, and safe personal information storage.

Through the integration of theoretical concepts into the framework, we can acquire a deeper understanding of the factors that impact user acceptance, behavior modification, and the overall user experience of the Pet Care App.

Section 03: User requirements

Section 3.1: Target users / stakeholders

This is very important for pet owners with a busy and hectic lifestyle and also this gives extra support for veterinarians. So, the following are the stakeholders of our project.

1. Pet owners (primary users)
2. Veterinarians and pet care professionals (secondary users)
3. App administrators and developers

Section 3.2: Fact gathering.

We have conducted some interviews with pet owners and a few vets to understand their needs, pain points, and expectations. As pet owners we interviewed our own team members with pets at home. And we interview some veterinarians that our team members usually visit. We have observed pet owners in their daily pet care routines to identify challenges and opportunities for improvement. As pet owners we have our own identified challenges during pet care routines. So, this gives a big support to our project. And we gather some information from internet surveys, researchers etc.

Section 3.3: Functional and non- functional requirements

Give pet owners an easy-to-use registration procedure that requires only their username, password, email address, or phone number.

Provide a dashboard so pet owners can keep an eye on their animal companion's health, establish daily feeding targets, and oversee their nutrition.

Utilize artificial intelligence to recommend the appropriate amount of food for your pet depending on its age, weight, and height.

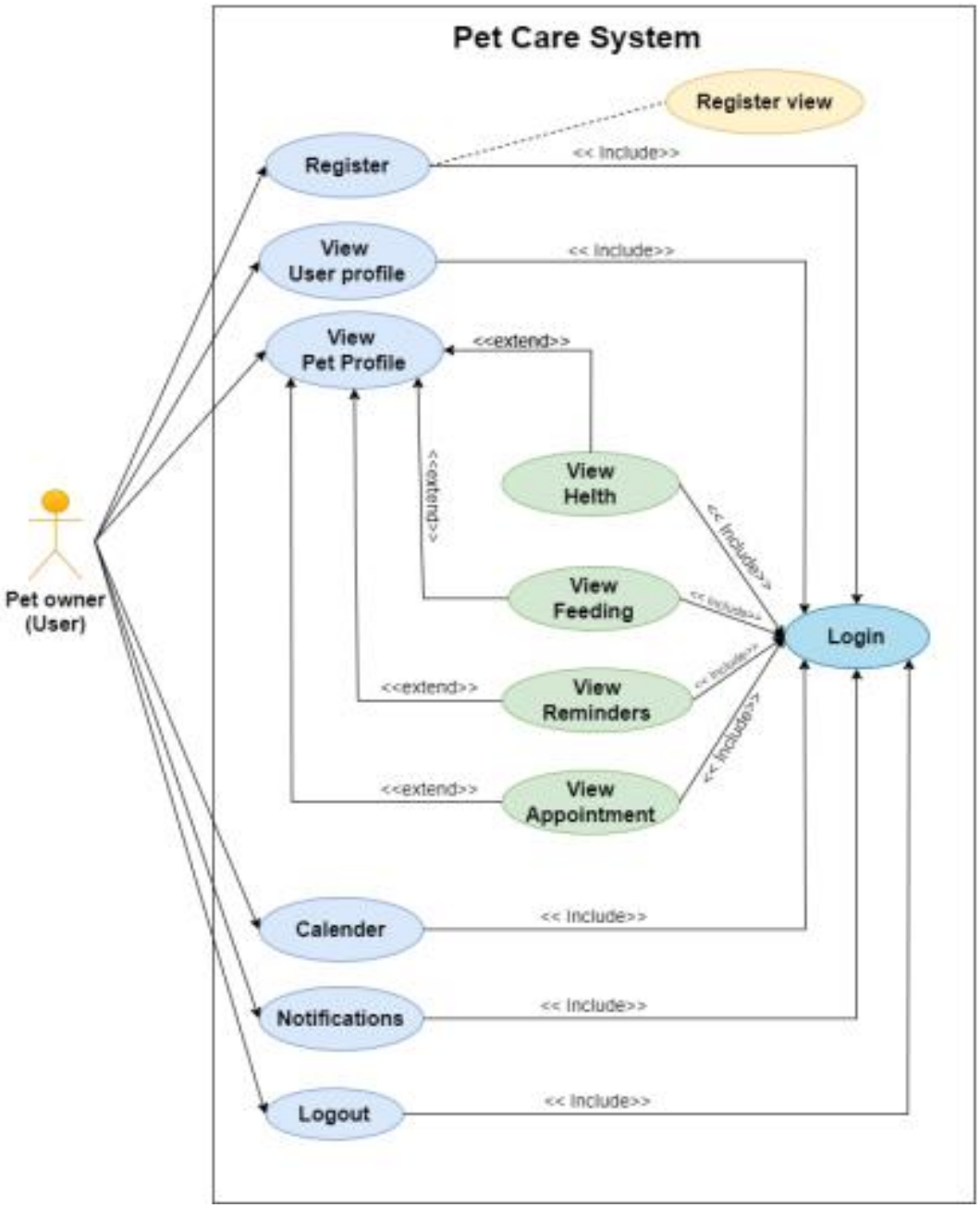
Permit users to monitor their pet's weight increase or decrease and offer them information about their health and fitness.

Users may customize the reminders that are sent to remind them when to feed.

Include a healthcare function that enables users to make veterinary visits as needed.

Put in place the necessary safeguards to secure user information in order to ensure data security and privacy.

Section 3.4: Use case analysis.



Section 3.5: Persona Development

Persona: Sasini Hettiarachchi

1. Background:

- Sasini is a 23 -year-old student who studies full-time and lives in an urban area.
- She owns a 11-year-old Black German Shepard named pinky and a 4-year-old lion Shepard, that considers as a part of her family.

2. Goals and Needs:

- Sasini wants to ensure that her pets receive proper nutrition and exercise to maintain their health and well-being.
- She needs a convenient way to track pet's food intake, monitor their weight, and set exercise goals.
- She seeks expert advice on pet care and would like access to a network of trusted veterinarians.

3. Pain Points:

- Sasini often forgets to measure pet's food portions accurately, leading to inconsistent feeding and potential weight issues.
- She struggles to find reliable information online and would prefer a vet-recommended resource for pet care.

Persona: T.Hettiarachchi

1. Background:

- He is a 26-year-old who lives alone in the Colombo neighborhood.
- He has a 7-year-old domestic shorthair cat named Luna, whom he adores and considers his companion.

2. Goals and Needs:

- Hettiarachchi wants to ensure Luna's health and happiness in his absence during occasional trips & work time.
- He needs assistance in managing Luna's feeding schedule and tracking her litter box usage.
- He desires a platform to connect with other cat owners, share experiences, and seek advice when needed.

3.Pain Points:

- Hettiarachchi often worries about leaving Luna alone for extended periods and wishes to have a reliable system for monitoring her well-being remotely.
- He finds it challenging to find accurate information about cat behavior and health concerns.

Section 04: Functional Specification

For mobile applications, functional requirements specify what must be implemented precisely in a system or product as well as the steps users must take to interact with the software. They decide what ought to be done by the system.

1.) Requirement ID: Signup / Login
   - Requirement Description: Using this function user can login to an existing account or create a new account
   - Dependencies: User Account
   - Acceptance Criteria:
     The condition is satisfied if a user can utilize the signup and login functions to establish a ne w account and log into an existing account, respectively.
   - Priority: Importance level: High

2.) Requirement ID: User Account

- Requirement Description: The users of the app will be able to register accounts, log in securely.
- Dependencies: Signup, Login
- Acceptance Criteria:
- The condition will be satisfied if users are able to register an account without any problems retrieve their passwords, and have their user profile fully viewable
- Priority: Importance level: Medium

3.) Requirement ID: Pet Profile
   - Requirement Description: This shows information about the pet such as health, feeding and quick access
   - Dependencies: Signup, Login
   - Acceptance Criteria: If users can login to the pet profile and check the pets information properly the requirement will be fulfilled
   - Priority: Importance level: High

4.) Requirement ID: Health
   - Requirement Description: contain all the details about the pets vaccinations , medicines etc. Basically this gives details about the pets current health
   - Dependencies: Pet Profile
   - Acceptance Criteria: If the user can check the accurate details of the pets health the requirement is fulfilled
   - Priority: Importance level: High

5.) Requirement ID: Feeding
   - Requirement Description- - contains the particular diet recommended for the pet and the consumption of food and water
   - Dependencies: Pet Profile
   - Acceptance Criteria: If the user can check the accurate details of the pets diet and food consumption requirement is fulfilled
   - Priority: Importance level: High

6.) Requirement ID: Quick Access/ Appointments
   - Requirement Description- Schedule visits (channeling)
   - Dependencies: Pet Profile
   - Acceptance Criteria: If the person can schedule a visit without any issue requirement is fulfilled
   - Priority: Importance level: High

7.) Requirement ID: Quick Access/ Reminders
    - Requirement Description- vaccination dates, feeding time and medicine
    - Dependencies: Pet Profile
    - Acceptance Criteria: If the owner gets the reminders on the accurately without delay requirement is fulfilled
    - Priority: Importance level: High

8.) Requirement ID: Calendars
- Requirement Description: This basically contains all the activities such as online appointments, daily visits, activities etc.
- Dependencies: Pet Profile, Owner profile
- Acceptance Criteria: If the activities are mentioned up to date the requirement is fulfilled
- Priority: Importance level: Medium

Section 05: Technical Specification

Section 5.1: User Interface Design- UI and UX.

Fig 1: Opening page

Fig 2: loading page

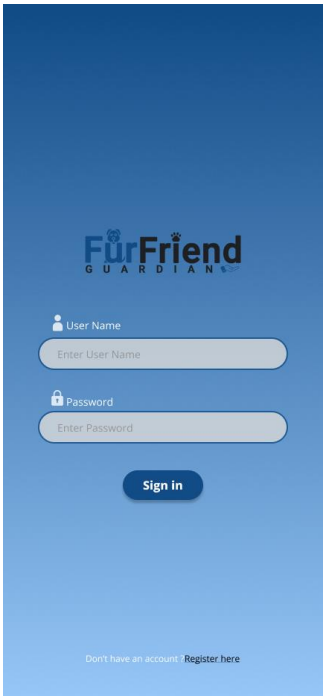


Fig 3: sign in page

Fig 4: register page

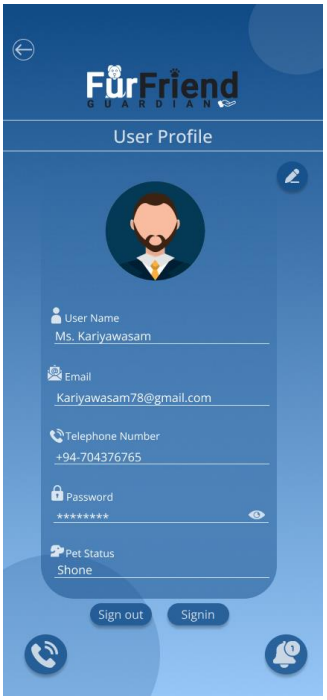


Fig 5: user profile

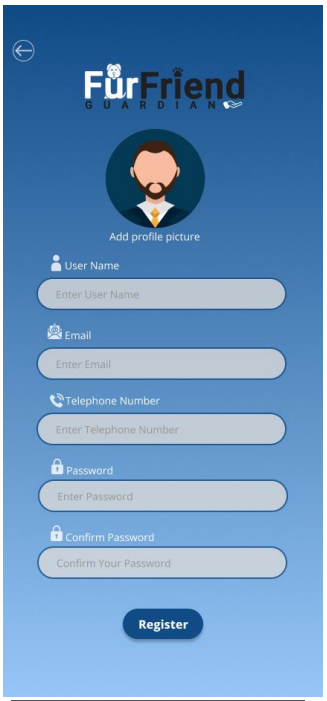


Fig 6: create user profile

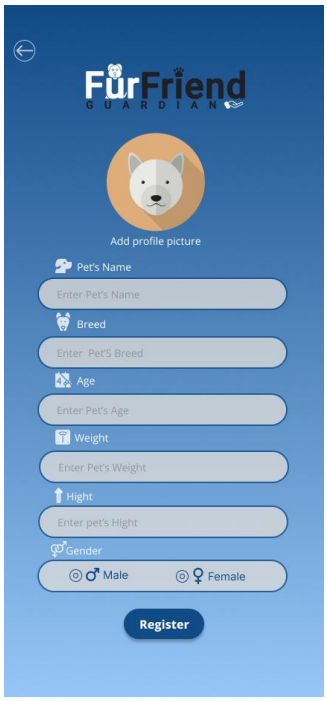


Fig 7 : create pet profile

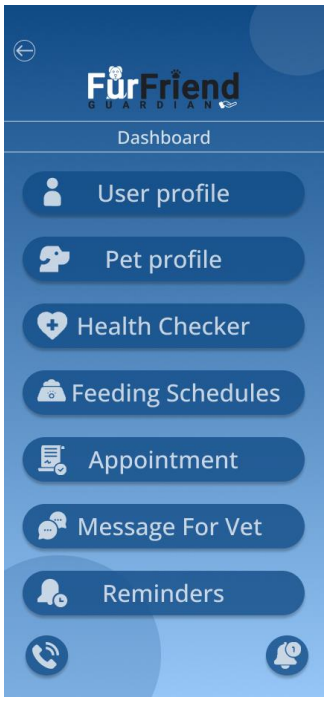


Fig 8: dashboard

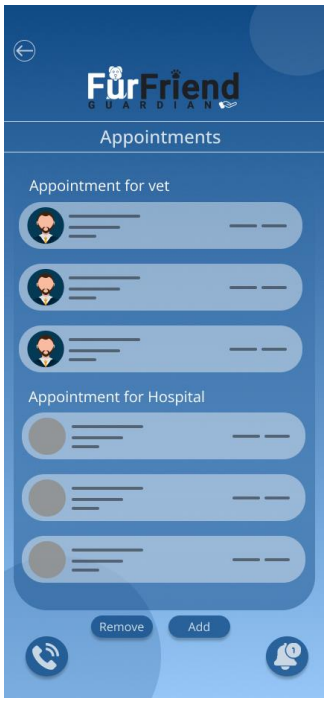


Fig 9: appointment

Fig 10: chat

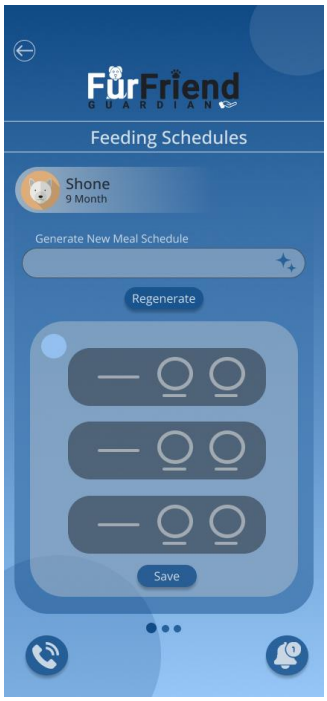


Fig 11: feeding schedule AI

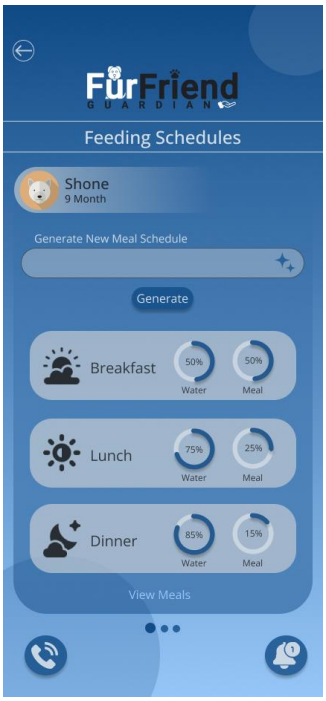


Fig 12: feeding schedule

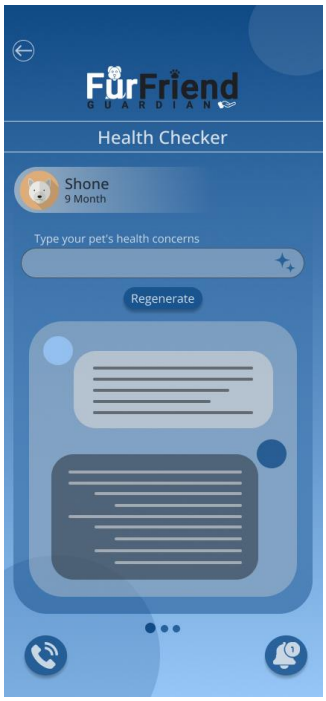


Fig 13: health checker AI

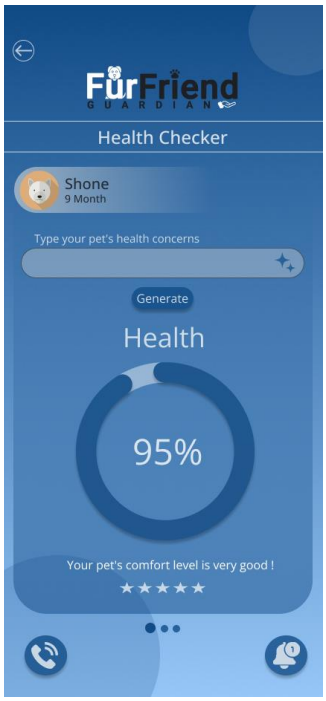


Fig 14: health checker

Fig 15: M.R. pet profile

Fig 16: M.R. user profile

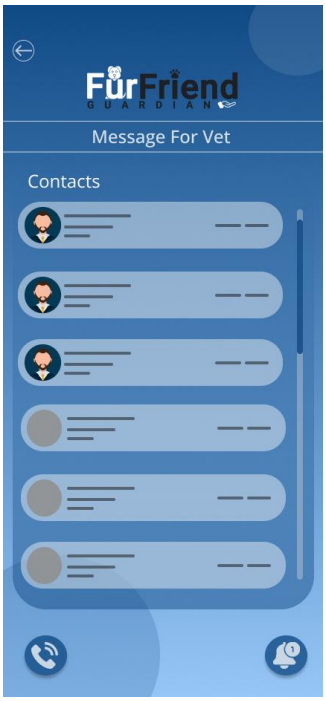


Fig 17: message for vet

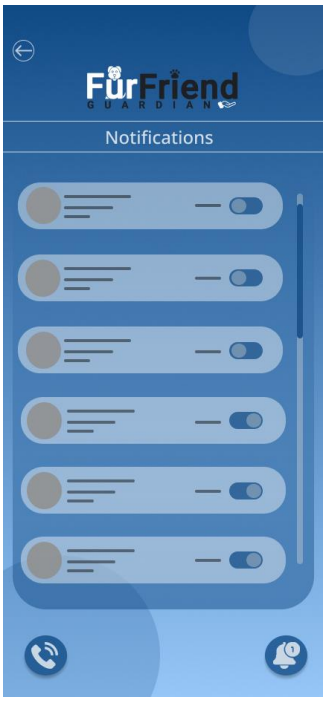


Fig 18: notification

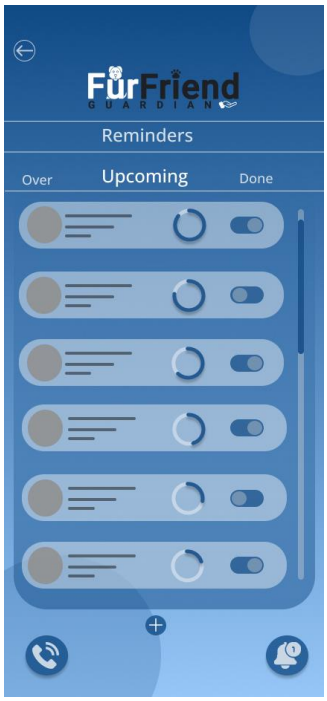
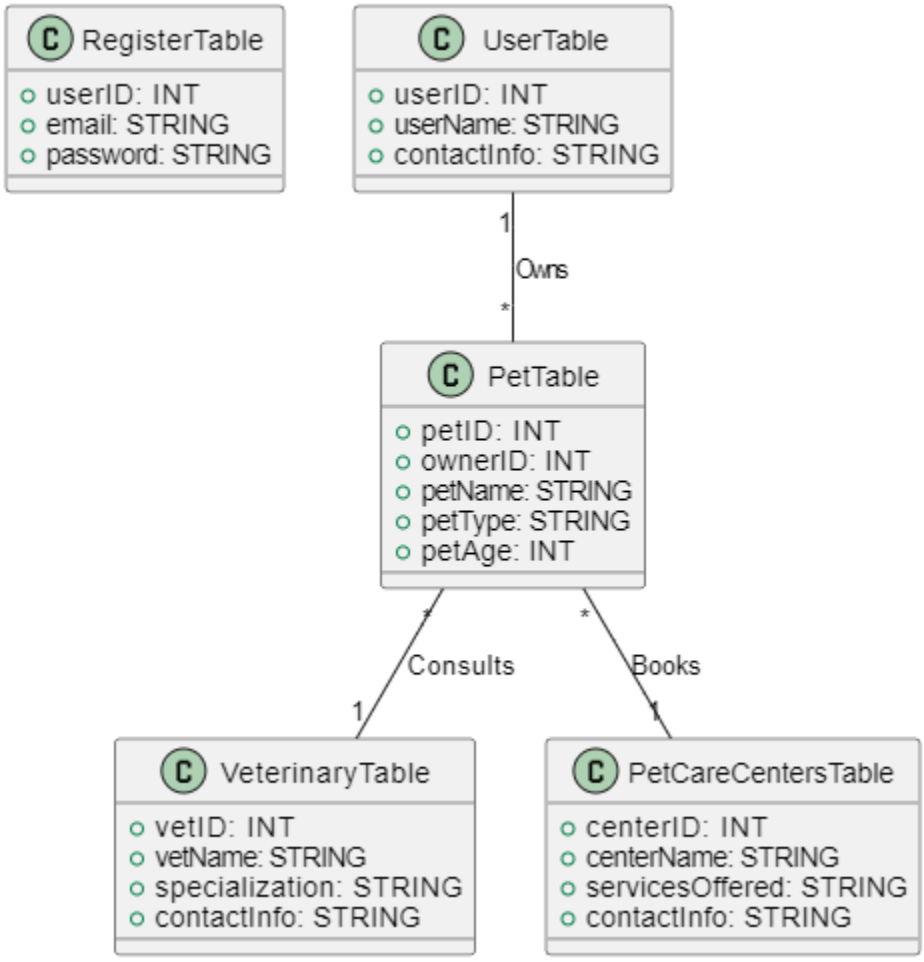


Fig 19: reminders

Section 5.2: Data Model-DFD



Section 5.3: System Architecture

Application Framework and Platform

- **Development Platforms -** iOS and Android for broad accessibility.
- **Programming Languages -** Swift for iOS, Dart for Android, or use a cross-platform framework like Flutter.
- **Backend Services -** Python (Django or Flask) server migration service .

AI and Machine Learning

- **Machine Learning Frameworks -** TensorFlow, PyTorch, or Keras for developing AI models.
- **AI Features,**
  - **Image Recognition -** For identifying breeds, spotting potential health issues through user-uploaded pet photos.
  - **Voice Recognition -** To understand pet sounds or commands, indicating their needs or health issues.
  - **Behavior Tracking and Analysis -** Using AI to analyze pet activity data collected through the app or connected devices to provide health and wellness advice.

Data Storage and Management

- **Database -** Use SQL (MySQL, PostgreSQL) for structured data and NoSQL (Firebase) for unstructured data like user interactions, pet photos, and health records.
- **Cloud Storage -** AWS S3, Google Cloud Storage, or Azure Blob Storage for storing large files like images and videos.

User Interface and Experience (UI/UX)

- **Design Principles -** Accessibility and simplicity, with easy navigation for all types of users.
- **Interactive Elements -** Customizable pet profiles, interactive health checklists, and AI-driven suggestions for pet care.

Connectivity and Integration

- **APIs and Third-Party Services -** Vet appointment scheduling through integration with veterinary clinic systems. Pet diet and nutrition advice using databases from pet food providers. Real-time chat or video consultations with vets or pet care experts.
- **Device Integration -** Compatibility with IoT devices like smart collars, feeders, and activity trackers.

Security and Privacy

- **Data Encryption -** Use HTTPS and SSL for data transmission. Encrypt sensitive data at rest.
- **Authentication -** Implement OAuth for secure logins through social media or email. Consider biometric authentication for enhanced security.
- **Compliance -** Adhere to GDPR, CCPA, and other relevant data protection regulations to ensure user data privacy.

Analytics and Reporting

- **Tools -** Google Analytics, Firebase Analytics for tracking user engagement and app performance.
- **Custom Reports -** AI-driven insights on pet health trends, app usage statistics, and personalized pet care recommendations.

Testing and Deployment

- **Testing -** Automated unit and integration tests, user acceptance testing (UAT), and AI model validation.
- **Deployment -** CI/CD pipelines for seamless updates, use Docker or Kubernetes for containerization and orchestration.

Accessibility and Internationalization

- **Accessibility Features -** Voice commands, screen readers compatibility, and adjustable text sizes for users with disabilities.
- **Languages -** Multilingual support to cater to a global user base, considering cultural differences in pet care practices.

Support and Maintenance

- **Customer Support -** In-app support chat, FAQs, and AI-driven troubleshooting guides.

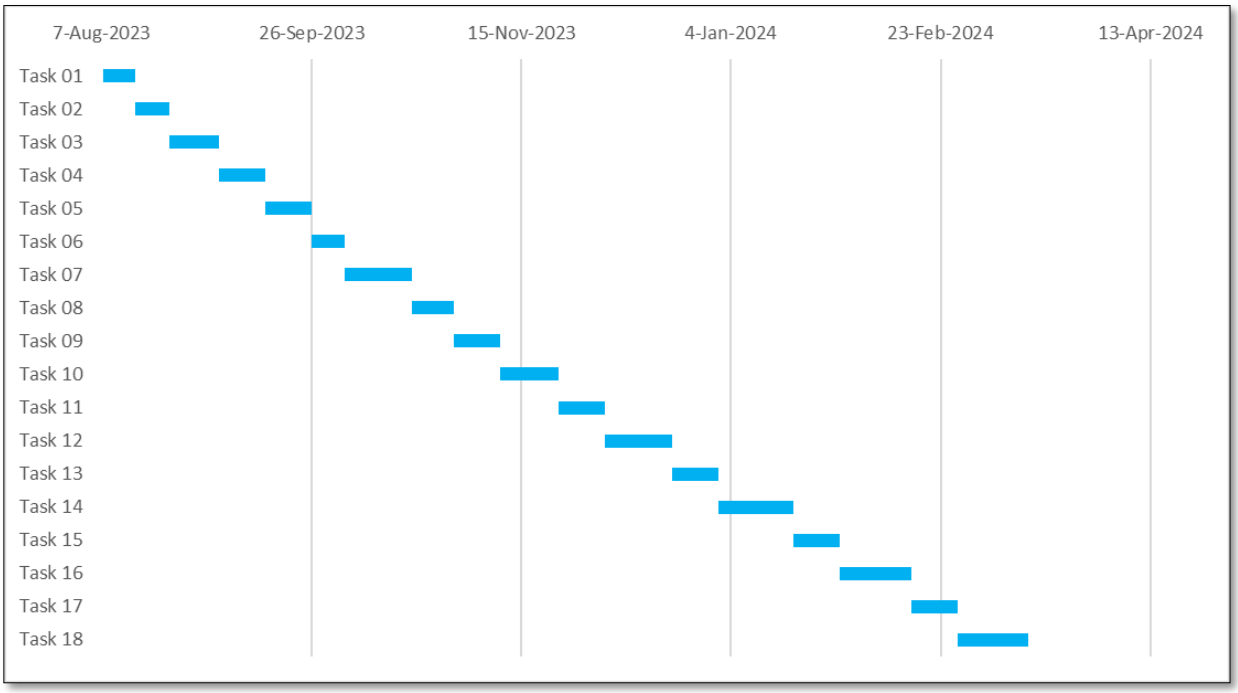
Updates - Regular updates for AI models, app features, and security patche

Section 06: Work breakdown structure/project timeline

Section 6.1: work breakdown structure

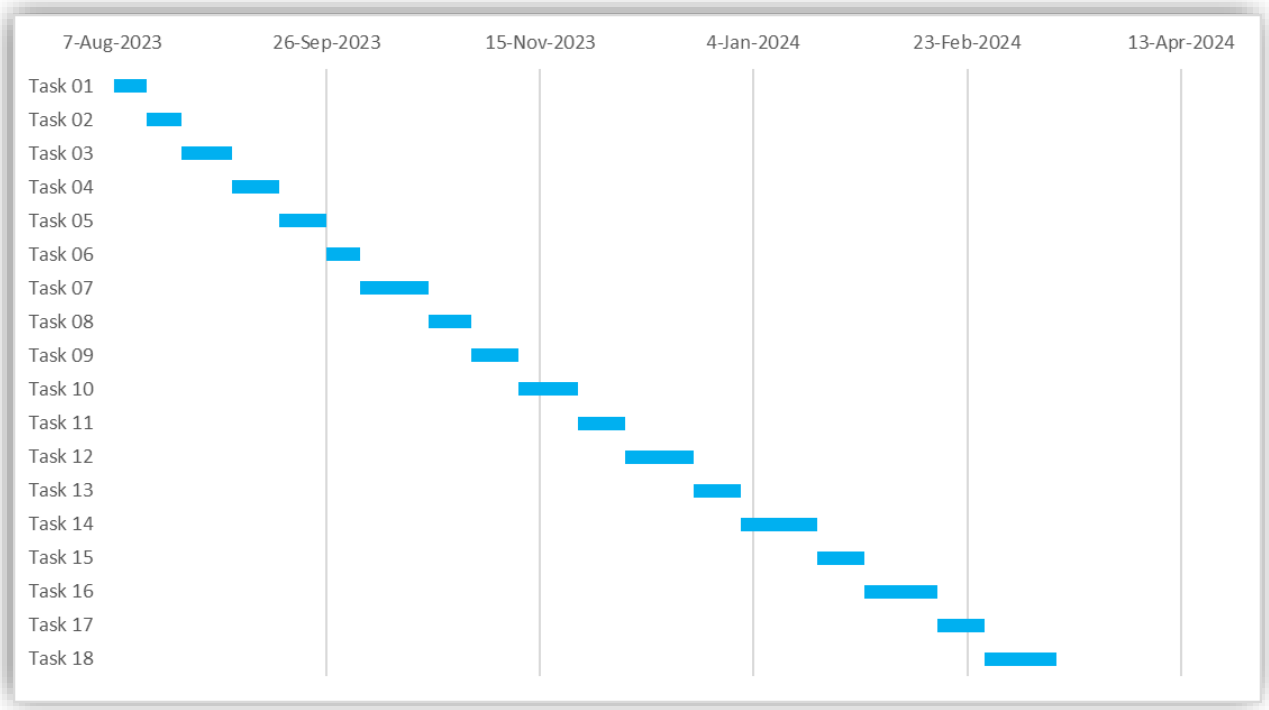
Task No :-	Task	Start	End	Days
1	Problem Analysis	2023/08/07	2023/08/15	8
2	Finding solution	2023/08/15	2023/08/23	8
3	Gathering information	2023/08/23	2023/09/04	12
4	Gathering software requirements and gathering requirements	2023/09/04	2023/09/15	11
5	Planning	2023/09/15	2023/09/26	11
6	Analysis	2023/09/26	2023/10/04	8
7	Project proposal creating	2023/10/04	2023/10/20	16
8	Design UI and UX	2023/10/20	2023/10/30	10
9	Coding	2023/10/30	2023/11/10	11
10	Selecting data set	2023/11/10	2023/11/24	14
11	Training data set	2023/11/24	2023/12/05	11
12	Model Training	2023/12/05	2023/12/21	16
13	Developing database	2023/12/21	2024/01/01	11
14	Developing mobile Application	2024/01/01	2024/01/19	18
15	implementation	2024/01/19	2024/01/30	11
16	System Testing	2024/01/30	2024/02/16	17
17	Configuration of Errors Encountered	2024/02/16	2024/02/27	11
18	Maintains of System	2024/02/27	2024/03/15	17

Section 6.2: Gantt Chart



Section 07: Current Status

- **Project Timeline highlighting the status.**



It's evident that the Pet Save app has advanced significantly based on the project schedule shown in the picture. We've finished a lot of work, which indicates how well the project is going.

The timetable indicates that we are halfway through the project, with only a few chores left. This is a thrilling stage since it means the application is prepared for completion and release. Our team is working hard to deliver the project on schedule and within the anticipated time limit, and the remaining work should be finished shortly.

- **Progress Update.**

The development of the Pet Care App has advanced significantly since the project's start. The development team is putting in a lot of effort to accomplish the objectives and provide top-notch software for pet owners. Below is a progress report as of right now:

1. Design and Development: Based on in-depth analysis and input from users, the app's user interface and general design are decided upon. We have effectively integrated the dashboard, weight tracking, meal reminders, and tailored nutrition management into the app.

2. AI integration: The application's artificial intelligence component has been tested and integrated. It is

essential to the process of assessing health data and offering individualized pet feeding suggestions. To guarantee accurate and trustworthy outcomes, AI algorithms are trained utilizing pertinent data.

3. User Registration and Profile: After completing the necessary information, such as a username, password, email address, or phone number, users may establish their accounts. After registering, users may designate specific profiles for their animals, giving them access to and management of all vital data on a single, centralized platform.

4. Healthcare Integration: Users may book veterinarian appointments straight from the app thanks to its integration with the larger healthcare system. This connection guarantees that pet owners may provide their animals with timely medical attention, when necessary, therefore prioritizing their well-being.

5. User Testing: To get input and pinpoint areas that needed work, a lot of user testing was done. Veterinarians and pet owners' input is very helpful in improving the app's functionality and user experience.

- **Key Achievements.**

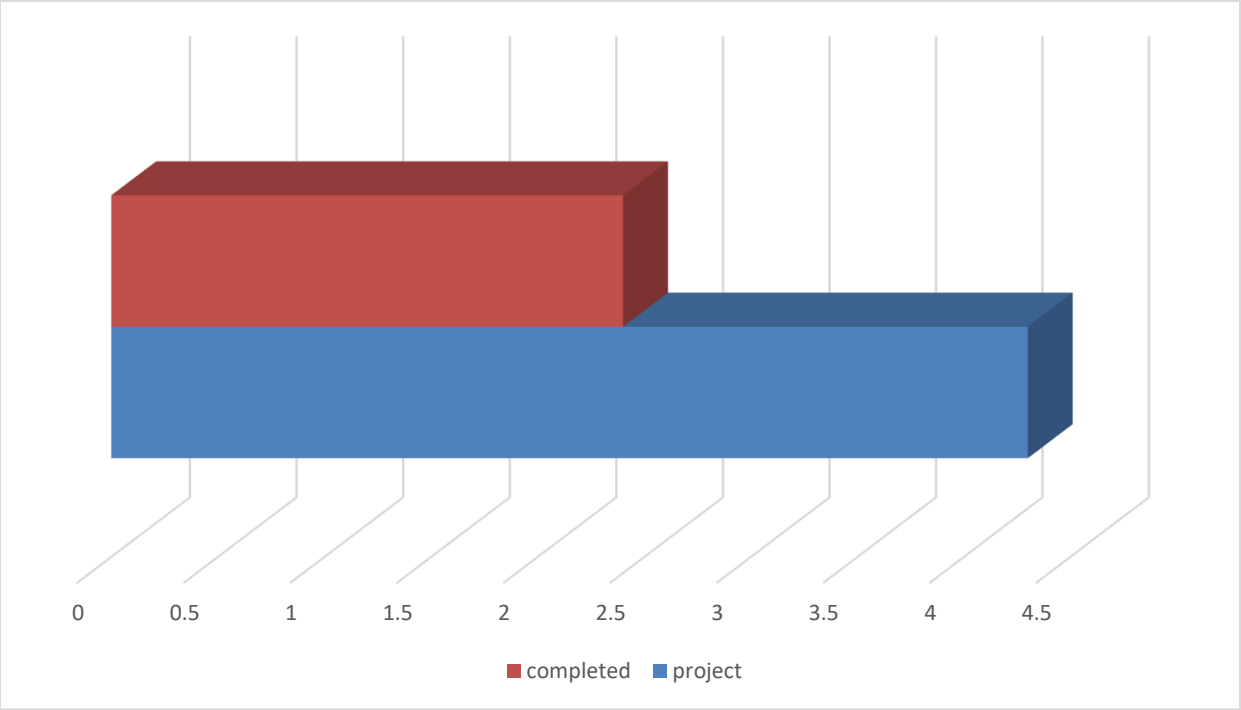
Contact between users and veterinarians is seamless thanks to the app, which makes it simple for pet owners to make appointments and ask for professional guidance. This tool encourages collaboration and guarantees that dogs get prompt medical attention when required.

Data Security and Privacy: To safeguard user information and guarantee data confidentiality, robust security measures are put in place. Pet data privacy is given priority by the app, which gives customers safe access to all information while preserving their piece of mind.

User-friendly UI: Pet owners may easily explore and access a variety of functions using the app's intuitive and user-friendly layout. The design prioritizes effectiveness and simplicity to provide a seamless user experience.
Personalized nutrition management: The app makes feeding recommendations for each pet based on individual requirements, accounting for variables like age, weight, and height to make sure they get the proper quantity of food. This feature encourages pet owners to maintain their dogs' ideal weight and supports good feeding habits.

All things considered, our project has advanced significantly in creating a thorough and user-focused pet care app. The project's accomplishment of milestones and important features shows how successfully it worked to provide pet owners with a useful tool for managing their dogs' health and wellbeing while working with veterinarians and other pet care specialists.

- **Work Completed**



- **Current Issues**

1. Technical Difficulties: When implementing various features, such the AI bot for veterinary medicine and the integration of healthcare services, the development team ran into some technical difficulties. The development schedule has been delayed because of these difficulties.

2. User Adoption: Because of worries about technology, data privacy, or a preference for more conventional pet care techniques, there's a chance that some pet owners may be reluctant to accept and utilize the app. For the software to succeed, securing user acceptance and overcoming opposition are essential.

- **Risks & Mitigation Strategy**

1. Technical Risks: The development team will provide more resources and experience to handle the difficulties encountered to reduce technical risks. They'll carry out extensive testing and quality control to find and fix any technological problems as soon as possible.

2. User Adoption Risks: The group will concentrate on efficient marketing and communication tactics to reduce the risks associated with user adoption. They will openly address privacy issues, emphasize the app's advantages and simplicity of use, and provide thorough user support and training materials.

- **Next Steps**

1. Feature Refinement: Based on user input and testing outcomes, the development team will keep enhancing the app's current functionality. This includes improving the AI bot's performance, streamlining the UI, and adding further features as needed.

2. Incorporation of User input: To make sure the app satisfies pet owners' requirements and expectations; the team will aggressively seek out and integrate user input. To gather information and make the required improvements, this involves doing surveys, user interviews, and usability testing.

3. Scaling and Expansion: After the app's essential functions are reliable and well-liked, the development team will concentrate on growing the app's user base and making it more widely accessible. To reach a larger audience, this may include looking into joint ventures with veterinarian practices, pet care service providers, and marketing campaigns.

- **Resource Allocation**

Training and user support: Funds will be set aside to provide thorough training and user support resources. This includes creating tutorials, FAQs, and a support staff to help users with any problems or inquiries they may have.

Analysis of User input: Resources are allotted for a thorough analysis and incorporation of user input. To determine areas for development and prioritize feature upgrades, this entails investing time in user research, conducting surveys and interviews, and evaluating data.

The project may go easily and meet its objectives of giving users a useful pet care application and guaranteeing the health of their cherished pets by resolving existing problems, reducing risks, and allocating resources wisely.

Section 08: Conclusion.

Our pet care app is an innovative tool for pet owners to keep an eye on their dogs' food and overall health, which is driven by artificial intelligence. In order to guarantee the best meal portions depending on age, weight, and height, it provides features like goal-setting, food intake tracking, and personalized nutrition management. In addition to offering convenience and organization, the software lets owners plan veterinary appointments and establish daily food consumption limitations. The app strengthens the relationship between pet owners and their pets by utilizing technology and user-friendly design, guaranteeing the best possible health and pleasure for all parties.

Section 09: workload matrix

	Group Number	**AB**	
	Student ID (Plymouth)	Name (as appeared on DLE)	
1	**10898774**	**Egoda Hettiarachchi**	**Introduction** **User requirements** **conclusion**
2	**10898739**	**Iddamalgoda Bandara**	**Current Status**
3	**10898908**	**Galagedara Senevirathne**	**Background**
4	**10898913**	**Sammu Silva**	**Technical specifications**
5	**10898507**	**Jayaweera Jayaweera**	**Functional specifications**