COMPUTING WITH PLYMOUTH UNIVERSITY

School of Computing and Mathematics

PRCO303

Final Stage Computing Project

FINAL REPORT

BSc (Hons) <*Software Engineering* >

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<Find Your Dog >

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ABSTRACT

This pet tracking system can use to track our pets when they are missing and not to be found. In present situation, if a pet will not be able to find the pet owners will have to make post include with his pet picture on the social media and newspapers. Then, someone would be able to find the pet, they will have to inform the pet owners and sometimes pet owners will pay some money for help as a gift. But in my system pet owners cannot be able to post pictures on social media or waiting for someone informs about their pets. Pet owners will be able to find their pets by own. My intention was drawn to developing a pet tracking system that will do as follows: A custom-made GPS tracking device will be attached to the pet's collar, The owner can monitor the whereabouts of the pet using the developed android application with the use of the live location feature pet owners will be guided to their pets using the shortest route. The pet owner has the ability to track more than one pet using the application. Not only in Sri Lanka but everywhere in the world, pets going missing is a problem many pet-owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up "LOST" posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. Operation of this system is all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates. And the pet owner can see the location with safe zones. when the pet went out the home area the app user can see location with different color zone. When the developing the mobile application and the hardware device testing the validations of the mobile app and refactoring the code and complier and debug the code. In hardware section rearrange the prototype and utilized the features.

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INTRODUCTION

Real time pet tracking system is solutions for pet owners. Pets are going missing is a problem many pet -owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up “LOST” posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. This real time pet tracking system helps to find their own pets easily with low cost and risk, not only that reduce the pet owners time. This pet tracking device is android application project. Using this mobile application, pet owners would be able to tack real time location with GPS device. Applying this purpose pet tracking system pet owners will not be able to share post on social media and newspapers, pet owners can find their pets in their pets by own. The operation of this system is uniquely boated GPS tracking device whether connected to pet’s collar for the purpose of trace the live location of pets. In this system live locations shows in via mobile application in a short time.

In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

In current situation there are lots of locating applications. As an example, delay pointers, in this case item were passed the point. After data were collected. Another Examples are barcode or gate. Others are actual time using GPS, depend on data upgraded. There are bar code systems that allow a human to scan objectives and discover oneself automatically (automated ID RFID). The major section, the world of tracking contains of separate hardware, software systems for the various applications. The reason for choosing this project to implement a pet tracking system is often the loss of pets as well as in public places and on their own grounds.

For this perspective this is a one of the solutions for problem. In emergency, pet owners would not be able to find and animal hospital near to their own area and will forget the upcoming vaccination dates of their pets. This is a mobile application can be solved above problems.

Literature Review

This paragraph include academic research has done about lost pet and how the tracking technology could involve. This section explains resources materials and articles, journals written by authors in the internet and newspapers. There are focusing similar pet tracking applications with multifunctional virtual fence is global tracking application has the combination of positioning system, GPS device and portable collaborate modem to connect pets and the virtual fence (include combinations of ground station to transfer the communication to the target scope of the receiver joint with the pet (pet owner). Though receives pass to the found location whenever the receiver is in the target scope. The appropriate virtual fence frame includes the base where the flag is sent, the signal connected to the signal sender used by the upstairs pet tracer. Beneficially the start-up point is very easy. These pet tracking app feature a sign mounted on the pet. The GPS contains and are of finder items to identify the special activated location using GSP module and the GPS Beacon is a type of radio signal transmitter. GPS collaborate with radio signal together whenever; A main station and a GPS beacon are in a noted range of an RF transmitter. A Pet tracing chain collar contain on a reasonably adaptable cylinder with locks attached to pet or else tracer.

Attached to the cylinder is an airless electrical strip that extends and the distance of the electrical twine connector and the receiving wire. Amount of light emission diodes visible and the clear cylinders are connected to the remote connector.

A lower collar recalls a connecting wire to send an incoming wire to the power strip link and a radio repeating signal. A link in the adaptable cylinder is obtained about a object that the strain forwards the area of the cylinder will not be sent to its link. If the belt or collar is not in good quality, it means that if it is wet, there is enough independence among a battery though a divider to drain the water, and the course or distance is determined by the radio repeater signal receiver. Comparing the collar with the recipient. (P. Sai Murali[1], T. J. Nagalakshmi[2] , 2004):

Toward the position customers (pet owners) on the direct(short) route, as this point you use Google's direct(shortest) route algorithm. One magazine commented that it shows a few spaces that can help you find the guide. The reason is that satellites turning the earth are helping the world using GPS. The satellite emits an embedded radio signal that follows a transmitter's fixed area. The radio sender generated by the satellite is connected to the radio manage center, and a satellite is derived from the world's cable. Dijkstra's algorithm is the shortest path tracking method in the graph. The Dijkstra algorithm was developed in 1956 by Dutch computer researcher Edsjer Dijkstra. Dijkstra used direct algorithm to find the short path in an unpredictable time. This scheme is practical to solving the shortest path. (Erkan; GÜZEL,, 2016) (J. Patman, S. C. J. Michael, M. M. F. Lutnesky and K. Palaniappan, 2018)

In this study case requires the assistance of the Google API. The programming interface provides an interface to collaborate or talk to each other. Whenever person use multitasking apps on their mobile phones, the portable app connects to the Internet and sends information to staff. The workers able then get back the information, decode it, perform basic operations, and send again to owner's phone. Particular application decodes the information at this point and presents the data you need in a way that is simply to figure out. The API has some key features, for example, controlling access to devices that perform a significant task in home security. As a example, on the map, after open a lead first, the app asks authorization to allow GPS have to observe the current customer area. (Hiroshi Watabe,Takuya Hayashi, 2009)

The Dijkstra algorithm is the most well-known algorithm that helps to make a shortcut call from two locations or a hub. The Dijkstra algorithm can be introduced in pseudo-code factors (G) with edges (E) and vertical (V) and a predefined source header (Anon., n.d.).

Business Case

Business Need

In present situation, not only in Sri Lanka but everywhere in the world, pets going missing is a problem many pet-owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up "MISSING" posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. Above process is very hard process to find their pets. Mostly pets owners must spend huge time find their pets and sometimes they have given money some for-pet finders. The current pet finding system is not useful to pet owners therefore pet tracking system is most useful system for customers (pet owners) to find their pets.

Business Objectives

- Removes manually findings (Eliminates the manual searching process).
- effectively connect GPS device to mobile app.
- Time reduces (no need to find their pets manually).
- Improves the system can track live location.
- Allows to customer for log to app via email (find live location).
- Allows facilities for find near animal clinic and accessories shops.

Project Objectives

Aim

Manley hope to develop a mobile application with custom made GPS device to track down the pet current location.

Objectives

- To analyses exist system and provide stranded improvements for new system.
- To identify the exist system what does the pet owners do to track pets when they cannot be found.
- Clearly analyses development technologies for deployment solutions.
- To provide compatibility between the pet outdoor exploring and the pet owners.
- To provide pet owner training.
- To implement a way to get a route to where the pet is currently at from the owners location.
- To provide an app to trace live locations of your pets.

PROPOSE SYSTEM

My intention was drawn to developing a pet tracking system that will do as follows:

- A custom-made GPS tracking device will be attached to the pet's collar.
- The owner can monitor the whereabouts of the pet using the developed android application.
- With the use of the real time location feature pet owners will be guided to their pets using the shortest route.
- User (pet owner) has the ability to track more than one pet using the application.

GOAL

- ✓ When the pet owners log into this application, they can find their pets by their own in real time. This purpose system's device will show the pet's real time location via the implemented mobile application.

PROJECT SCOPE

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner.

In existing system was manual founding system centred to pet owners. In purposing system, manual system transpose to digital system. Therefore customers (user)can allow to new technology.

Contain of scope

- Track the pets' live locations

❖ this pet tracking device targeting to track in pets on time. who are the using this application they can easily find their pet by own. Pet owners would be able to log in the mobile application via email address and the password. Then pet owners will be able to see their pet's live location via GPS device in the pet collar.

- The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

❖ The costume made device attach to collar, from using that device can get signal of real time location of lost pet. After pet owner would be able to trace the live location with in receive data from the pet tracking device.

●Plan to make custom-made GPS to track pets outdoor exploring

●Collect all information using custom-made GPS and receive the data to mobile application

❖ In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

●Pet owner can allow to find near animal clinic and hospital

●Pet owner would be able to find near pet shops

●User (pet owner) can place the reminder for upcoming vaccination dates.

❖ This system allows more features for find near animal clinic and hospital emergency, where nearest pets accessories shops and keep trace the vaccinations and make remind the date of vaccinations

●User can allow their own email and password to log this application in under high security

INFORMATION GATHERING

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner. All the primary data were gathered by interviewing and some questionnaires, internet, research papers and articles on the google scholar

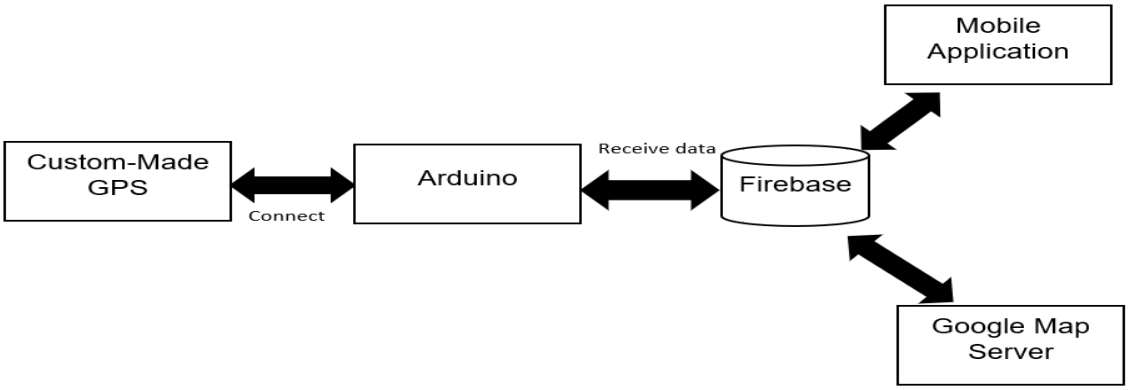
The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

- There was no option to find a pet when it goes missing.
- They have no option to find their pets cannot found
- How to find pet clinic and hospital in emergency situation
- To find animal accessories shops and food shops in quickly.
- Keep reminder status on pet vaccination date for the convenience of pet owners

METHOD OF APPROACH

The pet tracking system developing under agile methodology. Agile methodology the fastest methodology and most well -known methodology. The use of agile scrum strategies in program improvement can have an impact on a task with minimal probability of culmination and delivering results quickly and after a while. Clever logic, however, was never intended to be simply a programmatic improvement. Mainly agile methodology presents the better way how to achieve the major goals in the standard level though it would be able to show the best guidance to deliver the product in target level.

Operation of this system is all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.



Project Plan		
Stage	Deadline	Products/Deliverable/Outcome
1. Initiation	17/11	PID
2. Investigation, Requirements	20/11	Feasibility study (analysis exist systems and requirements, technologies)(focus project and the scope)
3. Design	5/12	Design diagrams before start. (Architecture. Database schema, UI)
4. Implementation1	7/1	Implement sub-system and provide customer functionality
5. Implementation2	20/2	Implement sub-system between internal and the commination (Hardware system implementation)
6. Implementation3	10/3	Implement other features related to software finality
7. Testing the system	15/3	Final system and testing
8. Final report and research	1/4	PRC303SL Report

Initial Risk List

Risk	Management strategy
Schedule overrun	Face the 1st supervisor meeting with the project idea ,but exception plan will be developed ,and have to feasibility analysis before start the project .therefore this event more extend to 1 week.
Learn new technologies and difficult Learn in short period	In stage 2 period hope to develop simple and strong system prototype
Requirements breakdowns	According the supervisor advice their would be some disputable features. Therefore production may have changes in some stagers
Failure about technology	This system IOT related application ,it may have some failures. Therefore try to get system backups daily.
Manage with other module deadlines	There are some module submissions and examinations conduct in parallelly there plan time work frame to mange the time

Table 2. Initial Risk List

Initial Quality Plan

Initial quality plan	
Quality check	Strategy
Requirements	Check the requirements to sure are they correct and relevant ,complete ,achievable ,demonstratable .product quality and prototype ,user interviews will employed
Design and validation	The design will be checked to compliance, screen-design acceptance, DB normalization and software design principles (e.g., cohesion, coupling)
Sub-system usability and validation	To be conducted at the end of each increment
System validation and user acceptance	To be conducted within Stage 7

Table 3. Quality Plan

TASKS UNDERTAKEN AND OUTCOMES

- Get correct understand about the project and selected most suitable technology as the Arduino technology.
- Implement the circuit using Custom-made GPS, ESP8266 (NodeMCU) and Arduino Uno.
- Get data from custom-made GPS and send it to the mobile application.
- Started implementation of the user mobile application.
- Study and start Implementation of hardware product.
- Implement Arduino code for the data transferring to firebase.

PRODUCTS PRODUCED AND PRODUCT QUALITY

- Made some sections of mobile application
- Validate using the functions those sections
- Check the validations.
- Check the quality of interface designing.
- Made some sections of hardware circuit

RESOURCES AND TECHNOLOGIES

- **Hardware / Devices** – Hardware components (IOT)-Tracking Device NODEMCU board, Arduino UNO board, GPS Device, NEO 6M Device.

- **Technologies** – Firebase, Android studio, Google API, Adobe XD, Arduino technology, Flutter framework
- **Languages** -Dart

Firebase: Firebase is a real time database support to store data. Firebase is NOSQL database. Firebase present More facilities for crash report and bug fixing quickly any developers can be assessable to machine learning via firebase. And cand send the message to cantered crowd. Therefore, Firebase is used to make database in this application.

Android studio: Android Studio is the powerful development system for implement mobile application. Android studios present more facility such as firebase support, faster coding, testing and fully feature rich emulator. Android studio is used to develop mobile application

Flutter is open souse UI software development kit most of flutter app are written in dart language .flutter will help to create and design beautiful app with productive and open development model and beautiful user experience and come up with fast result and productive development

HARDWARE DESCRIPTION WITH ALTERNATIVE ISSUES AND SOLUTIONS

I will plan to make the custom-made device as a prototype. The NEO 6M GPS, NODEMCU, Arduino uno board and power bank are components .But we can add alternative features for this prototype . We can replace NEO 6M GPS to Grove-GPS Module or Grove (Air530) module. Those GPS performance level are better than 6M GPS datasheet .But those GPS are some heavy weights and expensive .Therefore as a prototype I choose 6M GPS.

Arduino mega 2560 and Arduino Due are present similar performs like Arduino uno. Thought Arduino mega 2560 and Arduino Due are small unit and situation for make this

device. because device mainly focusing pet's environment. Therefore, I agree to choose this units for my implementation. According to my budget plan there is gap to buy it. I target to make a prototype so if I handle my budget plan, I would be able to use above Arduino unit consider about pet environments.

DAOKI ESP8266-12E development board is the advance unit with temperature and humanity sensor +breadboard. Therefore, I can replace NODEMCU to DAOKI .AS a prototype, I think no need this. But in further implementation I definitely use this standard feature considering about my budget.

According to connection type I will plan to connect to wi-fi method. But there is a anther connection type, We can use IOT SIM material to make connection facility. Using the IOT SIM, it has high rage not like wi-fi. IOT sim can work minimal 2G signal. But apply this sim I will have to develop anther hardware configuration to connect, and it spend high battery life. According to my plan, it may be a big task .Using NODEMCU I can quickly access wi-fi connection. All the connect type doing similar task (connect to the server in difference methods).

I will plan to power bank to supply power for this device. Because if we use some batteries, we have to think about their lifetime .some batteries durations are very short .Using small power bank it would be able to recharge.

Regarding to the signal and the frequencies and communication among device I think not harmful to dogs. If we think about our home wi-fi and mobile phone signals, always humans have to face those frequencies .In that point I Thinks no issues for pets. And I will analysis about this are more .In this moment I cannot find any harmful things belongs to frequencies.

In climate changers, I analysed this area, And I found some solutions for it . regrading to signal issue we can make small antenna to custom made devices .another thing is we can make waterproof background for this device .

According to the weight of device ,it may have some issues, but definitely this device(prototype) can wear a big pedigree dog weight between 10-12kg. first, I am targeting to make a working prototype consider about my budget .After I will go to Further development consider about weight and using other standard technologies

LEARNING UNDERTAKEN AND REQUIRED UNDERTAKEN:

Undertaken

- Learned dart language
- Learned Arduino technology.
- Learned Hardware components
- Learned android studio IDE
- Learned google maps service
- Started to implement mobile application.

Regarding to my project I hope to implement divided in two categories. first, I develop mobile application in mobile application developing I need more knowledge about firebase authentication servicers etc. When the developing mobile application first I create a wireframe for interface design after I design Ui via figma platform. Further design use case diagram for this application. This pet tracking mobile application develop under using flutter framework. Therefore, need more practices and knowledge about dart language. Using the dart language would be able to optimize interfaces, fast and quick in the whole platform. And the flutter framework is open-source framework support multiple platforms and fast. Other main category is hardware configuration. Under hardware configuration 6m Neo GPS Device, Arduino Uno board, NODEMCU are the main components of hardware implementations, as a prototype I hope to MIU small power bank for get power supply for circuit. System hardware implementation is close to custom-made. when the complete of the hardware device, it is totally custom-made device. The hardware configuration under Arduino technology therefore needs more knowledge about Arduino technology. In current days I am following Arduino fundamental courses in LinkedIn learning center. In those courses I am learning about programming regarding to Arduino-Uno bord and details about serial monitor etc. Before I started the project implementing, I wrote the feasibly analysis about existing systems and alternative hardware components. I studied IEE newspapers under animal tracking and the animal care. Regarding to those articles I gathered information about, what are the most wanted additional feature for pet tracking application.

Required

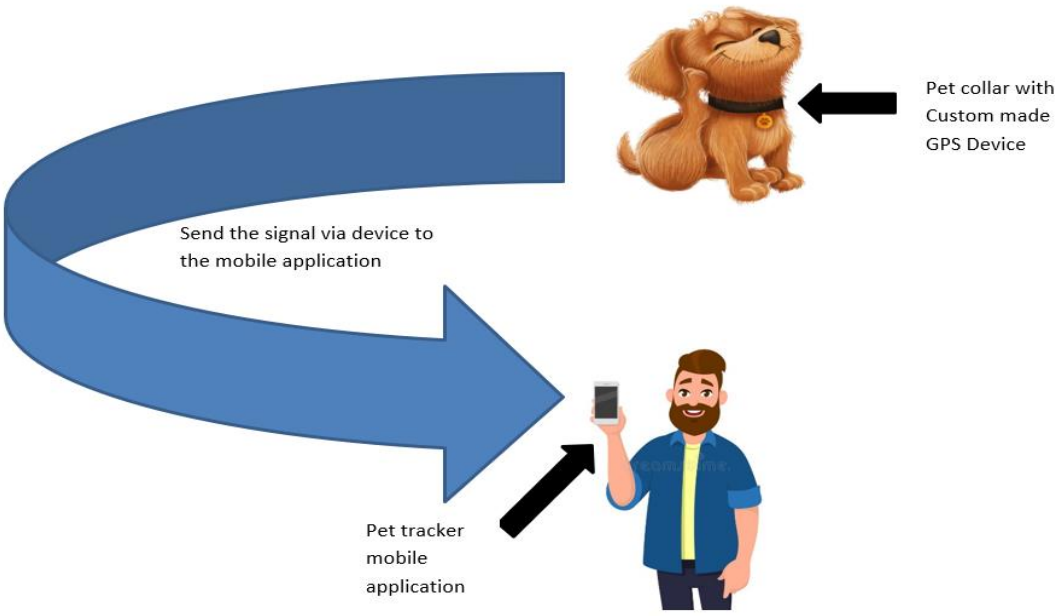
- More no-SQL database knowledge (firebase SDK)
- More Arduino technology using tutorials.
- Learning course about Arduino foundation in LinkedIn leaning (Khalil, 2021)
- More Android following course in UDEMY.COM
- Learning how to design circuit using NODEMCE board combine with Arduino UNO board.
- Learning googles sign-in for apply to android app
- More knowledge Arduino and study tutorial and documentation

PROJECT ALTERNATIVES

I decided to Switch from Java programming language to drat language with flutter framework to implement android application. Because for the purpose of clear interface designing and other sharp features development.

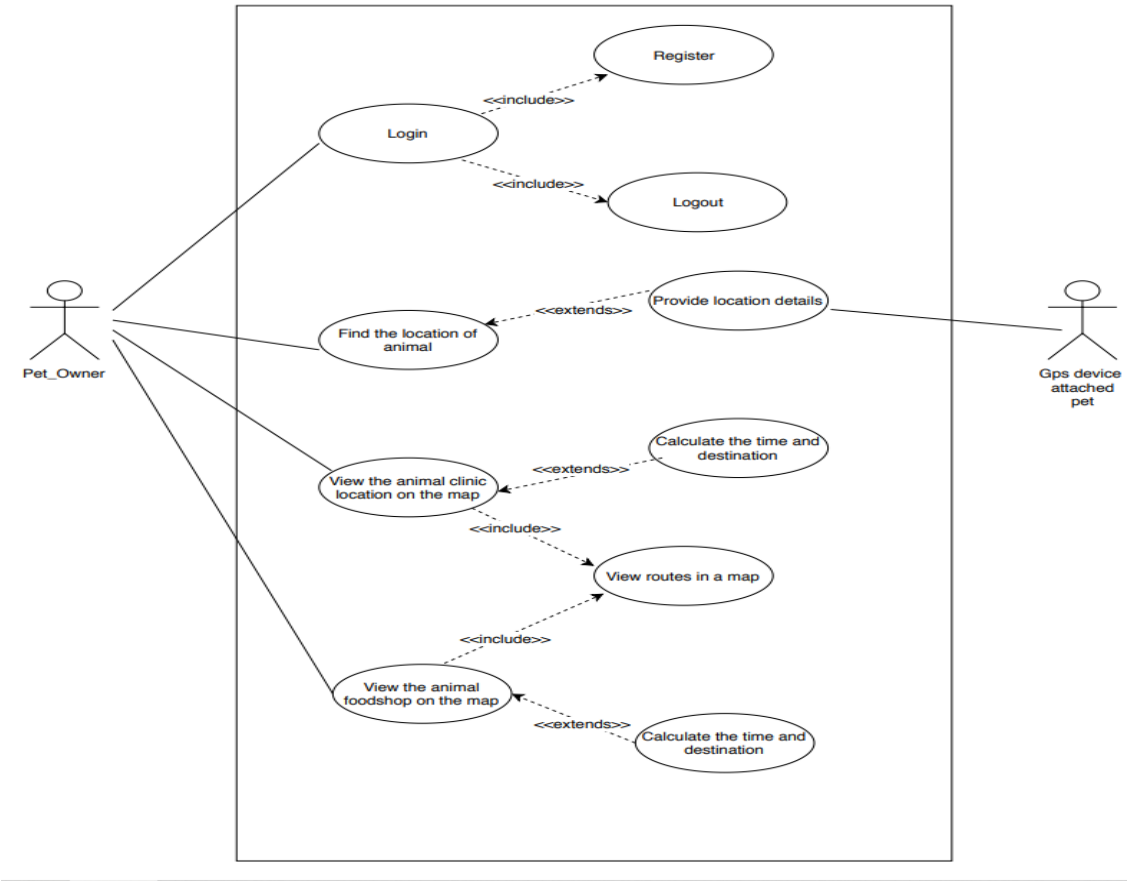
HOW DOES IT WORK?

In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination. This pet tracking device targeting to track in pets on time. who are the using this application they can easily find their pet by own. Pet owners would be able to log in the mobile application via email address and the password. Then pet owners will be able to see their pet's live location via GPS device in the pet colour .The costume made device attach to collar, from using that device can get signal of real time location of lost pet. After pet owner would be able to trace the live location with in receive data from the pet tracking device. Then pet owner would be able to trace via in google map service .

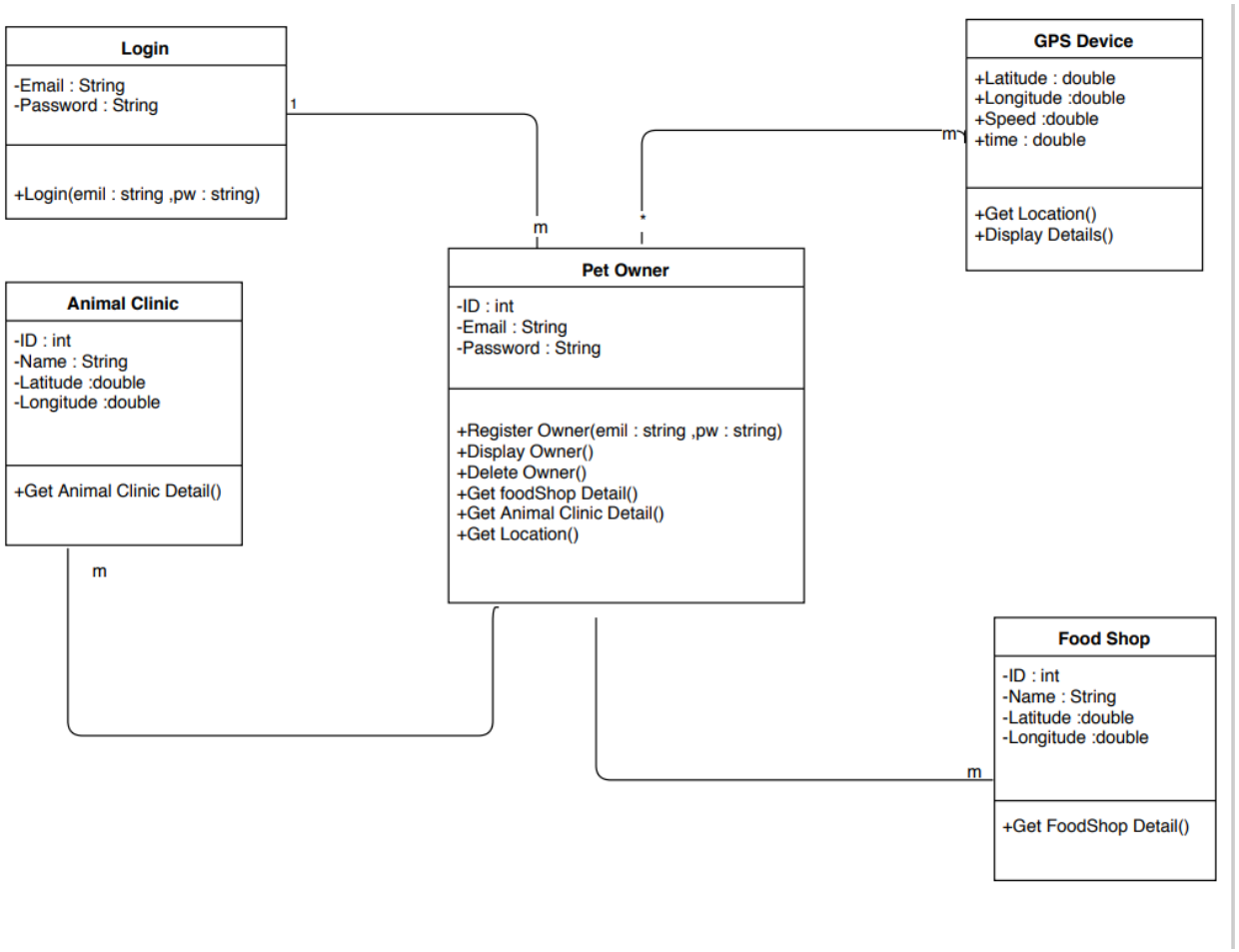


UML DIAGRAMS

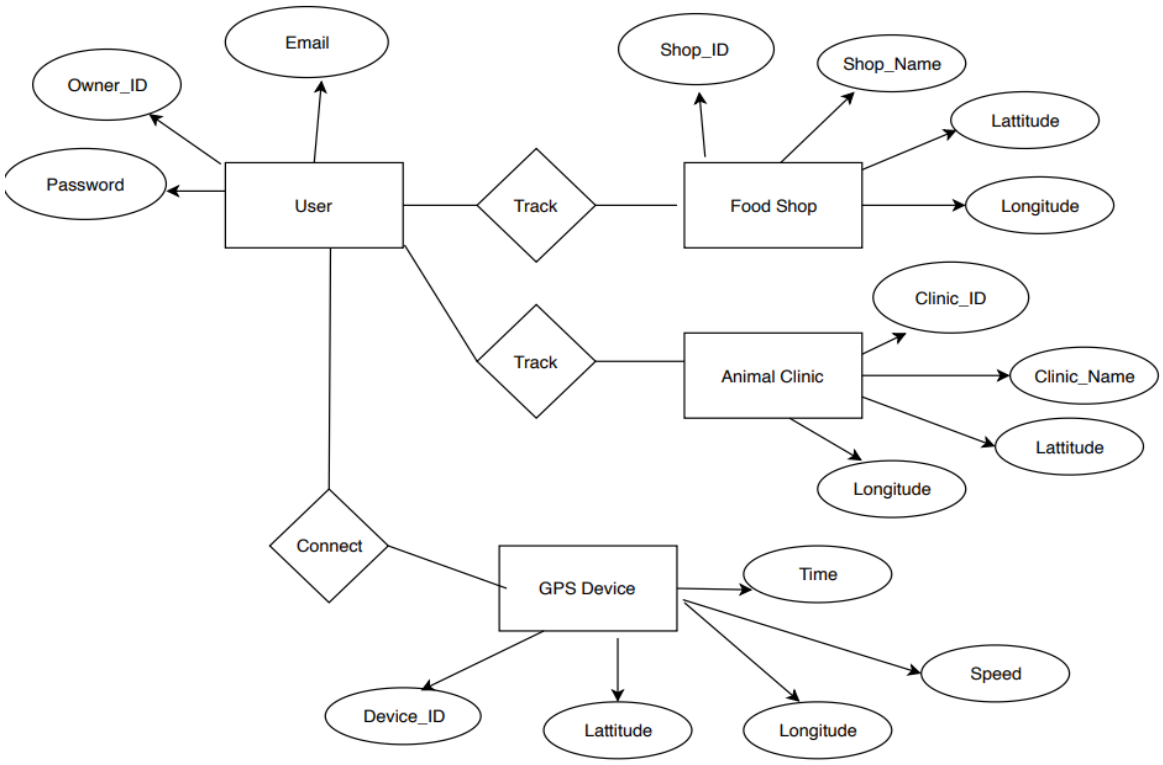
USE CASE DIAGRAM



CLASS DIAGRAM



ER DIAGRAM



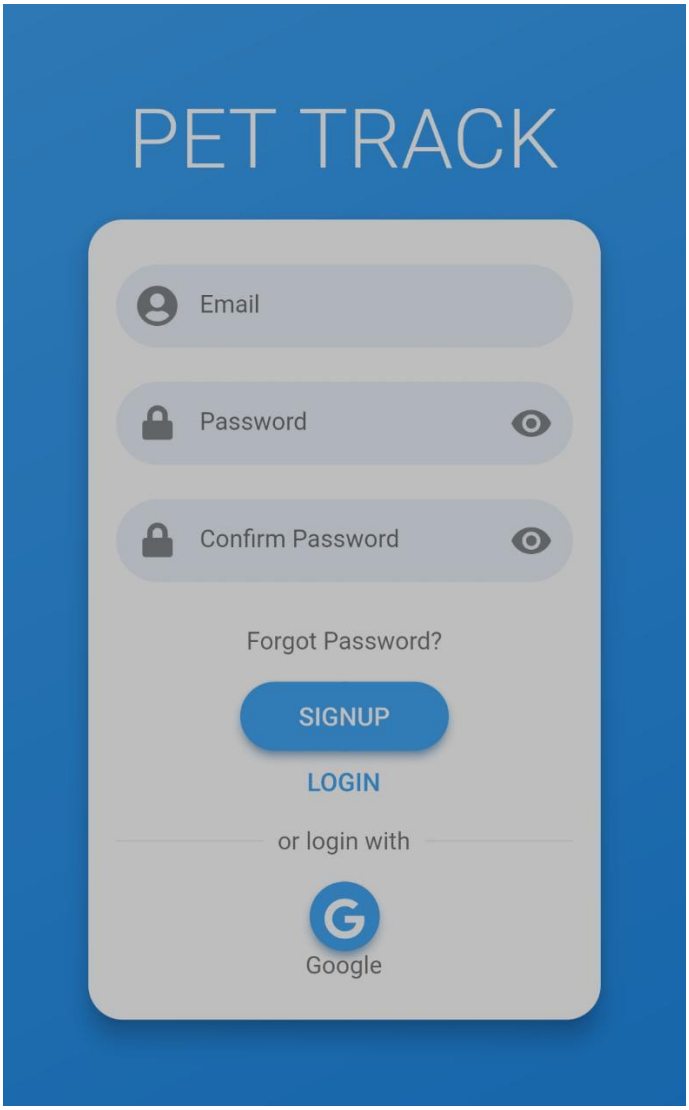
In ER diagram ,there are four main entities in the diagram. Namely user ,food shop ,animal clinic and GPS device are the entities of this ER diagram .user have email and ID, password attributes ,food shop has ID, name, longitude, Latitude. And animal clinic has ID, name, longitude, Latitude. GPS device entity has time ,speed, ID, longitude, Latitude attributes The user has strong relationship to GPS device to connect and other two strong relationship to food shop and animal clinic to track .

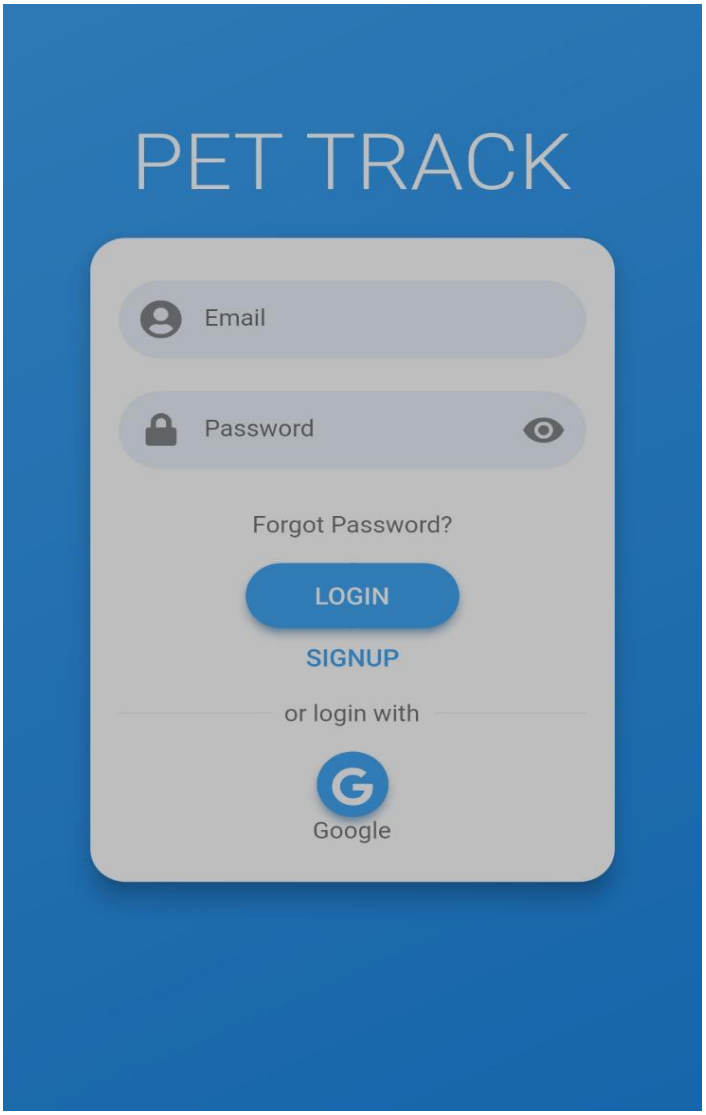
IMPLEMENTATION DISCRIPTION

In mobile application I will be going to add following features

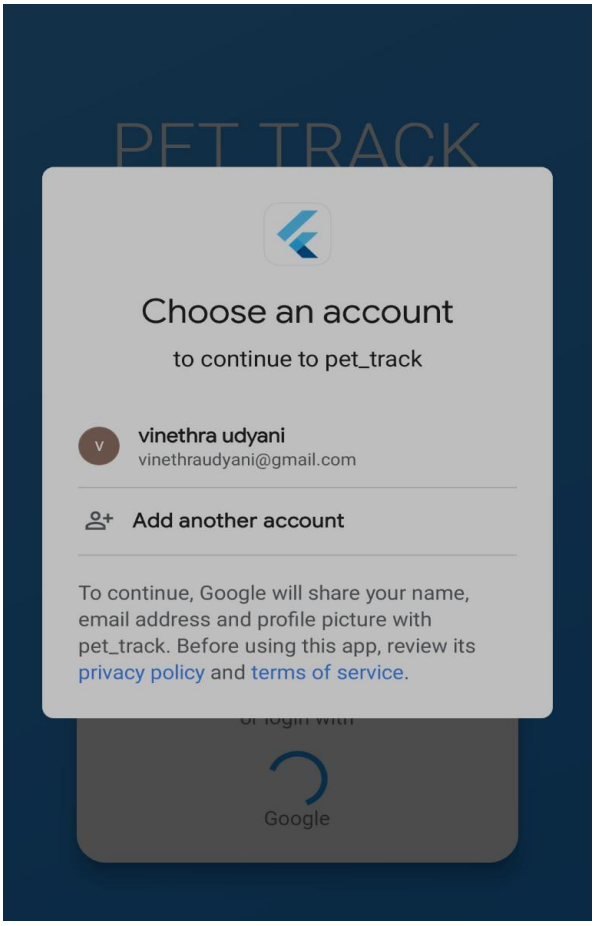
- User signup
- User login
- Real time locations
- Near pet shops
- Near pet clinic
- Upcoming vaccinations dates

In progress description I start to implement mobile application side. First, I would be able to develop sign in and sign-up page, find pet shops page, find pet shops page and pet vaccination page

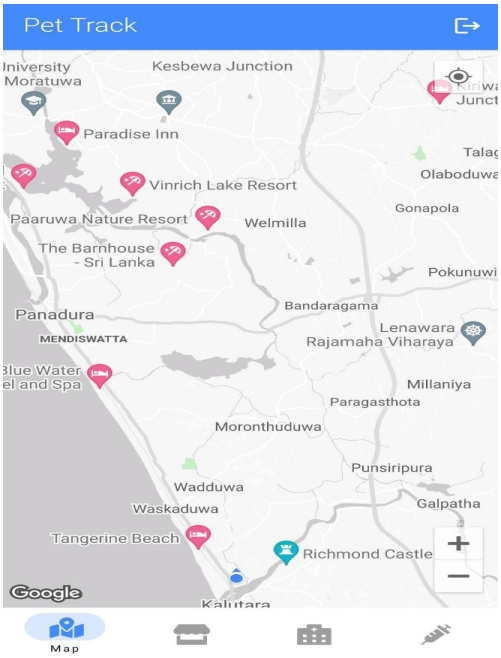


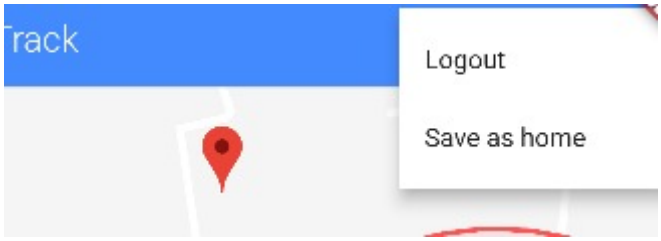


- In sign page- the pet owner can sign up to the mobile application using email address and the unique password.
- In login page -after the sign up the user can login to the application using already sign-up email and the password

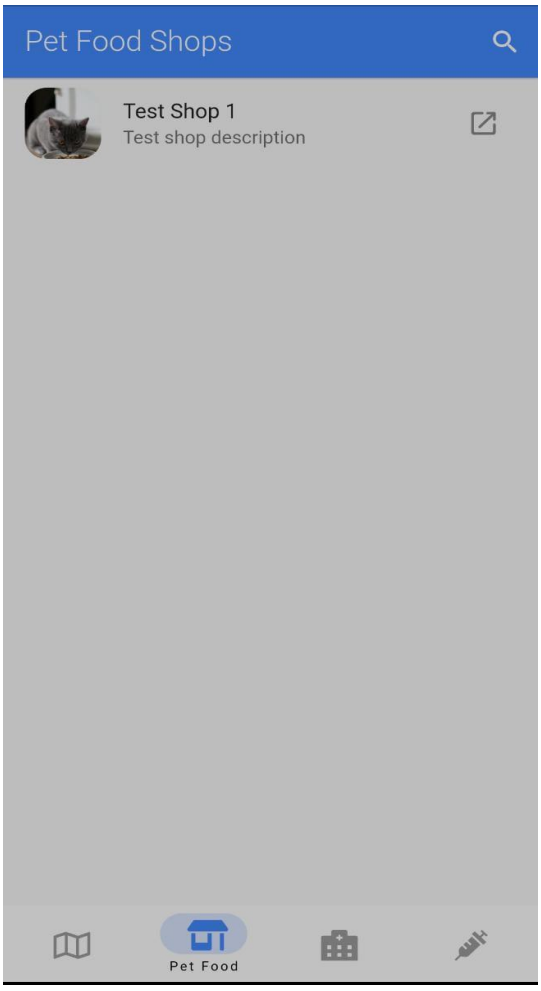


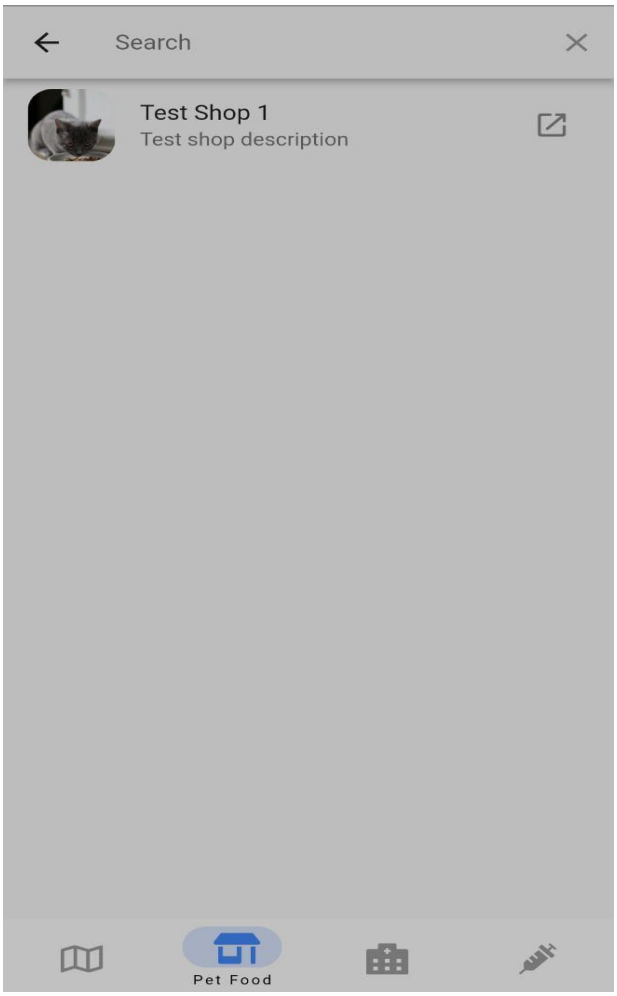
- In log in page- in this page deliver another sign up. The user can use their Gmail address as a google sign in



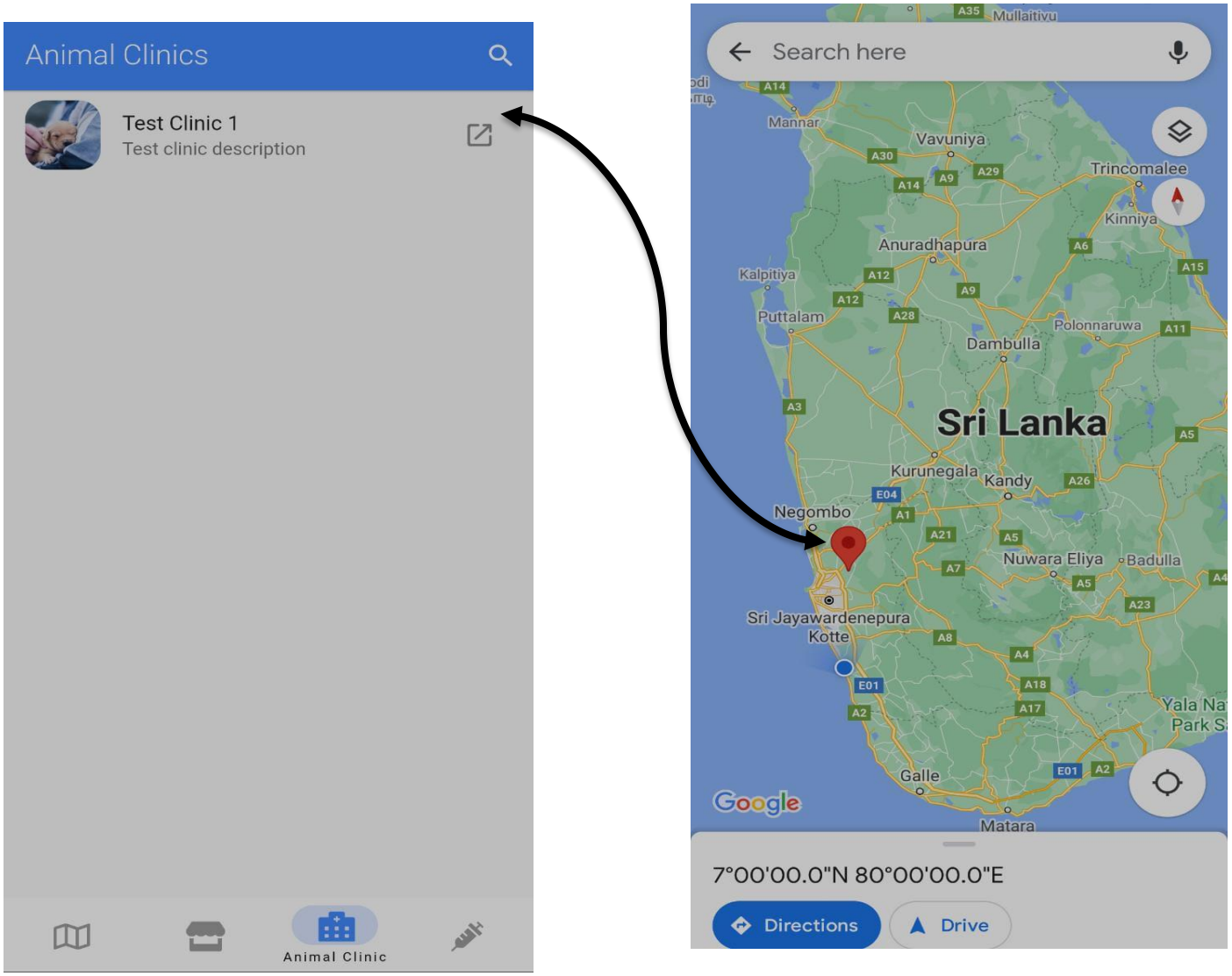


This is a page of searching real time location of pet. I still developing this section. In this find locations section is the combination of hardware circuit with Arduino programming. Therefore, I have to make customer-made GPS device. After the complete the hardware device and it connect to the database would be able to find real time locations via mobile application map. Under supervisor advice I have to implement safe zone. if the pet going in unsafe place pet owner can see that location with different color. If the pet is in safe area the pat owner can see that location in anther color. if the pet in owners home, owners mobile app shows their location in green color. If the pet going out in somewhat near place to home, mobile app shows in orange color tag in the that location. And the pet going to the unsafe area the location shows in red color area via mobile app. And anther feature is the safe zone can be fixed under app user requirement.

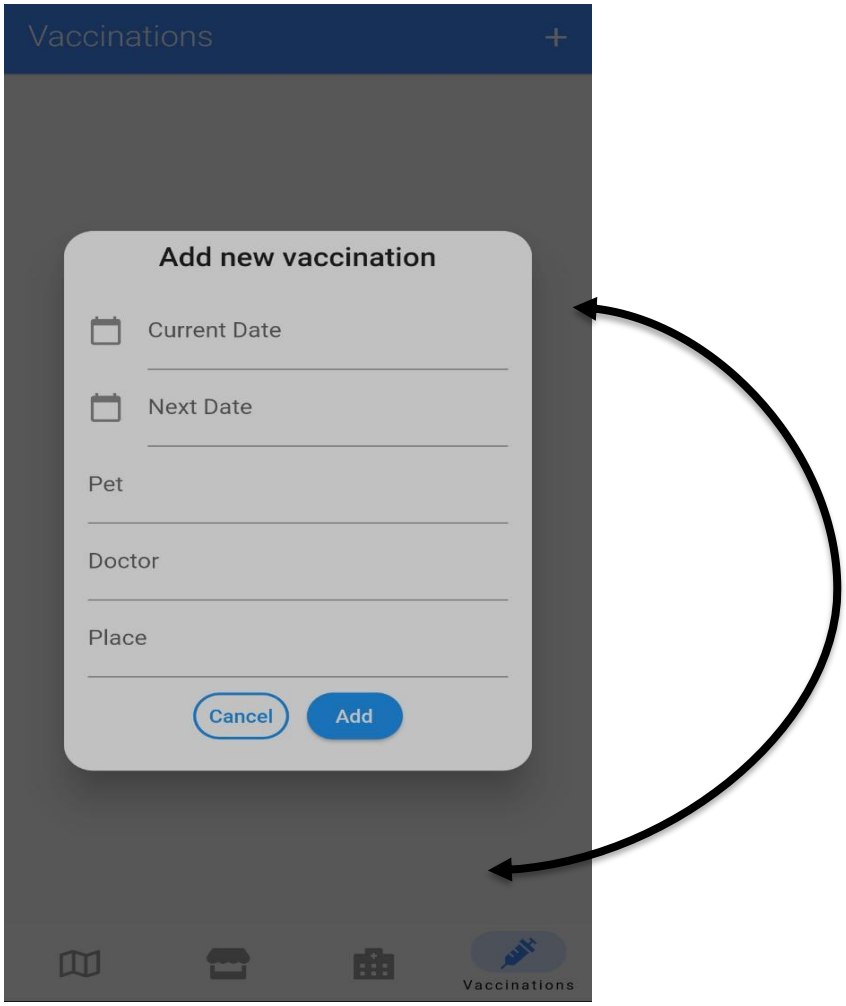




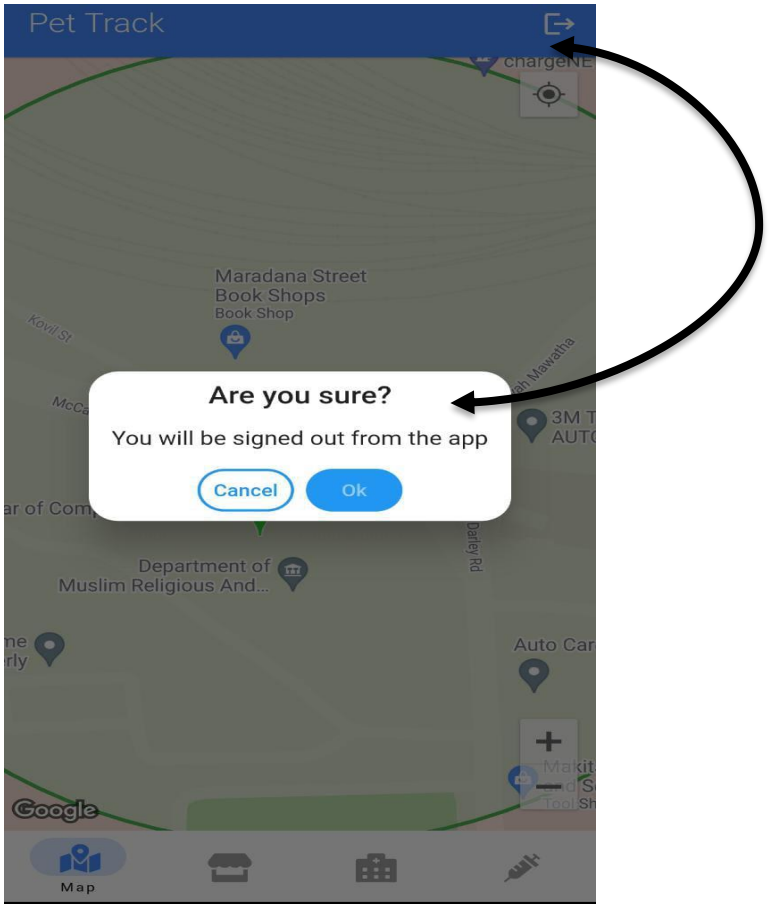
This page is pet shops page and thus page shows all the pet shops in the near area. Special thing is if new pet shops descriptions can be added in database. Then in that page shows all the pet shops and detail descriptions. When clicking on the corner icon is going to shows where the locations of the pet shops located .In the pet shop descriptions can add the picture and icon via database .And searching bar is used to search pet shops descriptions in the pet shop.



This page is present find animal clinic around the near areas. And the page present descriptions about animal clinic. The new animal clinic descriptions and locations would be able to add via database .In the mobile app there is an icon in the right corner .When the clicking on that icon app user can find that animal clinic as the emergency .Then user can see the locations of animal clinic via map when user want to go or other purpose.



This is page of upcoming vaccination date. The pet owner can add next date and last vaccination date related to pet and the doctor .In this page has the input next vaccination date ,last vaccination date doctor name and the pet's name. If pet owner needs to delete this vaccination note clicking on dustbin icon would be able to delete vaccination note. In log in page has an icon in right corner .



If app user needs to log out in any time clicking this icon the notification pops up to cancel or ok ,clicking ok button application user can log out this application.

Hardware section

In this project have some IoT device for find real time locations. I still implementing customer-made GPS device .This hardware device include Node MCU ,Arduino uno borad,6M GPS device and MI power bank, Node MCU is for retrieve data to database .Using Arduino uno board and 6M GPS would be able to find real time locations of pets .As the prototype I choose MI power bank for the power supply .Because it is reusable. As alternative power battery. I selected but as the pandemic situation that battery is not available in Sri lanka .I will have to connect device to database using Arduino programming .In hardware description with alternative issues and solutions ,above topic I mention all the alternative plans and features and why I choose this hardware components to develop this customer-made GPS device .

Gathering and analyzing requirements

Task

The user data was collected in interview getting from pet owners and some collect details via questionnaire with understanding and identify better understanding. Using the internet, google search engine and journal articles and IEEE newspapers. collecting after the user details could be identify below information and the data.

- The pet is missing pet owner cannot find their pet.
- If the pet getting injured the pet owner can not find animal clinic easily.
- To get and reminder health details about pet via app
- Get the details about food accessories.

Issues

- Pet owners are not intertest to fill the questionnaires
- Need more responses from pets owners to identify better user requirements.
- Collecting the details via google is somewhat difficult because lots of paper article are wrote for vehicle tracking

Solutions

- Interviewing pet owners about their wants and expectations when it comes to pet care.
- Made phone calls and text messages to pet owners.
- Went to pet shows and talked about their issues with pet ownership.

Designing

Task

Regarding the hardware designing have to develop custom-made GPS device and it connect to firebase to get real time locations. And via the mobile applications would be able to see the live location to pet owner

Issues

A. Somewhat difficult to get real time locations via predesign Device
B. Flutter and dart language is newly learned
C. Pet collar must be a small therefore find to difficult a small GPS device

Solutions

A. Design custom made GPS Device with 6MNEO and NODEMCU components
B. Follow the course from LinkedIn learning center and the UDEMY.COM
C. Follow tutorials in YouTube based on Arduino

Implementation

Task

Because this is an android-based application, the timetable follows agile technique, and issues can only be discovered when using the system. The goal is to create the first prototype (GPS Device) and test it with users before moving on to the final product. Following the correction of mistakes and problems, the final product (GPS Device) and application are implemented, with maintainability testing continuing.

Issues

- As additional time was spent designing the circuit, the initial time management was exceeded.
- During the development time, I was unable to follow the initial Gantt chart.
- To retrieve the current location from a normal GPS device, the owner needs to send a message to the device.

Solutions

- A. When designing the application, I eventually managed my time.
- B. As much as feasible, spent less time on design, development, and other phases.
- C. Create a tracking device that combines a NODEMCU, NEO 6M GPS, and a portable Wi-Fi device to provide real-time location information.

Documentation

Task

I had to submit a project proposal, a contextual report, a reflective report, a final thesis report, and monthly progress updates as part of the evaluation process.

Issues

- The majority of publications and papers are outdated or do not correspond to current technologies.
- Finding the most recent articles and papers is difficult.
- Gather enough research papers and articles to back up your claims.

Solutions

- Visit official websites to obtain information.
- For the most recent research papers and articles, I used "google scholar."
- Selected papers and articles with the help of the supervisor**.**

TESTING

Testing Introduction:

The important of the software life cycle behaver as the expected and sure the system, relevant components are working as expected and define numbers of testing times and materials. For the purpose of well performed to improve the quality of the new product. This application tested in several time. after the several time testing can be identifying the bug and errors, also can be able to detect the run time errors. Therefore, several times checked and get sure all the software performed all the requirements of the customers need. There are several testing methodologies are available to test the software application. Those are unit testing, functional testing. white box testing and the usability testing are the methods of to check the software application. In this software testing section can be used white box testing and usability testing. In the Whitebox testing can be test the structure of the code of the project. And the usability testing can be testing the feedbacks from the users and the testing methods get the positive results. Testing is the main factor the of the software project to improve the quality of the product

Testing Methodologies:

The testing methods are helping to improve the target requirements of the project successfully. Testing methods are categorizing the entire project of the several stage and check the stage separately. And always check the connection between product and the source code. The testing methodologies helps to improve entire project with better performance.

Development & Testing

Below section include the all the test cases of the mobile application

Test case	Test case Description	Test Data	Expected Result	Actual Result	Test status
01	Launch the pet application		View the signup form	Signup form	pass
02	Sign up the application	Email Address: test@test.com Password :123456 And the user Gmail	Sign up the application	Signup the application	Pass
03	Log in the application	Email address and password or app owner google sign - in	Sign in the application	Sign in the application	Pass
04	Show the live location via map	Click the icon below in the starting interface	Get the location details via firebase	Show the custom-made gps live location	Pass
05	Show the near pet clinic locations	Click the clinic icon below in starting interface	Get near the animal clinic locations	Show the clinic locations	Pass
06	Show the near pet accessories	Click the shop icon below in starting interface	Get near the animal clinic locations	Show the near pet accessories	Pass
07	Sent the location details to the firebase	N/A	Get the location details from firebase	Get the location details from firebase	Pass
08	Update real time locations	N/A	Real time locations	Real time locations	Pass
09	Connect the GPS	N/A	Show the real time locations in the mobile application	Show the real time in the mobile application	Pass

Testing pass word and the email

Test case01	Test case Description	Test Data	Expected Result	Actual Result	Test status
1.1	Sign up	Empty email Enter password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
1.2	Signup	Enter email Empty password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
1.3	Signup	Enter empty email and password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
1.4	Signup	Enter correct email and correct strong password	Valid signup	Valid signup	Pass (valid signup attempt)

Test case02	Test case Description	Test Data	Expected Result	Actual Result	Test status
2.1	Sign in	Empty email Enter password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.2	Sign in	Enter email Empty password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.3	Sign in	Enter empty email and password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.4	Sign in	Enter empty email and incorrect password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.5	Sign in	Enter incorrect email and empty password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.6	Sign in	Enter incorrect email and incorrect password	Invalid signup	Invalid signup	Fail (invalid signup attempt)
2.7	Sign in	Enter correct email and correct strong password	Valid signup	Valid signup	Pass (valid signup attempt)

Evaluation

Multiple approaches will be utilized to estimate the artefact for this device. The item will first be compared to what was planned at the outset of the project. Following that, personal opinions about the object will be considered. Following that, potential users will be able to use the system and submit input, which will be analyzed and reviewed. Combining these two ways of evaluation will aid in determining whether the product and equipment will be a successful overall endeavour.

Evaluation Assumption

For this review, it will be assumed that the is not being used as a complete gadget, but rather as a prototype of what may be accomplished with this tracking device and the technologies proposed to meet the needs of consumers.

Evaluation Methodology

Various approaches, such as self-evaluation and future user evaluations, will be utilized to assess pet tracking and project development. To ensure an overview of the gadget, these several evaluation methods are supported. This will enable for more relevant and accurate work in the future, resulting in a better tracking gadget.

Review of evaluation

Throughout the test, it was obvious that the developed application successfully implemented the garage tracking concept. The testing section proves that the application met the majority of the requirements listed in the requirement section. However, it has been discovered that many more functions might be added to the application to expand its reach.

Conclusion

The report will be examined in this phase, with significant points specialized and discussed. Following the assessment of the functional points stated throughout the report, further work will be collected through user feedback and suggestions will be made as to what features should be introduced to update the device.

Summery

The pet tracking device was created to demonstrate how location tracking works. After using the device with the application and completing the idea, self-evaluation was performed. The results of the self-evaluation showed that the anticipated pet monitoring device met the majority of the fundamental standards and had a few extra functions.

Limitation

This custom-made device was created to meet the majority of the needs gathered from pet owners and trainers. The user of the device can get a real-time live location of the approximate point of position from his or her end. Additionally, the software provides several additional user-friendly capabilities.

In order to work on developing the pet monitoring gadget and software, a user must be able to utilize a smart phone or tablet that runs an Android operating system and has more than 1 GB of RAM. Users should have a version of Android that is newer than 5.0. When the user uses the application, the device must be within range of a Wi-Fi or appropriate internet connection. Currently, this application

Future Implementation

The future implement of pet tracking system has to be developed with improvements. under improvements provides extra features for the system users to base on user questionnaire previously answered.

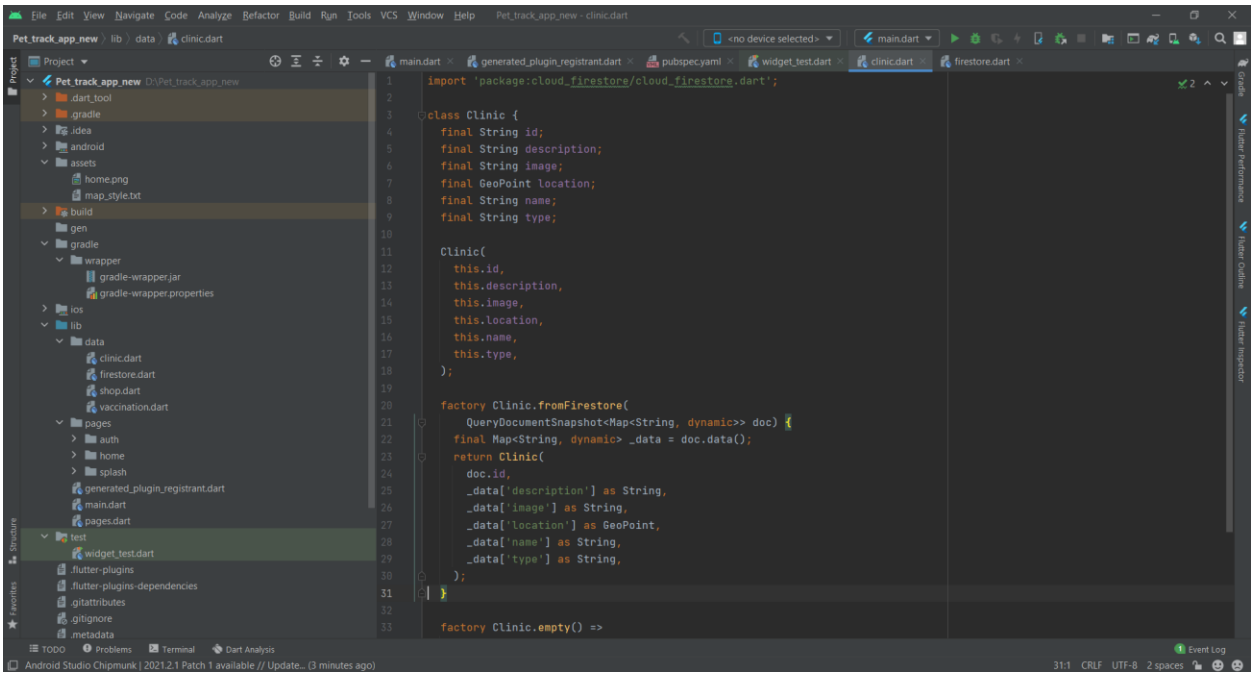
The current application introduces and show the pet locations via custom made device has better to important and useful for live pet tracking. There are new and upgraded pet tracking concepts are in the modern technology. Using the upgraded technology can be modify the application better than current application. Not only that after the releasing the mobile application, getting the feedback of the users can be improve the new facilities with next update as the version

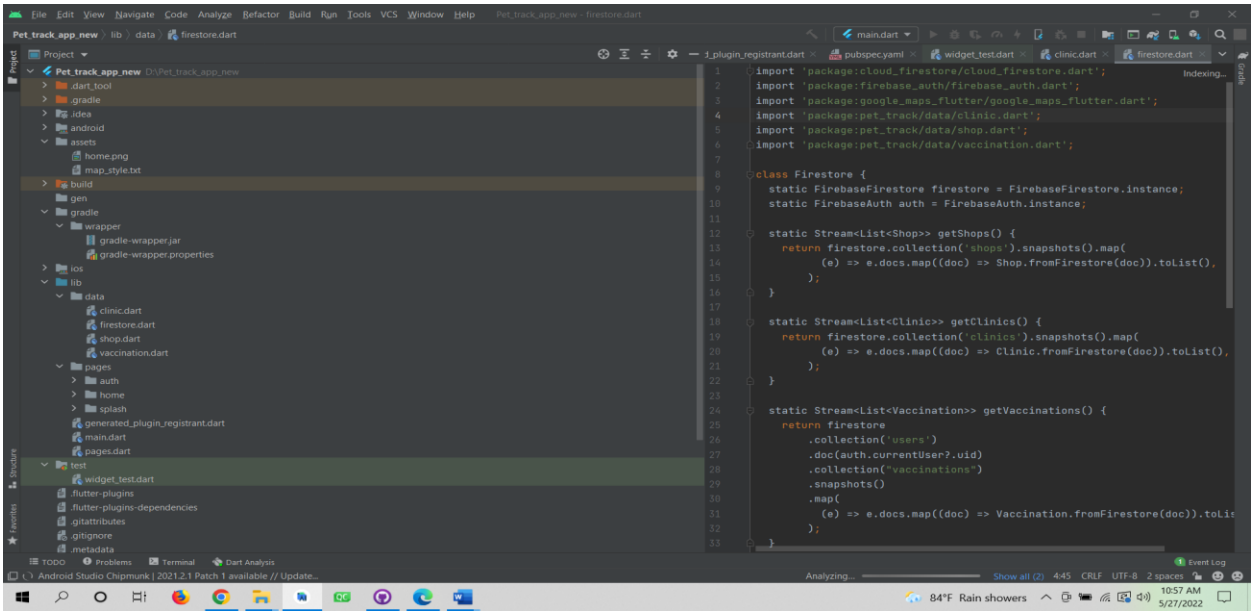
In the developed system application conduct under pet tracking concept. Regrading the pet tracking concept, the system user can be searching the locations of the pet. Then system user can get the location via the mobile app shown love path, this system main connect with two components there are custom-made device and the mobile application in the mobile phone as the future implementation will plan to upgrade the application to connect multiple device such PC and difference operating system. Then system user can see the real time location of pet with difference devices.

The current application would be able to see live location of the pet and the location of when the pet going safe or unsafe area. But the future implementation will hope to improve the to see the current location via mobile application and hope to attach more upgraded sensors and camera to see the live activities in video mood. And mobile application will upgrade to add more pets accounts for the one application. Future hope to connect vet nary doctors profiles and facilitate to confidence relationship between pet owner and vet nary doctor. And hope to connect the pet lost social media platform one of my university mates developed.

Regarding to the entire application will hope to develop with complains and the feedbacks for any upgrades. system will provide to; users can post their solutions and other feedback about this application.

CONSOLE SCREEN SHOTS





https://github.com/vinethra-123/Pet-Tracking-System (github link)

APPENDIX

INTERIM-2

COMPUTING WITH PLYMOUTH UNIVERSITY

School of Computing and Mathematics

PRCO303

Final Stage Computing Project

INTERIM REPORT -2

BSc (Hons) <*Software Engineering* >

< M.A.V.U. *Matharaarachchi*>

<Find Your Dog >

2021/2022

INTRODUCTION

Real time pet tracking system is solutions for pet owners. Pets are going missing is a problem many pet -owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up “LOST” posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. This real time pet tracking system helps to find their own pets easily with low cost and risk, not only that reduce the pet owner’s time. This pet tracking device is android application project. Using this mobile application, pet owners would be able to tack real time location with GPS device. Applying this purpose pet tracking system pet owners will not be able to share post on social media and newspapers, pet owners can find their pets in their pets by own. The operation of this system is uniquely boated GPS tracking device whether connected to pet’s collar for the purpose of trace the live location of pets. In this system live locations shows in via mobile application in a short time.

In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

In current situation there are lots of locating applications. As an example, delay pointers, In this case item were passed the point. After data were collected. Another Examples are barcode or gate. Others are actual time using GPS, depend on data upgraded. There are bar code systems that allow a human to scan objectives and discover oneself automatically (automated ID RFID). The major section, the world of tracking contains of separate hardware, software systems for the various applications. The reason for choosing this project to implement a pet tracking system is often the loss of pets as well as in public places and on their own grounds.

For this perspective this is a one of the solutions for problem. In emergency, pet owners would not be able to find and animal hospital near to their own area and will forget the upcoming vaccination dates of their pets. This is a mobile application can be solved above problems.

PROPOSE SYSTEM

My intention was drawn to developing a pet tracking system that will do as follows:

- A custom-made GPS tracking device will be attached to the pet's collar.
- The owner can monitor the whereabouts of the pet using the developed android application.
- With the use of the real time location feature pet owners will be guided to their pets using the shortest route.
- User (pet owner) has the ability to track more than one pet using the application.

GOAL

✓ When the pet owners log into this application, they can find their pets by their own in real time. This purpose system's device will show the pet's real time location via the implemented mobile application.

PROJECT SCOPE

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner.

In existing system was manual founding system centered to pet owners. In purposing system, manual system transpose to digital system. Therefore customers (user)can allow to new technology.

Contain of scope

- Track the pets' live locations

❖ this pet tracking device targeting to track in pets on time. who are the using this application they can easily find their pet by own. Pet owners would be able to log in the mobile application via email address and the password. Then pet owners will be able to see their pet's live location via GPS device in the pet collar.

- The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

❖ The costume made device attach to collar, from using that device can get signal of real time location of lost pet. After pet owner would be able to trace the live location with in receive data from the pet tracking device.

●Plan to make custom-made GPS to track pets outdoor exploring

●Collect all information using custom-made GPS and receive the data to mobile application

- In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

●Pet owner can allow to find near animal clinic and hospital

●Pet owner would be able to find near pet shops

●User (pet owner) can place the reminder for upcoming vaccination dates.

- This system allows more features for find near animal clinic and hospital emergency, where nearest pets accessories shops and keep trace the vaccinations and make remind the date of vaccinations

●User can allow their own email and password to log this application in under high security

INFORMATION GATHERING

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner. All the primary data were gathered by interviewing and some questionnaires, internet, research papers and articles on the google scholar

The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

- There was no option to find a pet when it goes missing.
- They have no option to find their pets cannot found
- How to find pet clinic and hospital in emergency situation
- To find animal accessories shops and food shops in quickly.
- Keep reminder status on pet vaccination date for the convenience of pet owners

TASKS UNDERTAKEN AND OUTCOMES

- Get correct understand about the project and selected most suitable technology as the Arduino technology.
- Implement the circuit using Custom-made GPS, ESP8266 (NodeMCU) and Arduino Uno.
- Get data from custom-made GPS and send it to the mobile application.
- Started implementation of the user mobile application.
- Study and start Implementation of hardware product.
- Implement Arduino code for the data transferring to firebase.

PRODUCTS PRODUCED AND PRODUCT QUALITY

- Made some sections of mobile application
- Validate using the functions those sections
- Check the validations.
- Check the quality of interface designing.
- Made some sections of hardware circuit

RESOURCES AND TECHNOLOGIES

- **Hardware / Devices** – Hardware components (IOT)-Tracking Device NODEMCU board, Arduino UNO board, GPS Device, NEO 6M Device.

- **Technologies** – Firebase, Android studio, Google API, Adobe XD, Arduino technology, Flutter framework
- **Languages** -Dart

Firebase: Firebase is a real time database support to store data. Firebase is NOSQL database. Firebase present More facilities for crash report and bug fixing quickly any developers can be assessable to machine learning via firebase. And cand send the message to cantered crowd. Therefore, Firebase is used to make database in this application.

Android studio: Android Studio is the powerful development system for implement mobile application. Android studios present more facility such as firebase support, faster coding, testing and fully feature rich emulator. Android studio is used to develop mobile application

Flutter is open souse UI software development kit most of flutter app are written in dart language. flutter will help to create and design beautiful app with productive and open development model and beautiful user experience and come up with fast result and productive development

HARDWARE DESCRIPTION WITH ALTERNATIVE ISSUES AND SOLUTIONS

I will plan to make the custom-made device as a prototype. The NEO 6M GPS, NODEMCU, Arduino uno board and power bank are components. But we can add alternative features for this prototype. We can replace NEO 6M GPS to Grove-GPS Module or Grove (Air530) module. Those GPS performance level are better than 6M GPS datasheet. But those GPS are some heavy weights and expensive. Therefore as a prototype I choose 6M GPS.

Arduino mega 2560 and Arduino Due are present similar performs like Arduino uno. Thought Arduino mega 2560 and Arduino Due are small unit and situation for make this device. because device mainly focusing pet's environment. Therefore, I agree to choose this units for my implementation. According to my budget plan there is gap to buy it. I target to make a prototype so if I handle my budget plan, I would be able to use above Arduino unit consider about pet environments.

DAOKI ESP8266-12E development board is the advance unit with temperature and humanity sensor +breadboard. Therefore, I can replace NODEMCU to DAOKI .AS a prototype, I think no need this. But in further implementation I definitely use this standard feature considering about my budget.

According to connection type I will plan to connect to wi-fi method. But there is a anther connection type, We can use IOT SIM material to make connection facility. Using the IOT SIM, it has high rage not like wi-fi. IOT sim can work minimal 2G signal. But apply this sim I will have to develop anther hardware configuration to connect, and it spend high battery life. According to my plan, it may be a big task. Using NODEMCU I can quickly access wi-fi connection. All the connect type doing similar task (connect to the server in difference methods).

I will plan to power bank to supply power for this device. Because if we use some batteries, we have to think about their lifetime. some batteries durations are very short. Using small power bank, it would be able to recharge.

Regarding to the signal and the frequencies and communication among device I think not harmful to dogs. If we think about our home wi-fi and mobile phone signals, always humans have to face those frequencies. In that point I Thinks no issues for pets. And I will analysis about this are more. In this moment I cannot find any harmful things belongs to frequencies.

In climate changers, I analyzed this area, And I found some solutions for it. regrading to signal issue we can make small antenna to custom made devices. another thing is we can make waterproof background for this device.

According to the weight of device, it may have some issues, but definitely this device(prototype) can wear a big pedigree dog weight between 10-12kg. first, I am targeting to make a working prototype consider about my budget. After I will go to Further development consider about weight and using other standard technologies

LEARNING UNDERTAKEN AND REQUIRED UNDERTAKEN:

Undertaken

- Learned dart language
- Learned Arduino technology.
- Learned Hardware components
- Learned android studio IDE
- Learned google maps service
- Started to implement mobile application.

Regarding to my project I hope to implement divided in two categories. first, I develop mobile application in mobile application developing I need more knowledge about firebase authentication servicers etc. When the developing mobile application first I create a wireframe for interface design after I design Ui via figma platform. Further design use case diagram for this application. This pet tracking mobile application develop under using flutter framework. Therefore, need more practices and knowledge about dart language. Using the dart language would be able to optimize interfaces, fast and quick in the whole platform. And the flutter framework is open-source framework support multiple platforms and fast. Other main category is hardware configuration. Under hardware configuration 6m Neo GPS Device, Arduino Uno board, NODEMCU

are the main components of hardware implementations, as a prototype I hope to MIU small power bank for get power supply for circuit. System hardware implementation is close to custom-made. when the complete of the hardware device, it is totally custom-made device. The hardware configuration under Arduino technology therefore needs more knowledge about Arduino technology. In current days I am following Arduino fundamental courses in LinkedIn learning center. In those courses I am learning about programming regarding to Arduino-Uno bord and details about serial monitor etc. Before I started the project implementing, I wrote the feasibly analysis about existing systems and alternative hardware components. I studied IEE newspapers under animal tracking and the animal care. Regarding to those articles I gathered information about, what are the most wanted additional feature for pet tracking application.

Required

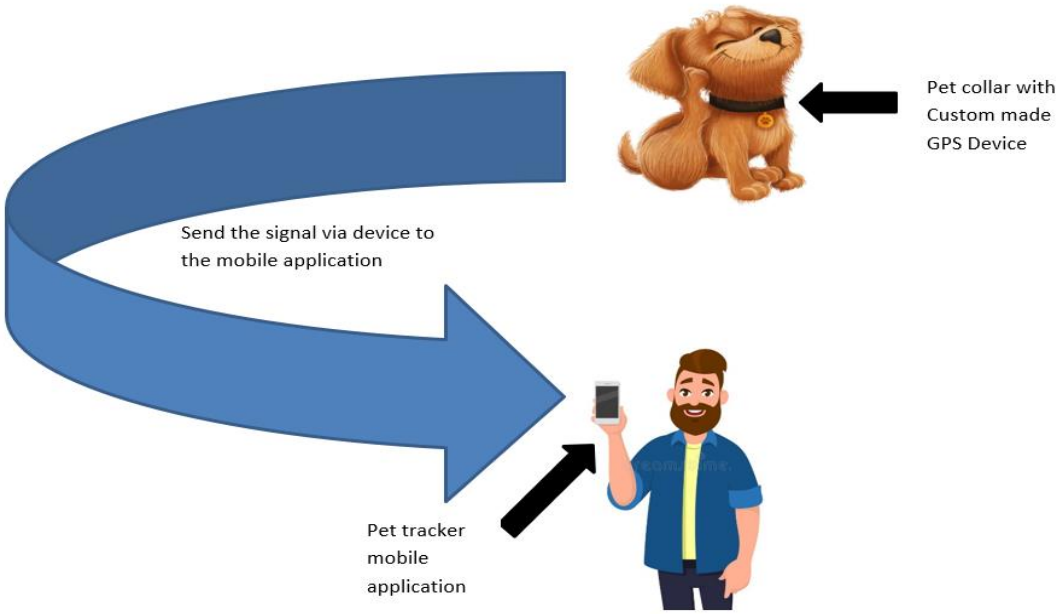
- More no-SQL database knowledge (firebase SDK)
- More Arduino technology using tutorials.
- Learning course about Arduino foundation in LinkedIn leaning (Khalil, 2021)
- More Android following course in UDEMY.COM
- Learning how to design circuit using NODEMCE board combine with Arduino UNO board.
- Learning googles sign-in for apply to android app
- More knowledge Arduino and study tutorial and documentation

PROJECT ALTERNATIVES

I decided to Switch from Java programming language to drat language with flutter framework to implement android application. Because for the purpose of clear interface designing and other sharp features development.

HOW DOES IT WORK?

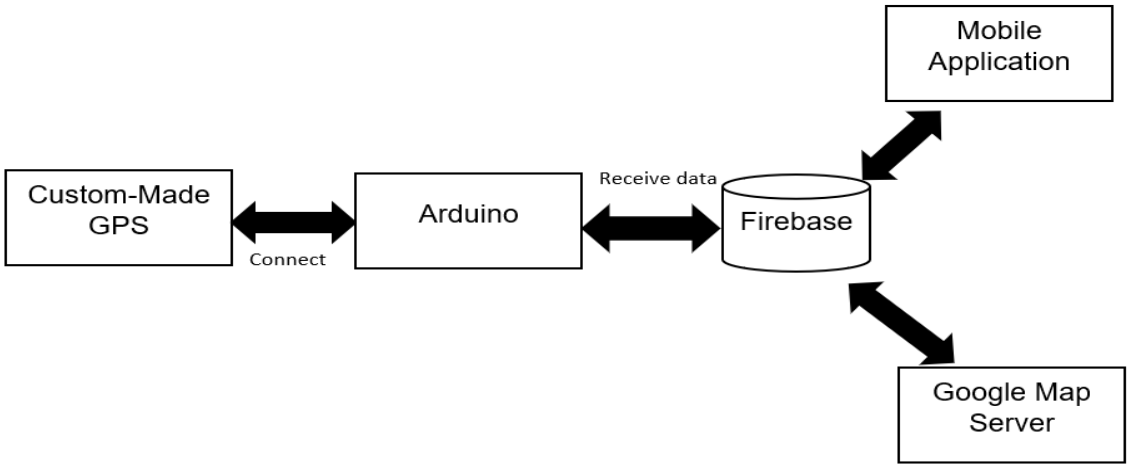
In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination. This pet tracking device targeting to track in pets on time. who are the using this application they can easily find their pet by own. Pet owners would be able to log in the mobile application via email address and the password. Then pet owners will be able to see their pet's live location via GPS device in the pet color. The costume made device attach to collar, from using that device can get signal of real time location of lost pet. After pet owner would be able to trace the live location with in receive data from the pet tracking device. Then pet owner would be able to trace via in google map service.



METHOD OF APPROACH

The pet tracking system developing under agile methodology. Agile methodology the fastest methodology and most well -known methodology. The use of agile scrum strategies in program improvement can have an impact on a task with minimal probability of culmination and delivering results quickly and after a while. Clever logic, however, was never intended to be simply a programmatic improvement. Mainly agile methodology presents the better way how to achieve the major goals in the standard level though it would be able to show the best guidance to deliver the product in target level.

Operation of this system is all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.



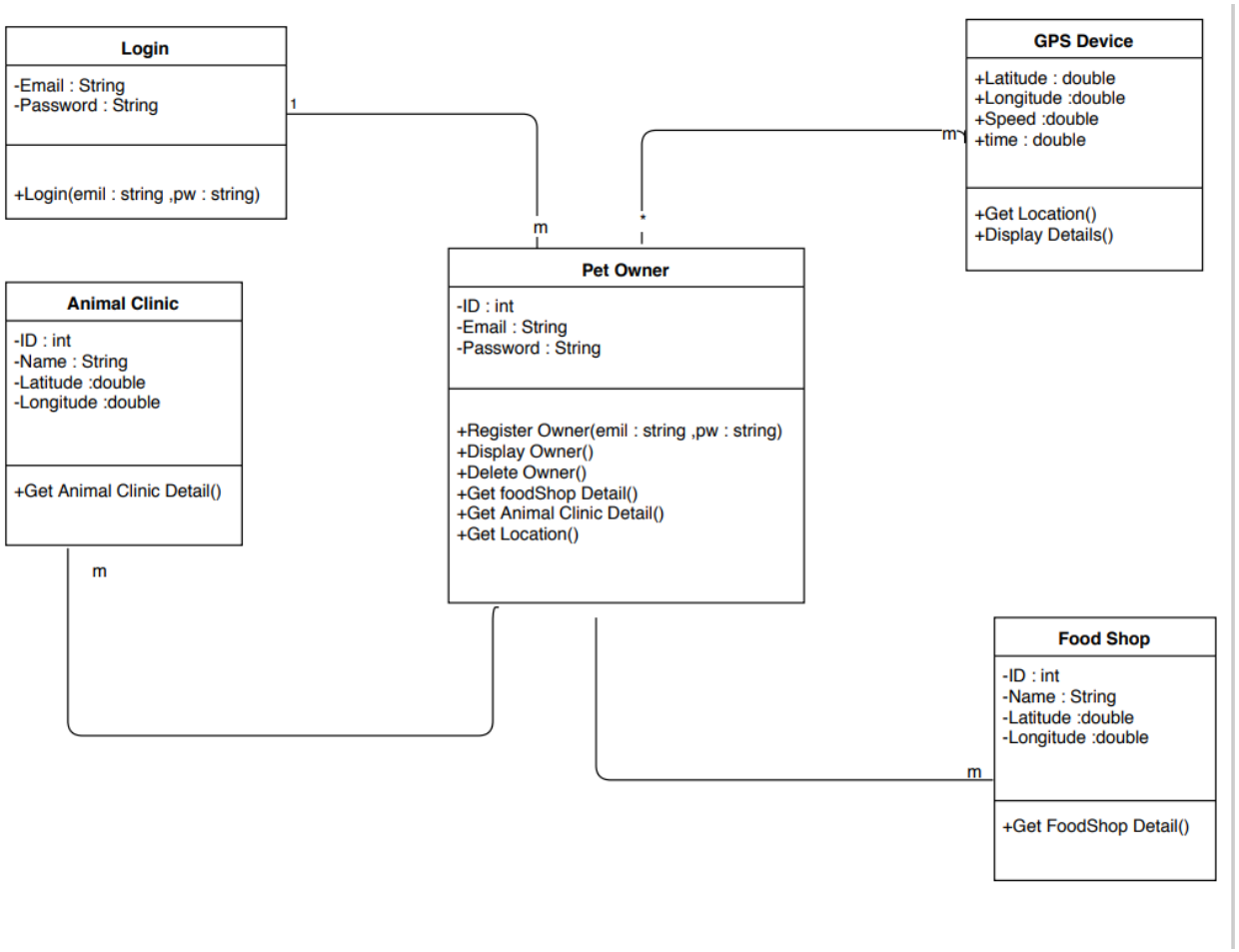
SCHEDULE

Project Plan			
Stage	Deadline	Products/Deliverable/Outcome	Current status
9. Initiation	17/11	PID	Completed
10. Investigation, Requirements	20/11	Feasibility study (analysis exist systems and requirements, technologies) (focus project and the scope)	Completed
11. Design	5/12	Design diagrams before start. (Architecture. Database schema, UI)	Completed
12. Implementation1	7/1	Implement sub-system and provide customer functionality	Completed
13. Implementation2	20/2	Implement sub-system between internal and the commination (Hardware system implementation)	Still implementing
14. Implementation3	10/3	Implement other features related to software finality	Not completed
15. Testing the system	15/3	Final system and testing	No
16. Final report and research	1/4	PRC303SL Report	No

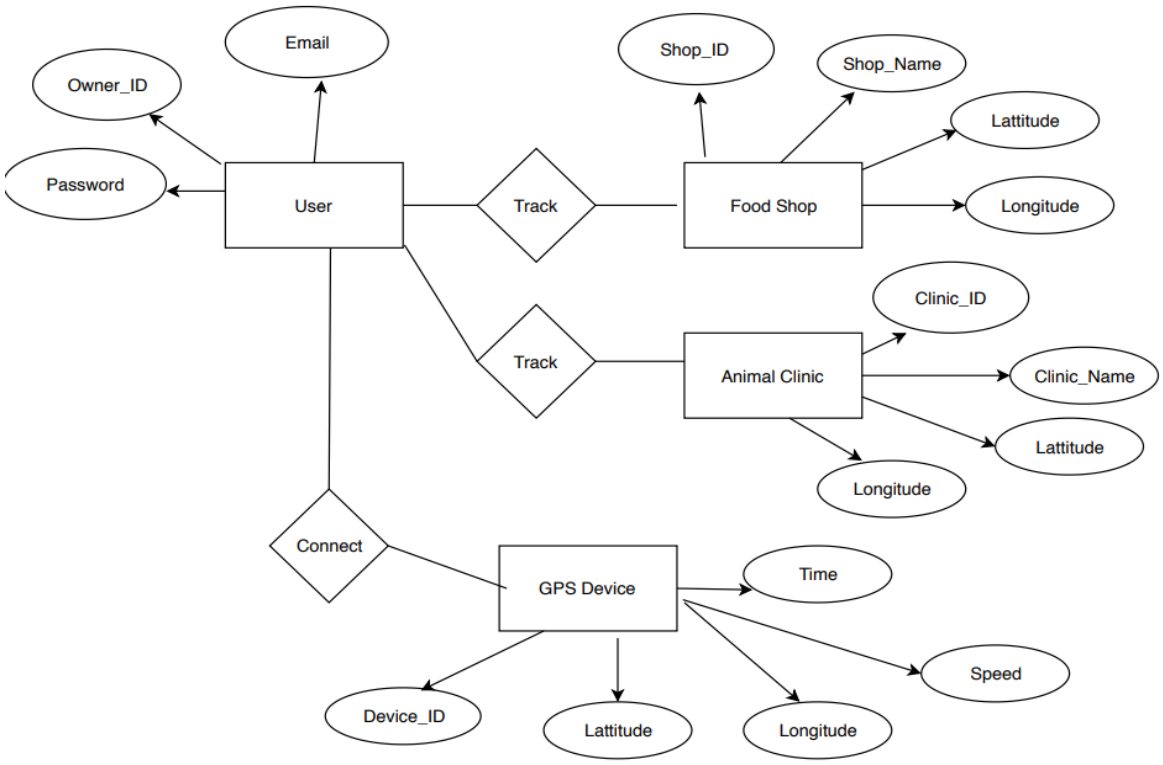
UML DIAGRAMS

USE CASE DIAGRAM

CLASS DIAGRAM



ER DIAGRAM



In ER diagram, there are four main entities in the diagram. Namely user, food shop, animal clinic and GPS device are the entities of this ER diagram .user have email and ID, password attributes, food shop has ID, name, longitude, Latitude. And animal clinic has ID, name, longitude, Latitude. GPS device entity has time, speed, ID, longitude, Latitude attributes The user has strong relationship to GPS device to connect and other two strong relationship to food shop and animal clinic to track.

RISKS THAT HAVE MATERIALIZED AND YOUR RESPONSE, CHANGES TO THE RISK LIST

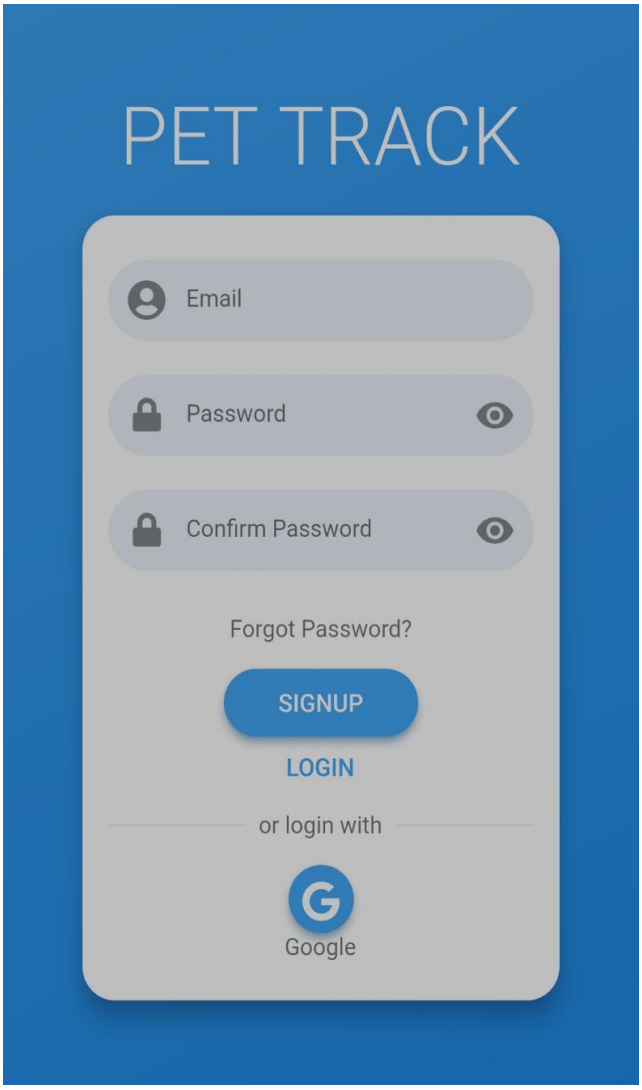
Risk	Management strategy
Schedule overrun	Regarding to schedule there should be overruns. because some modules and exam are conduct in parlay. Therefor some implementations get more time within expect time schedule
Learn new technologies and difficult Learn in short period	In stage 2 period hope to develop simple and strong system prototype
Requirement's breakdowns	According to the supervisor advice there would be some disputable features. Therefore, production may have changes in some stagers
Bugs	Refer stack overflow or google and fix that bug
Failure about technology	This system IOT related application, it may have some failures. Therefore, try to get system backups daily.
Manage with other module deadlines	There are some module submissions and examinations conduct in parallelly there plan time work frame to manage the time

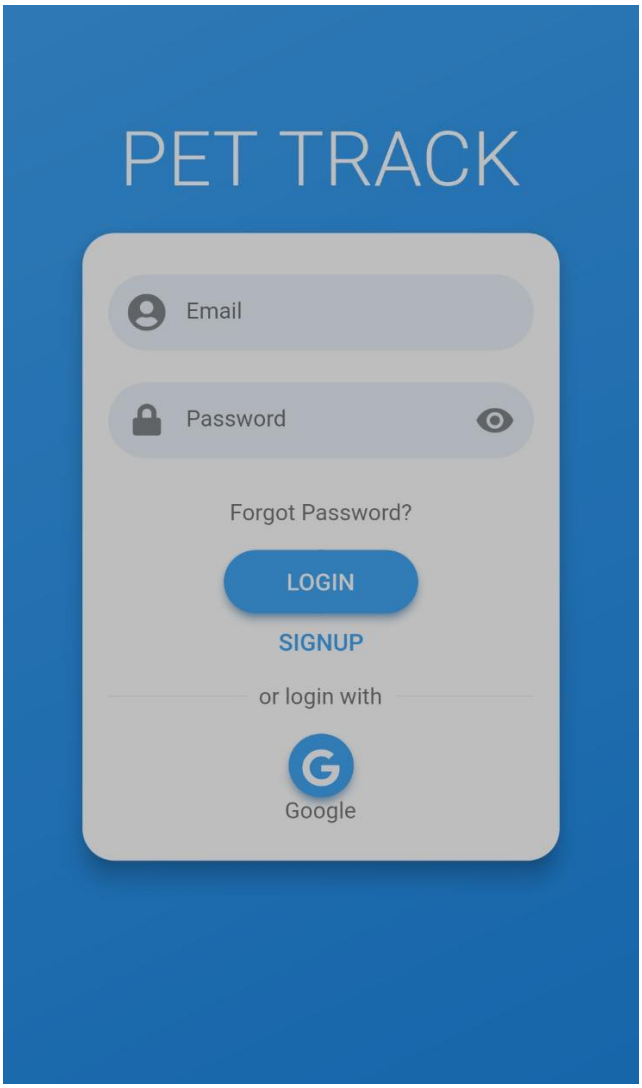
CURRENT IMPLEMENTATION

In mobile application I will be going to add following features

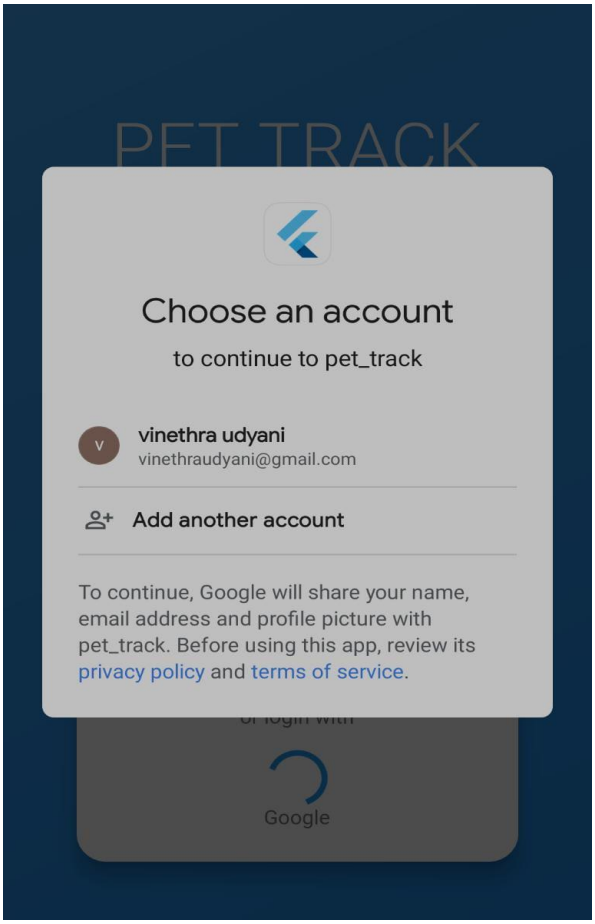
- User signup
- User login
- Real time locations
- Near pet shops
- Near pet clinic
- Upcoming vaccinations dates

In current progress I start to implement mobile application side. First, I would be able to develop sign in and sign-up page, find pet shops page, find pet shops page and pet vaccination page

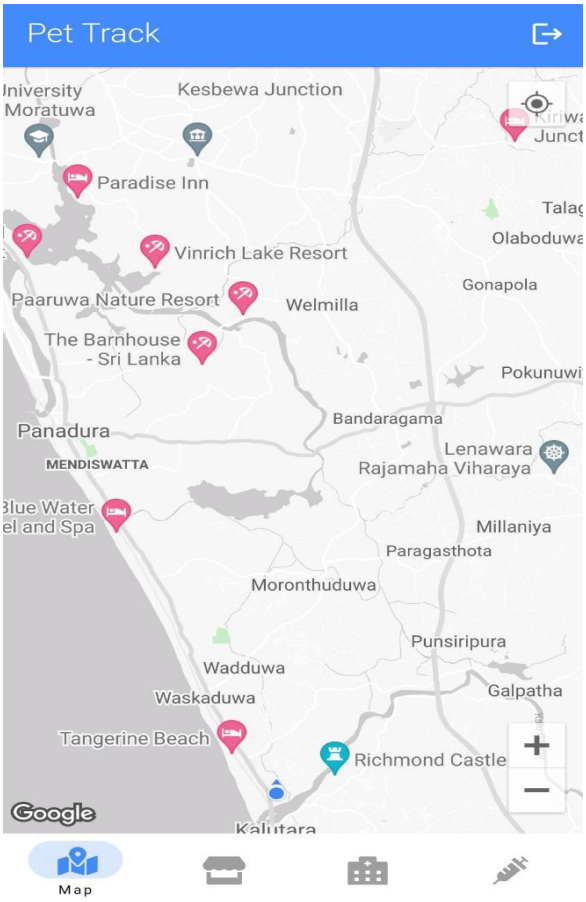




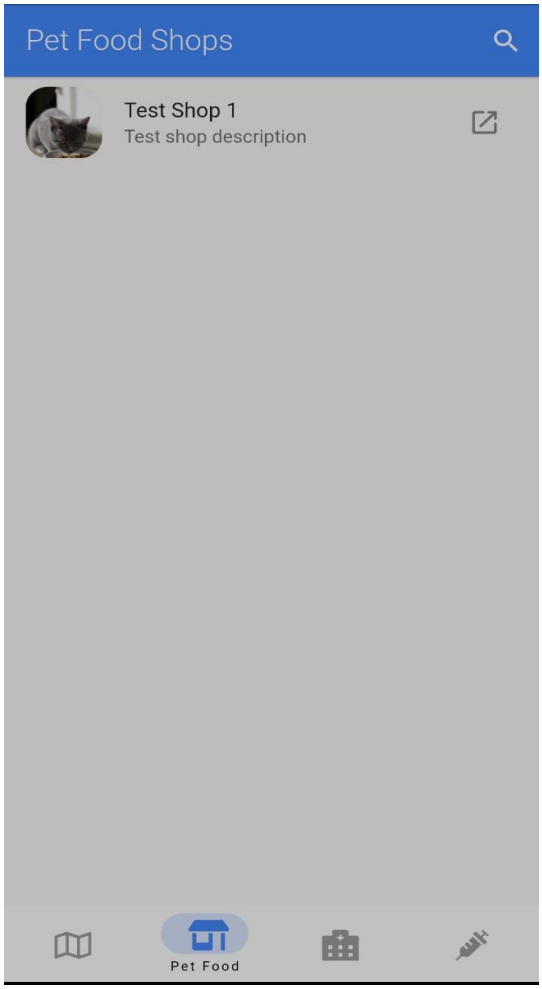
- In sign page- the pet owner can sign up to the mobile application using email address and the unique password.
- In login page -after the sign up the user can login to the application using already sign-up email and the password

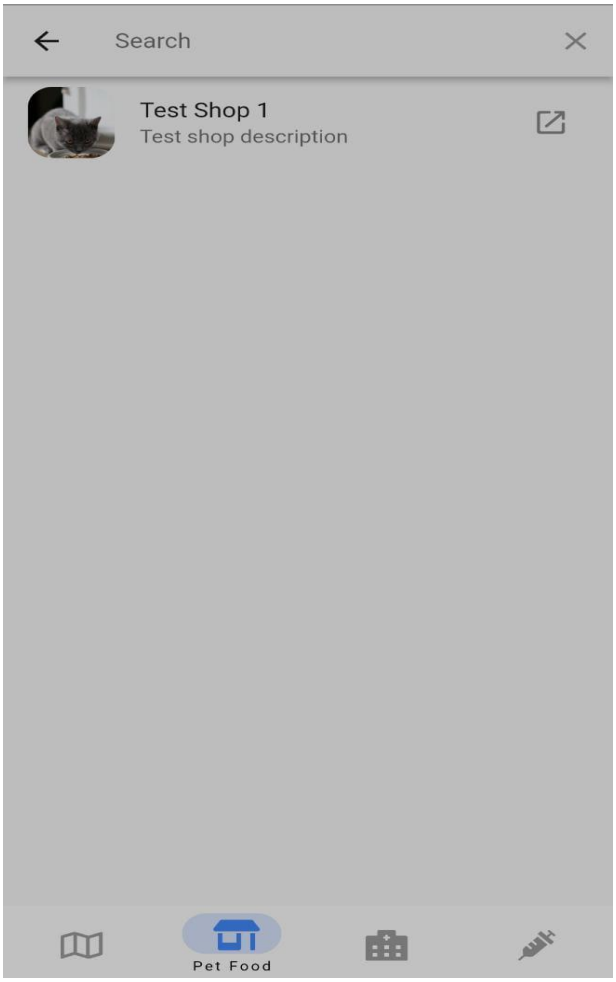


- In log in page- in this page deliver another sign up. The user can use their Gmail address as a google sign in

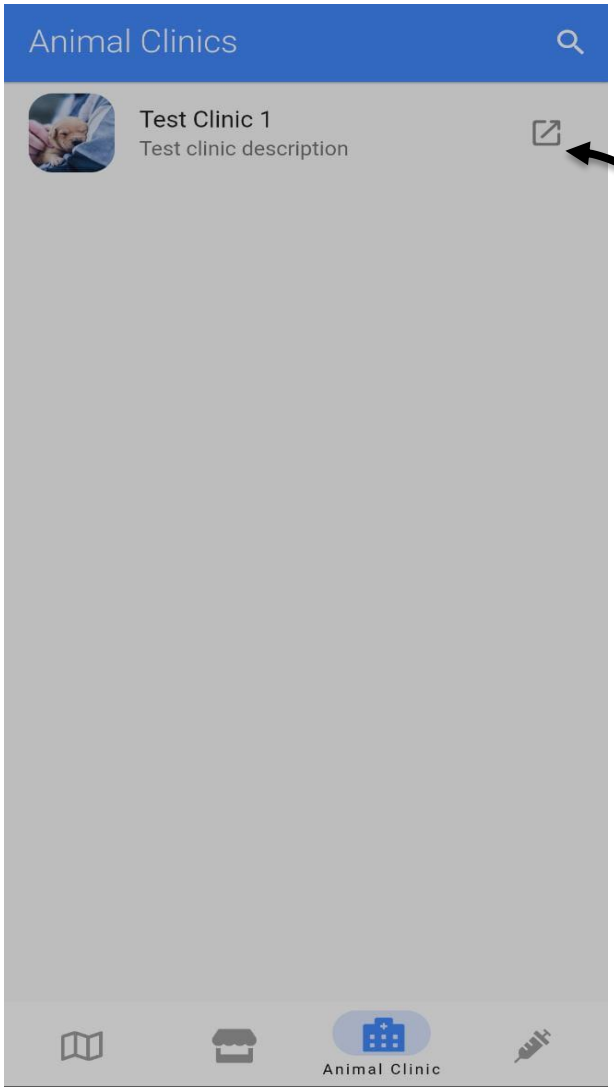


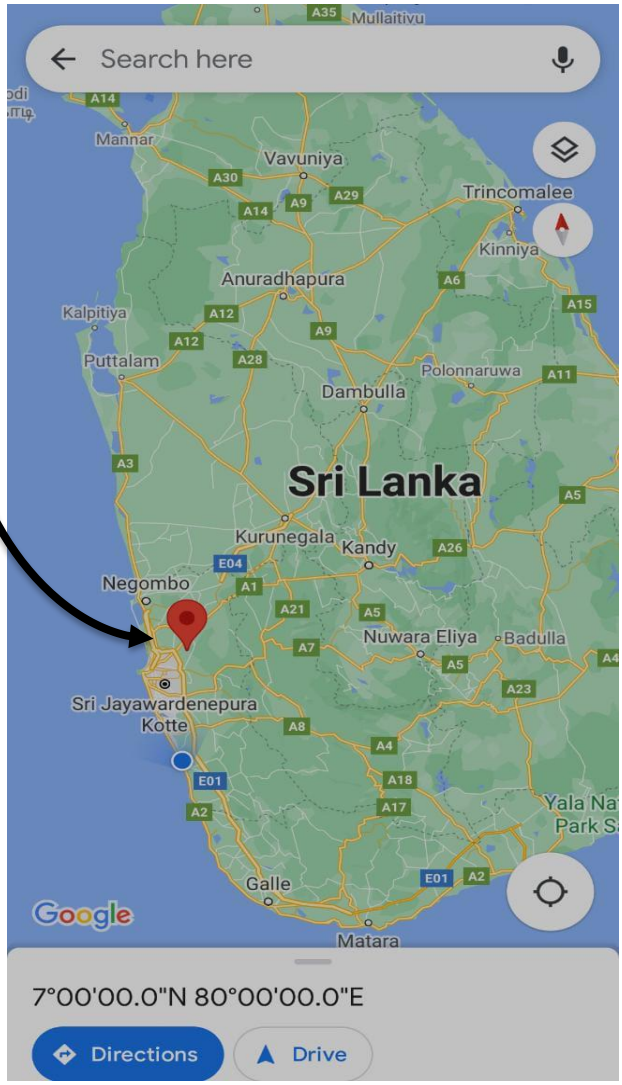
This is a page of searching real time location of pet. I still developing this section. In this find locations section is the combination of hardware circuit with Arduino programming. Therefore, I have to make customer-made GPS device. After the complete the hardware device and it connect to the database would be able to find real time locations via mobile application map. Under supervisor advice I have to implement safe zone. if the pet going in unsafe place pet owner can see that location with different color. If the pet is in safe area the pat owner can see that location in anther color. I have to develop that section as the next step after the connect customer-made made device to the database.



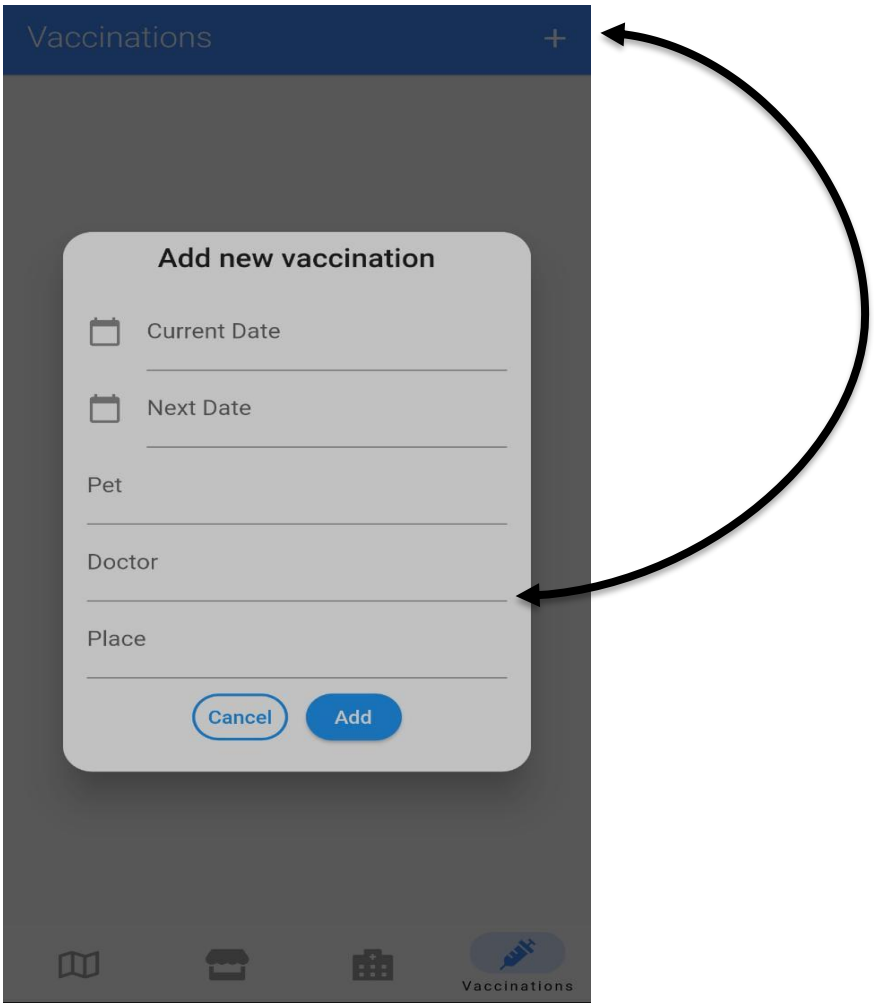


This page is pet shops page and thus page shows all the pet shops in the near area. Special thing is if new pet shops descriptions can be added in database. Then in that page shows all the pet shops and detail descriptions. When clicking on the corner icon is going to shows where the locations of the pet shops located. In the pet shop descriptions can add the picture and icon via database. And searching bar is used to search pet shops descriptions in the pet shop.

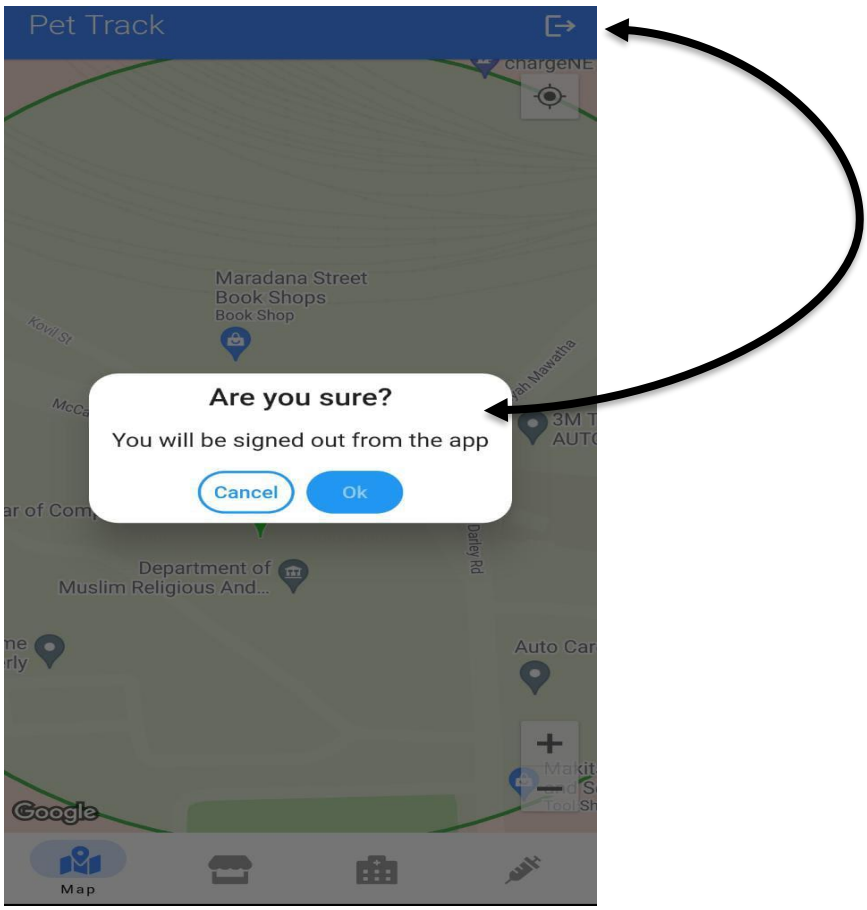




This page is present find animal clinic around the near areas. And the page present descriptions about animal clinic. The new animal clinic descriptions and locations would be able to add via database. In the mobile app there is an icon in the right corner. When the clicking on that icon app user can find that animal clinic as the emergency .Then user can see the locations of animal clinic via map when user want to go or other purpose.



This is page of upcoming vaccination date. The pet owner can add next date and last vaccination date related to pet and the doctor. In this page has the input next vaccination date, last vaccination date doctor name and the pet's name. If pet owner needs to delete this vaccination note clicking on dustbin icon would be able to delete vaccination note. In log in page has an icon in right corner.



If app user needs to log out in any time clicking this icon the notification pops up to cancel or ok, clicking ok button application user can log out this application.

Hardware section

In this project have some IoT device for find real time locations. I still implementing customer-made GPS device. This hardware device includes Node MCU, Arduino uno borad,6M GPS device and MI power bank, Node MCU is for retrieve data to database. Using Arduino uno board and 6M GPS would be able to find real time locations of pets. As the prototype I choose MI power bank for the power supply. Because it is reusable. As alternative power battery. I selected but as the pandemic situation that battery is not available in Sri lanka. I will have to connect device to database using Arduino programming. In hardware description with alternative issues and solutions, above topic I mention all the alternative plans and features and why I choose this hardware components to develop this customer-made GPS device.

INTERIM-1

COMPUTING WITH PLYMOUTH UNIVERSITY

School of Computing and Mathematics

PRCO303

Final Stage Computing Project

INTERIM REPORT 1

BSc (Hons) <*Software Engineering* >

< M.A.V.U. *Matharaarachchi*>

<Find Your Dog Pet tracking system>

2021/2022

Background

This propose system (pet tracker) would be able to track our pets when they are missing and wouldn't be able to find. In present situation, if a pet will not be able to find the pet owners will have to make post include with his pet picture on the social media and newspapers. Then, someone would be able to find the pet, they will have to inform the pet owners and sometimes pet owners will pay some money for help as a gift. But in my system pet owners cannot be able to post photographs and articles on social media or waiting for someone notify and informs to pet owners about their pets. Pet owners will be able to find their pets by own.

Propose system

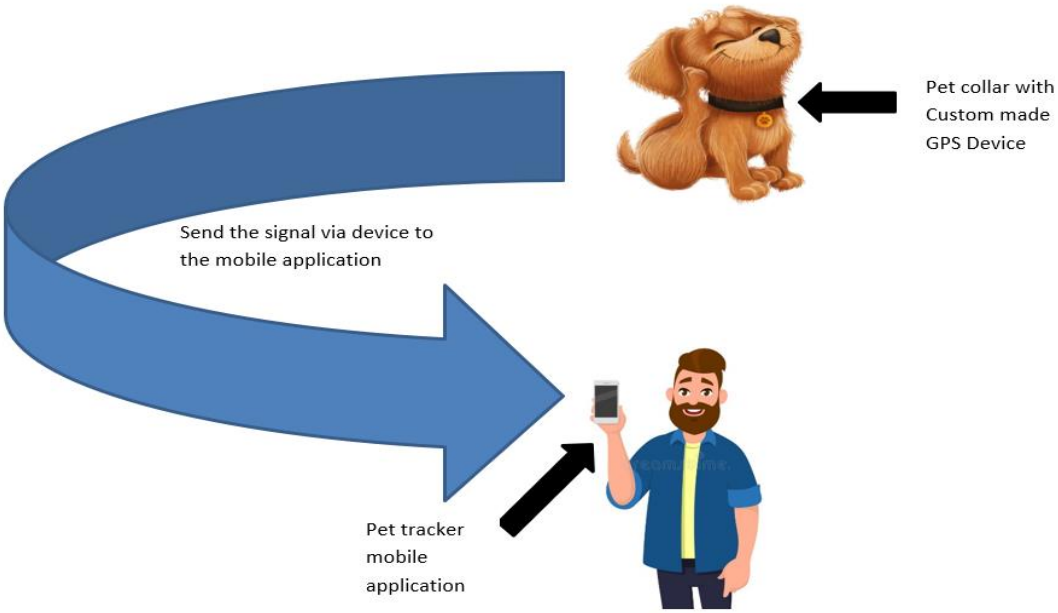
My intention was drawn to developing a pet tracking system that will do as follows:

- A custom-made GPS tracking device will be attached to the pet's collar.
- The owner can monitor the whereabouts of the pet using the developed android application.
- With the use of the real time location feature pet owners will be guided to their pets using the shortest route.
- User (pet owner) has the ability to track more than one pet using the application.

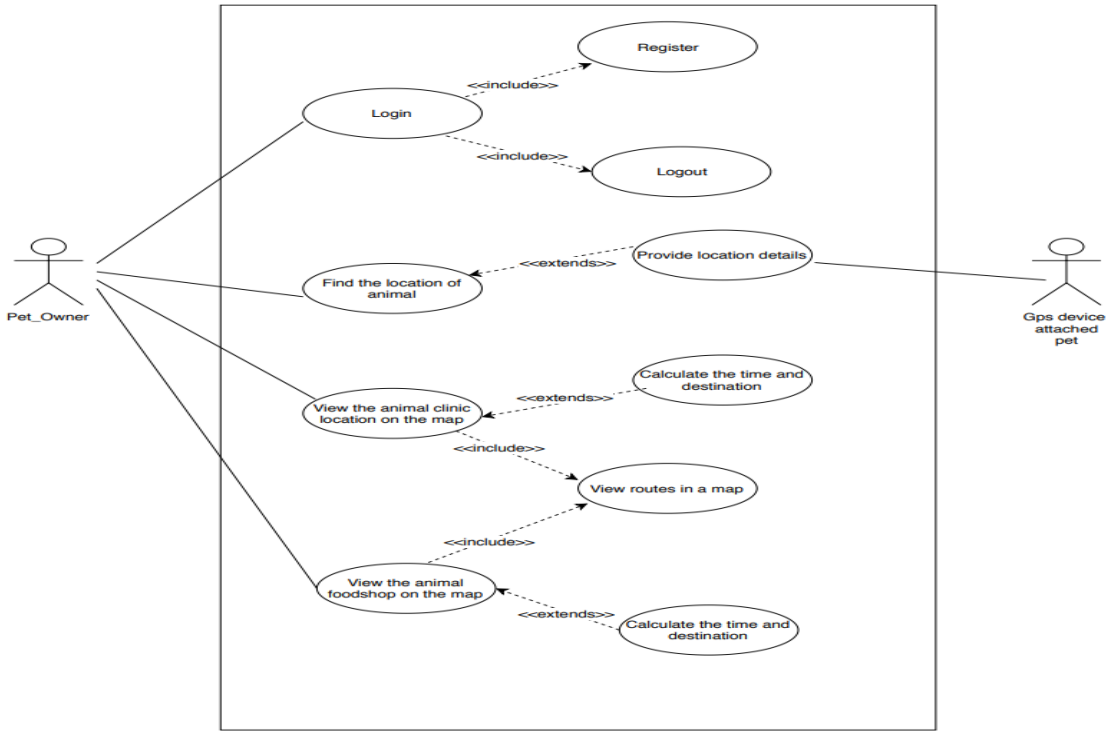
Goal

- ✓ When the pet owners log into this application, they can find their pets by their own in real time. This purpose system's device will show the pet's real time location via the implemented mobile application.

High level diagram and use case diagram



Use case diagram



Project Objectives

Aim

Manley hope to develop a mobile application with custom made GPS device to track down the pet current location.

Objectives

- To analyses exist system and provide stranded improvements for new system.
- To identify the exist system what does the pet owners do to track pets when they cannot be found.
- Clearly analyses development technologies for deployment solutions.
- To provide compatibility between the pet outdoor exploring and the pet owners.
- To provide pet owner training.
- To implement a way to get a route to where the pet is currently at from the owner's location.
  To provide an app to trace live locations of your pets

User stories

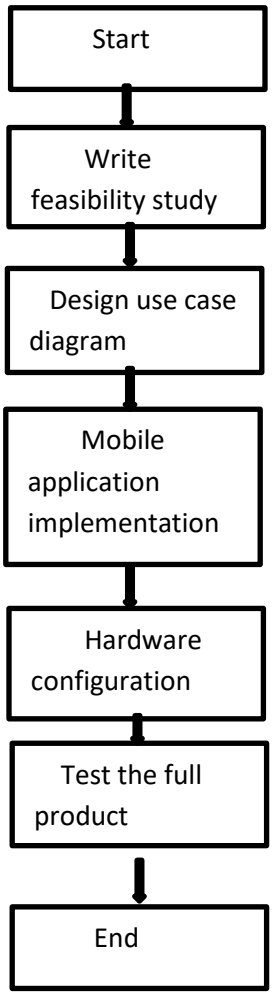
In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner. All the primary data were gathered by interviewing and some questionnaires, internet, research papers and articles on the google scholar

The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

- There was no option to find a pet when it goes missing.
- They have no option to find their pets cannot found
- How to find pet clinic and hospital in emergency situation
- To find animal accessories shops and food shops in quickly.
- Keep reminder status on pet vaccination date for the convenience of pet owners

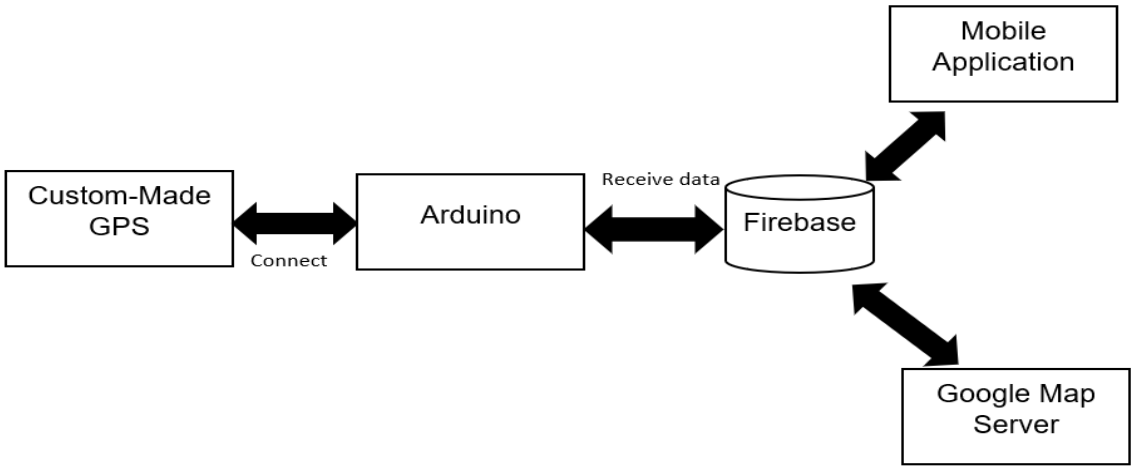
Method of approach

The pet tracking system developing under agile methodology. Agile methodology the fastest methodology and most well -known methodology. The use of agile scrum strategies in program improvement can have an impact on a task with minimal probability of culmination and delivering results quickly and after a while. Clever logic, however, was never intended to be simply a programmatic improvement. Mainly agile methodology presents the better way how to achieve the major goals in the standard level though it would be able to show the best guidance to deliver the product in target level.



System description and functionalities

Operation of this system is all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.



Schedule

Project Plan		
Stage	Deadline	Products/Deliverable/Outcome
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23. Testing the system	15/3	Final system and testing
24. Final report and research	1/4	PRC303SL Report

Tasks undertaken and outcomes

- Get correct understand about the project and selected most suitable technology as the Arduino technology.
- Implement the circuit using Custom-made GPS, ESP8266 (NodeMCU) and Arduino Uno.
- Get data from custom-made GPS and send it to the mobile application.
- Started implementation of the user mobile application.
- Study and start Implementation of hardware product.
- Implement Arduino code for the data transferring to firebase.

Products produced and product quality

- Made some sections of mobile application
- Validate using the functions those sections
- Check the validations.
- Check the quality of interface designing.

Risks that have materialized and your response, changes to the risk list

Risk	Management strategy
Schedule overrun	Regarding to schedule there should be overruns. because some modules and exam are conduct in parlay. Therefor some implementations get more time within expect time schedule
Learn new technologies and difficult Learn in short period	In stage 2 period hope to develop simple and strong system prototype
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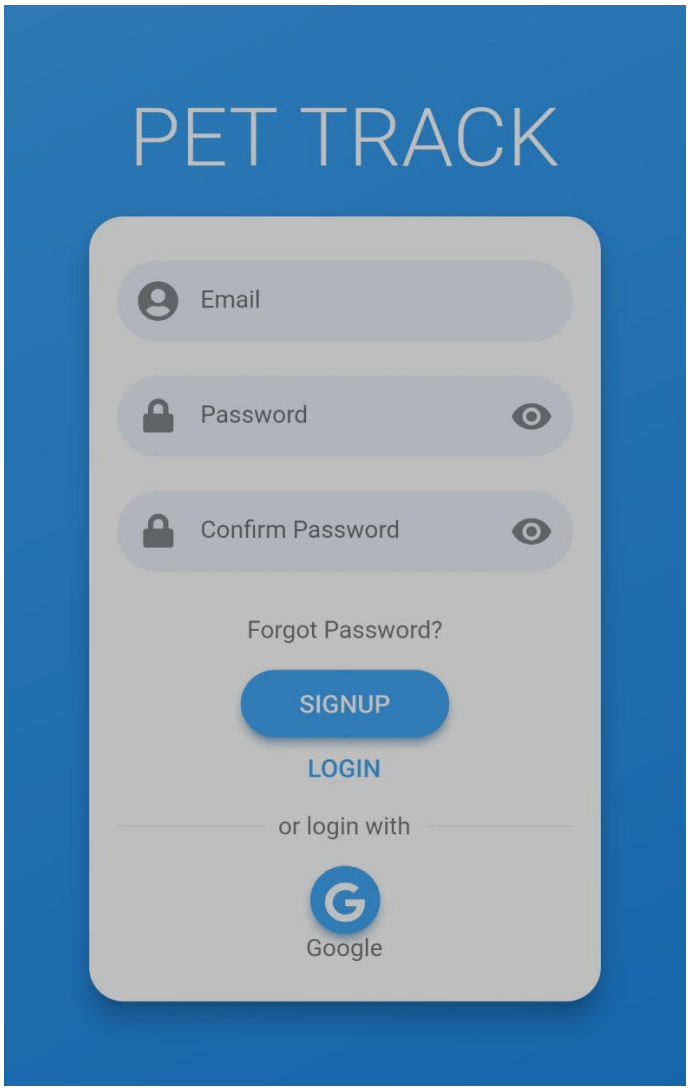
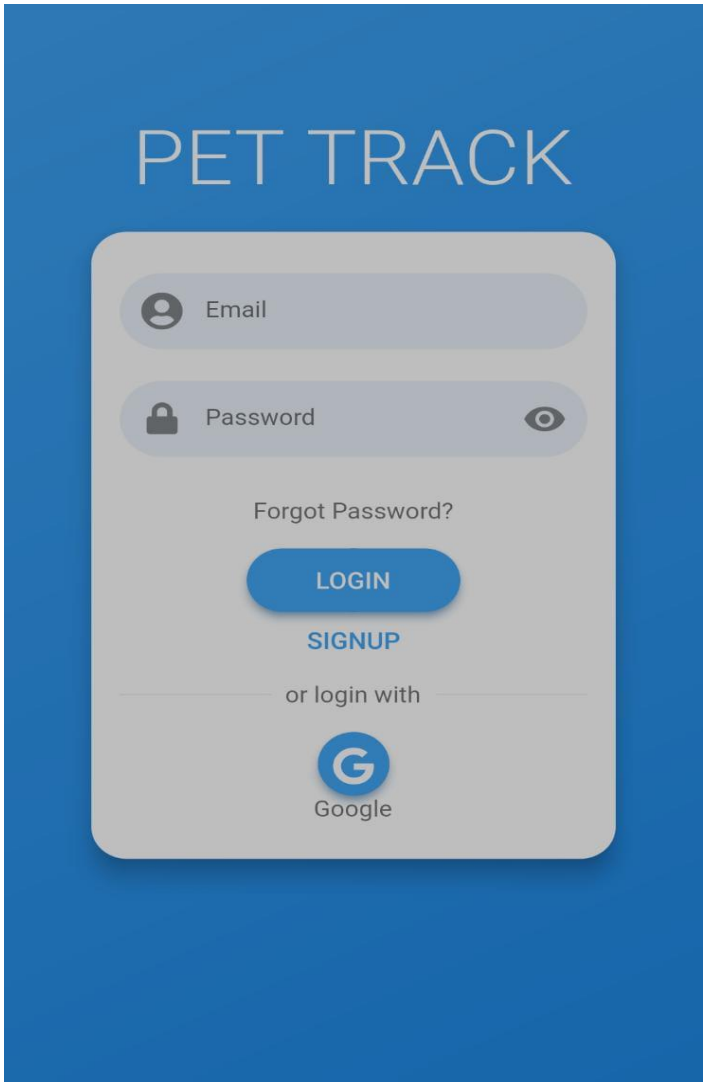
Bugs	Refer stack overflow or google and fix that bug
Failure about technology	This system IOT related application, it may have some failures. Therefore, try to get system backups daily.
Manage with other module deadlines	There are some module submissions and examinations conduct in parallelly there plan time work frame to manage the time

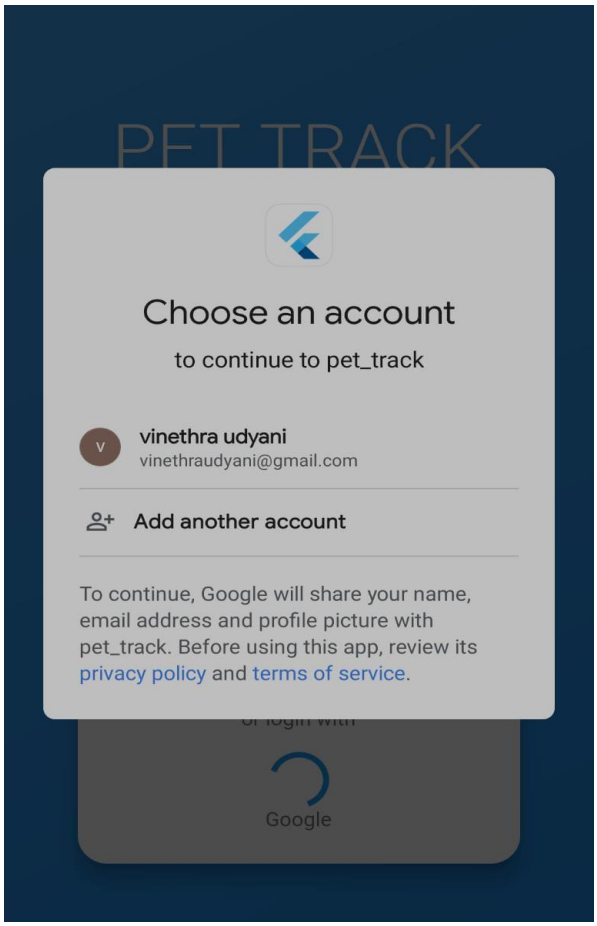
Current Progress

In current progress I start to implement mobile application side. First, I would be able to develop sign in and sign-up page





- In sign page- the pet owner can sign up to the mobile application using email address and the unique password.
- In login page -after the sign up the user can login to the application using already sign-up email and the password



- In log in page- in this page deliver another sign up. The user can use their Gmail address as a google sign in

In mobile application I will be going to add following features

- User signup
- User login
- Real time locations
- Near pet shops
- Near pet clinic
- Upcoming vaccinations dates

Source code

In bellow screen shots present some source code of application in the current situtation .

Sign up for user

```
Future<String?> _signupUser(SignupData data) async {
  if (data.name == null || data.password == null) {
    return "Fields cannot be empty";
  }
  try {
    await auth.createUserWithEmailAndPassword(
      email: data.name!,
      password: data.password!,
    );
  } on FirebaseAuthException catch (e) {
    return e.message ?? "There was an error!";
  } catch (e) {
    return "There was an error";
  }
}
```

Send password recovery

```
Future<String> _recoverPassword(String name) async {
  try {
    await auth.sendPasswordResetEmail(email: name);
    return "Email was sent to $name";
  } on FirebaseAuthException catch (e) {
    return e.message ?? "There was an error!";
  } catch (e) {
    return "There was an error, Please try again!";
  }
}
```

Log in for user

```
Future<String?> _loginUser(LoginData data) async {
  try {
    await auth.signInWithEmailAndPassword(
      email: data.name,
      password: data.password,
    );
  } on FirebaseAuthException catch (e) {
    return e.message ?? "There was an error!";
  } catch (e) {
    return "There was an error";
  }
}
```

Initiate google sign in with firebase

```
Future<String?> _googleSignIn() async {
  try {
    final GoogleSignInAccount? googleUser = await GoogleSignIn().signIn();
    final GoogleSignInAuthentication? googleAuth =
        await googleUser?.authentication;
    final credential = GoogleAuthProvider.credential(
      accessToken: googleAuth?.accessToken,
      idToken: googleAuth?.idToken,
    );
    await auth.signInWithCredential(credential);
  } catch (e) {
    // print(e);
    return "There was an error";
  }
}
```

Resources and Technologies

- **Hardware / Devices** – Hardware components (IOT)-Tracking Device NODEMCU board, Arduino UNO board, GPS Device, NEO 6M Device.

- **Technologies** – Firebase, Android studio, Google API, Adobe XD, Arduino technology, Flutter framework
- **Languages** -Dart

Learning undertaken and required Undertaken:

Undertaken

- Learned dart language
- Learned Arduino technology.
- Learned Hardware components
- Learned android studio IDE
- Learned google maps service
- Started to implement mobile application.

Regarding to my project I hope to implement divided in two categories. first, I develop mobile application in mobile application developing I need more knowledge about firebase authentication servicers etc. When the developing mobile application first I create a wireframe for interface design after I design Ui via figma platform. Further design use case diagram for this application. This pet tracking mobile application develop under using flutter framework. Therefore, need more practices and knowledge about dart language. Using the dart language would be able to optimize interfaces, fast and quick in the whole platform. And the flutter framework is open-source framework support multiple platforms and fast. Other main category is hardware configuration. Under hardware configuration 6m Neo GPS Device, Arduino Uno board, NODEMCU are the main components of hardware implementations, as a prototype I hope to MIU small power bank for get power supply for circuit. System hardware implementation is close to custom-made. when the complete of the hardware device, it is totally custom-made device. The hardware configuration under Arduino technology therefore needs more knowledge about Arduino technology. In current days I am following Arduino fundamental courses in LinkedIn learning center. In those courses I am learning about programing regarding to Arduino-Uno bord and details about serial monitor etc. Before I started the project implementing, I wrote the feasibly analysis about existing systems and alternative hardware components. I studied IEE newspapers under animal tracking and the animal care. Regarding to those articles I gathered information about, what are the most wanted additional feature for pet tracking application.

Required

- More no-SQL database knowledge (firebase SDK)
- More Arduino technology using tutorials.
- Learning course about Arduino foundation in LinkedIn leaning (Khalil, 2021)
- More Android following course in UDEMY.COM
- Learning how to design circuit using NODEMCE board combine with Arduino UNO board.
- Learning google sign-in for apply to android app
- More knowledge Arduino and study tutorial and documentation

Project alternatives

I decided to Switch from Java programming language to drat language with flutter framework to implement android application. Because for the purpose of clear interface designing and other sharp features development.

PID

School of Computing and Mathematics

PRCO303

Final Stage Computing Project

(PID)

BSc (Hons) <*Software Engineering* >

< M.A.V.U. *Matharaarachchi*>

<Find Your Dog >

2021/2022

Introduction

Background

Real time pet tracking system is solutions for pet owners. Pets are going missing is a problem many pet -owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up “LOST” posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. This real time pet tracking system helps to find their own pets easily with low cost and risk, not only that reduce the pet owner’s time. This pet tracking device is android application project. Using this mobile application, pet owners would be able to tack real time location with GPS device. Applying this purpose pet tracking system pet owners will not be able to share post on social media and newspapers, pet owners can find their pets in their pets by own. The operation of this system is uniquely boated GPS tracking device whether connected to pet’s collar for the purpose of trace the live location of pets. In this system live locations shows in via mobile application in a short time.

In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

In current situation there are lots of locating applications. As an example, delay pointers, in this case item were passed the point. After data were collected. Another Examples are barcode or gate. Others are actual time using GPS, depend on data upgraded. There are bar code systems that allow a human to scan objectives and discover oneself automatically (automated ID RFID). The major section, the world of tracking contains of separate hardware, software systems for the various applications. The reason for choosing this project to implement a pet tracking system is often the loss of pets as well as in public places and also on their own grounds.

For this perspective this is a one of the solutions for problem. In emergency, pet owners would not be able to find and animal hospital near to their own area and will forget the upcoming vaccination dates of their pets. This is a mobile application can be solved above problems.

Literature Review

This paragraph include academic research has done about lost pet and how the tracking technology could involve. This section explains resources materials and articles, journals written by authors in the internet and newspapers. There are focusing similar pet tracking applications with multifunctional virtual fence is global tracking application has the combination of positioning system, GPS device and portable collaborate modem to connect pets and the virtual fence (include combinations of ground station to transfer the communication to the target scope of the receiver joint with the pet (pet owner). Though receives pass to the found location whenever the receiver is in the target scope. The appropriate virtual fence frame includes the base where the flag is sent, the signal connected to the signal sender used by the upstairs pet tracer. Beneficially the start-up point is very easy. These pet tracking app feature a sign mounted on the pet. The GPS contains an area of finder items to identify the special activated location using GSP module and the GPS Beacon is a type of radio signal transmitter. GPS collaborate with radio signal together whenever; A main station and a GPS beacon are in a noted range of an RF transmitter. A Pet tracing chain collar contain on a reasonably adaptable cylinder with locks attached to pet or else tracer.

Attached to the cylinder is an airless electrical strip that extends and the distance of the electrical twine connector and the receiving wire. Amount of light emission diodes visible and the clear cylinders are connected to the remote connector.

A lower collar recalls a connecting wire to send an incoming wire to the power strip link and a radio repeating signal. A link in the adaptable cylinder is obtained about a object that the strain forwards the area of the cylinder will not be sent to its link. If the belt or collar is not in good quality, it means that if it is wet, there is enough independence among a battery though a divider to drain the water, and the course or distance is determined by the radio repeater signal receiver. Comparing the collar with the recipient. (P. Sai Murali[1], T. J. Nagalakshmi[2] , 2004):

Toward the position customers (pet owners) on the direct(short) route, as this points you use Google's direct(shortest) route algorithm. One magazine commented that it shows a few spaces that can help you find the guide. The reason is that satellites turning the earth are helping the world using GPS. The satellite emits an embedded radio signal that follows a transmitter's fixed area. The radio sender generated by the satellite is connected to the radio manage center, and a satellite is derived from the world's cable. Dijkstra's algorithm is the shortest path tracking method in the graph. The Dijkstra algorithm was developed in 1956 by Dutch computer researcher Edsjer Dijkstra. Dijkstra used direct algorithm to find the short path in an unpredictable time. This scheme is practical to solving the shortest path. (Erkan; GÜZEL,, 2016) (J. Patman, S. C. J. Michael, M. M. F. Lutnesky and K. Palaniappan, 2018)

In this study case requires the assistance of the Google API. The programming interface provides an interface to collaborate or talk to each other. Whenever person use multitasking apps on their mobile phones, the portable app connects to the Internet and sends information to staff. The workers able then get back the information, decode it, perform basic operations, and send again to owner's phone. Particular application decodes the information at this point and presents the data you need in a way that is simply to figure out. The API has some key features, for example, controlling access to devices that perform a significant task in home security. As a example, on the map, after open a lead first, the app asks authorization to allow GPS have to observe the current customer area. (Hiroshi Watabe,Takuya Hayashi, 2009)

The Dijkstra algorithm is the most well-known algorithm that helps to make a shortcut call from two locations or a hub. The Dijkstra algorithm can be introduced in pseudo-code factors (G) with edges (E) and vertical (V) and a predefined source header (Anon., n.d.).

Business Case

Business Need

In present situation, not only in Sri Lanka but everywhere in the world, pets going missing is a problem many pet-owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up "LOST" posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it. Above process is very hard process to find their pets. Mostly pets owners must spend huge time find their pets and sometimes they have given money some for-pet finders. The current pet finding system is not useful to pet owners therefore pet tracking system is most useful system for customers (pet owners) to find their pets.

Business Objectives

- Removes manually findings (Eliminates the manual searching process).
- effectively connect GPS device to mobile app.
- Time reduces (no need to find their pets manually).
- Improves the system can track live location.
- Allows to customer for log to app via email (find live location).
- Allows facilities for find near animal clinic and accessories shops.

Project Objectives

Aim

Manley hope to develop a mobile application with custom made GPS device to track down the pet current location.

Objectives

- To analyses exist system and provide stranded improvements for new system.
- To identify the exist system what does the pet owners do to track pets when they cannot be found.
- Clearly analyses development technologies for deployment solutions.
- To provide compatibility between the pet outdoor exploring and the pet owners.
- To provide pet owner training.
- To implement a way to get a route to where the pet is currently at from the owner's location.
- To provide an app to trace live locations of your pets.

Initial Scope

Project Scope

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner.

In existing system was manual founding system centered to pet owners. In purposing system, manual system transpose to digital system. Therefore customers (user)can allow to new technology.

Contain of scope

- Track the pets' live locations

❖ this pet tracking device targeting to track in pets on time. who are the using this application they can easily find their pet by own. Pet owners would be able to log in the mobile application via email address and the password. Then pet owners will be able to see their pet's live location via GPS device in the pet collar.

- The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

    ❖ The costume made device attach to collar, from using that device can get signal of real time location of lost pet. After pet owner would be able to trace the live location with in receive data from the pet tracking device.

- Then pet owner would be able to trace shortest path suggest the algorithm create in google.
- Plan to make custom-made GPS to track pets outdoor exploring
- Collect all information using custom-made GPS and receive the data to mobile application
    ❖ In this system all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.
- Pet owner can allow to find near animal clinic and hospital
- Pet owner would be able to find near pet shops

- User (pet owner) can place the reminder for upcoming vaccination dates.
    - ❖ This system allows more features for find near animal clinic and hospital emergency, where nearest pets accessories shops and keep trace the vaccinations and make remind the date of vaccinations
- User can allow their own email and password to log this application in under high security

User stories

In current system pet finding process are working on manually. There is big a gap in modern society. In purpose pet tracking system make strong relationship between pet who wear in GPS device include in belt and pet owner. All the primary data were gathered by interviewing and some questionnaires, internet, research papers and articles on the google scholar

The pet owners mainly faced bellow these issues in proposed system would be able to solve and give best solutions.

- There was no option to find a pet when it goes missing.
- They have no option to find their pets cannot found
- How to find pet clinic and hospital in emergency situation
- To find animal accessories shops and food shops in quickly.
- Keep reminder status on pet vaccination date for the convenience of pet owners

Method of Approach

Pet tracking mobile application uses track device with collar, helps find pets live locations. Pet owners can see their pet's daily operation of the pet and can evaluate the pet. Then in accordance pervious activity customer would be able to find their pets.

The pet tracking system developing under agile methodology. Agile methodology the fastest methodology and most well -known methodology. The use of agile scrum strategies in program improvement can have an impact on a task with minimal probability of culmination and delivering results quickly and after a while. Clever logic, however, was never intended to be simply a programmatic improvement. Mainly agile methodology presents the better way how to achieve the major goals in the standard level though it would be able to show the best guidance to deliver the product in target level.

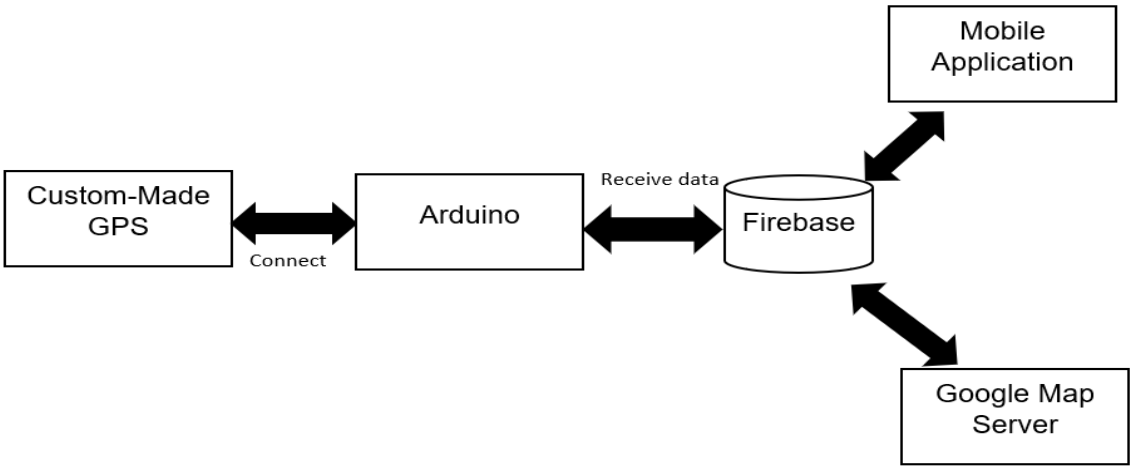
Operation of this system is all the necessary information collected by using custom made GPS device Connect to the pet to the pet for the purpose to track in actual time location. The apparatus In NEO GPS device and NODEMCU with portable Wi-Fi. Using mobile application can identify where the lost pet live location via map. The pet who wears the collar with GPS device send signals to the mobile application. The benefit of this project is pet owners can find their pet in short time and provide right directions to find lost pet. This mobile application provides another feature to status of near food shops and animal clinic and receive the notifications of latest vaccination dates.

The operating range and the battery health and lifetime, depend on type of technologies are system developers use. Most usual applied technologies for pet tracing applications are connect to IOT, mobile phone and the GPS. though RF tracers are ordinary even though it can able it selves' shortages. RF missing pet tracers have a wider reach than most newer resolutions and use less battery, thought they are larger and require a divide relay station to read signals from a collar. Though, if you do not use GPS in addition, using RF trackers would be a complex. Cellular tracker is one of the most common types of pet tracker that assist to Internet of Things. This tracker usually uses an exist Wi-Fi network to pass data to users(customer), wherever it would be accessed

in Android applications. They are ideal for locating a pet in real time and making it easy for the owner to find the pet, especially for stray pets.

Firebase: Firebase is a real time database support to store data. Firebase is NOSQL database. Firebase present More facilities for crash report and bug fixing quickly any developers can be assessable to machine learning via firebase. And cand send the message to cantered crowd. Therefore, Firebase is used to make database in this application.

Android studio: Android Studio is the powerful development system for implement mobile application. Android studios present more facility such as firebase support, faster coding, testing and fully feature rich emulator. Android studio is used to develop mobile application



Flow chart

Project Plan

Control Plan

This project is mainly based on real pet environment, and I have to build this type of pet tracking System within this project time period. I will be studying mainly Java Language, firebase. Arduino, and I will be doing experiments. I hope to complete this project step by step as I have shown in the Initial Project Plan.

Communication plan

To success of this project, I have arranged meeting minutes with my Supervisor (Mr. Iman Ashly). I will be able to plan minimum five meeting minutes and hope to discuss improvements and additional details step by step at the meetings.

And I have successfully done my first meeting with my supervisor. In that first meeting, Mr. Iman Ashly has explained lots of things according to the project.

I hope to arrange three meetings in first semester and other two in second semester

Project Plan		
Stage	Deadline	Products/Deliverable/Outcome
25. Initiation	17/11	PID
26. Investigation, Requirements	20/11	Feasibility study (analysis exist systems and requirements, technologies) (focus project and the scope)
27. Design	5/12	Design diagrams before start. (Architecture. Database schema, UI)
28. Implementation1	7/1	Implement sub-system and provide customer functionality
29. Implementation2	20/2	Implement sub-system between internal and the commination (Hardware system implementation)
30. Implementation3	10/3	Implement other features related to software finality
31. Testing the system	15/3	Final system and testing
32. Final report and research	1/4	PRC303SL Report

Table 1. Stage 1 Plan

Initial Risk List

Risk	Management strategy
Schedule overrun	Face the 1st supervisor meeting with the project idea, but exception plan will be developed, and have to feasibility analysis before starting the project. therefore, this event more extends to 1 week.
Learn new technologies and difficult Learn in short period	In stage 2 period hope to develop simple and strong system prototype
Requirement's breakdowns	According to the supervisor advice there would be some disputable features. Therefore, production may have changes in some stagers
Failure about technology	This system IOT related application, it may have some failures. Therefore, try to get system backups daily.
Manage with other module deadlines	There are some module submissions and examinations conduct in parallelly there plan time work frame to manage the time

Table 2. Initial Risk List

Initial Quality Plan

Initial quality plan	
Quality check	Strategy
Requirements	Check the requirements to sure are they correct and relevant, complete, achievable, demonstratable. product quality and prototype, user interviews will be employed
Design and validation	The design will be checked to compliance, screen-design acceptance, DB normalization and software design principles (e.g., cohesion, coupling)
Sub-system usability and validation	To be conducted at the end of each increment
System validation and user acceptance	To be conducted within Stage 7

Table 3. Quality Plan

PROJECT PROPOSAL

Find Your Dog (Pet Tracking System)

Proposer

M.A.V.U. Matharaarachchi (10707277)

Proposed supervisor

Mr. Iman Ashly

Problem Statement

Not only in Sri Lanka but everywhere in the world, pets going missing is a problem many pet-owners face. Either the pet has wandered off or got stuck somewhere away from home or sometimes it might have been stolen. These worried owners would either walk all around the streets searching for their lost pet, asking by passers whether they have seen it, or put up “LOST” posters on walls or on social media. Lucky pet owners find their pets back with no injuries but there are unfortunate cases when the pet has been brutally injured or sometimes even dead just because the owner was too late to get to it.

Project description

This pet tracking system can use to track our pets when they are missing and not to be found. In present situation, if a pet will not be able to find the pet owners will have to make post include with his pet picture on the social media and newspapers. Then, someone would be able to find the pet, they will have to inform the pet owners and sometimes pet owners will pay some money for help as a gift. But in my system pet owners cannot be able to post pictures on social media or waiting for someone informs about their pets. Pet owners will be able to find their pets by own.

My intention was drawn to developing a pet tracking system that will do as follows:

- A custom-made GPS tracking device will be attached to the pet’s collar.
- The owner can monitor the whereabouts of the pet using the developed android application.
- With the use of the real time location feature pet owners will be guided to their pets using the shortest route.
- User (pet owner) has the ability to track more than one pet using the application.

Goal of this application

- ✓ When the pet owners log into this application, they can find their pets by their own in real time. This purpose system's device will show the pet's real time location via the implemented mobile application

Project keywords

- Petcare
- IOT device
- Mobile application
- Google API
- GPS Tracking

Requirements

- **Hardware / Devices** – Hardware components (IOT)-Tracking Device NODEMCU board, Arduino UNO board, GPS Device, NEO 6M Device.

- **Technologies** – Firebase, Android studio, Google API, Adobe XD, Arduino technology

Finance

Cost of Internet facilities and required software and IOT hardware components.

External organizations

None.

Other staff None

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Meeting minutes

Final Year Project – Supervisory meeting minutes

Meeting No:

Date : 22/10/2021

Project Title : Pet tracking

Name of the Student : Matharaarachchi.M.A.V.U. U

Students ID :10707277

Name of the Supervisor : Mr. Iman Ashly

Items discussed:

- Briefly explain Project idea

Items to be completed before the next supervisory meeting:

- Understand and refer project scope

(https://plymouth.zoom.us/j/93406233984?pwd=dHlQenJPaUY3ZE5qZXI1dFBkRE01dz09)

Supervisor (Signature -)

Instructions to the supervisor: **Do not sign** if the above boxes are blank.

IN PARTNERSHIP WITH PLYMOUTH UNIVERSITY

Final Year Project – Supervisory meeting minutes

Meeting No:01

Date : 28/10/202

Project Title : Pet Tracking (find your dog)

Name of the Student : Matharaarachchi.M.A.V.U.

Students ID : 10707277

Name of the Supervisor : Mr. Iman Ashly

Items discussed:

- About project idea
- About project scope

Items to be completed before the next supervisory meeting:

- Refer journals
- Do a literature review ~~study~~
- Refer existing systems

.....

Supervisor (3/11/2021)

(https://plymouth.zoom.us/j/99994871679?pwd=cEJiSzBxMEVYSGV5N1dYb2ltMW9Sdz09- Zoom meeting link)

Instructions to the supervisor: **Do not sign** if the above boxes are blank.

NSBM IN PARTNERSHIP WITH PLYMOUTH UNIVERSITY

Final Year Project – Supervisory meeting minutes

Meeting No:02

Date : 08/11/2021

Project Title : Pet tracking (find your dog)

Name of the Student : Matharaarachchi.M.A.V.U.

Students ID : 10707277

Name of the Supervisor : Mr. Iman Ashly

Items discussed:

Discuss hardware requirements.
Depth of project.
Discuss Mobile application features

Items to be completed before the next supervisory meeting:

Inform Current progress via email
Complete the project

.....

Supervisor ( )

Instructions to the supervisor: **Do not sign** if the above boxes are blank.