

**DOGODO: IOT BASED ENHANCED MOBILE
APPLICATION TO PROVIDE ESSENTIAL HEALTH
SERVICE TO DOGS- BREED YOUR PET**

2021-162

Project Proposal Report

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Sri Lanka Institute of information technology

SRI LANKA

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Declaration of the candidate & Supervisor

We declare that this is our own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Name	Student Id	Signature
Wijethilaka M.G.R.	IT18062816	

The supervisor/s should certify the proposal report with the following declaration.

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the supervisor:

Date

Abstract

Nowadays most people like to spend some time with their pets. In the world of pets, the dog has a very interesting place. But some problems come about dogs their owners do not have much experience about those situations. We suggest this device with mobile app like a smart assistant. From this app pets' owners can understand the situation and get an idea about next step. The mobile app has four main components. Smart Health Analyzer, Smart translator, breed your pet, and Pet skincare are the main four components.

As my part, I will be doing the Breed your pet which is a component that will help the owner to Identify partners for their pets, analyze and provide a reliable statement about the breed, Analyze and provide the necessary treatments, medical routines, and food routines for newborn pets. Biological data from selected dogs will be used to predict new results of different breed crosses using this component. Using a modern machine-learning algorithm predict crossing outcomes of different breeding in an innovative way.

Keyword: Machine learning, treatments, medical routines, food routines, newborn pets

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List of abbreviations

1. IoT – internet of things
2. ML- machine learning
3. AI- Artificial intelligence

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1. Introduction

1.1 Background

In the world of pets' dog is the most loyal animal for the human. The dog descended from an ancient, now extinct wolf. The dog was the first species to be domesticated by humans' gatherers more than 15,000 years ago. Dogs have been particularly attuned to human behavior because of their long relationship with humans. So, dogs are very loyal to human. For centuries, the dog has been selectively bred for different traits, sensory abilities. Hunting, herding, pulling loads, protection, assisting police and the military, companionship is some of them. Because of those things people says, "dog is man's best friend". So, dog is one of perfect pet in the word.

Because of those things people try to do some important things for them and their owners. Developing software, creating some IoT devices, developing some mobile applications are some useful things which they try to do for their convenience. But those apps and devices are very difficult to bring from other countries. Also, those things are not more accuracy. Those apps have a lot of limitations for access for some functions. Sometime devices prices are more expensive.

Dog's breeding is a one of very important thing for their owners. People always know the result of pure breed. But from the mix breed most people do not know what type of pet will born, how it is look like, what are the treatments, medical routines, and food routines for newborn pets? But identify the mix dog breed is very important things for the pet owners. Using a mobile application, we can identify the result of mix breed.

A new application called "Fetch" [1] uses artificial intelligence to analyze the breed of dogs using a smart phone camera or photo library. After analyzing a dog, it gives user a brief overview of the breed and the percentage of the breed.

The dog scanner application [2] can reliably identify a dog's breed. This application identifies mixed breeding. Detailed data of mix breed dogs are available. The app currently identifies over three hundred and seventy different breeds and has access to detailed databases of all dog breed with information and pictures without scanning.

Although these apps can identify dogs by photos and videos, it is difficult to get complete information data about them. Therefore, the study shows that there is a need for improvement. There is a need to develop a detailed application of the medical routine, the types of dogs that is born across two breeds of dogs, and the treatment and food routines to be given to that dog.

1.2 Literature survey

A survey was performed to assess the degree of the dog owner. A Google doc was used to build the survey. Around Sri Lanka, dog owners were chosen at random, and the survey was distributed to them via social media such as Facebook and WhatsApp. Also, the survey was also sent to several dog owners by email. The survey had questions to cover our entire group research and here only related to breed your pet which is my topic will be evaluated. Around 58 responses were collected from dog owners. From the survey following figure shows the level of knowledge about dogs of dog owners.

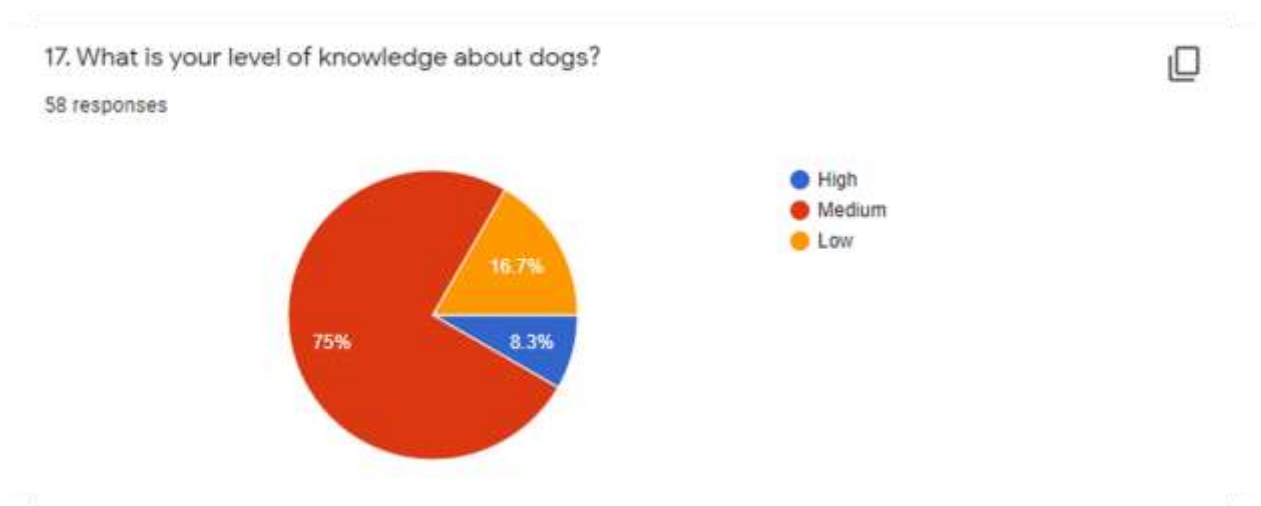


Figure 1 Knowledge level of dog owners

According to this pie chart most dog owners have the medium knowledge about dogs. According to the survey 8.3 % dog owners have the best knowledge about dog. 75% of dog owners think their knowledge level is medium. Only 16.7 % of dog owners has low knowledge about their dogs.

9. How do you know what result will come after a cross dog mix breed?

58 responses

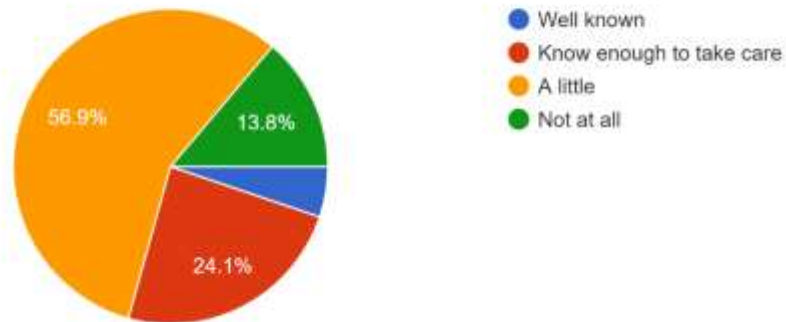


Figure 2 Knowledge level of dog mix breed result.

This is a one of major problem which is face by pet owners. According to the above graph only 5.2% pet owners exactly know what the result is of after cross mix breed. From the experience 24.1% pet owners have knowledge to know enough to take care. Most pet owners have a little idea about mix breeds result which is 56.9%. Finally, from this graph we can see 13.8% do not have any idea about dog mix breed results.

10. How do you normally find a partner for your pet?

58 responses

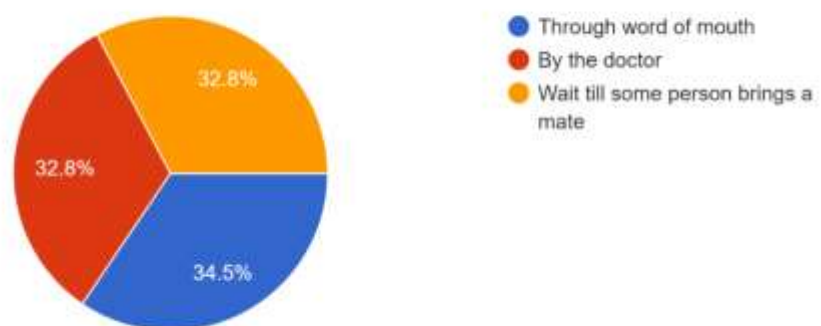


Figure 3 How do you normally find a partner for your pet.

According to the above graph dog owners has indicated How do you normally find a partner for their pet. According to the graph we can see 34.5% of pet owner find a partner for their pet through word of mouth. Only 32.8% of dog owners think they should find a partner form doctor.32.8% of pet owners wait till some persons bring a dog for mate. These steps are too slow and waste a lot of time to find a partner. Using new technology, we can find a partner for the pet is too easy.

11. How to find necessary food recommendations for your pet?
58 responses

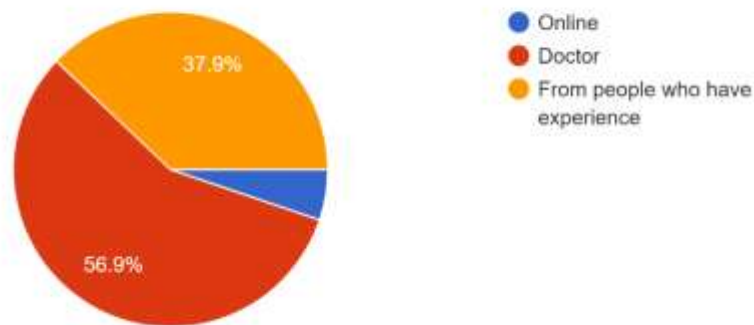


Figure 4 How to find necessary food recommendations for your pet.

Give the necessary food to pet is very important thing. Most of pet owners are very careful when give the food for their pets. According to this graph we can see most of pet owner get the food recommendation from doctors which is 56.9%. But 37.9% of pet owners get the food recommendation from the people who have experience about dog foods. But only 5.2% of pet owners get the food recommendation from online. We could find a reason for that during the study. Because there are no any web site or application for get the correct food recommendations from a one place for the dogs.

12. If you are not going to channel a doctor for your pet how do you find medical treatment for your newborn pet?

58 responses



Figure 5 How to find medical treatment for your newborn pet without doctor.

Medical treatment is very important to newborn pet. According to this graph 46.6% of pet owners get the knowledge from people who have experience about medical treatment. 32.8% of pet owners give the general treatment for newborn pet. Only 20.7% of pet owners get the knowledge about medical treatment from the online. We could find a reason for that during the study. Because there are no any web site or application for get the correct and trusted medical recommendations for new born pet.

2. Research Gap

There are some solutions in the market to identify the result of dogs' breed, recommending the food and medical treatment for newborn pet. Also, there is not any application to find a perfect partner for your dogs. As for an instance, there are some applications which can identify the result of mix breed using dogs' pictures. Some applications recommending food and medical routings without having the knowledge about newborn pet. But the main concern is providing the proper answer for above problems. The main reason owner is not using an application to find the solution for the above problem which is those application does not get the necessary information about dogs to provide the proper answer about those problems. It is not providing the proper solution, only generate common answers. Here are the gaps which I found in the community and can be filled with an innovative and efficient solution.

- “Find your pet’s partner” Using this component owner can find the perfect partner for their pet.
There some web site available in the market [ref]. But it has lot of limitations. When creating an account in site it is not requesting medical information, high, weight, dog group, fur type, life span and their parent information. And only one photo can upload your pet. Because lack of information, pet owners cannot find the suitable partner for their pets. To further elaborate how this gap has been affected to the pet owners is, withing that information system cannot automatically recommended the partner for their pets.
- “Breed your pet” Using this component owner can get the clear idea about newborn pet.
There are some applications available in the market which can find the type of dog using photos[ref]. That mean is after born a new pet we can identify what kind of do is it. But from a picture cannot get all related information and give the proper answer. Owner cannot get a clear idea about newborn pet before pet born. And those application are not requesting much information as I mention earlier. Most inexperience pet owners do not know what they should do after pet born. They do not know the food recommendations and medical recommendations for newborn pet.

By considering above requirement there is not any application provide to answer the above requirements. And the same time application and websites in the market have lot of limitations and those services are very expensive.

3. Research Problem

Dogs are sensitive, knowledgeable, social, and loyal companions to humans. When it comes to dog owners, we can also see that there are mainly two groups of dog owners, based on the survey data. They are experienced dog owners who have kept pets for a long time and inexperienced dog owners who are unfamiliar with newborn dogs, medical recommendations, and food recommendations. Inexperienced dog owners do not like experienced dog owners. Because they are very interesting to know all the information about newborn pet and how to care him. Without having knowledge about above problems people give them to food and medicine which used for peoples. Because of those things they have to face very bad situations. Sometimes they might be the death.

The other thing is both experienced and inexperienced pet owners want to find a proper partner for their pet. Based on the survey data we can see most of them find a mate to breed their dog from doctor and through word of mouth. Most people are busy with their day to activities. But when they are doing those things, they have to wait more time to contact them. Before contact, the other owner they do not have and clear idea about the other dog and mainly they do not know the health detail, history of that dog and some other important things.

There are not applications with machine-learning techniques have been used to find dog mix breed result. With a machine learning approach can identify the pattern of newborn pet after analyzing the information. Find the solution for above problems using artificial intelligence and machine learning approaches has not been successfully completed yet.

Withing the current schedule and life pattern of people, they have become accustomed to do their things quickly. They try do their works by own. However, each problem has its own way of solving it. Therefore my research will bring up a solution for 'find the result of newborn pet', 'recommending food and medical routings for newborn pet', 'help to find a perfect partner for your dog' and create a platform like social media to share their information among registered pet owners.

4. Objectives

4.1 Main objective

The main objective of this component is not only providing the common answers which have to dog owners. Simply this module is more than that. Through this module, the application has two main components.

1. Breed your pet.
2. Find a partner for your pet.

For the first component data will be collected from veterinary doctors. And collected data will be analyze with user's requirements using machine learning algorithms. For the second component data will be collecting when user register to the application. From both components generate very useful information to the user. Collected data will be directed to the real time data base to the storage purposes.

As mentioned, the first component will provide more accurate information using machine learning algorithms. Therefore the main objective is to provide an innovative useful solution to the pet owner for their dogs.

4.2 Specific objectives

1. Breed your pet component which help you to identify what kind of pet will born for your dog.

This is the main component we are going to focusing on this application. It is mainly focusing to generate the result of mix breed. Firstly, all users have to register the application before they use this component. When they are registering to this application, they have to enter all necessary information about their dogs. Because application is analyzing that information using machine learning algorithms with pre train data in the database. From that we can get the clear idea about their newborn pet. It is the primary target of this component. But additionally, in this component this application generates the recommendations for food and medical treatments for that newborn pet. Because of that thing people who have lack of knowledge about pet, can take care their dog and their newborn pet by own.

2. Find a partner for your pet.

This is the second component of this application. This component is mainly working such as social media platform. Because of that using this component user can find the proper partner for their pet. As I mention earlier when user is going to register the application they have to enter all necessary information about their dogs. Additionally, that they can enter their location details. From that information application automatically shows the nearest dogs around your area who registered in the application. Also, if you want to find some specific breed user can search and find the proper partner for their pet. When they are finding the partner, they can see the all information about dog and if user want to contact that pet owner they can also get the contact details.

Because of this component user can find a proper partner without wasting time and they can get a clear idea about dog which they are going to breed their dog.

5. Methodology

When we are considering about this research component, we want to get a brief idea about the main divisions and technologies that are going to use in this application. For the frontend in this application, we used 'React Native' and for the backend we used 'python'. Small data will be store in Mongo atlas database and large data will be store in the AWS S3 Server. Gathered data will be analyze using regression algorithms to find out the result of mix breeds. Identified data will be share with the mobile application. Also share the food and medical recommendations with the user.

Here is a brief idea about how this application work and how use entered data will deliver to the data base and how to analyze and give the result to user.

1. When user register to the application they have to enter all necessary information about dog and contact details to the application.
2. If user select the component which is breed your pet, they can use their own profile information or they can enter another pet's information to compare and get the result of new breed.
3. That information will be directed to the Mongo atlas database to be analyze and get the result of mix breed using machine learning algorithm such regression algorithm.
4. When the getting result by application will be analyze data which are in user profile data or user in that time entered data with data which are in the data base using machine learning algorithms.
5. If user selected the component which is find a partner for their dog, application will be automatically recommend the suggestion for the users.
6. If user not satisfying with the recommended suggestions, they can find a suitable partner by their own using this application.
7. For this component data will be getting from the Mongo Atlas database and large data such as pictures will be getting from AWS S3 server.
8. Finally, in both components analyze data will be shown in the mobile application for owner's perusal.
9. Because of very user-friendly direction in the application user can very easy and understand the getting the result and control it.

Here is a summary of how the system flow work,

1. Users enter the relevant data to application when they are register to the application.
2. Gathered data will be directed to the Graph QL API.
3. After the API will deliver the information to the server. Small data will be directed to the Mongo atlas database while large ones will be stored in AWS S3 server.
4. Gathered data will be analyzed using regression algorithms to find out the result of mix breed using regression algorithms and automatically suggestion for the suitable partner.
5. Both component result will be share with the mobile application.

5.1 Testing

For the application and project testing purposes, following steps will be conducted,

- Application testing will be mainly do with well-known pet owners' people who have experience about dog and inexperience pet owners.
- Implementation will be carefully organizing under developer and pet owner supervision.
- Application will be handover to the selected pet owners for 3 days.
- Setup and guidelines will be delivering to the that selected pet owners.

6. Project Requirements

Table 1 Scope of the project

Scope of the Project	<ul style="list-style-type: none">➤ Supporting Mobile Application.➤ Predictions,<ol style="list-style-type: none">1. Based on dog parents' historical data, predicting the medical condition for newborn pet.2. Based on dog parent's characteristics, what are the features of newborn pet.3. Based on newborn pet what are best food recommendations and medical recommendations.➤ Form user created profile, get the related information to analyze and identify the patterns of medical conditions.➤ Giving the result of newborn pet will be based on parents' characteristics.➤ Medical recommendation's notifications to the owner's smart phone on the correct time.➤ Diagnosis reports which can be shown to the doctors and drug stores when necessary.
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7. Conclusions and Recommendations

This approach will provide an accurate answer to questions that have arisen in our community. Even though there are answers, as I mention above, there are not any single application to find the result of mix breed, recommending food and medical treatments for that newborn pet and find a suitable partner to cross your pet. The current applications that have been introduced to the market only provide a limited range of features that do not provide the expected results to dog owners. These would be the features that existing implementations provide, as well as the features that this research project plans to offer:

Table 2 What Research Project Offers

Existing solutions deliverables	Research Project Deliverables
<ul style="list-style-type: none">➤ Getting information from pictures.➤ Analyze and get the result base on pictures.➤ Application that can identify the newborn pet after born.➤ Only one component in the application.➤ Result is not 100% accurate.➤ Only support some specific version or devices.	<ul style="list-style-type: none">➤ Get the accurate information from pet owner when they are register to the application.➤ Predictions using related profile information, or they can customize the details as the wish.➤ All information will be stored to analyze and identify patterns of the mix breed.➤ Food suggestion and medical recommendations base on type of newborn pet.➤ All medical recommendations will be giving to user by notification on right time.➤ Diagnosis reports will be generating which can be shown to the doctors or drug stores when necessary.➤ Automatically suggest partners for your pet who nearest your location➤ Otherwise, user can find a partner using this application which is working like as social media.

8. Budget and budget justifications

Item	Amount
1. DB Subscriptions (AWS)	1000.00 LKR
2. Data Connection Cost	500.00 LKR
3. Others	500.00 LKR
Approx.	2000.00 LKR

Table 3 Budget

Reference List

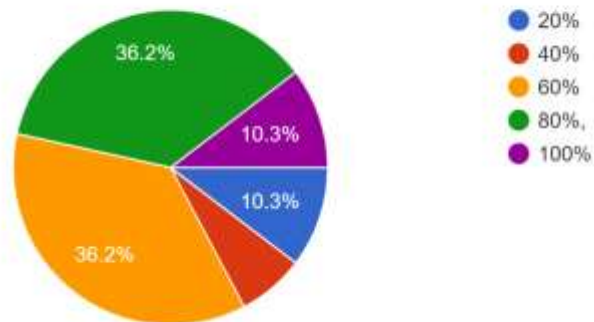
- [01] New App Uses Artificial Intelligence To Identify Dogs By Breed
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Available: <https://www.akc.org/expert-advice/news/app-identifies-dogs-by-breed>
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Available:
<https://play.google.com/store/apps/details?id=com.imappz.petfirstaid>
[Accessed: 02- Oct- 2020]

Appendices

Appendix A: Complete questionnaire results

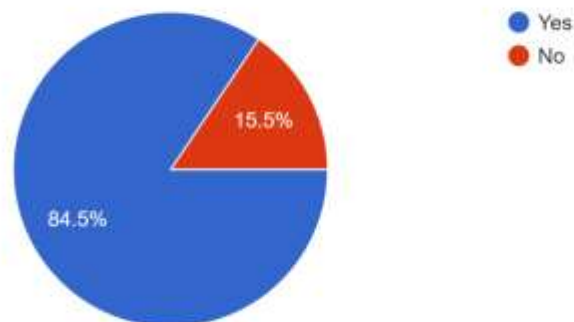
1. How well do think you understand your dog?

58 responses



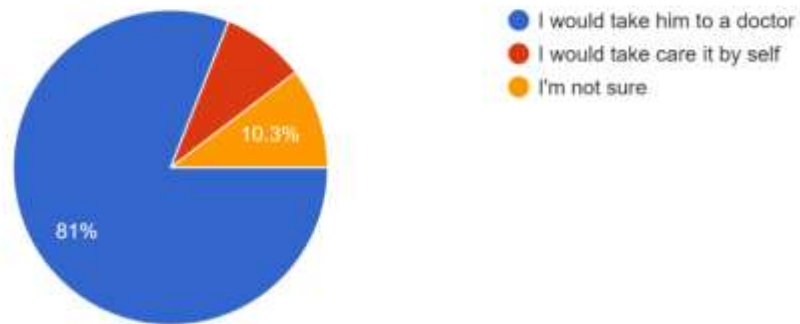
2. Can you understand if the dog is suffering from an illness?

58 responses



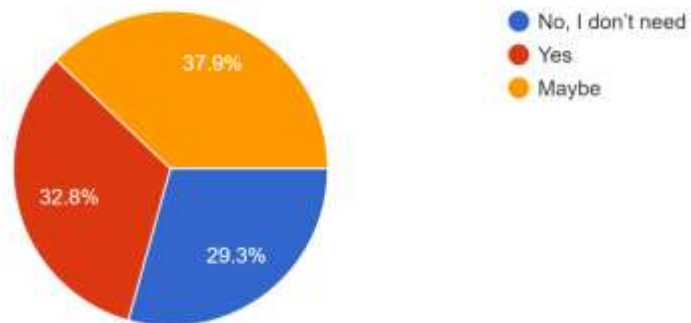
3. If you understand that the dog is suffering what would you do?

58 responses



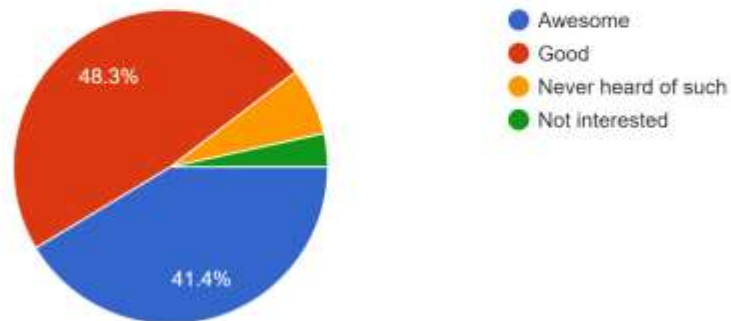
4. Would you like to have a device that would help the understand the dog better?

58 responses



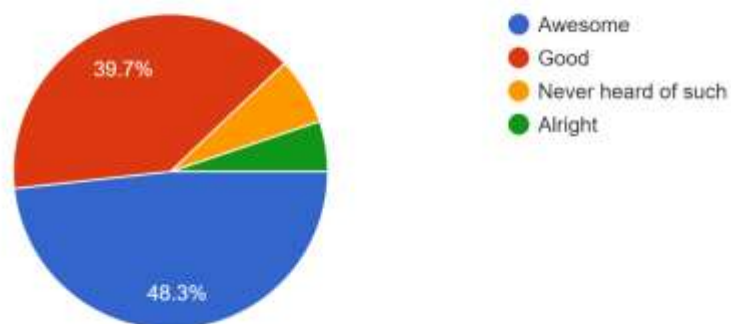
5. Would it be easy for you to have a device which can generate your Pet dog's internal health such as (temperature/footsteps (calories)/respiratory levels)?

58 responses



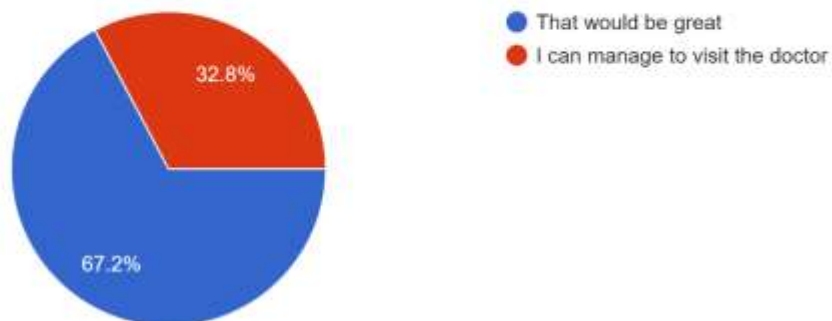
6. What do you think about a system which can predicts exercises and diet plans by tracking dogs foot steps and heart rate levels for the future health benefits?

58 responses



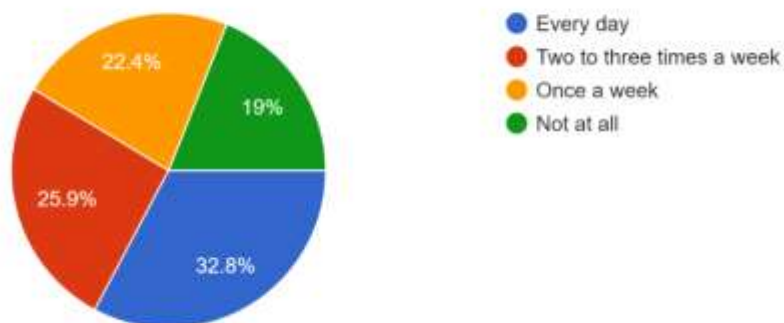
7. How do you rate the process of taking your dog to a doctor to a small issue which can be sorted out by a drug store with correct details?

58 responses



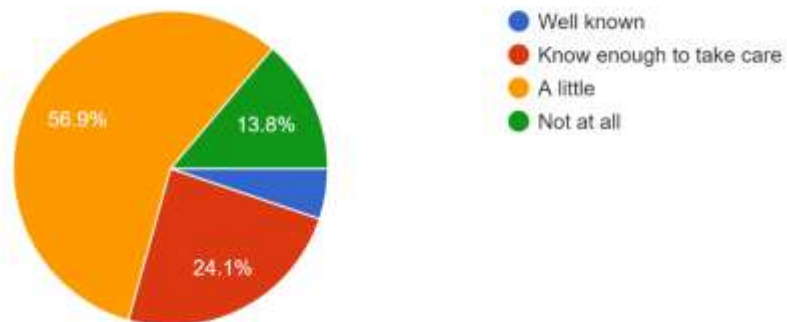
8. How often do you take your dog to a walk?

58 responses



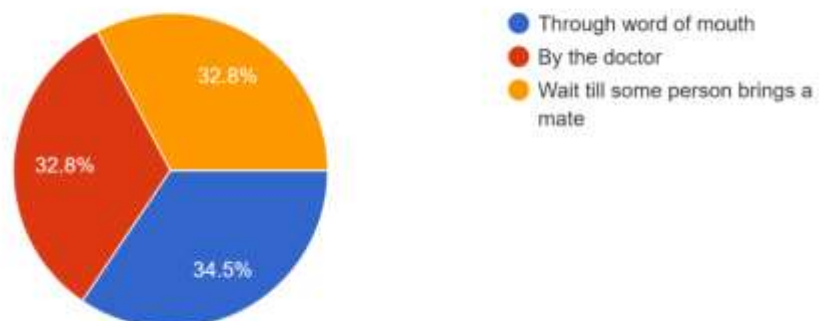
9. How do you know what result will come after a cross dog mix breed?

58 responses



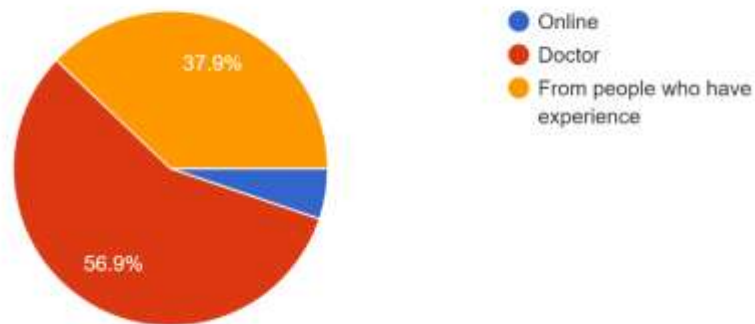
10. How do you normally find a partner for your pet?

58 responses



11. How to find necessary food recommendations for your pet?

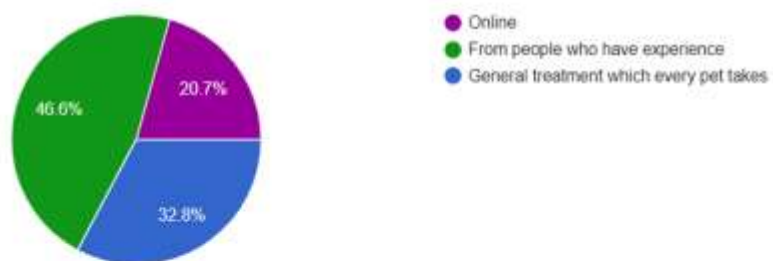
58 responses



12. If you are not going to channel a doctor for your pet how do you find medical treatment for your newborn pet?

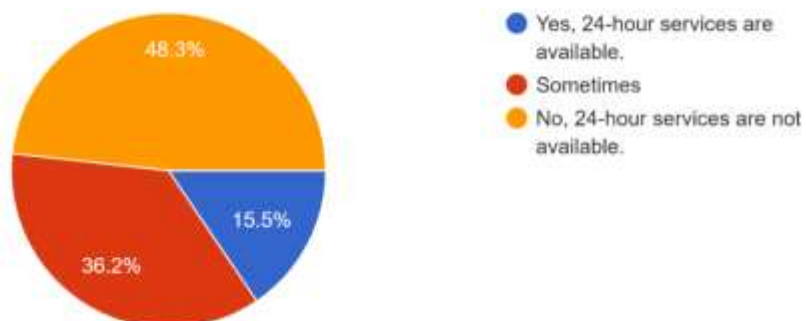


58 responses



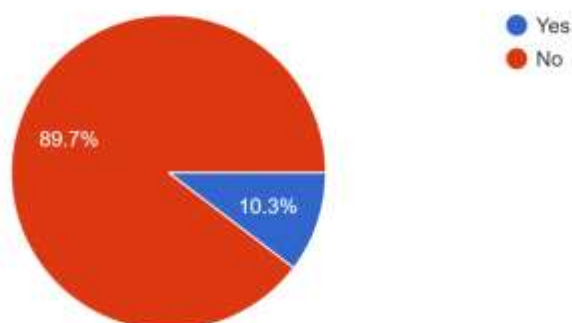
13. In your area, are veterinary services available 24 hours a day?

58 responses



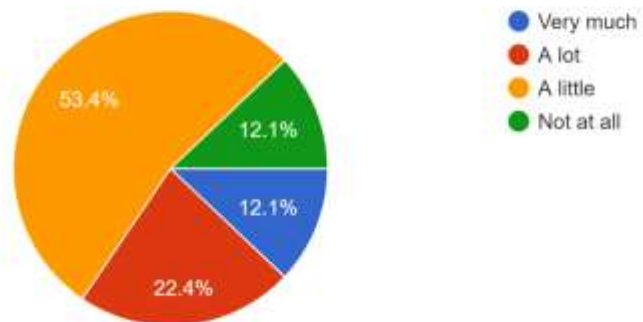
14. Have you ever used a mobile app to identify your pet dog's skin diseases?

58 responses



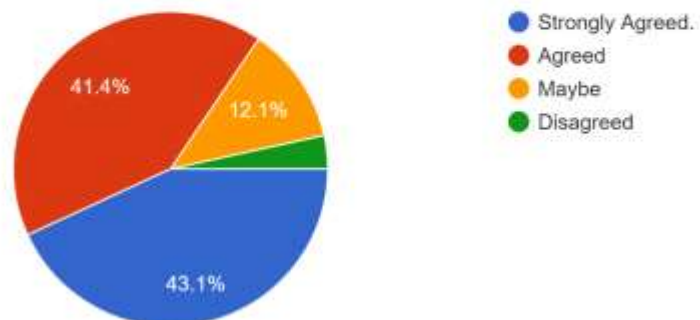
15. Do you pay attention to your dog's skin 24 hours a day?

58 responses



16. If there is a mobile application system for identifying small skin diseases without meeting a doctor, it helps identify skin di.... Do you agree with those mentioned above?

58 responses



17. What is your level of knowledge about dogs?

58 responses

