

Smart Pet-caring Detector System-Assignment Two

Group #15

University of Victoria

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User Research

Participant Summary

We interviewed seven current college students aged 18-25, with a gender distribution of four males and three females. There are four reasons for recruiting college students: first, they usually juggle study and work and do not have much time to observe and spend time with their pets. Second, because college students generally lack adequate knowledge about pets, they do not immediately recognize emotional and physical problems. Third, 87% of college students rent a room while attending school (Skyfactor, n.d.), and they face space issues and roommate problems with their pets. Fourth, college students are not financially well-off, and having a pet is undoubtedly a vast expense. Analyzing customer needs through the interviews and video and picture recording, and helping us by providing feedback and information, can significantly improve the quality of features and user convenience. The overall number of participants is undoubtedly insufficient, and there may be error values in the final design results. However, it still reflects how modern people have lost focus on their pets or have difficulty taking good care of them.

Research Methods

In order to show the required demands functions, we designed two primary methodologies: structured interview primarily and photo/video elicitation secondary.

Interviews

Seven participants answered the same 16 questions, which focused on four parts: pet feeding, cleaning, interaction, and health. By summarizing and analyzing the results of these questions, we understood pet owners' problems better. We also used the survey results to adjust the app's requirements and functions to find the app easy to use and feel good about using it.

Results

Classification	Related Questions	Result
Feeding Pets	<ol style="list-style-type: none">1. Are you too busy to feed your pets regularly?2. Do you know how much and how often and what you should feed your pets?	<ol style="list-style-type: none">1. 5/7 of the participants said that they could not feed their pets regularly due to busy work and study.2. 4/7 of the participants reported that they did not know how to choose suitable food for their pets.3. 3/7 of them did not know the optimal amount of food to feed their pets.
Pets' Health	<ol style="list-style-type: none">3. Do you think your pet has any healthy issues? (Including frequently shed hair etc)4. How often do you take your pet to do the regular examination, and do you have a detailed schedule for that?5. Can you identify your pets' health problems and take actions to solve them?	All of the participants reported that they did not know what to do except to take the pets to a vet when their pets got ill, and they wished to get more support from that.
Cleaning	<ol style="list-style-type: none">6. How often do you have a bath for your pet?7. Do you know how to clean your pets? Do you know what type of cleaner you should use?8. Do you find cleaning for your pet difficult and exhausting?9. How often do you clean your house?	<ol style="list-style-type: none">1.4/7 of participants thought it was challenging to clean the hair of the pets in the home.2. 5/7 of participants did not know when to change the cat litter.
Interaction	<ol style="list-style-type: none">10. Do you have enough patience with your pets?11. Do you miss your pets at home?12. Do you spend enough time with your pets(at least 3 hours per day)?13. Do you want to interact with your pets when you are not with them?14. Do you want to observe your pets' behaviour when you are away from them?15. How do you maintain the connection and affection with your pet when you are away from it for long periods of time?16. What do you think you can do more for your pet?	<ol style="list-style-type: none">1.5/7 of participants said that they did not spend enough time with their pets.2.They also wanted to observe the behavior of their pets when they went out for work.

Summary

In conclusion: Through the interviews, we identified the daily needs of pet owners. First, most of the participants lacked the knowledge of scientific feeding of pets, and automated feeder systems are necessary. Second, pet health is a significant concern for pet owners. Therefore, it is

essential to establish a forum for pet owners to receive constructive advice, including answers from experienced pet owners and experts. Third, hygiene is an issue, as most participants will lack the time and energy to clean, so it is necessary to design a remote control cleaning robot to ease the burden of pet owners. Finally, to meet the needs of pet owners to have more interaction with their pets when they are not at home and check their pets' health. The app is designed with a real-time tracking function and a camera function. It is important to note that some of the questions developed in the interview are not detailed. As a result, the answers given by the interviewees were not informative. For example, compared with the statement 'Do you find it difficult and tiring to clean your pet?', 'What parts of the pet do you find more difficult to clean?' would help interviewees give a more precise answer.

Photo/Video Elicitation

The group asked the seven observed pet owners to record how they kept their cats for two weeks including how they fed and watered their cats, where they bought cat food, where they bought cat food, what products they consumed (bath gel, nail clippers, medication, litter, etc.), when they cleaned up feces, how they played with their cats, and how they prepared their cats for physical examinations, etc. Forty-nine photographs were collected from seven interviewers. Four themes were identified: feeding, cleaning, interaction with pets, and health. After the participants took the photos, a meeting was arranged to discuss the images.

There are many pet foods on the market. How to choose healthy and safe food is one of the primary issues for pet owners to consider. Second, because the protein and fat in meat provide fuel for cats' daily activities, but each cat has different tastes and needs, only one of the interviewees understood the ingredient list and the table of analytical values on the cat food package. Such a situation can lead to the purchase of incorrect cat food and trigger health problems for your pet. Or being sold expensive cat food that is not suitable for their cat's situation by the salesperson, resulting in a waste of money and food (Figure 1).



Figure 1

The cat's hair is often scattered in all corners of the room, which may be due to the cat's metabolism, seasonal hair change, nutritional problems, excessive salt intake, skin diseases, etc. The owner is too busy with work and study to clean the room and places where the cat spends a lot of time (cat trees, cat nests, desks). This can lead to rhinitis and respiratory diseases. In addition, because cats like to stay in places where their owners smell, they like to stay on human sheets, clothes, and mats, which can cause skin diseases in their owners. In addition, college students have roommates, and the inability to deal with pet hair problems quickly can lead to a deterioration in roommate relations (Figure 2)



Figure 2

As cats are very sensitive creatures, they need the company of their owners. However, since pet owners are young, they have a lot of time for social activities in addition to their work and study time. This can lead to psychological problems, such as depression, mania, and food deprivation, which can seriously threaten the health of the pet and the relationship between the director and the pet. During the holidays, college students often go on short and long-term trips, which causes the pet and the owner to not see each other for a long time, and the owner cannot understand the pet's dynamics and cannot have a good time. Pets may think they have been abandoned and may run away from home, go on hunger strike, or commit suicide. The worst case is that the owner loses the pet from then on, triggering the owner's emotional problems (Figure 3).

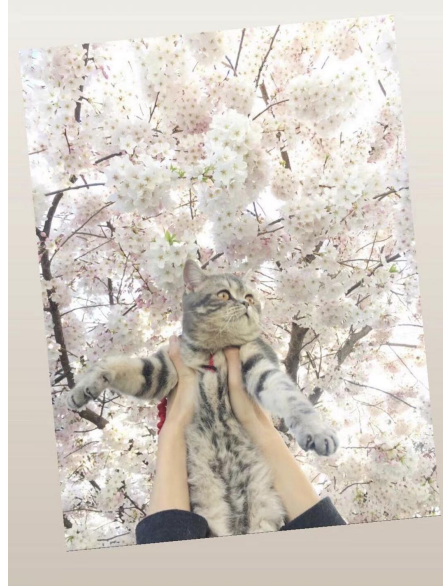


Figure 3

Pet health issues are among the most challenging and require a great deal of time, money and effort on the pet owner. Pets need vaccinations, regular annual checkups, spaying, and neutering, as well as encountering physical emergencies and unseen physical problems. This is expensive, with the average pet visit costing anywhere from \$100 to \$3,000. This is a cost that the average pet owner cannot afford, which leads to pet abandonment. In addition, college students lack effective knowledge about pets and simply ask friends or google to solve pet health problems, which can lead to the loss of pets due to the wrong solution and the aggravation of the pet's unhealthy symptoms (Figure 4).



Figure 4

Task Descriptions

Task 1: Feeding of Pet Cats

purpose: Feed pets scientifically with basic information. This is a crucial task because feeding must be done scientifically so that the pets can be healthy. But, unfortunately, some pet owners might be busy with their work or study and cannot feed their pets regularly. Moreover, some do not know the suitable type and amount of food to feed their pets.

User Description: Molly is a fourth-year student at Camosun University, 21 years old, and has a four-year-old cat. She has more extensive knowledge of cat ownership, but her cat is a very picky eater.

User Wants: Molly wants to be able to feed her cat scientifically.

Specific Molly chose Royal cat food after consulting a lot of information and asking the salesman.

Complete job/action

1. Molly wants to buy healthy cat food that is safe for pets.
2. Molly searched the Internet for cat food products, asked shop assistants, and asked friends what she should buy.
3. Jasmine bought royal cat food, which was suitable for indoor cats. She poured the food into the bowl and observed the cat-eating.
4. Molly noticed that the cat accepted the royal food and hasn't changed it since.

System	Subtasks
The feeding system	1. Determine the type, weight, and age of the cat. Question: Different breeds of cats have different nutritional requirements.
	2. To feed the cat Question: customers forget to feed, or feed too little or too much food.

	<p>3.Feed the cat snacks</p> <p>Problem: Lead to cats preferring canned cat food and cat snacks over food.</p>
	<p>4.Cat defecation</p> <p>Question: Is the cat's excretion normal?</p>
Potential users	<p>Student Base (main customer)</p> <p>An office worker</p> <p>The elderly</p>

Task 2: Collect health info

Purpose: Gather health indicators at home to identify healthy or not

This function is one of the critical tasks because, among all the considerations, health care is one of the most important ones. Besides, nowadays, more and more pet owners ignore or don't realize their pets' health issues, which could cause potential disease. Pets aren't humans who can tell the illness directly but only by recording data collected and analyzed. This is why this task is essential.

User Description: Bob is a third-year engineering student at UVic, which is an expert technology user. In addition, he has owned a dog at home for one year.

User wants: Bob wants to identify if the pet is healthy or not.

Specific	Bob finished the health collection process after a while ▾
Complete job/action	<ol style="list-style-type: none">1. Buy a stethoscope online.3. Put the stethoscope on the 5-6 ribs close to the middle of the chest cavity.4. Count the number of the heart bumps in 60-second timing.5. Redo the process three times to make it accurate because the dog moves all the time.6. Check the color of pet excrement shows the health status.7. Check if the pet has any anorexia or doesn't drink enough water.8. Check whether the pet breathes as usual or breathes unnaturally after a run.
System	Subtasks
Health detection system	1.Count the heart rate Question: not sure if the heart rate is in safe range or not
	2. Check the color of pet excrement Question: How to identify if the excrement shows healthy?
	3. Check the pet has any anorexia Question: How to know the pet has enough food or not or really has anorexia
	4. Check the pet breaths Question: How frequently the breath should be and what kind of strange sound means something wrong with the lungs?
Potential users	Student Base (main customer) An office worker The elderly

Task 3: Interact with pets**Purpose:** Establish a closer relationship with pets**User Description:** Justin is a third-year software engineering student at UVic, which is an expert technology user. In addition, he has a cat at home.**User wants:** Justin wants to accompany his cat more.

Specific	Justin had played catching the ball game with his cat at home 8 times today.
Complete job/action	<ol style="list-style-type: none">1. Gently stroke the cat and let it relax2. Use a laser pointer to shoot at a wall or furniture3. Change the position of the laser point to have the cat chase the laser point4. Train the cat with a feathered bell stick5. Reward the cat with snacks if it behaves well
System	Subtasks
Pet company system	1: Real-time monitoring To observe the behaviour of pets when pet owners are out
	2: Remote control of the laser pen To controls a laser pen though app to accompany the pet
	3: Performance rewards To rewards snacks when pets has a behaves well
	4: Pet mobile video To have a video with pets
	5: Pet capture moment To take photos to record pet moment through app
	6: Automplay pet games To projection animation on the floor or ceiling to interest pet
Potential users	Student Base (main customer) An office worker The elderly

Task 4: House cleaning

Purpose: Provide a clean environment both for his cat and for himself. This task is necessary because a clean environment is essential for both pets and pet owners. However, most students or workers do not have much time to clean the house regularly. In addition, a dirty environment can cause health issues for both pet owners and their pets.

User Description: Tim is a third-year computer science student in UVic who is a novice pet owner. He keeps a cat in his house. The cat is very lively and scatters its hair everywhere in the house. Tim is very busy on weekdays from morning to evening. As a result, he does not have much time for cleaning. Today, he gets back home at 9:00 pm and plans to clean his house

User wants: Clean up all the cat hair and replace cat litter if necessary.

Specific	Keep the cleaning process within 30 minutes
Complete job/action	<ol style="list-style-type: none">1. Clean the cat bowl2. Search the house thoroughly and clean the cat hair3. Check the status of the cat litter4. Clean the cat litter and replace it if necessary5. Throw out the garbage
System	Subtasks
Cleaning system	<ol style="list-style-type: none">1. Search for cat hair automatically and clean it up
	<ol style="list-style-type: none">2. Remind the pet owners to clean or replace the cat litter
	<ol style="list-style-type: none">3. Throw out the garbage collected
Potential users	Student Base (main customer) An office worker

Task 5: Solving pet's health problem

Purpose: Effectively identify and solve the pet health issues, and avoid the expense and time of going to a pet hospital if you don't need it at all.


User Description: Tom is a fourth-year mechanical engineering student at Uvic and has a lot of work to do every day, including weekends. He doesn't know much about pet health himself. However, he wanted to solve his pet's health problems reasonably and efficiently.

User wants: Tom wants to get some help when he faces health issue of his pet


Specific	Tom explored more than 12 websites and called 7 of his friends in one day. Finally, he went to a pet hospital for treatment.
Complete job/action	<ol style="list-style-type: none">1. Observing the cat's behavior and reaction, and trying to interact with the pet.2. Looking up the sudden changes in pets.3. Asking for help from friends who also have the same cat and had a history with the same behavioral symptoms history.4. Go to the pet hospital to have an examination and treatment.
System	Subtasks
Health issue advising system	Keeping track of changes in the pet's health and reaction.
	Finding a correct solution which is economical and practical.
	Implement the functionalities by 'Forum' and 'On-line advision'.
Potential users	Student Base (main customer) An office worker The elderly

Journey Maps


Task 1:

	PERSONA Molly, with a four-year-old cat	SCENARIO Feed Molly's cat	USER EXPECTATIONS Feed pets in a healthy, scientific and hygienic way with basic information
PHASE 1 Buy cat food and supplies	PHASE 2 Set a feeding schedule for her cat	PHASE 3 Prepare the food for the cat	PHASE 4 Observe how satisfied the cat is with the food
DOING Searched the Internet, asked shop assistants, and asked friends what she should buy	Drew a rough food schedule on a piece of paper and set an alarm on her phone to remind herself	Pour the cat food into a bowl and prepare a cup of milk.	Observe the cat's state before eating and the amount of food left after eating
THINKING Deciding to buy what kinds of cat food and utensils was really a headache thing	Molly wondered how she can feed her cat when she is away from home?	Molly was not sure if the amount of food was enough and was the food she prepared nutritionally balanced for her cat.	Molly thought it took a lot of work to find the right kind of food for her cat
SAYING Molly hoped she could have an app that would help her decide what brand of food she should buy for her cat	Molly thought it would be great if she can have a little robot to feed her cat automatically.	She thought she need to consult experienced cat owners and ask them how can she prepare the food	Molly was worried that her cat won't eat the food since she always rewarded her cat with snacks after it eats
INSIGHTS Molly wants to feed her pet in a healthy, hygienic and scientific way, which is very important.		INTERNAL OWNERSHIP A smart application that can set a scientific, healthy feeding schedule can help the keepers a lot. A small robot that can help feed the pets is also necessary.	
Mengyang Zhang			


Task 2:

	PERSONA Bob, 21, a third year engineering student	SCENARIO Bob wants to check if his pet dog is healthy or not at home because he don't want to go to the pet clinic and cost a lot of money to do the examination	USER EXPECTATIONS He wants to easily and accurately detect every health indicators
PHASE 1 Detect the heart rate	PHASE 2 Check the excrement	PHASE 3 Check if the pet has anorexia	PHASE 4 Check the breath
DOING Buy a stethoscope online and put it on the 5-6 ribs close to the middle of the chest cavity and count the heart bumps for three times	Search online about the healthy excrement color and compare it to the pet's	Check every meal if the pet finish all the required amount of food or not	Listen to the pet's breath carefully after a run
THINKING The whole process is exhausting. He won't do this again	He can hardly distinguish the difference between healthy one and none-healthy one	He has to notice this all day, this is so tired.	He knows that the dog may breath with murmur if there's something wrong with the lungs and throat, but I still can't tell the difference
SAYING He hopes there's some way can do all this for him easily	He hopes there's some online advising to identify it for him and also give him a correct instruction	He wishes there's some kind of assistant can do this for me. Besides, he is also not sure if I feed the pet with correct amount of food	He needs some professional pet doctors or some detailed instructions to help him identify this
INSIGHTS The client wanted to be able to identify his pet's health indicators. It is important to support health examinations at home at a low cost.		INTERNAL OWNERSHIP Lower the cost and the time consumption of the examination Do the process automatically and regularly Give support of professional pet doctors	
Daming Wang			


Task 3:

	PERSONA Justin, 23years old, university student	SCENARIO Play interactive games with the cat	USER EXPECTATIONS Establish a closer relationship with the cat and reduce its sense of loneliness
PHASE 1 Stroke the cat gently	PHASE 2 Teasing a cat with a laser pen	PHASE 3 Train the cat with a feathered bell stick	PHASE 4 Reward the cat with snacks
DOING Gently stroke the cat's back, smooth its fur and make it feel relaxed.	Use a laser pointer to shoot at a wall or furniture, change the position of the laser point to attract the cat.	Shake the feathered bell stick up and down to train the cat's jumping ability and reflexes	Give some snacks as treats to the cat if it behaves well.
THINKING He hope he don't touch anywhere which will make my cat feel uncomfortable and angry.	Cat can be attracted by laser and the hunting instinct is triggered by toys that move agility.	He find it hard to strengthen the bond he had with my cat since this training is the interaction between the stick and his pet.	Rewarding is good for training his cat, but it often grabs his snacks, which might probably hurt his hands.
SAYING Sometimes his cat is very cold, it would not let him touch it, which makes him feel very headache.	Controlling the laser pointer for a long time made his fingers sore, and changing the battery was a hassle.	He would like to have a small robot to help him control the feathered bell stick so that he can also play with my cat together.	It would be nice to have a device to help him control how much and how often he should reward his cat.
INSIGHTS Playing games with pets can get closer to them and know them better It's also a good idea to invite family members and friends to spend time with your pets.		INTERNAL OWNERSHIP A small robot is needed to accompany the pet When people are busy with work or study, they need a device to help them better interact with their pets.	
Xinxin Wu			

Task 4:

<div>  <div> PERSONA Tim, a third-year computer science student in UVic </div> <div> SCENARIO Today, Tim gets back home at 9:00 and plans to clean his house within 30 minutes. </div> <div> USER EXPECTATIONS 1. Finish within 30 minutes. 2. Clean up all the cat hair 3. Provide a clean environment for his cat </div> </div>			
PHASE 1 Clean the cat bowl	PHASE 2 Search the house and clean up all the cat hair	PHASE 3 Check the cat litter and replace if necessary	PHASE 4 Throw out the garbage
DOING Use detergent to clean the cat bowl	Search the house thoroughly and clean up all the cat hair in the house	Check the status of the cat litter. If the condition is good, just clean it. Otherwise, replace the cat litter.	Throw cat hair and excrement in the trash and then throw out the garbage.
THINKING It is not hard to clean the cat bowl.	It is very annoying and time-consuming. He doesn't know where his cat had been to. Therefore, he needs to search for every corner in the house.	He doesn't have much experience about keeping pets and is not sure when he should replace the cat litter.	It is not very hard because the cat knows where to urinate.
SAYING It is not a time-consuming task. It only took three minutes to finish	He found it very tiring and time-consuming. It would be better if a robot can help him with that, which can save him a lot of time	Hope that someone can remind him to replace the cat litter when necessary.	It is easy except that the excrement is a little bit dirty.
INSIGHTS Cleaning the pet bowl and throw out the garbage are not difficult tasks for pet owners. However, cleaning the pet hair is challenging and time-consuming. Also, for a novice pet owner like Tim, he is unlikely to know when to replace the cat litter.		INTERNAL OWNERSHIP 1. An auto-cleaning function might be very useful for pet owners to clean the pet hair 2. A reminder for replacing cat litter is helpful for novice pet owners. Junhao Lin	

Task 5:

<div>  <div> PERSONA Tom, 25 years old Fourth-year engineering student at UVic </div> <div> SCENARIO Tom does have much knowledge about pet health, but his cat always throw up for unknown reasons. </div> <div> USER EXPECTATIONS He needed a way to get help with his cat's health issues. </div> </div>			
PHASE 1 His cat was found to have abnormal reactions.	PHASE 2 Try to find some idea from internet	PHASE 3 Ask for help from friends	PHASE 4 Go to pet hospital for treatment
DOING 1. Observe the time the cat sleeps, the number of times it drinks, and the amount of food it eats every day to see if it is the same as before. 2. Try to play games with the cat to check the cat's mental state.	Look up the reasons for the sudden change in cat habits on Google and ask questions on Quora.	Ask friends who also have cats if their cats have the same behavioral symptoms.	1. Take the cat to the hospital for examination. 2. Get the test results, but can't read them. 3. Ask the doctor about the results and ask his questions.
THINKING 1. The cat is eating less and drinking more frequently. 2. The cat is not very willing to play with people and is not interested in the toys it used to like.	1. The explanation for the cat's lack of spirit is very academic and it is impossible to understand the meaning. 2. The answers from Google were also not very trustworthy.	1. Due to the different breeds of cats, the habits and physical quality of each cat are also different. 2. Each cat has different habits due to a different growing environment. 3. Cats may change their habits according to the change of seasons. The answer is not indicated due to the differences between a friend's cat and his own cat due to different breeds, different levels of health and different growing environments. Although Tom felt that asking his friend was helpful, he was still concerned about the cat's health. He wishes there is someone who is professional and gives reliable advice.	1. The cost of the test is very expensive. 2. It takes time to make an appointment for the test and you can only do the test according to the doctor's schedule, which will delay Tom's time in class and study. 3. The waiting time is too long, resulting in a waste of time. 4. The doctor used words such as maybe, indicating that Tom still needs to observe the cat's habits.
SAYING The cat's habits were indeed different from before. He is worried about the cat's health.	The results from Google are very disappointing. No effective solution to the problem was obtained. He hopes there is an advisor who can help him to identify his problems.		It takes a lot of time, money and effort to go to the hospital for examination. As a student, it causes stress to Tom. Tom hopes to get a quick and effective solution to the problem, with more convenience and time-saving.
INSIGHTS Tom wants to keep track of changes in the cat's health during the busy process. And he is a student, it was important to get an effective solution at little cost to him.		INTERNAL OWNERSHIP There can exist an on-line advising functionality that can help the users like Tom to identify the problem and make correct decision about the first movement needs to do. And let the users to make sure should they go to pet clinic or not. The on-line advising should be professional enough. Linyao Hou	

Design Requirements

Must include:

1. Huge pet database
Contain the data related to the pets uploaded by experienced keepers and pets' organizations.
2. Auto-feeding function
Automatically feed the pets with a proper amount of food in scheduled timings.
3. Hair-cleaning function
Find out cat hair automatically and clean it up.
4. Intelligent advice
To provide scientific and sound suggestions on pet feeding, care, and medicals.
5. Notification
Reminders would help notice the users of important dates, such as vaccination, periodic health examination.
6. Real-time monitoring
To help users check their pets anytime and anywhere.

Should include:

1. Pet health Chart
Generate a report regarding pets' health conditions according to their temperature, heart rate, diet, etc.
2. Online advising
Online advising can help many breeders who lack the knowledge to make correct choices or consult professional experts.

Could include:

1. The platform where users can communicate
Upload pictures and videos with their pets, share tips and suggestions or post some confusion to ask for help.

2. Pet rescue center community

Share homeless animals in need on the app, raise money to help them, or send them to a pet rescue center.

Exclude:

1. Pet Trading Service

Do not support users to buy or sell pets, not allow users to publish information about seeking or selling pets.

Reference

Skyfactor Mapworks (n.d.). The Impact of Roommates on First-Year Students.

<http://www.skyfactor.com/wp-content/uploads/2017/02/2017-Roommate-Research-Note.pdf>