



American International University-Bangladesh (AIUB)

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PawsitiveCare: Application for animals

Software Requirement Engineering

Sec: A



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Contents

Abstract	2
1. Problem domain.....	2
1.1 Background.....	2
1.2 Proposed Solution.....	3
2. User Requirements.....	3
2.1 User stories	3
3. Proposed solution.....	6
3.1 System features.....	6
3.2 UML diagrams.....	7
4. Social impacts	10
5. Development plan.....	11
5.1 Project roadmap.....	11
5.2 UI/UX design	12
6. Marketing Plan.....	12
6.1 Target audience.....	12
6.2 Objectives	13
6.3 Strategies	13
6.4 Metrics	13
7. Cost and Profit Analysis	14
7.1 Development Cost	14
7.2 Marketing Costs	14
7.3 Revenue Model.....	15
7.4 Profit Analysis	15
8. Conclusion	16
References	16

Abstract

"PawsitiveCare: A Mobile Application to Revolutionize Animal Welfare in Bangladesh"

Bangladesh's stray animals face severe neglect and abuse, with outdated laws and insufficient enforcement exacerbating the problem. PawsitiveCare is a mobile application that aims to provide a sustainable solution to this issue. The app's features include locating nearby qualified vets, ordering pet medicine, and booking rescuers for sick or injured animals. By controlling the population of stray animals and promoting responsible pet ownership, PawsitiveCare aims to change people's mindset toward animal welfare and create a better world for these sentient beings. Join us in our mission to give animals the respect they deserve with PawsitiveCare.

1. Problem domain

Bangladesh is a country that faces numerous challenges in providing healthcare services, not only to humans but also to animals. According to a report by the Daily Star, the Dhaka region alone is home to an estimated forty thousand stray dogs and an unquantifiable number of stray cats. These animals are vulnerable to various problems, such as accidents, homelessness, and animal abuse, and are often subjected to violent acts. Unfortunately, the mistreatment of stray animals is a pervasive issue in Bangladesh, rooted in fear and the notion of these creatures as insignificant objects.

Regrettably, the society in Bangladesh views stray animals as a threat or a nuisance, and as such, people do not hold much regard for their welfare. Shockingly, dogs, in particular, are tortured in broad daylight, which occurs with little to no intervention from the relevant authorities. Despite reports highlighting the extent of animal cruelty in the country, the city corporation has not taken sufficient measures to address the issue, as elaborated in Sayere Nazabi Sayem's report on the current state of animal abuse in Bangladesh.

Bangladesh's existing laws against animal cruelty are outdated and lack enforcement, rendering them ineffective in 2023. Consequently, it is challenging to provide justice for these animals. However, a solution could be to offer treatment for injured stray animals and raise awareness in society to promote the humane treatment of these animals. This approach could go a long way in mitigating the problem and fostering a more compassionate society.

1.1 Background

Bangladesh's lack of awareness of animal first aid techniques is prevalent. It is common to observe individuals who express compassion for injured animals but lack knowledge of intervening in such situations. However, there are rescuers in the country who provide this service. Nonetheless, the most significant challenge associated with animal rescue is the funding required to treat these animals. Since stray animals do not have owners, the absence of a funding mechanism presents a significant hurdle to resolving this issue.

Furthermore, once the funding issue is addressed, there is a need to devise a means of providing proper medical care to these animals. This process may involve contacting rescuers for immediate first aid and vet appointments where necessary. However, unlike human healthcare providers, veterinarians are not always readily available, and the quality of their services may be inconsistent. As such, there is a need to identify the right veterinary practitioners at the right

time to ensure proper treatment. Additionally, animal medication is not readily available in all pharmacies, and sourcing these drugs may present a significant challenge.

As sentient beings, animals are incapable of vocalizing their health problems, thus requiring us as humans to provide them with the care and treatment they deserve. Many animals die daily from preventable causes, such as accidents or abuse by street children. Consequently, there is a pressing need for a permanent and sustainable solution to this issue. Otherwise, as human beings, we cannot consider ourselves successful in fulfilling our ethical obligations.

1.2 Proposed Solution

In order to address the issue of stray animals, we propose the development of a mobile application called PawsitiveCare. This application aims to bring together individuals who care for animals and want to make a difference in their lives.

The application will have features allowing users to locate nearby qualified vets/surgeons and book rescuers nearby. This feature will make it easier for people to get help for injured or sick animals, much like how we call for an Uber nowadays.

Furthermore, the app will also have pharmaceutical contacts, allowing users to order medicine for their pets on the spot. This addresses the issue of medicine availability, which is often a problem in such situations.

Our vision is to give animals a better life and the respect they deserve. The app will also help keep track of these animals, ensuring they are vaccinated, spayed, or neutered as per requirement, to control the population of stray animals and reduce the risk of them causing harm to people.

Overall, the development of PawsitiveCare aims to positively change people's mindset towards animals and encourage love and care for them. We hope that within 6 to 10 years of launching this application, we will be able to achieve this vision and create a better world for animals.

2. User Requirements

2.1 User stories

Upon elicitation from various users, we formulated the following user stories:

Donors:

"As a donor, I want to login to my account so that I can see all my previous contributions."

"As a donor, I want to be able to donate money online using a secure payment platform so that I can easily contribute."

"As a donor, I want to receive a receipt for my donation so that I can keep track of my charitable contribution."

"As a donor, I want to be able to specify how my donation should be used so that I can ensure it is being used for a specific purpose."

"As a donor, I want to receive updates on how my donation has been used so that I can see the impact of my contribution."

"As a donor, I want to apply for a donation so that the admin can approve it."

"As a donor, I can give reviews and comments so that everyone can see the donating fund."

"As a donor, I want to be able to easily share information about the pet organizations so that I can help spread awareness and encourage others to donate."

"As a donor, I want to see the pet organization's financial statements so that I can ensure my donation is being used responsibly."

"As a donor, I want to be able to donate specific items such as food, toys, or blankets so that I can help provide for the pets in the organization's care."

Vets:

"As a vet, I want to be able to access a pet's medical history so that I can provide better care."

"As a vet, I want to view upcoming appointments so that I can prepare for them in advance."

"As a vet, I want to be able to schedule appointments with pet owners through the software so that I can manage my schedule more efficiently."

"As a vet, I want to be able to record my diagnoses and treatment plans in the software so that others can access the information."

"As a vet, I want to be able to view lab results and x-rays in the software so that I can make informed treatment decisions."

"As a vet, I can communicate with other vets in the center about a pet's treatment plan so that we can collaborate and provide the best care possible."

"As a vet, I want to be able to receive notifications when a pet's medical record is updated or when there are upcoming appointments so that I can stay informed."

"As a vet, I want to be able to add notes to a pet's medical record so that other vets can have additional context about a pet's condition."

"As a vet, I want to be able to view a pet's vaccination history so that I can ensure they are up-to-date on their vaccinations."

"As a vet, I want to be able to access educational resources through the software so that I can stay up-to-date on the latest practices and treatments."

Manager:

"As a manager, I want to be able to create and manage accounts for vets, donors, pet owners, and rescuers so that they can access the software."

"As a manager, I want to be able to monitor the activity of vets and staff members in the software so that I can ensure compliance with center policies."

"As a manager, I want to be able to create and manage schedules for the center's vets so that the center runs efficiently."

"As a manager, I want to be able to generate reports on the center's financial performance, such as revenue and expenses, so that I can make informed decisions."

"As a manager, I want to be able to manage the center's inventory of medical supplies, food, and other supplies so that we are always well-stocked."

"As a manager, I want to be able to manage the center's budget so that we can operate within our financial means."

"As a manager, I want to be able to generate invoices for services provided to pets so that we can get paid for our services."

"As a manager, I can delete or add any items or members so that I can see the update."

"As a manager, I want to be able to manage the center's customer service function, such as answering phone calls and emails, so that we can provide excellent customer service."

"As a manager, I want to be able to see the donors so that I can approve for donation."

Pet owner:

"As a Pet owner, I can search rescuers with their name or phone number so that I can find them."

"As a pet owner, I can search for my preferred vets so that I can consult them."

"As a pet owner, I can buy medicines from pharmacies online."

"As a pet owner, I can donate for the pets so that I can help them get cared for or cured."

"As a pet owner, I can register and login into my account."

"As a pet owner, I can delete my account."

"As a pet owner, I can post my pets' problems so that I can know how to solve the problem at home."

"As a pet owner, I can give reviews of vets and rescuers so that other users may know where to go when they face any problems."

"As a pet owner, I can put my pets up for adoption so that someone else can adopt them."

Rescuer:

"As a rescuer, I can browse for pets on a location basis to find injured pets to help them."

"As a rescuer, I can give suggestions to pet owners when needed."

"As a rescuer, I can create my profile."

"As a rescuer, I can register and login in my account."

"As a rescuer, I can delete my account."

"As a rescuer, I can change my account information so that other users know my updated info."

"As a rescuer, I can give them their prescribed medicines."

"As a rescuer, I can donate money if a situation calls for it."

"As a rescuer, I can make hospital suggestions so that users know which hospitals treat different types of pets."

3. Proposed solution

3.1 System features

This application is designed to aid society in various ways, particularly pet rescue and spot treatment. Equipped with a team of veterinarians, rescuers, and pharmaceutical connections, it offers reliable and valuable services for injured street or house pets. Given the limited number of pet treatment centers, this application fills an important gap in the market. It offers a range of therapies for various pets, including dogs, cats, and birds, as well as prescription drugs.

Being developed in-house, this application has multiple branches and provides round-the-clock service. If a rescuer discovers an injured pet, they can transport it to the facility, where veterinarians can provide immediate treatment. While the vets operate on a schedule, they are always available to address critical situations. Pet owners can conveniently schedule appointments with veterinarians online, avoiding lengthy wait times. Additionally, users can learn about medications and treatments for their pets from the comfort of their homes. The application facilitates the online ordering of prescriptions and pet food, with payment options including Bkash, Nagad, Rocket, and online banking.

Furthermore, the application has a mechanism for soliciting funding to improve the organization's facilities and care for its animals. In sum, the care and well-being of animals are crucial to creating a safe and secure society for all living beings.

3.2 UML diagrams

Use Case Diagram:

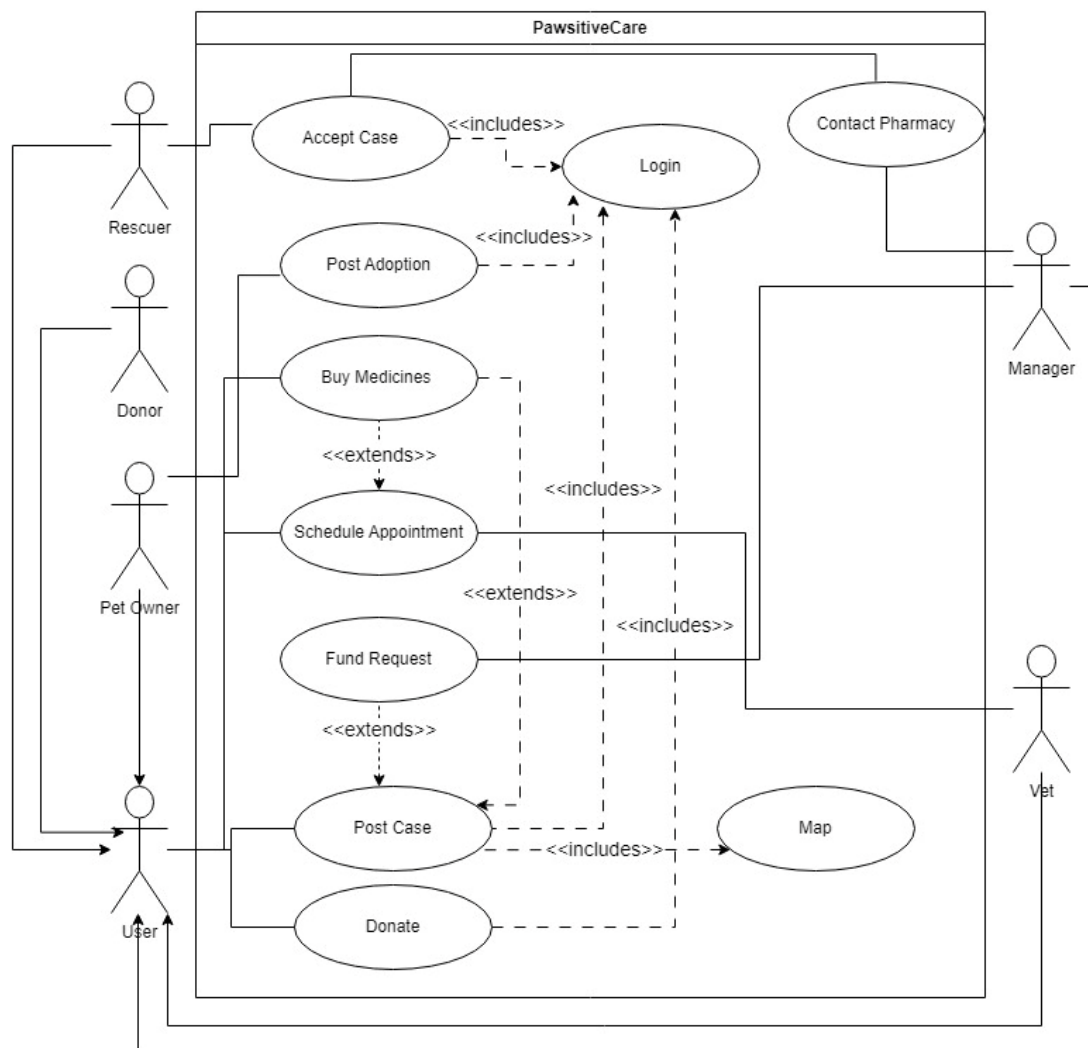


Figure: Use Case Diagram for the System

The use case diagram depicts the various tasks that each user is authorized to perform within the system. The actors in the system, including donors, pet owners, vets, donors, and managers, are generalized as user actors, as each user can perform several tasks. One such task is the login function, which is included in other use cases, indicating that users must log in to the system to access specific features such as posting a rescue case, donating money, or posting for adoption.

However, not all functionalities require the user to log in, such as buying medications or scheduling appointments, as there may be urgent cases where time is a critical factor, and users need to provide their address and phone number for immediate communication or delivery.

The extends relationship is used between the medicine, appointment, and case use cases, indicating that users may need to purchase medication depending on the severity of the case or prescription. Additionally, users can request funds, which must be approved by a manager, and access an online map for precise location information while filing a case.

In summary, the use case diagram visually represents the various tasks each user can perform within the system. The login function is essential for accessing several features, while other functionalities do not require authentication. The extends relationship denotes optional functionalities such as purchasing medication, and users can request funds and access location information for filing cases.

Entity Relationship Diagram:

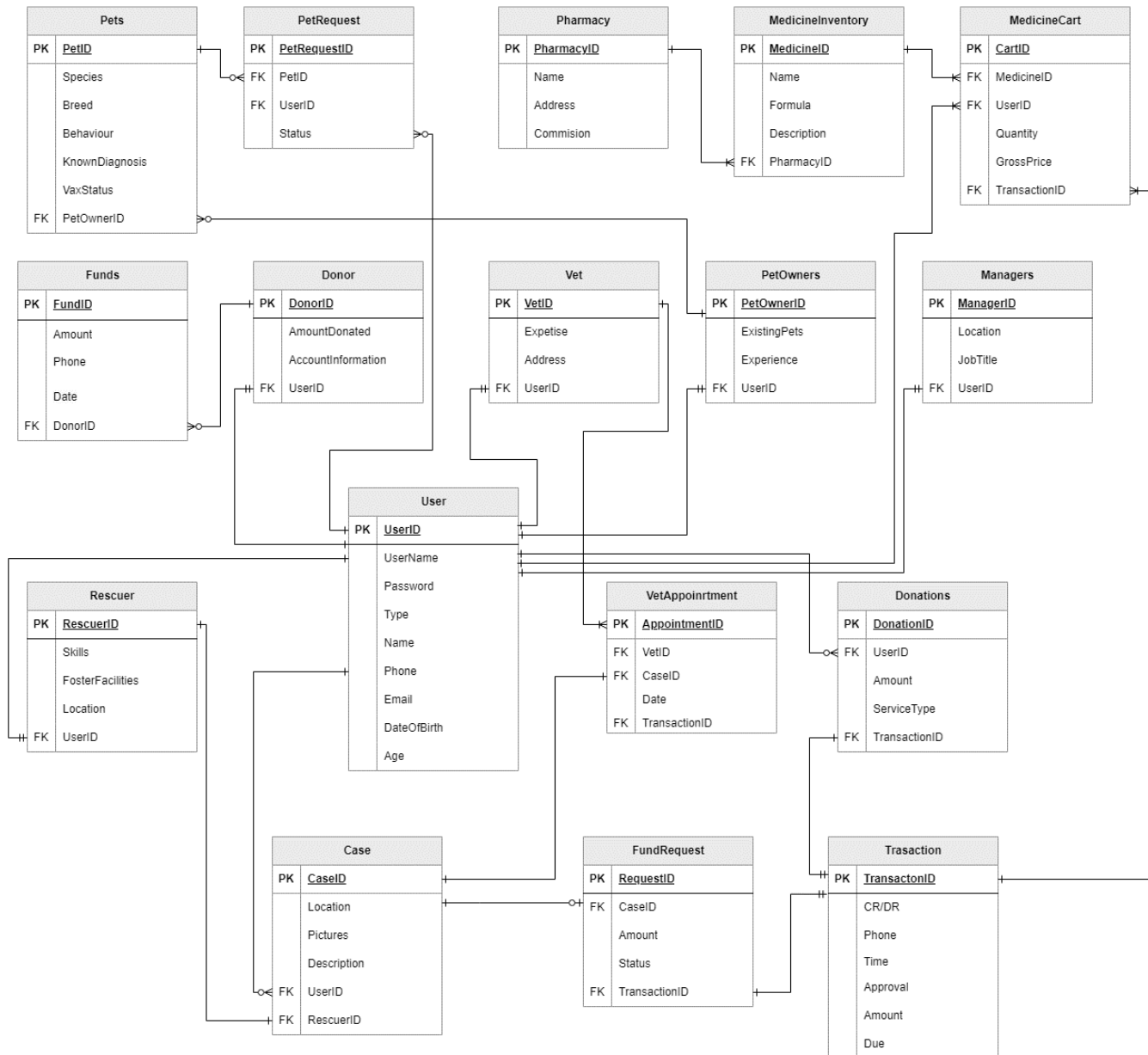


Figure: Entity Relationship Diagram for PawsitiveCare

An entity-relationship (ER) diagram is a crucial component during software application development. The ER diagram is vital to ensure data integrity, accuracy, and consistency in the application. In this context, the ER diagram for the current project features an available user table that has a one-to-one relationship with each type of user.

The diagram also showcases the relationship between users and the cases they file, which may request funds. As funds may not always be necessary, the relationship between funds and cases

is one-to-zero or many. When a fund request is approved, it generates a transaction. Therefore, the relationship between fund requests and transactions is one-to-only one. Similarly, cases can have vet appointments and rescuers assigned to them, with their relationships highlighted in the diagram.

Additionally, pet owners can put their pets up for adoption, and users can buy medicine from a selected pharmacy database. The purchase of medicine generates a transaction, and since a user may buy multiple medicines in a single order, the relationship between users and medicines is one-to-many. Finally, users may request to adopt a pet, which generates a request that the pet owner must approve. The ER diagram thus represents the structural relationships between the various entities in the application.

Activity Diagram:

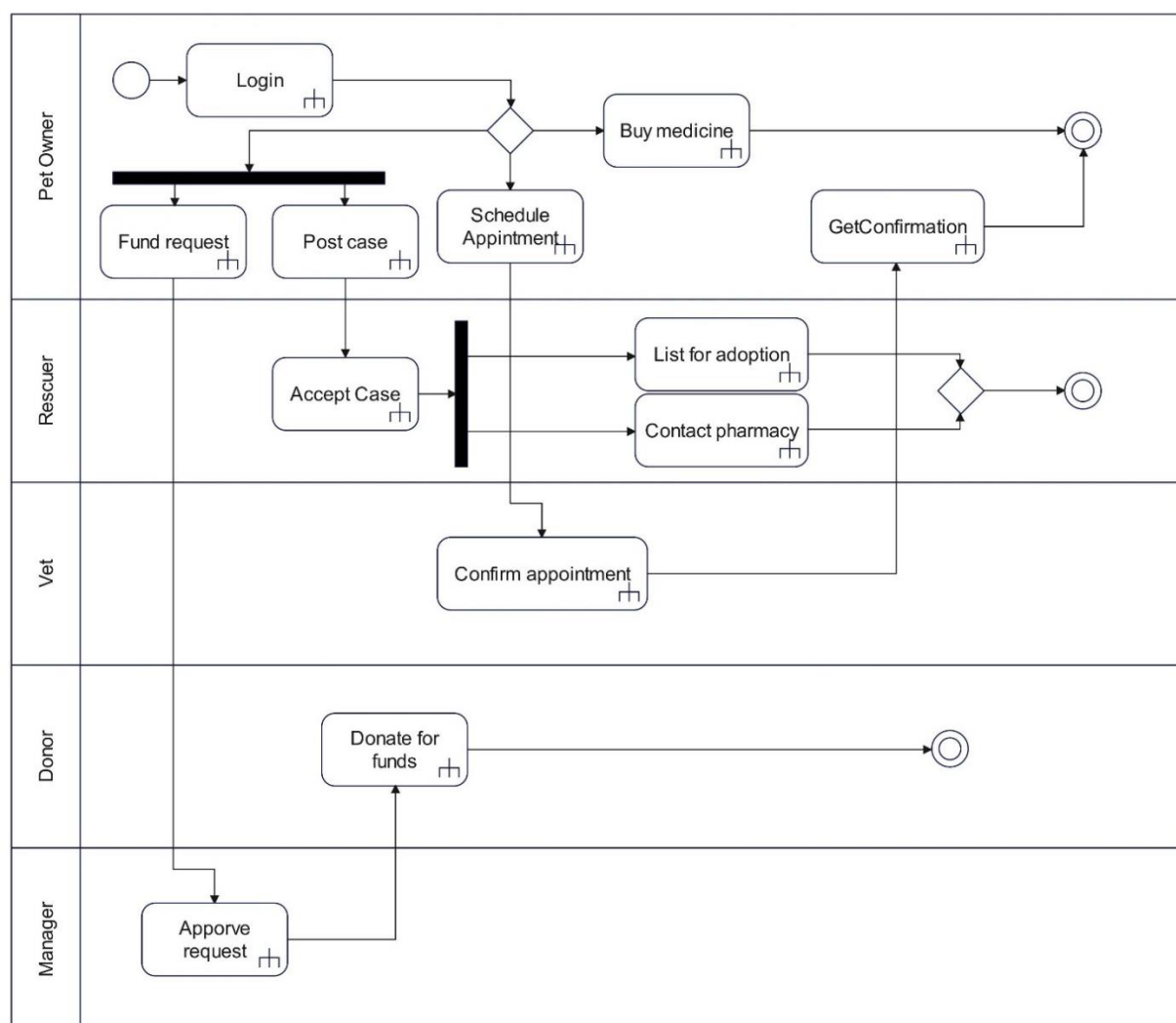


Figure: Activity Diagram for PawsitiveCare

The activity diagram shows all possible activities for a pet owner/a regular user. A pet owner/user can post a case for a rescue, schedule an appointment, or buy medicine for their pets. If the pet owner schedules an appointment with a Vet, the vet will accept the appointment if they can. If the pet owner/user posts a case for a rescue, the rescuer will first accept the case, then simultaneously list that pet for adoption and contact the pharmacy for medical care. Aside

from posting the case, the pet owner/user can request funds so that it helps the rescuers to take the necessary steps to rescue the animal. After requesting funds, a manager must confirm the request for the user to receive the fund.

Class diagram:

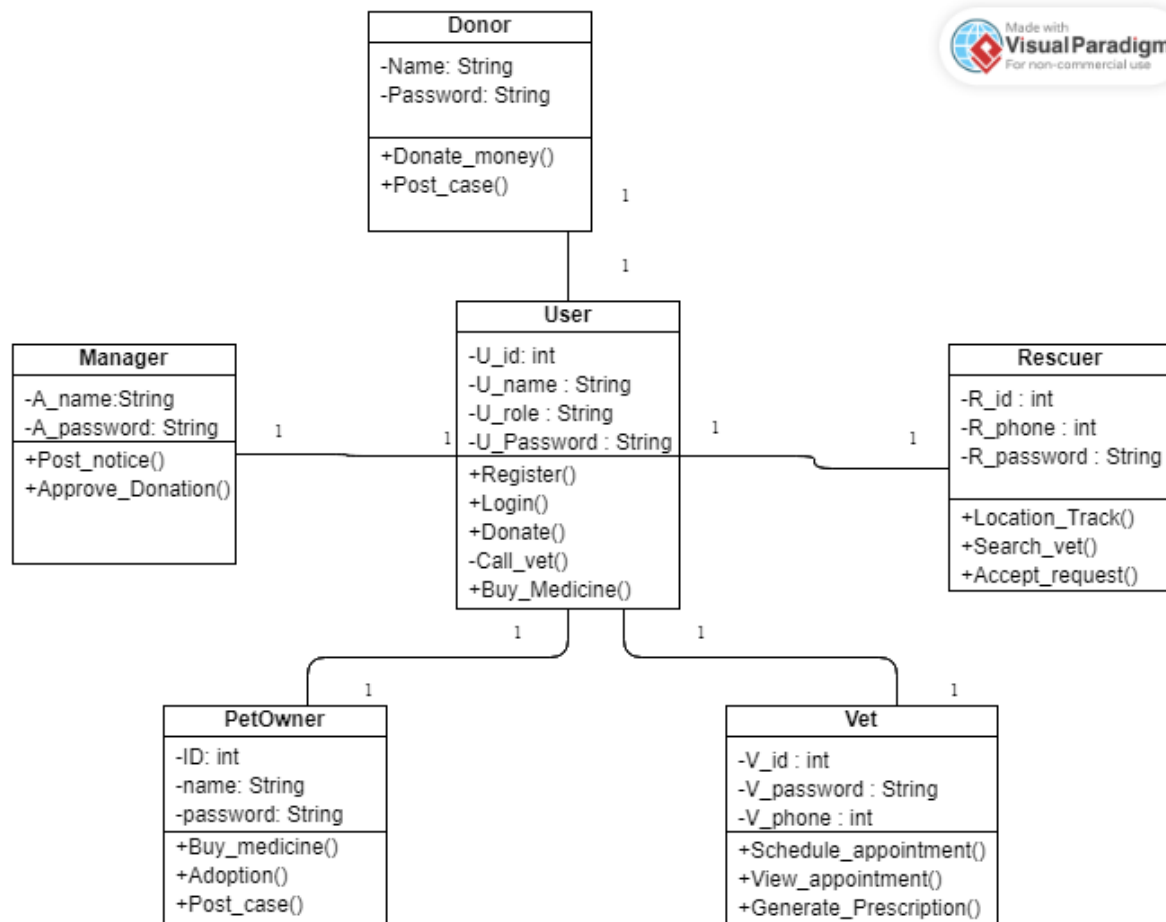


Figure: Class Diagram for PawsitiveCare

The structure of the system classes, their properties, functions, and interrelationships of the objects are all described in this class diagram. The primary categories of users are:

User, Admin, Donor, Pet Owner, Rescuer, and Vet.

Relationships in this class diagram can be deduced from the fact that the manager, veterinarian, pet owner, rescuer, and donor are all in one-to-one relationships with the user. Additionally, a user can register, log in to their account, and donate money to the manager. For emergency or medical attention, the User can also call a vet. The application also allows users to purchase medications and to seek rescuers nearby for emergency cases.

4. Social impacts

PawsitiveCare will significantly impact society by providing a platform where animal lovers can unite and make a difference. With the app's features, people can quickly locate qualified veterinarians and rescuers nearby to help injured or sick animals. The ability to order

pharmaceuticals through the app will also make it easier for people to provide medication to animals in need.

As the app helps keep track of animals, it will also contribute to reducing stray animal populations. By encouraging people to spay and neuter animals, PawsitiveCare will play a role in reducing animal overpopulation and promoting responsible pet ownership.

Furthermore, PawsitiveCare will help to change the mindset of society towards animals. By promoting a culture of love and care for animals, the app will encourage people to treat animals with kindness and respect. In the long run, this will lead to a safer and more compassionate society for both animals and humans.

5. Development plan

5.1 Project roadmap

We used Jira to schedule a one-year development plan for the application.

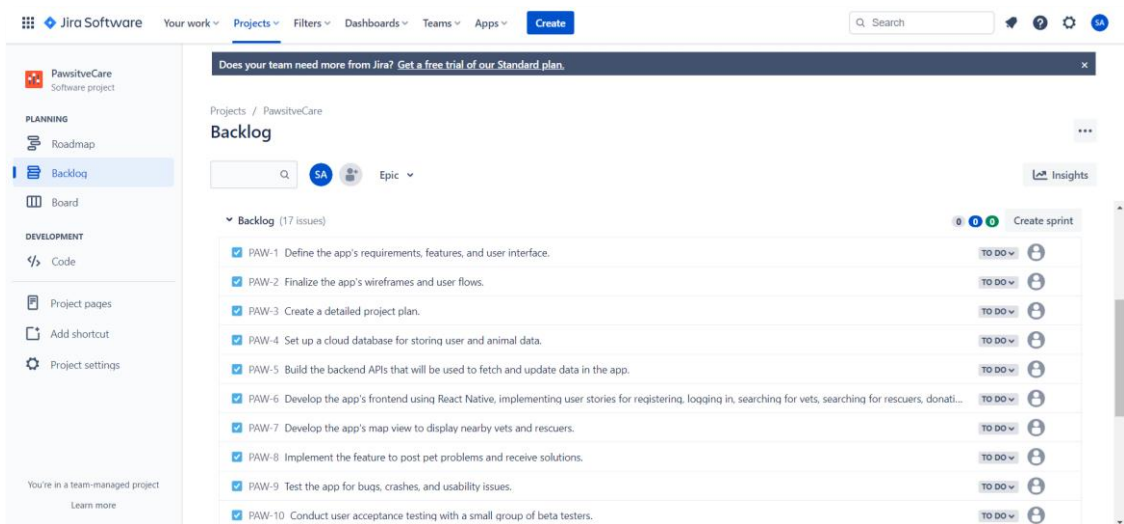


Figure: Backlog of all the requirements

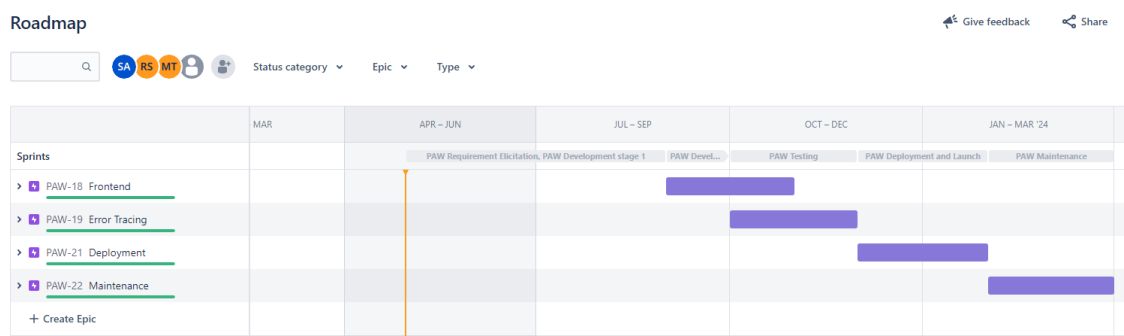


Figure: Roadmap of how the development will propagate

The development plan for the PawsitiveCare mobile application spans over one year and aims to provide users with a comprehensive platform for animal welfare in Bangladesh. The plan has six phases: starting with the design phase and concluding with the launch and post-launch support phase. The design phase involves gathering user requirements, analyzing competitors,

and finalizing the app's design. The development phase will involve creating the application's functionality and ensuring a seamless user experience.

The third phase, testing and quality assurance involves testing the application's features and ensuring it meets user requirements. The fourth phase involves deploying the app, ensuring it is compatible with various mobile devices and operating systems, and obtaining necessary approvals and certifications.

The fifth phase focuses on the app's launch, where marketing campaigns will be initiated to create awareness and attract potential users. Finally, the post-launch phase involves supporting users, monitoring the application's performance, and identifying areas of improvement. The development plan aims to provide a seamless and sustainable solution to the animal welfare issue in Bangladesh and foster a more compassionate society.

5.2 UI/UX design

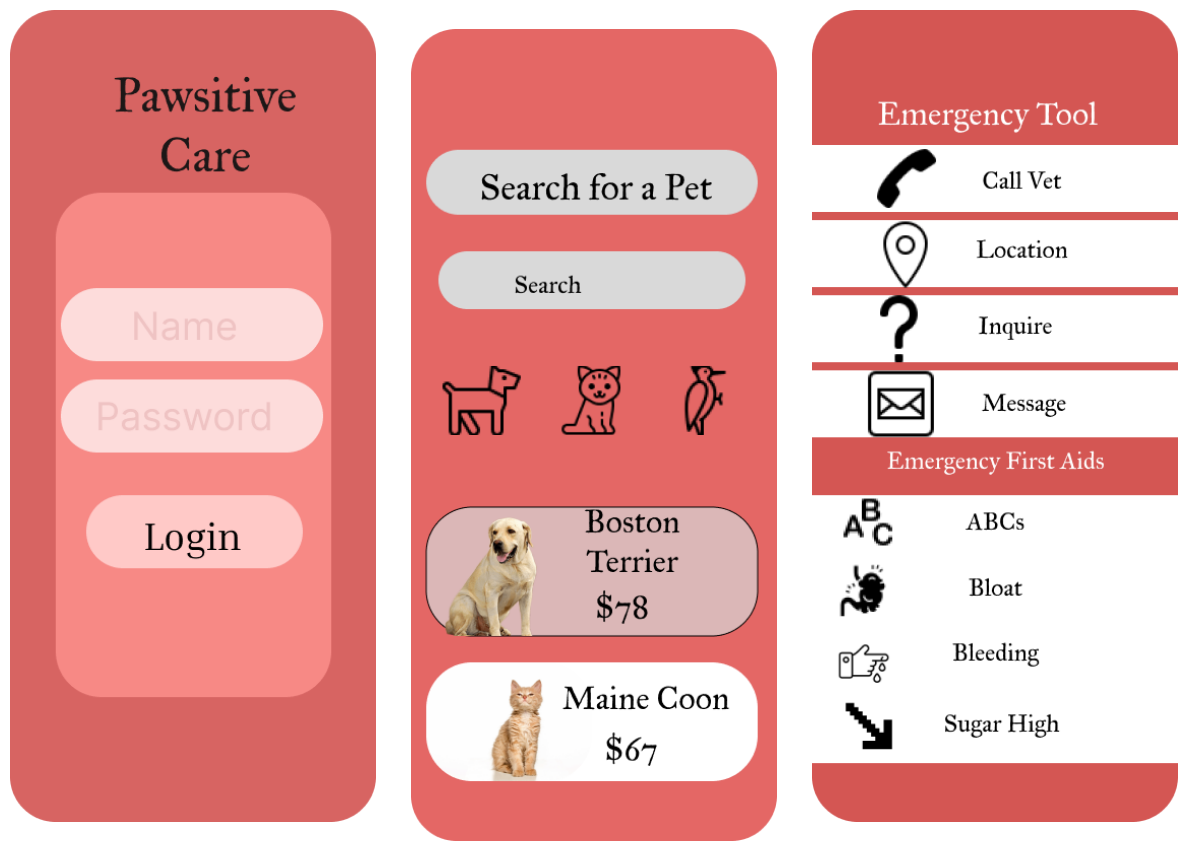


Figure: UI for the login, pet adoption, and rescue services

6. Marketing Plan

6.1 Target audience

Initially, the app targets animal lovers and pet owners who want to make a difference in the lives of stray animals, but more regular people could be brought on board to use this application through influence.

6.2 Objectives

- Increase app downloads and registrations
- Encourage users to donate to animal shelters and rescues
- Raise awareness about the benefits of spaying/neutering and vaccinating stray animals

6.3 Strategies

1. **Social media marketing:** Creating and maintaining an active presence on platforms like Facebook, Twitter, and Instagram and sharing engaging content about animal welfare, success stories of rescued animals, and updates about the app's features and using targeted advertising to reach people who have shown an interest in animal welfare or who have interacted with similar pages.
2. **Influencer marketing:** Partnering with animal welfare influencers on social media to promote the app to their followers and collaborating with animal rescue organizations to create social media campaigns and events that raise awareness about the app and its features.
3. **Content marketing:** Creating engaging content for the app's blog and website that focuses on animal welfare and the app's features. Using SEO strategies to ensure the content is discoverable by people searching for animal welfare and rescue information.
4. **Public relations:** Pitching the app to journalists and bloggers who cover animal welfare and tech news and use press releases and media outreach to get local and national media coverage.
5. **Email marketing:** Sending regular emails to users who have opted-in to the app's email list. Share updates about the app's features, success stories of rescued animals, and opportunities to donate or volunteer.
6. **Partnership marketing:** Partnering with pet supply stores and veterinarians to promote the app to customers and offering discounts or promotions to users who download the app through these partnerships.

6.4 Metrics

- Number of app downloads and registrations
- Social media engagement (likes, shares, comments)
- Website and blog traffic
- Email open and click-through rates
- Donations and volunteer sign-ups

By implementing these strategies and tracking the right metrics, we can increase awareness about the PawsitiveCare app and encourage more people to participate in animal welfare and rescue efforts.

7. Cost and Profit Analysis

*All costs concerning Bangladesh's level of income

7.1 Development Cost

Table: Calculation of all possible development costs

Members	Quantity	Salary in dollars (\$)	Total Cost/Month
Project manager	1	1500	1500
Backend developers	3	350	1050
Frontend developers	2	350	700
UI/UX designers	1	200	200
Legal	1	200	200
QA Engineer	1	350	350
		Total salary/month	4000
		Yearly Total	48000

7.2 Marketing Costs

Table: Calculation of all possible marketing costs

Plan	Duration in months	Cost/month	Total cost
Search engine optimization	12	160	1920
Social media marketing	24	60	1440
Influencer marketing	12	100	1200
Content marketing	48	80	3840
		Total Cost	8400

7.3 Revenue Model

We plan on targeting 10,000 requests at the initial phase of our deployment. Therefore, the possible revenue generation is shown as follows: -

Table: Calculation of gross revenue

Charges	Rate (\$)	Requests	Earnings (\$)
Platform fee	0.1	10000	1000
Vet commission	0.1	3000	300
Rescue commission	0.6	5000	3000
Grant fund	2000	1	2000
Medicine commission	0.2	2000	400
		Monthly total	6700
		Yearly revenue	80400

7.4 Profit Analysis

Table: Net profit analysis for the application

Total cost of development (\$)	48,000
Total cost of marketing (\$)	8,400
Taxes (\$)	40,200
Estimated 2-year revenue generation (\$)	160,800
Profit (\$)	64,200

Therefore, we can estimate that with proper initial investments and receiving at least a \$24,000 grant annually, we can generate up to \$64,200 in profit after taxes. Of course, the actual number will slightly deviate, but we think this estimate is good enough to start executing the project since it will only improve through future advancements.

8. Conclusion

In conclusion, the problem of animal cruelty and mistreatment of stray animals in Bangladesh is a significant issue that needs to be addressed urgently. The lack of awareness and funding for animal first aid and medical treatment is a significant challenge, and the existing laws against animal cruelty are outdated and lack enforcement. However, the proposed solution of developing a mobile application called PawsitiveCare offers hope for humanely treating animals. The application's features, such as locating nearby qualified vets/surgeons, booking rescuers, and ordering medicine, aim to make it easier for people to get help for injured or sick animals. Moreover, the app's tracking feature aims to control the population of stray animals and reduce the risk of them causing harm to people. With the successful implementation of PawsitiveCare, we hope to achieve a better world for animals in Bangladesh and foster a more compassionate society towards animals.

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