Faculty of Computing & Information Technology

Title: **PETx** Deliverable One

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Course Name: Final Year Project

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Date of Submission: Nov 21, 2022

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Introduction

PETx will be all in one platform for services related to pets. We aim to facilitate pet owners by creating an online veterinary appointment system, rescue system, and social community specifically designed for pet owners. Apart from that, it will serve as a social awareness platform about pets for the general public and application visitors.

Project/Product Feasibility Report

To make PETx, we have commands on MongoDB, ReactJS, NodeJS, and ExpressJS to design and function websites while also having a database connected to them. For this project we will use a desktop having either Windows or Linux, CPU 2.0 GHz or more, RAM 8GB or more, having tools such as VS Code, Git, GitHub, etc. Our team members are capable of doing frontend, and backend as well as connecting databases, thus the “PETx” can be developed within a given time.

There are many types of feasibilities:

- ➔ Technical
- ➔ Operational
- ➔ Economic
- ➔ Schedule
- ➔ Specification
- ➔ Information
- ➔ Motivational
- ➔ Legal and Ethical

Technical Feasibility

This project requires command on development of frontend, backend, and database. For this purpose, we will use MongoDB, ReactJS, NodeJS, and ExpressJS. Our team does possess the ability to create this project, thus the project can be developed. For development purposes, Windows or LINUX, CPU 2.0 GHz or more, and RAM 8GB will be needed which will already have, so the development of this project is possible within the given time.

Operational Feasibility

With respect to the operational feasibility of the project, we aim to use the system for the following purposes. It is believed that they are important for the user base.

- ➔ Rapid Emergency Services for Pets
- ➔ Easy approach to veterinary doctors for pet owners
- ➔ Social interaction for Pet owners
- ➔ More societal awareness about Pets

- ➔ Feel of satisfaction upon using the services of PETx

Development of this project will benefit many people who have pets yet are unable to find a one-stop shop for their pets. Upon sharing this idea with people around us having pets we get a positive response thus we think this project has a high probability of success.

Economic Feasibility

The project cost is not very high. The required softwares is either open source or we are using student subscriptions. For the hardware costs, we already have the required and recommended machines for development. Irrespective of the financial benefits we gain from the project, input resources will be low and hence it is a win-win situation in either case.

Schedule Feasibility

For schedule feasibility, we have a dedicated team of four members ready to work 15 hours per week for this project. So, we believe that the project milestones will be achieved within the given time frame.

Specification Feasibility

Requirements for this project have been analyzed, refined, and specified with mutual understanding of group members (stakeholders of the project). So, requirements are all set for the next phase which is implementation. The project scope has also been discussed and finalized. Some of the requirements have been labeled as options for the first year of the project.

Information Feasibility

All the information regarding the pet will be uploaded by the pet owner which will have a verified account. Furthermore, if an admin thinks the information uploaded by the user is false, he will be able to delete it. In the case of the newsfeed, the same policy of admin controls will be applicable. The non-admin users will be able to report content.

Motivational Feasibility

The team responsible for the project is ready and energized to start working on the project. We as a team are on the same and with the same mindset to create an impact in the community and that is why we have started this project.

Legal & Ethical Feasibility

Information and data hiding of stakeholders (patients, doctors, and volunteers) is solely the responsibility of the development team and we are taking care of using various techniques. That is the only legal responsibility and we are bound to secure the system from illegal usage.

Project/Product Scope

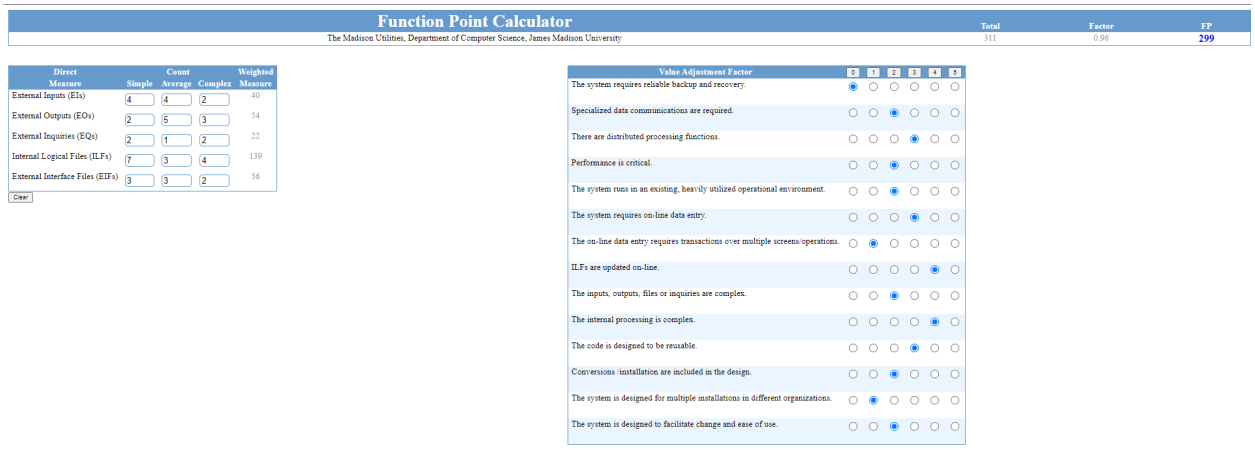
The main aim of the project revolves around the rescue of pets in times of distress. This involves communication between doctors and pet owners. The product will also facilitate veterinary doctors to work from home instead of being bound to specific locations. The project will also cover online payments to doctors and storing the information of pets in blockchain-based system

Project scope has been defined, validated, and specified. With the passage of time, we aim to extend the scope or descope in the coming iterations and sprints.

Project/Product Costing

Project Cost Estimation By Function Point Analysis

Function Point Metric Calculated using:
https://w3.cs.jmu.edu/bernstdh/web/common/webapps/oop/fpcalculator/FunctionPointCalculator.html



Calculate Function Point:
FP est. = 299 p-m

For our project:
Assuming:
1 month = 22 working days, per person
Labour Rate =30000 Rs/pm (per day: 1363.63 Rs)
Average productivity = 15 FP/month (per day: 0.58 FP)

Cost per FP= Cost/FP=Labor Rate/Productivity
Cost/FP = Labour rate / productivity parameter
Cost/FP= 1363.63/0.58
Cost/FP= 2350 Rs/FP

Total Project Cost = FP estimation * (Cost/FP)
Total Project Cost = 299 * 2350
Total Project Cost = 702,650 Rs

Effort=Total cost/Labor rate per p-m
Total estimation effort =FP estimation / productivity parameter
Total estimation effort = 299/15
Total estimation effort =19.93 pm. (19.93 * 22 = 430 days)

Project Cost Estimation by using COCOMO'81 (Constructive Cost Model)

https://strs.grc.nasa.gov/repository/forms/cocomo-calculation/

http://softwarecost.org/tools/COCOMO/

COCOMO RESULTS for PETx								
MODE	"A" variable	"B" variable	"C" variable	"D" variable	KLOC	EFFORT, (in person-months)	DURATION, (in months)	STAFFING, (recommended)
semi-detached	9.692949569986077	1.12	2.5	0.35	5.000	58.790	10.404	5.651

Explanation: The coefficients are set according to the project mode selected on the previous page, (as per Boehm). Note: the decimal separator is a period.

The final estimates are determined in the following manner:

effort = a*KLOC^{b}, in person-months, with KLOC = lines of code, (in thousands), and:

staffing = effort/duration

where a has been adjusted by the factors:

CPM - Critical Path Method

Access the calculator used for this calculation

PERT Calculator

Online calculator to find the critical path method of project plans. Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are the two useful techniques for planning a project.

Find Project Critical Path Method (CPM)

Number of Activities

8

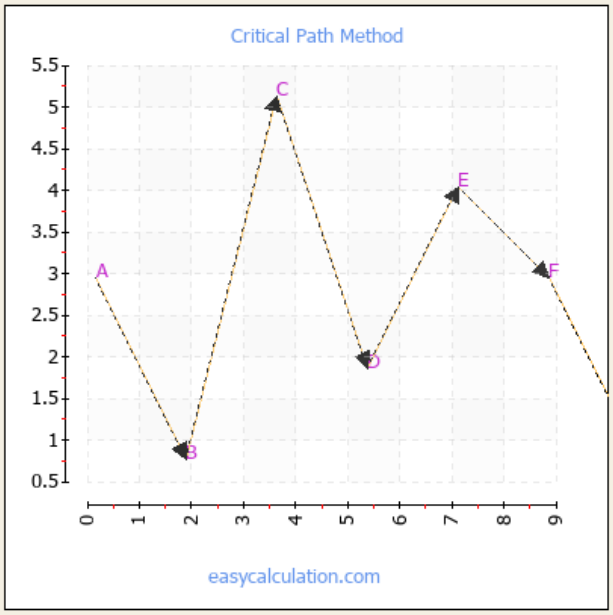
Activity	Succes - sors	Predeces - sors	Duration	EST	EFT	LST	LFT	Slack Time
A	B		0	0	0	0	0	0
B	C	A	1	0	1	0	1	0
C	D	B	2	1	3	1	3	0
D	E	C	3	3	6	3	6	0
E	F	D	4	6	10	6	10	0
F	G	E	5	10	15	10	15	0
G	H	F	6	15	21	15	21	0
H		G	0	21	21	21	21	0

Calculate Reset

Enter Single Character of the 8th activity field

Critical Path

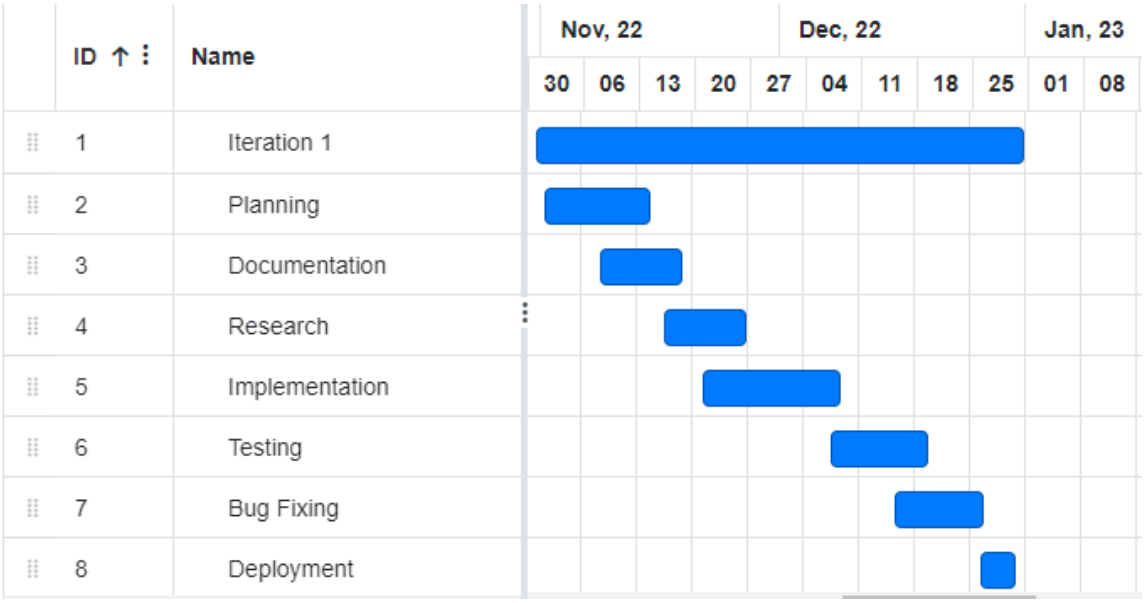
A --> B --> C --> D --> E --> F --> G --> H



Gantt chart

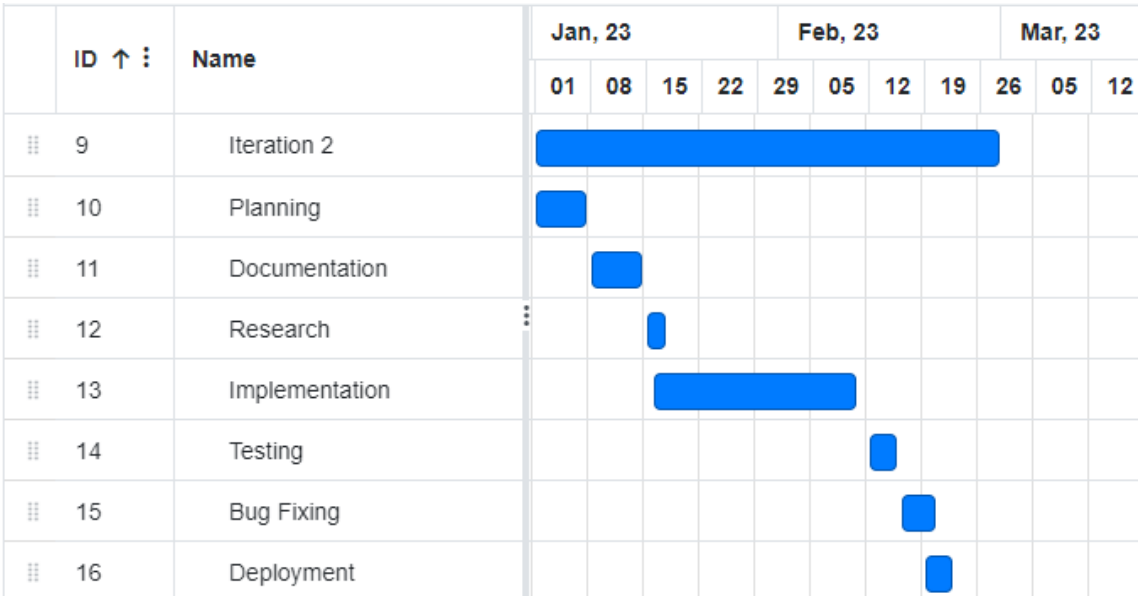
ID	Name	Start Date	End Date	Duration
1	**Iteration 1**	**Oct 31, 2022**	**Dec 31, 2022**	**62 days**
2	Planning	Nov 01, 2022	Nov 14, 2022	14 days
3	Documentation	Nov 08, 2022	Nov 18, 2022	11 days
4	Research	Nov 16, 2022	Nov 26, 2022	11 days
5	Implementation	Nov 21, 2022	Dec 08, 2022	18 days
6	Testing	Dec 07, 2022	Dec 19, 2022	13 days
7	Bug Fixing	Dec 15, 2022	Dec 26, 2022	12 days
8	Deployment	Dec 26, 2022	Dec 30, 2022	5 days
9	**Iteration 2**	**Jan 01, 2023**	**Feb 28, 2023**	**59 days**
10	Planning	Jan 01, 2023	Jan 07, 2023	7 days
11	Documentation	Jan 08, 2023	Jan 14, 2023	7 days
12	Research	Jan 15, 2023	Jan 17, 2023	3 days
13	Implementation	Jan 16, 2023	Feb 10, 2023	26 days
14	Testing	Feb 12, 2023	Feb 15, 2023	4 days
15	Bug Fixing	Feb 16, 2023	Feb 20, 2023	5 days
16	Deployment	Feb 19, 2023	Feb 22, 2023	4 days
17	**Iteration 3**	**Mar 01, 2023**	**Apr 30, 2023**	**61 days**
18	Planning	Mar 01, 2023	Mar 08, 2023	8 days
19	Documentation	Mar 08, 2023	Mar 15, 2023	8 days
20	Research	Mar 15, 2023	Mar 18, 2023	4 days
21	Implementation	Mar 19, 2023	Apr 15, 2023	28 days
22	Testing	Apr 16, 2023	Apr 20, 2023	5 days
23	Bug Fixing	Apr 20, 2023	Apr 22, 2023	3 days
24	Deployment	Apr 21, 2023	Apr 27, 2023	7 days
25	**Iteration 4**	**May 01, 2023**	**Jun 30, 2023**	**61 days**
26	Planning	May 01, 2023	May 06, 2023	6 days
27	Documentation	May 05, 2023	May 08, 2023	4 days
28	Research	May 08, 2023	May 13, 2023	6 days
29	Implementation	May 18, 2023	Jun 17, 2023	31 days
30	Testing	Jun 16, 2023	Jun 19, 2023	4 days
31	Bug Fixing	Jun 18, 2023	Jun 21, 2023	4 days
32	Deployment	Jun 22, 2023	Jun 24, 2023	3 days

Iteration One

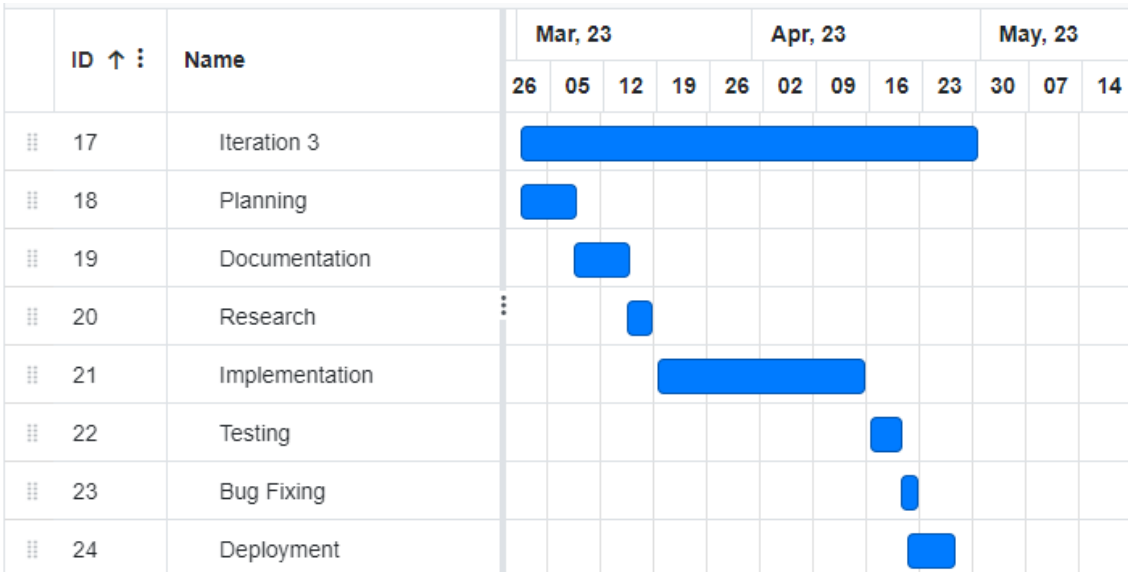


ID	Name
1	Iteration 1
2	Planning
3	Documentation
4	Research
5	Implementation
6	Testing
7	Bug Fixing
8	Deployment

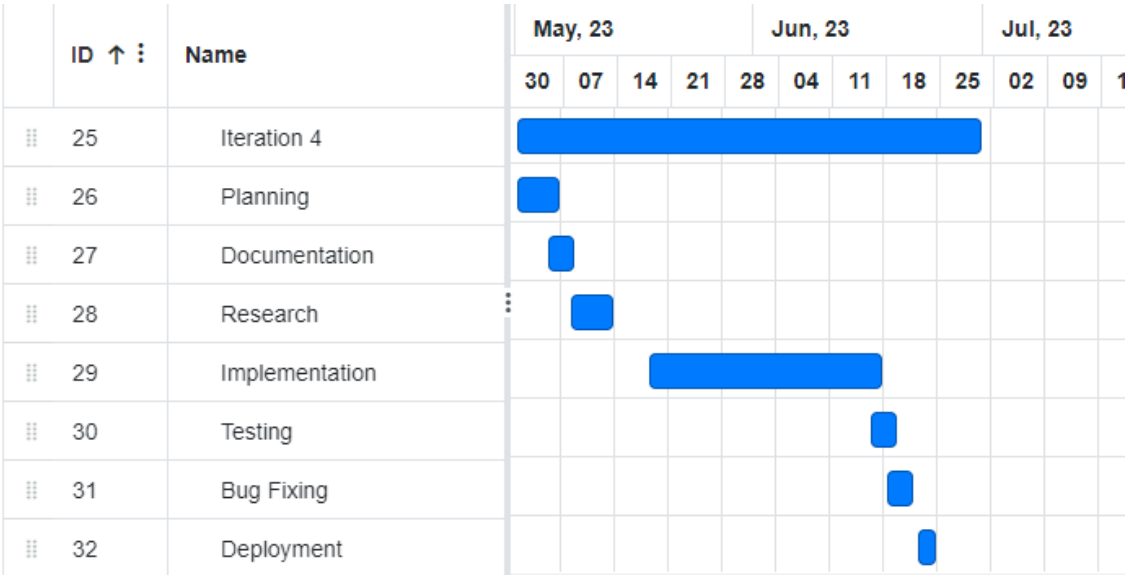
Iteration Two



Iteration Three



Iteration Four



Introduction to Team members and their skill set

Serial No.	Name	Expertise	Responsibilities
1	ATA UL MOHSIN	ReactJS, Quality Assurance	➔ Frontend Development of PETx ➔ Quality Assurance of the product
2	HASSAN AHMAD SARFRAZ	MongoDB, Express	➔ Backend development of PETx ➔ APIs creation and usage
3	MUHAMMAD SAAD	ReactJS, Blockchain	➔ Research on blockchain for PETx ➔ Frontend development
4	MUHAMMAD SALEH BUTT	NodeJS, MongoDB	➔ Backend development ➔ Database handling

Tools and Technology with reasoning

Tools	Reason
VS Code	Used as IDE for front-end development. It is lightweight, extensible, free, open source and cross-platform
GitHub and Git	Used for team collaboration. Git is a version control system that lets you manage and keep track of the source history. GitHub is a cloud-based hosting service that lets you manage Git repositories.
Google Docs	Used for documentation. It helps to make professional-quality documents.

Technology	Reason
ReactJS	It's used for building interactive user interfaces and web applications quickly and efficiently with significantly less code than you would with vanilla JavaScript.
NodeJS	Node. js is commonly used to develop real-time applications, also known as RTAs. Its asynchronous, event-driven nature, allows it to handle heavy input-output operations, which makes it much easier for Node. js developers to achieve the level of performance users have come to expect from modern real-time applications.
ExpressJS	Express is a node js web application framework that provides broad features for building web and mobile applications. It is used to build a single page, multipage, and hybrid web application. It's a layer built on top of the Node js that helps manage servers and routes.
MongoDB	is an open-source NoSQL database management program. NoSQL is used as an alternative to traditional relational databases. NoSQL databases are quite useful for working with large sets of distributed data. MongoDB is a tool that can manage document-oriented information, and store or retrieve information.

Vision

-- In the loving memory of Laika

An online portal where users can call rescue teams for pets or birds in times of distress and those team's manager/administrator can send the nearest team to spot for help. This portal will also serve as a base for online appointments with pets and veterinary doctors.
Inspiration for this project is from the first animal taken in earth orbit, a female dog named Laika. While returning back to earth, the spacecraft malfunctioned and she was dead in a few moments. Would it have been much better if some kind of rescue or ejection system was placed there? Let's aim to help them at least in our capacity (nearby areas).

Elaborated View

➔ Introduction
We want to design a system or marketplace to be more precise in which we can gather all the important and major services that a pet owner usually needs. We want to develop a platform where the pet owner need not worry about most things associated with pets. This marketplace could make the life of a pet owner easier.

➔ Positioning
Individual services related to pets may be available out there, but we lack a system where one can get everything almost at arm's length. Such a system does not exist with such a unique idea that makes pet keeping a lot easier and more convenient. So we are almost certain that we are going to make our own benchmark in the market and will serve the community as well.

➔ Stakeholder description
Our stakeholders include our sponsors that are from other domains but looking forward to working with us for their advertisement and branding.
The chief investor hit upon the idea and decided to make his dream come true.
Also the companies from our domain that want to cooperate with us and provide us with their best services to entertain our end users.

➔ High-level goals
A marketplace where we can earn both good repute and profit by serving the pets community. Our goal is to hit the highest rank in the market by developing a system in which a pet owner can get easy access to all the things he needs for the best growth of his pet.

➔ User-level goals

The idea is to provide an emergency rescue team for animals in general that are trapped in a dangerous situation so that their lives may get saved.
We also want to make pet keeping hassle-free by providing our vet care services that include a general appointment with doc for consultation or an appointment with doc for some specific medical condition.
And last but not least, we will be providing our users a common place where similar pet owners could interact with each other to have guidelines from experienced ones or just share their thoughts with others.

➔ Product overview
A full-fledged product that will take away all the tension from the mind of pet owners by providing assistance at every step he wants. We will make pet keeping more fun and peace of mind than ever.

➔ Summary of features
Users can call the rescue team for emergencies. Users can consult a doctor on general concerns or can have an appointment with a specialist for having a specific issue / disease-oriented discourse. A section of the social community will also be added for the interaction of pet owners with other owners.

Risk List

Listed from highest to lowest risk
1 means the highest risk and 6 means the lowest risk.

1. Customers/Users may change their functional/ elemental requirements.
2. Performance may not be according to the needs of the client.
3. Security and privacy may not be enough for clients.
4. Project costs may increase later.
5. We may have to modify throughout the project resulting in development side loss.
6. Development team may not meet the deadline for the project.

Systems Specifications

Introduction

PETx is an emergency medical service for pets which deals with basic medical prescriptions from veterinary doctors to providing volunteer service to pets in emergency situations. In Pakistan from urban to rural areas, pets and cattle are found in every town.However, the number of which is diminishing day by day due to unavailability of doctors to treat pets and lack of awareness about them.

Existing System

- ➔ PETx system mainly deals with the following aspects:
  - ◆ Basic Medical Prescription for pets
  - ◆ Emergency Rescue service
  - ◆ NewsFeed for pet owners
- ➔ *Basic Medical Prescription for pets*
  - ◆ Deals with prescribing basic medicine to pets
- ➔ Emergency Rescue service
  - ◆ Deals with providing emergency rescue services to pets on voluntary basis
- ➔ NewsFeed for pet owners
  - ◆ To share stories about pets Facebook-like news feed will be maintained in system

Phases of the System Development

The PETx System is divided into three phases.

Phase I

Phase I includes the following basic architecture areas:

- ➔ Landing pages
- ➔ Simplified UI
- ➔ Database Setup

Phase II

Phase II involves improvement of user experience. Phase II includes the following areas:

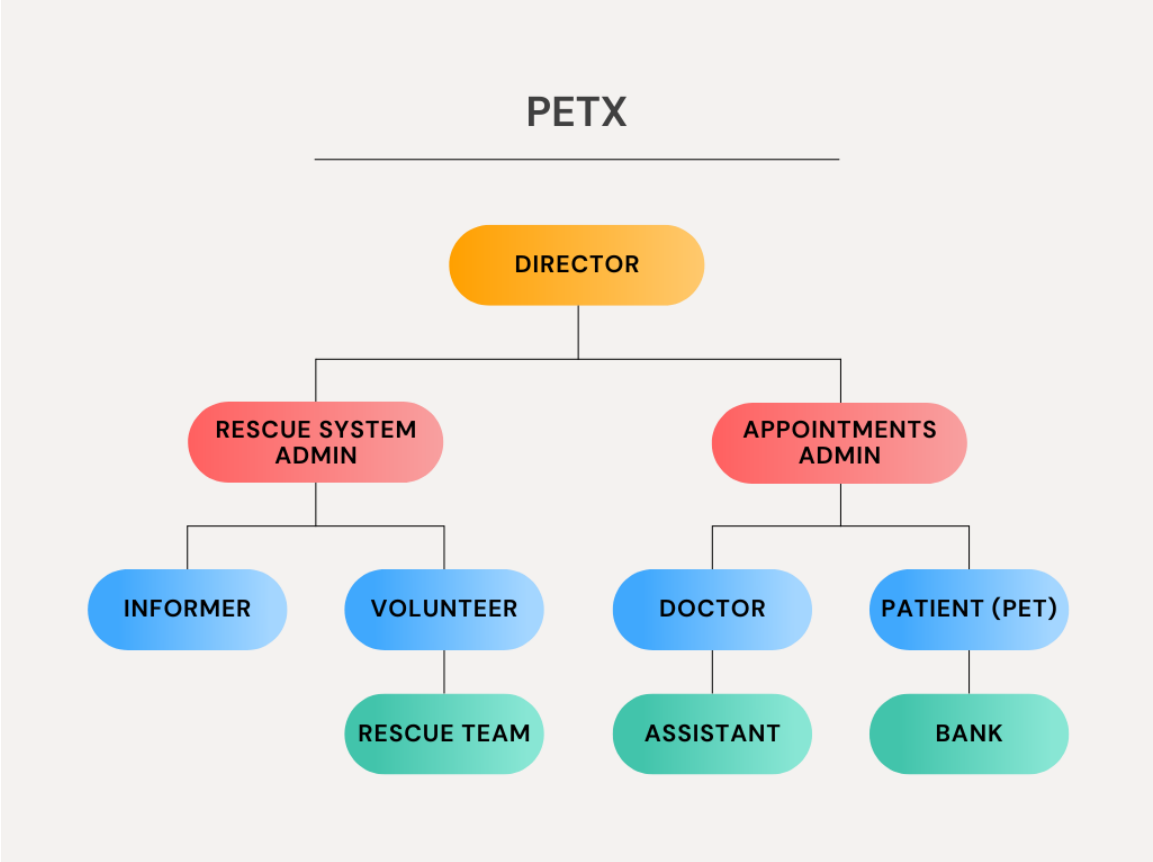
- ➔ Customized Roles
- ➔ Improved UX and UI

Phase III

Phase III covers a complete solution for PETx. Phase III includes remaining business areas which are not developed in previous phases.

- ➔ Blockchain-based payment system
- ➔ Blockchain to be used for storing pet information

Organizational Chart



Summary of Requirements (Initial Requirements)

An abstract is necessary at this stage to give an understanding of the initial requirements of the system. This will show what high-level requirements the proposed system must address. This abstract will act as a foundation for the future analysis of the system.

Rescue System

Rescue system is the prime feature of our project. This module will require emergency situation information from the informer or the person who told the system about distress. This information should be in a form having location, contact number, and related information if any about the situation. Once an emergency event is initiated, it'll alert the volunteers and nearby rescue teams to move toward the location. Here only one team will be assigned the task of rescue and that team or volunteer will complete the job. If the task is not completed by a volunteer, a team will be assigned the job then.

Veterinary Doctor Appointment System

The logged-in customer or pet owner will visit the page of available doctors and will select a doctor according to his requirements. Then, he'll be asked to schedule an appointment from the

available time slots of a doctor. If he selects the time, the doctor will be notified about the scheduled appointment and then the person will move to the payment page which will be the banking site for the transaction.
From the doctor's side, he'll be able to see scheduled appointments from his side and will be able to change availability hours and fees.

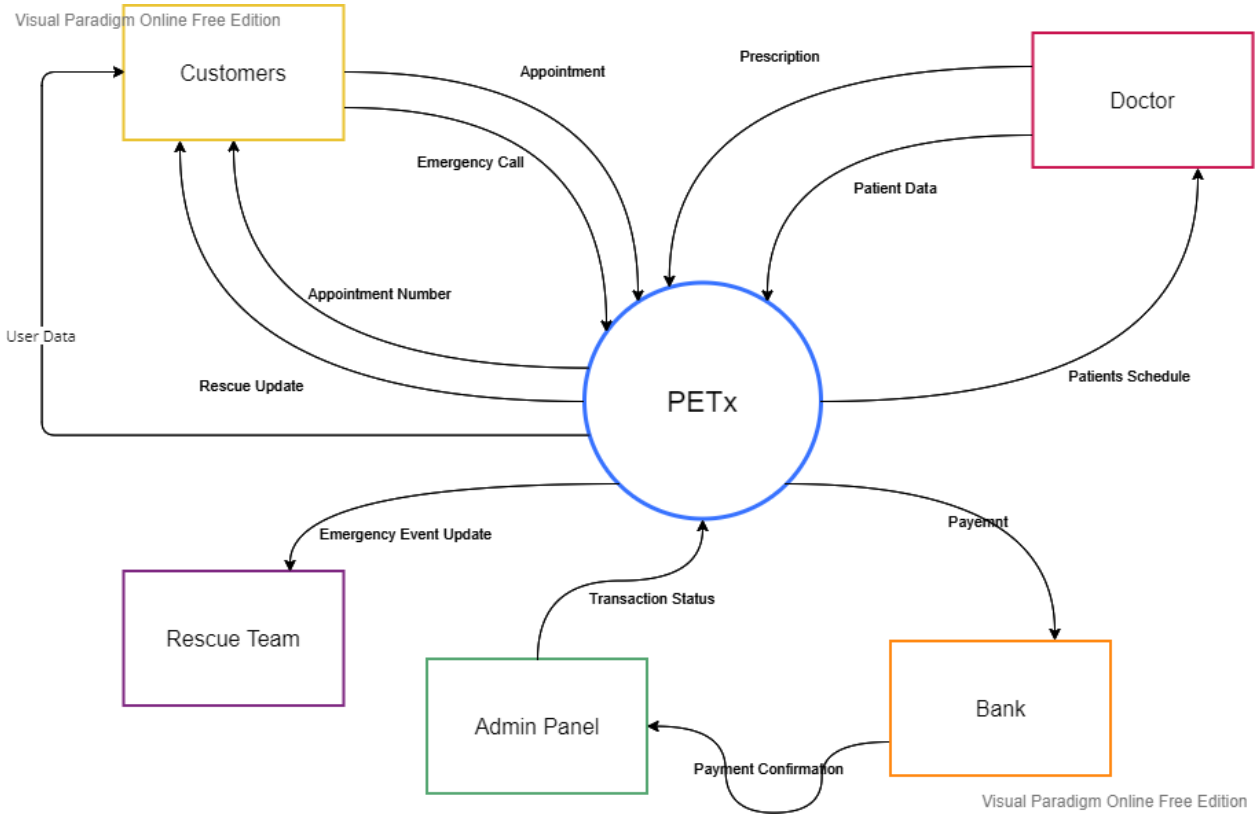
Social Feed

This will serve as a community for pet owners. They'll be able to see posts of other users in their feed and like, and comment on them. These posts will be focused on pets only just like a Facebook group. Our first priority in this regard will be to integrate this module with Facebook APIs. Otherwise, we shall develop our own social media system.

Identifying External Entities and Actors

- **Primary Actors**
  - Veterinary Doctors
  - Informer
  - Customer
- **Secondary Actors**
  - Rescue Team
  - Bank

Context Level Data Flow Diagram



Capture "shall" Statements

- ➔ Call for emergency pet rescue
  - ◆ The system shall be able to contact animal rescuers for help in times of emergency.
- ➔ Consultancy
  - ◆ The system shall be capable of online appointments with veterinary doctors.
  - ◆ The system shall be able to remind registered users of regular checkups of their pets via email or SMS.
- ➔ Interaction with similar pet owners
  - ◆ There shall be able to handle a community where registered users can interact with other users via posts or messages.
- ➔ FAQs/ Infopedia
  - ◆ The system will consist of an FAQ list for common questions.
- ➔ Membership or Special Discounts
  - ◆ The system shall be able to offer special discounts on different occasions.

Allocate Requirements

Serial No	Initial Requirements	Use Case Name
1	User will create account for Application	UC_Register
2	User will need to login to use Application	UC_Login
3	Users will be allowed to contact the system in case a pet faces an emergency.	UC_Help
4	User will know if there is any volunteer to help	UC_Volunteer
5	User will be able to upload the posts in NewsFeed	UC_Newsfeed
6	Users will be allowed to schedule a meeting with the Doctor.	UC_Meeting
7	Users will be able to make online payments.	UC_Billing
8	Users will also be able to get online prescriptions from Doctors.	UC_Medicine
9	Users will be able to report a NewsFeed Post	UC_ReportPost
10	Admin will be able to add a Doctor in a system.	UC_AddDoctor
11	Admin will be able to delete a post of User from NewsFeed.	UC_DeletePost
12	Admin will remove the rescue post if he thinks it is a fake	UC_FakeReport
13	Volunteers will be added to the system just like normal users.	UC_OnBoarding

Prioritize Requirements

Key: High: H, Medium: M, Low: L

Serial No.	Requirement	Priority
1	Rescue System	H
2	Onboarding of volunteers for rescue module	M
3	Onboarding of rescue organizations for rescue module	L

4	Accessibility of emergency information system	M
5	Online Appointment System	H
6	User shall create Account to use the App	H
7	User must be logged in to use the app	H
8	Appointment Scheduling and time management	M
9	User shall be able to post in Newsfeed	M
10	User will be able to report a post in NewsFeed	M
11	Admin will be able to delete a post	L
12	Admin will be able to register a doctor	H
13	User will be able to get online prescription from doctor	M

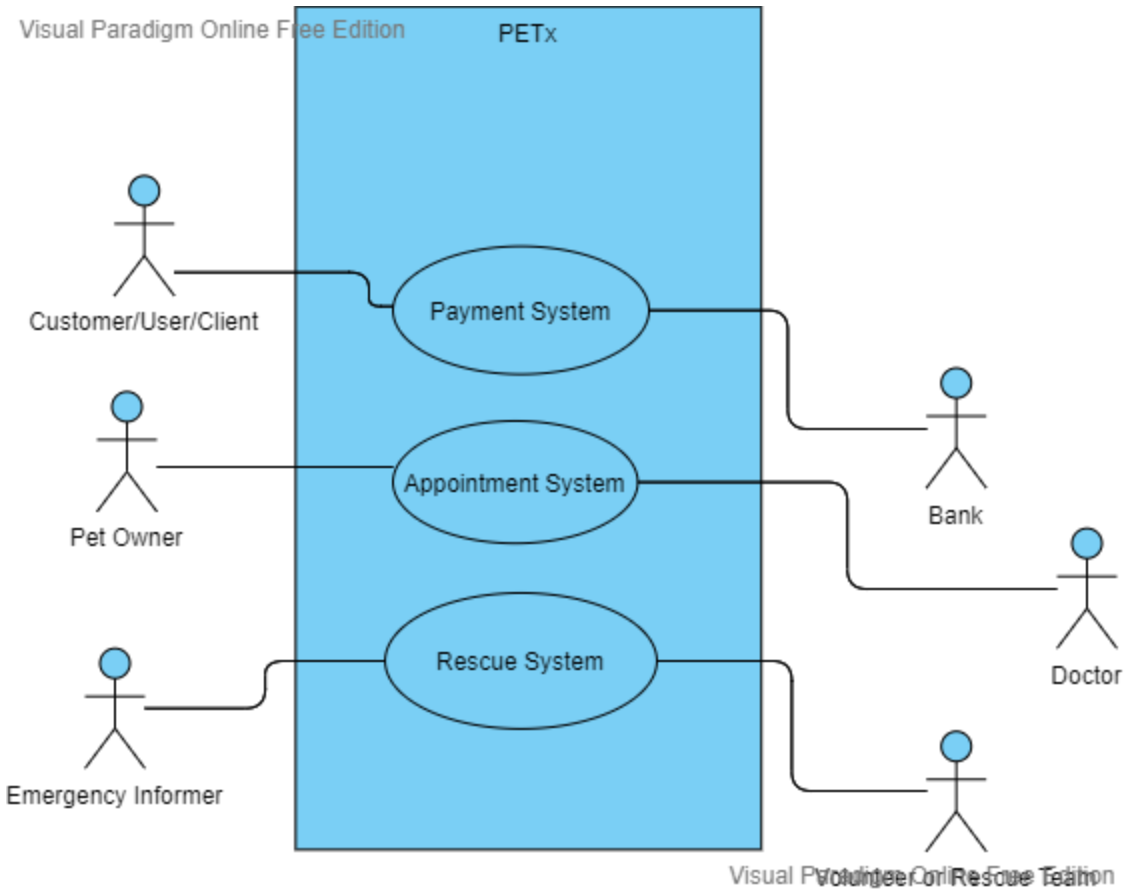
Requirements Trace-ability Matrix

Serial No.	System Specification Text	Use Case Name	Build	Category
1	User will create account for Application	UC_Register	1.0	Functional
2	User will need to login to use Application	UC_Login	1.0	Functional
3	Users will be allowed to contact the system in case a pet faces an emergency.	UC_Help	1.0	Business
4	User will know if there is any volunteer to help	UC_Volunteer	1.0	Functional
5	User will be able to upload the posts in NewsFeed	UC_Newsfeed	1.0	Functional
6	Users will be allowed to schedule a meeting with the Doctor.	UC_Meeting	2.0	Business

7	Users will be able to make online payments.	UC_Billing	1.0	Functional
8	Users will also be able to get online prescriptions from Doctors.	UC_Medicine	1.0	Business
9	Users will be able to report a NewsFeed Post	UC_ReportPost	2.0	Functional
10	Admin will be able to add a Doctor in a system.	UC_AddDoctor	1.0	Functional
11	Admin will be able to delete a post of User from NewsFeed.	UC_DeletePost	1.0	Functional
12	Admin will remove the rescue post if he thinks it is a fake	UC_FakeReport	2.0	Functional
13	Volunteers will be added to the system just like normal users.	UC_OnBoarding	1.0	Business

High Level Use Case Diagram

Business Level


Visual Paradigm Online Free Edition
PETx
Customer/User/Client
Payment System
Pet Owner
Appointment System
Bank
Doctor
Rescue System
Emergency Informer
Volunteer or Rescue Team

Analysis Level