System Analysis & Design

1. Executive Summary

1.1 Introduction

Noah’s Pet Clinic (NPC), a specialised veterinary facility in rural Manchester, faces challenges with its current appointment and registration system. The system is inefficient and lacks accessibility for both doctors and nurses. This report provides a comprehensive solution for upgrading the existing system, as well as addressing various issues from appointment scheduling to data management.

1.2 Problem Statement

The clinic's efficiency is hindered by the present system, which has trouble keeping appointments, inconsistent data entry, and organising pet and owner information. NPC aims to create a system that is easily navigable, and integrated, and boosts employee efficiency while offering pet owners a flawless experience.

1.3 Overall Summary

This report outlines a thorough plan for modernising NPC's registration and appointment system, solving existing issues with digital solutions, strong adherence to regulations, and improved data integrity. The method includes entity identification, a Use Case Diagram (UCD), Use Case Specifications, a top-down and bottom-up Entity-Relationship Diagrams (ERD), normalisation and Oracle tables implementation. These implementations will provide a holistic framework for system functionality and prioritisation. Moreover, the report incorporates advanced SQL queries to extract useful data from the database, such as pet and vet doctor details. This will aid in examining pet appointments, determining costs, and analysing doctor performance. Overall, the design considers future scalability in addition to making sure the suggested system maximises clinic operations, boosts employee productivity, and improves the overall experience for pet owners.

2. Main Goals

The Main goals of the system are:

- Standardise consultation document forms for clear and consistent information.
- Provide a user-friendly interface for receptionists to manage appointments and records.
- Implement a more organised filing system for virtual folders.
- Ensure the uniqueness of doctors' email addresses and petIDs, for consistency.
- Restrict pet appointment dates to Mondays and Fridays, addressing staff concerns.
- Enforce constraints on pet age, sex, and cost, based on NPC policies.
- Improve cost calculation for consultations based on pet age.
- Optimise the system for scalability to accommodate potential growth.
- Minimise errors in data entry and retrieval to improve overall clinic efficiency.

3. Functional and Non-Functional Requirements

3.1 Functional Requirements

Customers/Pet Owners

- Make appointments.
- Cancel appointments.
- Pay cancellation fee.
- Fill out the Pet Registration Form.

Admin User (Receptionist)

- File the owner registration form.
- File the pet registration form.

System

- Enables data input for scheduling appointments.
- Stores the appointment diaries.
- Allows the input of data relating to completed consultations.

Doctors

- Write referral note.
- Write deferral note.
- Write a diagnosis advising.

Pharmacy

- Gives medication.

3.2 Non-Functional Requirements

Customers/Pet Owners need to have read access to

- Their own pet information.
- Their appointments.
- The consultation advice of their pet.

Admin users need access to

- Read and write pet and owner appointment diary.
- Read and write pet and owner registration forms.
- Read pet consultation document form.

Doctors need access to

- Read and write consultation documents.
- Read pet and appointment details.
- Read and write referral notes.
- Read and write deferral notes.

Nurses need access to

- Read pet and appointment details.

Usability

- The system should be user-friendly.

Performance

- The system should respond to user interactions quickly and efficiently.

Reliability

- The system should be reliable, with minimal downtime and data loss.
- It should have backup and recovery mechanisms to protect against data loss.

Integrity

- Pets have unique and sequential pet ID valid between 1000 and 3000 inclusive.
- Doctors email must be unique.

Data Validation

- The system accepts pet ages between 0 to 12 years.
- The system accepts appointments only on Monday or Friday.
- The system validates pet sex as “M” or “F”.

Security

- The system should enforce strong security measures to protect sensitive pet and owner information.
- Compliance with data protection regulations should be ensured.

Scalability

- The system should be scalable to accommodate the growing number of pet owners, pets, and clinic staff.
- It should maintain performance while handling more users and data.

Compatibility

- The system should be compatible with various web browsers, operating systems, and devices.

4. Use Case Diagram and Use Case Specifications

4.1 Use Case Diagram

To illustrate the functional requirements and interactions inherent in the system, the subsequent use case diagram (Figure 1) has been developed, highlighting key user interactions and system functionalities.

The Use Case Diagram illustrates that within the system, a pet owner can easily fill out the pet registration form, pay for or cancel their appointment, including a functionality that allows them to pay the cancellation fee. The extension relationship between the use cases “Make inquiry” and “Make Appointment” shows that the receptionist is responsible for managing appointments, and he cannot proceed to schedule an appointment until a pet owner initiates an inquiry. This logical sequence ensures a coherent progression of actions.

When attending an appointment, the vet doctor diagnoses the pet, writes referrals, and, if needed, provides deferrals. In addition, the nurse interacts with the system, while the external actor “Pharmacist” is shown outside the system boundary indicating that it does not directly engage with the system’s functionalities.

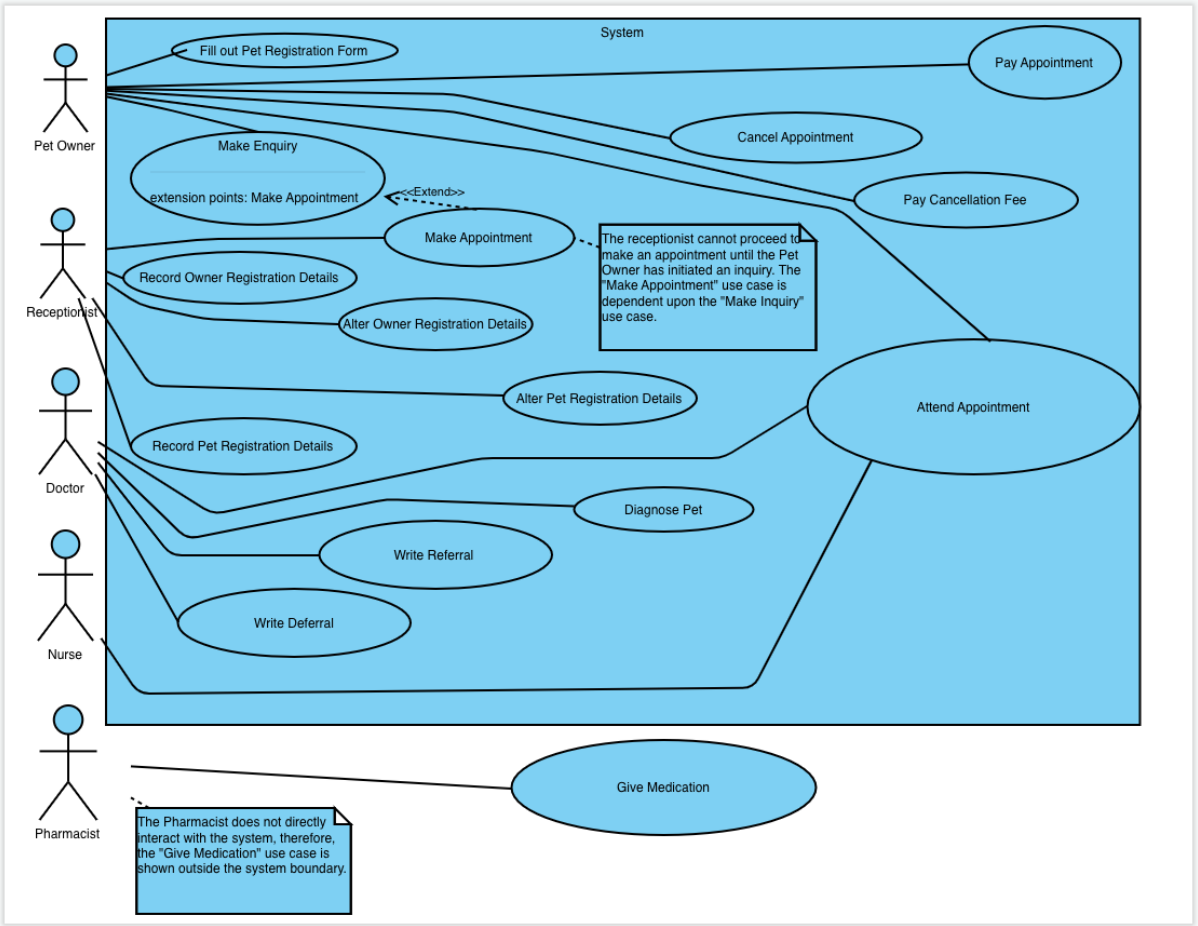

Figure 1. Use Case Diagram

4.2 Use Case Specifications

- Use Case Specification: Make Appointment

Use Case: Make Appointment
Owner: Pet owner
Pre-Conditions
The pet owners need to register.
Post-Conditions
The pet can accept treatment
Primary Path
1. Owners contact the clinic. 2. Owners make an enquiry on appointment. 3. Receptionists take the appointments and file them.
Alternate Path
2.a) Owners cancel the appointment.
Notes

- Use Case Specification: Diagnose Pet

Use Case: Diagnose Pet
Owner: Doctor
Pre-Conditions
The pet and owner attends appointment.
Post-Conditions
The pet is prescribed medication.
Primary Path
1. Appointment is made. 2. The owner, pet, nurses, and doctor attends appointment. 3. The Doctor makes a diagnosis on the pet.
Alternate Path
Diagnosis cannot be made so a referral/ deferral is made.
Notes

- Use Case Specification: Attend Appointment

Use Case: Attend Appointment
Owner: Pet/Owner, Doctor, Nurse
Pre-Conditions
The appointment is booked.
Post-Conditions
1. Doctor fills the consultation form with the details of pet diagnosis. 2. If diagnosis is not possible then a referral/deferral is made
Primary Path
1. Appointment is made. 2. Owner fills pet and owner registration form. 3. The owner, pet, nurses, and doctor attends appointment. 4. The Doctor makes a diagnosis on the pet. 5. If diagnosis is made medical advice is given and treatment is prescribed.
Alternate Path
Appointment is cancelled.
Notes

- Use Case Specification: Record Pet Registration Form

Use Case: Record Pet Registration Form
Owner: Pet Owner

Pre-Conditions
Appointment has been made.
Post-Conditions
Receptionist sort pet & owner registration forms into alphabetic order when required
Primary Path
1. Owner fills in Pet registration form via email or in person 2. Owner submits the form (if via email) Receptionist transcribed the paper form (if filled in person)
Alternate Path
1- Missing required information on the form a- Receptionists contact pet owner. 2- Receptionist didn't receive the registration form.
Notes

- Use Case Specification: Make Referral

Use Case: Make Referral
Owner: Doctor
Pre-Conditions
Customer, pet, doctor, and nurses attend appointment.
Post-Conditions
Pet is referred for another appointment at the clinic or at a different practice.
Primary Path
1. Diagnosis of the pet cannot be made. 2. A referral is made for the pet.
Alternate Path
Notes

- Use Case Specification: Cancel Appointment

Use Case: Cancel Appointment
Owner: Pet owner

Pre-Conditions
1. An appointment is booked
Post-Conditions
1. Admin (receptionist) cancels appointment 2. Pet owner pays cancellation fee on next visit
Primary Path
1. Pet owner calls to book appointment 2. Pet owner calls to cancel appointment.
Alternate Path
1. Pet owner does not arrive for next visit. 2. Invoice for cancellation fee plus further charges is sent to pet owners address
Notes

- Use Case Specification: Give Medication

Use Case: Give Medication
Owner: Pharmacist
Pre-Conditions
1. Diagnosis is made by doctor. 2. Prescription is given to pet owner.
Post-Conditions
Pet owner makes payment to pharmacist for medication.
Primary Path
1. Pharmacist reviews prescription. 2. Pharmacist dispenses medication. 3. Medication is given to pet owner after payment.
Alternate Path
Notes