"UniPet: NVP Clinic Management with SMS, POS, Appointment, Delivery, and Forecasting Sales Integration"

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CHAPTER 1. INTRODUCTION

This chapter acts as the entrance point, to the part of the project, where the researchers explore the foundation that will support the researcher's goal.

Project Context

In a society where pets hold a place, in homes their health and overall welfare hold immense significance. Veterinary clinics bear the duty of safeguarding these cherished creatures. However many of these clinics still depend on outdated systems and traditional approaches resulting in inefficiencies and difficulties when it comes to providing high quality pet care services.

To address these difficulties the groundbreaking project **"UniPet; NVP Clinic Management, with SMS, POS, Appointment, Delivery and Forecasting Sales Integration"** represents an initiative that aims to revolutionize the way veterinary clinics are managed. It offers an integrated solution that caters, to the changing requirements of both owners and veterinary professionals.

The UniPet project holds importance as it is supported by research and studies;

A study conducted by Amin on the **"Pet Health Clinic; Animal Health System"** sheds light on the necessity, for sophisticated pet management systems. This system not only allows pet owners to schedule appointments online but also provides services like pet hotels, grooming facilities and assistance, with pet import/export.

The significance of this research lies in the solutions it offers to enhance customer satisfaction ensure data management and improve operational efficiency.

The article, titled **"Exploring the Emergence of Online Pet Food Stores, in China"** discusses the significance of this market. Offers insights into the various factors that impact pet owners when it comes to purchasing pet food. The research sheds light on the dynamics of the industry, which is particularly beneficial for the project as the researchers aim to enhance the services by establishing an online store and improving the efficiency of product and service ordering processes.

The main objective of the **"Oikos Animal Clinic Sales and Inventory Management System"** is to enhance efficiency, accuracy and productivity in clinics. This case study is significant for the project efforts to improve NVP clinic

efficiency through the implementation of a Point of Sale (POS) system for, in clinic purchases and transactions.

The article, on **"Veterinary e commerce"** highlights the increasing significance of retail in businesses related to pets, veterinary practices. It introduces the idea of implementing omnichannel strategies that blend in person and shopping experiences. The project embraces the trend, by launching mobile app, a store and local delivery services to meet the demands and preferences of contemporary pet owners.

The project **"UniPet; NVP Clinic Management, with SMS, POS, Appointment, Delivery and Forecasting Sales Integration"** initiative functions, in a world where the number of people owning pets is increasing and these pet owners are looking for more effective ways to take care of their pets health. In a time marked by progress the project utilizes integration and user friendly design to meet the rising needs of the pet care industry. It aligns with the movement towards transformation in different sectors and in this particular scenario brings about significant changes, in veterinary management practices.

The project takes inspiration from research studies and new technologies, in the areas of online shopping,

mobile apps and data analysis. By combining these advancements the researchers aim to create an organized, effective and user method, for managing veterinary clinics.

Objectives

In the world of care and veterinary services there is a known establishment called NVP Animal Clinic also known as "UniPet," which has gained a strong reputation, for providing excellent care and earning the trust of pet owners. However with its track record the clinic faces certain complex challenges that require a systematic research approach. To address these issues and improve clinic operations and client experience the "UniPet; NVP Clinic Management with SMS, POS, Appointment, Delivery and Forecasting Sales Integration" system has been implemented. These issues include problems with pet owner relationships accuracy, inefficiencies in appointment bookings and limited access to product information. The purpose of this study is to enhance accuracy levels improve system functionality and data management practices while enriching the client experience. By implementing these interventions the clinic aims to solidify its position as a top notch destination, for care and support. Ensuring that animals receive optimal care while their owners are satisfied.

Specifically, this study is intended to:

1. The research project begins by analyzing the clinics existing database to identify and rectify any inaccuracies, in the relationships between owners and their pets. This overhaul of the database ensures that clients with pets receive care leading to higher satisfaction and loyalty.

2. The transition from appointment scheduling to automated scheduling through the "UniPet" system brings about improvements in precision and efficiency reducing errors and administrative burdens. This enhances the efficiency of the clinic's operations.

3. A user friendly online system is developed, specifically focusing on enhancing the clinics store. This empowers owners to access product information effortlessly greatly enhancing their overall experience while positively contributing to their

pets well being.

4. By adopting the "UniPet" system the clinic effectively addresses issues related to system functionality. This allows for administration adaptability to evolving client needs and improved accessibility.

5. The introduction of a client side interface in the system empowers clients to easily manage their data, schedule visits and access their pets health records without any hassle or inconvenience. Ultimately this leads to increased satisfaction and loyalty, among clients.

6. The all inclusive solution merges retrieval of product information, with local delivery and the option to pay in cash resulting in a substantial enhancement of the overall customer experience and the well being of pets. This further instills confidence, in the services offered by NVP Animal Clinic.

Scope and Limitation

The UniPet; NVP Clinic Management System has been developed based on research, in the healthcare management systems field. Taking into account the expertise of professionals the project aims to create an animal clinic management system that prioritizes user satisfaction by handling appointments, records and sales. The system incorporates SMS integration, Point of Sale (POS) capabilities and sales forecasting, which aligns with the recommendations made by Sofea & Azhari (2020) regarding the significance of an animal clinic management system.

Moreover the strategy prioritizes a user interface aligning with the findings of a literature review titled "Interventions to Help Pet Owners Seek Health Information Online; A Qualitative Content Analysis and Proposed Model" published in the Health Information & Libraries Journal (2018). This study highlights the importance of making

animal healthcare systems consumer friendly. In the project, researchers expand upon this principle by developing a website and mobile application that are easy to navigate aiming for an experience, for both pet owners and clinic administrators.

The researchers have also included SMS notifications to keep patients updated about their appointments. This approach is supported by the findings of Fatihah & Binti (2017) who demonstrated a decrease, in missed appointments when such notifications were used.

However it is important to acknowledge the limitations of the project. It does not include marketing campaigns to attract and retain clients as these are beyond the project budget and resource constraints. While the research may partially address inventory management, limitations may exist in terms of Point of Sale support, considering hardware-related constraints.

Definition of Terms

UniPET: In the context of the system, the "UniPet" system is a thorough software solution designed to modernize the management of veterinary clinics. It integrates SMS, POS (Point of Sale), appointment scheduling, delivery management, and sales forecasting features. Within the context of the system, UniPet serves as the central software that enables these capabilities, streamlining clinic operations and enhancing the overall experience for both pet owners and veterinary professionals.

NVP CLINIC: In the context of the system, It encompasses a specialized veterinary facility that places a strong emphasis on providing high-quality pet care, particularly in services related to spaying and neutering procedures. These procedures

contribute to controlling the population of stray animals, aligning with the clinic's dedication to responsible pet ownership and animal well-being. Within the system, NVP Clinic represents a specialized veterinary service provider, offering its unique services to pet owners and their animals, supported and facilitated by the UniPet system.

PWA (Progressive Web Application): In the context of the system, a PWA is a website that provides an app-like experience for pet owners and clinic staff. It allows them to access features like appointment scheduling, pet health records, and clinic services directly from web browsers on various devices.

Main Admin: The Main Admin, in the context of the system, refers to the primary administrator or manager responsible for overseeing and controlling all administrative and managerial aspects of the clinic. This includes tasks such as staff management, financial supervision, appointment scheduling, resource allocation, and ensuring the smooth operation of the clinic.

Couriers: Couriers are individuals or services responsible for transporting and delivering essential items, such as medications, lab samples, and pet supplies, to and from the clinic. They play a crucial role in ensuring the efficient operation of the clinic by facilitating the safe and timely exchange of items within the system.

Encryption: Encryption, in the context of the system, is the process of converting sensitive data, such as SMS messages, customer information, payment details, and 8 various records, into a secure and unreadable format. This transformation is carried out to protect this information from unauthorized access, breaches, or tampering within the software.

SMS: SMS, in the system, refers to a communication method involving sending brief text messages via mobile phones or

other communication devices to facilitate important interactions between the clinic and pet owners. These messages are used for appointment reminders, vaccination alerts, prescription notifications, or general updates related to a pet's health and care.

POS (Point of Sale): Within the system, POS is a central hub where staff can record and process payments for services and products related to veterinary care. This includes consultations, treatments, medications, pet food, and other merchandise. The veterinary clinic's POS system also maintains client records, manages appointment scheduling, and tracks patient medical history.

APPOINTMENT: In the context of the system, appointment refers to a specialized service offered by pet care professionals and veterinarians to schedule and manage appointments for pets to receive grooming and health assessments.

DELIVERY: In the system, delivery refers to a convenient retail model in which customers can shop for products online and arrange for the items to be delivered to a nearby physical store of their choice for easy pick-up.

FORCASTED SALES: Forecasted sales in the system entail making educated predictions about future revenue and patient appointments, relying on historical data, market trends, and the clinic's services

INTEGRATION: Integration, in the context of the system, refers to the seamless combination of various systems and processes within the clinic's operations. It allows different software applications, equipment, and workflows to work together cohesively, enhancing efficiency and enabling the sharing of critical data.

CHAPTER 2. REQUIREMENTS SPECIFICATION

In this chapter, we provide a detailed breakdown of the specific criteria, features, and functionalities crucial to achieve the successful execution of our project.

1. Hardware and Software Requirements

1.1 Hardware Requirements

The "UniPet" system has specific hardware requirements to ensure its optimal performance. These requirements include:

Server Infrastructure: The system should be hosted on a dependable web hosting service with adequate processing power, memory, and storage capacity.

Desktop Accessibility:

- The system ensures accessibility to desktop users through modern web browsers such as Chrome, Firefox, and Safari.
- To guarantee optimal performance, desktop systems are recommended to have a multi-core processor (e.g., dual-core or quad-core) with a clock speed of 2.0 GHz or higher.
- A minimum of 4 GB RAM and at least 128 GB of storage is required for smooth operation on desktop devices.

Mobile Accessibility:

- Mobile users can access the system through web browsers on their devices.
- For mobile devices, the system requires a speedy multi-core processor (e.g., quad-core) with a clock speed of 1.5 GHz or higher.
- A minimum of 2 GB RAM and at least 32 GB of storage are necessary to ensure optimal performance on mobile devices.

Network Infrastructure: The system should operate efficiently with a stable internet connection, requiring a minimum bandwidth of 10 Mbps. The network must support standard web protocols (HTTP/HTTPS) to ensure secure data transfer.

Networking Equipment: Routers, switches, and cabling for connecting all hardware components within the clinic.
Backup and Storage: Systems for data backup and storage, including external hard drives or network-attached storage (NAS) devices.

1.2 Software Requirements

The "UniPet" system relies on specific software components and dependencies to function effectively. The software requirements are as follows:

- **Database Management System (DBMS):** A DBMS like MySQL (Version 5.7 or higher) for storing and managing patient records and clinic data.
- **Web Browser:** If the software has a web-based interface, it will require compatible web browsers such as Google Chrome, Mozilla Firefox, or Microsoft Edge.
- **API-Integrated Communication Software:** Email clients and communication tools with API functionality designed for both internal and external communication for delivery rider using Facebook API.
- **Operating System:** The choice of operating system will depend on the specific software used, but it's commonly Windows of Linux for servers and various operating systems for client computers.

- **Programming Language and Frameworks:**
  - **Backend:** The system should be developed using PHP with CodeIgniter 4 (CI4) framework.
  - **Front-End:** For progressive web app (PWA) components , the system should utilize JavaScript with Vue.js. The web hosting environment must support for PWA features.

- **Development Tools:** Developers working on the system should have access to integrated development environment (IDEs), code version control system (e.g.,Git), and relevant development libraries for CI4 and Vue.js.

2. Functional Requirements

2.1 Admin and Clients :

1. All sides should be able to register accounts and edit their profile information. Admins and Users are required to create strong passwords, including a combination of upper and lower case letters, numbers, and special characters.
2. After providing their registration information, all sides should receive a confirmation link via email. Clicking the link will activate their admin and users accounts.

2.2 Administrators (Admin):

1. Admins have the ability to control user access and manage login mechanisms.
2. They can differentiate access levels and grant or deny access to the system.
3. Admins can modify and maintain the ERD to ensure accurate representation of data relationships.
4. Admins can create, edit, and maintain digital records, including appointments and treatments.
5. Admins manage the Point of Sale system for in-clinic purchases and transactions.
6. Admins generate reports showcasing both walk-in and online sales for financial insights.
7. Admins have access to client analytics, allowing them to

track and analyze client behavior and preferences.

8. Admins collect and use location data to visualize and identify areas with the most and least bookings, aiding in decision-making processes.
9. Admins oversee the integration of a local delivery service for items purchased through the online store. They ensure payment for deliveries is handled by the delivery service.
10. Admins may manage the development and maintenance of mobile applications for clients to access the clinic's services and products.
11. Admins can access and review order history or summaries of buyers to understand purchasing trends and client preferences, helping in decision-making and inventory management.
12. Admins can visualize the most purchased products and analyze the geographic locations of buyers, providing insights into the popularity of products in specific areas.

2.3 Main Client Sides:

1. Clients can securely log in to the system.
2. Clients have the ability to schedule appointments for their pets online, specifying date, time, and pet details during the booking process.
3. Clients create and manage profiles for their pets, including details such as name, breed, age, medical history, and specific requirements.
4. Clients view and track their appointment history, facilitating management of past and upcoming visits.
5. Clients can access their order history to review past purchases made in the online store.
6. Clients receive SMS reminders and updates regarding upcoming appointments.

7. Clients can interact with an intuitive and easy-to-use interface to navigate and interact with the system.
8. Clients track their pets' health conditions, medication schedules, and receive alerts for health-related activities.
9. Clients browse and purchase products and services through the online store.
10. Clients complete a streamlined checkout process for their online bookings and store purchases.

2.4 Courier

1. Integrate a local delivery service for items purchased through the online store.

- The system shall integrate with Facebook Messenger to facilitate real-time communication with couriers.
- When a customer places an order, the system shall generate a message that includes delivery instructions and customer contact information.
- The system shall automatically send this message to the courier's Facebook Messenger page using the Facebook Messenger API.
- Couriers shall receive notifications on their Facebook Messenger accounts when a new order is placed, including essential order information.
- Couriers shall have the capability to view order details, acknowledge receipt of delivery instructions, and confirm the order within the Facebook Messenger interface.
- Couriers may also provide estimated delivery times and respond to customer inquiries using Facebook Messenger.
- Both the system and couriers shall engage in a two-way conversation via Facebook Messenger to ensure real-time

communication.

- This communication channel shall be used for order updates, changes in delivery schedules, and resolution of any delivery-related issues.
- Couriers shall use Facebook Messenger to confirm the successful delivery of an order or report any issues that may arise during the delivery process.

2. Ensure that payment for deliveries is handled by the delivery service.
   - Couriers should accept payments from customers for the delivered items at the time of delivery.

Non-Functional Requirements

Performance Requirements

- **Prompt Response:** The system must respond gracefully to user actions, like scheduling appointments and making purchases, within a maximum of 1-3 minutes ensuring a smooth and enjoyable user experience.

- **Efficient Workload Handling per Minute:** The system should seamlessly manage numerous user requests within a minute without any indications of performance degradation, demonstrating its capability to support a minimum of 5-8 users collaboratively working together per minute.

- **Reliable Uptime:** The system's availability should be exceptional, maintaining a consistent

presence of at least 99.9% to ensure uninterrupted service to users.

Operational Requirements

1. **Accessibility**: The system should be available 24/7, always there to support users whenever they need it.
2. **Compatibility**: The system should work seamlessly with all web browsers and mobile operating systems, ensuring it's accessible to everyone.
3. **Scalability**: The server should have limitless potential, accommodating a numbers of computers, tablets, mobile phones, and screens without restrictions.
4. **User-Friendly Assistance**: The system should be a helpful companion to users, providing friendly error messages and clear guidance when needed.
5. **Data Protection**: Strong data backup and disaster recovery procedures should safeguard information and ensure the system is consistently available.

Security Requirements

1. Implement user authentication and authorization to ensure that only authorized clinic staff can access and modify SMS messages.
2. Encrypt SMS content, including user and password, to protect sensitive information, such as appointment details or personal information.
3. Implement role-based access control to limit the staff members who can edit.
4. Implement strong user authentication and role-based access control to secure the POS system from unauthorized access.

5. Encrypt sensitive id, payment information, and transaction records to prevent data breaches.
6. Protect inventory data to prevent unauthorized access, tampering, or theft.
7. Secure access to the delivery service, allowing user/customer and authorized staff to manage and monitor deliveries.
8. Messages must be digitally signed to authenticate the sender.
9. Encrypt delivery and tracking airway bill to protect client information and delivery schedules.
10. Implement a secure method to confirm that clients receive the correct items.
11. Secure the integration between the delivery service and the POS system to prevent data breaches or manipulation.
12. Protect historical sales data and sales forecasts from unauthorized access or tampering.
13. Encrypt sensitive data used in forecasting, such as sales trends and patterns.
14. Ensure that real-time sales data is securely integrated and monitored.
15. Implement a database backup and restoration strategy to protect against data loss and ensure the availability of critical data.

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