# PetVax: A Mobile Application for Addressing Rabies Cases

Maria Lea E. Gatungay[1], Kate G. Lorite[2], Precy Marie A. Gerola[3], Naneth S. Bongar[4], Lykha G. Geonigo[5]

[1,2,3,4,5] Guimaras State University - Mosqueda Campus
[1] marialea.gatungay@gsu.edu.ph, [2] kate.lorite@gsu.edu.ph, [3] precymarie.gerola@gsu.edu.ph
[4] naneth.bongar@gsu.edu.ph, [5] lykha.geonigo@gsu.edu.ph

***Abstract*—** Rabies remains a significant public health concern, primarily due to unregistered pets and insufficient vaccination monitoring. This study introduces PetVax, a mobile application designed to address rabies cases by facilitating pet registration, vaccination monitoring, and communication between pet owners and local authorities. The primary objectives are to streamline pet record management, enhance vaccination compliance, and improve accessibility to vaccination schedules. The study follows the System Development Life Cycle (SDLC) methodology, including requirements gathering, system design, development, testing, and deployment. PetVax was developed with the use of technology tools such as Flet, Python, and SQlite. The application incorporates features such as pet registration, vaccination reminders, and notifications of upcoming rabies vaccination events, with all data stored in a centralized database for easy retrieval. The results demonstrate improved pet registration accuracy, increased vaccination compliance, and enhanced accessibility to pet health records. The novelty of this research lies in its integration of digital pet health management within a user-friendly platform, ensuring real-time data accessibility for both pet owners and administrators. PetVax significantly contributes to rabies prevention efforts by providing an efficient, scalable solution for local governments and pet owners.

***Keywords*—** *rabies; pet registration; mobile application; vaccination; pet health management*

## I. INTRODUCTION

Rabies remains a persistent public health threat, particularly in developing countries where vaccination coverage is inadequate, and pet registration is not strictly enforced [1]. According to the World Health Organization (WHO), rabies causes an estimated 59,000 human deaths annually, with 99% of cases transmitted through dog bites [2]. The Philippines continues to face challenges in rabies eradication, with reported cases every year due to low vaccination rates, lack of pet ownership accountability, and inefficient tracking systems. Despite efforts of the local organizations to implement mass dog vaccination campaigns [3], ensuring widespread compliance and monitoring remains a challenge. A significant factor contributing to this issue is the reliance on manual record-keeping systems [4], which often lead to data inaccuracy, lost vaccination records, and inefficient tracking of vaccination history.

Addressing this gap requires the integration of digital solutions to improve the monitoring, accessibility, and enforcement of rabies vaccination programs.

Recent advancements in mobile-based health applications have shown significant potential in improving disease surveillance and vaccination tracking [5]. Studies have demonstrated that digital vaccination record-keeping can increase vaccination compliance and accessibility by allowing pet owners and veterinary authorities to track and manage immunization schedules more effectively. The Global Alliance for Rabies Control (GARC) Data Logger, for example, was successfully implemented in Namibia's rabies vaccination campaigns, enabling real-time monitoring and data collection for better decision-making [6]. Similarly, in Haiti, the use of technology-aided canine vaccination campaigns led to higher vaccination coverage and better coordination among health workers [7]. A study in Tanzania explored a mobile facial recognition system for identifying vaccinated dogs, further illustrating how digital solutions can enhance vaccination efforts [8]. These technological advancements underscore the need for a mobile application that centralizes pet registration, vaccination tracking, and real-time notifications to ensure compliance and efficiency.

To address these challenges, this study introduces PetVax, a mobile application designed to streamline pet registration, vaccination monitoring, and event notifications to ensure real time access of upcoming announcements regarding vaccination programs from Department of Agriculture - Bureau of Animal Industry to the pet owners.The system provides a user-friendly, digital platform where pet owners can register their pets, record vaccination details, and receive notifications for upcoming rabies immunization schedules. By replacing traditional paper-based records with a digitized, easily accessible system, PetVax aims to increase vaccination compliance and enhance overall rabies prevention efforts.

The study follows the System Development Life Cycle (SDLC) methodology [9], ensuring a structured and systematic approach to system planning, development, testing, and deployment. PetVax is developed using the Flet framework for the mobile interface, Python [10] for backend, and SQLite [11] for the database. Unlike existing digital health tools that focus on human vaccination tracking, PetVax is

specifically designed for pet health management, addressing a crucial gap in rabies prevention initiatives.

The novelty of this research lies in its integration of digital pet health management with vaccination tracking and automated reminders. While similar mobile applications have been implemented for general veterinary health monitoring, PetVax is uniquely focused on rabies prevention and vaccination compliance at the community level. Additionally, it enhances data transparency and real-time access, allowing local government veterinary offices to monitor pet vaccination statuses, identify high-risk areas, and implement targeted interventions.

By providing a scalable, innovative, and user-friendly platform, PetVax contributes to public health and pet management, ensuring a more proactive approach to rabies prevention. Through accurate record-keeping, timely reminders, and improved vaccination monitoring, the system empowers pet owners and authorities to work collaboratively toward the elimination of rabies cases. Ultimately, PetVax serves as a practical and sustainable tool for improving pet vaccination programs and promoting responsible pet ownership.

## II. METHODS OF THE STUDY

The output of the study on PetVax: A Mobile Application for Addressing Rabies Cases will address challenges in pet registration and vaccination monitoring by providing a centralized digital platform that enhances efficiency and accessibility. This system aims to streamline pet vaccination monitoring, improve data accuracy, and ensure better coordination between pet owners and veterinary authorities. By transitioning from manual record-keeping to a mobile-based solution, PetVax offers a more reliable, user-friendly, and proactive approach to rabies prevention and pet health management.

In the development of PetVax, the researchers adopted the Software Development Life Cycle Model [9] as the project management methodology. This approach allowed for a structured and sequential process while providing flexibility to revisit previous stages when necessary. The following outlines the key phases of the methodology: Planning, Analysis, Design, Implementation, and Testing and Maintenance phase. This approach acts as a benchmark for improving the overall system development process and software quality.

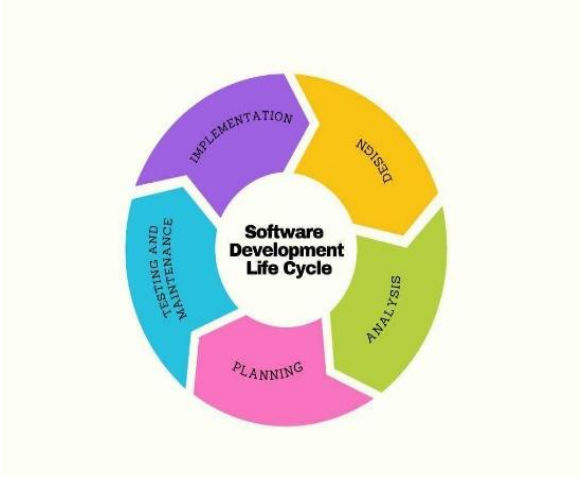


Fig. 1 Software Development Life Cycle (SDLC)

### *2.1 Planning Phase*

In this phase, the researchers focused on defining the scope and the objectives of the system. During this phase, the researchers gathered information through conducting an interview with stakeholders from Barangay Salvacion, including the Department of Agriculture and pet owners, to help determine the specific requirements, challenges, and issues related to the pet vaccination process.

*Table 1* outlines the different phases of the Software Development Life Cycle (SDLC) along with their corresponding tasks. The process begins with the Planning phase, which involves organizing the development team, planning the project, finalizing the study title, preparing the proposal, gathering data, and scheduling project tasks. Following this, the Analysis phase focuses on defining problems, defending the proposal and title, and analyzing user requirements to ensure the system meets user needs. Next, is the Design phase which involves creating both the logical and physical structure of the system, including the development of the user interface (UI), user experience (UX), and database design. Once the design is established, the Implementation phase takes place, where the system is presented, delivered, and supported. Finally, the Testing and Maintenance phase ensures the system functions correctly through database testing, system debugging, and the development of final documentation. These five phases play a crucial role in the systematic development of a software project, ensuring a well-structured and functional system.

Table 1 - Phases of Software Development Life Cycle and Corresponding Task.

| Phases | Tasks |
|---|---|
| **Planning** | T1 Group Organization |
| | T2 Project Planning |
| | T3 Finalizing the Study Title |
| | T4 Proposal Making |
| | T5 Data Gathering |
| | T6 Project Task and Scheduling |
| **Analysis** | T7 Defining Problems |
| | T8 Proposal Making and Title Defense |
| | T9 User Requirements Analysis |
| **Design** | T10 System Logical and Physical Design |
| | T11 System UI/UX and Database Design |
| **Implementation** | T12 Project Presentation |
| | T13 Delivery and Support |
| **Testing and Maintenance** | T14 Database Testing and Debugging |
| | T15 System Testing and Debugging |
| | T16 Development of Final documentation |

*2.2 Analysis Phase*

Next is the Analysis Phase. During this phase, the researchers looked further into the system's requirements to ensure a profound understanding of how the PetVax system will address stakeholder needs. Existing procedures for pet vaccination are also analyzed to identify gaps and inefficiencies.

*2.3 Design Phase*

This phase converts the system requirements into a blueprint for development. In this phase, the researchers designed the system's architecture, including the structure of the database and the relationships between entities like pet owners, pets, and vaccination events. Wireframes for key components are also created to visualize the layout and functionality of the system. The researchers chose Flet as the framework used for developing the system, which ensures a responsive and user-friendly interface. Python is utilized for backend logic, handling system operations and data processing, while SQLite serves as the database for storing user, pet, and vaccination information.

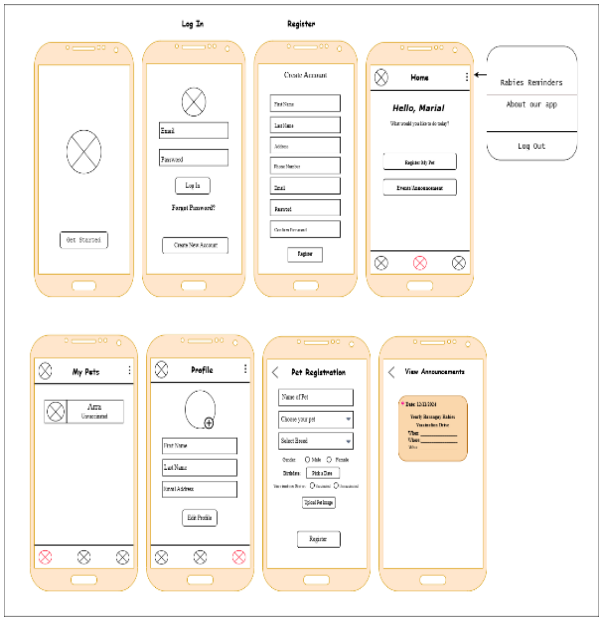


Fig. 2 System Wireframe

*Figure 2* outlines the structure and functionality of the PetVax app. It begins with a welcome screen, followed by the login/registration page where users can either log in or register by providing their personal details such as name, address, phone number, email, and password. Once logged in, users are taken to the home screen, which greets them by name and offers two main options: Register My Pet and View Events/Announcements.

The app includes a side menu for additional navigation, allowing users to access Rabies Information/Reminders which contains an infographic showing what rabies is, its symptoms, rabies prevention, and animal bite first aid tips. Another is About the App page which includes information about the app, its goals and features, and the people behind its development. Last is the logout button to end the user's session or sign out their accounts. In the My Pets section, users can view their registered pets and their vaccination status. The Profile screen enables users to update personal information. The Pet Registration screen allows users to input their pet's details, including name, species, breed, gender, birthdate, vaccination status, and an option to upload a pet image. To enhance rabies awareness, the app features an Announcements screen, where users can stay informed about upcoming vaccination drives and rabies awareness campaigns. This design ensures that pet owners are encouraged to vaccinate their pets, stay informed about rabies prevention efforts, and actively participate in community initiatives.

*2.4 Implementation Phase*

The actual development of the system takes place in this phase. Core features, such as user registration with account verification and admin approval, are developed and integrated with the database. The admin interface is built to allow the Department of Agriculture to post announcements and vaccination events. Once development is complete, the system is prepared for deployment on mobile platforms, ensuring compatibility and accessibility.

### *2.5 Testing and Maintenance Phase*

The final phase is the System Testing and Maintenance which guarantees the long-term functionality of the system. This involves monitoring the system for any issues, fixing bugs, and implementing updates in response to user feedback. Additionally, the system is continually improved to remain compatible with emerging technologies and evolving user requirements, ensuring the app's sustainability and effectiveness.

## III. RESULTS AND DISCUSSION

### *3.1 High-Level Diagrams*

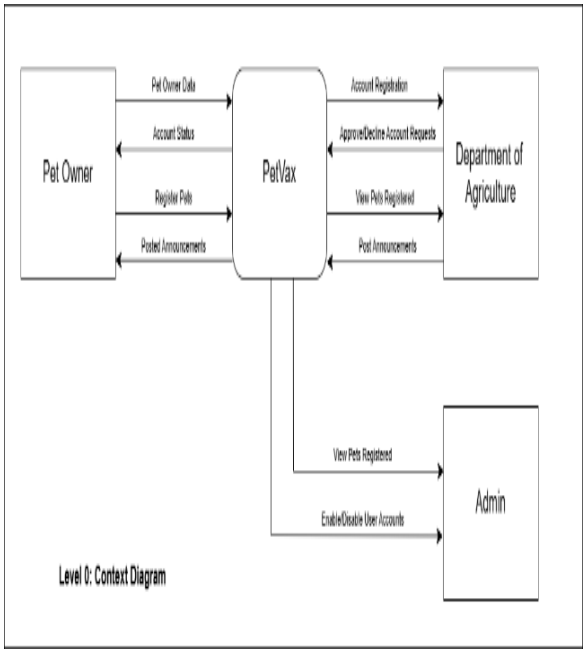


Fig. 3 Level 0 Data Flow Diagram: The Context Diagram

*Figure 3* shows the Level 0 Data Flow Diagram of the System. This illustrates the interactions between the system and its external entities: Pet Owners, the Department of Agriculture (Bureau of Animal Industry), and the System Administrator. The Pet Owner inputs personal and pet information into the system and registers their pets for vaccination monitoring. They also receive updates on their account status and announcements regarding vaccination schedules. The Department of Agriculture manages account registrations, approving or declining pet owner accounts, viewing registered pets, and posting important announcements related to rabies prevention and pet vaccination. Meanwhile, the Admin oversees system operations by monitoring registered pets and enabling or disabling user accounts based on system policies. This enhances coordination between pet owners, government agencies, and administrators to improve rabies prevention efforts and promote responsible pet ownership.

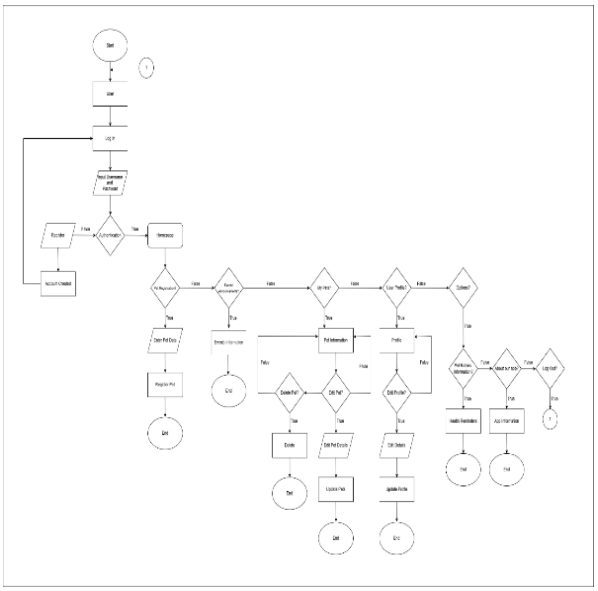

Fig. 4 System Flowchart

*Figure 4* shows the Flowchart of the system which represents the user flow, depicting different actions such as Registration, Login, Homepage Navigation, Event Information, Pet Registration, Profile Management, etc.

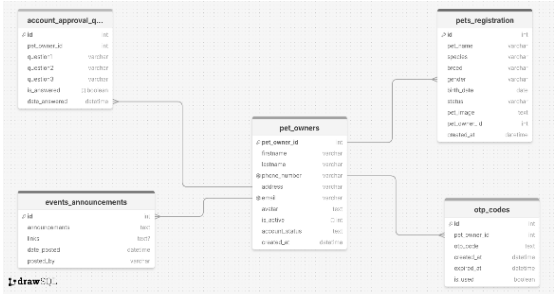


Fig. 5 Entity Relationship Diagram

*Figure 5* represents the Entity-RelationshipDiagram (ERD) that defines how different entities in the system interact with each other. The database is structured

to manage pet owners, their registered pets, vaccination tracking, security verification, and rabies-related announcements. The Pet Owners table stores user information, including names, contact details, addresses, email, and account status. Each pet owner can register multiple pets, which are stored in the Pets Registration table. This table records details such as the pet's name, species (dog or cat), breed, gender, birth date, vaccination status, and a profile image. A relationship exists between these two tables, ensuring that each pet is linked to its respective owner.

To enhance security, the system implements Account Approval Questions, where new users must answer verification questions before gaining full access. Additionally, the OTP Codes table is used for account authentication, generating temporary one-time passwords sent through the user's registered email address for verification purposes. Each pet owner can receive multiple OTP codes, which expire after a certain period.

The system also includes an Events & Announcements table to inform pet owners about upcoming rabies vaccination drives and Barangay awareness campaigns. Pet owners can view multiple announcements, which contain event descriptions, links, and posting dates.

### *3.2 Developed User Interfaces*

This part shows the prototype of the user interface of the system, allowing us to visualize its design, evaluate its functionality, and ensure a user-friendly experience before full implementation.

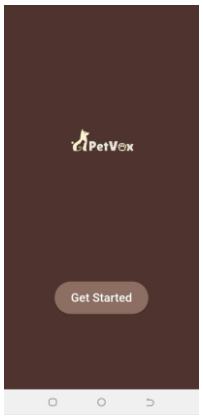


Fig. 6 Screenshot of PetVax's Landing Page

*Figure 6* shows the app's Landing Page. This screen serves as the entry point for users to access the app's features.

*Figure 7* shows the user login page and registration which enables the user to log in to their account. If the user has no account yet, the user must proceed to the registration page and input the necessary information and wait for the admin's approval of the account.

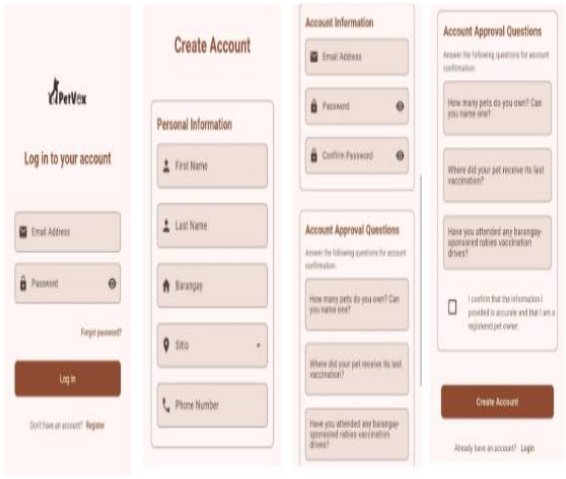


Fig. 7 Prototype of User Log in and Registration

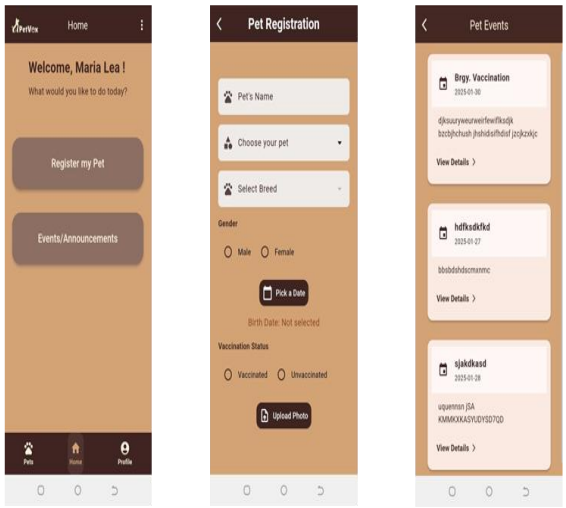


Fig. 8 Screenshots of Home Screen, Pet Registration, and Pet Events Page

*Figure 8* depicts the Home Screen, Pet Registration, and Pet Events Page. The Home Screen greets the user by name and provides quick-access buttons for pet registration and event announcement. The Pet Registration page allows users to input pet details and information such as name, breed, gender, etc. The Pet Events page displays upcoming vaccination events and other pet-related announcements with options to view more details.

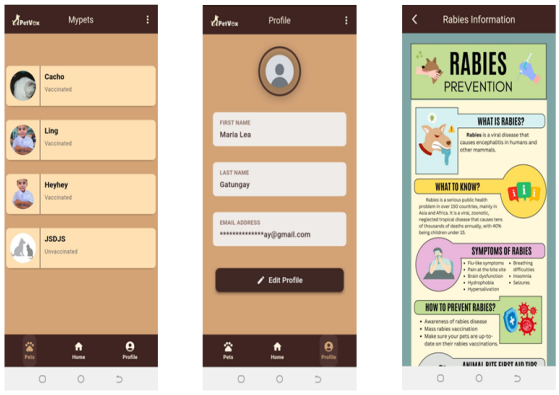


Fig. 9 Screenshots of My Pets, My Profile, and Rabies Information Page

*Figure 9* shows the Pets, Profile, and Rabies Information Page. The initial screen, labeled “Mypets,” shows a list of the registered pets, each with their name and vaccination status, showing whether they are "Vaccinated" or "Unvaccinated." In the second screen, "Profile," the app shows the user's details, such as their profile picture, name, etc. The last screen, "Rabies Information," is an
educational page, giving important information regardi ng rabies.

## IV. Conclusions

Based on the findings of this study, the system successfully achieved its objectives by providing a solution for managing pet registrations and vaccination records while enabling the Department of Agriculture - Bureau of Animal Industry to disseminate important vaccination updates. The system addressed key problems in traditional rabies prevention efforts, such as manual record-keeping, lack of transparency, and inefficient communication with pet owners.

The development and implementation of PetVax highlights the importance of integrating technology into public health initiatives, particularly in rabies prevention and control programs. By having a secure database, automated notifications, and an admin dashboard for monitoring pet vaccinations, the system enhances coordination and efficiency in implementing rabies vaccination campaigns.

The benefit of this system extends not only to the Department of Agriculture but also to the pet owners and the stakeholders of Barangay Salvacion who were part of the study.

However, while the system has proven effective in its core functionalities, certain areas, such as scalability, integration with veterinary clinics, and additional security enhancements, could further improve its performance and adoption in larger communities.

## Acknowledgment

The researchers wish to extend deep thanks to everyone involved in the successful completion of "PetVax: A Mobile Application for Addressing Rabies Cases." They give thanks to God for guiding them through the project, and to their advisor for invaluable guidance. They
also thank the relevant government agencies for the necessary data, the leadership of their academic institution for excellence in research, and their grammarian for ensuring clarity. Additional thanks are extended to those who provided constructive comments and
technical support.
Finally, they profoundly thank the unshakeable support of their friends, families, and classmates, whose support
was instrumental in keeping them going. They owe it all to the combined efforts of everyone.

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