

# MAWROSE Animal Clinic Management System

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## Abstract

The veterinary industry is advancing, necessitating modern management systems to improve service quality in animal clinics. Currently, MAWROSE Anima Clinic uses Krelases, a cloud-based system. Still, it has limitations such as flexibility in customization, reliance of software updates, and a lack of customer engagement features. This project aims to develop an enhanced MAWROSE Animal Clinic Management System to address these issues by introducing a customer portal and flexible system customization. The portal enables customers to manage appointments, access their pet's health records and use features like pet adoption and cat hotel reservation services. The system was designed using an object-oriented and web-based approach, using tools like HTML, CSS, JavaScript, and MySQL to implement and maintain the database. Key findings indicate that the proposed system improves operational efficiency, improves customer satisfaction, and aligns better with clinic workflows. Future work could explore integrating with mobile application and incorporating artificial intelligence for predictive analytics, such as detecting common health issues in pets based on medical records. This project highlights the potential of technology in solving real-world challenges, benefiting both clinics and their clients in reducing the dependency on clinic staff for routine tasks.

## 1. Introduction

As the modern era progresses, technology in the veterinary industry is also developing leading to awareness of animal health [1]. To improve the service quality of an animal clinic, a modern management system must be established to facilitate all complicated daily tasks [2]. Currently, MAWROSE Animal Clinic uses a cloud-based management system called Krelases. This system is designed to enhance operations for veterinary clinic like patient management, appointment scheduling, billing and financial management, inventory management, reports, analytics, and accessible support [3]. However, there are some limitations in the system that MAWROSE Animal Clinic hopes some improvement and flexibility can be made. Therefore, the development of an automated system for MAWROSE Animal Clinic Management System is crucial to overcome these limitations.

The current MAWROSE Animal Clinic Management System that uses Krelases system offers a centralized platform where all clinic operations, from patient registration to billing, can be managed seamlessly. For example, this system handles patient management, appointment scheduling, inventory control, billing, and financial reporting. However, systems often operate within a rigid structure with limited flexibility for adaptation. Clinics rely heavily on system updates from software providers to add new features or modify workflows, which can result in delays when trying to meet specific operational requirements.

The existing system has provided many features to the clinic, but the system lacks a customer platform that functions for customer engagement and satisfaction. For example, clients frequently need to call or visit the clinic to schedule appointments, and inquire about their pet's medical records. Reliance on clinical staff for these simple tasks leads to unnecessary delays, inefficiencies and administrative burdens. Not only that, but the

system also has limited customization challenging to customize system to their specific workflow. Plus, existing systems is depending on periodic updates from the software provider to introduce new features or fix bugs. This often results in long waiting periods for important improvements or adjustments leading to clinic experience disruptions. MAWROSE Animal Clinic also demands to have pet adoption sites and cat hotel services for their clinic.

This project proposes the development of an enhanced MAWROSE Animal Clinic Management System with a customer portal and flexible customization according to the desired workflow. The customer's site will allow customers to manage appointments, view their pet's medical records, pet's adoption sites and cat hotel service. By providing customers with self-service options, the system will reduce administrative workload and improve communication between the clinic and its customers. This enhanced system will streamline internal operations and improve the overall customer experience. Moreover, clinic staffs can increase quality of works with the ability to customize the system based on their specific workflow. The expansion of pets' adoption site and cat hotel service could be an exciting new way for the clinic to engage with the community [4].

This paper organized into six sections. The first section introduces project background. Section2 provides a literature review. Section 3 describes the project methodology and outcome from analysis and design. Section 4 discusses results and discussion. Section 5 explains the extent implemented in the proposed system. Section 6 gives the conclusion.

## 2. Literature Review

The system currently in use to manage veterinary clinics vary in terms of capabilities and scope. The use of outdated techniques, such as manual record keeping, has led to inefficiencies, errors, and challenges in analyzing data [5]. Cloud-bases solutions have emerged because of recent developments, providing remote access, data protection, and accessibility for clients and employees. These systems often include functions such as financial tracking, inventory management, electronic medical records, appointment scheduling, client communication tools, and even telemedicine [6]. The cost of implementation, the need for robust data security measures, and the ongoing need for support and training to ensure efficient use of the system and optimize its benefits remain barriers.

The MAWROSE Animal Clinic Management System has been compared with three related systems: Kreloses, Petfinder, and Vetport. These systems provide a range of features tailored to veterinary clinics and pet management. Kreloses offers tools for clinic management, such as appointment scheduling, inventory tracking, and client communication [3]. Petfinder focuses on pet adoption, providing a platform for matching pets with potential owners [7]. Vetport specializes in cloud-based veterinary practice management with features like medical record tracking, teleconsultations, and billing [8].

The proposed MAWROSE Animal Clinic Management System integrates features inspired by these systems while addressing gaps specific to the clinic's needs. For example, it incorporates Kreloses' appointment scheduling but adds a client portal. Next, inspired by Petfinder, the system offers pet adoption and cat hotel service that are not seen in other systems studied. Finally, it uses Vetport's medical record management system but integrates it more easily into the client's portal for better transparency.

This comparison stated in Table 1, highlights how existing systems' strengths can be adopted and adapted to improve clinic efficiency and customer experience and provide comprehensive functionality developed to MAWROSE Animal Clinic Management System's unique requirements.

**Table 1** *System's Comparison*

| Features/ Systems      | Kreloses | Petfinder | Vetport | MAWROSE Animal Clinic Management System |
|------------------------|----------|-----------|---------|-----------------------------------------|
| Customization          | √        | √         | √       | √                                       |
| Customer Portal        | X        | √         | X       | √                                       |
| Appointment Management | √        | X         | √       | √                                       |
| Self-service Options   | X        | √         | X       | √                                       |
| Inventory Management   | √        | X         | √       | X                                       |
| Pet Adoption Feature   | X        | √         | X       | √                                       |
| Cat Hotel Service      | X        | X         | X       | √                                       |

### 3. Methodology

#### 3.1 Software Development Activities

MAWROSE Animal Clinic Management System employed Agile Methodology. This methodology allowed continuous delivery and flexibility in responding to changes, high-value features while consistently refining the system based on user needs [9]. There are total of five phases in the agile model. As shown in Table 2, each phase has its assignment and output that needs to be produced during the entire project development.

**Table 2** *Software development activities and their task*

| Phase          | Task                                                             | Output                                 |
|----------------|------------------------------------------------------------------|----------------------------------------|
| Planning       | - Proposed the project                                           | - Project proposal                     |
|                | - Determine the project schedule, activities and output          | - Gantt Chart                          |
|                | - Define project goals and objective                             | - DFD                                  |
|                |                                                                  | - ERD                                  |
| Design         |                                                                  | - Flowchart                            |
|                | - Create initial system architecture                             | - System architecture                  |
|                | - Develop a sketch or wireframe for user interface               | - UI wireframe                         |
|                | - Outline technical specifications                               | - Design specification                 |
|                | - Prepare design documentation                                   | - Database scheme                      |
| Implementation |                                                                  | - Data dictionary                      |
|                |                                                                  | - UI design                            |
|                | - Start coding and development based on design                   | - Functional code for each iteration   |
| Testing        | - Develop in iterations, focusing on high-priority feature first |                                        |
|                | - Perform a small group to test the system                       | - Test reports                         |
|                | - Gather user feedback on prototype                              | - Feedback from users and stakeholder  |
|                | - Refine features                                                | - List of bugs and improvement         |
| Deployment     |                                                                  |                                        |
|                | - Deployment the functional product to the live environment      | - Deployed product in live environment |
|                | - Provide user training and documentation                        | - User training                        |
|                | - Monitor system for issues and gather feedback                  | - User feedback for post-deployment    |
|                | - Plan for future update                                         |                                        |

#### 3.2 System Requirement Analysis

In this section, discussing two things which is the analysis of the system's needs and the analysis of the user's need. These two must meet functional requirements and non-functional requirements. Meanwhile, Table 3 explaining the module included in the proposed system.

**Table 3** *System Module*

| Modules                | Descriptions/Functions                                                                                                                                                                                                                                                                                    | User                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Login/Registration     | The system provides secure logins with role-based access control. Customer can register and log in. Admin can manage user roles and permissions. Upon successful login, users are redirected to their appropriate dashboards. Staff can log in once admin registered to the system and approve permission | -Customers<br>-Administrator<br>-Staff |
| Appointment Management | The system allows customer to view, schedule, edit and cancel appointments. Administrators can view, manage, and approve appointments. Staff can view, confirm, or reschedule appointments and receive reminders                                                                                          | -Customers<br>-Administrator<br>-Staff |
| Medical Record         | The system allows customers to view their pet's medical history and treatment records. Additionally, administrator and staff can update and manage patient medical records                                                                                                                                | -Customers<br>-Administrator<br>-Staff |
| Dashboard              | The system features personalized dashboards. Customer can view upcoming appointments and pet health updates, while administrator have access to a customizable dashboard with reports and statistics.                                                                                                     | -Customers<br>-Administrator           |
| Pet Adoption           | The system allows customer to view and adopt available pets. Customer can browse through detailed listing of available pets. Additionally, administrators can manage and update adoption listings.                                                                                                        | -Customers<br>-Administrator           |
| Cat Hotel Service      | The system allows customers to book accommodations for their cats. Customer can select their desired stay duration. Additionally, administrators and staff can manage bookings, availability, check-in/check-out processes.                                                                               | -Customers<br>-Administrator<br>-Staff |

Goals like improvement or control, which require changing the target entity, also involve functional requirements as shown in Table 4. In an Object-Oriented Approach (OOA), functional requirements describe what the system should do from the user's perspective. They focus on the system's behavior, expressed as services, operations, or methods provided by objects (classes) in the system. [10].

**Table 4** *Functional Requirement*

| No. | Module                 | Description                                                                                                                                                                                                                                                                                                                 |
|-----|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Registration and Login | <ul style="list-style-type: none"> <li>- The system provides secure logins with role-based access control.</li> <li>- New customer can register before login.</li> <li>- Admin can manage user roles (customer, staff) and permissions.</li> <li>- System redirect the valid users to the appropriate dashboard.</li> </ul> |
| 2.  | Appointment Management | <ul style="list-style-type: none"> <li>- Customer to view, schedule, edit and cancel appointments.</li> <li>- Administrators can view, manage, and approve appointments.</li> <li>- Staff can view, confirm, or reschedule appointments and receive reminders.</li> </ul>                                                   |
| 3.  | Medical Record         | <ul style="list-style-type: none"> <li>- Customers to view their pet's medical history and treatment records.</li> <li>- Administrator and staff can update and manage patient medical records.</li> </ul>                                                                                                                  |
| 4.  | Dashboard              | <ul style="list-style-type: none"> <li>- Customer can view upcoming appointments and pet health updates.</li> <li>- Administrator have access to a customizable dashboard with reports and statistics.</li> </ul>                                                                                                           |
| 5.  | Pet Adoption           | <ul style="list-style-type: none"> <li>- System allows customer to view and adopt available pets.</li> <li>- Customer can browse through detailed listing of available pets.</li> <li>- Administrator can manage and update adoption listings.</li> </ul>                                                                   |
| 6.  | Cat Hotel Service      | <ul style="list-style-type: none"> <li>- Allows customers to book accommodations for their cats.</li> <li>- Customer can select their desired stay duration.</li> <li>- Administrators and staff can manage bookings, availability, check-in/check-out processes.</li> </ul>                                                |

Evaluation goals like understanding or monitoring can be achieved through strategies involving non-functional requirements, such as definition, measurement, and analysis as shown in Table 5.

**Table 5** *Non-Functional Requirement*

| No. | Requirement            | Description                                                                            |
|-----|------------------------|----------------------------------------------------------------------------------------|
| 1.  | Performance            | The system should load any page or process action under normal usage conditions.       |
| 2.  | Operational            | The loading time required for a website not more than 1 minute.                        |
| 3.  | Security               | The system should implement encryption for sensitive data of users' information.       |
| 4.  | Cultural and Political | The system should be able to work on any web browser.                                  |
| 5.  | Scalability            | Support future growth in the number of users, pets and transactions as clinic expands. |
| 6.  | Usability              | Ensures an intuitive and user-friendly interface with minimal learning curve.          |

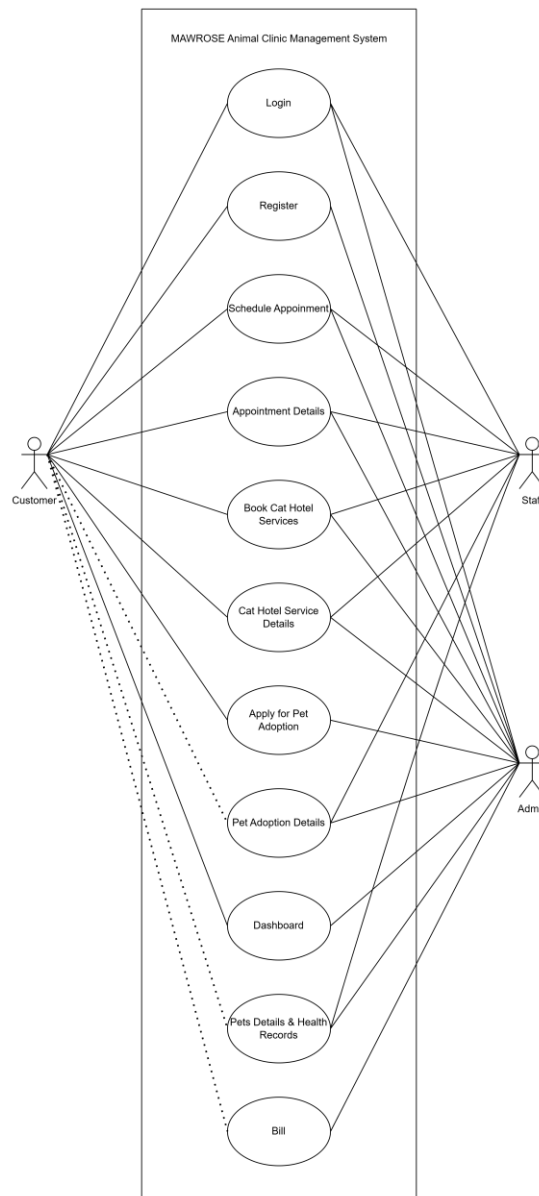
User requirement is the process of identifying and understanding the needs, expectations and what users can do when they use the system. It involves gathering and documenting detailed insights into what users require for the system to meet their goals effectively as shown in Table 6. This process is critical for ensuring that the developed solution aligns with user needs and provides a satisfactory experience [11].

**Table 6** *User Requirement*

| No. | Requirement                                                                                                     |
|-----|-----------------------------------------------------------------------------------------------------------------|
| 1.  | All users must have registered account and login with valid id and password                                     |
| 2.  | Administrator should be able to view, manage, and approve appointments.                                         |
| 3.  | Administrator and staff should be able to access and update pet medical history and treatment plans.            |
| 4.  | Administrator should be able to manage and update adoption listings.                                            |
| 5.  | Administrator and staff should be able to manage bookings, availability, and check-in/check-out processes.      |
| 6.  | Administrator should be able to access a customizable dashboard with reports and clinic statistics.             |
| 7.  | Customers should be able to view, schedule, edit, and cancel appointments.                                      |
| 8.  | Customers should be able to view their pet's medical history and treatment records.                             |
| 9.  | Customers should be able to view upcoming appointments and pet health updates in their dashboard                |
| 10. | Customers should be able to view and adopt available pets. Also, browse detailed listing of available pets.     |
| 11. | Customers should be able to book accommodations for their cats. Also, able to select the desired stay duration. |

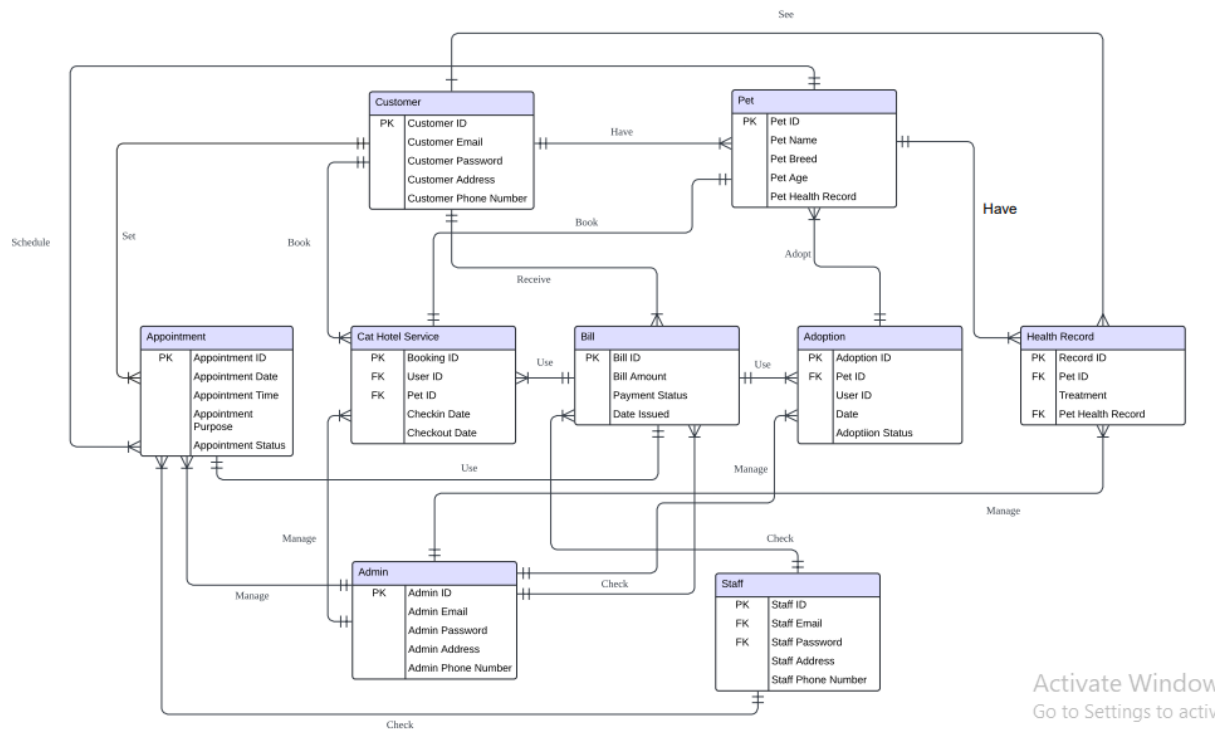
### 3.3 System Analysis

System design describes the overall structure or flow of the system, including its function. Indirectly, it will reduce the gap between the needs and the proposed system. It also transfers the proposed system functionality into the graphical diagram according to specific requirements. For the MAWROSE Animal Clinic Management System Figure 1 shows the use case diagram that represent the overall activity of the MAWROSE Animal Clinic Management System. The figure shows the methodology implemented in system analysis to identify, clarify, and organize all requirements of the proposed system. It ensures a comprehensive understanding of how the system operates within its environment and how it serves its users effectively.



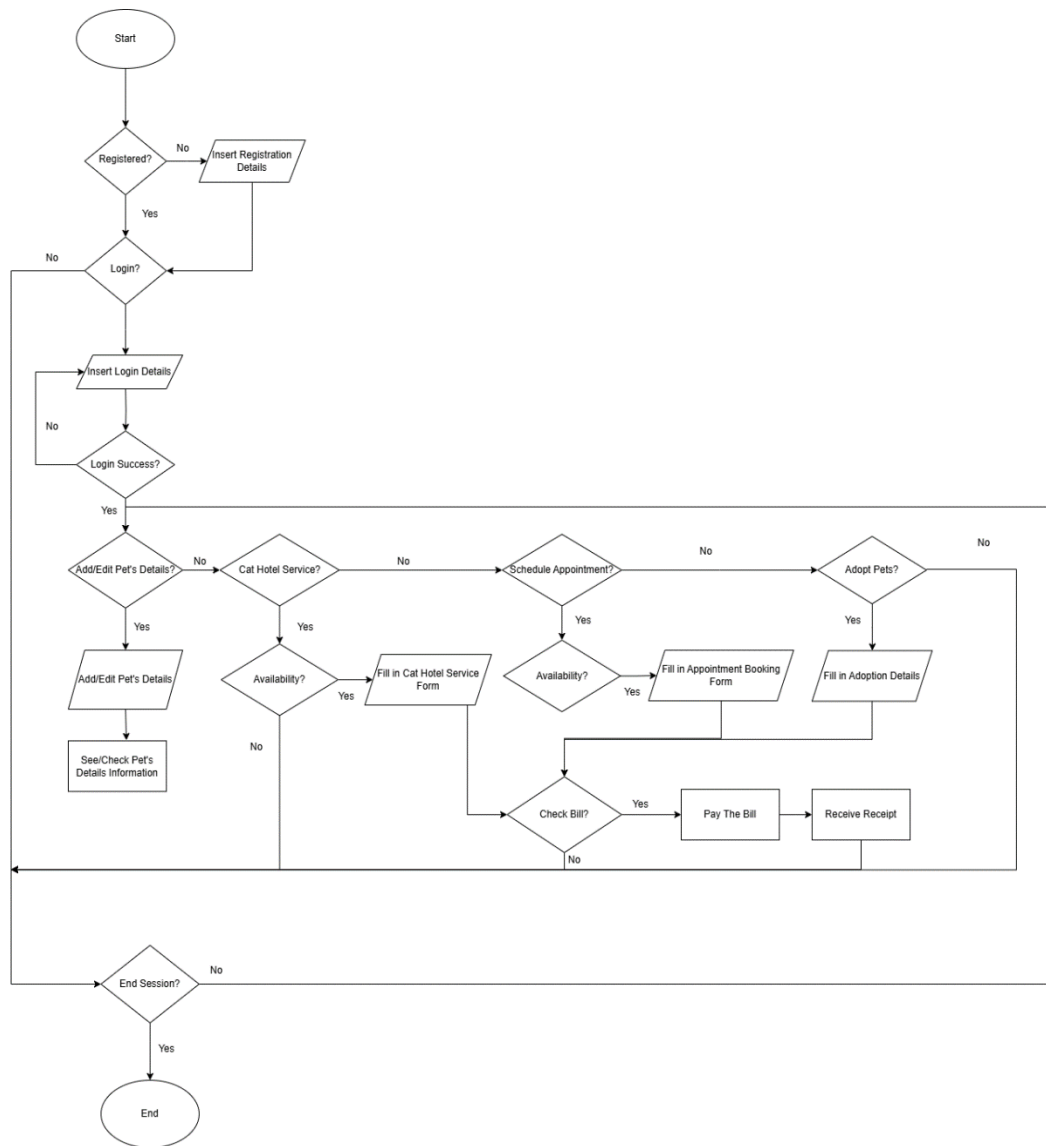
**Fig. 1** Use Case Diagram

An Entity Relationship Diagram (ERD) is a visual representation of how different entities relate to each other in a system. ERDs are commonly used in database design to model the structure of a database and ensure data integrity. Figure 2 shows the ERD each of the data component in database will call an entity.



**Fig. 2** Entity Relationship Diagram

A flowchart is a diagram that shows the steps in a process. It used to visualise, analyse, and communicate process. There are three flowcharts because this system has three users involved. Figure 3(a) specific to customer system's flowchart, Figure 3(b) for staff system's flowchart and Figure 3(c) for administrator system's flowchart. All the flowcharts are created for the developed system.



**Fig. 3(a)** System's Flowchart for Customer

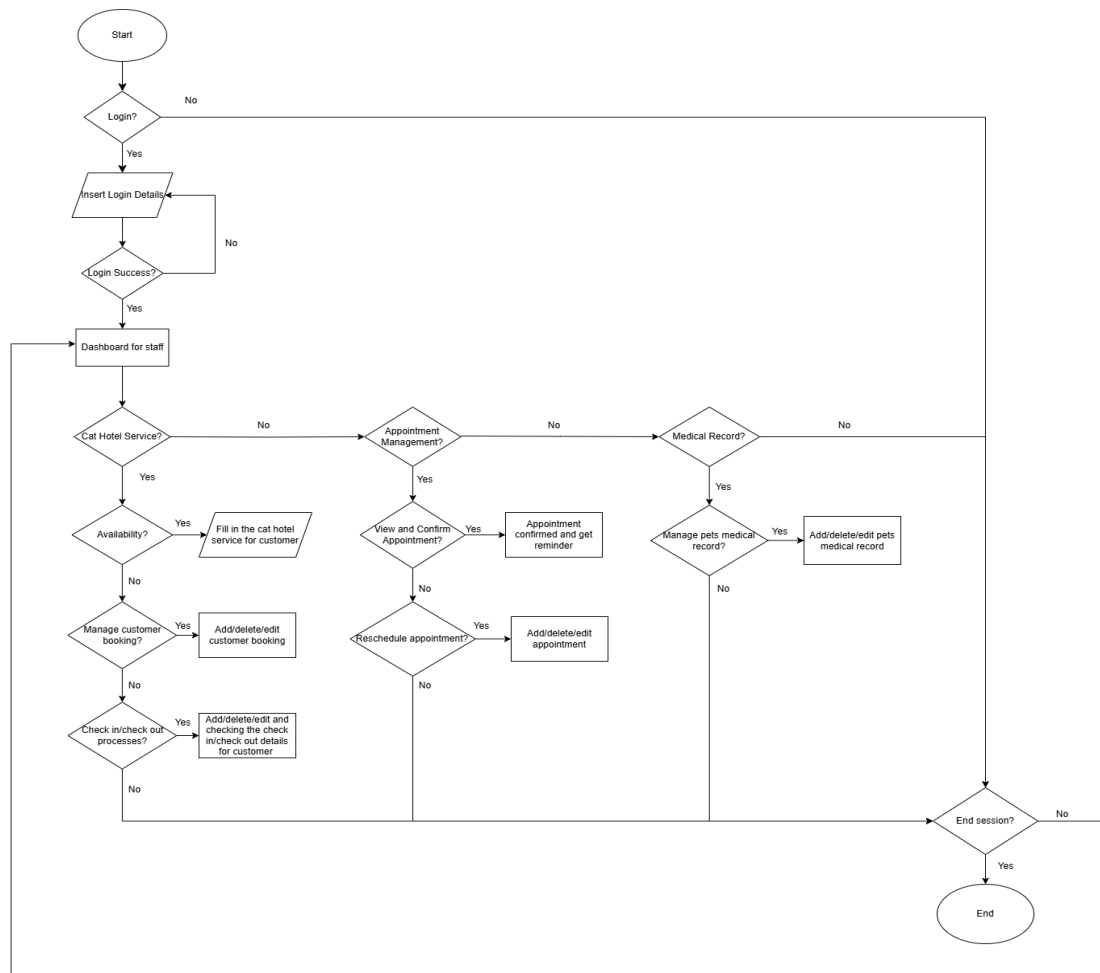


Fig. 3(b) System's Flowchart for Staff

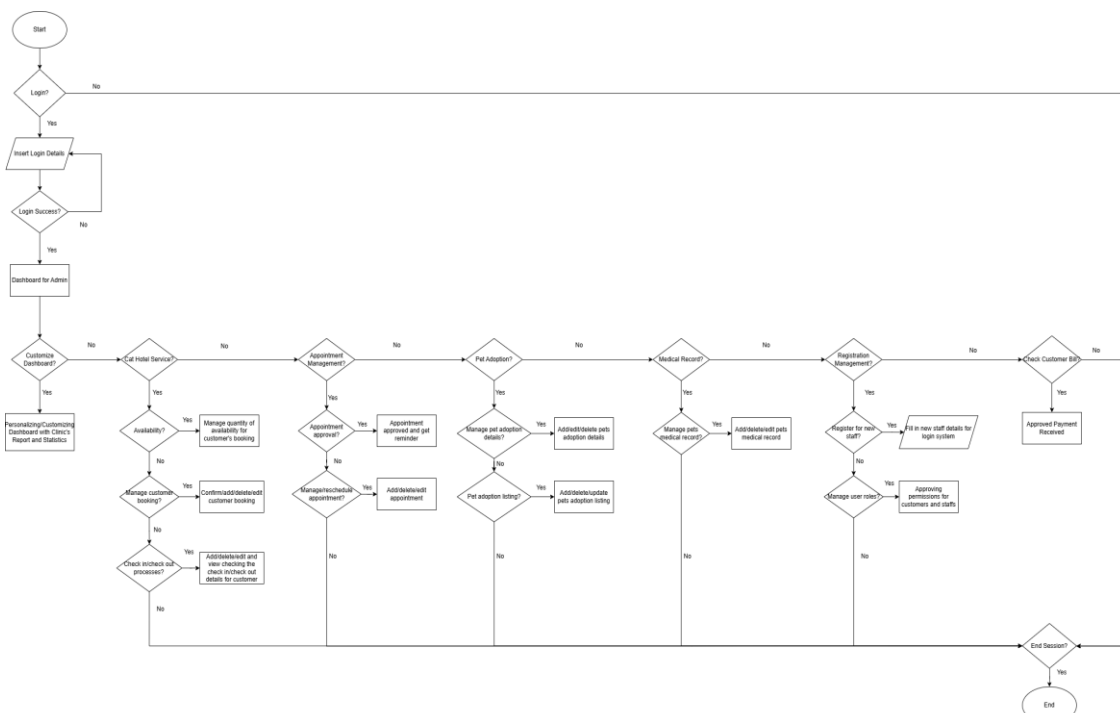
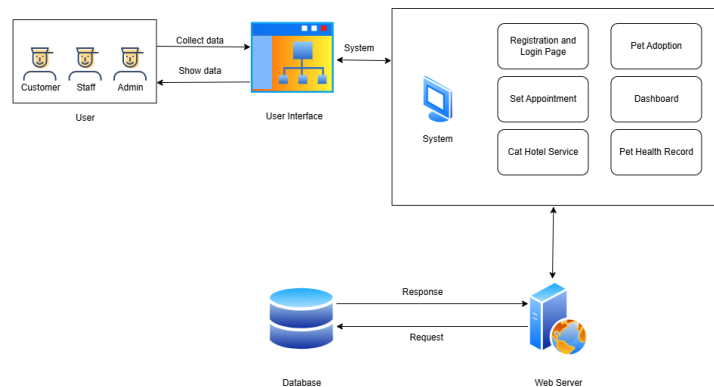


Fig. 3 (c) System's Flowchart for Admin

### 3.4 System Design

After all the users' requirements are successfully analyzed, the project will proceed in the design phase. In this phase, both interface and database were designed in order to help visualize the system before proceeding with coding of the system. Figure 4 shows the system architecture involved in MAWROSE Animal Clinic Management System. This system architecture refers to a conceptual model that explains the structure, behaviors, and views. It also provides a blueprint for the system's structure, component, and interactions to ensure scalability, reliability, and maintainability [12]. A well-planned architecture ensures the system can support effectively and aligns with clinic's operational goals.



**Fig.4 System Architecture**

The proposed system MAWROSE Animal Clinic Management System database information was created using php language. To connect the database with the website system, MySQL and PhpMyAdmin is used. The following are the tables from the databases that have been designed and extracted from the class diagram.

- i. User (User\_Id, Username, Password, Email, Phone, Address, Role)
- ii. Pets (Pet\_Id, Name, Species, Breed, Age, Weight)
- iii. Appointments (Appointment\_Id, Appointment\_Date, Reason, Service, Status, Payment\_method, Created\_at)
- iv. Cat\_HotelService (Booking\_Id, User\_Id, Pet\_Id, CheckIn\_Date, CheckOut\_Date)
- v. Pet\_Adoption (Adoption\_Id, Pet\_Id, User\_Id, Date, Adoption\_Status)
- vi. Heath\_Record (Record\_Id, Pet\_Id, Service, HealthRecord)

The following are the interfaces as shown in Figure 5 until Figure 10 that have been designed based on each process in Figure 4. They are designed by using Visual Studio Code.

**Sign Up**

Name

Username

Email

Password

Phone Number

Address

**Log In**

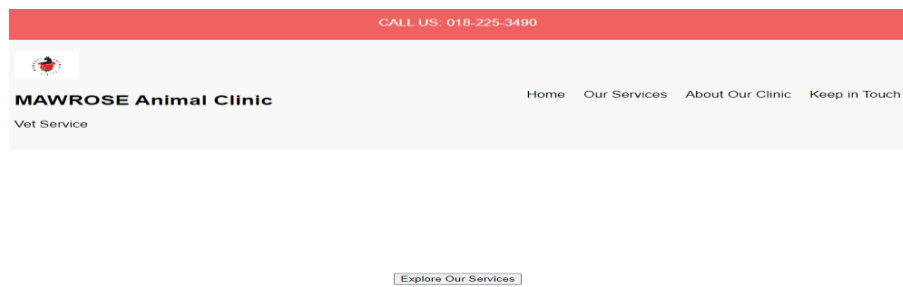
Username or User ID

Password

[Forgot password?](#)

New to this site? [Sign Up](#)

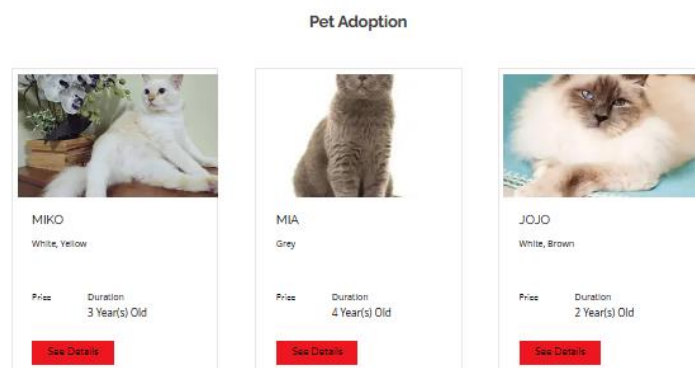
**Fig.5 Login and Sign Up Interface**



**Fig.6 Main Menu Interface**

The image shows the "Schedule Your Appointment" interface. It features a red header bar with the title "Schedule Your Appointment" and a sub-header "Check Out Our Availability and Book the Date and Time That Works For You". Below the header, there are two sections: "Select Date" and "Select Time". The "Select Date" section shows a calendar view for the month of May 2023. The "Select Time" section shows a list of available time slots, with "10:00 AM" selected. Below these sections is a "Booking Form" with fields for "Select Pet" (a dropdown menu), "Full Name", "Email", "Phone Number", and "Message". There is also a "Payment Method" dropdown menu and a "Book Now" button.

**Fig.7 Schedule Appointment Interface**



**Fig.8 Pet Adoption Interface**

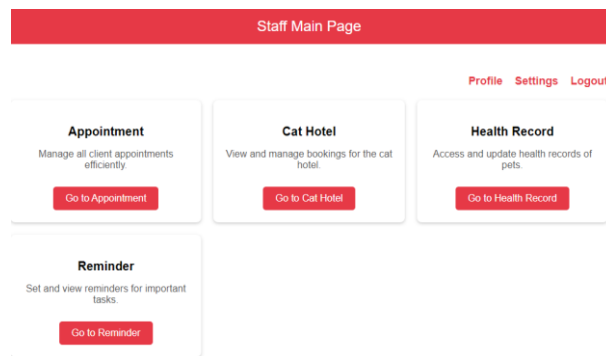


Fig.9 Staff Main Page Interface

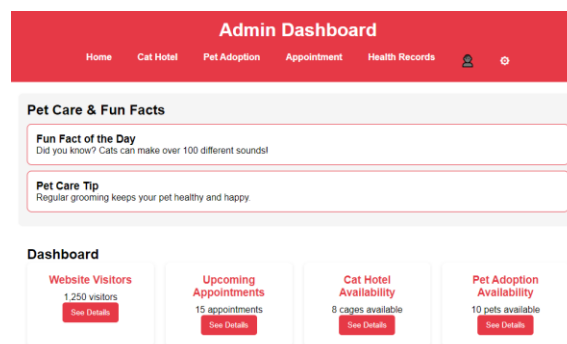


Fig.10 Admin Main Menu Interface

#### 4. Result and Discussio

The process of developing this system using two software tools which are Visual Studio Code for coding and design interface using programming language HTML, CSS, JavaScript and PHP, another one is XAMPP used to set up a server and execute server-side coding. This system module includes registration and login, appointment management, pet hotel reservation and pet adoption.

Figure 11 shows the login interface user-based-role, which mean three types of user in the system allowed to login in the same login page. User need to fill-in their login details and choose their roles. For Figure 12 shows the sign-up interface for new customer to register in the system. This is only for customer registration, while for staff, admin will register it through admin dashboard.

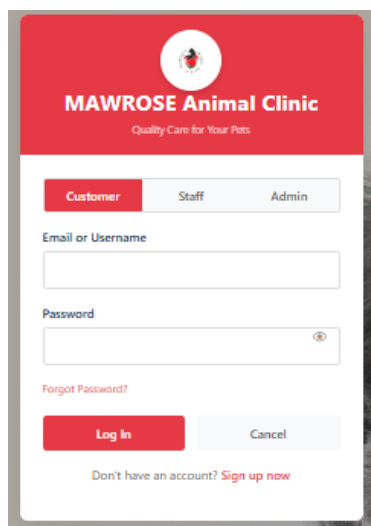


Fig.11 Login Interface

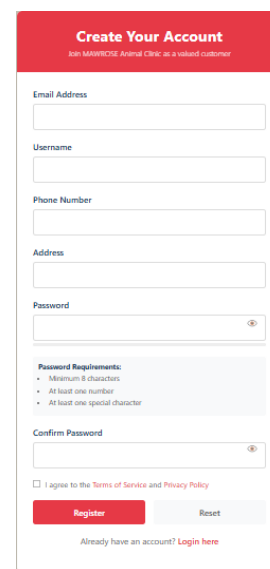


Fig.12 Sign-up Interface

Next, customer page at Figure 13 displayed the homepage for customer to view the background and services offered at MAWROSE Animal Clinic. Its also explain briefly kind of services offer for customer to make appointment, not only that customer can fill-in contact us form to ask any further questions or communicate with the clinic.

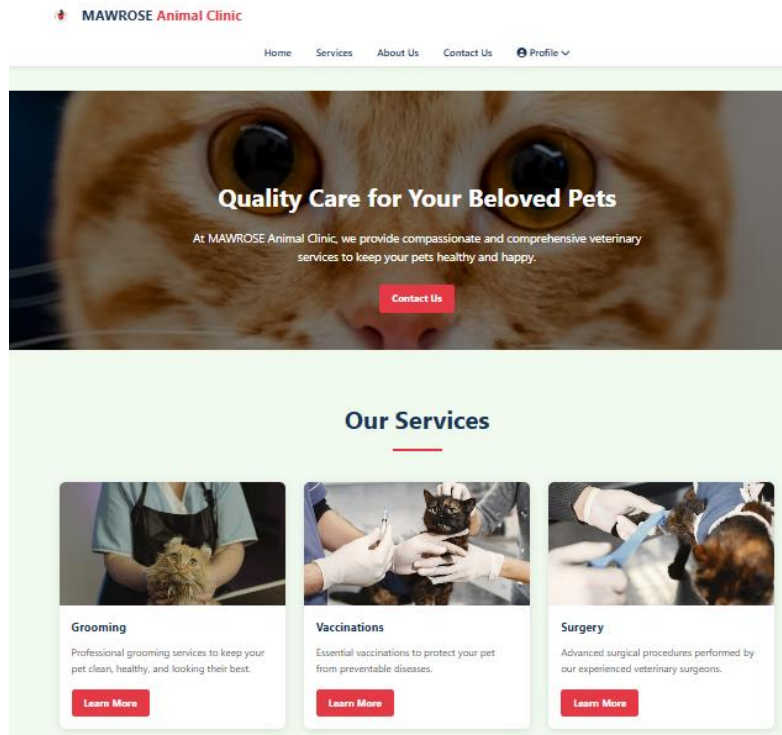


Fig.13 Customer Page Interface

Figure 14 shows booking appointment page for customer book any ten services offered by the clinic. The button "Confirm Booking" to let customer submit complete filled-in booking form to the clinic system. Also, clinic information are also stated to let customer book appointment at the right time.

Fig.14 Booking Appointment Interface

Another model in the system are cat hotel reservation shown in Figure 15 and pet adoption in Figure 16. In pet hotel reservation, customer is allowed to reserve the hotel only during operation hour and need to pick-up or pets need to check-out at least same day as they chose in the system. Any additional days, the price is different from the normal price. For pet adoption, customer viewed the availability of pets to be adopted and read the details of pets then contact the clinic via WhatsApp.

Fig.15 Cat Hotel Reservation Interface

Fig.16 Pet Adoption Interface

Figure 17 shows the staff portal to manage the clinic daily operation. There is a dashboard to overview the brief analysis about appointment, adoption and hotel. Also, the side bar navigation to link it to appointment, pet hotel, pet adoption and logout respectively. Figure 18 shows the admin portal to manage all the clinic processes via the system. There is also a dashboard and navigation side bar but admin portal has staff management part to register and remove staff details.

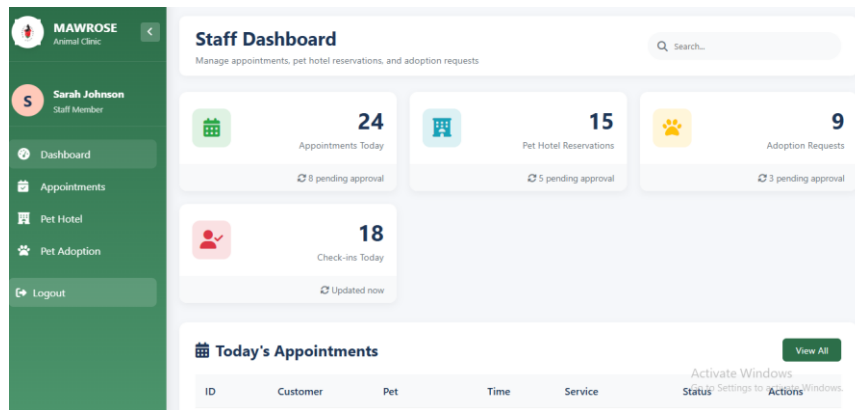


Fig. 17 Staff Portal Interface

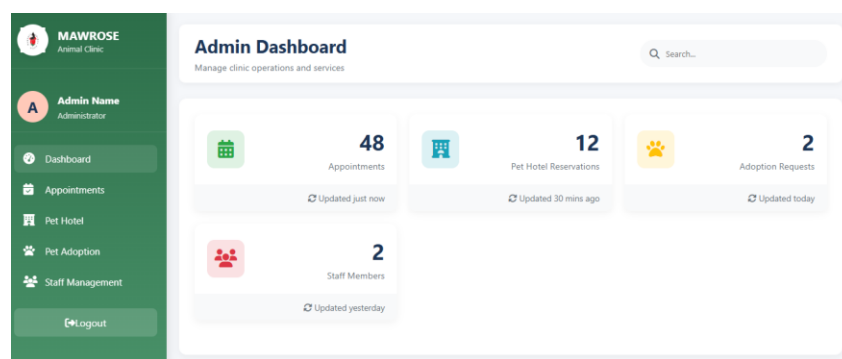


Fig.18 Admin Portal Interface

In the testing phase, alpha testing and beta testing have been conducted. The alpha testing determines that the system functions properly according to the expectations. Table 7 to Table 11 shows the test plans for MAWROSE Animal Clinic.

Table 7 Test Case for Users Login and Registration

| Test Case ID | Description                                                                             | Expected Result                                                               | Actual                                                                            | Result |
|--------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------|
| M1-1         | To check whether the users can register into the system.                                | The users should be able to register into the system.                         | The users successfully registered into the system                                 | Pass   |
| M1-2         | To check whether users can log into the system.                                         | The users should be able to log into the system,                              | The users have successfully log into the system.                                  | Pass   |
| M1-3         | To check whether the system will restrict login whenever a wrong credential is enterer. | The system should restrict login when incorrect credentials have been entered | The system restricted the login when incorrect or no credential had been entered. | Pass   |

**Table 8** *Test Case for Booking Appointment*

| Test Case ID | Description                                                           | Expected Result                                                        | Actual                                                                   | Result |
|--------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|
| M2-1         | To check whether customer can redirect to booking page.               | The system should allow customer to redirect to booking page.          | The customer was able to redirect to booking page.                       | Pass   |
| M2-2         | To check whether customer can submit booking form.                    | The customer should be able to submit the booking form.                | The users have successfully to submit the booking form.                  | Pass   |
| M2-3         | To check whether the administrator approve the booking appointment.   | The administrator should approve or reject the booking appointment.    | The administrator was able to approve or reject the booking appointment. | Pass   |
| M2-4         | To check whether the system update the status of booking appointment. | The system should be able to update the status of booking appointment. | The system was able to update the status of booking appointment          | Pass   |
| M2-5         | To check whether the users can reschedule appointment with reasons.   | The users should be able to reschedule appointment with reasons.       | The users were able to reschedule appointment with reasons.              | Pass   |

**Table 9** *Test Case Cat Hotel*

| Test Case ID | Description                                                                 | Expected Result                                                          | Actual                                                                     | Result |
|--------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------|--------|
| M3-1         | To check whether customer can redirect to pet hotel page.                   | The system should allow customer to redirect to pet hotel page.          | The customer was able to redirect to pet hotel page.                       | Pass   |
| M3-2         | To check whether customer can submit pet hotel reservation form.            | The customer should be able to submit the pet hotel reservation form.    | The users have successfully to submit the pet hotel reservation form.      | Pass   |
| M3-3         | To check whether the administrator approve or reject the hotel reservation. | The administrator should approve or reject the pet hotel reservation.    | The administrator was able to approve or reject the pet hotel reservation. | Pass   |
| M3-4         | To check whether the system update the status of pet hotel reservation.     | The system should be able to update the status of pet hotel reservation. | The system was able to update the status of pet hotel reservation.         | Pass   |
| M3-5         | To check whether the users can reschedule reservation with reasons.         | The users should be able to reschedule reservation with reasons.         | The users were able to reschedule reservation with reasons.                | Pass   |

**Table 10** *Test Case for Pet Adoption*

| Test Case ID | Description                                                                        | Expected Result                                                                | Actual                                                                  | Result |
|--------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------|
| M4-1         | To check whether customer can redirect to pet adoption page.                       | The system should allow customer to redirect to pet adoption page.             | The customer was able to redirect to adoption page.                     | Pass   |
| M4-2         | To check whether the system will redirect the customers to WhatsApp to adopt pets. | The system should be able to redirect the customers to WhatsApp to adopt pets. | The system was able to redirect the customer to WhatsApp to adopt pets. | Pass   |
| M4-3         | To check whether the system will update the status of pets.                        | The system should be able to update the status of pets.                        | The system should be able to update the status of pets.                 | Pass   |

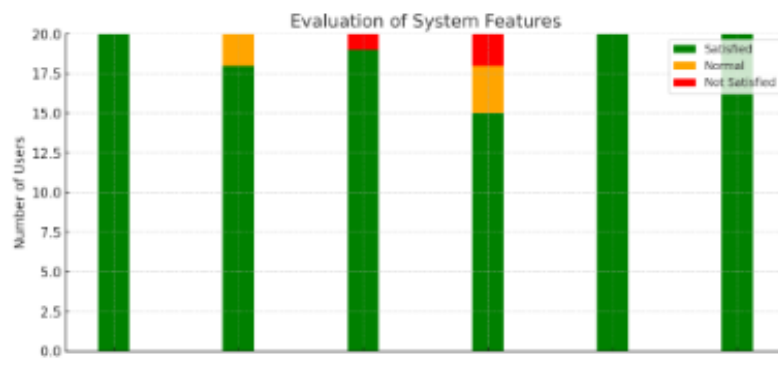
**Table 11** *Test Case for Dashboard*

| Test Case ID | Description                                                                | Expected Result                                                         | Actual                                                                          | Result |
|--------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------|
| M5-1         | To check whether users can redirect to dashboard respectively.             | The system should allow users to redirect to dashboard respectively.    | The customer was able to redirect to dashboard respectively.                    | Pass   |
| M5-2         | To check whether users can view all the summaries of actions or processes. | The users were able to view all the summaries of actions and processes. | The users have successfully to view all the summaries of actions and processes. | Pass   |
| M5-3         | To check whether the system can update automatically on dashboard.         | The system was able to update automatically on dashboard.               | The system has successfully update automatically on dashboard.                  | Pass   |

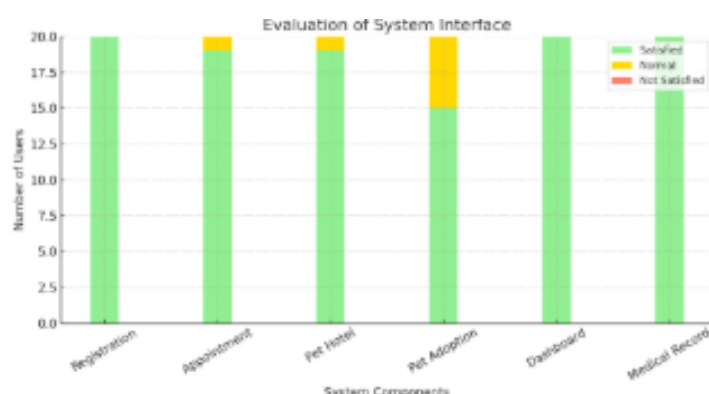
**Table 12** *Test Case for Medical Record*

| Test Case ID | Description                                                         | Expected Result                                                           | Actual                                                            | Result |
|--------------|---------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| M6-1         | To check whether users can redirect to medical record respectively. | The system should allow users to redirect to medical record respectively. | The customer was able to redirect to medical record respectively. | Pass   |
| M6-2         | To check whether users can view the updated medical record.         | The users were able to view the updated medical record.                   | The users have successfully to view the updated medical record.   | Pass   |
| M6-3         | To check whether the admin and staff can update the medical record. | The system was able to update the medical record.                         | The system has successfully updated the medical record.           | Pass   |

Beta testing will test the beta version of MAWROSE Animal Clinic Management System for Mawrose Animal Clinic. For this testing, 20 users have been chosen to participate to test the system and gather their feedback. All 20 users representing the customers, staff and doctors which also the clinic owner. Figure 20 shows the results for evaluation of system features and Figure 21 shows the results for evaluation of system interface.



**Fig.19** Result for Evaluation of System Features



**Fig. 20** Result for Evaluation of System Interface

## 5. Conclusion

The proposed MAWROSE Animal Clinic Management System represents a significant enhancement over the existing Kreloses platform by introducing a customer portal designed to streamline and personalize client interactions. Through this portal, customer allows to manage appointments, access medical records, and use added services like pet adoption and a cat hotel. These features reduce administrative workload and boost customer satisfaction. With customizable branding and functionality, the system aligns more closely with the clinic's workflows, improves operational efficiency, and supports community engagement by promoting responsible pet care and adoption initiatives. It also lays a scalable foundation for future innovations, positioning MAWROSE Animal Clinic Management System for better service quality, increased competitiveness, and sustainable growth in the veterinary industry.

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## Conflict of Interest

Authors declare that there are no conflicts of interests regarding the publication of the paper.

## Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Nurain Roslee, Nazri Mohd Nawi; **data collection:** Nurain Roslee, Nazri Mohd Nawi; **analysis and interpretation of results:** Nurain Roslee, Nazri Mohd Nawi; **draft manuscript preparation:** Nurain Roslee, Nazri Mohd Nawi. All authors reviewed the results and approved the final manuscript.

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