Journal of Mathematics and Computing Science, 11 (1): 25-40, 2025

eISSN: 0128-0767

Development of a Web-Based Application for Cat Hotel and Grooming Management System using the Waterfall Model

Siti Hasrinafasya Che Hassan[1]*, Nurul Athirah Mohd Zukri[2], Wan Salfarina Wan Husain [3] and Marina Ahmad[4]

[1,2,3,4]Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan, Bukit Ilmu, Machang, Kelantan, Malaysia

Authors' email: hasrina581@uitm.edu.my[1]*, athirahzukri24@gmail.com[2], salfa457@uitm.edu.my[3] and marina170@uitm.edu.my[4]

*Corresponding author

Received 17 March 2025; Received in revised 2 April 2025; Accepted 13 June 2025
Available online 18 June 2025
DOI: https://doi.org/10.24191/jmcs.v11i1.8087

Abstract: This study examined the difficulties faced by Malaysian companies that provide grooming services and cat hotels due to their dependence on manual reservation and data administration records. Inefficiencies, potential data loss, and a higher chance of errors are all consequences of the manual management system. To make it easier for cat owners to book hotel rooms and grooming appointments online, Paw Palace, a web-based cat hotel and grooming services system, was developed. The system was designed based on the Waterfall model of the System Development Life Cycle (SDLC), which includes five stages: 1) requirements gathering; 2) design; 3) implementation; 4) testing; and 5) maintenance. After the system was completed, an evaluation was conducted to assess its usability and efficiency. According to user acceptance testing derived from the System Usability Scale (SUS) evaluation, every module met the test plan objectives.

Keywords: Booking system, Cat hotel, Grooming system, System usability, Web-based reservation

1 Introduction

In Malaysia, the pet hotel and grooming industry has been experiencing significant growth, driven by increasing pet ownership and the rising trend of pet humanisation. However, many pet hotels, including Paw Palace, face significant challenges with their manual booking systems. These systems require staff to handle reservations via phone calls or WhatsApp messages, leading to inefficiencies and potential overbooking. All of these challenges are supported by an article [1] stating that pet grooming businesses in Malaysia face issues such as market competition, resource management issues and technology adoption challenges. Manual booking caused difficulty in tracking bookings, which could lead to missed last-minute requests and overbooking. This may also cause inconvenience, as customers must call to check for availability, causing delays and frustration. In businesses, data must be managed properly to avoid data duplication, error and slow response times. Poorly managed data could lead to ineffective scheduling of the room and grooming services. Manual communication leaves gaps that must be overcome to avoid losing customers.

Therefore, the aim of this research is to create a web-based system called Cat Hotel and Grooming Management System that offers an automated, web-based solution that benefits both customers and employees. The system provides real-time room availability checking, makes reservations online and reduces the need for phone calls. While employees can track all bookings through the system, it can prevent overbooking and ensure accurate scheduling. Automated data entry also reduced error and duplication which, in turn, improved reliability.

The web-based system is able to send automated notifications and reminders for check-in times and costs which improve customer experience. Overall, the system will improve service quality with streamlined processes that allow staff to focus on providing better care and service.

This paper is organised as follows: Section 2 emphasises a literature review of the pertinent works and current applications related to the issue. Subsequently, Section 3 delineates the methodology employed in the system's development. Afterwards, it is followed by the results and discussion in Section 4. Finally, the concluding section encapsulates the present study and addresses prospective research endeavours.

2 Related Works

A A Review of Current Related Systems

Three characteristics of currently available systems were examined: Koocing Cat Hotel and Cat Grooming (System 1) [2], Syukri & Zulerwan Cat Hotel and Shop (System 2) [3], and G Pet Hotel (System 3) [4]. The comparison between existing and developed systems can be categorised into various features, as shown in Table 1 below.

Table 1: A Comparison of the Proposed System in Relation to Current Systems (Adopted from [5])

Feature / System	Koocing Cat Hotel and Cat Grooming (System 1)	Syukri & Zulerwan Cat Hotel and Shop (System 2)	G Pet Hotel (System 3)	Proposed System
Easy to access with online booking	x	x	x	√
Clarify booking history	x	x	x	√
Check availability of time slots	x	x	x	√
Recommend available dates in the calendar	x	x	x	√
Registration an account is needed for booking	x	x	x	√
The system keeps track of the pet's owner and pet's data.	x	x	x	√
Provide a function for updating profiles.	x	x	x	√
Provide booking update function	x	x	x	√
Generate an automatic payment details	x	x	x	√
Enable to leave reviews / comments	√	√	√	√

In comparison to the three extant systems, the proposed system possesses all of the aforementioned characteristics. The system that has been developed shares similar characteristics to System 1, System 2, and System 3, with the exception of the integration of an online booking system that is user-friendly. This function improves user convenience by enabling the seamless booking of services via the internet and providing a user-friendly interface for the efficient management of reservations and appointment scheduling process.

3 Research Methodology

A System Development Phases According to the Waterfall Model

Creating a well-structured and successful project, particularly for Paw Palace: Cat Hotel and Grooming Services web-based application, requires careful planning and execution. The selection of the Waterfall model in the system development process is because it offers a valuable framework for web-based application development and ensures a systematic and organised approach throughout the process. In addition, the Waterfall model followed a linear and sequential progression through different phases, with each phase building upon the previous one [6]. This methodology encompassed various stages, including requirements gathering, design, implementation, testing, and maintenance [7]. Each stage contributed to the overall progress and success of the project. By applying the Waterfall model SDLC, effective project management becomes possible, enabling the evaluation of progress and outcomes.

In the requirement-gathering phase, the activities were to define the background of the study, identify the problems faced in the Paw Palace business management context, outline the objectives of the project, and classify the scope of the project as well as significance of the study. During this initial stage, six respondents were queried regarding the challenges they encountered in finding a suitable cat care place and the way they prefer to arrange for their cat care. The survey questions are detailed in Table 2 below.

Table 2: The Preliminary Survey Questions

No.	Question	Response
1	Have you ever used cat grooming services before?	Yes: 83.3% (5 respondents) No: 16.7% (1 respondents)
2	How likely do you consider booking a cat room for your pet when travelling or going on a vacation?	Yes: 83.3% (5 respondents) No: 16.7% (1 respondents)
3	What challenges or inconvenience have you encountered when booking cat grooming appointments in the past?	R1: Management of cat care and ambiguous information received R2: Complicated Manual Booking R3: Making reservations by WhatsApp or phone, which is frequently unanswered or never returned R4: Unable to make reservations at any time. R5: The opening and closing times of cat hotels are not easy to find out. R6: Booking overlaps with someone else.
4	What features or amenities would you prioritise when choosing a cat hotel for your pet?	R1: Accessible and reasonably priced R2: A location that is familiar due to the presence of records. R3: Comfort, reliability and reasonable price. R4: Attractive and good cat hotel facilities. R5: Has an easy-to-use booking system. R6: Provide a pleasant check-in and check-out process.
5.	What factors influence your decision to book grooming services for your cat?	Price: 50% (3 respondents) Services offered: 33.3% (2 respondents) Location: 16.7% (1 respondent)
6	How would you prefer to book grooming appointments for your cat?	Online: 100% (6 respondents) Phone: 0% (0 respondent) Face-to-face: 0% (0 respondent)
7	How likely are you to try a new cat grooming and hotel service based on positive recommendations or reviews?	Yes: 66.7% (4 respondents) No: 33.3% (2 respondents)

All respondents expressed a distinct preference for the online system. This agreement emphasises a clear preference for the convenience and accessibility offered by online booking platforms when it comes to scheduling grooming appointments for cats. Nonetheless, respondents expressed varying perspectives when enquired about their willingness to consider a new cat grooming or hotel service influenced by positive reviews. Among the respondents, four individuals, constituting 66.7%, expressed a significant inclination to consider services that had garnered favourable reviews from others. In the meantime, two respondents, representing 33.3% of the group, expressed diminished interest, suggesting a more cautious approach to exploring new applications solely based on positive reviews. The comments demonstrate the diverse attitudes individuals possess for the discovery of novel cat grooming and hotel services, shaped by the perspectives of others. Therefore, it is essential to meticulously design and construct a systematic web-based application for Cat Hotel and Grooming Management.

In the system design phase, the focus was on building and developing the system design and prototype. The prototype is an early design model of the final user interface of a website or application, complete with interactive user interfaces and animations [5]. Besides that, to control the flow of the system, essential diagrams such as Use Case Diagrams and Context Diagrams (CD) were developed using draw.io application. CD shows the interactions between a system and other actor (external factor) with which the system is designed to interface. System context diagrams can be helpful in understanding the context in which the system will be a part of, and even useful at the outset of a project as it can establish the scene, set expectations, and even determine the outcomes of a project.

In the implementation phase, the focus was on writing programming codes and developing the web-based Paw Palace Cat Hotel and Grooming Management System. During this stage, the database and system modules had to be integrated and put into function. Database management software phpMyAdmin establishes a connection to MySQL. In addition, the system is built with several programming languages, including Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), and JavaScript on the front end, and Hypertext Preprocessor (PHP) server-side scripting on the back end that was written using the Visual Studio application. The implementation phase includes both the coding and system error detection processes. If an error arises in the system, the developer needs to fix the code before moving on to the next part of the code. Until the system is finished, these two critical steps will be maintained.

To make sure the project's goal is achieved, the system module was tested once the final system was finished. Testing of the web-based application involved verifying the application's functionality, usability, and performance to ensure it satisfies specific criteria and provides a seamless user experience [8]. The purpose of functional testing was to ensure that the software performed the intended functions correctly. To ensure that the system adhered to the requirements, enhancements and modifications have been made to fix the issues and errors. This included testing various functions, such as user registration and login, booking processes, payment processing, service and package management, and notification and communication functions. Usability testing aimed to improve the user-friendliness of the system and the user interface, evaluating aspects such as navigation, user interface design, and accessibility. Performance testing was also conducted to assess the system's reliability, speed, and resource usage. The Paw Palace web-based application was tested using a desktop or computer in a controlled setting. Results were documented and provided as feedback to the 6 customers of the Paw Palace. The System Usability Scale (SUS) questionnaire, which can be referred to in the appendix, assessed overall usability, while tasks and activities were used to evaluate specific features. Each phase of the project development encompasses specific tasks and deliverables, as demonstrated in Table 3.

The last phase is the ongoing work performed to keep the web-based application functional and efficient after its initial development, referred to as maintenance. This includes updating the system, correcting bugs, optimising performance, and adapting it to changing requirements and technologies. The purpose of maintenance is to ensure the long-term functionality, usability, and reliability of the software.

Table 3: Expected Outputs based on the Waterfall Methodology (Adopted from [5])

Phase	Task	Expected Output
Requirements gathering	▪ Find the appropriate project title ▪ Create a proposal for the project ▪ Design a Gantt chart ▪ Establish the problem statement, objectives, and scope of the project ▪ Examine additional related systems ▪ Comparison of similar current systems to the proposed system	✓ Project title confirmed ✓ Gantt chart ✓ Project proposal ✓ Literature review ✓ Functional and non-functional requirements
Design	▪ Create high fidelity prototype using Figma tool ▪ Exhibit use case and context diagrams.	✓ User interface design ✓ Use Case diagram ✓ Context diagram
Implementation	▪ Create system modules ▪ Integrate system module ▪ Connect the entire system to the database	✓ High fidelity prototype
Testing	▪ Conduct User Acceptance Test using System Usability Scale (SUS)	✓ System usability result
Maintenance	▪ Update and fix the errors ▪ Optimise system performance	✓ A completed system

B System Design Requirements

This section examines functional and non-functional requirements of the developed system. A product's functional requirements outline its features and capabilities. These functional requirements most likely arise from system goals or future system users' needs [9]. Table 4 presents the functional requirements for the Paw Palace Cat Hotel and Grooming Management System.

Table 4: Functional Requirements of Paw Palace Cat Hotel and Grooming Management System (Adopted from [5])

System Module	Functionality
User registration	▪ Customers can create a new account ▪ An error message will display when the input format is incorrect
User login	▪ The username and password must be entered accurately by the user. ▪ If an incorrect login or password is entered, an error message is displayed on the screen.
User logout	▪ Users may terminate their account session.
User profile configuration	▪ Customers can change their personal information and manage their profiles.
Room reservation	▪ Customers can make a room reservation by selecting an available date and room type
Grooming service reservation	▪ Customers can make an appointment for a grooming service by selecting an available date
Room management	▪ Administrators are capable of handling room information by adding new records, updating and deleting existing records in a database.
Service management	▪ It is feasible for an administrator to manage the information regarding grooming services by adding a new record, amending existing records, and removing records in a database in accordance with the requirements.
System management	▪ Administrator is responsible for approving room booking status ▪ Administrator is responsible for updating grooming services reservation status ▪ Administrator can approve the amount of refund after booking cancellation is done by customers. Afterwards, users will receive notification regarding to their refunds ▪ Customers can write some reviews or comments regarding to the available services and quality of facilities provided ▪ Administrator can manage the system by updating the site information

Additionally, non-functional requirements describe the overall characteristics of a system [10], which specify the quality constraints of its features and capabilities, such as security, performance, and usability [11]. Table 5 presents the non-functional requirements of the Paw Palace Cat Hotel and Grooming Management System.

Table 5: Non-Functional Requirements of Paw Palace Cat Hotel and Grooming Management System (Adopted from [5])

Non-Functional Requirement	Description
Security	▪ Make sure that the password stored in the database and the one entered by the user are both encrypted. ▪ The user can only log into the system when the username and password match.
Usability	▪ Usability refers to how easily and effectively users can interact with a product and how satisfied they are with that interaction. As an example, it would be ideal if the system were intuitive to understand and navigate.
Performance	▪ Performance refers to a system's capability to respond and remain stable under specific workload conditions. For instance, the total cost is determined automatically based on the number of days stayed and the type of room selected.

Furthermore, diagrams, including use case diagrams and context diagrams, will be presented to assess the performance of the developed system. A use case diagram describes the functional requirements of the software, and it can be used to understand how the system should work. Its primary purpose is to provide a high-level overview of the functionalities and behaviour of the system, depicting how users or external entities interact with it to achieve specific goals or tasks [12]. Figure 1 shows the use case diagram of the Paw Palace Cat Hotel and Grooming Management System.

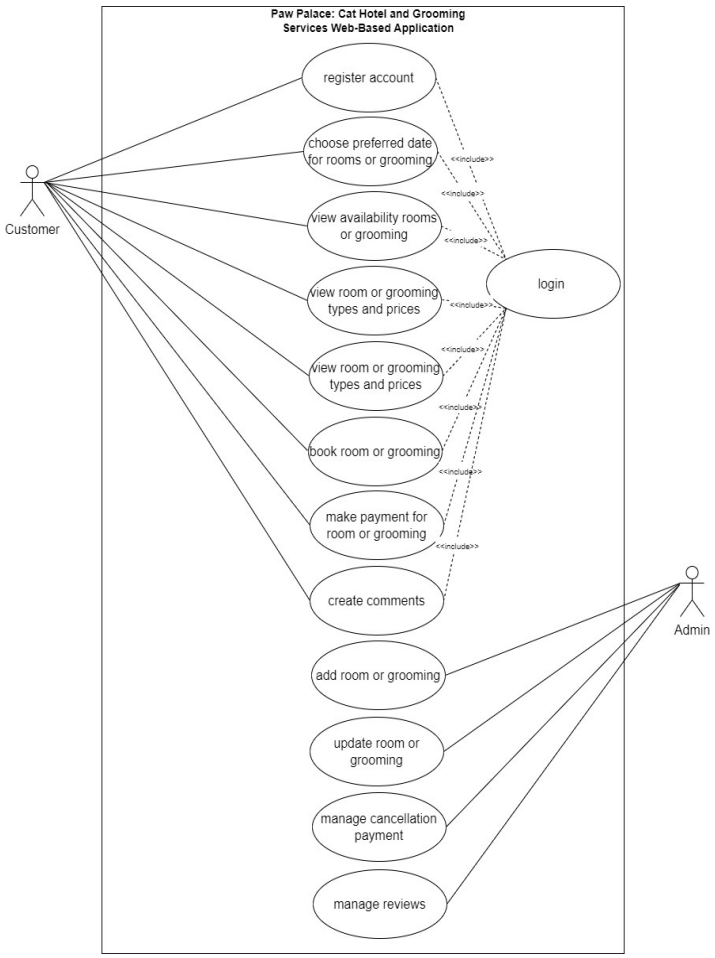

Figure 1: Use Case Diagram of the System

A context diagram depicts the relationships between external entities and an internal software system [10]. Figure 2 illustrates the context diagram for the Paw Palace Cat Hotel and Grooming Management System, enables interactions between two main actors: users (or customers) and administrators. The platform provides both with various features accessible via the login process. Users can register accounts, select preferred dates for both room accommodation and grooming appointments, check service availability, view types and prices of rooms and grooming services, proceed to book selections, make secure payments, and submit customer reviews. On the other hand, administrators are responsible for managing backend operations. They could add new room accommodation and grooming services, update existing details as necessary, handle cancellation payments, and monitor as well as respond to customer reviews to maintain high-quality service delivery. These functionalities provide a user-friendly experience for users and administrators, enabling efficient booking, payment, and management processes within the Paw Palace ecosystem.

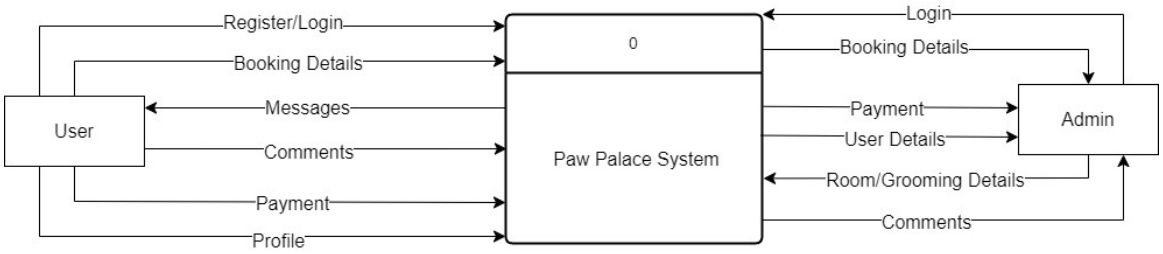

Figure 2: Context Diagram of the System

C System Interface

The customer dashboard page serves as a centralised hub for Paw Palace users, providing them with a comprehensive overview of their account activities and bookings. Upon logging in, users are greeted with a personalised dashboard that displays relevant information such as booked cat room hotel stays and grooming appointments, along with any recent activities. Additionally, users have access to manage their profile details, including updating contact information and viewing past bookings and receipts. The dashboard offers convenient navigation to various sections of the user account, enabling users to effortlessly make new bookings or track existing reservations.

The admin dashboard page provides a comprehensive overview of platform activity through informative cards. These cards display metrics such as total users, room and grooming bookings, reviews, sales, and booking history. Admins can quickly assess key performance indicators and make data-driven decisions to optimise platform operations.

i. Room Booking Interface (Customer Dashboard Interface)

The room booking details interface (as illustrated in Figure 3) on Paw Palace's website offers users a comprehensive overview of their selected booking details for their cat's stay. This page typically includes information such as the selected room type, check-in and check-out dates, total price, total days of stay, bank account, and to upload receipts. Users can review and confirm their booking details before proceeding to payment, ensuring accuracy and satisfaction with their reservation. Note that the total payment will be calculated automatically based on the type of room and the number of days stayed.

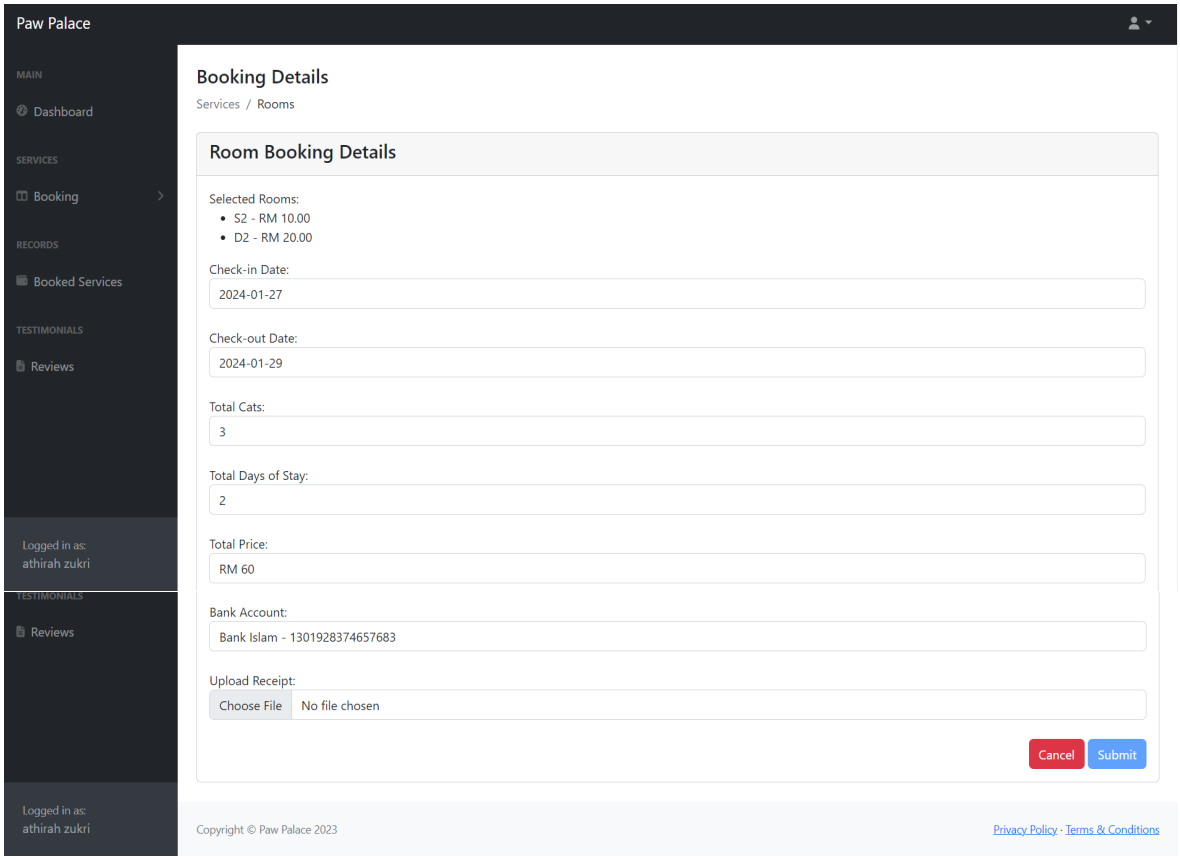

Figure 3: Room Booking Details Interface

ii. Room Management Interface (Administrator Dashboard Interface)

The room management page features essential details such as room numbers, total capacity for cats, and pricing information for each room. Administrators can take actions such as adding, editing or deleting existing room entries using corresponding buttons. It involves some data fields, such as room number, total capacity for cats, and pricing information.

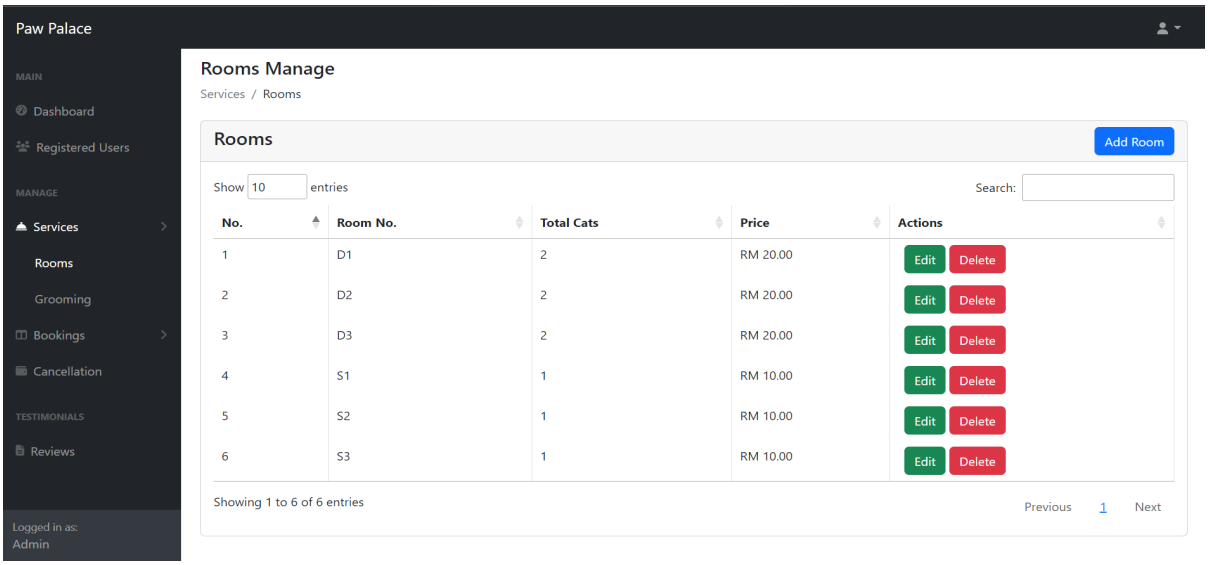

Figure 4: Room Management Interface

iii. Grooming Services Booking Interface (Customer Dashboard Interface)

The grooming booking page, as shown in Figure 5, is where users can schedule appointments for grooming services at Paw Palace. This page typically features a form where users can choose a preferred date and time for their appointment.

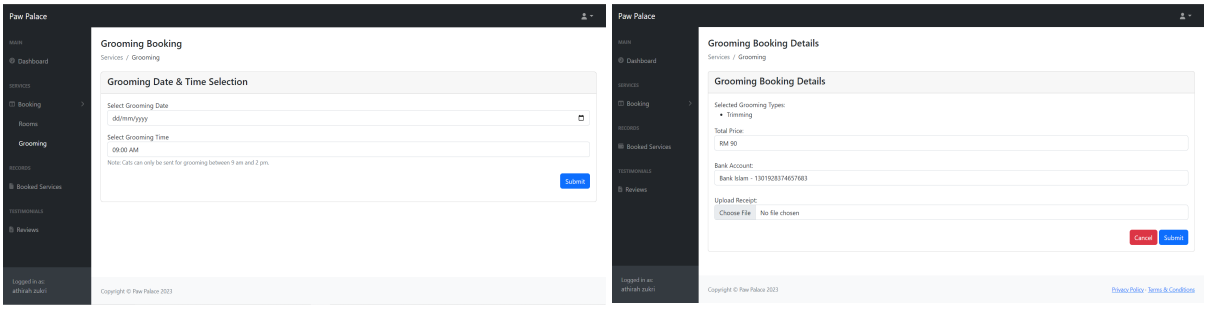

Figure 5: Grooming Services Booking Details Interface

The grooming booking details page provides users with a detailed summary of their reserved grooming sessions at Paw Palace. This section typically contains vital details like the chosen grooming services, total expenses incurred, and upload receipts. Users may also encounter options for cancelling their appointments, if needed.

iv. History of Rooms and Grooming Services Booking Interface

The booked services page, as described in Figure 6, serves as a comprehensive overview of all the services that users have reserved at Paw Palace, including both room bookings and grooming appointments. It typically displays a list of booked services along with relevant details such as the user's name, the type of service booked (e.g., room or grooming), booking dates, total price, and booking status. Additionally, users may have the option to view or download receipts for their bookings. The page may also include functionality for users to cancel or modify their bookings if necessary.

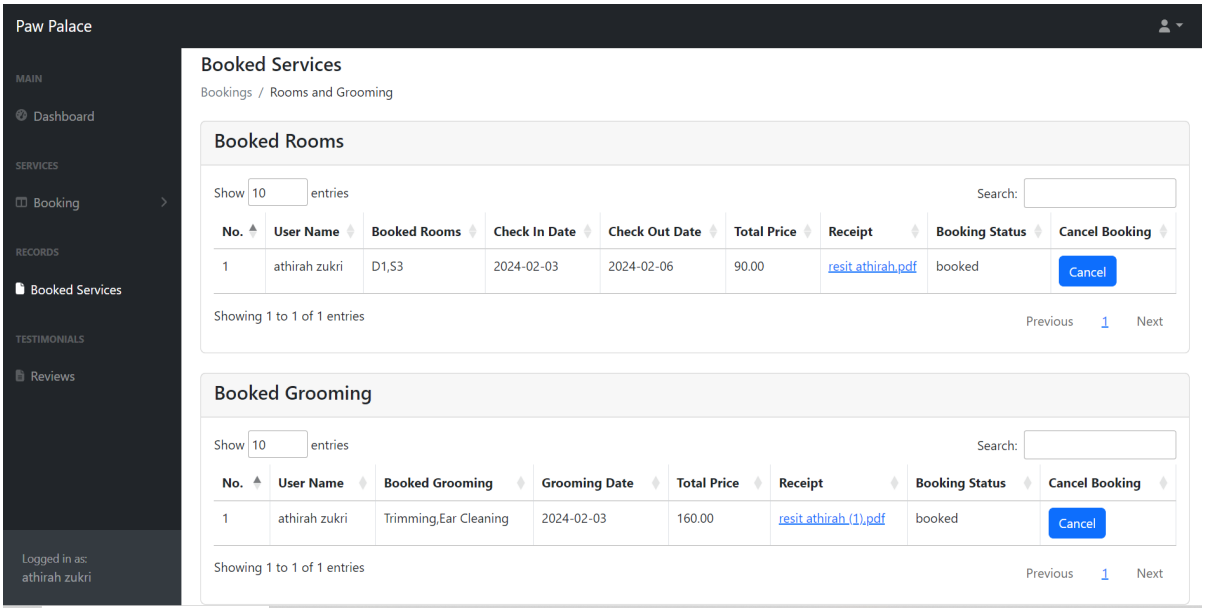

Figure 6: Booked Services Interface

The booking history page provides users with a comprehensive overview of their past bookings and interactions with Paw Palace. Users can access this page to review details such as dates of previous

bookings, types of services booked (such as grooming sessions or room reservations), associated costs, and any other relevant information. By offering a detailed record of past transactions, the booking history page enables users to track their engagement with Paw Palace over time, facilitating better organisation and planning for future bookings.

v. Cancellation Services Interface

The cancellation page (as depicted in Figure 7) displays the details of both room and grooming bookings that have been cancelled by users. It provides information such as the user's name, booked rooms or grooming type, booking dates, total price, and status. Additionally, the page includes a refund button for administrators to initiate the refund process for cancelled bookings, ensuring transparency and efficient management of refunds.

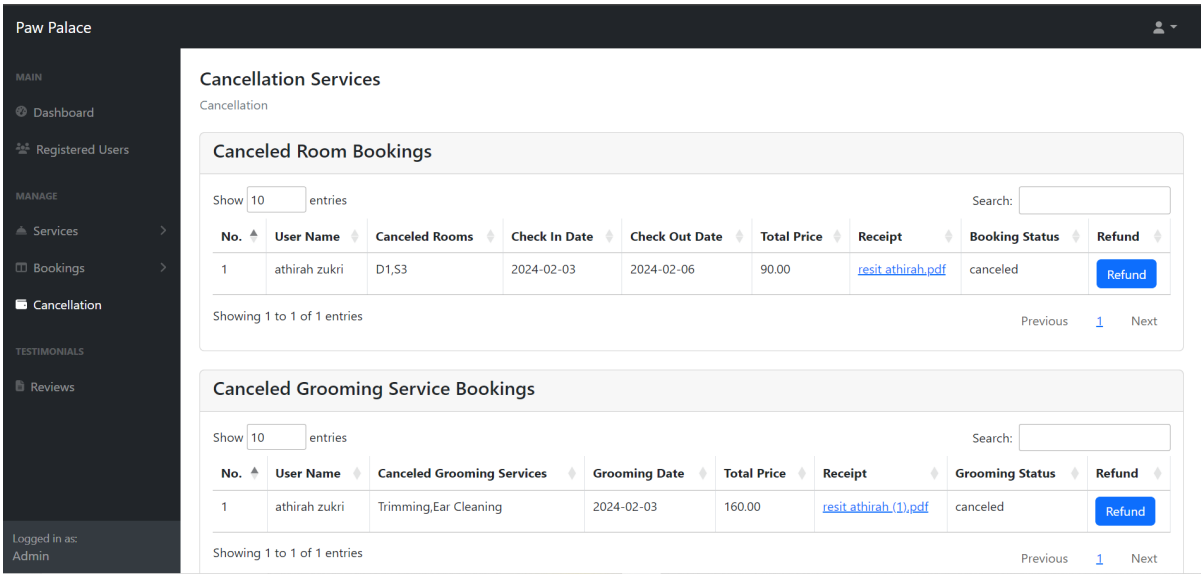

Figure 7: Cancellation Services Interface

4 Result and Discussion

A System Testing

In the software development life cycle, system testing [6] stood as a critical phase to ensure the functionality, reliability, and quality of a system prior to deployment. During this stage, a thorough evaluation of the system was performed, rather than an evaluation of its individual components, in order to validate their adherence to requirements and their ability to function correctly in real-world settings. As a result of this, system testing ought to be incorporated into the objectives and scope of the project from the very beginning.

A test plan is a thorough document that outlines all the tasks that are linked to testing for a particular work project. It describes in detail what will be tested, how it will be tested, and who will be testing it. Table 6 delineates the test categories of the Paw Palace Cat Hotel and Grooming Management System, whereas Table 7 presents the test plan result of the Paw Palace Cat Hotel and Grooming Management System.

Table 6: Test Category of Paw Palace Cat Hotel and Grooming Management System (Adopted from [5])

Test Category	Description
1	The functionality of the system tested by the administrator
2	The functionality of the system tested by customers

Table 7: Test Plan of Paw Palace Cat Hotel and Grooming Management System (Adopted from [5])

System Module	Test Category	Description	Expected Result	Actual Result
User registration	2	Register a new user in the system: - Insert name - Insert email - Insert phone number - Insert date of birth - Insert address - Insert password - Click the register button	User registration process completes successfully, and the user's account is created in the system	Pass
View registered user	1	Display a list of all registered users in the system	The system presents a comprehensive list of registered users with their relevant details	Pass
Login	1, 2	Log in to the system: - Insert username - Insert password - Click the login button	The user is able to sign in to their account if the information entered is correct.	Pass
Room management (add, update, delete)	1	Perform operations related to managing rooms: - Add new rooms - Update rooms - Delete rooms	Room management operations execute successfully without any errors, and the changes reflect accurately in the system.	Pass
Room availability	2	Check the availability status of rooms within the system for a specified date	The system accurately displays the availability status of rooms, indicating they are available	Pass
Room booking	2	Reserve a room by selecting the desired room	Room booking process completes successfully, and the booked room is reserved for the specified date	Pass
View room booking history	1, 2	View the history of room bookings made by users, including details such as user's name, booking date, total price, and receipt	The system presents a comprehensive history of room bookings, allowing users to track their past reservations	Pass
Grooming services management (add, update, delete)	1	Perform operations related to managing grooming services: - Add new services - Update services - Delete services	Grooming services management operations execute successfully without any errors, and the changes reflect accurately in the system	Pass
Grooming services availability	2	Check the availability status of grooming services within the system for a specified date and time	The system accurately displays the availability status of grooming services	Pass

Table 7: Test Plan of Paw Palace Cat Hotel and Grooming Management System (Adopted from [5]) *cont…*

Grooming services booking	2	Reserve a grooming service by selecting the desired service	Grooming service booking process completed successfully, and the booked service is reserved for the specified date and time	Pass
View grooming services history booked	1, 2	View the history of grooming services booked by users, including details such as user's name, booking date, total price, and receipt	The system presents a comprehensive history of grooming service bookings, allowing users to track their past reservations	Pass
Cancellation services	1, 2	Cancel a previously booked room or grooming service, including processing refunds	Cancellation of services completed successfully, the refund process is initiated and executed accurately	Pass
Leave comments	2	Allow users to leave comments regarding their experience with the system, services, or overall satisfaction	Users can successfully submit comments, which are then recorded and made visible for review by the system administrators	Pass
Check comments	1	View comments left by users within the system	The system displays a list of comments left by users, allowing administrators to review and take necessary actions if required	Pass
View user profile	2	Display the profile information of a specific user, including name, email, and address	The system presents the user profile accurately, showcasing relevant information associated with the user's account	Pass
Edit user profile	2	Allow users to modify their profile information such as name, password, email, and address	User profile editing process completes successfully, and the updated information is reflected accurately in the system	Pass

B User Acceptance Testing using System Usability Scale (SUS)

User Acceptance Testing (UAT), alternatively referred to as application testing or end-user testing [13], is a procedure conducted prior to market release to assess the product by its target audience in real-world conditions [5]. The purpose of UAT is to verify that the program can perform real-world tasks and adheres to development criteria.

The SUS [14] is a widely used tool designed to evaluate the usability of software, websites, or other systems [15]. It consists of a questionnaire with a series of statements that users respond to based on their experience with the system. The SUS provides valuable insights into users' perceptions of the system's usability and efficiency, helping developers and designers identify areas for improvement and gauge overall user satisfaction [16]. Table 9 shows the user acceptance testing result for Paw Palace Cat Hotel and Grooming Management System. This section will explore the results of the SUS

questionnaire administered to users, providing an overview of their perceptions and feedback regarding the usability of the system. After the system's completion, an evaluation was conducted to assess its usability and efficiency. Respondents could choose from a range of options to rate each provided criterion in the following questions. The scale's range is illustrated in Table 8 below.

Table 8: Ranking of the Questionnaire

Scale	Description
1	Strongly Disagree
2	Disagree
3	Neither Agree nor Disagree
4	Agree
5	Strongly Agree

Table 8: User Acceptance Test Result (Adopted from [14])

No	Question Item	Ranking				
		1	2	3	4	5
1	I think that I would like to use this system frequently.				4	2
2	I found that the system unnecessarily complex.	2	4			
3	I thought the system was easy to use.				5	1
4	I think that I would need the support of a technical person to use this system quickly.	5	1			
5	I found the various functions in this system were well integrated.				6	
6	I would imagine that most people would learn to use this system very quickly.				6	
7	I think there was too much inconsistency in the system.	1	5			
8	I found the system very cumbersome to use.	1	5			
9	I felt very confident using the system.				4	
10	I need to learn a lot of things before I could get going with this system.	1	4			

From the survey results, usability and efficiency are determined by analysing user responses to specific questions aligned with established usability metrics (SUS). The following is a discussion of the analysis based on the UAT results:

i. 66.7% and 3.33% of respondents agree and strongly agree that they would like to use this system frequently. This response describes that the majority of respondents express some level of willingness to use the system frequently, indicating general acceptance.

ii. 33.3% and 66.7% of respondents strongly disagree and disagree that they found the system unnecessarily complex. In other words, all respondents (100%) rejected the idea that the system is unnecessarily complex, suggesting strong user approval of its design. This feedback reflects that the system's design appears to align well with user expectations regarding complexity, making this a non-critical area for improvement. Besides, this implies the system is perceived as intuitive and user-friendly.

iii. 83.3% and 16.7% of respondents agree and strongly agree that the system is easy to use. These responses collectively demonstrate a widespread sentiment among users regarding the system's user-friendliness, with the majority finding it easy to navigate and operate and a smaller fraction perceiving it as exceptionally straightforward. This indicates that the system's interface, workflows, and interactions are likely well-aligned with user expectations. In which, users can navigate the system without significant confusion or frustration.

iv. 83.3% and 16.7% of respondents strongly disagree and disagree that they needed technical support to use this system quickly. This indicates the system excels in usability, and all respondents felt that they did not require technical support to operate the system quickly and efficiently.

v. All respondents agree that various functions in this system were well integrated. This overall agreement highlights the idea that the functions of the system work well together to provide a smooth user experience.

vi. All respondents agree that most people would learn to use this system very quickly, indicating their belief that most users would quickly grasp how to use the system. This shared perspective suggests a high level of confidence in the system's user-friendly design and intuitive interface. Consequently, users anticipate that new users will easily learn and navigate the system's functionalities.

vii. 83.3% and 16.7% of users disagree and strongly disagree that there was too much inconsistency in the system. In User Experience (UX) terms, inconsistency could mean unpredictable behaviour, varying User Interface (UI) elements, or erratic workflows. This interprets that all respondents perceive the system as coherent and reliable, with no significant inconsistencies in design, workflow, or behaviour. If users do not see inconsistency, that is a good sign. It means the system is reliable and predictable. Consequently, users should not have to wonder whether words, situations or actions mean the same thing in different contexts.

viii. 66.7% and 33.3% of respondents disagree and strongly disagree that the system is very cumbersome to use. Cumbersome usually refers to being slow, awkward, or complicated. Since all users disagree, it reinforces that the system is easy to use and simple enough for users. Users perceive the system as smooth, efficient, and free of unnecessary steps or friction.

ix. All respondents agree that they felt very confident using the system, showing it is user-friendly and intuitive. This confidence reflects its effectiveness and contributes to high satisfaction.

x. The data showing 66.7% disagree and 33.3% strongly disagree (totalling 100% rejection) that users need to learn a lot of things before using the system. This implies that all users felt they could start using the system immediately without prior training or extensive learning. This suggests that the system aligns with users' existing mental models or common workflows. As a result, users are unlikely to require extensive tutorials, manuals, or guidance to begin efficiently interacting with the system.

5 Conclusion and Recommendations

In conclusion, the Paw Palace Cat Hotel and Grooming Services web-based Application serves as a valuable platform for both cat owners and cat hotel administrators. It was designed to facilitate the booking of rooms and grooming services. This system offers convenience and efficiency for users looking to ensure the comfort and well-being of their cats. By providing a user-friendly interface for booking accommodation and grooming appointments, Paw Palace streamlines the process for both customers and service providers, enhancing the overall experience for all involved. With its focus on meeting specific needs, Paw Palace stands as an essential tool in the management and care of cats in hotel and grooming settings. This system includes several functional modules, such as a login/logout module, register module, user profile management module, room management module, grooming services management module, and system management module (including booking cancellation and leaving comments).

While Paw Palace: Cat Hotel and Grooming Services web-based application offers considerable benefits to both cat owners and service providers, several limitations hinder its full potential. Firstly, the absence of a reminder function within the system means that customers are not alerted to their upcoming room bookings and grooming services, potentially leading to missed appointments. Secondly, the inability to book room accommodation and grooming services as a combined package restricts customer flexibility and may result in a disjointed booking experience. Furthermore, the system's restriction preventing customers from booking rooms on different dates if they are already reserved for other bookings poses a significant challenge, especially for those requiring flexible scheduling. Addressing these limitations is crucial to enhancing the overall usability and effectiveness of the Paw Palace application.

To address the limitations identified in the Paw Palace: Cat Hotel and Grooming Services web-based application, several recommendations can be implemented to enhance its functionality and user experience. Firstly, integrating a reminder feature within the system would ensure that customers receive timely notifications about their upcoming room bookings and grooming services, reducing the likelihood of missed appointments. Additionally, offering combined booking packages for room accommodation and grooming services, along with discounts for bundled services, would streamline the booking process and incentivise customers to utilise these combined offerings, thereby enhancing satisfaction and revenue generation. Furthermore, improving the date management system to allow for greater flexibility in booking rooms on different dates, even in the presence of existing reservations, would provide customers with more options and convenience. By implementing these recommendations, Paw Palace can significantly improve the functionality, usability, and overall satisfaction of its web-based application.

Acknowledgements

The authors would like to thank the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Kelantan Branch, for its support.

Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

References

[1] 3e Accounting Malaysia, "Starting A pet Grooming Business in Malaysia. Beginner's Guide on Starting a Pet Grooming Business in Malaysia," *3e Accounting Malaysia*. [Online]. Available: https://www.3ecpa.com.my/resources/industry-guide/starting-a-pet-grooming-business-in-malaysia/

[2] Koocing Hotel, "Facebook," [Online]. Available: https://www.facebook.com/koocingcathotel/.

[3] Syukri & Zulerwan Cat Hotel & Shop, "Instagram," [Online]. Available: https://instagram.com/syuk.zulerwan.catt?igshid=NTc4MTIwNjQ2YQ.

[4] G-Pet Hotel, [Online]. Available: https://g-pet.com/contact.html.

[5] Y. J. Ru and H. Kamaludin, "Pet Care Management System," *Appl. Inf. Technol. Comput. Sci.*, vol. 4, no. 2, pp. 2019–2038, 2023.

[6] S. Kumar, "Reviewing Software Testing Models and Optimization Techniques : An Analysis of Efficiency and Advancement Needs," *J. Comput. Mech. Manag.*, vol. 2, no. 1, pp. 43–55, 2023, doi: 10.57159/gadl.jcmm.2.1.23041.43.

[7] S. Pargaonkar, "A Comprehensive Research Analysis of Software Development Life Cycle (SDLC) Agile & Waterfall Model Advantages , Disadvantages , and Application Suitability in Software Quality Engineering," *Int. J. Sci. Res. Publ.*, vol. 13, no. 8, pp. 120–124, 2023, doi: 10.29322/IJSRP.13.08.2023.p14015.

[8] M. Whaiduzzaman *et al.*, "applied sciences Concept to Reality : An Integrated Approach to Testing Software User Interfaces," *J. Appl. Sci.*, vol. 13, no. 11997, pp. 1–23, 2023.

[9] M. J. Escalona *et al.*, "An Overview on Test Generation from Functional Requirements," *J. Syst. Softw.*, vol. 84, no. 8, pp. 1379–1393, 2011, doi: 10.1016/j.jss.2011.03.051.

[10] P. A. Laplante and M. Kassab, *Requirements Engineering for Software and Systems*. Auerbach Publications., 2022.

[11] P. Becker, G. Tebes, D. Peppino, and L. Olsina, "Applying an Improving Strategy that Embeds Functional and Non-Functional Requirements Concepts," *J. Comput. Sci. Technol.*, vol. 19, no. 2, pp. 153–174, 2019.

[12] R. Fauzan, D. Siahaan, S. Rochimah, and E. Triandini, "A Different Approach on Automated Use Case Diagram Semantic Assessment," *Int. J. Intell. Eng. Syst.*, vol. 14, no. 1, pp. 496–505,

2021, doi: 10.22266/ijies2021.0228.46.
[13] S. Goericke, *The Future of Software Quality Assurance*. Springer Nature, 2020.
[14] J. Brooke, "SUS - A Quick and Dirty Usability Scale," 1996.
[15] J. Blattgerste, J. Behrends, and T. Pfeiffer, *A Web-Based Analysis Toolkit for the System Usability Scale*, vol. 1, no. 1. Association for Computing Machinery, 2022. doi: 10.1145/3529190.3529216.
[16] D. Pal and V. Vanijja, "Perceived Usability Evaluation of Microsoft Teams as an Online Learning Platform during COVID-19 using System Usability Scale and Technology Acceptance Model in India," *Child. Youth Serv. Rev. Elsevier*, no. December, 2020.