Applied Information Technology And Computer Science Vol. 2 No. 2 (2021) 1555-1567

AITCS

Homepage: http://publisher.uthm.edu.my/periodicals/index.php/aitcs
e-ISSN :2773-5141

The Development of Veterinary Clinic Management System Using Structured Approach

Nurnajlaa Bahirah Jaffar , Nur Ariffin Mohd Zin *

Fakulti Sains Komputer Teknologi Maklumat, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor Malaysia

DOI: https://doi.org/10.30880/aitcs.2021.02.02.100
Received 09 July 2021; Accepted 23 September 2021; Available online 30 November 2021

Abstract: Nowadays, with the development of information technology, services process in an institution become more effective and efficient. The same goes for services in veterinary clinics that require the advantages of information technology to support the management of information and services. Thus, veterinary clinic management system was developed for the V Care Animal Clinic. This is due to some problems faced by veterinary clinic clients such as the difficulty of using printed forms to fill in recurring information. Another problem is the difficulty of making appointments for animals and clients do not know the treatment options provided by veterinary clinic. The new system was developed with an iterative model and system design based on structured approach. The language that had been selected for this project was hypertext pre-processor (PHP) and other software used for this project are notepad as a programming tool, lucidchart, XAMPP as a platform to access the database and for webserver, MySQL which is for design and build database and lastly is Microsoft window 10 as an operating system. There are three users for this new system which are the Administrator of the clinic, clinic's staff and clients of the clinic. Moreover, this system provide functions likes clinic information, appointments details about treatment packages for animals, schedule for booking appointments, online payments and provide appointment notification as a reminder for clients. Therefore, this system will help veterinary clinic's clients of making appointment at time that most convenient and will help all the user of system to save time.

Keywords: Veterinary clinic management system, Information system, Database, Structured design, Web based system

1. Introduction

Over the decade, the veterinary industry is only giving a medical treatment to the pets but now they already upgrade their services and are available with different types of treatment such as pet's hotel, pet's grooming and others [1]. Veterinary clinic is providing a medical and surgical treatment for animals, especially for domestic animals. Additionally, online booking is not a new system to this world. Now, a lot of services in this world are already offer online booking system options. This is no exception with veterinary clinics that also offer booking system services.

*Corresponding author: ariffin@uthm.edu.my

The current process used by this veterinary clinic to record and for customer make an appointment is using the traditional method which is record on the piece of paper. However, there are veterinary clinic which are already using this new online booking system but not for this clinic. Customers who want to book an appointment need to come to the clinic for register and the staff will check the date which is still available to book. Sometimes for customer who already comes to the clinic before, to book the new appointment just need to call and the staff will give them an appointment date.

However, using this traditional method may cause difficulties. The problems that will be faced by the clinic management are lost customers data. It happened because there are many records paper need to be stored so there can be careless mistake or miss place. The other problems are duplicate data will occur because this traditional method cannot detect if the new information contained is the same as the other.

Hence, veterinary clinic management system is proposed. The objectives for this system are to design a veterinary clinic management using structured approach and to develop a website for veterinary clinic management. This project will have two types of target user which are direct user and indirect user. For the direct user is customer who is a pet's owner while for indirect user are administrators and also the veterinary clinic staff. This system be used to edit and update the record about their clients and at the same time, clients can make an online booking appointment. Using this website, pet's owner can view the important dates such as the next appointment for their pet with the veterinarian.

This paper contains four main sections. Section 1 is the background of the project while Section 2 shows the literature review. Section 3 is about research methodology and lastly section 4 is explaining the analysis and design phases.

2. Literature Review

The veterinary clinic prepared a details form using papers for new customers to fill up the details. After that, the clinic's staff will store the information papers inside the huge cabinet which already provided. The staff will give a small card to thecustomer and it will be used when the customers come for the next treatment or appointment. For the next treatment, customer needs to show the card and the staff will find the paper information related to that customer inside the cabinet. This way is quite complicated and waste of time.Moreover, to make an appointment customer need to make a call or need to come to the veterinary clinic just to set up an appointment. This will cause problems because there are limitations as customers can call the veterinary clinic during operations hours only. It is not an effective way since we are dealing with living creatures so we need to have a system which can handle this situation by the time. As time goes by, the traditional method needs to change for a better method to improve the performance of the clinic management. Thus, this proposed system is one of the alternatives that can replace the traditional method to improve the clinic performance.

The method used for this project is information system. Web information systems are usually composed of two main components: the front-end, or presentation layer, and the back-end [2]. The front-end is composed of multiple resources (html templates, images, CSS and JavaScript files, etc. which are accessed by means of the users' browsers and provide the main interface of the system; while the back-end provides different functionalities or services and, generally, it is not directly accessed by the final users [2]. A Web contains many types of data such as structured, unstructured and semi-structured having huge amount of data also having different variety web data [3]. Website design is one of the most effective and efficient marketing strategies of cost and time used, this is because through the use of the web, the introduced about the veterinary clinic service can be widespread easily [4]. Thus, this method is suitable to use for completing this project.

There are many existing systems in the industries in Malaysia which are similar with this project. However, it is not only study on veterinary clinic but also on hospital management websites. The

proposed system will combine all the modules and features from these threeexisting systems. Table 1 shows the similarities and differences between these systems.

Table 1: System's comparison between existing systems with the proposed system.

Features	Animal Medical Centre	Kuala Lumpur Hospital (HKL)	Putrajaya Hospital	Veterinary Clinic Management System
Log in and sign up	X	X	X	/
Profiles details	/	X	X	/
Pet details	/	X	X	/
Medicine information	/	/	/	/
Appointment information	/	X	X	/
Online payment	X	X	/	/

Table 2: System Development activities and task

Phases	Task	Output
Planning	1. Choose the title of proposed project. 2. Gathering data. 3. Identify the problem. 4. Define the scope of the proposed project. 5. Identify the objective. 6. Estimate time taken for project to be completed.	Project proposal Gantt chart
Analysing	1. Make a research about the project. 2. Gathering organization requirement. 3. Design process diagram. 4. Performing detail analysis.	Context diagram. Data flow diagram. Entity relationship diagram.
Design	1. Design user interface.	Flowchart User interface design Database design
Implementation	1. Develop the web-based project. 2. Implement the coding.	Web based project Project report
Testing	1. Test the web-based project. 2. Evaluate project. 3. Prepared slide for presentation.	Project evaluation form. Poster. Slide.

3. Methodology

The development process that will use to complete this project is iterative development process. Iterative model works based on iteration in the software development process and it conducts the

development process via a cyclic manner so that every step is repeated after another [5]. In fact, the model each iteration has more features and capabilities than the previous iterations [5]. Table 2 shows theactivities of every phase in system development.

4. Analysis and Design

The results and discussion section presents data and analysis of the study. This section can be organized based on the stated objectives, the chronological timeline, different case groupings, different experimental configurations, or any logical order as deemed appropriate.

4.1 Context Diagram

Figure1 is a context diagram which is a method used to represent the flow of data in information system. The context diagram is a single diagram at the top level (Diagram 0) according to the Data Flow Diagram definition [6].

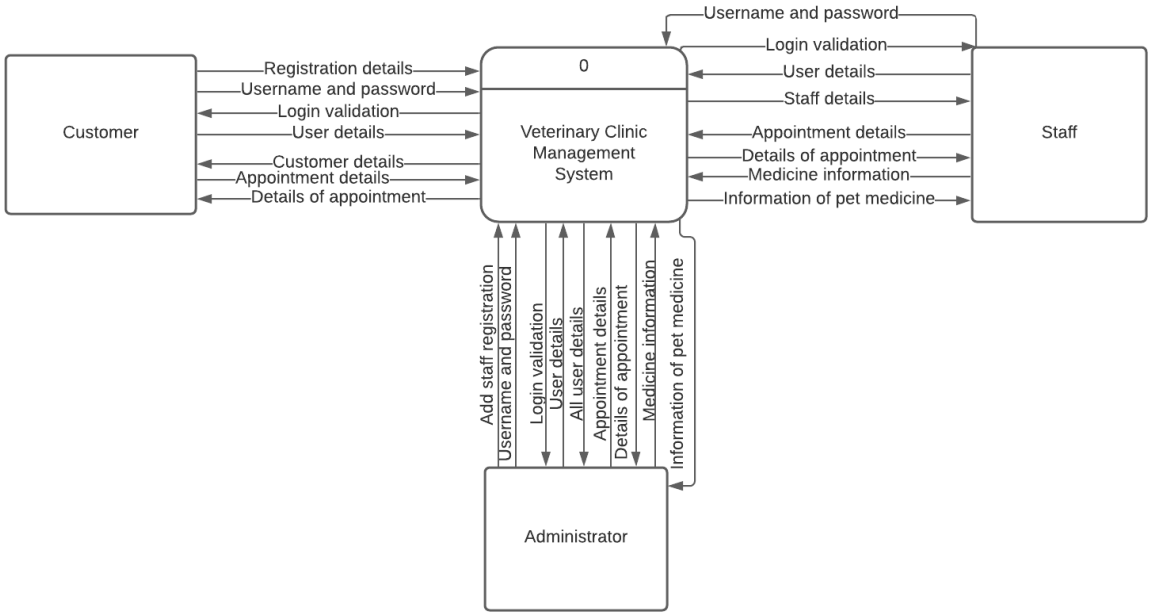

Figure 1: Context Diagram

4.2 Data Flow Diagram

Data flow diagram contains four symbols which are processes, data flows, data stores, and external entities to accomplish the veterinary clinic data flow diagram project [7]. Figure 2 and 3 shows the DFD for the proposed veterinary clinic management system.

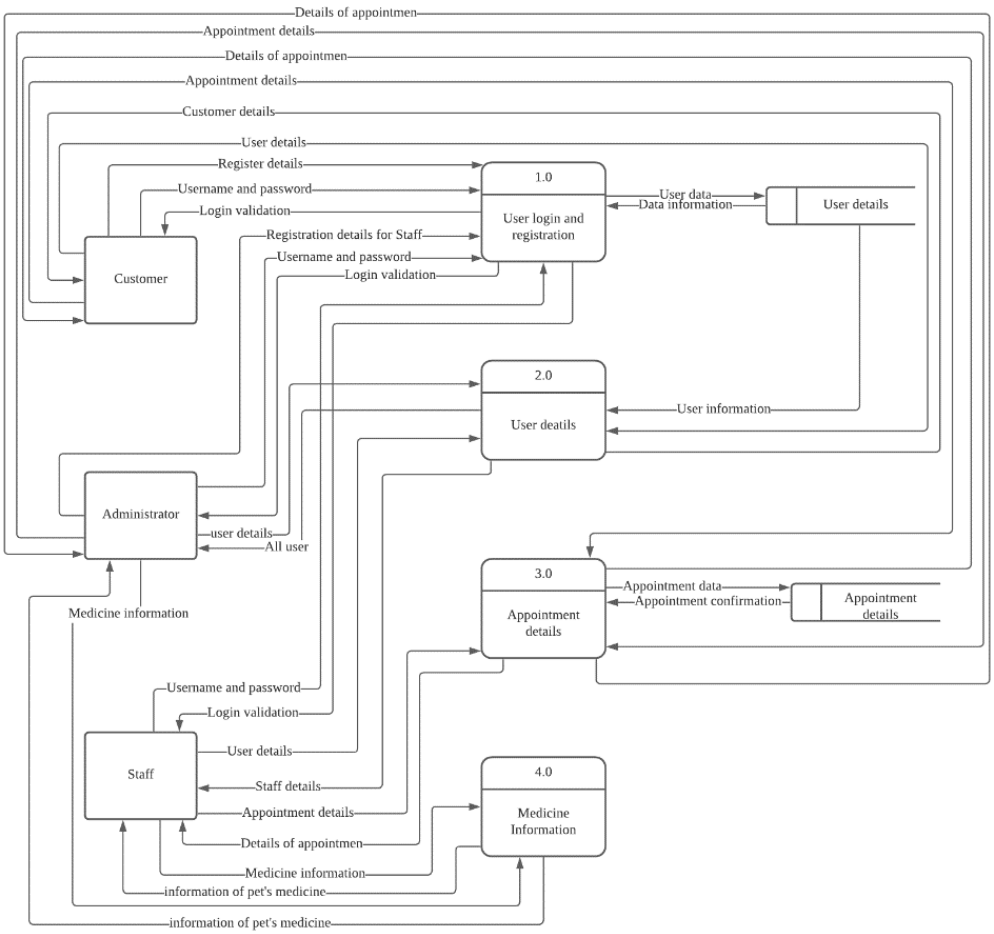

Figure 2: Data Flow Diagram Level 0

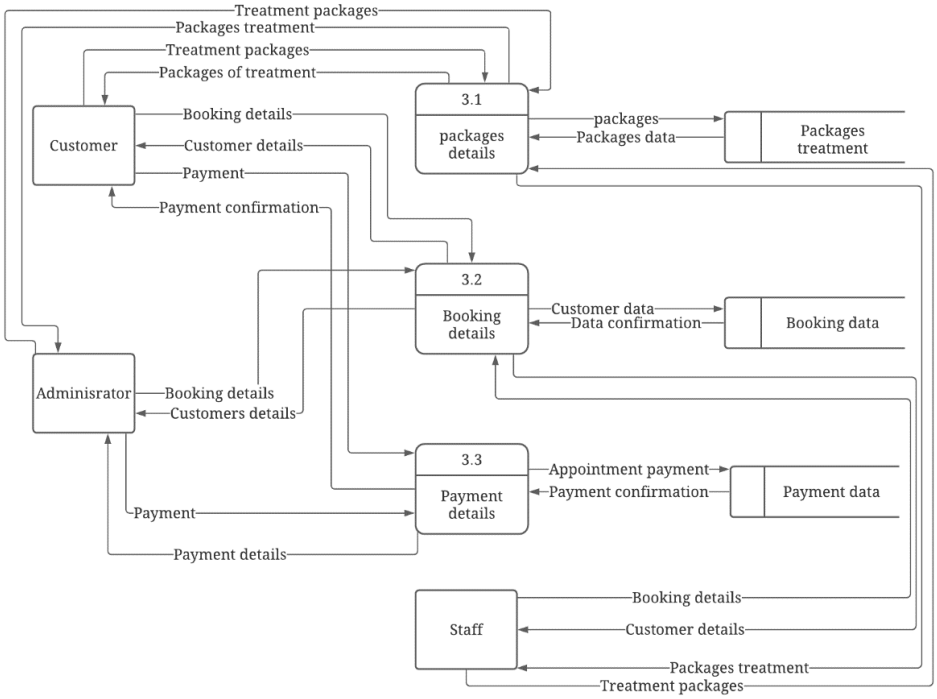

Figure 3: Data Flow Diagram Level 1

4.3 Entity Relationship Diagram

Entity Relationship Diagram (ERD) consists of two specifications attributes which are Primary Key (PK) and Foreign Key (FK). Primary key is a special kind attributes that define a unique database entry while foreign key is attributes that can be share with multiple entities [8].Figure 4 shows the entity relationship diagram for the veterinary clinic management system.

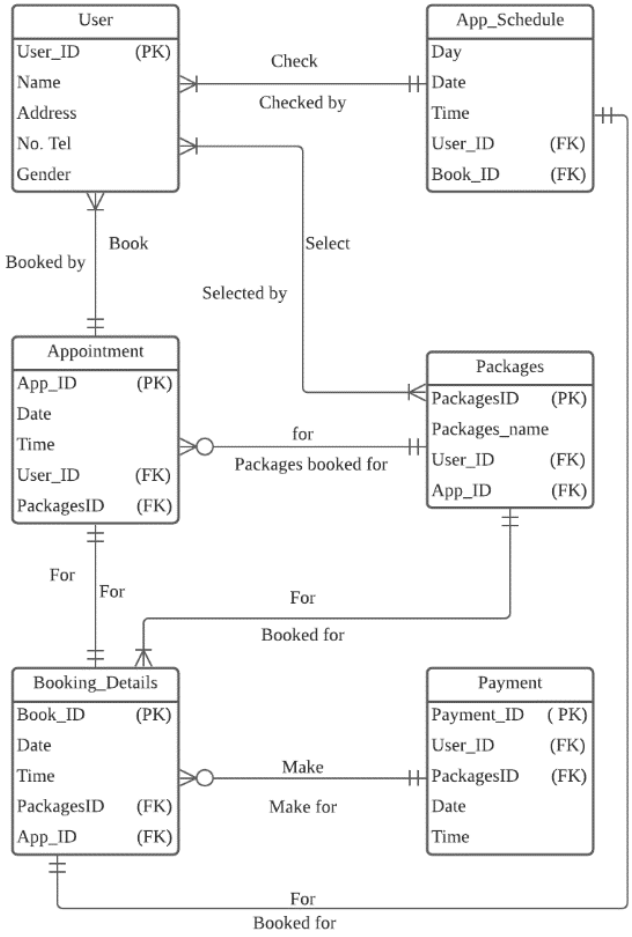

Figure 4: Entity Relationship Diagram

4.4 System Design

A flowchart is simply a graphical representation of steps. Figure 5until 7 below shows flowchart for three user of the proposed system which are administrator, Clinic's staff and customer.

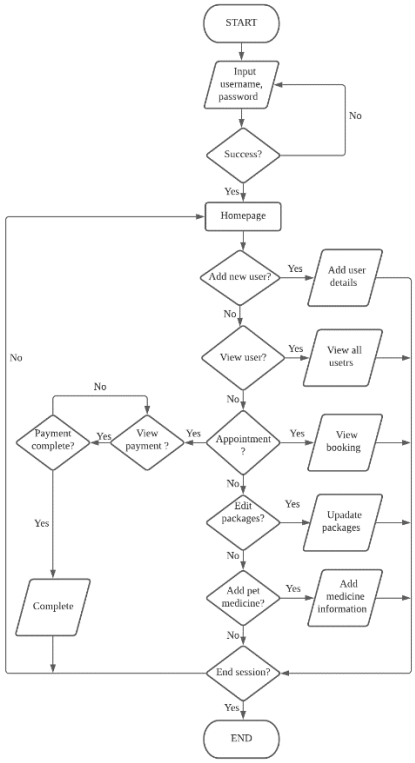

Figure 5: Flowchart for Administrator

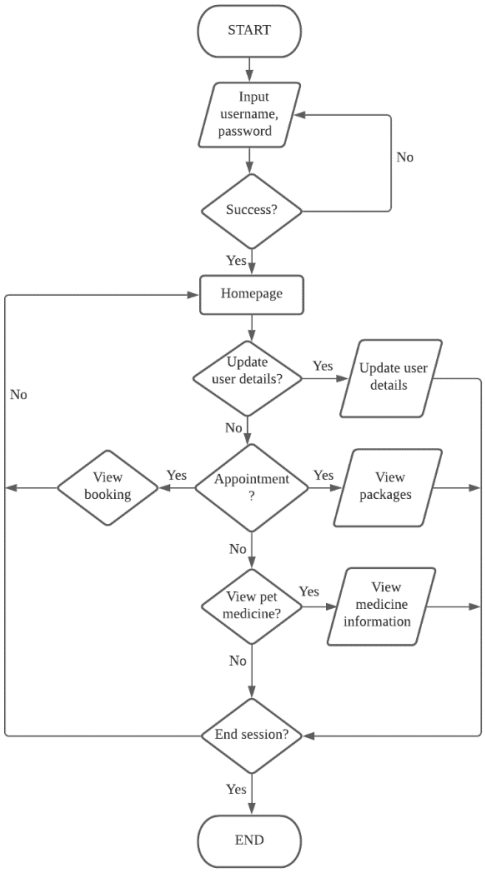

Figure 6: Flowchart for Clinic's Staff

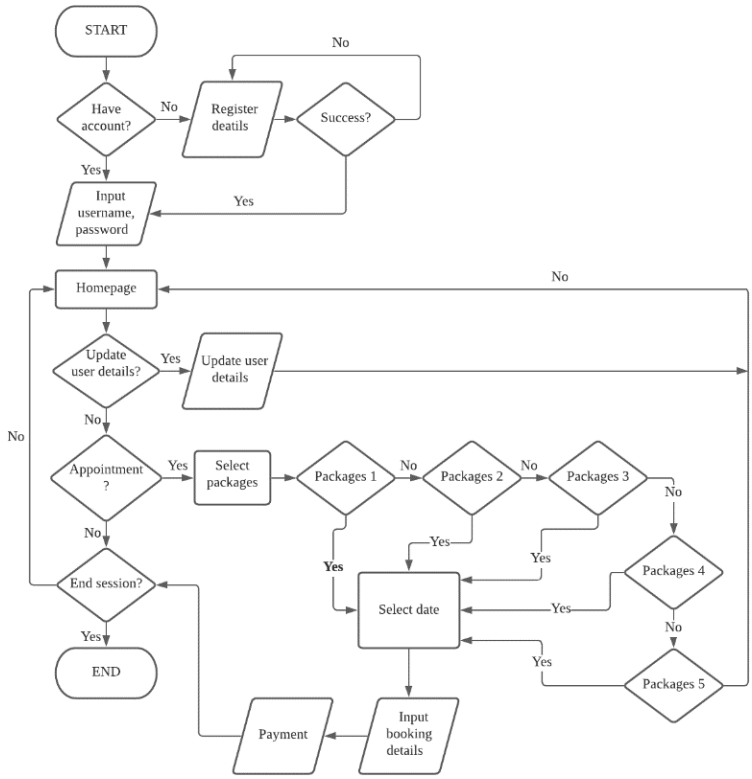

Figure 7: Flowchart for Customer

4.5 Implementation

This Veterinary Clinic Management System was build using php language. Php language is the mainly used to develop this system and CSS for designing the interfaces and layouts of the system for every module. It is also used MySQL and PhpMyAdmin to connect with the database of the proposed system.

4.5.1 Database Connection

To store and connect all the data of this Veterinary Clinic Management System with the database MySQL and PhpMyAdmin was needed. However, to run the system the XAMPP was needed because it will connect the proposed system with the database. Figure 8 (Appendix A) shows the MySQL database connection of the proposed system.

4.5.2 Homepage

Homepage is the first interface that all users will see. At this interface all users need to select one button to go to the login interfaces. There are three button which are admin, staff and lastly is customer. Users need to select the correct one that related. Figure 9 (Appendix A) shows the interfaces for homepage module.

4.5.3 User Register

Figure 10 (Appendix A) shows the interfaces for registration module which is the first module for this proposed system. This module is necessary for the new user because customer need to register for the first time before login to the system. Customers need to fill some details such as username, address, contact number and the important one which is password for login purpose. After customer finished fill in all the data, the data will be store to the PhpMyAdmin for future used.

4.5.4 User Login

This module will be used for three user which are administrator, staff or doctor of the veterinary clinic and also the customer of the clinic. All users need to fill in the correct username and password that already had been registered. Figure 11 (Appendix A) shows the interface for login module and every user have the same interfaces.

4.5.5 User Details

This module will be used by clinic's staff and customer. This module has two function which are user can update details or can only view the details that already registered. Figure 12 (Appendix A) shows the interface for viewing user details and Figure 13 (Appendix A) shows the interfaces for inserting and updating user information.

4.5.6 Packages Details

This module will display the packages details that are provided by the veterinary clinic. Customer can view all the packages before making an appointment because customer need to select the treatment based on the packages. However, the treatment that listed at the packages is only basic treatment for pet. This module can be viewing by all of the user. Figure 14 (Appendix A) shows the interfaces of the package details.

4.5.7 Booking Appointment

This module will be used by the customer of the veterinary clinic to make an appointment with that clinic for the pet. Customers need to fill in all the information and need to select the packages, date and time to book an appointment. Figure 15 (Appendix A) shows the interface for booking details. Moreover, module also has another one function which is user can display the booking appointment details once there are customer who submitted the booking details. Figure 16 (Appendix A) shows the booking details that will be see when user select the booking detail part.

4.5.8 Medicine Details

Medicine module is the module that will be used by the doctor to fill in the details about the disease and medicine of the pet. This will help doctor and staff to save time since after doctor submit the data into the system staff can viewing the data. Moreover, by having this module it can reduce the use of paper and also the data that already store are important for future used. Figure 17 (Appendix A) shows the interface of the form that will be used by the doctor and Figure 18 (Appendix A) shows the interfaces after staff clicking the viewing part of the medicine information.

5. Conclusion

The Veterinary Clinic Management System was built for the veterinary clinic to help customer to register details and make a booking appointment for pets easily without need to go to the veterinary clinic itself. Based on the problem statements and purpose of this study the main problems are most of the veterinary clinic are still using the traditional paper-based management system, so this system has achieved its goals based on the problem statement, system requirements, scope and the user requirements. By creating this online booking system, customer do not need to fill in the registration form detail on the paper and it can help the clinic's staff to detect customer details easily and better than using the traditional method.It is also can help all the pet's owner to save time because this booking system can be used for 24 hours.

Even though there are some limitations for this system, it can be improved to a better system performance and this system still can be function as it is purpose. These are several improvement and recommendations that can be implemented to improve this system which are interfaces can be built based on smartphone screen display, booking calendar to avoid from duplicate appointment and

notification reminder for sending to customer. Thus, hoping that this system can give benefits to the users.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support and encouragement throughout the process of conducting this study.

Appendix A

```
<?php

DEFINE ('DB_USER', 'root');
DEFINE ('DB_PSWD', '12345');
DEFINE ('DB_HOST', 'localhost');
DEFINE ('DB_NAME', 'veterinaryclinic');

$dbcon = mysqli_connect(DB_HOST, DB_USER, DB_PSWD, DB_NAME);

?>
```

Figure 8: Code for Database Connection

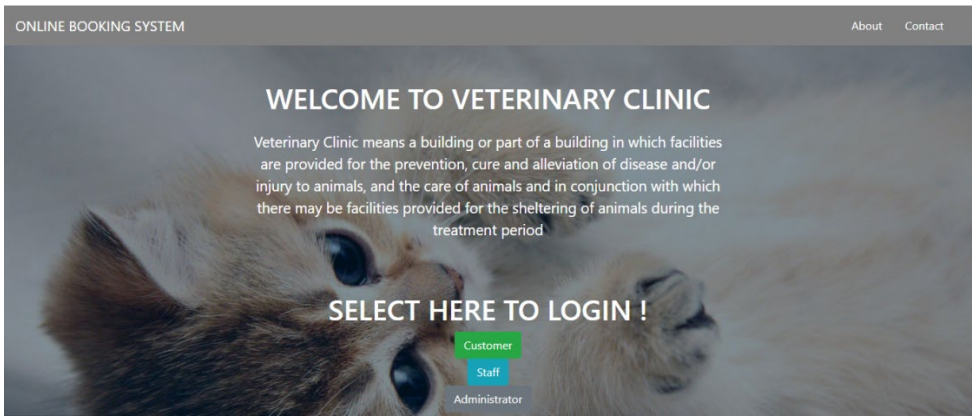

Figure 9: Homepage Interface

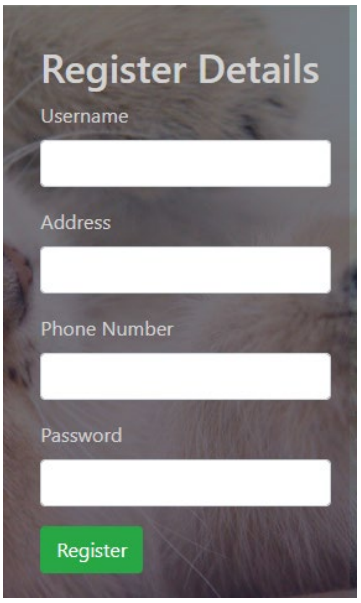

Figure 10: Registration Interface

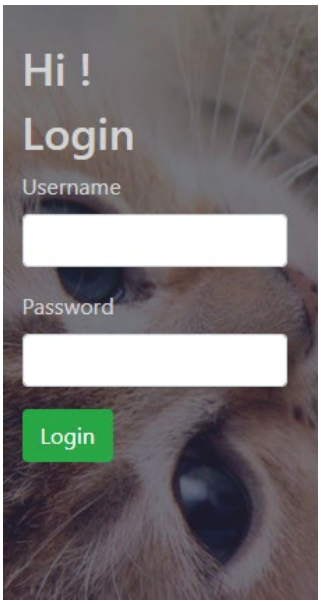

Figure 11: Login Interface

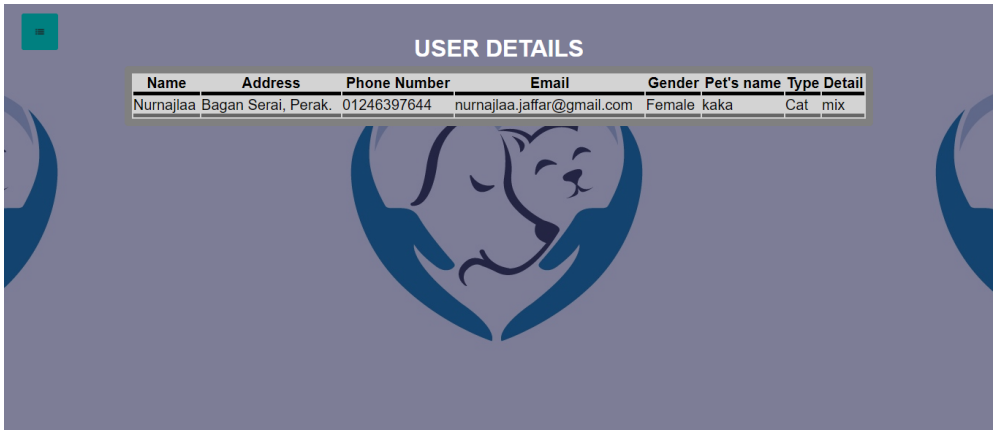

Figure 12: User Details Interface

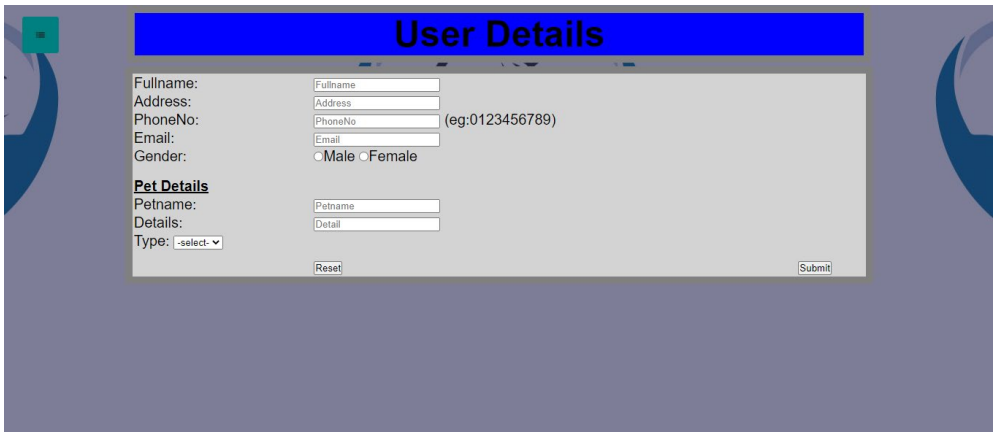

Figure 13: Update User Details Interface

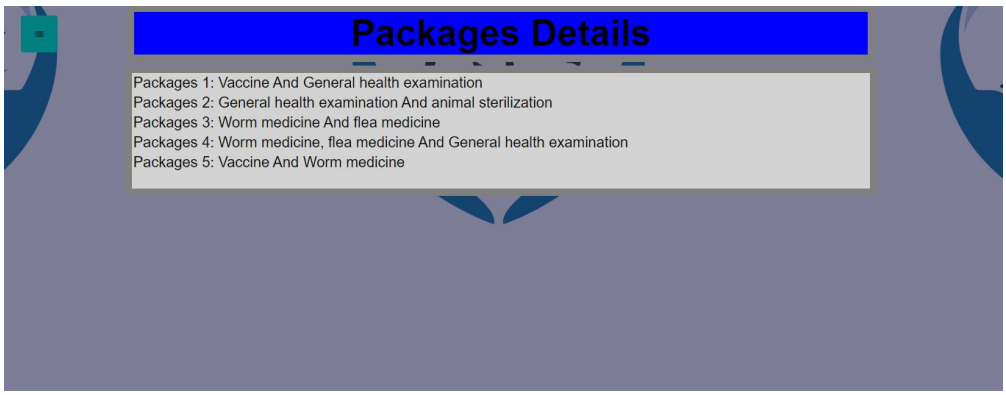

Figure 14: Packages Details Interface

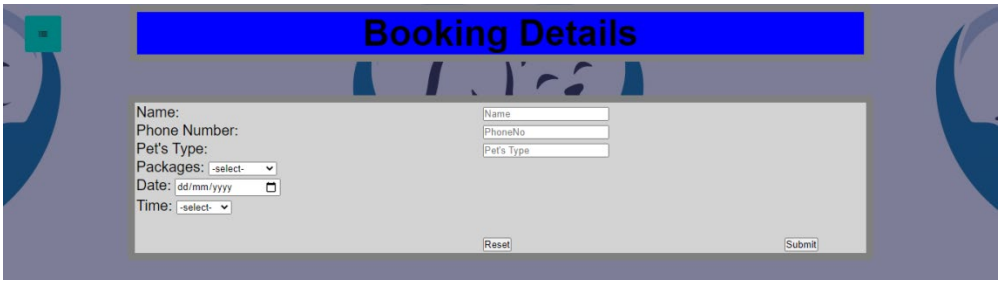

Figure 15: Booking Details Form Interface

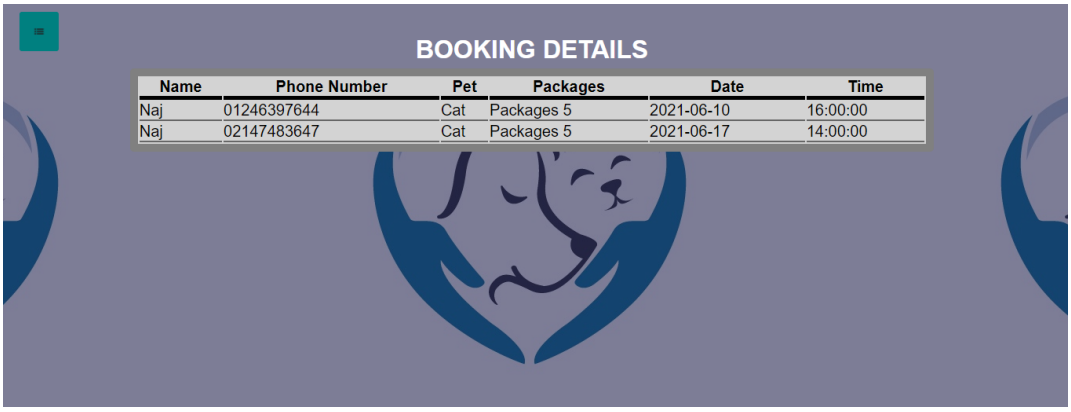

Figure 16: Booking Details Interface

Figure 17: Add Medicine Details Interface

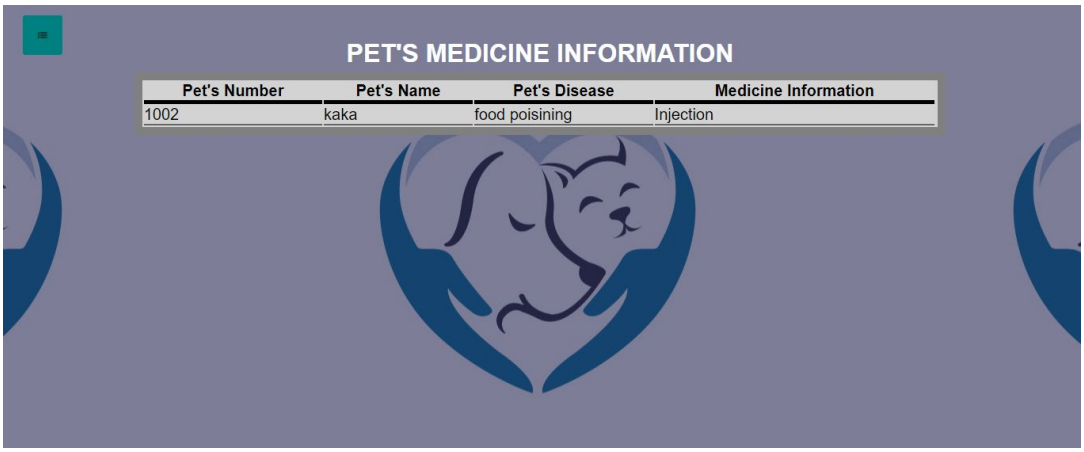

Figure 18: Medicine Details Interface

References

[1] R. L. Scotney, D. McLaughlin & H.L Keates. (2015). A systematic review of the effects of euthanasia and occupational stress in personnel working with animals in animal shelters, veterinary clinics, and biomedical research facilities. *Journal of the American Veterinary Medical Association*, *247*(10), 1121-1130.

[2] S. Bernardi, R.P. Alastuey & R. Trillo-Lado. (2017, April). Using process mining and model-driven engineering to enhance security of web information systems. In *2017 IEEE European Symposium on Security and Privacy Workshops (EuroS&PW)* (pp. 160-166). IEEE.

[3] S. S. Pandarge & V.A. Chakkarwar. (2017, April). Automatic web information extraction and alignment using CTVS technique. In *2017 International conference of Electronics, Communication and Aerospace Technology (ICECA)* (Vol. 2, pp. 94-99). IEEE.

[4] M.S. Iskandar & I. N. Firdaus. (2018, August). Marketing Strategy of Tourism Package through Design of Web-based Information System on One of Tours and Travel in Bandung. In *IOP Conference Series: Materials Science and Engineering* (Vol. 407, No. 1, p. 012048).

[5] M.S. GHARAJEH. Waterative Model: an Integration of the Waterfall and Iterative Software Development Paradigms. *Database Systems Journal BOARD*, 75.

[6] M. TANABE & N. KOBAYASHI. A method to visualize the Scope with no Data Leakage: Context Diagram and Assurance Cases should Do.

[7] H.M. Alyafei. (2016). Data Flow Diagram Project For Perinatal Follow Up Program.

[8] K. Ľachová, P. Trebuňa, G. Bohács, Z. Győrváry, et al. (2019). Modelling of electronic Kanban system by using of entity relationship diagrams.