Development of E-Healthcare Management System using PHP, Javascript and Cascading Style Sheets

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Abstract. It is a responsibility for higher authorities in a government/private institute to provide an essential health care service to all their own community. The current health management is quite tedious and unpractical by using manual methods in order to get an appointment from doctor. Furthermore, the current situation, Covid-19 is spreading throughout Malaysia and it is very risky for direct doctor visit. This paper is mainly focused on developing an E-healthcare management system for government/private institute to make doctor appointment online. The used programming developing tools are CSS, PHP, Javascript and Cascading Style Sheets (CSS). Patients may log in to make appointment with the doctor with its specialized. All the appointment details is processed and directly sent to the centralized database system. Then doctors confirm the appointment through their web page. Finally, patients receive an alert from doctor after the confirmation. E-Healthcare Management system is successfully developed to cater all the needs in appointments and organizing the records. In addition, current patients’ data and appointment can be retrieved just in a click of second.

1. Introduction
Institute usually provides their own community with everyday healthcare or the specialized services. This is to ensure the well-being of the community day to day [1]. Covid-19 is spreading throughout Malaysia. It is very risky to meet doctor in the hospital/clinic directly because it will worsen the situation more. Despite the fear of Covid-19, the direct doctor’s visit should be avoided. Therefore, the healthcare management system is able to their community to make appointments through online whenever the needs of medical services.

Traditional healthcare management has become a complex task for health care in hospitals or clinics. There are few reasons to contribute to these complications which are heavy flow of patient traffic to a physician that practices in number of clinics, an ineffective appointment management could also cause overlapping appointments, rise in numbers of no-show patient, patient dissatisfaction in general and revenue loss for healthcare institutions [2-3]. At the same time, sudden retrieve patient’s record in traditional healthcare management is very difficult as the storage of information is inappropriate way since the information of the patients is not updated in the patient’s profile like updating the allergy towards medication [4-7].

The development and usage of computerized healthcare appointment management system is increasingly as it the tool that lightens the hard work associated with managing in health care centre.
Indirectly, it enhances the efficient and quality of the healthcare [3]. Healthcare management system is basically for usage of different user groups like doctors, admins, nurses, patients and many more. [3] designs Hospital Management System using Java with the connectivity of My SQL. Similarly, [8] develops system using JavaFx, HTLM, CSS, JavaScript, PHP, XAMPP Server Engine and Biometric Fingerprint Technology. These systems are basically for medical staff usage where can enter and update the patients’ records, show the patients’ history and list of available drugs [3, 8]. Healthcare Management System is developed in Android based smartphone by [4, 9]. The system can be used by medical staff for registration, recording and billing. [6] develops hospital management systems for doctors and patients for registration, payment, view reports and medicine. [10] uses Php, Dreamweaver and Apache MySQL. [11] uses Angular JS and Sqlite3 and MySQL for the frontend and backend respectively whereas for client-server request, Ajax framework is used. In [10-11], the patient can make an appointment while admin/doctor schedules the appointment for the doctor. Besides this, smart hospital management system is developed for patient and medical staff by using hybrid cloud, IoT, machine learning and Artificial Intelligence [12]. Electronic health information system is developed to improve the management system to improve diagnosis and also treatment [13]. Besides webpage, Android based appointment system is available [14-15]. The system is developed by using Android Studio 2.1.1. and SDk plugin, JDK 6, Android 6.0, Ipage server, HTML and Php. The patient can either email to doctor or make a call to a doctor by using this system [14]. [15] uses Google and Java language, Php and MySQL for backend. The patient is able to make a live consultation beside making an appointment.

Most of the developed systems are mainly for medical staff to make the appointment. This ensures the needs of patient’s presence at the hospital. Furthermore, the system is developed for the usage of the hospital/clinic and not specifically for academic institute usage. Therefore, E-healthcare management system is proposed for academic institute usage for doctors and patients who seek for medical attention. Patients are able to make an online appointment for daily basis according their necessary. In this paper, UniMAP Health Care Department at Pauh, Wang Ulu, Kangar and Padang Besar campus is implemented in the system. The PHP, Javascript and Cascading Style Sheet programming languages is used in developing the database and webpage of this system. The paper is organized as in the next section (II), methodology is briefly explained on how the web page is developed. In section (III), the figures of the web page are shown together with some explanation. Finally, section (IV) is to conclude the work done in this paper.

2. Methodology

2.1. Overview

In this system, two modules are developed i.e: Patient module and Doctor module. Figure 1 shows the flowchart for healthcare management system. Initially, the patient registers to the system. After login the account, patient may choose the location and category of treatment to make new appointment. After creating appointment, it pushes notifications to doctors. After that, doctor may just login the account with the email and password provided by administrator. Doctor views the appointment that is made by patient. Doctor can arrange the time that is requested by patient according to their availability. If doctor is not available, doctor can rearrange the appointment with their availability and send confirmation email back to the patient. Patient can check the confirmation and meet with doctor if available with the time given. If not patient need to write email back to doctors to request for another time and date.
2.2. Entity Relational Diagram (ERD)

Entity relation diagram (ERD) is drawn for patient and doctor module separately as shown in Figure 2. Both figures are the structural diagram with the combination of different symbols which visualizes the major entities and the relationship with other entities and gives a clear view to develop database system. Patient module (Figure 2(a)) consists of patient login, patient sign up, patient dashboard, new appointment, appointment history and confirmation history and confirmation history. Patient ID will act as the primary key in every single entity. Doctor module (Figure 2(b)) consists of doctor login, doctor dashboard, appointment history and new appointment. Doctor login consists of doctor id, email and password whereas doctor dashboard consists of doctor id, full name, email, category and location. Appointment history and new appointment also act as the entity.
2.3. Creating User Interface

This section focuses in creating the user interface by using phpMyAdmin as the server to. Notepad++ software is used to make the coding of the website. The programming languages that used in notepad ++ is the combinational language of PHP, CSS and Java Script. The only way for the phpMyAdmin to get link of the files that is done in notepad ++ is by saving all the files in the extension of .php. In the notepad ++, the files are written with the format of PHP so that phpMyAdmin can trace it and display the interface at the website. Besides that, php connection is used to link the php file with the database that is developed in phpMyAdmin. The system is implemented in Google Chrome server as it is more stable platform compare to others. Figure 3 shows the algorithm for PHP connection.

```
<?php

session_start();
$host = "127.0.0.1:3306";
$username = "root";
$password = "";
$database = "hello";
$conn = new mysqli($host, $username, $password, $database);

if (mysqli_connect_error()) {
    die("Connect Error ('. mysqli_connect_errno() .') '", mysqli_connect_error());
}
```
2.4. Designing Webpage

After creating interface using server phpMyAdmin, the webpage is designed in order to be displayed at the localhost phpMyAdmin. Cascading Style Sheets (CSS) programming language is used to design the webpage with different types of animations and effects. This will give a good image for user and attract user to use it frequently.

After designing the webpage, the whole appointment system can be displayed as a webpage. A complete system is formed by linking the designed webpage with the PHP and Javascript coding. Figure 4 shows the homepage of E-healthcare management system.

![Figure 4. Homepage Health Care Centre](image1)

3. Results and Discussions

The development system is implemented in UniMAP. Figure 5 shows the homepage with the description of the healthcare centre in UniMAP. In Figure 5 (a), the category of the medical services is shown whereas Figure 5 (b) shows the location of UniMAP Healthcare Centre. There are three main locations of healthcare centre in UniMAP which are in Pauh Putra, Unicitii Alam and Wang Ulu.

![Figure 5. (a) Category](image2)
Initially, patient can register to the system whereas doctor is registered by the administrator. Figure 6 shows the sign up webpage.

Then, users either doctor or patient can log in the system as shown in Figure 7.

After patient’s log in, Figure 8 shows the main page of the patient. There are several tabs on the left
hand sided (my profile, doctors, new appointment, appointment history, confirmation appointment) in the web page which shows the detail of the patient as shown in Figure 8 (a). Patients can see and edit their profile based on their needs. Within that, they can update their profile if necessary as shown in Figure 8 (b).

![Patient Details](image)

![Patient Edit Profile](image)

**Figure 8. Patient Main page**

The patient can access the doctors’ directory to see which doctors are available and the location of the doctors as shown in Figure 9. This will be easier for patient to make new appointment according to the location and category needed.
Figure 9. Patient Main page

Patient can leave a message in the new appointment textbox to request an appointment according their preference of doctor and location as shown in Figure 10.

Figure 10. New Appointment for Patient Page

Patient can trace back their appointments through appointment history tab. Patients also can see their previous records on appointment. Not only that, but patients can also check the confirmation appointment once doctor arranges the time for patient. Figure 11 shows the doctor’s main page after doctor log in. Figure 11 (a) shows the details of doctor. The doctor is able to check the appointment’s time and date requested by the patient as shown in Figure 11 (b).
Doctor can rearrange the time according to their availability on that day as shown in Figure 12(a). Doctor confirms the appointment for the patient at new appointment tab and it appears as confirmation appointment for both patient and doctor as shown in Figure 12(b).
4. Conclusion

In conclusion, E-healthcare management system is successfully developed for UniMAP Health Care Centre. Based on the results of testing, patient can make appointment according to their desired category and location through online without going to the place which saves lots of time. In the other hands, doctors can also check their appointment with patients through the system which is much easier for doctors. Doctor can arrange the time for patient according to their availability. This system contains the function that is convenience and easier to fulfill the requirement and criteria of the patient. In the future, this system can be improved to make it more convenience by adding some important services such as medicine and payment services.

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