EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project I

Doctor Appointment Booking System

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A Doctor Appointment Booking System to efficiently manage patient-doctor appointments in a hospital. The system allows patients to book appointments with doctors in a specific department within a time frame that suits their condition. The goal is to create a reliable, continuous and user-friendly booking system.

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1.Introduction

Technology has become a part of every aspect of our lives, including healthcare. The integration of technology and health has greatly improved the quality of life for individuals around the world. Health technology, including devices, medicines, vaccines, procedures, and systems, aims to address health challenges and enhance the delivery, accessibility, and cost-effectiveness of health services **[1].** This project aims to use digital tools such as software, computers, the internet, and telephones to organize communication between patients and hospital staff, making it more efficient and effective. Overall, the combination of technology and health has the potential to bring numerous benefits to humanity.

1.1 Problem definition

The main objectives of my project are to improve the relationship between patients and doctors, increase organizational efficiency, and facilitate traceability. I plan to facilitate communication not only between doctors and patients, but also between other hospital employees such as secretaries, nurses, and managers. Additionally, my project aims to make patient documents more easily accessible. There are various needs on both the hospital and patient side that this project aims to address, including the desire for time-saving and efficient technology-based solutions rather than reliance on paper. The resulting product is expected to be highly beneficial, providing benefits such as improved time management, efficient information exchange, enhanced customer satisfaction, and increased employee comfort.

Example-Problems:

- The decline in traditional data storage methods has created a need for data management software in hospitals.
- In particular, storing personal data using old methods takes up a lot of space, which is an undesirable problem.
- In addition, there are problems with interactive communication between patients and doctors, and processes such as reviewing a patient's medical history and prescribing new medications by doctors and secretaries progress slowly.
- Cancellation of appointments upon patient request or in case of emergencies is an unknown situation.

- Therefore, the need for systematization has arisen due to the slow and error-prone nature of feedback made through human channels.

The project I developed is currently available in the market, however, its effectiveness is debatable due to several shortcomings. My aim for this project is to address and resolve these issues in a practical and user-friendly manner, by creating solutions to the problems mentioned above.

1.2 Goals

The main goal of this project is to develop a user-friendly and practical doctor appointment booking system. The system should be easy to use for all users, including those who may not be technologically proficient. To achieve this, the following objectives will be pursued:

- User-friendly interface: A user-friendly interface will be designed to make it easy for users to find and navigate the system.
- Fast information sharing: The system will use database systems to efficiently store and share information between doctors, secretaries, and patients.
- Time-saving: The system will be designed to save time, money, and resources for all parties involved.
- Better appointment management: The system will improve appointment management for both patients and doctors by reducing errors and making it easier to manage all appointments and reservations.
- Improved sessions: By managing time more effectively, the system will enable better sessions between doctors and patients.

2. Literature Survey

Doctor appointment management systems are computer-based systems that facilitate the planning and management of appointments between healthcare providers and patients. These systems have become increasingly popular in recent years due to the growing demand for efficient and convenient healthcare services. Using a doctor appointment management system can provide a range of benefits for both patients and healthcare providers. For patients, these systems allow for easy booking and rescheduling of appointments, as well as online access to appointment information and medical records. For healthcare providers, doctor appointment management systems can reduce workload and improve the efficiency of the appointment process, allowing for more time to be devoted to patient care **[2].**

Doctor appointment management systems can be divided into two main categories: standalone systems and integrated systems. Standalone systems are specifically designed for appointment scheduling and management, while integrated systems are part of a larger electronic medical record system and offer additional features such as electronic prescribing and medical billing. There have been numerous studies on the effectiveness of doctor appointment management systems, which have found that these systems can improve the efficiency and convenience of the appointment process and patient satisfaction with healthcare services. However, there are also potential drawbacks to consider, such as the initial cost of implementing the system and the ongoing maintenance and updates that may be required.

Overall, doctor appointment management systems offer numerous benefits for both patients and healthcare providers, and while there may be some initial costs and challenges involved in implementing these systems, the potential long-term benefits are likely to outweigh any potential disadvantages.

Compare1 - 10to8:

- Allows customers to book appointments online through a customizable booking page
- Integrates with Google Calendar and other calendar apps
- Automated SMS and email reminders for customers and staff
- Offers real-time availability checking
- Provides analytics and reporting on appointments and customer data

Compare2 - Picktime:

- Provides a customizable booking page for customers to book appointments online
- Integrates with Google Calendar and other calendar apps
- Offers automated SMS and email reminders for customers and staff
- Allows for online payments through various gateways
- Offers a loyalty program and customer management tools

Compare3 - Setmore:

- Provides a customizable booking page for customers to book appointments online
- Integrates with Google Calendar and other calendar apps
- Offers automated SMS and email reminders for customers and staff
- Allows for online payments through various gateways
- Provides a customer relationship management (CRM) tool to manage customer data and interactions

Overall, all three of this appointment scheduling software offer similar core features such as online booking, calendar integration, and automatic reminders **[3].** However, there are differences in pricing and available plans, as well as additional features and integrations. Some potential advantages of using appointment scheduling software include streamlining the appointment booking process for both the business and the customer, reducing the risk of double-booking or scheduling conflicts, automating reminders to reduce no-shows, and improving the organization's overall efficiency and productivity. On the other hand, there are also some potential drawbacks to consider, such as the need for a reliable internet connection, the cost of the software (if it is not offered for free), the learning curve involved in setting up

and using the software, and any limitations or constraints on the features or customization options offered by the software.

Finally, I would like to talk about my own project. Of course, since I am not working with a professional team and have limited time, there are some areas where my project falls short compared to the software mentioned above. In general, I have observed that these other software products have user interfaces that are difficult to use, and some features are only available in paid versions, which can be costly for users. On the other hand, my project will be more user-friendly, functional, and free compared to the above software. In project, appointment reminder notifications for patients, statistics that provide convenience for admin and data that provide business practicality for doctor & secretary. It will also speed up communication between doctors and their patients, allowing for a more efficient examination process. I think this addresses an important gap and is in line with the primary goal of this kind of software: to positively contribute to people living more comfortable and practical lives. This is also my primary goal.

3. Background Information

3.1 Required software

- **PHP:**

  I will be using PHP as my primary programming language because it is widely used for web development and can easily be embedded into HTML files **[4]**.

- **HTML:**

  I have also chosen to use HTML for creating and displaying content and images on web pages in browsers **[5]**.

- **CSS:**

  CSS, another important markup language, will allow me to customize the style and appearance of my website pages according to my own rules and imagination.

- **JavaScript:**

  JavaScript will be useful for implementing complex coding on the web, reducing server interaction and response times, and improving user experience **[6]**.

- **MySQL:**

  I have selected MySQL as my database of choice because it is quick to install and manage, free to use, and commonly used in the web field, particularly in conjunction with PHP.

3.2 Other software

- **BitBucket:**

  I selected Bitbucket because it is a free and useful web-based network storage service that utilizes the Git version control system **[7]**.

- **Git:**

  Git is a widely used tool in software development, and it allows me to easily access previous versions of my projects by making copies of the step-by-step versions. In addition, I know that I will encounter Git frequently in my future professional life.

- **AdobeXD:**

  AdobeXD allows me to visualize and plan the interfaces of my project, and it is a very helpful resource for me **[8]**.

- **XAMPP:**

  I am using XAMPP to set up a PHP development environment for web services and establish a connection to the database. It provides me to all of the necessary software components for this purpose **[9]**.

3.3 Hardware

- **An up-to-date web browser:** Google Chrome, Mozilla, Microsoft Edge, Android and iOS mobile browsers.
- **An up-to-date operating system:** Windows7-8-10-11, Mac OS 10, Linux.
- **Internet connection:** An internet connection with a bandwidth of at least 1 or 2 Mbps to perform any operation.

4. Modules

4.1 Authentication Module

4.1.1 **Admin Authentication:** My project will have a super admin, who will have top-level authority over everything. The login screen interface for the super admin will be different from the others, and when an admin authenticates, he will be redirected to the admin homepage. **[redirected to 4.2.1]**

4.1.2 **Doctor and Secretary Authentication:** Doctors and secretaries will have similar levels of authorization. When they authenticate and log in, they will be redirected to their own customized homepage. **[redirected to 4.2.2]**

4.1.3 **Patient Authentication:** Patients are the least authorized users. After authenticating, each patient will be directed to their own homepage. **[redirected to 4.2.3]**

4.2 Dashboard Module: All homepages will have a fixed menu bar. This menu bar will be used to switch to other modules.

4.2.1 **Admin Dashboard:** The admin will be able to see some statistics about the system on the homepage and will also be able to switch between the modules he is authorized to access (Dashboard, Manage Users, Manage Appointments, Schedules).

4.2.2 **Doctor and Secretary Dashboard:** Doctors and Secretaries will see statistics about their patients and appointments on their homepage, and they will also be able to switch between the modules they are authorized to access (Dashboard, My Appointments, My Schedule Sessions, My Patients, Profile).

4.2.3 **Patient Dashboard:** Patients will see small details of their appointments on their homepage and will also be able to switch between the modules they are authorized to access (Dashboard, My Appointments, Profile).

4.3 Appointment Module

4.3.1 Admin: Can view, edit, or cancel all appointments and also send notification for remind appointment in this module.

4.3.2 Doctor and Secretary: Can view, edit, cancel and send a remind notification the appointments they have received in this module.

4.3.3 Patient: Can create appointments in this module, view current appointment, edit, or cancel the appointments they have created.

4.4 Schedule Module

4.4.1 Admin: Can edit, remove doctors' sessions.

4.4.2 Doctor and Secretary: In this module, the doctor schedules, removes or organizes his/her sessions or delegates these tasks to the secretary.

4.5 Profile Module: By clicking on this module, the logged-in user will be able to see and edit their profile information also see record history.

5. Risk Analysis

There are several potential risks associated with my project (doctor appointment booking system). Some of these risks are as follows:

- If the system is not user-friendly and users cannot easily find what to do within the system, the utilization rate will decrease.
- A doctor appointment booking system should store users' information with security. If patients' sensitive information is not secured, then bad results will occur.
- If too many users use the system, it may not be able to handle it. Sudden crashes, system failures may occur.
- If a hospital is already using a doctor appointment booking system, we may have synchronization problems when switching to my system.
- Developing and maintaining the system can be costly as it is a large project requiring a large number of database transactions. Therefore, there may be budget problems for those who buy the system.

6. Ethics

The concept of ethics in technology and health is complex. When developing a technological project in the health sector, it is important to be conscious of responsibility and consider the ethical implications. Below, I have listed some important ethical considerations for a doctor appointment booking system:

- Patients' personal data and disease histories should be stored and processed confidentially. The hospital should only share this data with authorized persons (doctors and secretaries) and it should not be used for any other purpose. This is called privacy and confidentiality **[11]**.
- System users have the right to be informed about every action they take. This is called "informed consent". The system owner should inform patients about how to use the system and ensure that they receive digitally healthy services **[12]**.
- Patients should have equitable access to all technological health services regardless of their economic, cultural, sociological or any other personal characteristics. This is known as accessibility **[13]**.
- A doctor appointment booking system should not discriminate against any group or individual and should be designed in a way that is equal, fair, and equitable for all users. This is called fairness and non-discrimination **[14].**
- Hospitals should transparently inform patients about how technology is used in healthcare. Transparency is important in healthcare **[15].**
- Technological interventions in health should be developed and utilized in a socially responsible manner and with due consideration of their impact on society as a whole. This is called social responsibility **[16].**

Overall, it is extremely important to adhere to these ethical guidelines when developing and implementing a health technology project. The rights of patients, doctors, and all other users must be respected and protected **[17].**

7. Conclusion

7.1 Benefits

a. Benefits to users:

1. There will be more efficient communication between all users.
2. By leveraging the benefits of programming, we can eliminate old-style paperwork for data storage.
3. Doctors will be able to spend more time with their patients.
4. Thanks to the user-friendly interface, every user will be able to easily do what they want.
5. Hospital operation will be better managed from the admin panel with various statistics.

b. Benefits to me:

1. I will learn the process and operation of installing a database.
2. I will learn web interface design.
3. I will learn how to download and install something from a website.
4. I will learn better by practicing with the HTML, CSS, and JavaScript trilogy.
5. By working on both front-end and back-end on my own, I will gain experience as a full stack web developer.

One of the main factors that led me to choose this project was based on a personal challenge. When I had to go to the hospital or any other healthcare institution where I live, I noticed that they managed appointments using very irregular and outdated methods. In today's digital age, it seems strange that some companies are unable to modernize their practices.

As a result, I decided to undertake this project with the goal of making people's lives easier and reducing time loss through more efficient appointment management **[18]**.

7.2 Future Works

The development and improvement of software can be an ongoing process. Of course, the resulting software will have problems. The first goal will be to try to fix the problems and glitches that arise. Then, I can add things to my project in the future:

- ✓ It can be made into a mobile application that is compatible with both Android and iOS.
- ✓ A part of the system can be created where the doctor and patient can chat with each other.
- ✓ The system can be made faster, more reliable, and more useful.
- ✓ The buyers of the system may have more than one hospital, and it is possible to expand the system by creating shared servers and databases.

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