International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

A DOCTOR PATIENT PORTAL FOR EFFECTIVE HEALTHCARE

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Abstract— In large hospitals, massive staff members and doctors are present. Efficient management of time and scheduling of tasks becomes a very tough task. At present, a person sick from any disease needs to visit the hospital to book an appointment. All the patients need to wait in a queue while getting an appointment. In case that a doctor calls off an appointment due to some emergency reasons then the patient remains unaware about the cancellation of the appointment till the time he or she visits the hospital. Also whenever the patient visits the doctor he or she is asked to bring their prescriptions. Doctors don't keep a record of when the patient last visited him for an appointment. Doctors are unaware of who all will visit him on a given day and hence are unable to manage the appointments accordingly. Doctors are not able to access the patient details and medical history until and unless he/she checks the medical report. Sometimes patients are not able to book appointments according to their convenience. The patients don't have the liberty to reschedule their scheduled appointment in case of any emergency. In case the patient requires an organ then he/she doesn't have a record of all the potential organ donors. We have designed an Efficient doctor patient portal which is able to manage and help doctors along with patients.

I. INTRODUCTION

IN THE RAPIDLY EVOLVING LANDSCAPE OF HEALTHCARE, THE INTEGRATION OF TECHNOLOGY HAS BECOME INDISPENSABLE. ONE SUCH INNOVATION THAT IS RESHAPING THE DOCTOR-PATIENT RELATIONSHIP AND STREAMLINING HEALTHCARE PROCESSES IS THE DOCTOR-PATIENT PORTAL. THIS DIGITAL PLATFORM SERVES AS A CENTRALIZED HUB WHERE PATIENTS CAN SECURELY ACCESS THEIR MEDICAL RECORDS, COMMUNICATE WITH HEALTHCARE PROVIDERS, SCHEDULE APPOINTMENTS, REQUEST PRESCRIPTION REFILLS, AND MORE, ALL FROM THE CONVENIENCE OF THEIR COMPUTER OR MOBILE DEVICE.

The doctor-patient portal represents a paradigm shift in healthcare delivery, offering unprecedented levels of accessibility, efficiency, and patient engagement. By empowering individuals to take a more proactive role in managing their health, these portals foster collaboration between patients and providers, leading to improved outcomes and satisfaction.In this exploration, we will delve into the myriad benefits of doctor-patient portals, examine their impact on healthcare delivery, and explore the implications for both patients and healthcare professionals. From enhancing communication and coordination of care to facilitating remote consultations and reducing administrative burdens.

A. *EXISTING SYSTEM*

Previously, before the advent of online booking systems, scheduling appointments for patients in hospitals was primarily a manual process. Patients would either visit the hospital in person or call the hospital's reception desk to request an appointment with a doctor. Hospital staff, typically receptionists or appointment schedulers, would then check the availability of the desired doctor and assign the patient a suitable appointment time based on the doctor's schedule and the patient's preferencesThis process often involved navigating through paper-based appointment books or using rudimentary electronic scheduling systems. Appointment slots would be penciled in manually, and any changes or cancellations would require updates to be made

by hand. Consequently, there was a higher risk of scheduling errors, overbooking, or double-booking appointments. In cases where a doctor needed to cancel or reschedule an appointment due to unforeseen circumstances, such as emergencies or scheduling conflicts, patients would generally only be informed upon arrival at the hospital for their appointment. This lack of advance notice could inconvenience patients and lead to frustration, as they might have rearranged their schedules or made other arrangements to attend the appointment.

1. *DRAWBACKS*

- **Limited Accessibility:** Patients had to physically visit the hospital or call during operating hours to schedule appointments, which could be inconvenient, especially for those with busy schedules or mobility issues.
- **Long Wait Times:** Without the ability to view real-time availability, patients often faced long wait times for appointments, as they relied on hospital staff to find suitable slots based on limited information.
- **Higher Risk of Errors**: Manual scheduling systems were prone to errors such as double-bookings, overbookings, or scheduling conflicts, leading to confusion and frustration for both patients and staff.
- **Lack of Flexibility**: Patients had little flexibility in rescheduling or canceling appointments, as changes had to be communicated directly with hospital staff during operating hours, potentially leading to missed appointments or noshows.

B. *PROPOSED SYSTEM*

The proposed system incorporates a user-friendly patient portal that enables users to manage their appointments and access their medical records securely. Here's how the system would function from a user perspective:

User Registration and Login

Appointment Booking

Access to Medical Records

Secure Communication

Appointment History and Billing

Permission Management

Appointment Reminders and Alerts

1. *ADVANTAGES*

Convenience: Patients can conveniently schedule appointments, access medical records, and communicate with healthcare providers from anywhere with an internet connection, reducing the need for physical visits or phone calls. Reduced Administrative Burden: By allowing patients to schedule appointments and manage their records online, the portal reduces the administrative workload on hospital staff, freeing up time for other tasks.

Improved Communication: Patients can securely communicate with healthcare providers through the portal, asking questions, requesting refills, or sharing concerns, leading to better communication and understanding of their healthcare needs.

Enhanced Patient Engagement: Empowering patients to access their medical records and take an active role in their healthcare fosters greater engagement and responsibility for their well-being, leading to better health outcomes.

Streamlined Appointment Management: The portal streamlines the appointment scheduling process, reducing wait times, minimizing scheduling errors, and optimizing the utilization of healthcare providers' time.

Better Coordination of Care: Access to comprehensive medical records allows for better coordination of care among healthcare providers, ensuring continuity and consistency in treatment plans and improving the overall quality of care.

Increased Patient Satisfaction: Providing patients with convenient access to appointment scheduling and medical records improves their overall experience with the healthcare system, leading to higher satisfaction levels and loyalty to the hospital or healthcare facility

II. LITERATURE SURVEY

Physician Empathy in Doctor-Patient Communication:

AUTHORS: Xin Zhanga , Linzi Lib , Quan Zhangc , Long Hoang Led , and Yijin Wu

YEAR : 16 Apr 2023

Physician empathy is at the heart of doctor-patient communication and significantly influences patient outcomes. However, the research on how physicians express their empathy and how physician empathy affects patient outcomes and doctor-patient communication has not been well summarized in the latest literature. Thus, we conducted a systematic review to synthesize existing studies on physician empathy and its value to patient outcomes and doctor-patient communication. The systematic review consisted of studies published in English peer-reviewed journals between January 2017 and October 2021. Following the PRISMA procedure, a total of 3055 articles were retrieved, and 11 articles were retained. The thematic analysis revealed three emergent themes: physicians' empathic expressions; patient outcomes (patient functional status, patient safety, and patient satisfaction); and empathy enhancing doctor-patient communication. This study highlighted the different ways empathy may be expressed by physicians and its positive effects on patient outcomes and doctor- patient communication. This study also suggested the under-researched areas that can be expanded in the future

A Doctor Patient Portal for Effective Healthcare

AUTHORS:Shamsuddin Mohammed Taiser, Md. Tarequl Islam, Muhammad Kamrul Hossain Patwary, Md. Sabir Hossain

YEAR: December 2007

Health care is an essential thing in life. Estimations suggest that health make a contribution numerous years to life expectancy. It additionally makes contributions possibly even greater to improving many human beings practical capability and fine of lifestyles. In Bangladesh, the health care machine is especially provided with the aid of the government with a very little price. However, this comes with many headaches. The huge number of sufferers makes it hard for the authorities hospitals to offer them with satisfactory fitness care. As an end result, lots of private hospitals are mounted so that you can meet the developing need of the loads for pleasant health care. But whilst one wish to take carrier from a clinic, he first attempts to collect a few statistics about that hospital. To reduce the health care problems in Bangladesh, we have developed a web-based application named doctor-patient portal for effective healthcare. Lengthy waiting times for registration to look a health practitioner are problematic in Bangladesh, specifically in tertiary hospitals. To address this difficulty, a web-based appointment device turned into evolved l. the intention of this examine turned into to analyze the efficacy of the web-primarilybased appointment gadget inside the registration provider for outpatients. This application will provide: Online doctor appointment system, Information approximately the physician's chamber in a town a manner to make an appointment with the doctor SMS notification for users booking confirmation, Find available blood donor, Information about the ambulance service provider.

III. REQUIREMENT AND ANALYSIS

HARDWARE REQUIREMENTS

- Processor : Minimum Intel i5
- RAM : Min 8 GB
- Hard Disk : 500 GB

SOFTWARE REQUIREMENTS

- Operating System : Windows 10
- Technology Used : Java,JSP,Servlet,HTML,CSS
- IDE : Eclipse IDE for Java EE Developers
- Framework /Libraries : Bootstrap 5, Servlet-MVC
- Data Base : MYSQL
- Server : Apache Tomcat

SYSTEM ARCHITECTURE

An allocated arrangement of physical elements which provides the design solution for a consumer A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. System architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system. There have been efforts to formalize languages to describe system architecture; collectively these are called architecture description languages (ADLs).

Various organizations define systems architecture in different ways, including:

- Product or life-cycle process intended to satisfy the requirements of the functional architecture and the requirements baseline.
- Architecture comprises the most important, pervasive, top-level, strategic inventions, decisions, and their associated rationales about the overall structure (i.e., essential elements and their relationships) and associated characteristics and behaviour.
- If documented, it may include information such as a detailed inventory of current hardware, software and networking capabilities; a description of long-range plans and priorities for future purchases, and a plan for upgrading and/or replacing dated equipment and software

The composite of the design architectures for products and their life-cycle processes.

3.2.Table Design:

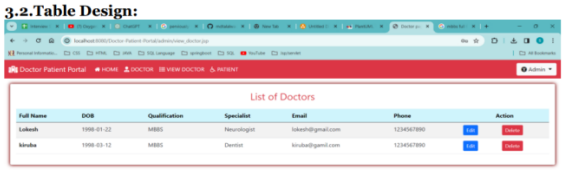


Table 3.2.1- Table Design

Fig 3. Storing of Data

USECASE DIAGRAM

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a systemand the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses.

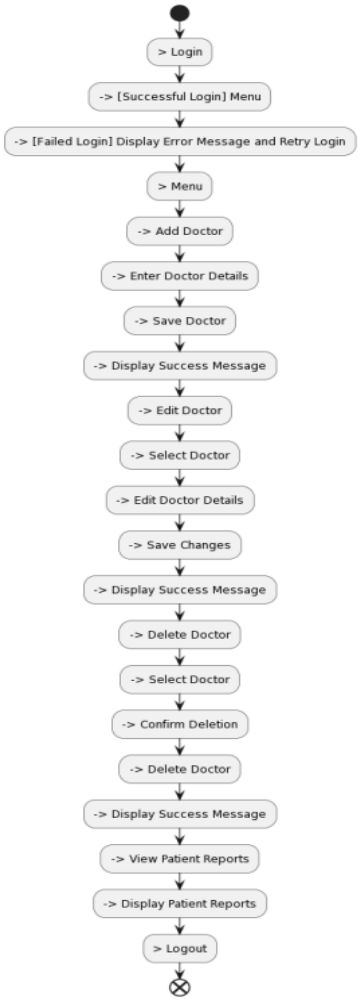
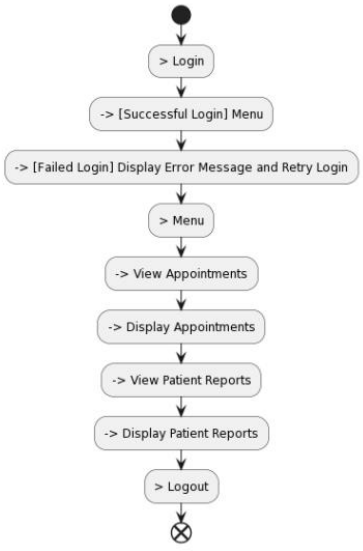


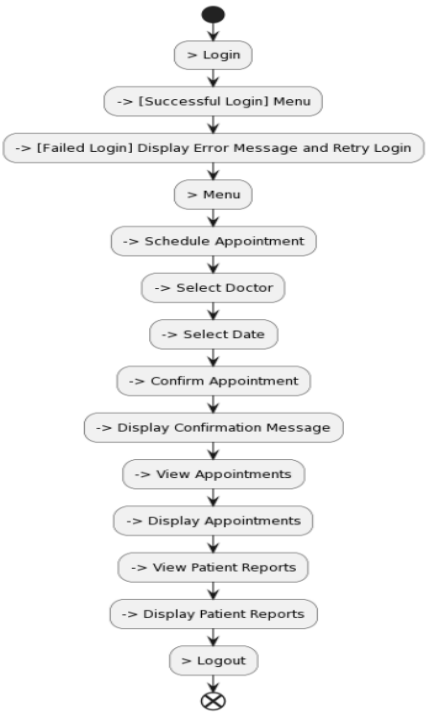
Fig 4. Usecase Diagram

DoctorModule:



2. Appointment Module:

3. . User Module:



IV. DESIGN & MODULE DESCRIPTION

Systems implementation is the process of: defining how the information system should be built (i.e., physical system design), ensuring that the information systemic operational and used, ensuring that the information system meets quality standard (i.e., quality assurance).Implementation is the process that actually yields the lowest-level system elements in the system hierarchy (system breakdown structure). System elements are made, bought, or reused. Production involves the hardware fabrication processes of forming, removing, joining, and finishing, the software realization processes of coding and testing, or the operational procedures development processes for operators' roles. If implementation involves a production process, a manufacturing system which uses the established technical and management processes may be required. The purpose of the implementation process is to design and create (or fabricate) a system element conforming to that element's design properties and/or requirements.

A. *MODULES*

- Admin Module
- Doctor Module
- Appointment Module
- User Module

1) *MODULE DESCRIPTION*

1. **Admin Module:**
   • This module allows administrators to manage doctors and view patient reports.
   • Functionalities
   • Add, edit, or delete doctors.
   • View all patients' reports.
   • Interaction with other modules
   • Communicates with the Doctor Module to perform doctor management tasks.
   • Retrieves patient reports from the Appointment Module.
2. **Doctor Module:**
   • This module is for doctors to manage their appointments and view patient reports
   . • Functionalities
   • View scheduled appointments.
   • View patient reports for their appointments.
   • Interaction with other modules
   • Communicates with the Appointment Module to retrieve appointment information.
   • Communicates with the Admin Module to update their profile or availability
3. **Appointment Module:**
   • This module handles appointment scheduling between users (patients) and doctors.
   • Functionalities
   • Allow users to select a doctor and schedule appointments
   . • Store appointment details including date, time, doctor, and patient information.
   • Interaction with other modules
   • Receives appointment requests from the User Module.
   • Provides appointment information to the Doctor Module for display.
4. **User Module:**
   • This module is for users (patients) to interact with the system and schedule appointments.
   • Functionalities
   • Select a doctor and schedule appointments.
   • View their scheduled appointments and corresponding reports.
   • Interaction with other modules
   • Communicates with the Appointment Module to schedule appointments
   . • Retrieves patient reports from the Appointment Module.
   • Provides user authentication and access control.

V. IMPLEMENTATION

A.*FRONT END*

1.*HTML*

The HyperText Markup Language, or HTML(HyperText Markup Language) is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags, written using angle brackets. Tags such as <img /> and <input /> directly introduce content into the page. Other tags such as <p> surround and provide information about document text and may include other tags as sub-elements. Browsers do not display the HTML tags, but use them to interpret the content of the page.

2.*CSS*

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs,variations in display for different devices and screen sizes as well as a variety of other effects.

A. *BACK END*

1. MySQL: MySQL is a popular open-source relational database management system (RDBMS). It allows users to store, retrieve, and manipulate data using SQL (Structured Query Language). MySQL is known for its reliability, scalability, and performance, making it suitable for a wide range of applications from small websites to largescale enterprise systems. It supports features like transactions, indexing, replication, and clustering for managing and optimizing data storage and retrieval.

2. Java: Java is a versatile, platform-independent programming language known for its simplicity, reliability, and security. It follows the "Write Once, Run Anywhere" principle, meaning Java code can be compiled into bytecode that runs on any device with a Java Virtual Machine (JVM). Java is used in a variety of applications, including web development, mobile app development (Android), enterprise software, and more. It offers features like object-oriented programming, multithreading, exception handling, and automatic memory management (garbage collection) for efficient and robust application development

3.JSP (JavaServer Pages): JSP is a technology used for creating dynamic web pages with Java. It allows embedding Java code within HTML pages using special tags (e.g.,) to generate dynamic content. JSP pages are compiled into servlets by the web container (e.g., Apache Tomcat) during runtime. JSP simplifies the development of dynamic web applications by providing a familiar HTML-based syntax with the power of Java for server-side processing

4.JSP Tag Libraries: JSP Tag Libraries (JSTL) provide a set of custom tags that simplify common tasks in JSP

pages. These tags encapsulate complex Java logic into reusable components for common tasks like iteration, conditional logic, formatting, and internationalization. JSTL tags enhance the readability and maintainability of JSP code by separating presentation logic from business logic

5.Java EE (Enterprise Edition): Java EE is a set of specifications and APIs (Application Programming Interfaces) for building enterprise-level Java applications. It provides a platform for developing distributed, scalable, and secure applications for the enterprise. Java EE includes specifications for web services, servlets, JSP, EJB (Enterprise JavaBeans), JPA (Java Persistence API), JMS (Java Message Service), and more. It offers features like container-managed transactions, security, and resource management for building robust and scalable enterprise applications.

6.Java Web Technologies: Java web technologies encompass various frameworks and APIs for building web applications using Java. This includes technologies like servlets, JSP, JSF (JavaServer Faces), JPA (Java Persistence API), JDBC (Java Database Connectivity), and more. These technologies provide the foundation for developing dynamic, interactive, and scalable web applications in Java.

7.Servlets: Servlets are Java classes that extend the functionality of web servers to generate dynamic web content. They handle requests and responses between a web client (e.g., browser) and a web server, processing user input and generating dynamic responses Servlets are the foundation of Java web development and are commonly used for implementing business logic, data processing, and application control in web applications.

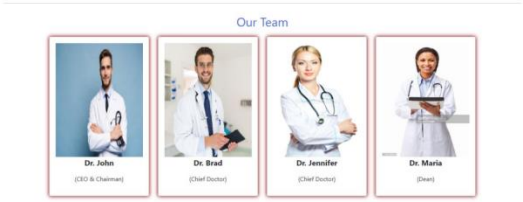
8. Advanced Java: Advanced Java typically refers to more specialized topics and concepts in Java programming beyond the basics. This may include topics like multithreading, networking, JDBC (Java Database Connectivity), Java RMI (Remote Method Invocation), JavaMail API, and more. Advanced Java topics are essential for building sophisticated and featurerich applications, especially in enterprise and distributed computing environments.

9.Servlet-MVC (Model-View-Controller): Servlet-MVC is a design pattern used in Java web applications for separating concerns into three distinct components: Model, View, and Controller. Model represents the data and business logic of the application. View is responsible for presenting the user interface to the user. Controller handles user input, processes requests, and coordinates communication between the Model and View components. Servlet-MVC promotes modularity, scalability, and maintainability in web applications by separating different aspects of the application's logic and presentation

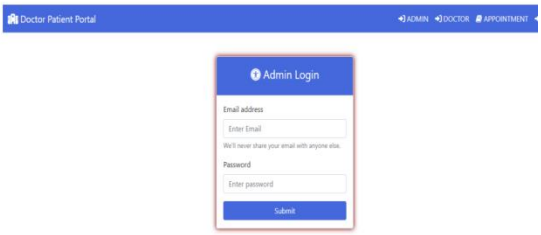
10.Bootstrap 5: Bootstrap is a popular front-end framework for building responsive and mobile-first websites and web applications. Bootstrap 5 is the latest version, providing a collection of CSS and JavaScript components for layout, typography, forms, buttons, navigation, and more. It simplifies the process of creating modern and visually appealing user interfaces by providing pre-designed and customizable UI components. Bootstrap is widely used by developers to create responsive, crossbrowser compatible, and aesthetically pleasing web designs with minimal effort

B. *SCREENSHOTS*

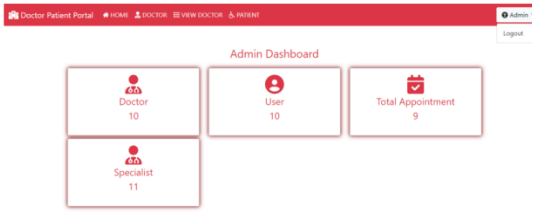
Some key Features of our Doctor Patient Portal



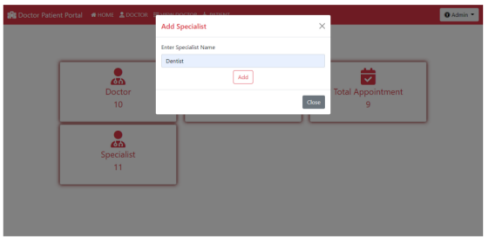
Admin Login:



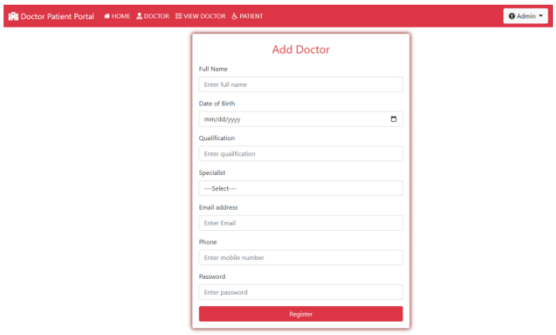
Admin Dashboard:



Add Specialist:



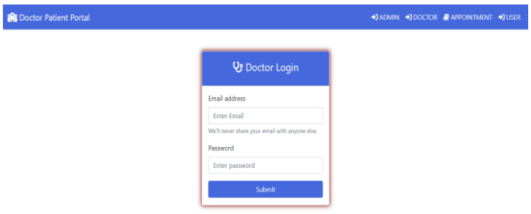
Add Doctor:



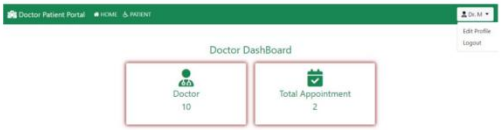
Doctor List:

No. of Patients Appointment:

Doctor Login:



Doctor Dashboard:



View list of Patient Appointment:

Edit/Change Profile Details:

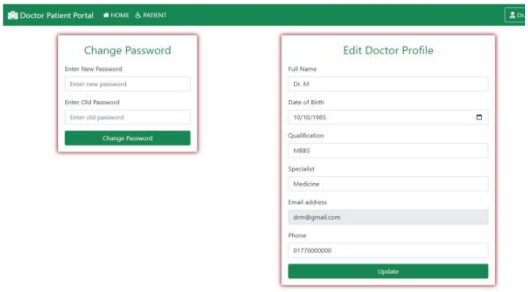
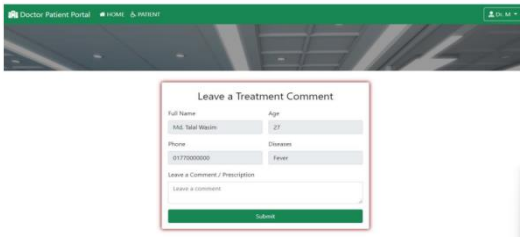
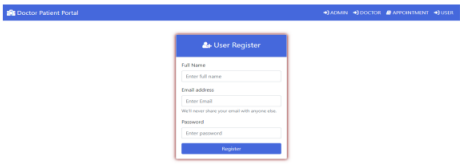


Figure 4.3.11

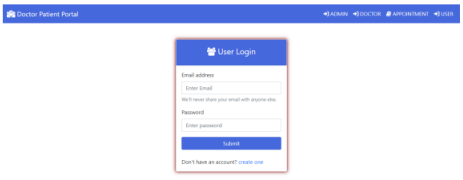
Prescribe medicine / Treatment Comment:



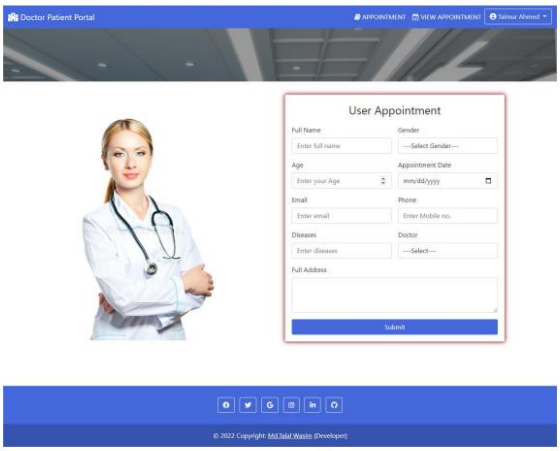
User Register first for Appointment Request:



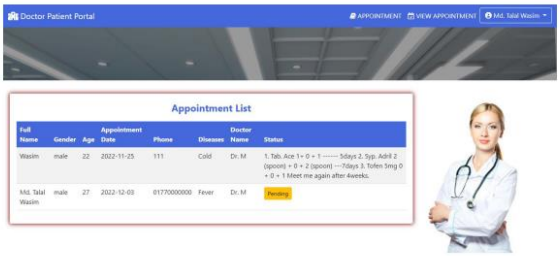
User Login:



Make Appointment Request:



View list of appointment



VI CONCLUSION AND FUTURE WORK

The Doctor-Patient Portal system holds significant potential for future enhancements and expansions

Telemedicine Integration: Integrating telemedicine features into the portal, such as video consultations and remote monitoring, can further enhance patient accessibility and healthcare delivery, especially in remote or underserved areas. AI and Analytics Integration: Leveraging artificial intelligence (AI) and data analytics capabilities can enable predictive health analytics, personalized treatment recommendations, and proactive healthcare management, enhancing patient outcomes and satisfaction. Mobile Application Development: Developing a dedicated mobile application for the portal can extend its reach and accessibility, allowing users to access services on-the-go using smartphones and tablets. Patient Engagement Features: Implementing features such as health education resources, wellness tips, and medication

reminders can promote patient engagement and adherence to treatment plans, leading to better health outcomes. Interoperability with Healthcare Ecosystem: Ensuring interoperability with electronic health record (EHR) systems, pharmacy systems, and other healthcare platforms can facilitate seamless data exchange and collaboration across the healthcare ecosystem, improving care coordination and efficiency.

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