আন্তর্জাতিক ইসলামী বিশ্ববিদ্যালয় চট্টগ্রাম

International Islamic University Chittagong

PROJECT REPORT

HOSPITAL MANAGEMENT SYSTEM

Course Code: CSE-3532

Course Title: Tools and Technologies for Internet Programming

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Overview

The **Hospital Management System** is a web-based application that allows patients to book online or offline appointments with doctors, manage their profiles, and receive email notifications. Doctors can view and update appointments and manage patient records.

How it is useful

The **Hospital Management System** is highly useful in real-time as it simplifies and speeds up the appointment process for both patients and doctors. Patients can instantly search for doctors, book appointments, and receive confirmations without visiting the hospital. Doctors can manage their schedules, update appointment statuses, and conduct online consultations efficiently. The system also ensures timely communication through automated email notifications and reduces paperwork with PDF confirmations. This real-time functionality improves patient experience, reduces waiting times, and enhances the overall efficiency of hospital operations.

Why This Project

We made the **Hospital Management System** project to streamline and digitalize the process of booking and managing medical appointments. In many hospitals, appointment scheduling, patient records, and communication between doctors and patients are still handled manually, leading to delays and inefficiencies. Our goal is to create a user-friendly web application that allows patients to easily book online or offline appointments, while giving doctors a platform to manage their schedules and communicate through email and Google Meet. By automating tasks like email notifications and PDF confirmations, the system enhances hospital workflow, improves patient care, and reduces administrative workload.

Technologies Used:

🖥️ Backend

- **Django** *(Python Web Framework)* — powering the backend APIs, models, and building logic
- **Django REST Framework (DRF)** — crafting clean and scalable RESTful APIs for the frontend
- **SQLite** — lightweight and efficient data storage solution

🎨 Frontend

- **HTML, CSS, JavaScript** — building interactive, responsive, and user-friendly web pages
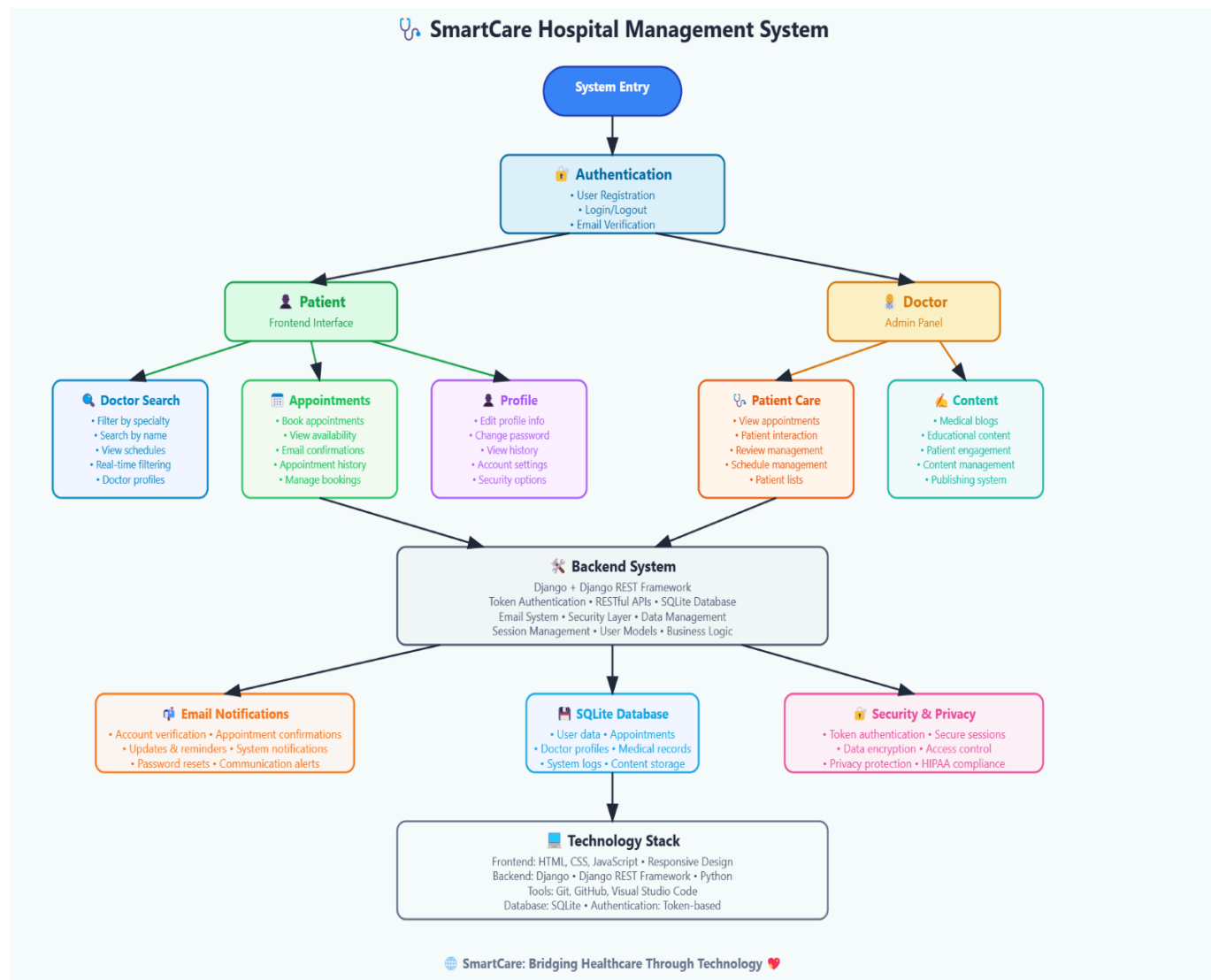
🔐 Authentication & Security

- **Django's built-in User model & authentication system** — robust and secure user management
- **Token Authentication (DRF)** — ensuring secure API access and user sessions
- **Email Verification System** — confirming user accounts through email to keep it safe and sound

🛠️ Tools & Environment

- **Git & GitHub** — seamless version control and team collaboration
- **Visual Studio Code** — your cozy IDE for coding and debugging with love 💖

Flowchart

SmartCare Hospital Management System

System Entry

🔒 **Authentication**
• User Registration
• Login/Logout
• Email Verification

👤 **Patient**
Frontend Interface

👤 **Doctor**
Admin Panel

🔍 **Doctor Search**
• Filter by specialty
• Search by name
• View schedules
• Real-time filtering
• Doctor profiles

📅 **Appointments**
• Book appointments
• View availability
• Email confirmations
• Appointment history
• Manage bookings

👤 **Profile**
• Edit profile info
• Change password
• View history
• Account settings
• Security options

🩺 **Patient Care**
• View appointments
• Patient interaction
• Review management
• Schedule management
• Patient lists

✏️ **Content**
• Medical blogs
• Educational content
• Patient engagement
• Content management
• Publishing system

🛠️ **Backend System**
Django + Django REST Framework
Token Authentication • RESTful APIs • SQLite Database
Email System • Security Layer • Data Management
Session Management • User Models • Business Logic

📧 **Email Notifications**
• Account verification • Appointment confirmations
• Updates & reminders • System notifications
• Password resets • Communication alerts

🗄️ **SQLite Database**
• User data • Appointments
• Doctor profiles • Medical records
• System logs • Content storage

🔒 **Security & Privacy**
• Token authentication • Secure sessions
• Data encryption • Access control
• Privacy protection • HIPAA compliance

🖥️ **Technology Stack**
Frontend: HTML, CSS, JavaScript • Responsive Design
Backend: Django • Django REST Framework • Python
Tools: Git, GitHub, Visual Studio Code
Database: SQLite • Authentication: Token-based

🌐 **SmartCare: Bridging Healthcare Through Technology** ❤️

Design Process

Our project, **SmartCare - Hospital Management System**, was carefully designed and developed through the following steps to ensure a smooth, user-friendly, and efficient healthcare experience:

1. **Requirement Gathering**
   We began by identifying the key needs of both patients and doctors — such as appointment booking, doctor search, profile management, and communication — to create a comprehensive feature list.

2. **System Design & Architecture**
   We designed a modular system architecture separating the frontend and backend, using Django REST Framework for APIs and a responsive frontend built with HTML, CSS, and JavaScript for a clean UI.

3. **Frontend Development**
   Created responsive web pages allowing users to search doctors, book appointments, manage profiles, and read blogs, with real-time API integration using JavaScript.

4. **Backend App & Model Setup**
   The backend was initialized by creating Django apps for different modules (e.g., patients, doctors, appointments).
   - Defined models for users, doctors, appointments, reviews, and blogs
   - Created **serializers** to handle data conversion between models and APIs

5. **Backend Development**
   Implemented RESTful APIs to handle authentication, appointment management, doctor profiles, and blog posting. Secure email verification and notification systems were integrated for smooth communication.

6. **Testing & Debugging**
   Conducted thorough testing on both frontend and backend to ensure functionality, usability, and security. Bugs were fixed promptly to deliver a stable product.

7. **Deployment & Documentation**
   Uploaded the complete project to GitHub with clear documentation, including README and project report, to assist users and future developers.

Future Plans & Next Phases

While **SmartCare** already offers essential features for hospital management, we have exciting ideas to expand and improve the system in future phases:

Phase 1: Enhanced User Experience

- **Live Chat Support** — Allow real-time chat between patients and doctors for faster consultations

- **Multi-language Support** — Make the platform accessible to a broader audience
- **Role-Based Dashboards** — Separate views for admin, patients, and doctors with personalized data
- **PDF Generation** — Allow users to download appointment confirmations and summaries in PDF format
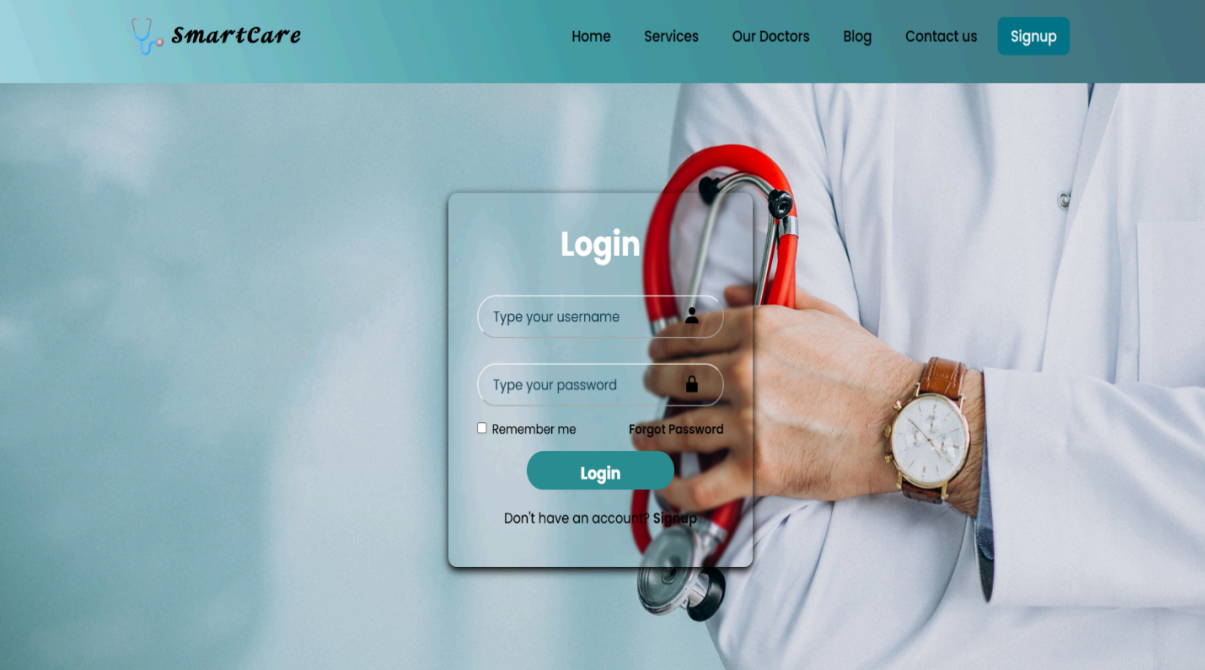
Phase 2: Improved Security & Authentication

- **Two-Factor Authentication (2FA)** — For an added layer of account protection
- **Password Reset via Email/SMS** — To help users securely regain account access

Phase 3: Advanced Features & Automation

- **Analytics Dashboard** — Display patient visit stats, doctor performance, and service usage
- **AI-based Appointment Suggestions** — Recommend the best available doctors based on symptoms
- **E-Prescription Module** — Doctors can issue digital prescriptions viewable by patients

Phase 4: Mobile App Development

- **Android & iOS App** — A fully functional mobile version of SmartCare for on-the-go access
- **Push Notifications** — For reminders, confirmations, and real-time updates

SmartCare

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Type your username

Type your password

☐ Remember me   Forgot Password

Login

Don't have an account? Signup

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X Ray
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MRI
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COVID 19 Test
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Conclusion

The Hospital Management System makes appointment booking and doctor-patient communication easier and more efficient. It helps improve hospital workflow through a secure, automated, and user-friendly platform.