

**SPL2 Project Proposal Form, 2024**  
**Institute of Information Technology (IIT)**  
**University of Dhaka**

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<p><b>Project Title:</b> SmileTrack: A Smart Dental Clinic Management System</p> <p><b>Motivation:</b> The motivation behind this project is to streamline the operations of dental clinics by reducing manual processes, improving patient care, and ensuring efficient management of dental treatments. By digitizing patient records, automating appointment scheduling, and offering modern features, this system not only enhances local clinic efficiency but also aligns with global trends towards smarter, tech-driven healthcare solutions.</p> <p><b>Project Description:</b></p> <p><b>Functional Requirements</b></p> <ol style="list-style-type: none"><li><b>1. User Management</b><ul style="list-style-type: none"><li>- Roles: Admin, Dentist, Dental Assistant, Receptionist, Patient.</li><li>- Authentication: Secure login for all roles with role-based access control.</li><li>- Profile Management: Allow users to view and update their profiles.</li></ul></li><li><b>2. Patient Management</b><ul style="list-style-type: none"><li>- Patient Registration: Allow patients to register, enter personal details, and create an account.</li><li>- Electronic Dental Records (EDR): Store and manage detailed dental records, x-rays, treatments, and history.</li><li>- Treatment Plans: Track current and past treatments, along with future treatment plans.</li></ul></li><li><b>3. Appointment Scheduling</b><ul style="list-style-type: none"><li>- Online Booking: Patients can view available slots and schedule appointments.</li><li>- Appointment Calendar: A calendar view for dentists and staff to manage bookings.</li><li>- Automated Reminders: Send SMS or email reminders for upcoming appointments.</li></ul></li><li><b>4. Dental Procedure &amp; Treatment Tracking</b><ul style="list-style-type: none"><li>- Procedure Management: Track each step of dental treatments, including start and end dates.</li><li>- X-ray &amp; Imaging Integration: Upload and store dental images within the patient's profile.</li></ul></li></ol>			

- Post-treatment Instructions: Automatically provide patients with follow-up care instructions.

## **5. Billing & Payment System**

- Invoice Generation: Automatically generate and display invoices after treatment.
- Payment Processing: Integrate with a payment gateway for quick and secure transactions.
- Insurance Management: Store patient insurance details and handle claims.

## **6. Staff Management**

- Task Assignment: Assign daily tasks to dental assistants and track their completion.
- Shift Scheduling: Manage dentist and staff schedules to ensure proper coverage.

## **7. Notifications & Alerts**

- Appointment Confirmations: Notify patients when appointments are confirmed or rescheduled.
- Dental Material Stock Alerts: Track supplies and notify staff when stock is running low.
- Follow-up Reminders: Send reminders to patients for their follow-up visits or dental hygiene checkups.

## **8. Patient Feedback System**

- Feedback Collection: Prompt patients to rate their experience and provide feedback after each visit.
- Analytics Dashboard: Show feedback metrics for continuous service improvement.

## **9. AI-Powered Dental Chatbot for Patient Assistance**

- AI Chatbot for Patient Queries: Assist patients with common dental concerns, appointment scheduling, and basic treatment advice via a chatbot integrated into the system.
- 24/7 Support: Provide real-time responses and guidance on dental hygiene, treatment FAQs, and follow-up care.
- Symptom Checker: Patients can describe symptoms to the chatbot, which suggests possible conditions and directs them to schedule an appointment if needed.

## **Mock Design for Key Features**

### **1. Patient Dashboard**

- Components: Upcoming appointments, dental history, current treatment plan, payment status.

- Design: A clean dashboard with quick access buttons to schedule appointments, view dental records, and communicate with the clinic.

- Illustration: Imagine a screen with a calendar on one side, a section for health history, and a messaging panel to interact with the clinic.

## **2. Appointment Scheduler**

- Components: A calendar showing available appointment slots, a list of available dentists, and options for booking appointments.

- Design: Drag-and-drop functionality for staff to quickly assign and reschedule appointments, with color codes to show availability.

- Illustration: A monthly calendar grid where each block represents an available appointment slot with dentist names beside the times.

## **3. Electronic Dental Records (EDR)**

- Components: Sections for medical history, x-rays, current dental issues, and notes from the dentist.

- Design: A tabbed layout where each tab represents a different section of the patient's dental health, with the ability to add new records.

- Illustration: A patient profile page with different tabs such as "History", "X-rays", and "Treatment Notes."

## **4. Billing Interface**

- Component: A breakdown of treatments, costs, insurance claims, and payment status.

- Design: A receipt-like interface showing a list of completed procedures, their costs, and a "Pay Now" button for processing payments.

- Illustration: A panel displaying treatment costs in a detailed invoice format, along with payment method options.

## **5. Doctor's Dashboard**

- Components: Today's schedule, patient list, treatment status, and voice-enabled note-taking.

- Design: A highly organized, interactive dashboard where dentists can track patient appointments and input real-time notes.

- Illustration: A screen with columns for patient names, appointment times, and a clickable button to view detailed patient records.

## **6. AI-Powered Chatbot Interface**

- Chat Window: Simple chatbot interface embedded on the homepage or accessible through the patient dashboard.

- Symptom Checker: Patients can describe symptoms and the AI suggests potential conditions or treatment recommendations.

## Strategy & Timeline:

### Phase 1: Requirements Gathering & Planning

- **Tasks:**
  1. Finalize system requirements with supervisor.
  2. Create initial wireframes/mock designs.
  3. Define system architecture and database schema.
  4. Set up project management tools

### Phase 2: System Setup & Basic User Management

- **Tasks:**
  1. Set up the development environment with React, Node.js, Express, and MongoDB.
  2. Implement user authentication and role-based access (Admin, Dentist, Patient, etc.).
  3. Design and build basic profile management

### Phase 3: Patient Management & Electronic Dental Records

- **Tasks:**
  1. Implement patient registration and profile creation.
  2. Develop the **Electronic Dental Records (EDR)** module to manage dental records, treatments, x-rays, etc.
  3. Integrate file upload functionality for x-rays and dental images.

### Phase 4: Appointment Scheduling System

- **Tasks:**
  1. Create the appointment booking system with a calendar view.
  2. Implement automated SMS/email appointment reminders.

3. Develop appointment rescheduling and cancellation functionalities.

## **Phase 5: Dental Procedure & Treatment Tracking**

- **Tasks:**
  1. Design and implement the **Dental Procedure Tracking** module, including treatment plans and post-treatment instructions.
  2. Add real-time progress tracking for ongoing procedures.

## **Phase 6: Billing & Payment System**

- **Tasks:**
  1. Develop the **Billing Interface** for generating invoices after treatments.
  2. Integrate a secure payment gateway for processing payments.
  3. Implement insurance claim management.

## **Phase 7: AI-Powered Dental Chatbot**

- **Tasks:**
  1. Design and integrate the **AI-powered chatbot** for patient assistance, enabling appointment scheduling and symptom checking.
  2. Ensure 24/7 support functionality with basic dental advice and FAQs.
  3. Test the chatbot for accuracy and user interaction.

## **Phase 8: Staff Management & Notifications**

- **Tasks:**
  1. Implement the **Staff Management** module, allowing admin to assign tasks and manage shifts.
  2. Set up notification alerts for low dental stock, follow-up reminders, and appointment confirmations.

## **Phase 9: Testing & Quality Assurance**

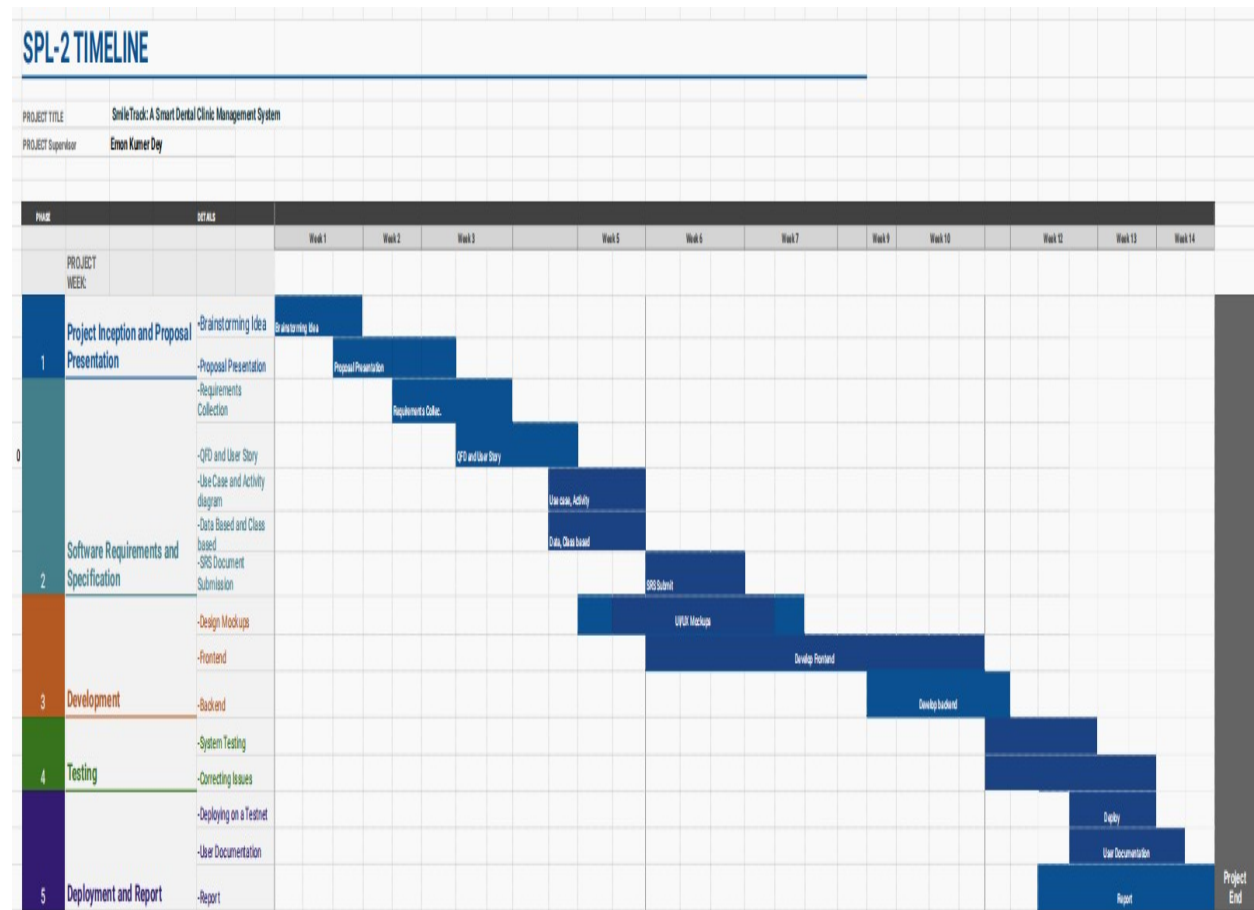
- **Tasks:**

1. Perform unit testing for each feature/module.
2. Conduct user acceptance testing (UAT) with dental staff.
3. Identify and fix bugs or performance issues.

## Phase 10: Deployment & Final Review

- **Tasks:**

1. Deploy the system to a live server (or cloud platform).
2. Conduct a final demo to the supervisor and get feedback.
3. Provide documentation



**Languages or Tools to be used:** HTML, CSS , JavaScript , React.js ,Node.js , Express.js, MongoDB, Git, GitHub, Visual Studio Code etc

**Supervisor's Name: Dr. Emon Kumar Dey**

**Signature of the supervisor:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Before the Midterm Presentation 1:**

I confirm that the progress is satisfactory and I am forwarding it for midterm presentation.

**Signature of the supervisor:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Proposal Presentation Feedback (if any) :**

**Midterm 1 Presentation Feedback (if any) :**

**Midterm 2 Presentation Feedback (if any) :**