ERD Problem Description for AI-Powered Medical Web Platform

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Introduction:

This document describes the **Entity-Relationship Diagram (ERD)** for an AI-powered medical web application. The platform facilitates interactions between doctors, patients, and hospital administrators, leveraging AI to analyze medical radiation images.

Key Entities and Attributes:

Patient:

- Stores patient & medical information, and appointments.
- Attributes include:
    - FullName,
    - gender
    - PatientId(PK)
    - phone number
    - Email,
    - Password
    - List Of Appointments
    - image
    - birthDate,
    - address,
    - identificationType,
    - identificationNumber,
    - identificationDocumentId,

- identificationDocumentUrl,
- emergency contact name,
- emergency contact number,
- privacy consent,
- occupation,
- insurance provider,
- insurance policy Number,
- allergies,
- currentMedication,
- familyMedicalHistory,
- pastMedicalHistory.

- **Actions:**
  - sign up
  - login
  - book Appointments
  - show Appointments
  - Receive notifications via email/SMS about their appointments and analysis results.
  - cancel Appointments
  - Give Feedback
  - Pay for appointment (stripe)
  - Show Patient History ⇒ {date, Doctor Name, Results, Work place name}

Doctor:

- Attributes include:

- FullName
- gender{enum},
- *DoctorID (PK)*
- phone number [multi value]
- Email,
- Password (hashed)
- 'List Of Appointments'
- image,
- address,
- birthDate,
- identificationType,
- identificationNumber,
- identificationDocumentId,
- identificationDocumentUrl,
- emergency contact name,
- emergency contact number,
- MedicalLicenseNumber
- Specialization
- work place{hospital or private clinic - Enum},
- identificationType,
- identificationNumber,
- identificationDocumentId,
- identificationDocumentUrl

Actions:

1. sign up
2. login
3. show patients appointments
4. provide appointments
5. upload image to model
6. send results to patients {sms, email, patient history}

HospitalAdmin:

Attributes:

- FullName
- gender{enum},
- *HospitalAdminID (PK)*
- phone number [multi value]
- Email,
- Password (hashed)
- image,
- birthDate,
- address,
- identificationType,
- identificationNumber,
- identificationDocumentId,
- identificationDocumentUrl,

- emergency contact name,
- emergency contact number,
- MedicalLicenseNumber
- Specialization
- work place{hospital or private clinic - Enum},
- identificationType,
- identificationNumber,
- identificationDocumentId,
- identificationDocumentUrl
- Department/Position

Actions:

1. View customer feedback.
2. View Doctors work.
3. Respond to feedback.
4. Manage Doctors.

Appointment:

Attributes:

1. AppointmentID {PK},
2. description,
3. AppointmentDateTime

4. Status (e.g., Confirmed, Cancelled)
5. Location,
6. PatientId (FK)
7. DoctorId (FK)
8. CreatedAt

MedicalImage: Stores the medical radiation images uploaded for analysis.

Attributes:

1. *ImageID (PK)*
2. PatientID (FK to Patient)
3. DoctorID (FK to Doctor)
4. AppointmentID (FK to Appointment, optional)
5. ImagePath or Blob Data
6. UploadDate

AIAnalysis

Contains the outputs from the AI model, including explainable elements like heatmaps and diagnosis insights.

Attributes:

1. AnalysisID (PK)
2. ImageID (FK to MedicalImage)

3. Diagnosis (text)
4. ConfidenceScore
5. HeatmapData (could be a URL or base64 string)
6. ExplanationDetails
7. AnalysisDate

Feedback: Captures feedback submitted by patients regarding their experience.

Attributes:

1. *FeedbackID (PK)*
2. PatientID (FK to Patient)
3. Message
4. Rating (optional)
5. SubmittedAt

Notification: Records the alerts sent to users regarding appointment statuses, analysis results, or feedback responses.

Attributes:

1. *NotificationID (PK)*
2. UserID (FK to User)
3. Type (Email or SMS)
4. MessageContent

5. SentDate

FeedbackResponse:

Attributes:

1. *ResponseID (PK)*
2. FeedbackID (FK to Feedback)

- HospitalAdminID (FK to HospitalAdmin)
- ResponseMessage
- RespondedAt
- Description: Allows hospital administrators to respond to patient feedback.

Relationships

- **Patient and Appointment:** One Patient can have multiple Appointments; each Appointment is linked to one Patient.
- **Doctor and Appointment:** One Doctor can have multiple Appointments; each Appointment is linked to one Doctor.
- **Patient and Medical Image:** One Patient can upload multiple Medical Images.
- **Doctor and Medical Image:** Each Medical Image is associated with the Doctor who requested the analysis.

- **Medical Image and AI Analysis:** One Medical Image leads to one AI Analysis output, representing the model's interpretation.
- **User and Notification:** Any User (Doctor, Patient, or Hospital Admin) can receive multiple Notifications.
- **Patient and Feedback:** A Patient can submit multiple Feedback entries.
- **Feedback and Feedback Response:** One Feedback entry can have one or more Feedback Responses from Hospital Admins.
