Medical Imaging AI Integration – Requirements Document

# 1. Functional Requirements

## User Requirements

### User Registration and Authenticatiaon

- Users (Radiologists, General Practitioners, Admins) must be able to register securely.

- The system must collect professional credentials, affiliation, and contact details.

- Multi-factor authentication (MFA) should be supported for enhanced security.

### Profile Management

- Each user should have a dashboard based on their role (e.g., Radiologist, Admin).

- Patient profiles must store medical history, previous diagnoses, and imaging results.

- Users can update personal info, manage notification preferences, and view activity logs.

### Medical Image Upload and Annotation

- The system should support uploading of DICOM, JPG, and PNG files.

- Users can upload single or batch images with drag-and-drop functionality.

- AI should automatically analyze images and provide overlays (bounding boxes, heatmaps).

### AI Communication and Analysis

- Integrate NLP-based assistant for clinical queries and follow-ups.

- Allow users to ask questions or describe symptoms related to the uploaded image.

- Provide transparent AI-generated diagnoses with confidence levels and visual justifications.

### Diagnostic Report Generation

- Auto-generate AI-based diagnostic reports with editable fields.

- Reports must include annotated images, confidence percentages, and clinician notes.

- Exportable in PDF or directly integrable with hospital EHR systems.

### Appointment & Follow-Up Scheduling

- Users can schedule appointments for secondary review or in-hospital visits.

- The calendar system must support reminders, rescheduling, and EMR sync.

### Role-Based Access Control

- Enforce different permissions based on user role (Viewer, GP, Radiologist, Admin).

- Limit access to sensitive data and AI results per compliance standards.

# 2. System Requirements

## Security & Privacy

- Data at rest and in transit must be encrypted (AES-256, TLS).

- Ensure compliance with HIPAA, GDPR, and other healthcare data standards.

- Enable audit logging for every data access or modification event.

## Scalability

- Use cloud-native architecture to scale with increased image upload and analysis demand.

- Handle concurrent processing of at least 1,000 scans without performance degradation.

## Cross-Platform Compatibility

- The system should work across desktop, mobile, and tablet platforms.

- Support major web browsers (Chrome, Firefox, Safari) and mobile OS (iOS, Android).