# 🩺 MediScan AI – Smart Pneumonia Diagnosis System 🩺

## Project Charter

### 1. Project Purpose and Objectives

Purpose:  
MediScan AI is designed to assist healthcare professionals by using Artificial Intelligence to detect pneumonia from chest X-ray images with high accuracy, speed, and reliability.

Objectives:

* - Develop an AI-powered diagnostic system for pneumonia detection.
* - Provide automated heatmap visualization to highlight infected regions.
* - Offer patient record management and progress tracking.
* - Enable comparative analysis between scans (before and after treatment).
* - Improve diagnostic efficiency and reduce human error in early pneumonia detection.

### 2. Project Scope

Included:

* - AI-based chest X-ray analysis using CNN models (DenseNet121, EfficientNetB0).
* - Web and mobile platforms for doctors and administrators.
* - Secure authentication and role-based access control.
* - Features: Upload, Analyze, Generate Reports, Compare Scans, Manage Patients.
* - Admin panel for system monitoring and performance analytics.

Excluded:

* - Real-time video analysis.
* - Non-X-ray-based medical imaging (CT, MRI).
* - Direct patient access (doctor-facing only).

Major Deliverables:

* - Functional AI diagnosis engine.
* - Responsive web and mobile applications.
* - Integrated NLP-based report generation system.
* - Admin monitoring dashboard.

### 3. Key Stakeholders

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| --- | --- |
| Stakeholder | Role / Responsibility |
| Project Sponsor | Provides funding, sets objectives |
| Project Manager | Oversees development, ensures milestones are met |
| AI Engineers | Develop and train CNN models for pneumonia detection |
| Backend Developers | Build API, integrate AI engine, manage data flow |
| Frontend Developers | Create responsive web and mobile interfaces |
| Doctors (End Users) | Use MediScan AI for diagnosis and reporting |
| System Administrator | Manages user accounts, monitors performance |

### 4. Project Manager and Team

Project Manager: Dr. Ahmed Hassan (AI Systems Specialist)

* - AI Developers: Responsible for CNN model training and deployment
* - Backend Engineers: Implement Flask/FastAPI APIs and data handling
* - Frontend Developers: Develop interfaces using React.js / Flutter
* - Database Engineer: Design PostgreSQL/MongoDB schema
* - QA Team: Conduct functionality, performance, and usability testing

### 5. Major Milestones and Timeline

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| --- | --- |
| Milestone | Target Completion |
| Requirement Gathering & Planning | Week 2 |
| System Design & Architecture | Week 4 |
| AI Model Training & Validation | Week 8 |
| Backend & API Integration | Week 10 |
| Frontend & Mobile App Development | Week 12 |
| Testing & QA Phase | Week 14 |
| Deployment & Final Review | Week 16 |

High-Level Schedule: 4-month project cycle.

### 6. Budget Overview

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| --- | --- |
| Component | Estimated Cost (USD) |
| AI Model Development | $3,000 |
| Web & Mobile App Development | $2,500 |
| Cloud Infrastructure (AWS, S3, EC2) | $1,200 |
| Database & Storage Setup | $800 |
| Testing & QA | $500 |
| Total Estimated Budget | $8,000 |

Constraints:  
- Limited dataset availability.  
- Cloud cost management.  
- Compliance with medical data privacy laws (HIPAA/GDPR).

### 7. Success Criteria

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| --- | --- |
| Metric / KPI | Target |
| AI Diagnosis Accuracy | ≥ 94% |
| Average Analysis Time | ≤ 10 seconds |
| Dashboard Load Time | ≤ 3 seconds |
| Uptime | ≥ 99% |
| User Satisfaction (Doctors) | ≥ 90% positive feedback |

### 8. Risks and Assumptions

Risks:

* - Model bias or misclassification due to limited dataset diversity.
* - Data security and patient privacy issues.
* - Internet dependency for cloud processing.

Assumptions:

* - Doctors have access to digital X-ray data.
* - Network connectivity is stable for cloud-based inference.
* - Medical institutions provide ethical and anonymized data.

Dependencies:  
- Availability of NIH and Kaggle chest X-ray datasets.  
- Cloud service reliability (AWS, Google Cloud).  
- Proper integration between AI, backend, and frontend systems.

### 9. Approvals and Sign-Offs

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| --- | --- | --- | --- |
| Role | Name | Signature | Date |
| Project Sponsor | Dr. Salma Youssef | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |
| Project Manager | Dr. Ahmed Hassan | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |
| AI Lead Engineer | Eng. Mohamed Ali | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |
| Backend Lead | Eng. Sara Ibrahim | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |
| Frontend Lead | Eng. Karim Tarek | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |