MedScope.AI – Prototype Version 1.0

Author: Venkata Sai Krishna Aditya Vatturi

# Abstract

MedScope.AI is a full-stack AI-powered tool designed to analyze and summarize medical documents including PDF reports and scan images (X-rays, CTs, MRIs). The system uses OCR, NLP, and computer vision to extract, process, and present concise health summaries to assist both clinicians and patients.

# Introduction

Many patients struggle to interpret complex medical reports, while doctors face significant review workloads. MedScope.AI addresses this by automating report summarization and diagnostic insight using artificial intelligence.

# Objectives

1. Develop an AI tool for analyzing medical text and images.  
2. Use NLP for extracting and summarizing medical language.  
3. Apply deep learning models to detect findings in scan images.  
4. Provide structured and simplified summaries.

# Methodology

1. OCR for Text Extraction: Converts scanned PDFs to readable text.  
2. NLP for Summarization: Highlights findings and simplifies text.  
3. Vision Model for Images: Processes scans and produces heatmaps.  
4. PDF Reporting: Generates downloadable reports.

# Tech Stack

Frontend: ReactJS + Tailwind CSS  
Backend: FastAPI  
NLP: HuggingFace Transformers (BioBERT)  
OCR: Tesseract  
Image Analysis: Custom X-ray CNN + Grad-CAM  
Export: jsPDF  
Deployment: Local Dev (prototype)

# Implementation Plan

1. ReactJS interface with multi-file upload support.  
2. FastAPI backend with OCR, NLP, and image models.  
3. Real-time loading screen with animated progress.  
4. Paginated result display with PDF export.

# Expected Outcomes

- Time-saving medical report reviews.  
- User-friendly explanations for patients.  
- Enhanced doctor-patient communication.  
- Improved accuracy in diagnostic support.

# Conclusion

MedScope.AI shows how AI can enhance healthcare analysis. The tool automates the extraction and visualization of medical insights, making critical information accessible to users. Future improvements may include real-time diagnostics, mobile accessibility, and EHR integration.