Implementation of AI-Powered Medical Diagnosis System

A Project Report

submitted in partial fulfillment of the requirements

of

AICTE Internship on AI: Transformative Learning
with
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by

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ABSTRACT

This project focuses on developing an **AI-Powered Medical Diagnosis System** that leverages machine learning to detect various diseases, including **eye diseases, heart disease, lung cancer, Parkinson's disease, and hypothyroidism**.

The objective of the project is to create an efficient and accurate AI model that assists in medical diagnosis, reducing the workload on healthcare professionals. The system uses **preprocessed medical datasets, machine learning models (CNN, Decision Trees, SVM, etc.), and Streamlit for deployment**.

Our methodology includes **data collection, preprocessing, model training, evaluation, and deployment**. The results show promising accuracy, demonstrating the potential of AI in early disease detection. The project concludes that AI can play a significant role in improving healthcare accessibility and efficiency.

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CHAPTER 1

Introduction

1.1 Problem Statement:

The increasing prevalence of **chronic diseases** and the **lack of accessible healthcare** demand an efficient solution for early diagnosis. Many individuals suffer from diseases like **heart disease, lung cancer, Parkinson's, and hypothyroidism**, but often receive delayed diagnosis due to limited medical resources. AI can help bridge this gap by providing **early disease detection based on medical data**.

1.2 Motivation:

The project was chosen to explore AI's potential in **healthcare automation**. By developing an AI-powered system, we aim to provide an **accurate, efficient, and accessible medical diagnostic tool** that assists healthcare professionals in decision-making.

1.3 Objective:

- To develop **AI models** for diagnosing multiple diseases.
- To use **machine learning algorithms** for classification and prediction.
- To deploy the system using **Streamlit**, making it user-friendly.
- To enhance **healthcare accessibility** through automation.

1.4 Scope of the Project:

- The system supports **multiple disease detection**.
- It utilizes **machine learning and deep learning techniques**.
- It can be expanded to include more diseases and improve diagnostic accuracy.

CHAPTER 2

Literature Survey

2.1 Review relevant literature or previous work in this domain.

Several studies have explored the role of artificial intelligence in medical diagnosis. Research papers highlight the efficiency of deep learning, CNNs, SVMs, and Decision Trees in disease prediction. AI models have been trained on large medical datasets, improving accuracy in detecting diseases like heart disease, lung cancer, Parkinson's, and thyroid disorders. However, the effectiveness of these models is often limited by dataset availability and computational constraints.

2.2 Mention any existing models, techniques, or methodologies related to the problem.

- Support Vector Machines (SVM) for structured medical data classification.
- Decision Trees and Random Forest for disease prediction based on patient records.
- Neural Networks and Deep Learning for pattern recognition in healthcare data.
- Machine Learning-based Regression Models for predicting disease probability.

2.3 Highlight the gaps or limitations in existing solutions and how your project will address them.

- **Data Scarcity:** Many medical datasets are limited in size, reducing model generalization capabilities.
- **Interpretability Issues:** Deep learning models act as black boxes, making it difficult for healthcare professionals to understand their decisions.
- **Computational Constraints:** AI models require high-performance hardware, which is often inaccessible in low-resource healthcare settings.
- **Bias in Data**: Many existing datasets are biased towards certain demographics, affecting the accuracy of predictions for diverse populations.

CHAPTER 3

Proposed Methodology

3.1 System Design

- Data Preprocessing: Handling missing values, normalization, feature selection.
- Model Training: Using CNNs for image classification and ML algorithms for structured data.
- Model Evaluation: Accuracy, Precision, Recall, and F1-score.
- Deployment: **Streamlit-based web application**.

3.2 Requirement Specification

3.2.1 Hardware Requirements:

- Minimum 8GB RAM,
- GPU for deep learning models.
- Intel i5 12th gen above processor

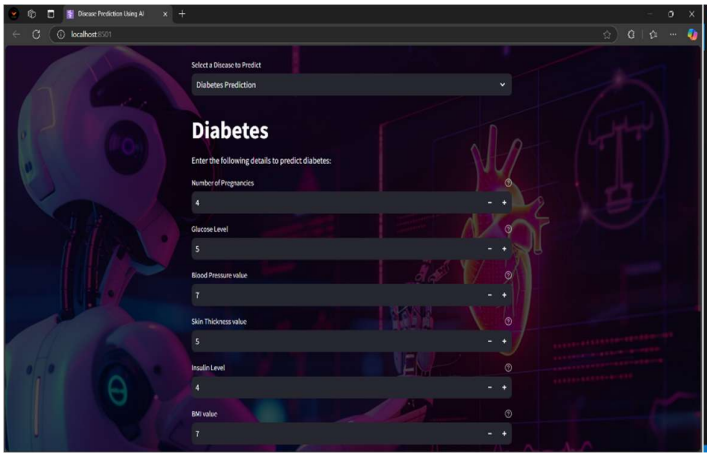
3.2.2 Software Requirements:

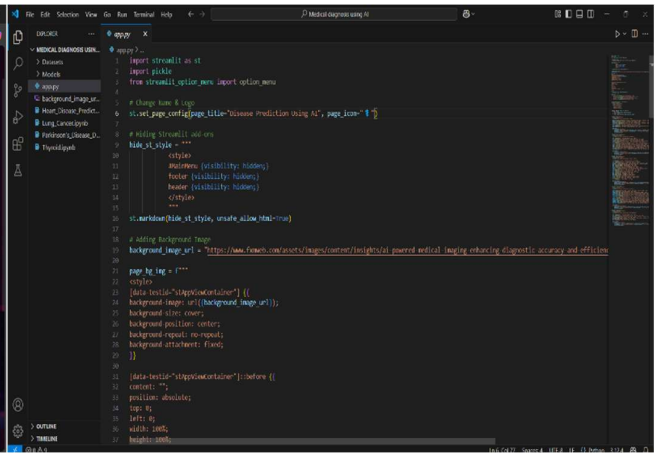
- Python (3.12.4)
- TensorFlow/Keras
- Scikit-learn
- Pandas & NumPy
- Matplotlib & Seaborn
- OpenCV
- Streamlit
- Jupyter Notebook
- VS Code

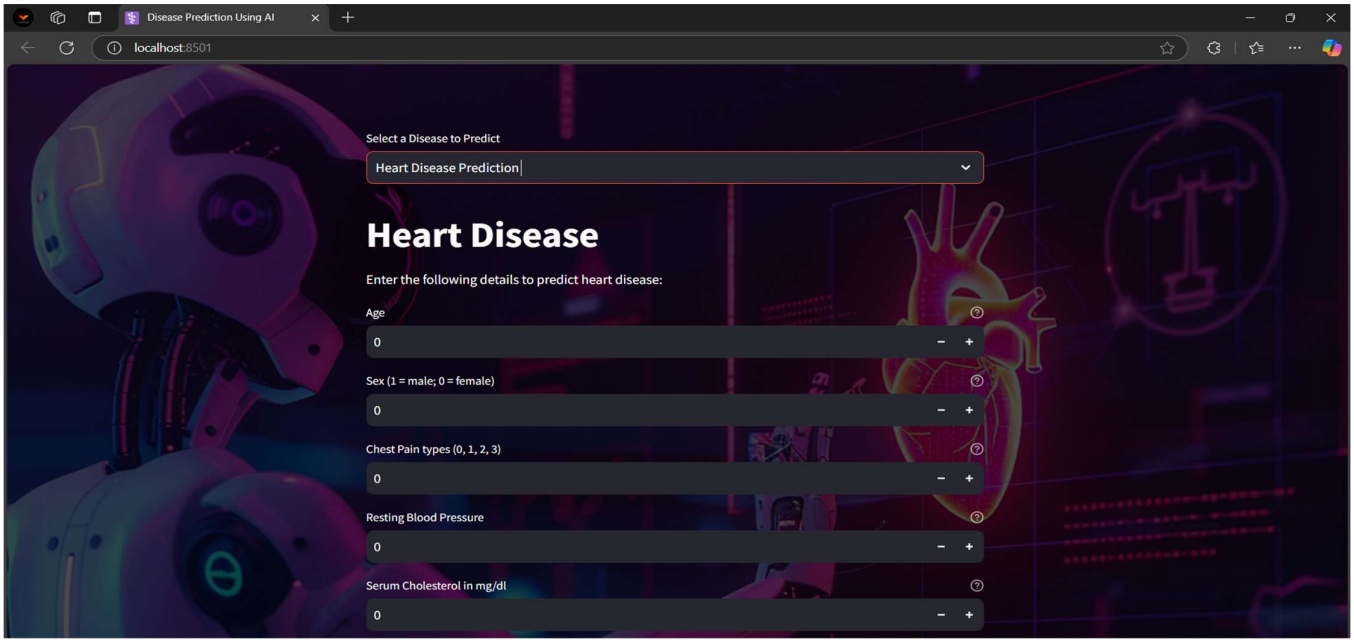
CHAPTER 4

Implementation and Result

4.1 Snap Shots of Result:







4.2GitHub Link for Code:

https://github.com/DARSHANKR03/AI-Powered-Medical-Diagnosis-System-

CHAPTER 5

Discussion and Conclusion

5.1 Future Work:

- Expanding the dataset for improved model accuracy.
- Adding more disease classifications.
- Implementing real-time medical data analysis.

5.2 Conclusion:

- The **AI-Powered Medical Diagnosis System** is designed to assist in the early detection of diseases using **machine learning and deep learning models**. The system focuses on diagnosing **eye diseases, heart disease, lung cancer, Parkinson's disease, and hypothyroidism** by analyzing medical datasets.

- The project workflow includes **data preprocessing, model training, evaluation, and deployment using Streamlit**. Various AI models such as **CNNs, Decision Trees, and Support Vector Machines (SVMs)** are employed to enhance diagnostic accuracy.

- The results demonstrate the **potential of AI in healthcare**, making disease detection **more accessible, accurate, and efficient**. The project also identifies key challenges such as **data scarcity, model interpretability, and computational constraints** and proposes strategies to address them.

- Future improvements include **expanding datasets, refining models, and integrating real-time medical data processing** to enhance diagnostic precision. This project highlights how AI can play a transformative role in **improving early disease detection and healthcare accessibility**.

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