

**\*\*Project Title: HealthGuard AI - Disease Prediction System\*\***

**\*\*A Project Report\*\***

Submitted in partial fulfillment of the requirements

of

**\*\*AICTE Internship on AI: Transformative Learning\*\***

With

**\*\*TechSaksham – A joint CSR initiative of Microsoft & SAP\*\***

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## **## \*\*ACKNOWLEDGEMENT\*\***

I would like to take this opportunity to express my heartfelt gratitude to all those who have supported me throughout this project.

First and foremost, I would like to thank my guide, **\*\*Aditya Prashant Ardak\*\***, for his unwavering support, patience, and invaluable insights. His expertise and encouragement have been instrumental in shaping this project. His guidance not only helped me complete this research but also deepened my understanding of AI in healthcare.

I also extend my sincere appreciation to **TechSaksham and AICTE Internship organizers** for providing this excellent learning opportunity in AI. This project has allowed me to gain practical experience and apply AI techniques in real-world healthcare challenges.

Lastly, I am grateful to my family, friends, and mentors who have constantly motivated me and believed in my capabilities. Their encouragement kept me going through the ups and downs of this project journey.

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## **## \*\*ABSTRACT\*\***

**HealthGuard AI** is a user-friendly, AI-driven disease prediction system designed to provide an initial health risk assessment for **Diabetes, Heart Disease, and Parkinson's Disease**. Early detection of these conditions can significantly enhance patient outcomes, and this project aims to empower individuals with a preliminary evaluation before seeking professional medical advice.

The system employs **Random Forest for Diabetes**, **Gradient Boosting for Heart Disease**, and **SVM for Parkinson's Disease**. By analyzing health parameters provided by the user, the trained models generate a prediction indicating potential risk. The project was developed using Python, scikit-learn, and Streamlit, ensuring an accessible interface for users.

Experimental results demonstrate **strong accuracy**: **Diabetes (72%)**, **Heart Disease (77%)**, and **Parkinson's (87%)**. These findings confirm the feasibility of AI in healthcare diagnostics. Future work includes incorporating additional diseases such as **Alzheimer's, Stroke, and Chronic Kidney Disease** and improving model performance through deep learning techniques.

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# **CHAPTER 1: INTRODUCTION**

## **1.1 Problem Statement**

Chronic diseases such as Diabetes, Heart Disease, and Parkinson's affect millions worldwide. Early diagnosis is crucial for effective treatment, yet traditional screening methods are expensive and inaccessible to many. This project leverages AI to offer an affordable and efficient **disease prediction system** that can assist individuals in assessing their health risks.

## **1.2 Motivation**

Healthcare is a fundamental human right, yet many people lack access to timely medical screenings. AI-powered diagnostic tools can bridge this gap by providing **early risk assessments**, encouraging users to seek professional healthcare if necessary. This project aims to empower individuals with **instant AI-driven health insights**.

## **1.3 Objectives**

- Develop a **user-friendly AI-based system** for disease prediction.
- Utilize **machine learning models** optimized for accuracy and performance.
- Ensure the tool is accessible to **non-technical users** via a simple web interface.

- Expand disease coverage beyond the initial three conditions in future iterations.

### ### \*\*1.4 Scope of the Project\*\*

While this project focuses on three diseases, its framework can be extended to cover additional health conditions. Further improvements may include \*\*deep learning techniques\*\*, \*\*integration with wearable devices\*\*, and \*\*real-time monitoring\*\* for continuous health assessments.

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## ## \*\*CHAPTER 2: LITERATURE SURVEY\*\*

A review of AI-based disease prediction systems highlights the effectiveness of machine learning models in healthcare. Several studies indicate that:

- \*\*Random Forest and Gradient Boosting\*\* yield high accuracy for structured medical datasets.
- \*\*SVM excels in Parkinson's detection\*\*, particularly with voice-based datasets.
- \*\*Deep learning models (CNNs & LSTMs)\*\* have been successful in medical imaging but require extensive computational resources.

Despite these advancements, most AI healthcare tools remain inaccessible to non-experts.

**HealthGuard AI addresses this challenge by providing an intuitive, web-based solution that simplifies disease prediction for everyday users.**

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## ## \*\*CHAPTER 3: PROPOSED METHODOLOGY\*\*

### ### \*\*System Design\*\*

The HealthGuard AI system consists of three primary components:

1. **User Input:** Patients enter relevant health parameters into the system.
2. **Model Prediction:** Trained AI models analyze input data and compute disease risk.

3. **Results & Recommendations:** Users receive a probability score and suggested next steps.

### **Tools & Technologies**

- **Programming Language:** Python
- **Libraries:** scikit-learn, Pandas, NumPy, Streamlit
- **Models Used:** Random Forest, Gradient Boosting, SVM
- **Deployment Platform:** Streamlit Web App

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## **CHAPTER 4: IMPLEMENTATION & RESULTS**

### **Model Performance**

Disease	Model Used	Accuracy
Diabetes	Random Forest	72%
Heart Disease	Gradient Boosting	77%
Parkinson's	SVM	87%

**GitHub Repository:** <https://github.com/Asmodeus14/HealthGuard-AI-Disease-Prediction-System>

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## **CHAPTER 5: DISCUSSION & CONCLUSION**

### **Future Work**

- Expand dataset to enhance model performance.

- Integrate additional diseases, including **Stroke, Alzheimer's, and Cancer**.
- Explore **Deep Learning models** to improve prediction accuracy.

### **### Conclusion**

HealthGuard AI successfully demonstrates **how machine learning can contribute to early disease detection**. Its **high accuracy and user-friendly interface** make it a valuable tool for proactive healthcare assessment. This project has the potential to revolutionize **preventive healthcare** by providing individuals with instant AI-powered medical insights.

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### **## REFERENCES**

- Relevant research papers and AI healthcare articles from IEEE, PubMed, etc.

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