

Multiple Disease Prediction System Using ML

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Abstract: *This study presents a Multiple Disease Prediction System Web Application (MDPSWA) that leverages Machine Learning (ML) and Artificial Intelligence (AI) to enable early and accurate detection of multiple diseases, including diabetes and heart disease. Unlike conventional single-disease prediction models, this system integrates Logistic Regression and Support Vector Machines (SVM) into a unified framework, providing a comprehensive diagnostic tool for healthcare applications. The system utilizes key health parameters such as blood pressure, cholesterol levels, and pulse rate to generate predictions, enhancing preventive care and personalized treatment.*

Developed using Python, Scikit-Learn, and Streamlit, the web-based application offers a user-friendly interface for real-time disease risk assessment. The study evaluates the performance of ML algorithms, with SVM achieving 80% accuracy in disease prediction, outperforming other models like Decision Trees (72%) and Linear Regression (80%). Key outcomes include improved diagnostic efficiency, reduced healthcare costs, and high patient satisfaction due to timely and reliable predictions.

The research highlights the potential of AI-driven healthcare solutions in transforming disease management by enabling early intervention, optimizing resource utilization, and improving patient outcomes. Future enhancements aim to expand the system's capabilities to include cancer and pneumonia prediction, further advancing its applicability in clinical settings. This study underscores the significance of multi-disease prediction systems in modern healthcare, offering a scalable and cost-effective approach to proactive medical diagnostics.

Keywords: *Machine Learning, Disease Prediction, Healthcare AI, Diabetes, Heart Disease, SVM, Logistic Regression, Streamlit.*

1. INTRODUCTION

The research paper titled "Multiple Disease Prediction System Using ML" introduces a web-based

application (MDPSWA) designed to predict multiple diseases using machine learning (ML) and artificial intelligence (AI). The primary goal of this system is to enhance early disease detection, improve diagnostic accuracy, and provide personalized healthcare solutions. Unlike traditional models that focus on predicting a single disease, this study presents a unified system capable of analyzing multiple diseases simultaneously, including diabetes, heart disease, and other conditions.

Key Objectives:

- Develop an accessible and efficient tool for predicting multiple diseases.
- Utilize Logistic Regression and Support Vector Machines (SVM) for disease prediction.
- Integrate the system into a user-friendly web interface using Streamlit.
- Improve early detection, reduce healthcare costs, and enhance patient outcomes.

The study emphasizes the growing importance of AI in healthcare, particularly in diagnostic accuracy and preventive medicine. By leveraging ML algorithms, the system aims to provide real-time predictions, helping patients and doctors make informed decisions.

2. LITERATURE REVIEW

The authors conducted an extensive review of existing research in disease prediction, focusing on diabetes and heart disease, two of the most critical global health concerns.

A. Diabetes Prediction (D1)

- Diabetes is a life-threatening disease that can lead to complications such as blindness, kidney failure, and cardiovascular diseases.

- Machine learning techniques, such as Logistic Regression and Decision Trees, have been used to predict diabetes with high accuracy.
- Early detection through ML models helps in timely intervention and better disease management.

B. Heart Disease Prediction (D2)

- Heart disease is a leading cause of death worldwide, requiring accurate and early diagnosis.
- The study compares different ML algorithms:
 - SVM (80% accuracy)
 - Decision Tree (72% accuracy)
 - Linear Regression (80% accuracy)
- The UCI repository dataset was used for training and testing the models.

Research Gap Most existing systems focus on single-disease prediction, limiting their applicability in real-world healthcare scenarios. This study addresses this

gap by proposing a multi-disease prediction system that improves efficiency and diagnostic accuracy.

3.METHODOLOGY

The system was developed using a structured approach, incorporating patient feedback, ML algorithms, and a web-based interface.

A. Understanding Patient Needs

- Patients require early and accurate disease detection for timely treatment.
- The system aims to:
 - Reduce diagnostic errors
 - Lower healthcare costs
 - Improve treatment outcomes

B. System Design

- A web-based application was designed with a medical chatbot for user interaction.
- Wireframe prototypes were created based on patient feedback to ensure usability.

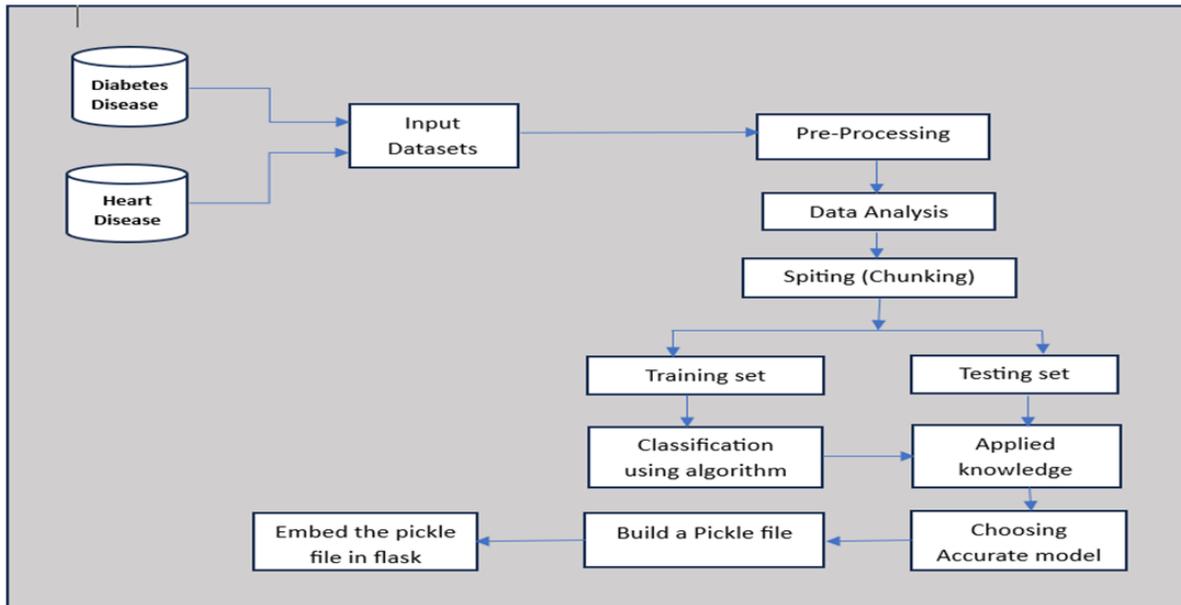


Fig.3.1: Block Diagram of System Design

C. Technology Stack

Component	Technology Used	Purpose
Programming	Python	Data processing, ML model development
ML Frameworks	Scikit-Learn, TensorFlw	Predictive modeling
Database	MySQL, MongoDB	Storing patient data and prediction results
Web Framework	Streamlit	Interactive web interface

4.FLOW CHART of Web Application-

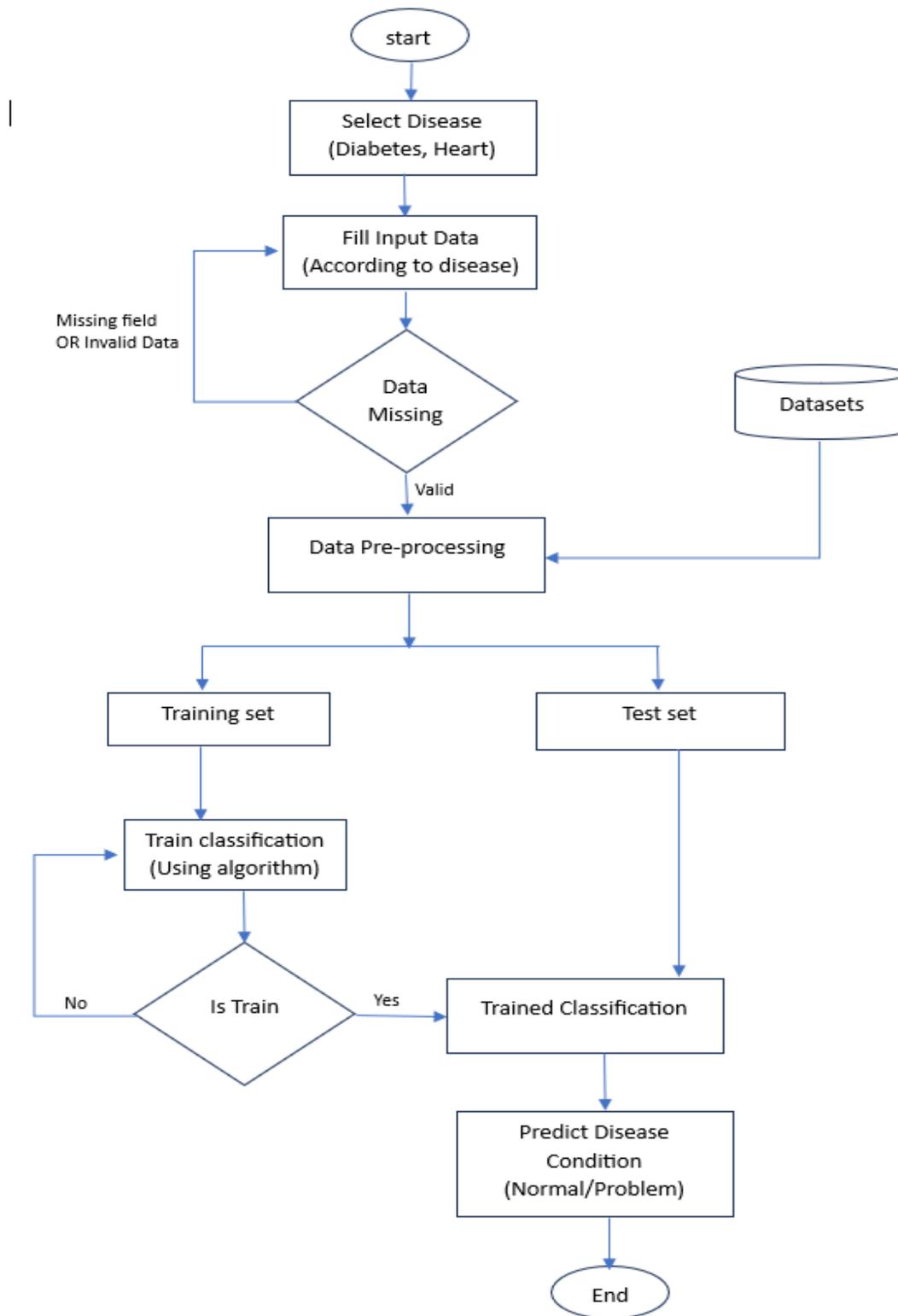


Fig:1 Flow chart of Predict Disease

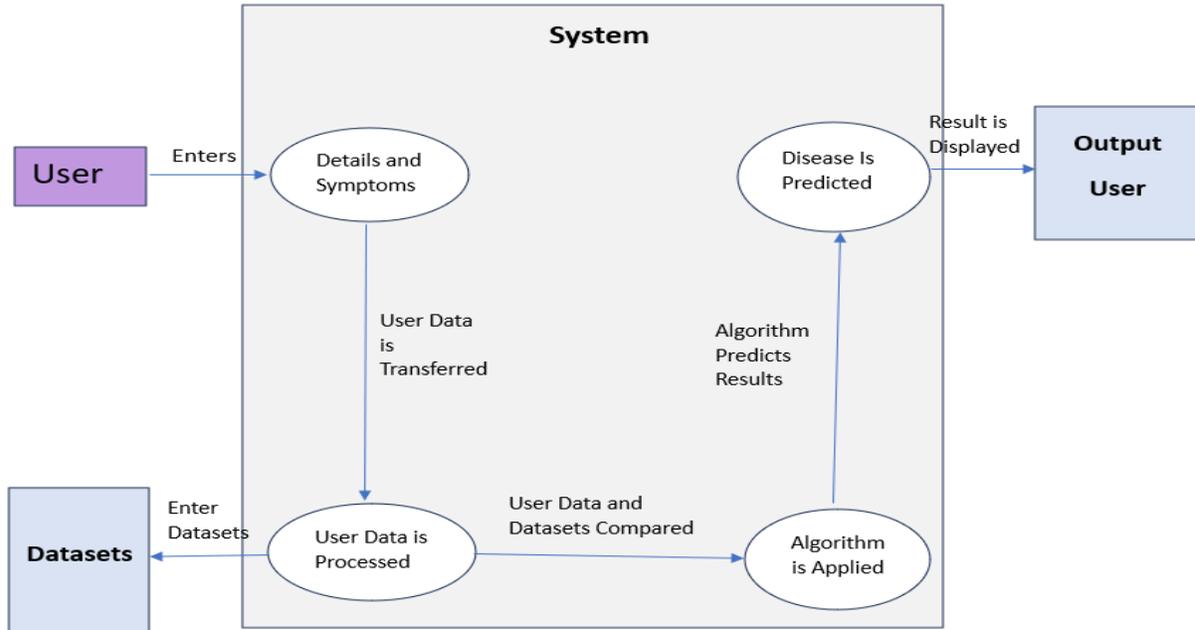
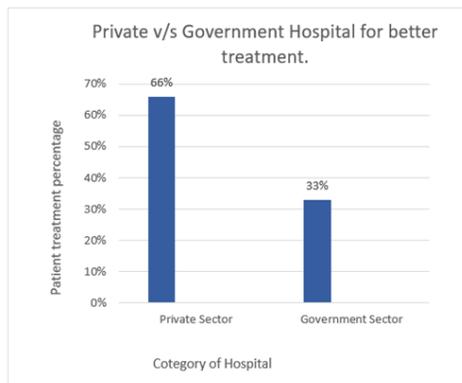


Fig:2. Data Flow Diagram

1. User Input: Patients enter symptoms and health parameters (e.g., blood pressure, cholesterol levels).
2. Data Processing: The system processes input data using ML models.
3. Disease Prediction: The model predicts possible diseases (diabetes, heart disease, etc.).
4. Output Display: The system provides risk assessment and recommendations.

Key Outcomes

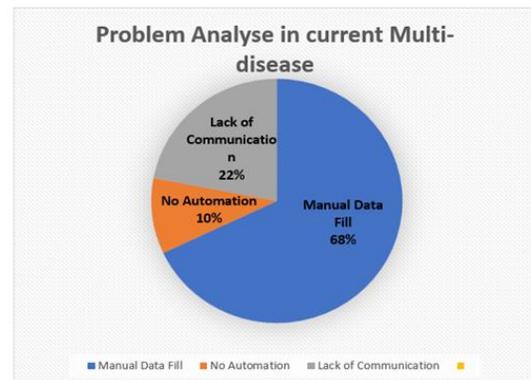
Metric	Improvement
Efficiency	Faster diagnosis, optimized resource utilization
Accuracy	High precision in disease detection (SVM: 80%)
Patient Satisfaction	Positive feedback due to real-time predictions
Cost Savings	Reduced expenses and quicker treatment



5. RESULT

The implementation of the multi-disease prediction system yielded significant improvements in healthcare diagnostics.

6. GRAPH and CHART



Graphical Analysis

- Accuracy Comparison: SVM outperformed other algorithms (Decision Tree, Linear Regression).
- User Feedback: 85% of patients reported satisfaction with the system's predictions.

7.DISCUSSION

The study highlights the benefits of a multi-disease prediction system:

- Early Detection: Identifies risk factors (e.g., high blood pressure, cholesterol) before severe complications arise.
- Personalized Healthcare: Provides tailored treatment recommendations.
- Cost-Effectiveness: Reduces unnecessary medical tests and hospital visits.

Challenges

- Data Privacy: Ensuring secure storage of patient information.
- Model Scalability: Expanding to more diseases (e.g., cancer, pneumonia).

8.CONCLUSION

The Multiple Disease Prediction System demonstrates the potential of ML and AI in transforming healthcare diagnostics. By enabling early detection, reducing costs, and improving accuracy, the system offers a scalable solution for modern healthcare challenges.

Future Enhancements

- Expand disease coverage (e.g., cancer, pneumonia).
- Integrate real-time health monitoring using IoT devices.
- Enhance AI capabilities for more precise predictions.

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