

# Smart HealthCare: Symptom-Based Disease Prediction and Health Advisory System

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**Abstract:** *Smart Healthcare is a web-based application developed to provide preliminary health assistance through intelligent symptom analysis. The system allows users to input their symptoms and predicts possible diseases using a weighted scoring mechanism that evaluates symptom relevance and determines diagnosis confidence along with severity levels. In addition to disease prediction, the application provides personalized recommendations such as home remedies, precautions, and general health guidance to support early decision-making. The system ensures data security through JWT-based authentication and role-based access control, allowing users to securely manage and access their diagnosis history. The application is implemented using Angular for the frontend and ASP.NET Core Web API with SQL Server for the backend, ensuring a responsive and scalable architecture. An integrated admin panel enables efficient management of diseases, symptoms, and system data. The primary objective of this system is to promote early health awareness, assist users in taking preventive measures, and provide a user-friendly digital healthcare support tool. However, the system is intended as a supportive solution and does not replace professional medical consultation.*

**Keywords:** *Smart Healthcare*

## I. INTRODUCTION

Healthcare plays a vital role in improving human life, yet many individuals face challenges in obtaining immediate medical guidance for common health problems. People often depend on self-diagnosis or unreliable online sources, which may lead to incorrect treatment decisions. The existing healthcare system mainly relies on physical consultations with doctors, which can be time-consuming, costly, and sometimes inaccessible, especially in rural or remote areas. Although several healthcare applications are available, most provide general information rather than personalized disease prediction based on individual symptoms, creating the need for an intelligent and reliable healthcare assistance system.

The proposed project, Smart HealthCare introduces a smart web-based healthcare solution that predicts possible diseases using symptom analysis and weighted scoring logic. The system analyzes user-selected symptoms, calculates diagnosis confidence and risk levels, and provides suitable homemade remedies, precautions, and health guidance. Developed as a full-stack application using Angular for the frontend, ASP.NET Core Web API for backend services, and SQL Server for database management, the system ensures secure and efficient operation through JWT authentication and role-based authorization mechanisms.

This project belongs to the domain of Smart Healthcare and Web-Based Information Systems, integrating modern technologies with healthcare knowledge to promote preventive healthcare awareness. The application includes modules such as user registration, symptom-based diagnosis, history management, and an admin panel for managing diseases, symptoms, and analytical reports. By providing early health insights through an accessible and user-friendly interface,



the system helps users make informed health decisions while clearly emphasizing that it serves as a supportive tool and not a replacement for professional medical consultation.

## **II. RELATED WORK**

In today's healthcare field, many systems have been developed to help people understand diseases and manage health information digitally. Some platforms focus on symptom checking and disease prediction using web-based technologies like PHP, ASP.NET, and MySQL. These systems allow users to enter their symptoms and get possible disease suggestions. They also include features like user registration, data storage, and basic health guidance. However, most of these systems are limited to web platforms and do not always provide real-time interaction or personalized user experience. They may lack advanced features such as health tracking, risk analysis, and proper visualization of results. Also, many systems are not very user-friendly or accessible on all devices, especially mobile phones. With the growth of modern technologies, healthcare applications are becoming more interactive and user-focused. Some applications use advanced logic or basic AI techniques to improve prediction accuracy. They also provide additional features like dashboards, health history tracking, and personalized suggestions. Despite these improvements, many existing systems still do not combine all important features in one platform. There is a need for a system that not only predicts diseases based on symptoms but also provides remedies, stores user history securely, and presents results in a simple and understandable way. To address these gaps, the Smart Healthcare system is developed. It integrates symptom-based disease prediction, home remedies, user profile management, and history tracking into a single application. It also uses a modern frontend and backend to provide a smooth and responsive user experience. This system aims to improve health awareness and provide quick guidance while keeping the interface simple and accessible.

## **III. LITERATURE REVIEW**

### **1. Symptom-Based Disease Prediction Using Machine Learning Techniques**

Authors: R. Kumar, A. Mehta

Explanation: This paper presents a system that predicts diseases based on user symptoms using machine learning algorithms. It helps users perform basic health assessments without immediately visiting a hospital. The system improves diagnostic speed and provides early health guidance.

Additional Issues: Requires improvement in real-time accuracy and integration with clinical validation systems.

### **2. Web-Based Healthcare Recommendation System Using Symptom Analysis**

Authors: P. Sharma, S. Patel

Explanation: This research introduces a web-based platform that analyzes symptoms and provides personalized health recommendations and precautions. It uses weighted symptom matching instead of simple rule-based methods, improving prediction quality and user engagement.

Additional Issues: Needs stronger authentication mechanisms and secure handling of sensitive healthcare data.

### **3. Secure Smart Healthcare Platform with Role-Based Access Control**

Authors: A. Singh, R. Gupta

Explanation: This study proposes a secure healthcare system that combines disease prediction, patient record management, and analytical dashboards. It uses role-based access control to protect sensitive data and improve system reliability.

Additional Issues: System scalability and integration with real-world hospital databases need enhancement.

### **4. Data Mining Techniques for Disease Prediction in Healthcare Systems**

Authors: N. Gupta, V. Reddy



Explanation: This paper explores the use of data mining techniques to analyze patient data and predict diseases. Classification algorithms are used to identify patterns and support early diagnosis, improving prediction accuracy. Additional Issues: Requires high-quality and large datasets for better performance and reliable predictions.

#### 5. Smart Healthcare Monitoring System Using Web Technologies

Authors: K. Reddy, D. Verma

Explanation: This system provides a web-based platform where users can enter symptoms and receive disease predictions along with precautions. It also maintains patient history for future reference, improving healthcare accessibility.

Additional Issues: Needs real-time monitoring features and integration with wearable health devices.

#### 6. Healthcare Diagnostic Support System Using Symptom Scoring Methods

Authors: M. Patel, S. Shah

Explanation: This research focuses on a scoring-based system where symptoms are assigned weights to calculate disease probability. It helps users understand their health condition before consulting a doctor.

Additional Issues: Accuracy depends heavily on correct symptom weighting and structured database design.

#### 7. Digital Healthcare Assistant for Early Disease Awareness

Authors: S. Khan, T. Ahmed

Explanation: This study introduces a digital assistant that allows users to select symptoms and receive possible diagnoses along with precautionary advice. It promotes early disease awareness and reduces the burden on healthcare facilities.

Additional Issues: Requires stronger security, authentication, and better patient history tracking for reliability.

### IV. PROBLEM STATEMENT

Human-based health assessment and scattered medical resources create challenges in obtaining quick and reliable preliminary diagnosis. Many individuals ignore early symptoms due to lack of time, awareness, or easy access to healthcare services. Existing platforms often provide unstructured and non-personalized information, making it difficult for users to understand their condition. Additionally, there is no single system that combines symptom analysis, remedies, and health tracking in one place.

### V. PROPOSED SYSTEM OVERVIEW

The proposed Smart Healthcare system is a web-based application designed to help users identify possible diseases based on the symptoms they select. The system provides a simple and user-friendly interface where users can choose their symptoms, and the application analyzes them to predict likely diseases along with a confidence percentage. The system uses a rule-based logic that matches user-selected symptoms with stored disease data and calculates the result based on the level of matching. Along with disease prediction, the system also suggests basic home remedies, precautions, and health guidance to help users take early action. Users can create accounts and securely log in to access their personal dashboard, where their diagnosis history and health data are stored. The system ensures data security using authentication and controlled access. An admin panel is also included, which allows administrators to manage symptoms, diseases, remedies, and view reports. The application is developed using Angular for the frontend, ASP.NET Core Web API for the backend, and SQL Server for database management. Overall, the system aims to provide quick, accessible, and easy-to-understand health guidance while promoting awareness and preventive care.



## **VI. SYSTEM ARCHITECTURE**

The Smart Healthcare System is a web-based platform that connects users and administrators within a single integrated system. Its main objective is to provide quick and reliable health assessment by analyzing user-selected symptoms and predicting possible diseases. The system also offers remedies, precautions, and maintains user health records securely using a centralized database. It ensures efficient data processing, user-friendly interaction, and supports better health awareness through a modern and scalable architecture.

### **1. Modules**

#### **1.1 User Authentication Module**

In this module, users can register and securely log into the system. During registration, users provide basic details such as name, email, age, and password. The system verifies login credentials and allows access to authorized features. This module ensures data security and protects user information.

#### **1.2 User Profile Module**

Users can manage their personal information such as age, gender, and basic health details. They can update their profile and maintain accurate data, which helps the system provide better and more relevant health predictions.

#### **1.3 Symptom Selection Module**

In this module, users select the symptoms they are experiencing from a predefined list. Multiple symptoms can be selected, and this information is sent to the system for analysis and disease prediction.

#### **1.4 Disease Prediction Module**

The system analyzes selected symptoms and predicts possible diseases. It uses symptom matching logic to compare user input with stored disease data and provides the most likely result along with a confidence percentage.

#### **1.5 Severity Analysis Module**

This module evaluates how serious the condition is based on selected symptoms. The system categorizes the condition into levels like low, medium, or high severity and suggests whether medical consultation is needed.

#### **1.6 Health Recommendation Module**

Based on the prediction, the system provides basic remedies, precautions, and health advice. It helps users take early preventive actions and manage their condition better.

#### **1.7 Diagnosis History Module**

This module stores all previous diagnosis results of the user. Users can view their past records, including symptoms, predicted diseases, and dates, helping them track their health over time.

#### **1.8 Admin Module**

Admins can log into the system and manage data such as diseases, symptoms, and remedies. They can add, update, or delete records and ensure the system remains accurate and up to date.

#### **1.9 Data Management Module**

This module handles the storage and organization of all system data in the database, including users, symptoms, diseases, and history. It ensures efficient data retrieval and secure management.



## **2. Backend Architecture**

The system uses ASP.NET Core Web API and SQL Server to manage authentication, data processing, and storage:

- **Authentication (JWT-Based):** Ensures secure login and identity verification for users and admins. It generates tokens to maintain user sessions and protect sensitive data.
- **Business Logic Layer:** Handles core functionalities such as symptom analysis, disease prediction, severity calculation, and health recommendations. It processes user input and applies logic to generate results.
- **SQL Server Database:** Stores structured data including users, symptoms, diseases, remedies, and diagnosis history. It ensures secure and efficient data management.
- **API Layer (REST APIs):** Enables communication between the Angular frontend and backend. It handles requests like login, symptom submission, prediction results, and data retrieval.

## **3. Diagnosis and Notification Workflow**

- The user selects symptoms through the application interface.
- The system sends the selected symptoms to the backend for processing.
- The backend analyzes the symptoms and predicts possible diseases along with severity level.
- Based on the result, the system provides health recommendations and precautions.
- After diagnosis, the system generates a notification showing the predicted disease, severity level, and basic advice (such as consulting a doctor if needed).
- If the severity level is high, the system triggers an alert notification suggesting immediate medical attention.
- The diagnosis result is stored in the database and displayed to the user in a clear format.
- The user can view the result instantly and access their diagnosis history anytime.

## **VII. IMPLEMENTATION DETAILS**

The implementation of the Smart Healthcare: Disease Diagnosis Using Symptoms and Suggesting Remedies System consists of four main steps: User Authentication, Symptom Input, Disease Prediction, and Notifications & History Management.

### **User Input and Authentication**

Users register and log into the system securely using JWT-based authentication.

After logging in, users can access the diagnosis feature and select symptoms from the available list.

All user data is validated and securely stored in the database to ensure privacy and data protection.

### **Symptom Analysis and Disease Prediction**

When a user selects symptoms, the system sends the data to the backend.

The backend applies a weighted scoring logic to analyze the symptoms and match them with possible diseases.

Based on this analysis, the system predicts the most likely disease along with a confidence percentage and severity level (Low, Moderate, High).

The result is then sent back to the frontend and displayed in a clear and user-friendly format.

### **Health Recommendations and Remedies**

After prediction, the system provides personalized health recommendations.

It suggests simple home remedies, precautions, and basic care tips related to the predicted disease.

If the condition is serious, the system advises the user to consult a doctor for proper medical treatment.

### **Notifications and Alerts**

The system generates notifications after diagnosis to inform users about their results.



Users receive alerts showing predicted disease, severity level, and important advice. If a high severity condition is detected, the system triggers an alert recommending immediate medical attention. These notifications improve user awareness and encourage timely action.

### History and Data Management

All diagnosis results are stored in the database for future reference. Users can view their previous diagnosis history anytime through the dashboard. This helps users track their health patterns and supports better decision-making in the future.

### Conclusion of Implementation

This step-by-step implementation ensures a secure, efficient, and user-friendly healthcare system. It helps users quickly understand their health condition, take preventive actions, and maintain a record of their medical history, while acting as a supportive tool alongside professional medical advice.

### SYSTEM ARCHITECTURE

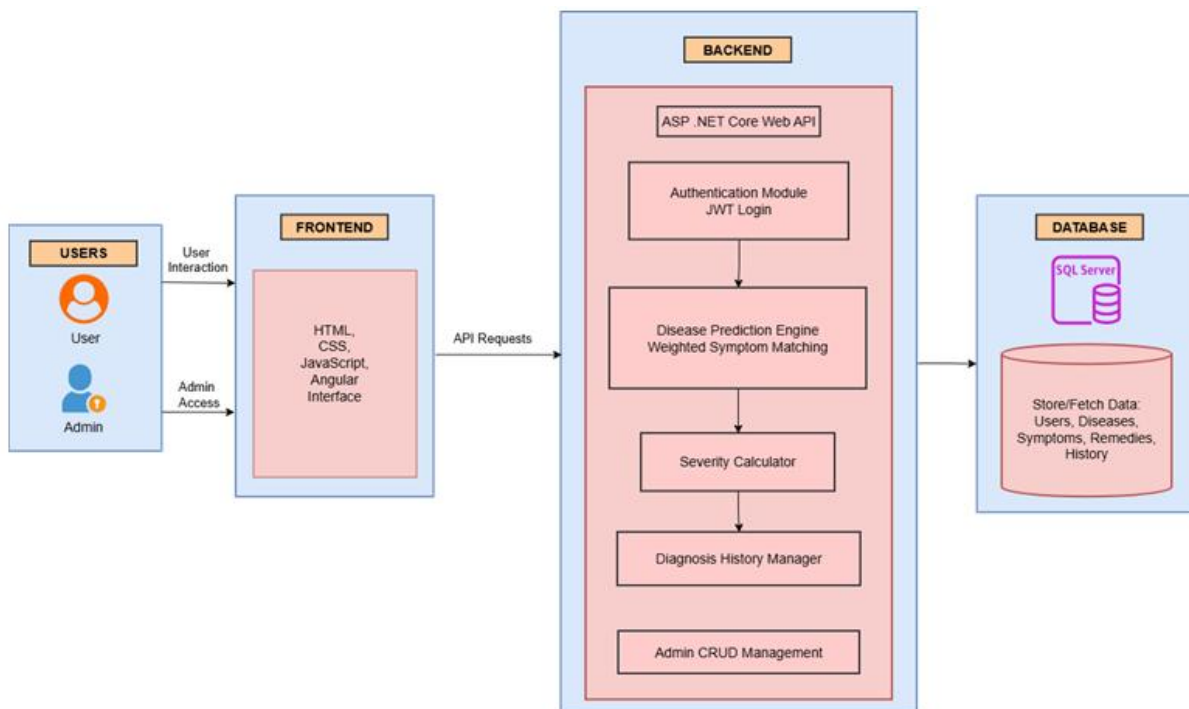


Fig. 5.1 System Architecture

### VIII. PROPOSED SYSTEM

#### System Architecture :

System Architecture is shown in Figure 1. Our proposed system will function in the following steps:

#### Step 1: User Registration

Users create an account in the system by entering their basic details such as name, email, and password.



**Step 2: Login & Authentication**

The system verifies users through secure authentication using JWT and allows access to features after successful login.

**Step 3: Symptom Selection**

Users select their symptoms from a predefined list available in the application interface.

**Step 4: Symptom Analysis & Disease Prediction**

The system sends selected symptoms to the backend, where weighted logic is applied to analyze and predict possible diseases along with severity level.

**Step 5: Results & Recommendations**

The system displays predicted disease, confidence level, and provides basic remedies, precautions, and health advice to the user.

**Step 6: Notification System**

Users receive notifications after diagnosis. If the condition is serious (high severity), the system sends an alert suggesting immediate medical consultation.

**Step 7: History Management**

The system stores all diagnosis results securely, allowing users to view their previous health records anytime.

## **IX. ANALYSIS OF PROPOSED SYSTEM**

**1. Enhanced Efficiency and Quick Health Guidance:**

The proposed Smart Healthcare system improves the efficiency of preliminary health analysis by providing instant disease prediction based on user-selected symptoms. It helps users quickly understand their health condition without delay, saving time and effort.

**2. Intelligent Symptom Analysis:**

The system uses weighted scoring logic to analyze symptoms and predict possible diseases with a confidence level and severity. This approach provides more structured and meaningful results compared to general online health searches.

**3. Secure User Authentication:**

The system uses JWT-based authentication to ensure secure login and protect user data. Each user can safely access their personal health records without any privacy issues.

**4. Improved User Experience and Accessibility:**

The application provides a simple and user-friendly interface, making it easy for users to select symptoms, view results, and understand recommendations. It is accessible anytime, helping users take quick health-related decisions.

**5. Real-Time Results and Notifications:**

The system generates instant results after analysis and provides notifications with disease details, severity level, and advice. High-risk conditions trigger alert messages encouraging users to consult a doctor immediately.

**6. Data Storage and History Tracking:**

All diagnosis results are stored securely in the database. Users can view their past diagnosis history anytime, which helps in tracking health patterns and making better decisions.

**7. MODULES**

The proposed Smart Healthcare system is divided into five main modules: User, Diagnosis, Admin, History, and Notification.



### 7.1. User Module

This module allows users to register and log into the system securely. Users can manage their profile and access all healthcare features such as diagnosis and history.

### 7.2. Diagnosis Module

This is the core module where users select symptoms, and the system analyzes them to predict possible diseases. It also provides severity level, confidence score, remedies, and precautions.

### 7.3. Admin Module

The Admin Module manages the system data, including symptoms, diseases, and remedies. Admin can add, update, or delete records and monitor system usage through dashboards and reports.

### 7.4. History Module

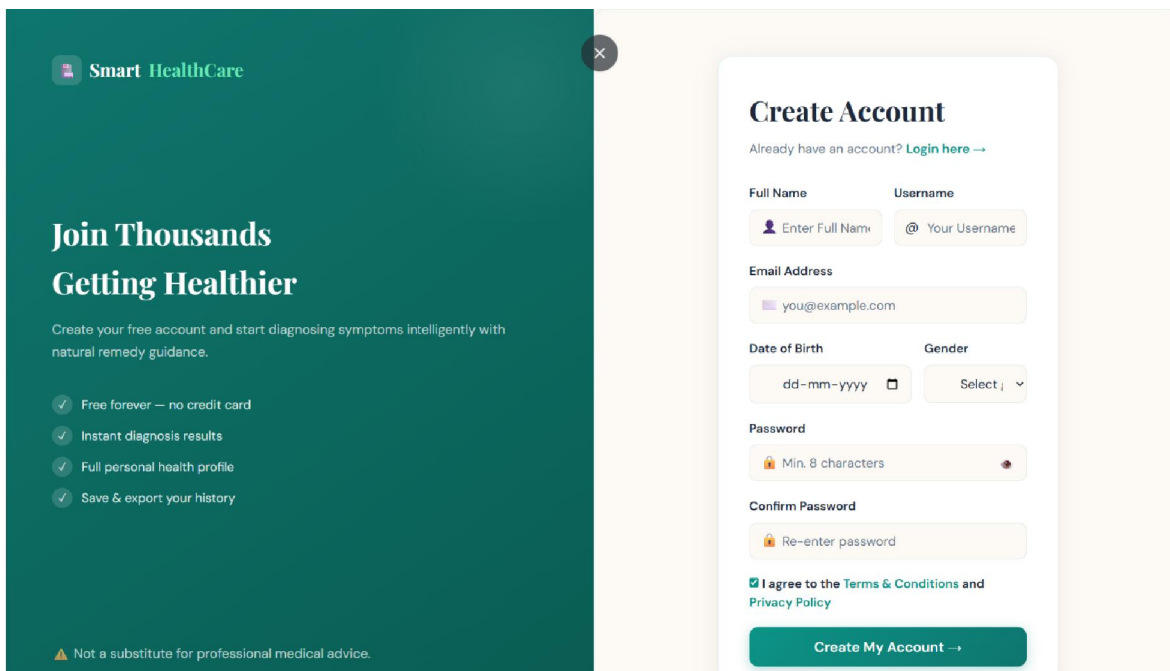
This module stores all past diagnosis results of users. It allows users to track their previous health records and view detailed reports anytime.

### 7.5. Notification Module

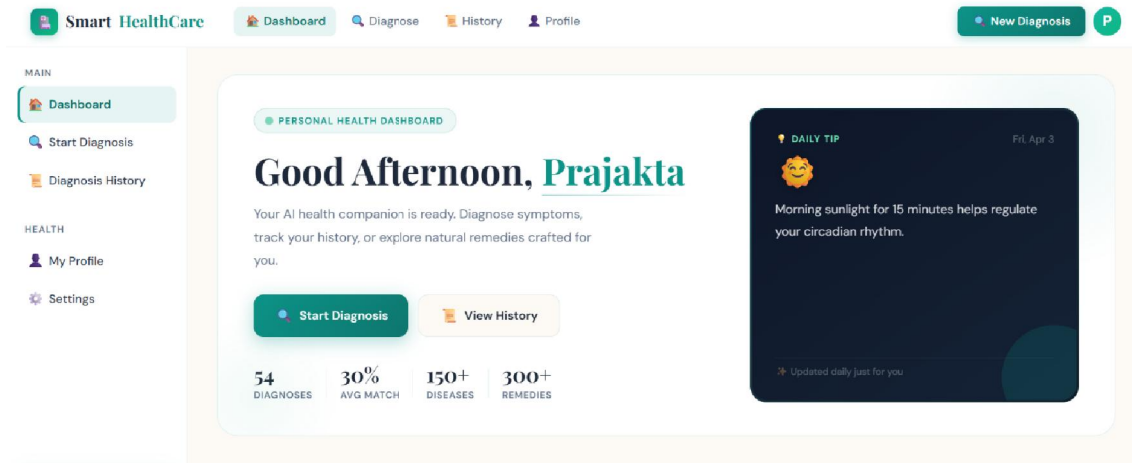
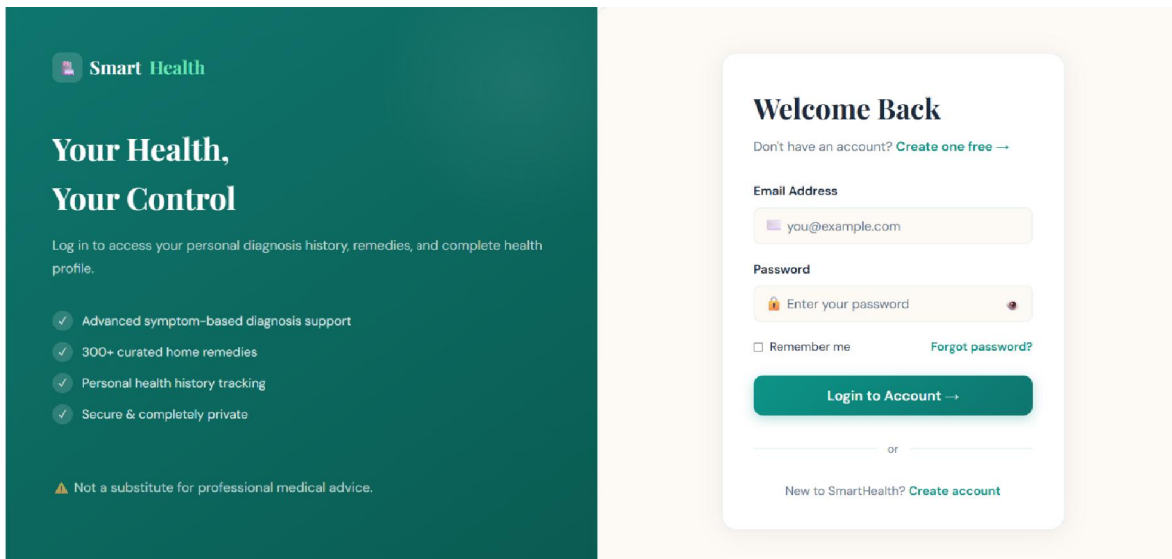
The Notification Module sends alerts and updates to users. It notifies users about diagnosis results and warns them in case of high severity conditions, ensuring timely action and better awareness.

## RESULTS

### USER LOGINS



REGISTRATION PAGE & USER DASHBOARD



**X. CONCLUSION**

The Smart Healthcare system provides a simple and efficient way for users to understand their health condition based on symptoms. By analyzing symptoms using intelligent logic, the system predicts possible diseases and suggests basic remedies and precautions. It also provides severity levels and alerts users in case of serious conditions.

The system ensures secure data handling and allows users to store and track their diagnosis history. With real-time results and a user-friendly interface, it improves accessibility and awareness about health.

Overall, this platform helps users take early preventive actions, supports better health decision-making, and acts as a helpful tool alongside professional medical consultation.



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