

Disease Prediction System: User Guide

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Introduction

The Disease Prediction System is a web-based application that uses machine learning to predict possible diseases based on patient symptoms, age, and gender. The system analyzes your input data against patterns learned from a comprehensive healthcare dataset to provide likely diagnoses.

Key features of the application include:

- Disease prediction based on symptoms and patient profile
- Detailed visualization of the underlying dataset
- User-friendly interface for easy navigation and input
- Probability-based predictions for transparent results

This guide will help you navigate and effectively use all features of the Disease Prediction System.

Getting Started

System Requirements

- A modern web browser (Chrome, Firefox, Safari, or Edge)
- Internet connection

Accessing the Application

The application runs on a local server. Once the server is started, you can access it at:

```

<http://localhost:5007>

```

To start the server:

1. Ensure Python and required dependencies are installed
2. Run **`python app.py`** from the terminal/command prompt
3. The application will be available at the above URL

Navigation

The Disease Prediction System features a simple navigation bar at the top of every page with three main sections:

- **Home:** The landing page with menu options
- **Predict Disease:** The page where you can input patient data for disease prediction
- **Data Visualization:** The page that displays various charts and graphs illustrating patterns in the dataset

You can navigate between these sections by clicking on the corresponding links in the navigation bar.

Disease Prediction

To get a disease prediction:

1. Click on **Predict Disease** in the navigation bar or select the Disease Prediction tile from the home page
2. Fill in the patient information:

- **Age:** Enter the patient's age (0-120)
- **Gender:** Select from the dropdown menu

3. Select symptoms by choosing "Yes" or "No" for each symptom listed:

- Fever
- Cough
- Fatigue
- Shortness of Breath
- Chest Pain
- Headache
- Nausea
- Joint Pain
- Sore Throat
- Runny Nose
- Sneezing
- Abdominal Pain
- Skin Rash
- Frequent Urination
- Back Pain
- Weight Loss
- Night Sweats
- Chills
- Loss of Taste
- Difficulty Swallowing

4. Click the **Predict Disease** button at the bottom of the form

The system will process your inputs and redirect you to the results page.

Data Visualization

The Data Visualization section provides insights into the dataset used to train the prediction model:

1. Click on **Data Visualization** in the navigation bar or select the Data Visualization tile from the home page
2. Browse through the available visualizations:
 - **Disease Distribution** : Bar chart showing the frequency of each disease in the dataset
 - **Age Distribution**: Histogram displaying the age distribution of patients
 - **Gender Distribution**: Pie chart showing the gender proportions in the dataset
 - **Symptom Frequency**: Bar chart illustrating how commonly each symptom appears
 - **Symptom Correlation Matrix**: Heatmap showing relationships between different symptoms

These visualizations can help you understand patterns in the data and how different symptoms relate to each other.

Understanding the Results

After submitting the patient information and symptoms, you'll be directed to the Results page which includes:

Selected Symptoms

A list of all symptoms you marked as "Yes" for the patient.

Most Likely Disease

The primary prediction result, highlighted at the top of the results section.

Detailed Predictions

A list of potential diseases with their associated probabilities, sorted by likelihood.

Note: If no symptoms are selected, or if the system's confidence is very low (below 20%), the result will be "No Disease."

Interpretation Tips:

- Higher probability percentages indicate greater confidence in the prediction
- Multiple disease predictions with similar probabilities suggest further testing may be needed
- Only diseases with a probability above 10% are displayed

Technical Information

The Disease Prediction System uses a Random Forest machine learning model to make predictions. The model is trained on a dataset of patient profiles, symptoms, and diagnosed diseases.

Key technical aspects:

- The model considers both demographic information (age, gender) and symptoms
- Predictions are probability-based, reflecting the confidence level of each potential diagnosis
- Data augmentation techniques are used to improve prediction accuracy
- K-fold cross-validation ensures model reliability

Troubleshooting

Common Issues

Problem: Form submission not working

Solution: Ensure all fields are filled in, including age, gender, and all symptom fields

Problem: Visualizations not loading

Solution: Refresh the page or try a different browser

Problem: "No Disease" prediction despite symptoms

Solution: The system may not have enough confidence to make a prediction. Try selecting more related symptoms if applicable.

Problem: Error message when submitting the form

Solution: Check that you've entered a valid age (0-120) and selected options for all fields

If problems persist, check the server console for error messages or restart the application.