

# PERSONALIZED MEDICAL RECOMMENDATION SYSTEM

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## Article Information

Received : 19 April 2025  
Revised : 20 April 2025  
Accepted : 22 April 2025  
Published : 23 April 2025

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**Abstract**— This Most people tend to live a long and healthy life, but people are busy in their day-to-day life and it is not possible for everyone to visit doctors for minor symptoms of a disease. Many people do not know about medicines and to visit a doctor and consult for minor symptoms for medicines is a time consuming process. AI and machine learning like emerging technology can help us to create a recommended system that will prescribe medicine and this system can accurately predict a medicine to use. In this paper proposes the medicine recommendation system which will predict disease and medicine according to symptoms entered by patients/users. This paper presents a novel medical recommendation system utilizing deep learning techniques. The system employs a recurrent neural network (RNN) architecture to analyze longitudinal patient data, including medical history, vital signs, and medication records. The RNN model learns complex temporal patterns to predict future health states and recommend proactive interventions. Evaluation on a real-world dataset demonstrates the system's ability to accurately forecast health events and provide timely, personalized recommendations.

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**Citation: Dipayan Kumar Ghosh, Priyansh Agarwal, Tushar Dixit, Ritik Saini, Rishi Gupta, Vansh Gill**, “ Personalized Medical Recommendation System”, Journal of Science, Computing and Engineering Research, 8(04), April 2025.

## I. INTRODUCTION

A medical recommendation system using machine learning (ML) is a software application designed to assist healthcare professionals and patients in making informed medical decisions. These systems leverage the power of ML algorithms to analyze vast amounts of medical data, identify patterns, and generate personalized recommendations.

Welcome to our cutting-edge Personalized Medical Recommendation System, a powerful platform designed to assist users in understanding and managing their health. Leveraging the capabilities of machine learning, our system analyzes user-input symptoms to predict potential diseases accurately.

A Medicine Recommendation System in machine learning (ML) is a software application designed to assist healthcare problems and patients in selecting the most appropriate medication based on various factors such as medical history, symptoms, demographics, and drug interactions.

A recommendation scheme has the potential to predict whether or not such a consumer should buy products, dependent mainly on the desires of the customer. This scheme could be applied based on the profiling of a person

or the profiling of even an object. This article describes the item-based cooperative filtering-based health advisory program that delivers physicians with helpful knowledge based on a characteristic of an object. Now, there are several internet- accessible websites and authorized users whereby individuals can have viewpoints, feedback, websites, and numerous product perceptions. The recommendation systems system would make decisions concerning customers who may only provide feedback once they obtain input for every item from patients. With the help of a recommendation framework, the popularity of e-business websites was attempting to increase their profit margins throughout the profitable market. Millions of e-commerce users buy products via web pages that interact. Following their purchases, individuals provide reviews or other comments about something else on a related social media platform.

## II. PROBLEM STATEMENT

In the healthcare field, providing personalized and accurate medical recommendations is crucial for improving patient outcomes and optimizing resource allocation. Traditional methods often rely on expert opinions and limited data, leading to potential biases and suboptimal treatment decisions.

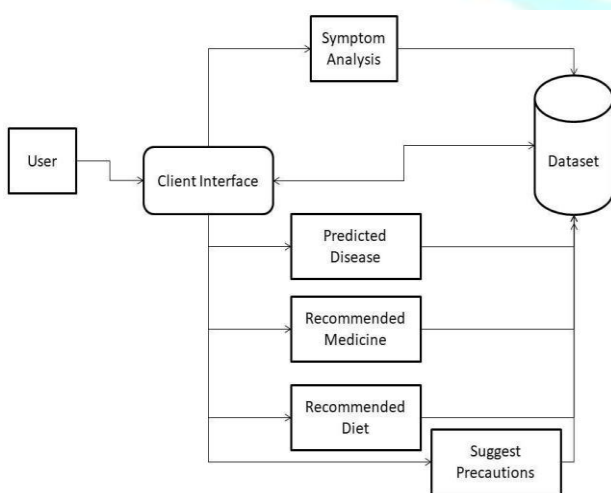
Goal: To develop a machine learning (ML)-powered medical recommendation system that can effectively analyze patient data, medical literature, and clinical guidelines to provide evidence-based recommendations for diagnoses, treatments, and preventive measures.

Health information needs are also changing the information seeking behavior and can be observed around the globe. Challenges faced by many people are looking online for health information regarding diseases, diagnoses and different treatments. If a recommendation system can be made for doctors and medicine while using review mining will save a lot of time. In this type of system, the user face problem in understanding the heterogeneous medical vocabulary as the users are laymen.

User is confused because a large amount of medical information on different mediums are available. In this research, a SVM (support vector machine), VSM (vector space model) based health recommendation system (HRS) is discussed for user that contain a web based assessment system using review mining. Expected outcome of this project is that a recommender system will be available that will suggest doctors and medicine to users.

III. PROPOSED METHOD

The proposed work model for this project revolves around the development of an integrated platform that bridges the gap between tenants seeking affordable homemade meals and home chefs looking to expand their reach. The model incorporates both frontend and backend components to ensure a seamless and efficient user experience for all stakeholders



IV. IMPLEMENTATION

System Architecture

- Input Layer:
- Patient symptoms

- Medical history
  - Vital signs
  - Recurrent Neural Network (RNN):
  - Captures temporal dependencies in patient data.
  - Analyzes sequences and patterns over time.
2. Data Preprocessing
- Data Collection:
  - Aggregated from electronic health records (EHRs) and patient surveys.
  - Normalization:
  - Scale features for improved model training.
  - Encoding:
  - Transform categorical data (e.g., symptoms, medications) into numerical format.
3. Deep Learning Model Development
- Model Selection:
  - RNN architecture for its effectiveness in sequence prediction.
  - Training Process:
  - Split data into training, validation, and test sets.
  - Use backpropagation through time (BPTT) for model optimization.
  - Employ cross-entropy loss for evaluation.
4. Evaluation Metrics
- Accuracy:
  - Measure the percentage of correct recommendations.
  - Precision and Recall:
  - Evaluate model's performance in identifying relevant treatments.
  - F1 Score:
  - Balance between precision and recall for performance assessment.
5. Recommendation Generation
- Predictive Modeling:
  - Analyze current symptoms to forecast potential health conditions.
  - Personalized Medicine Suggestions:
  - Generate a list of recommended medications based on predictions.

# PERSONALIZED MEDICAL RECOMMENDATION SYSTEM

Available at <https://jscer.org>

## 6. User Interface Design

- **Input Portal:**
  - Simple interface for users to log symptoms and medical history.
- **Output Display:**
  - Clear presentation of recommendations and potential health alerts.

## 7. Feedback and Iteration

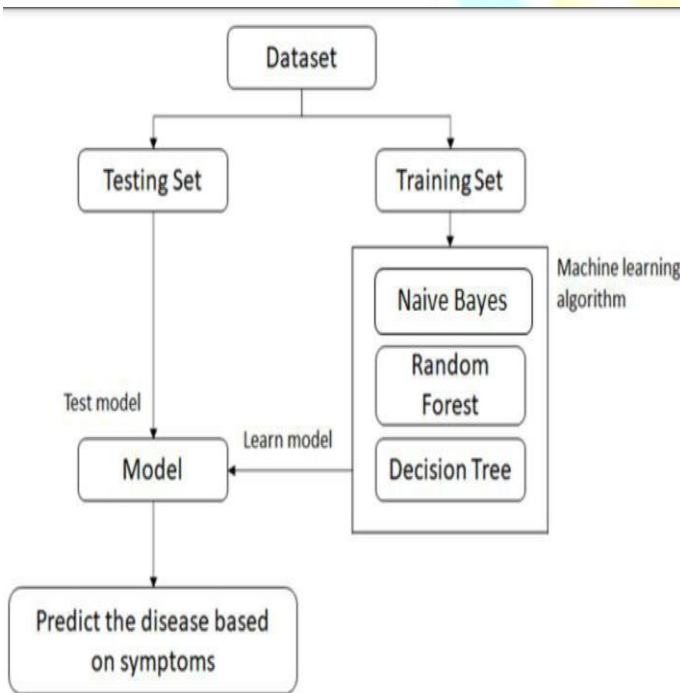
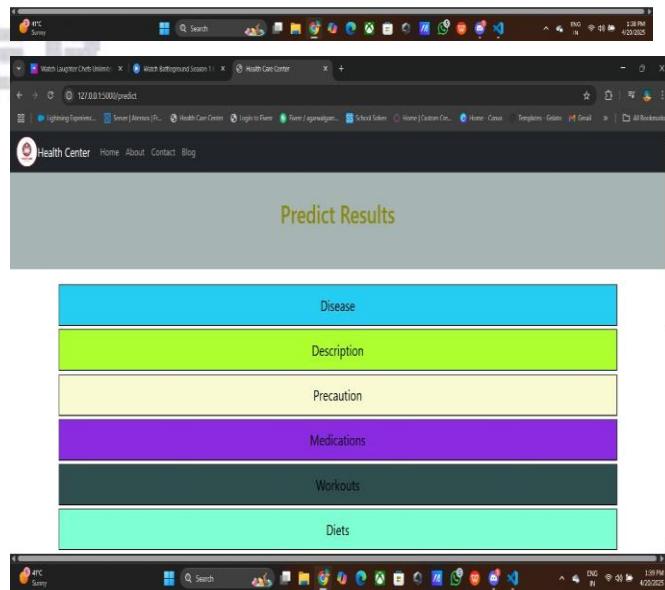
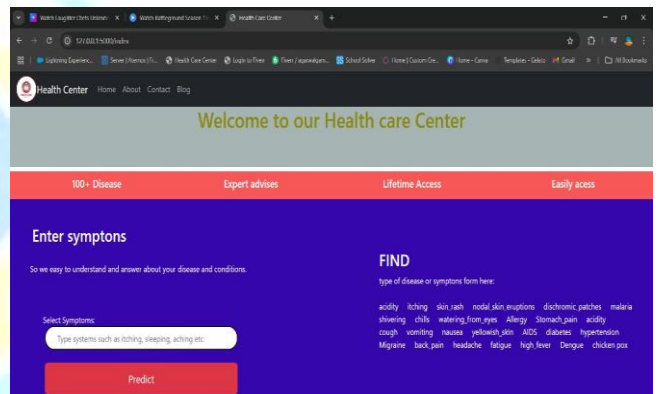
- **User Feedback Loop:**
  - Collect user responses to improve the recommendation accuracy.
- **Model Updates:**
  - Continuous learning to update the model with new data and insights.

## 8. Ethical Considerations

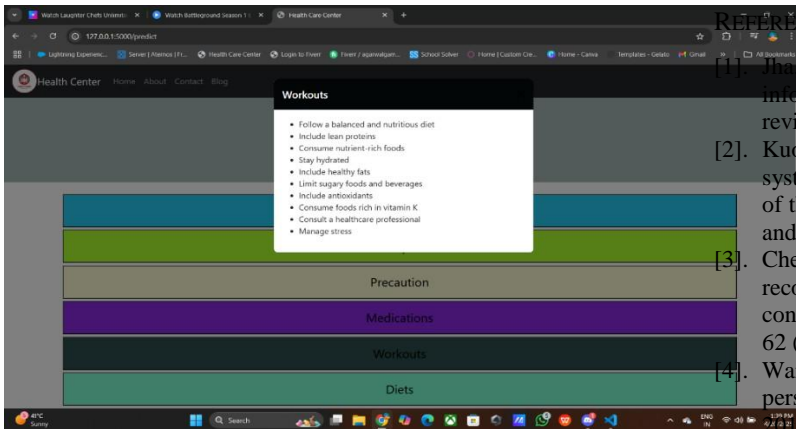
- **Data Privacy:**
  - Ensure that all patient data is anonymized and securely stored.
- **Bias and Fairness:**
  - Regular evaluation to mitigate biases in recommendations.

Category	Technology	Purpose
Frontend	HTML	Building user interface and user experience
Frontend	CSS	Styling and layout
Frontend	JavaScript	Adding interactivity
Backend	Python	Primary programming language
Backend	Flask	Lightweight web framework
Machine Learning	Scikit-learn	Machine learning library
Database	SQLite	Lightweight disk-based database
Deployment	NGINX	Web server for reverse proxying

## VI. RESULTS



## V. TECHNOLOGY STACK



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VII. CONCLUSIONS

- **Overview of the System:** The proposed medicine recommendation system harnesses deep learning, specifically utilizing a recurrent neural network (RNN) architecture, to provide timely and accurate healthcare recommendations.
- **Data Utilization:** The system processes longitudinal patient data, involving medical history, vital signs, and medication histories. This comprehensive approach allows the model to recognize complex patterns associated with patient health.
- **Predictive Capability:** By leveraging RNNs, the system effectively predicts future health states, enabling the identification of potential health issues before they escalate. This proactive approach empowers users to take necessary interventions early.
- **Real-world Application:** Evaluation against real-world datasets substantiates the system's effectiveness in predicting health events, which translates into personalized medicine recommendations tailored to individual patient needs.
- **Implications for Healthcare:** The integration of AI and machine learning into healthcare can significantly reduce the burden of minor ailments on healthcare systems, offering users an accessible and efficient means to manage their health.