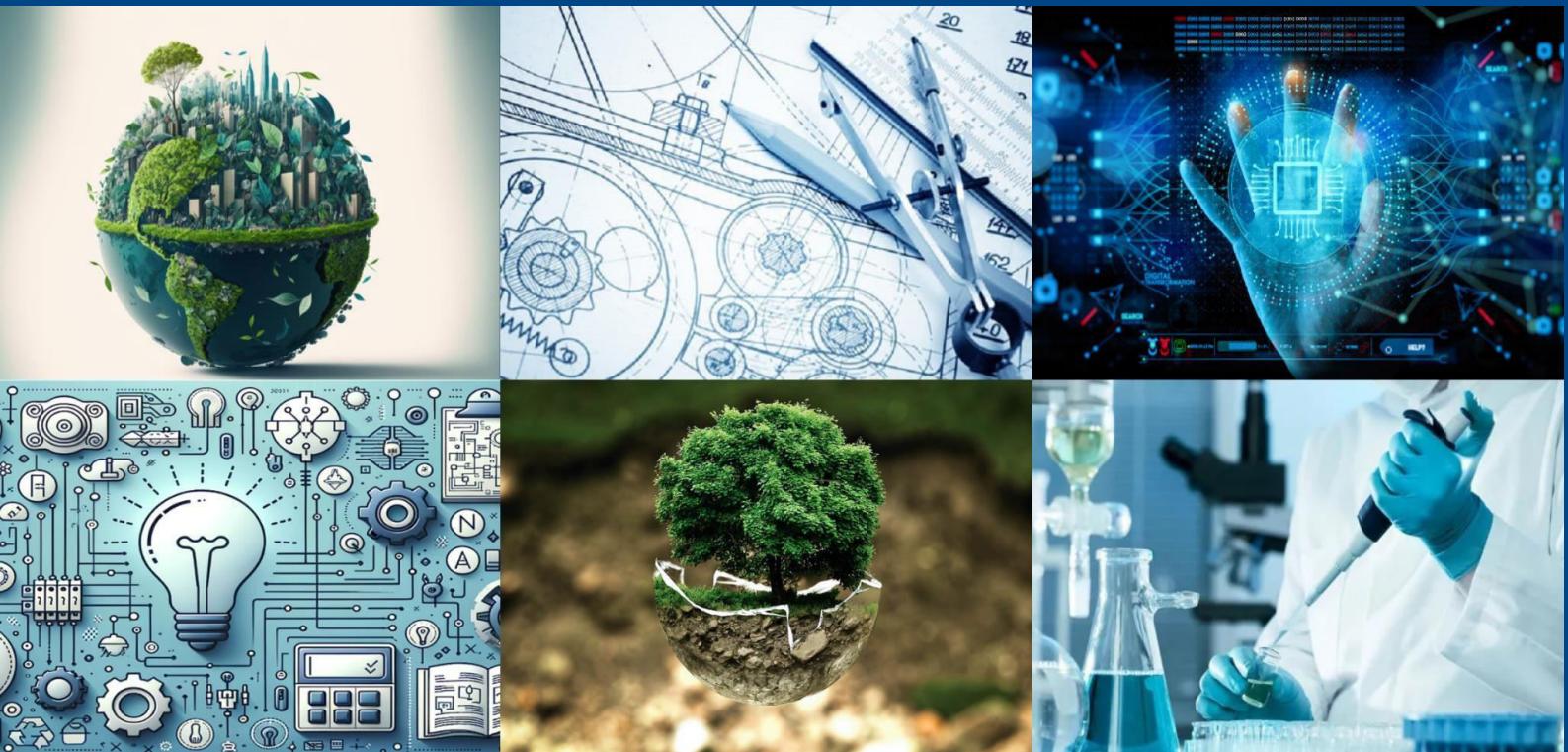




International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 12, December 2025



Elderly Health Risk Prediction and Recommendation System

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ABSTRACT: The growing elderly population faces increased health risks due to age-related conditions and delayed medical intervention. Traditional healthcare systems often rely on reactive treatment methods, where diseases are identified only after symptoms become severe. This paper presents an Elderly Health Risk Prediction and Recommendation System designed to support early detection and preventive healthcare using machine learning techniques. The proposed system collects essential health parameters such as age, blood pressure, blood sugar level, body mass index, and reported symptoms from elderly users. These inputs are analysed using trained machine learning models to classify health conditions into risk levels such as low, moderate, and high. Based on the predicted risk category, the system generates personalised health recommendations including lifestyle guidance, dietary suggestions, exercise plans, and medical consultation advice.

The system aims to assist elderly individuals and caregivers in monitoring health conditions effectively and reducing the likelihood of critical health events. Experimental observations indicate that the proposed approach improves early risk identification and supports informed healthcare decision-making, thereby enhancing overall elderly care management.

KEYWORDS: Elderly Healthcare, Health Risk Prediction, Machine Learning, Preventive Care, Recommendation System, Health Data Analysis, Predictive Healthcare, Medical Decision Support, Personalised Healthcare, Smart Health System, Early Disease Detection.

I. INTRODUCTION

Health management in old age needs ongoing attention; it is not just about occasional doctor visits. As people age, their physical strength gradually declines, and multiple health issues may arise at once. Often, these changes are subtle and do not show clear warning signs. As a result, health problems in older adults are frequently recognised only after they have become severe. The Elderly Health Risk Prediction and Recommendation System is developed to address this requirement through automated analysis of basic health data. The system considers commonly recorded parameters such as age, blood pressure readings, blood sugar values, body mass index, and user-reported symptoms. These inputs are processed using machine learning models to determine the overall health risk level of an individual.

II. LITERATURE SURVEY

The adoption of computational techniques in healthcare has enabled new methods for understanding and managing health conditions, particularly among elderly individuals who require continuous attention and early support.

[1] Research related to elderly healthcare focuses on monitoring age-related health changes and identifying early indicators of chronic conditions. These studies highlight the importance of analyzing basic physiological data to support preventive healthcare planning.

[2] Several studies demonstrate the use of machine learning models to process medical data and estimate health risk levels. By examining parameters such as blood pressure, blood sugar values, and body mass index, these models assist in identifying individuals who may require medical attention.

[3] Health risk assessment systems often categorize patients into predefined risk groups to simplify clinical decision-making. Such systems help caregivers and healthcare professionals prioritize care based on the severity of the predicted condition.



[4] Some healthcare applications concentrate on providing guidance and suggestions to users based on their health status. These systems aim to encourage healthy habits and improve awareness through personalized advice related to daily routines and lifestyle choices.

[5] Studies also report limitations in existing digital healthcare solutions, including inconsistent health data, difficulties in safeguarding sensitive medical information, and challenges in coordinating multiple healthcare functions within a single system.

[6] An examination of earlier work reveals that limited systems combine health risk analysis with personalized recommendations specifically for elderly care. This observation emphasizes the need for an integrated framework that supports both prediction and recommendation to improve long-term health management.

EXISTING SYSTEM

Most healthcare systems for elderly individuals rely on traditional methods, such as periodic hospital visits and manual health assessments. These systems require patients to go to healthcare centres for diagnosis and monitoring, which may not be convenient for seniors who need ongoing health checks. Some digital healthcare apps focus on predicting specific diseases using individual health data. Other systems offer general health advice without assessing the actual health risks for users. Often, the prediction and recommendation functions are developed as separate parts, which limits their usefulness when used alone.

Furthermore, existing systems frequently lack personalized health support and fail to adjust recommendations based on changes in health. This leads to delays in identifying health risks and reduces preventive care. As a result, current solutions do not fully support continuous monitoring and early health risk management for elderly individuals.

PROPOSED SYSTEM

The proposed Elderly Health Risk Prediction and Recommendation System aims to offer a complete solution for early health assessment and preventive care. The system emphasizes ongoing evaluation of health conditions using basic and readily available health information.

It gathers key health data, including age, blood pressure, blood sugar levels, body mass index, and symptoms reported by the user. This information is processed with machine learning methods to examine health patterns and assess the overall risk level for the elderly person. Based on the analysis, the system divides health risk into categories like low, moderate, and high. Personalized health recommendations are created depending on the identified risk level. These suggestions include advice on lifestyle management, dietary choices, physical activity, and timely medical consultations. The system merges health risk prediction and personalized recommendations in one platform. This combination helps elderly individuals and caregivers monitor health conditions effectively, take preventive measures early, and enhance long-term health management.

III. SYSTEM ARCHITECTURE

The proposed Elderly Health Risk Prediction and Recommendation System follows a modular system architecture designed to support efficient health data analysis and decision making. The system consists of four major components: Health Data Input, Risk Prediction, Recommendation Generation, and Result Display. Each module performs a specific function while contributing to the overall operation of the system.

The Health Data Input module collects essential health information such as age, blood pressure, blood sugar level, body mass index, and symptoms entered by the elderly user or caregiver. This input data is forwarded to the Risk Prediction module for further processing.

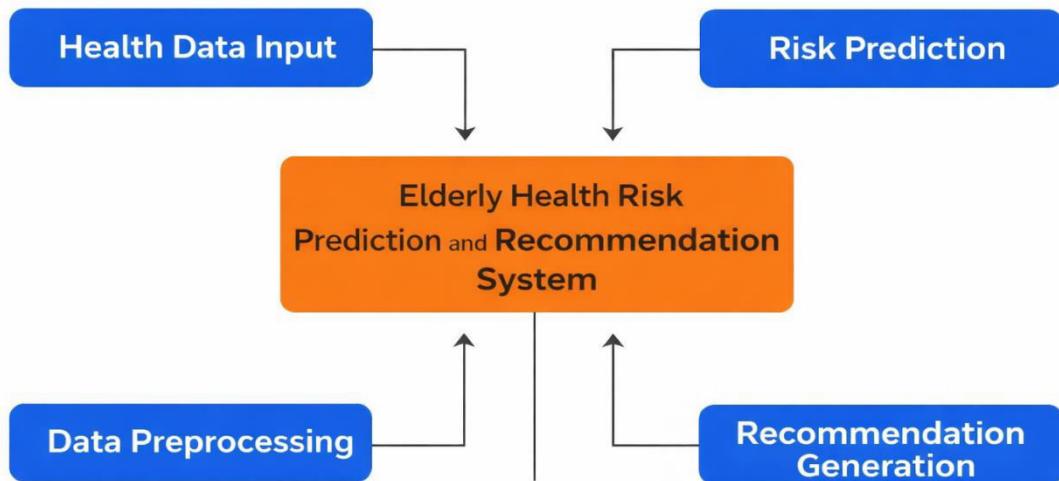


Fig 3.1 System Architecture

IV. METHODOLOGY

The Elderly Health Risk Prediction and Recommendation System details the procedures implemented to evaluate health risks and offer advice for senior citizens. The process begins with data collection. Essential health details, including age, blood pressure, blood sugar levels, body mass index, and symptoms, are obtained from the user via an input interface. This data acts as the primary source for the system. Following data collection, the information undergoes preprocessing to ensure both accuracy and consistency. This phase includes managing missing values, standardizing health metrics, and arranging the data into a format suitable for analysis. Subsequently, the system employs a machine learning model to predict risks.

The model analyzes the input health metrics and identifies patterns linked to various health conditions. Based on this analysis, the system categorizes the health risk as low, moderate, or high. After determining the risk level, the system provides recommendations. During this stage, established guidelines are utilized based on the identified risk category. These recommendations encompass suggestions regarding diet, physical activity, lifestyle modifications, and medical consultations. In conclusion, the output module displays the evaluated health risk level alongside personalized recommendations in a clear format. This organized approach aids in the early detection of health risks and enhances preventive healthcare management for older adults.



METHODOLOGY

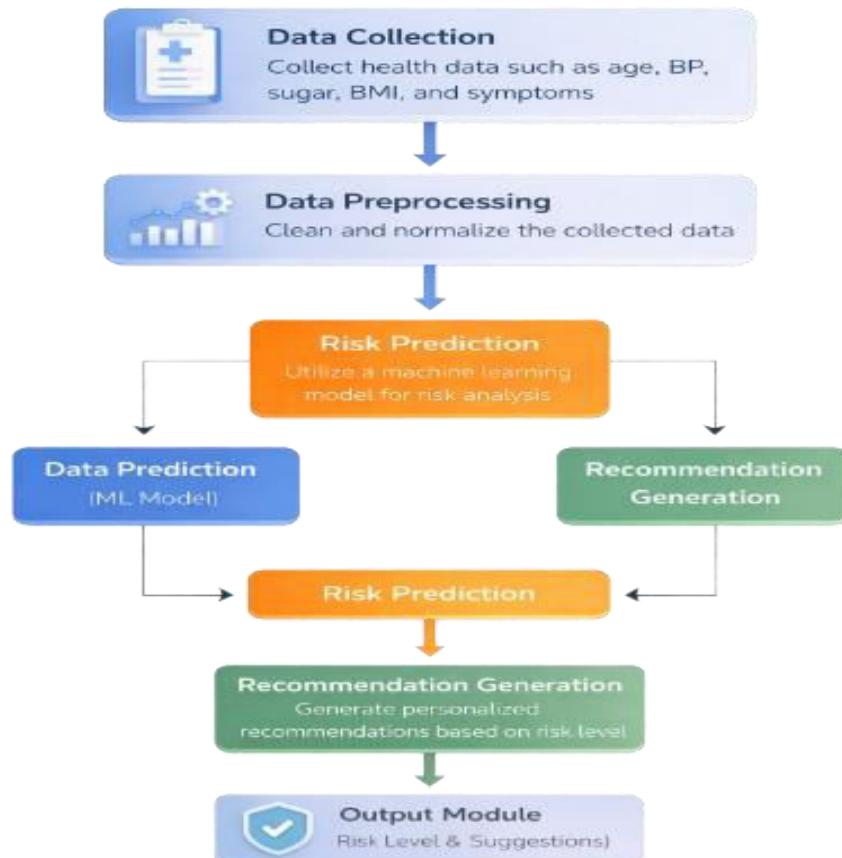


Fig 4.1 Methodology

V. DESIGN AND IMPLEMENTATION

The Elderly Health Risk Prediction and Recommendation System aims to create an accessible and effective platform for evaluating health risks and offering tailored healthcare advice. The design prioritizes simplicity, modularity, and user-friendliness, making it ideal for older adults and their caregivers.

The system is organized into distinct modules to ensure seamless functionality and straightforward maintenance. The user interface features uncomplicated input forms for entering health information such as age, blood pressure, blood sugar level, body mass index, and symptoms. The backend structure manages data processing, risk assessment, and the generation of recommendations. A modular design is utilized so that each element, including data entry, prediction algorithms, and output recommendations, functions independently while communicating with other modules through clearly defined interfaces. This architecture permits future upgrades without impacting the current system.



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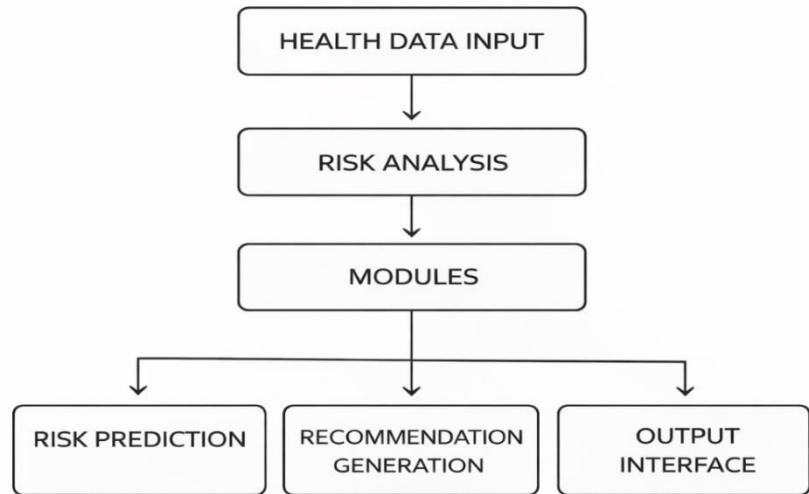


Fig 5.1 Sequential Diagram

The system's execution involves gathering user health information and processing it via machine learning algorithms. The input data undergoes validation and preprocessing to eliminate discrepancies. Once preprocessing is complete, the data is sent to the trained machine learning model for risk level prediction.

After determining the predicted risk category, established recommendation guidelines are applied to provide customised health suggestions. The results are presented to the user in an easily understandable format, indicating both the risk level and suggested actions. The system guarantees prompt responses and accurate outcomes, facilitating preventive healthcare management for elderly individuals.



Fig 5. Working Flow of Elderly Health Risk Prediction and Recommendation System



VI. OUTCOME OF RESEARCH

The outcome of this research demonstrates that the proposed Elderly Health Risk Prediction and Recommendation System effectively supports early identification of health risks using basic health parameters. By analyzing inputs such as age, blood pressure, blood sugar level, body mass index, and symptoms, the system successfully classifies health conditions into appropriate risk categories. The system provides meaningful and personalized health recommendations based on the predicted risk level. These recommendations help elderly individuals and caregivers understand health conditions better and take preventive actions at the right time. The integration of prediction and recommendation within a single platform improves usability and practical applicability.

The research outcome shows that automated health risk assessment can reduce dependency on frequent hospital visits and support continuous health monitoring. The system promotes preventive healthcare, improves awareness, and assists in long-term health management for elderly individuals. Overall, the proposed approach proves to be efficient, user-friendly, and suitable for real-world elderly healthcare applications.

VII. RESULT AND DISCUSSION

The system being reviewed used health records from older adults. The evaluation looked at how well the system processed basic health information and identified possible health risks. Factors such as age, blood pressure, blood sugar level, body mass index, and symptoms were used for this analysis. The system placed health conditions into three groups: low risk, moderate risk, and high risk. This classification helps to clearly separate normal health states from those that need medical attention. The risk levels produced by the system followed logical health patterns based on the input data. Depending on the risk category identified, the system offered appropriate health recommendations. Users labeled as low risk received general wellness tips, while those marked as high risk got specific advice on diet, lifestyle changes, exercise, and medical appointments. This approach encourages prompt preventive measures. The discussion suggests that combining health risk evaluation with recommendation generation improves how the system can be used practically. The proposed solution raises early awareness of health problems and lessens the need for frequent clinic visits. While the system works well with basic data inputs, there's room for improvement by using larger datasets and adding more health indicators in future updates.

VIII. CONCLUSION

This research presented an Elderly Health Risk Prediction and Recommendation System designed to support preventive healthcare for elderly individuals. The system analyzes basic health parameters such as age, blood pressure, blood sugar level, body mass index, and symptoms to identify possible health risks. The proposed system successfully classifies health conditions into low, moderate, and high risk levels. Based on the identified risk category, it provides suitable health recommendations that help users understand their health status and take timely preventive actions. By combining health risk prediction with personalized recommendations in a single platform, the system improves early health awareness and reduces dependence on frequent hospital visits. The solution is simple, user-friendly, and suitable for real-world elderly healthcare applications. Future improvements may include the use of larger datasets and additional health indicators to enhance accuracy and effectiveness.

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