IJARETY

International Journal of Advanced Research in Education and TechnologY (IJARETY)

Volume 12, Issue 2, March-April 2025

Impact Factor: 8.152

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

DOI:10.15680/IJARETY.2025.1202036

AI- Powered Cardio Vascular Risk Prediction

K. Sachin Kumaran, A. Roselin

M. Sc, Department of Computer Science with Data Analytics, Dr. N.G.P. Arts and Science College, Coimbatore, India

Assistant Professor, Dr. N.G.P. Arts and Science College, Coimbatore, India

ABSTRACT: AI-Powered Cardiovascular Risk Prediction predicts an individual's cardiovascular risk based on key health factors and machine learning. The system uses an XG Boost classifier trained on a publicly available cardiovascular dataset to analyze parameters such as age, blood pressure, cholesterol, glucose, and lifestyle factors (smoking, alcohol use, and physical activity). Developed using Streamlit, the application's dynamic and intuitive interface enables users to input their health data and receive real-time risk estimates. The model determines a person's risk level by generating a risk probability score . Additionally, by helping customers understand the key factors influencing their risk, visual aids like likelihood bar charts and feature importance graphs enhance interpretability.

KEYWORDS*:* XG Boost algorithm.

I. INTRODUCTION

AI-Powered Cardiovascular Risk Prediction offers an automated, data-driven method of risk assessment by utilising machine learning. To forecast the risk of acquiring heart-related illnesses, this study makes use of the XG Boost classifier, a strong and effective machine learning model that was trained on a real-world cardiovascular dataset. Cardio AI gives users a personalised risk prediction by evaluating important health characteristics such as age, blood pressure, cholesterol, glucose, and lifestyle choices.

II. RELATED WORK

The study investigates different feature selection techniques and compares the performance of several machine learning algorithms, such as Random Forest, SVM, and XG Boost.. G. J. Huynh, N. S. M. S. Hossain, T. S. M. A. H. Bin, M. B. Z. T. Hossain, M.T. Islam [1] This paper investigates the use of machine learning models, including XG Boost, to predict cardiovascular risk. A. C. M. F. De Faria, F. S. H. Silva, A. F. L. da Silva, L. J. P. da Silva [2] This paper presents a machine learning-based approach to early prediction of cardiovascular diseases Y. N. Shanker, B. S. K. R. Anjaneyulu, A. B. Gopalan [3]. This survey paper presents an overview of machine learning techniques, with a focus on the application of these algorithms to cardiovascular disease prediction. S. R. Shalev-Shwartz, S. Ben-David, S. K. V. Yavapai [4]. This paper delves into the integration of both machine learning and deep learning methods for predicting cardiovascular diseases. V. Kumar, A. Kumar, D. A. S. Bansal, P. S. S. M..

III. METHODOLOGY

Requirement Analysis: During this preliminary stage, the system's requirements were ascertained by looking at and analysing comparable systems. The project's goals, including the technical limitations, user interface design, and necessary functionalities, were well- defined.

System Design: A structured design approach was used in accordance with the requirements that were established. To illustrate the data and logic flow, flowcharts and diagrams were made once the system was divided into smaller components. This made it easier to comprehend how different components interacted with one another and to organise the development process.

Development and Coding: Coding and Development: The project was actually developed using [insert platform or programming language used, such as Python, Java, Arduino IDE, etc.]. Readability and maintainability were guaranteed by adhering to standard coding practices. The code was developed in a modular style to make debugging and future improvements simple.

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202036

Testing: To find and address errors early in the process, unit testing was done on individual modules. Integration testing was carried out to make sure the modules interacted as intended following successful unit testing. To confirm the accuracy, dependability, and functionality of the system, a number of test cases were created.

Implementation: The system was put into use in a controlled setting when testing was finished. Every feature was checked to make sure it worked properly. Based on comments, the necessary alterations and improvements were implemented.

Documentation: System architecture, code structure, testing protocols, and user manuals were all properly documented during the development process. This report offers a thorough overview of the work completed and offers insight into the development and operation of the system.

IV. EXPERIMENTAL RESULTS

This section describes the implementation results of the project. The user interface was implemented using the Tkinter library. The GUI provides the functionality to load images, extract text, and perform summarization using NLP techniques.

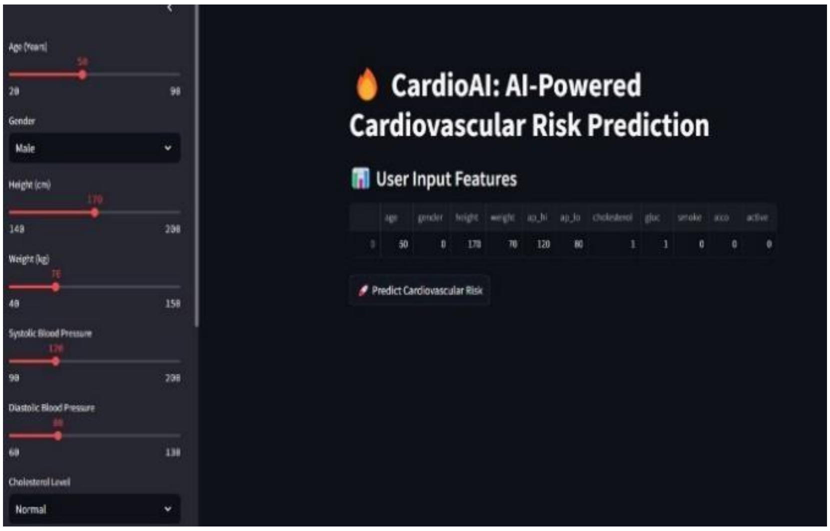

Fig 1: **Input**

Fig 2: **Output High Risk**

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202036

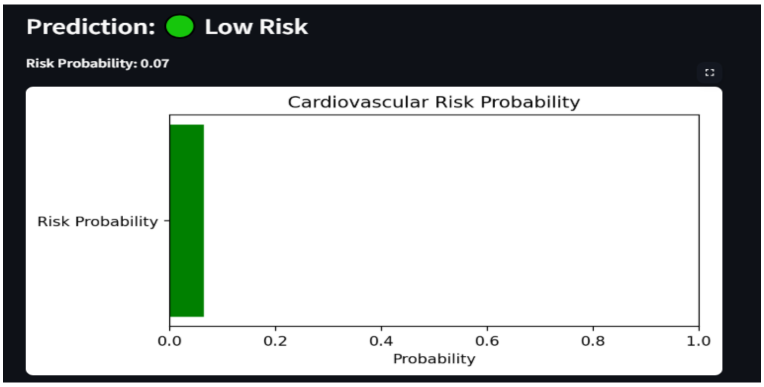

Fig 3: **Output Low Risk**

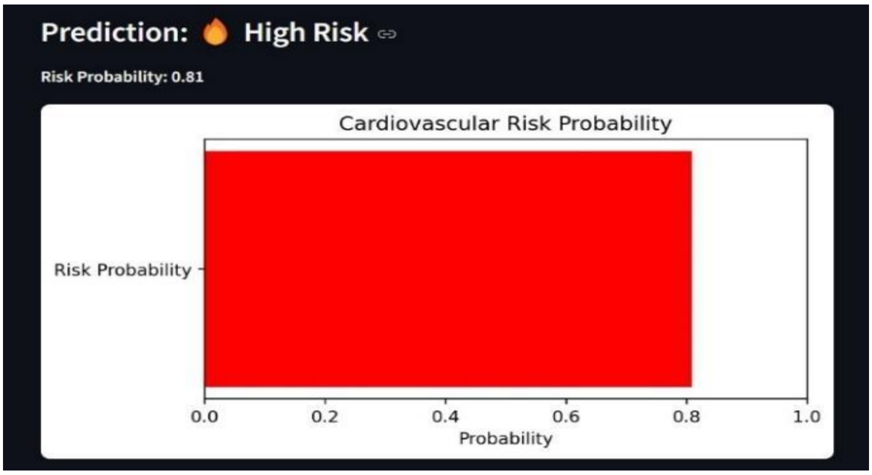

Fig 4: **Output Bar Chart**

V. CONCLUSION

In this project, we used the XGBoost algorithm to create an AI-powered cardiovascular illness prediction system. The model successfully divides people into high-risk and low-risk groups for cardiovascular disease by examining important medical and lifestyle variables such age, blood pressure, cholesterol, glucose levels, and physical activity. Users can enter their health information and get immediate forecasts thanks to the user-friendly and interactive interface that the Streamlit integration offers. Because of its great accuracy, the model is a useful tool for risk assessment and early identification. By facilitating proactive medical decisions and encouraging preventive treatment, this initiative demonstrates the potential of machine learning in the healthcare industry.

REFERENCES

1. Bishop, C. M., & Nasrabadi, N. M. (2006). *Pattern recognition and machine learning* (Vol. 4, No. 4, p. 738). New York: springer.
2. Hastie, T. (2009). The elements of statistical learning: data mining, inference, and prediction.
3. Goodfellow, I., Bengio, Y., Courville, A., & Bengio, Y. (2016). *Deep learning* (Vol. 1, No. 2). Cambridge: MIT press.
4. Raschka, S., & Mirjalili, V. (2019). *Python machine learning: Machine learning and deep learning with Python, scikit-learn, and TensorFlow 2*. Packt publishing ltd.

IJARETY

International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975 Impact Factor: 8.152

www.ijarety.in editor.ijarety@gmail.com