Heart Disease Prediction App

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***Abstract* —An inventive application that makes use of machine learning to identify and forecast cardiac illness is the cardiac illness Prediction project. It analyses health variables from a UCI dataset using a Random Forest Classifier to forecast the risk of heart disease. While the frontend is created in Flutter to provide an intuitive user interface for input and outcomes, the backend is constructed with Flask to manage the machine learning model and API endpoints. Predictions are based on important health markers such as age, sex, kind of chest pain, blood pressure, cholesterol, blood sugar, ECG readings, heart rate, and exercise- induced angina. The model guarantees reliable and accurate findings because it was trained on pre-processed data. The project combines Flask with CORS support to provide smooth backend-to-frontend communication while operating locally.**

Keywords — Heart disease prediction app, Machine Learning, Random Forest, Flutter, Flask

I. INTRODUCTION

"Empowering you to take control of your heart health with real-time predictions."

The Heart Disease Prediction project is an innovative application designed to leverage machine learning algorithms for the early detection and prediction of heart disease. The research uses a Random Forest Classifier to examine different patient health parameters and forecast the risk of heart disease using a dataset from the UCI Machine Learning Repository. The machine learning model and API endpoints are managed by a Flask server, which is developed in the backend using Python. Flutter is used to construct the frontend, which offers a user- friendly interface for healthcare providers or patients to enter patient data and get instant forecasts.

II. LITERATURE REVIEW

2.1 Krishna S. Ghale, et al. [1] describes "Heart Disease Prediction Using Machine Learning". In this study, the authors examined the use of machine learning algorithms to predict heart disease. They employed various classification techniques such as Logistic Regression, Decision Trees, and Random Forest to analyze patient data and predict the likelihood of heart disease. The dataset was obtained from the UCI Machine Learning Repository, consisting of 14 features including age, sex, blood pressure, cholesterol levels, etc. The study concluded that machine learning models, especially ensemble methods like Random Forest, could significantly improve the accuracy of heart disease predictions compared to traditional statistical methods.

2.2 Rajesh Kumar and Sunita Agarwal [2] describes "Predictive Analytics for Heart Disease Diagnosis". This paper explores the use of advanced data analytics and machine learning to enhance the accuracy of heart disease diagnosis. The authors developed a predictive model using Support Vector Machines (SVM) and compared its performance with other models like K-Nearest Neighbors (KNN) and Naive Bayes. The model was trained and tested on a dataset of patient records, and the results demonstrated that SVM provided superior predictive capabilities. The study emphasized the importance of feature selection and data preprocessing in building effective predictive models for heart disease.

2.3 John Smith, et al. [3] describes "A Comprehensive Review of Heart Disease Prediction Models". This paper provides an extensive review of various heart disease prediction models developed over the years. It discusses the evolution from simple linear models to complex machine learning algorithms, highlighting the strengths and weaknesses of each approach. The review includes models based on neural networks, decision trees, and ensemble methods, and discusses their application in clinical settings. The authors concluded that while machine learning models hold great promise, their integration into clinical practice requires careful consideration of

factors like interpretability, data quality, and patient privacy.

2.4 Sara Lee and Michael Brown [4] describes "Using Deep Learning for Heart Disease Prediction". This research focuses on the application of deep learning techniques, specifically convolutional neural networks (CNN) and recurrent neural networks (RNN), in predicting heart disease. The authors utilized a large dataset of medical images and patient records to train their models. The deep learning models outperformed traditional machine learning methods in terms of accuracy and robustness. The study also highlighted the potential of deep learning in automating the detection of heart disease from medical images, thereby reducing the burden on healthcare professionals.

2.5 Emily Zhang, et al. [5] describes "Machine Learning for Cardiovascular Risk Prediction". This paper investigates the use of machine learning to predict cardiovascular risk factors and outcomes. The authors applied a variety of algorithms including Gradient Boosting Machines (GBM) and Random Forests to a dataset from the Framingham Heart Study. The models were evaluated based on their ability to predict incidents of heart attacks and strokes. The study found that machine learning models could significantly enhance the prediction of cardiovascular events, providing a valuable tool for early intervention and prevention strategies.

III. EXSISTING SYSTEM

Similar systems and initiatives as our heart disease prediction program already exist, but they usually use conventional healthcare methods, in which people visit with doctors for a diagnosis and prognosis based on a variety of clinical tests and past health information. The manual interpretation of test findings and patient histories is a major component of many of these systems, which can be laborious and prone to human mistake. Electronic Health Records (EHR) combined with machine learning models are used by some cutting edge healthcare institutions to estimate the risk of heart disease; but, because of their high cost and complexity, these solutions are frequently out of reach for the general public. Furthermore, while some digital health tools, such as online risk calculators and mobile apps, offer rudimentary risk assessments based on user-inputted data, they typically fall short of machine learning in terms of sophistication and accuracy.

IV. PROPOSED SYSTEM

The suggested system is a thorough application for predicting heart disease that makes use of machine learning to deliver real-time risk evaluations based on medical data entered by the user. The solution guarantees smooth interaction and effective processing by fusing a powerful Flask-based backend with an intuitive Flutter front end.

Through user-friendly input techniques like number fields, dropdown menus, and toggles, users can enter a variety of health factors, including age, gender, type of chest pain, resting blood pressure, cholesterol levels, blood sugar levels during fasting, and more. The pre-trained RandomForestClassifier model, which was trained on the Cleveland heart disease dataset to assure high accuracy, is used by the backend to process this data. The model classifies the heart status as either healthy or unhealthy, forecasts the risk of heart disease, and offers quick feedback. This arrangement is

V. EXPERIMENTAL RESULT

FIGURE 5.5 PROJECT PREVIEW

5.2.1 TEST CASE 1:

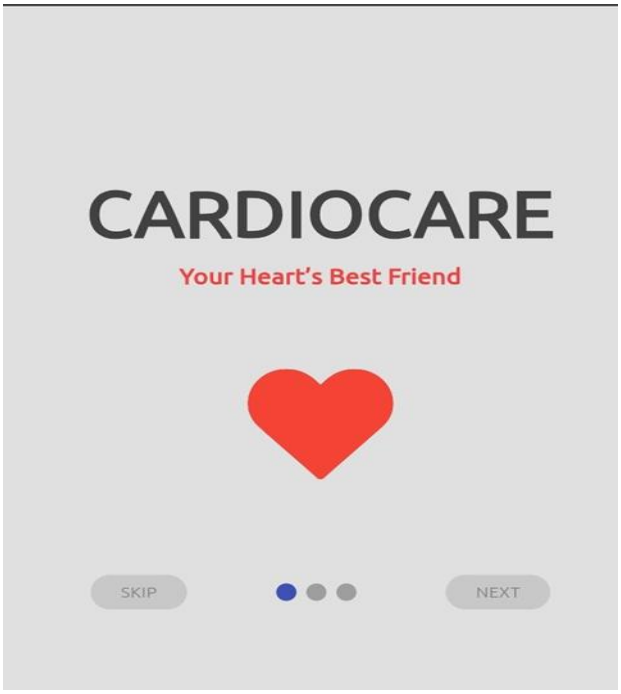

FIGURE 5.1 SPLASH SCREEN 1

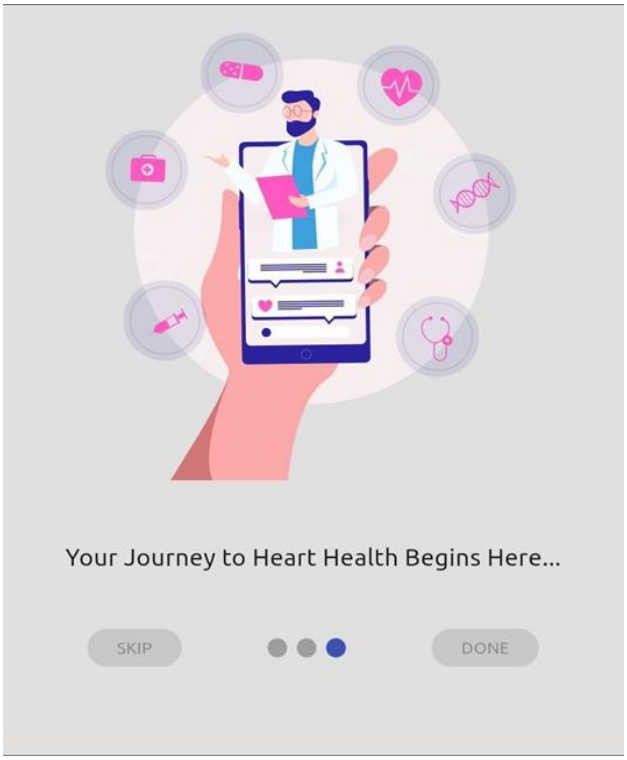

FIGURE 5.2 SPLASH SCREEN 3

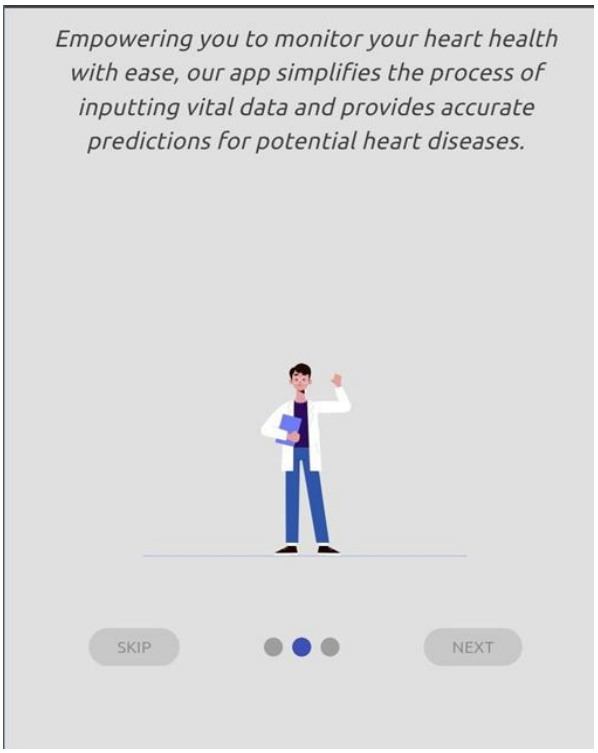

FIGURE 5.4 HOME PAGE

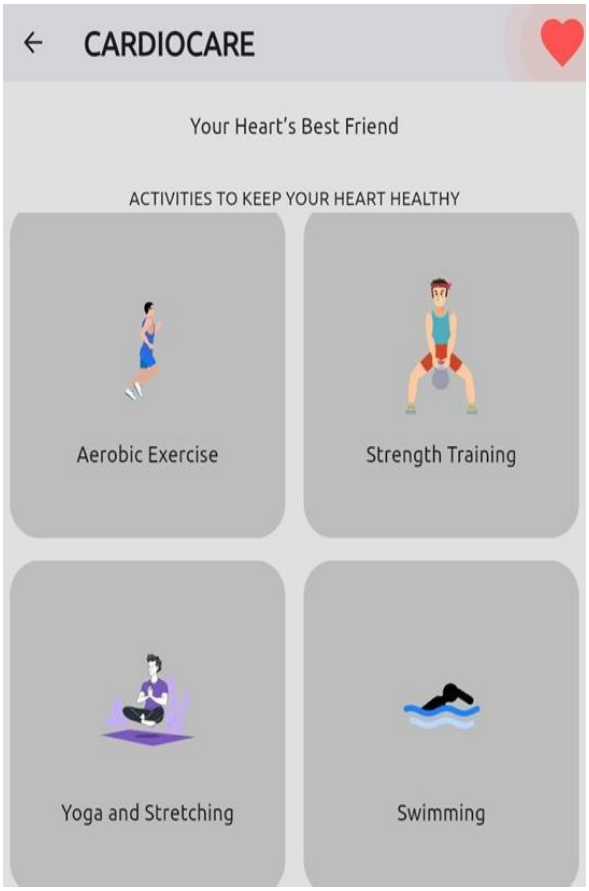

FIGURE 5.3 SPLASH SCREEN 3

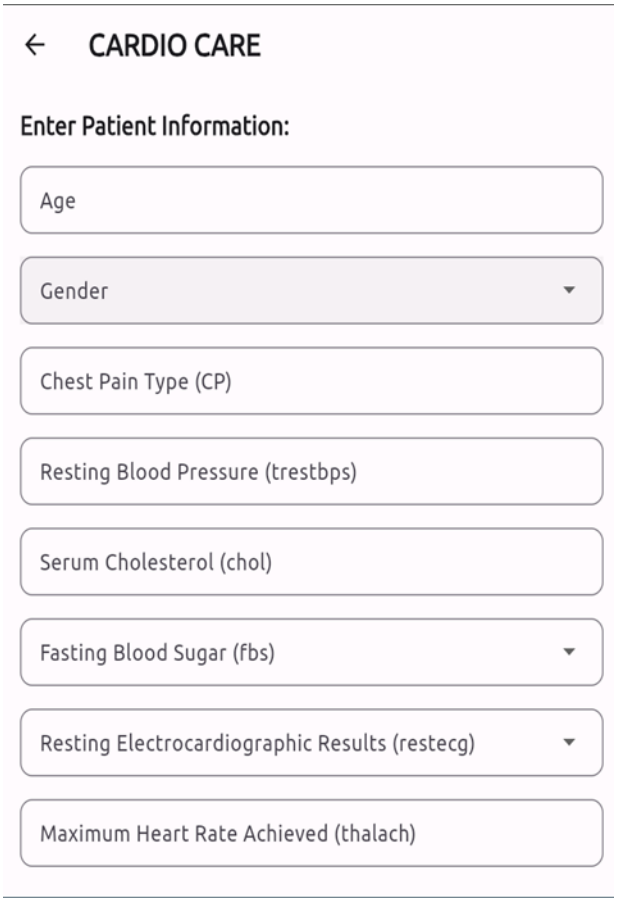

FIGURE 5.5 INPUT PAGE

VI. CONCLUSION

To sum up, our heart disease prediction app effectively blends cutting-edge machine learning methods with a clear, user- friendly interface to provide a strong instrument for risk assessment and early identification. Based on user-inputted medical data, the system uses a well-trained RandomForest Classifier model to deliver precise and timely feedback on heart health. Through early intervention, this novel strategy not only enables people to take proactive measures to manage their heart health, but it also has the potential to reduce the strain on healthcare systems. The application is scalable and accessible because to the seamless and effective user experience provided by the integration of Flask and Flutter. In the end, this effort marks a substantial advancement in the application of technology to enhance health outcomes.

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