University of Mysore
Department of Studies in Computer Science
Mysore - 570006

PRESENTATION OF END-OF-CYCLE PROJECT FOR THE AWARD OF THE MASTER OF SCIENCE IN COMPUTER SCIENCE

Topic :

« Developing an Efficient Prediction Model of Heart Disease using Machine Learning Techniques»

Presented By :

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Plan

Introduction

I Preliminary Study — Presentation of the project

II Analysis & Design — Analysis and Design

III Demo — Presentation of the system

Conclusion

Introduction

In today's world, cardiovascular disease is the leading cause of death. Heart disease prediction is a critical challenge in the medical data processing. The emergence of machine learning techniques has demonstrated their effectiveness in disease prediction from massive amounts of healthcare data.

Heart disease is difficult to recognize due to a variety of risk factors such as high blood pressure, cholesterol, and abnormal pulse rate. Because of the disease's complexity, it must be handled with care.

This project analyses the algorithms and methods used to implement prediction of heart disease. It is directed towards machine learning and also to provide a detailed analysis of heart disease risk based on several factors that may have a direct impact on cardiovascular health.

Plan

Preliminary Study

I. Presentation of the project

➢ Proposed System

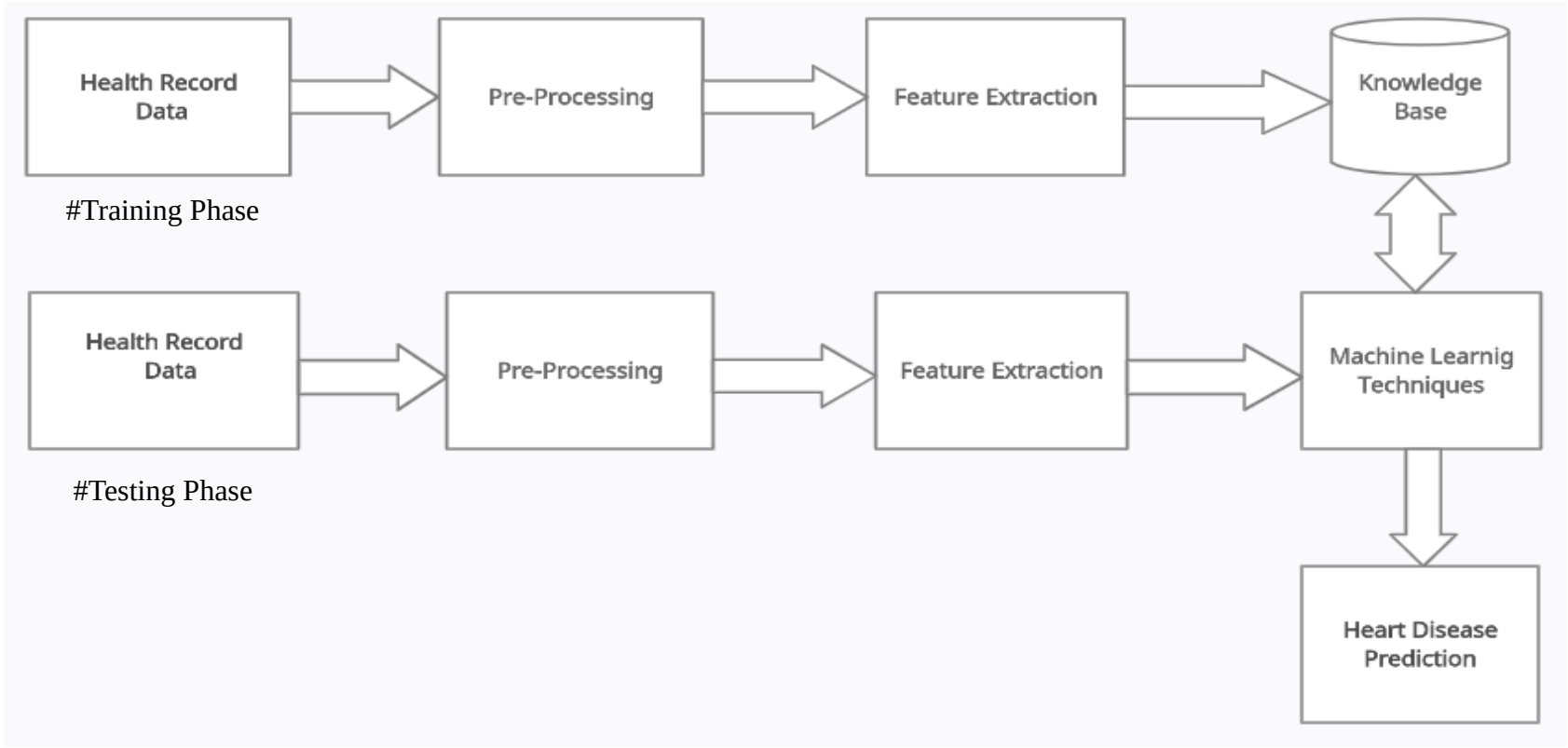
From studying different algorithms to make re-optimization to the existing system to find better results, researchers have gone through many different ways. The observable factor is that although the accuracy has been quite good. However, domain specific issues of healthcare are still to be resolved, and to get better accuracy of heart disease prediction, precisely work shall be done.

Hence, developing an efficient prediction model of heart disease based machine learning techniques at low cost to predict cardiovascular disease. The proposed system not only performs the task of disease prediction but also identifies and classifies heart disease patient and non-heart disease patient automatically along with the reducing of the cost to early detect heart disease using machine learning techniques. After analysis the various categories data, the system will predict the risk of heart disease with higher accuracy.

Preliminary Study

I. Presentation of the project

➢ Architecture of the System



Plan

Introduction

I Preliminary Study

Presentation of the project

II Analysis & Design

Analysis and Design

Analysis and Design

I. Analysis

➢ System Analysis

Systems analysis is a process of collecting factual data, understand the processes involved, identifying problems and recommending feasible suggestions for improving the system functioning.

The major objectives of systems analysis are to find answers for each business process: What is being done, How is it being done, Who is doing it, When is he doing it, Why is it being done and How can it be improved?

The result of this process is a logical system design. Systems analysis is an iterative process that continues until a preferred and acceptable solution emerges.

Analysis and Design

I. Analysis

1. Dataset Collection
2. Data Pre-Processing
3. Feature Extraction
4. Heart Disease Prediction

Analysis and Design

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Step 1

Dataset

I. Analysis

➢ Dataset Collection

Initially, we collect a dataset for our heart disease prediction system. After the collection of the dataset, we split the dataset into training data and testing data.

The training dataset is used for prediction model learning and testing data is used for evaluating the prediction model. For this project, 75% of training data is used and 25% of data is used for testing.

The dataset used for this project is Heart Disease Cleveland UCI. The dataset consists of 76 attributes; out of which, 14 attributes are used for the system.

Analysis and Design

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Step 2

Pre-Processing

I. Analysis

➢ Data Pre-Processing

Data pre-processing is an important step for the creation of a machine learning model. Initially, data may not be clean or in the required format for the model which can cause misleading outcomes.

In pre-processing of data, we transform data into our required format. It is used to deal with noises, duplicates, and missing values of the dataset.

Data pre-processing has the activities like importing datasets, splitting datasets, attribute scaling, etc. Preprocessing of data is required for improving the accuracy of the model.

Analysis and Design

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Step 3

Feature Extraction

I. Analysis

➢ Feature Extraction

In machine learning, a feature is a separate assessable property or characteristic of a phenomenon being detected. Picking informative, perceptive and independent features is a vital step for effective algorithms in classification.

When the input data to an algorithm is too huge to be processed and it is suspected to be redundant. Then it can be converted into a reduced set of features the selected features are expected to contain the appropriate information from the input data, so that the desired task can be performed by using this reduced demonstration instead of the complete initial data.

Analysis and Design

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Step 4

Prediction

I. Analysis

➢ Heart Disease Prediction

Once you have gone through collecting data, preparing the data, selecting the model, and training and evaluating the model and tuning the attributes.

It is now time to use various machine learning algorithms like Support Vector Machine, Logistic Regression, Decision Tree, and Random Forest for classification.

Comparative analysis is performed among algorithms and the algorithm that gives the highest accuracy is used for heart disease prediction.

Analysis and Design

II. Design

➢ System Design

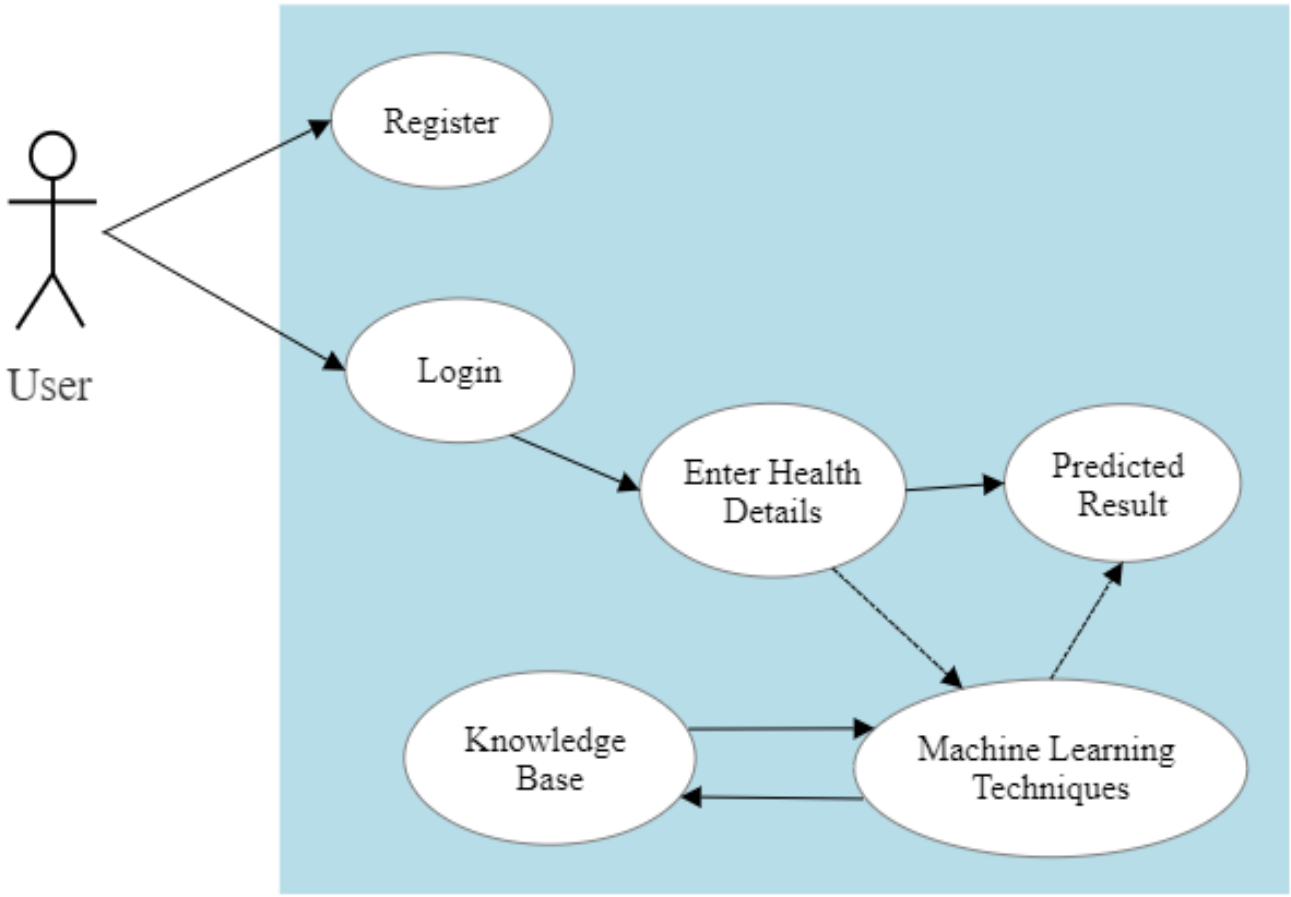
System design is the process, which involves conceiving, planning and carrying out the plan by generating the necessary reports and inputs. In other words, design phase acts as a bridge between the software requirement specification and implementation phase, which satisfies those requirements. System Design is the transformation of the analysis model into a system design model.

The goal is to divide the problem into manageably small modules that can be solved separately, the different modules have to cooperate and communicate together to solve the problem. The complete project is broken down into different identifiable modules. Each module can be understood separately. All the modules at last are combined to get the solution of the complete system.

Analysis and Design

II. Design

➢ Use Case Diagram

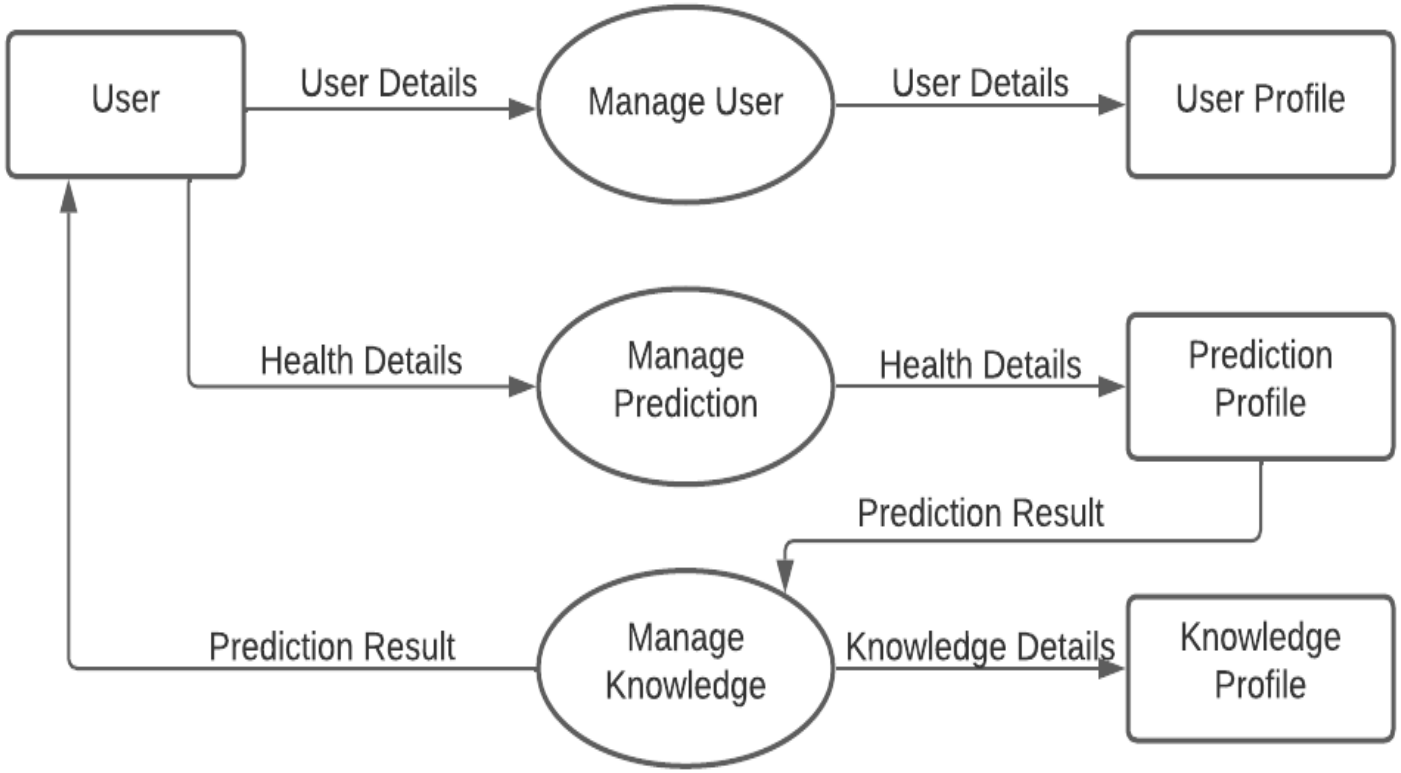


Analysis and Design

II. Design

- Introduction
- Part I
- Part II
- Part III
- Conclusion

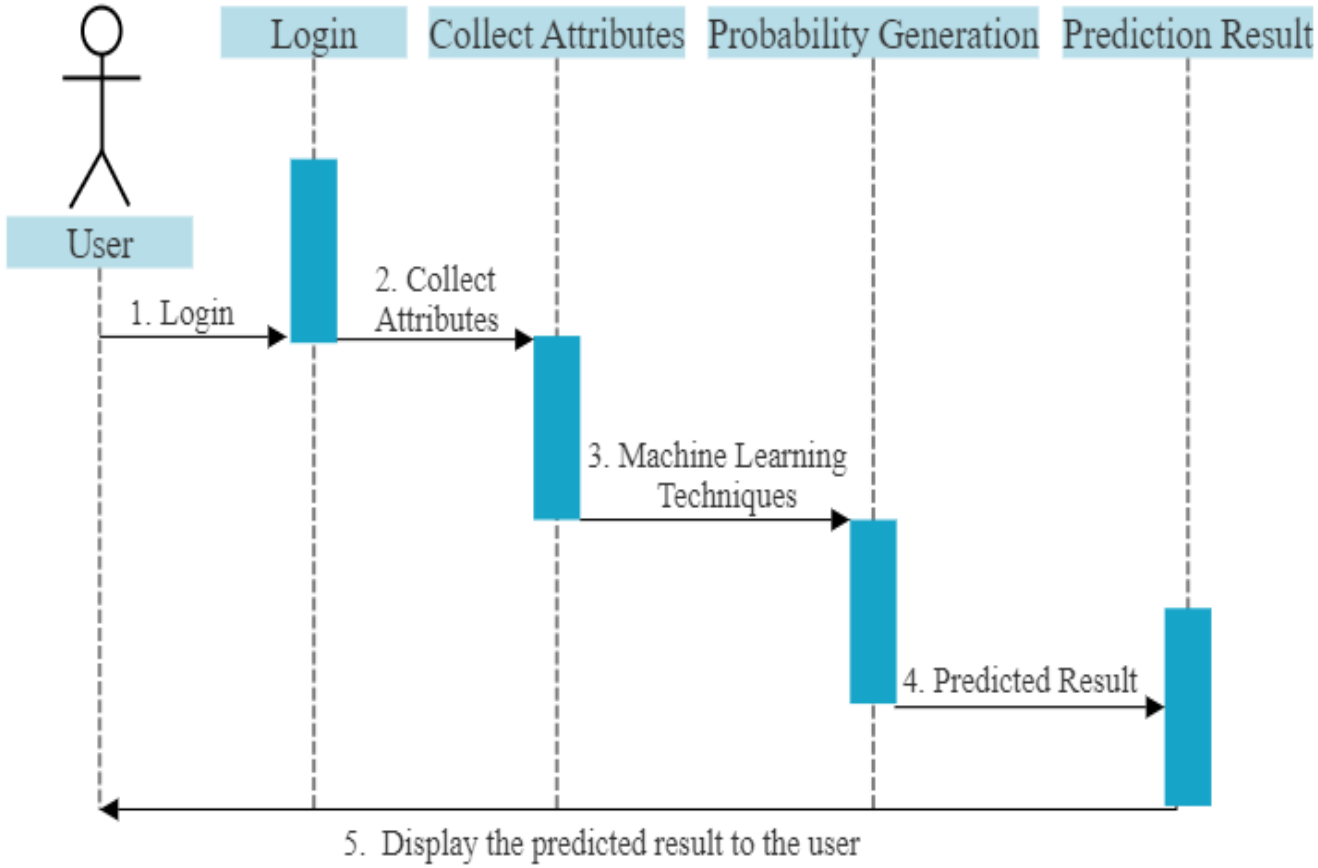
➢ Data Flow Diagram



Analysis and Design

II. Design

➢ Sequence Diagram



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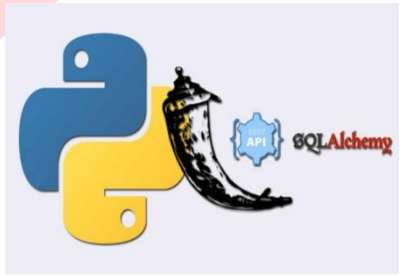
- III — Demo — Presentation of the system

Implementation

I. Software Specification

- Used Tools



Implementation

II. Presentation of the System

Demo

Conclusion

In this project, we develop an inexpensive but flexible and scalable heart disease prediction system that integrates the capabilities of AI and Machine Learning Techniques for cardiovascular disease prediction of a patient's health status.

Through experimental analysis, we have shown that the proposed framework is scalable and reliable with high classification accuracy. We believe that the proposed work can address the healthcare spending challenges by substantially reducing inefficiency and saving valuable lives.

We are currently implementing the proposed algorithm and testing it in a real-life environment.

Thank You
For Your Attention !

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