High Level Design (HLD) Healthcare Analytics on Heart Disease Data

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Contents

Page No.

Document Version Control 2
Abstract 4
1) Introduction 5
1.1) Why this High-Level Design Document 5
1.2) Scope 5
2) General Description 6
2.1) Problem Statement 6
2.2) Objective 6
2.4) Tools Used 7
3) Design Details 8
3.1) Functional Architecture 8
3.3) Deployment Process 9
4) Performance 9
4.1) Reusability 9
4.2) Application Compatibility 9
4.3) Resource Utilization 10
4.4) Deployment 10
5) Dashboards 11
6) Conclusion 11

Abstract:

The health care industries gather huge amounts of information that contain some hidden facts, that is beneficial for making effective decisions. For presenting suitable results and making effective choices on facts, a few advanced information mining techniques are used. on this take a look at, a heart disease Prediction system is advanced using Random Forest, decision Tree and various algorithms for predicting the risk level of heart sickness. The device uses 13 scientific parameters along with age, sex, blood strain, cholesterol, and obesity for prediction. The HDPS predicts the likelihood of patients getting heart ailment. It enables big information. E.g., Relationships among clinical factors related to heart disorder and patterns, to be installed. we've got hired the multilayer perceptron neural community with backpropagation because the training algorithm. The obtained results have illustrated that the designed diagnostic gadget can efficiently predict the threat stage of coronary heart diseases.

1. Introduction

1.1 Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
    - Security
    - Reliability
    - Maintainability
    - Portability
    - Reusability
    - Application compatibility
    - Resource utilization
    - Serviceability

1.2Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

2.General Description:

2.1 Problem Statement

Heart disease can be successfully managed through a combination of lifestyle changes, medication and, in some cases, surgery. With the right treatment, the symptoms of heart disease can be reduced heart function improved. The predicted results can be used to prevent and thus reducing the cost of the treatment provided and other expensive. The overall purpose of my work will be to accurately predict a few tests and symptoms. Presence of heart disease. The qualities considered form the basis for evaluation and delivery more or less accurate results. Many input attributes can be taken but our purpose is to predict with fewer qualities and faster performance risk of heart disease. Decisions are often made it is performed on the basis of the doctors' experience and experience rather than the rich hidden information in a set of data and details. This practice leads to unwanted prejudice, mistakes, and extremes treatment costs that affect the quality of service provided to patients. Data mining has a huge impact on the healthcare industry to empower health systems that systematically use data and analytics to identify inefficiencies and developments maintenance and cost reduction. According to (Wurz & Takala, 2006) opportunities to improve care and cost reduction simultaneously could apply to 30 percent of the total amount spent on health care. The the effective use of data mining in virtual sectors such as e-business, marketing and sales has led to its use in other industries and sectors. Among the categories that have been identified are health care. The health care environment is still `` rich '' but 'bad'. There a wealth of data found within health care systems. However, there are ineffective deficiencies analytical tools to detect hidden relationships and trends in data of African species.

2.2 Objectives:

• Provides new approach to concealed patterns in the data.

• Helps avoid human biasness.

• To implement Random Forest Classifier that classifies the disease as per the input of the user.

• Reduce the cost of medical tests. The main purpose of this study was to create a heart

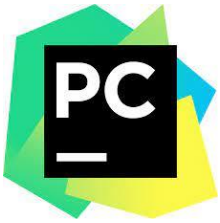
prediction system.

The system can locate and extract hidden disease-related information from a set of historical cardiac data The Heart disease prediction program aims to apply data mining techniques to pre-set medical data to assist in the prediction of heart disease

2.3 Tools used

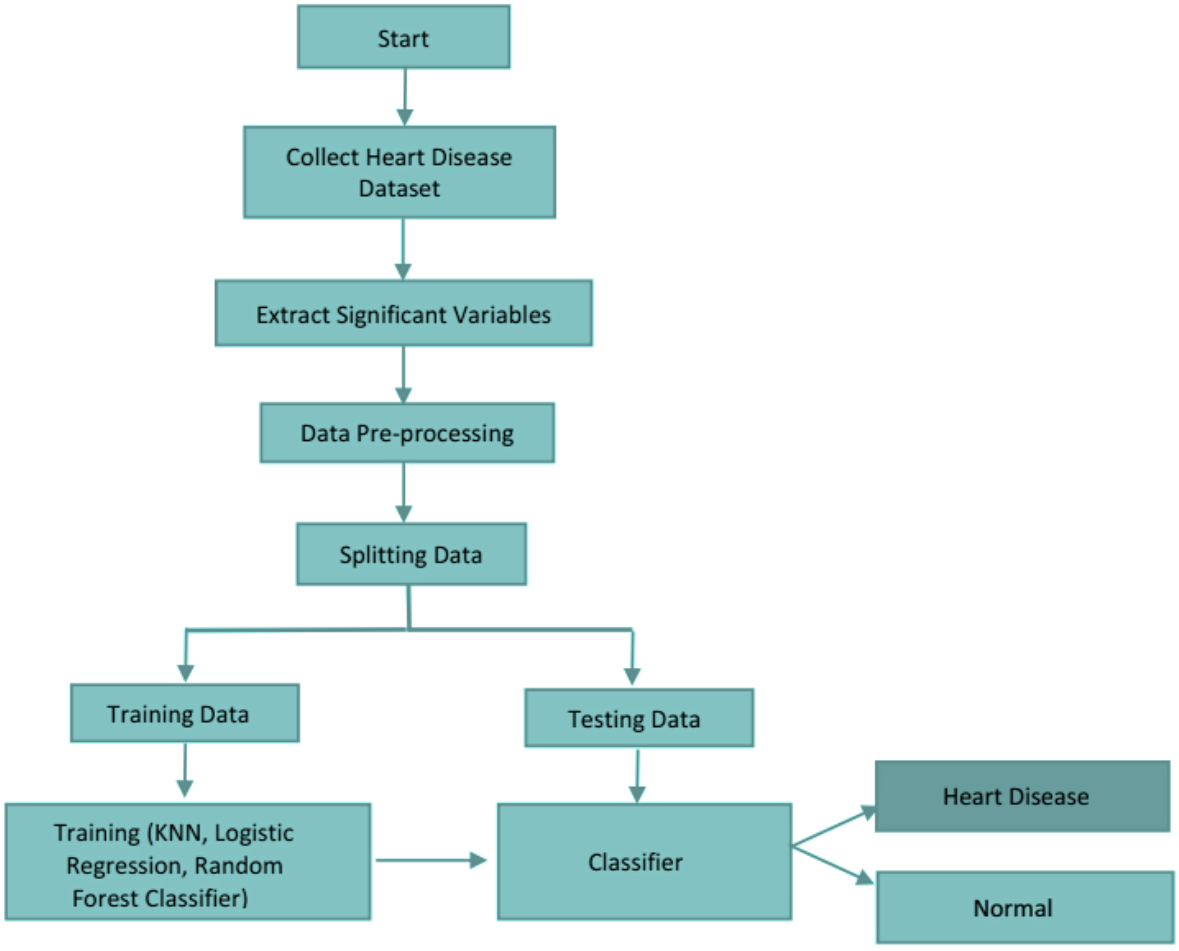
Business Intelligence tools and libraries works such as NumPy, Pandas, Matplotlib, Tableau, PyCharm, seaborn SKlearn Flask, Heroku are used to build the whole framework.



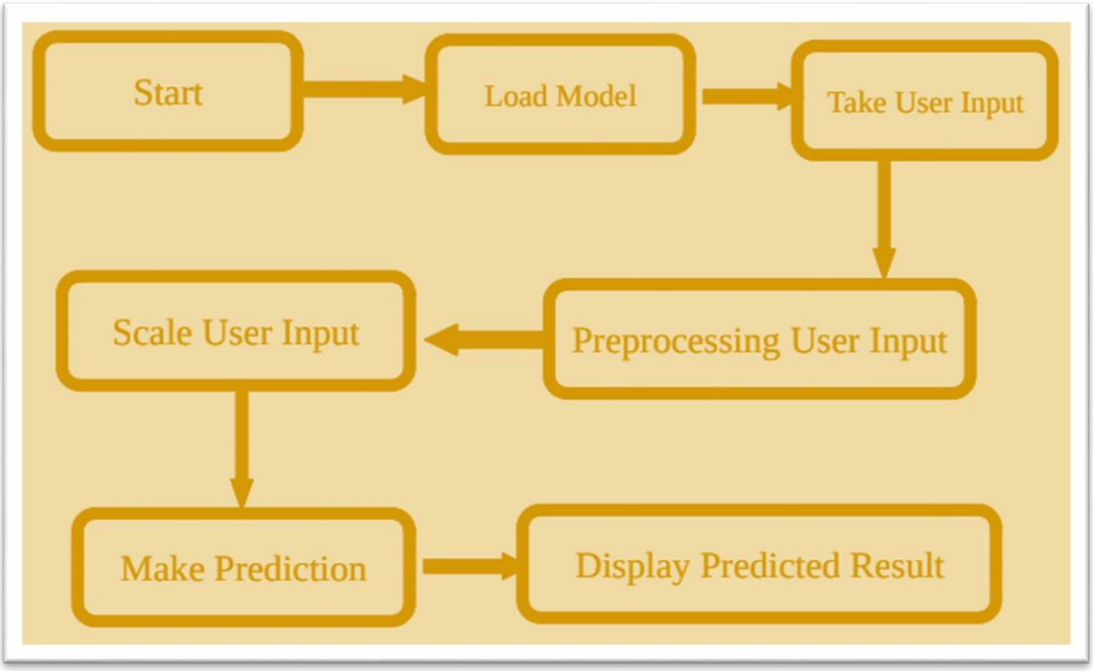



3. Design Details

3.1 Functional Architecture:



3.2 Deployment process



4.Performance

The Heart Disease prediction model is used to identify that which type of mushroom is edible and poisonous based on their features (Age, Sex, Chest pain type, resting blood pressure, serum cholesterol, fasting blood sugar resting electrocardiographic results, maximum heart rate achieved, exercise induced angina, oldpeak, the slope of the peak exercise, number of major vessels, thal etc...), So it should be as accurate as possible. The retraining of the model is also important to improve the performance.

4.1 Reusability

The code written and the component used should have the ability to be reused without any problem.

4.2 Application Compatibility

The different components for this project will be using Python as an interface between them Each component will have its own task to perform, and it is the job of Python to ensure proper transformation of information.

4.3 Resource Utilization

When any task is performed, it will likely use all the processing power available until that function is finished Make groups with calculations. Like include filters, calculated groups load only named members of the domain, whereas Tableau's group function loads the entire domain.

4.4 Deployment

The cloud application platform Heroku is used to deploy the model

5. Dashboards

Dashboards will be implemented to display and indicate certain KPIs and relevant indicators for the disease.

As and when, the system starts to capture the historical/periodic data for a user, the dashboards will be included to display charts over time with progress on various indicators or factors

Conclusion

The proposed system is GUI-based, easy to use, awesome, reliable and an expandable system. The proposed operating model can also help reduce treatment costs by providing Initial timely diagnosis. The model can also work for the purpose of a training tool for medical students and it will be a soft diagnostic tool available from a doctor and a cardiologist. Ordinary doctors can use this tool for initial diagnosis of cardio patients. There are many potential improvements that can be assessed to improve the scope and accuracy of this forecast system. As we we have made a standard plan, in the future we can use this program for analysis different data sets. The effectiveness of a medical diagnosis can be greatly improved by managing multiple class labels in the prediction process, and can be another good guide of research. In the DM warehouse, in general, the size of the cardiac database is high, therefore identification and selection of key indicators for a better diagnosis of most heart disease challenging tasks for future research.