Low Level Design

Heart Disease

Diagnostic - Analysis

Revision Number: 1.0
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Document Version Control

Date Issued	Version	Description	Author
19th January 2022	1.0	First Version of Complete LLD	Arushi Gogia
29th January 2022	1.1	Final Version	Arushi Gogia

Contents

1. Introduction

1.1 What is Low-Level design document?

The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the Heart Disease Diagnostic Analysis dashboard. LDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

1.3 Project Introduction

The term "heart disease" refers to several types of heart conditions. The most common type of heart disease is coronary artery disease (CAD), which affects the blood flow to the heart. Decreased blood flow can cause a heart attack. Sometimes heart disease may be "silent" and not diagnosed until a person experiences signs or symptoms of a heart attack, heart failure, or an arrhythmia.

India has one of the highest burdens of cardiovascular disease (CVD) worldwide. The annual number of deaths from CVD in India is projected to rise from 2.26 million (1990) to 4.77 million (2020). Coronary heart disease prevalence rates in India have been estimated over the past several decades and have ranged from 1.6% to 7.4% in rural populations and from 1% to 13.2% in urban populations. Statistics shows One person dies every 40 seconds in the United States from cardiovascular disease. So it becomes very important to study on this matter and take out some meaningful insights from the data for prevention and cure for Heart Diseases.

2. Problem Statement

Health is real wealth in the pandemic time we all realized the brute effects of covid-19 on all irrespective of any status. You are required to analyse this health and medical data for better future preparation. A dataset is formed by taking into consideration some of the information of 303 individuals

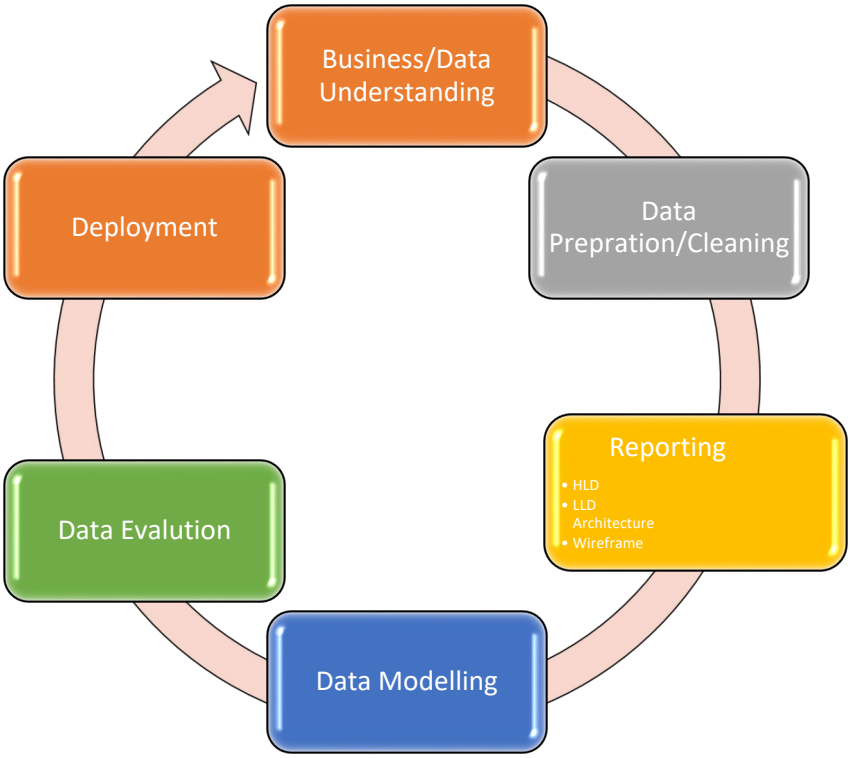
3. Dataset Information

As mentioned above dataset contains 14 features and information of 303 individuals which we will be studying and digging the insights to prevent and cure heart diseases at right point .

1. age (Age in years)
2. sex : (1 = male, 0 = female)
3. cp (Chest Pain Type): [0: asymptomatic, 1: atypical angina, 2: non-anginal pain, 3: typical angina]
4. trestbps (Resting Blood Pressure in mm/hg)
5. chol (Serum Cholesterol in mg/dl)

6. fps (Fasting Blood Sugar > 120 mg/dl): [0 = no, 1 = yes]
7. restecg (Resting ECG): [0: showing probable or definite left ventricular hypertrophy by Estes' criteria, 1: normal, 2: having ST-T wave abnormality]
8. thalach (maximum heart rate achieved)
9. exang (Exercise Induced Angina): [1 = yes, 0 = no]
10. oldpeak (ST depression induced by exercise relative to rest)
11. slope (the slope of the peak exercise ST segment): [0: downsloping; 1: flat; 2: upsloping]
12. ca [number of major vessels (0–3)
13. thal : [1 = normal, 2 = fixed defect, 3 = reversible defect]
14. target: [0 = disease, 1 = no disease]

4. Architecture



4.1. Architecture Description

1. Raw Data Collection ➡ Understanding Data

The Dataset was taken from INeuron's Provided Project Description Document.
https://drive.google.com/drive/folders/165Pjmfb9W9PGy0rZjHEA22LW0Lt3Y-Q8

2. Data Pre-Processing and Cleaning
Data cleaning is the process of fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset. Before building any model, it is crucial to perform data pre-processing and cleaning to feed the correct data to the model to learn and predict. Model performance depends on the quality of data feeded to the model to train.
This Process includes-

a) Handling Null/Missing Values
b) Handling Skewed Data

c) Outliers Detection and Removal
d) Remove duplicate or irrelevant observations
e) Filter unwanted outliers
f) Renaming required attributes

5. Reporting

Data reporting **helps you track what's happening to your business and evaluate its performance**. It's the process of collecting, merging, and visualizing raw data from all available sources. Most often, data is presented in the form of tables, graphs, or charts.

Reporting is a most important and underrated skill of a data analytics field. Because being a Data Analyst you should be good in easy and self-explanatory report because your model will be used by many stakeholders who are not from technical background.

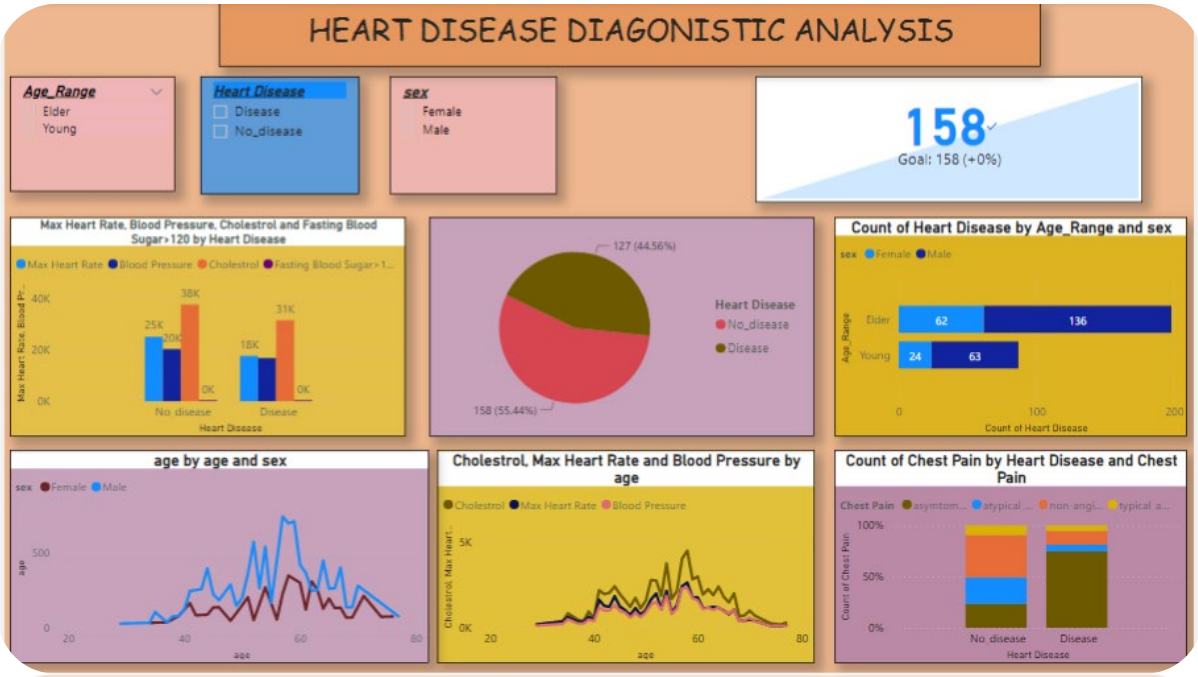
a) High Level Design Document (HLD)
b) Low Level Design Document (LLD)
c) Architecture
d) Wireframe
e) Detailed Project Report
f) Power Point Presentation

6. Modelling

Data Modelling is the process of analysing the data objects and their relationship to the other objects. It is used to analyse the data requirements that are required for the business processes. The data models are created for the data to be stored in a database. The Data Model's main focus is on what data is needed and how we have to organize data rather than what operations we have to perform. Analysis Model is **a technical representation of the system**. It acts as a link between system description and design model. In Analysis Modelling, information, behaviour, and functions of the system are defined and translated into the architecture, component, and interface level design in the design modelling.

7. Deployment

We created a Power BI Dashboard


HEART DISEASE DIAGONISTIC ANALYSIS
Age_Range
Elder
Young
Heart Disease
Disease
No_disease
sex
Female
Male
158
Goal: 158 (+0%)
Max Heart Rate, Blood Pressure, Cholestrol and Fasting Blood Sugar>120 by Heart Disease
Max Heart Rate
Blood Pressure
Cholestrol
Fasting Blood Sugar>1...
40K
20K
0K
38K
25K
20K
0K
31K
18K
0K
No disease
Disease
Heart Disease
127 (44.56%)
158 (55.44%)
Heart Disease
No_disease
Disease
Count of Heart Disease by Age_Range and sex
sex
Female
Male
Age_Range
Elder
Young
62
136
24
63
0
100
200
Count of Heart Disease
age by age and sex
sex
Female
Male
500
0
20
40
60
80
age
Cholestrol, Max Heart Rate and Blood Pressure by age
Cholestrol
Max Heart Rate
Blood Pressure
Cholestrol, Max Heart...
5K
0K
20
40
60
80
age
Count of Chest Pain by Heart Disease and Chest Pain
Chest Pain
asymtom...
atypical ...
non-angi...
typical a...
Count of Chest Pain
100%
50%
0%
No disease
Disease
Heart Disease