LOW LEVEL DESIGN(LLD)
HEART DISEASE DIAGNOSTIC ANALYSIS

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Document Version Control

Date	Version	Description	Author
20/11/2021	1.0	Introduction, Problem Statement	William Johnson
25/11/2021	1.1	Dataset Information, Architecture Description	William Johnson
16/12/2021	1.2	Final Revision	William Johnson

Contents

1.1   What is Low Level Design Document?

The goal of the Low-level design document (LLDD) is to give the internal logic design of the actual program code for the Heart Disease Diagnostic Analysis dashboard. LLDD 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   What is 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

Heart disease (HD) is one of the most common diseases nowadays, and an early diagnosis of such a disease is a crucial task for many health care providers to prevent their patients for such a disease and to save lives.

The health care industries collect huge amounts of data that contain some hidden information, which is useful for making effective decisions. For providing appropriate results and making effective decisions on data, some data science techniques need to be used. The data analysis predicts the likelihood of patients getting heart disease. It enables significant knowledge. E.g. Relationships between medical factors related to heart disease and patterns, to be established. The obtained results have illustrated that the designed diagnostic system can effectively predict the risk level of heart diseases.

1. 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 analyze this health and medical data for better future preparation. A dataset is formed by taking into consideration some of the information of 303 individuals.

2. Dataset Information

Age : The person's age in years

sex : The person's sex (**1 = male, 0 = female**)

cp : The chest pain experienced (**1 : typical angina, 2 : atypical angina, 3 : non-anginal pain, Value 4 : asymptomatic**)

trestbps : The person's resting blood pressure **(mm Hg** on admission to the hospital)

chol: The person's cholesterol measurement in **mg/dl**

fbs : The person's fasting blood sugar **(> 120 mg/dl, 1 = true; 0 = false)**

restecg : Resting electrocardiographic measurement (**0 : normal, 1 : having ST-T wave abnormality, 2 : showing probable or definite left ventricular hypertrophy by Estes' criteria**)

thalach : The person's **maximum heart rate achieved**

exang : Exercise induced angina (**1 = yes; 0 = no**)

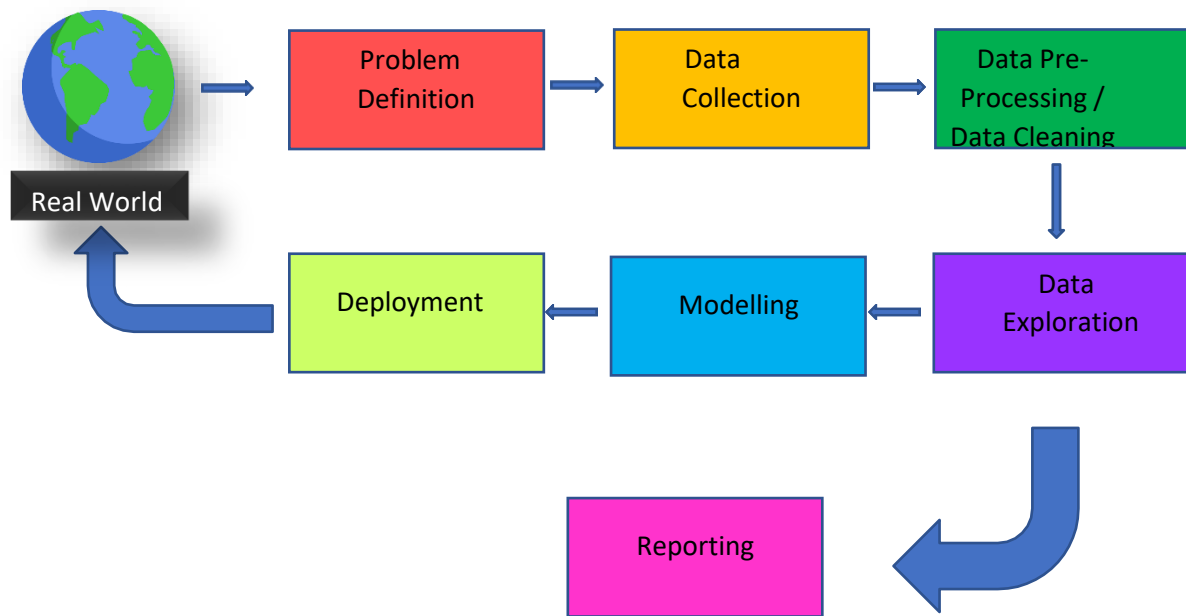**oldpeak :** ST depression induced by exercise relative to rest

slope : the slope of the peak exercise ST segment (**1 : upsloping, 2 : flat, Value , 3 : down sloping**)

ca : The number of major vessels (**0-3**)

thal : A blood disorder called thalassemia (**3 : normal; 6 : fixed defect; 7 : reversable defect**)

num : heart disease (**0 : no, 1 : yes**)

1. Architecture

1.1 Architecture Description

1. Raw Data Collection

The Dataset was taken from iNeuron's Provided Project Description Document.

https://drive.google.com/drive/folders/165Pjmfb9W9PGy0rZjHEA22LW0Lt3Y-Q8

2. Data Pre-Processing

Before building any model, it is crucial to perform data pre-processing to feed the correct data to the model to learn and predict. Model performance depends on the quality of data fed to the model to train.
This Process includes-
   a) Handling Null/Missing Values
   b) Handling Skewed Data
   c) Outliers Detection and Removal

3. Data Cleaning

Data cleaning is the process of fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset.
   d) Remove duplicate or irrelevant observations
   e) Filter unwanted outliers
   f) Renaming required attributes

1. Exploratory Data Analysis (EDA)

Exploratory Data Analysis refers to the critical process of performing initial investigations on data to discover patterns, spot anomalies, test hypothesis and to check assumptions with the help of summary statistics and graphical representations.

2. Reporting

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

3. Modelling

Data Modelling is the process of analyzing the data objects and their relationship to the other objects. It is used to analyze 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.

4. Deployment

4.1 Power BI Deployment

The deployment process lets you clone content from one stage in the pipeline to another, typically from development to test, and from test to production.

During deployment, Power BI copies the content from the current stage, into the target one. The connections between the copied items are kept during the copy process. Power BI also applies the configured deployment rules to the updated content in the target stage. Deploying content may take a while, depending on the number of items being deployed. During this time, you can navigate to other pages in the Power BI portal, but you cannot use the content in the target stage.

4.2 Publish datasets and reports from Power BI Desktop

When you publish a Power BI Desktop file to the Power BI service, you publish the data in the model to your Power BI workspace. The same is true for any reports you created in Report view. You'll see a new dataset with the same name, and any reports in your Workspace navigator.

Publishing from Power BI Desktop has the same effect as using Get Data in Power BI to connect to and upload a Power BI Desktop file.

Power BI Dashboard

Heart Disease Analysis

Sample Size
297

Heart Disease Percentage

- Absent
- Present

46.13%   53.87%

Fasting Blood Sugar VS Target

- Absent
- Present

Fasting Blood Sugar

Thalassemia VS Target

- Absent
- Present

Normal   Reversable Fefect

Gender VS Heart Disease

89   112   71   25

- Absent
- Present

MALE   FEMALE

Resting Blood Pressure VS Target

- Absent
- Present

Resting Blood Pressure

Males And Females In The Data

96
(32.32%)
FEMALES

MALES
201 (67.68%)

Heart Disease Analysis

Sample Size
297

Chest Pain VS Target

- Typical Angina
- Atypical Angina
- Non-Angina Pain
- Asymptomatic

FALSE   TRUE

Heart Disease VS Cholesterol VS Age

- Absent
- Present

Cholesterol

AGE

Rest ECG Measurement VS Target

Resting Electrocardiographic Meas...

- Absent
- Present

Thalassemia VS Target

- Absent
- Present

Normal   Reversable Fefect   Fixed Defect

Heart Disease VS Max Heart Rate VS Age

Max Heart Rate

- Absent
- Present

AGE

Maximum Heart Rate VS Target

- Absent
- Present

MAX Heart Rate