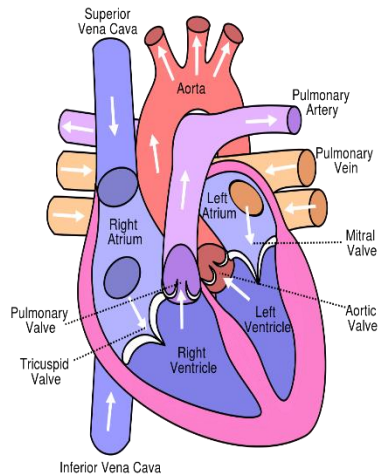# HIGH LEVEL DESIGN DOCUMENT

Heart Disease Diagnostic Analysis

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Contents

Abstract:

Heart disease is a term covering any disorder of the heart. Heart diseases have become a major concern to deal with as studies show that the number of deaths due to heart diseaseshave increased significantly over the past few decades in India it has become the leading cause of death in India. A study shows that from 1990 to 2016 the death rate due to heart diseases have increased around 34% from 155.7 to 209.1 deaths per 1 lakh population in India. Heart disease is the major cause of deaths worldwide. To give treatment for heart disease, a lot of advanced technologies are used. In medical center it is the most common problem because many medical persons do not have equal knowledge and expertise to treat their patient so they deduce their own decision and as a result it shows poor outcome and sometimes lead to death. To overcome these problems , prediction of heart disease is being done by using machine learning algorithms and data mining techniques, it has become easy to perform automatic diagnosis in hospitals as they are playing vital role in this regard. Heart disease can be predicted by performing analysis on patient's different health parameters. There are different algorithm to predict heart disease like naïve Bayes, k Nearest Neighbor (KNN), Decision tree ,Artificial Neural Network(ANN).We have used different parameters to predict heart disease. Those parameters are Age, Gender, Cerebral Palsey (CP), Gender, Cerebral palsey (CP), Blood Pressure, Fasting blood sugar test (fbs) etc.

Thus, preventing heart diseases has become more than necessary. Good data-drivensystems for predicting heart diseases can improve the entire research and preventionprocess, making sure that more people can live healthy lives.

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 thecurrent project description to represent a suitable model for coding. This document is also intended to help detect contradictions before coding and can be used as a reference manualfor 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

1.2 Scope

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

2   General Description

2.1   Product Perspective & Problem Statement

The goal of this project is to analyze to predict the probability of heart disease occurrence, based on a combination of features that describes the disease. To achieve the goal, we used a data set that is formed by taking into consideration some of the information of 303 individuals. The problem is based on the given information about each individual we have tocalculate that whether that individual will suffer from heart disease or not.

2.2   Tools used

Business Intelligence tools and libraries works such as NumPy, Pandas, Seaborn, Matplotlib, MS-Excel, MS-Power BI, Jupyter Notebook and Python Programming Language are used to build the whole framework.
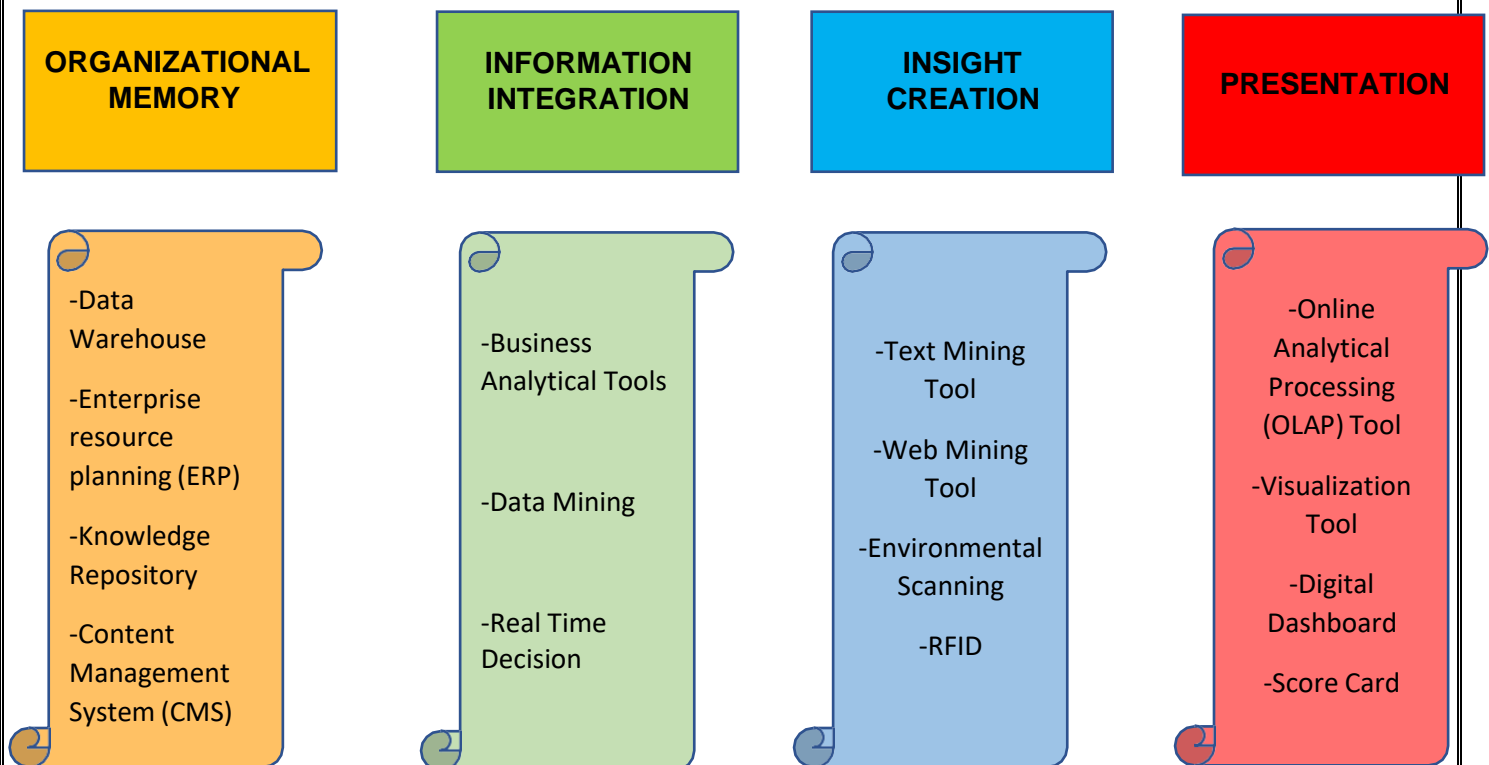
3 Design Details

3.1 Functional Architecture

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Data from source systems is integrated and loaded into a data warehouse of other analytics repository.	Data sets are organized into analytics data models or OLAP cubes to prepare them for anlysis.	BI analysts, other analytics professionals and business users run analytical queries against the date.	The query results are built into data visualizations, dashboards, reports and online portals.	Busness executives and workers use the information for decision-making and strategic planning.

Figure 1: Functional Architecture of Business Intelligence

How BI Works

ORGANIZATIONAL MEMORY	INFORMATION INTEGRATION	INSIGHT CREATION	PRESENTATION
-Data Warehouse -Enterprise resource planning (ERP) -Knowledge Repository -Content Management System (CMS)	-Business Analytical Tools -Data Mining -Real Time Decision	-Text Mining Tool -Web Mining Tool -Environmental Scanning -RFID	-Online Analytical Processing (OLAP) Tool -Visualization Tool -Digital Dashboard -Score Card

3.2 Optimization

1. **Your data strategy drives performance**

    1. Minimize the number of fields
    2. Minimize the number of records
    3. Optimize extracts to speed up future queries by materializing calculations, removing columns and the use of accelerated views

2. **Reduce the marks (data points) in your view**

    1. Practice guided analytics. There's no need to fit everything you plan to show in a single view. Compile related views and connect them with action filters totravel from overview to highly-granular views at the speed of thought.

    2. Remove unneeded dimensions from the detail shelf.

    3. Explore. Try displaying your data in different types of views.

3. **Limit your filters by number and type**

    1. Reduce the number of filters in use. Excessive filters on a view will create a more complex query, which takes longer to return results. Double-check yourfilters and remove any that aren't necessary.

    2. Use an include filter. Exclude filters load the entire domain of a dimensionwhile including filters do not. An include filter runs much faster than an exclude filter, especially for dimensions with many members.

    3. Use a continuous date filter. Continuous date filters (relative and range-of- date filters) can take advantage of the indexing properties in your databaseand are faster than discrete data filters.

    4. Use Boolean or numeric filters. Computers process integers and Booleans(t/f) much faster than strings.

    5. Use parameters and action filters. These reduce the query load (and workacross data sources).

4. Optimize and materialize your calculations

1. Perform calculations in the database
2. Reduce the number of nested calculations.
3. Reduce the granularity of LOD or table calculations in the view. The moregranular the calculation, the longer it takes.

   - ✓ LODs - Look at the number of unique dimension members in the calculation.

   - ✓ Table Calculations - the more marks in the view, the longer it will take to calculate.

- Where possible, use MIN or MAX instead of AVG. AVG requires more processing than MIN or MAX. Often rows will be duplicated and display thesame result with MIN, MAX, or AVG.

- Make groups with calculations. Like include filters, calculated groups load only named members of the domain, whereas Tableau's group function loadsthe entire domain.

- Use Booleans or numeric calculations instead of string calculations. Computers can process integers and Booleans (t/f) much faster than strings. Boolean>Int>Float>Date>DateTime>String.

4 KPI

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

Key indicators displaying a summary of the Housing Price and its relationship withdifferent metrics

1. Percentage of People Having Heart Disease
2. Age Distribution including Gender
3. Gender Distribution Based on Heart Disease
4. Chest Pain Experienced by People Suffering from Heart Disease
5. Blood Pressure, Cholesterol Level and Maximum Heart Rate ofPeople According to their Age and Heart Disease Patients.
6. ST Depression Experienced by People According to their age andheart disease.

5   Deployment

Prioritizing data and analytics couldn't come at a better time. Your company, no matter what size, is already collecting data and most likely analyzing just a portion of it to solvebusiness problems, gain competitive advantages, and drive enterprise transformation. With the explosive growth of enterprise data, database technologies, and the high demand for analytical skills, today's most effective IT organizations have shifted their focus to enabling self-service by deploying and operating Power BI at scale, as well as organizing, orchestrating, and unifying disparate sources of data for business users andexperts alike to author and consume content.

Power BI prioritizes choice in flexibility to fit, rather than dictate, your enterprise architecture. Power BI Desktop and Power BI Service leverage your existing technologyinvestments and integrate them into your IT infrastructure to provide a self-service, modern analytics platform for your users. With on-premises, cloud, and hosted options, there is a version of Power BI to match your requirements.