

VISUALIZING AND PREDICTING HEART DISEASES WITH AN INTERACTIVE DASHBOARD

REPORT

TEAM ID: PNT2022TMID35144

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1. INTRODUCTION :

1.1 PROJECT OVERVIEW:

A study in 2016 found that human beings are collectively data more than ten exabytes 5×10^{18} bytes from various sources (Lyman and Varian 2003). Exploratory Data Analysis (EDA) is a method to analyse data using advanced techniques to expose hidden structure, enhances the insight into a given dataset, identifies the anomalies and builds parsimonious models to test the underlying assumptions. Exploratory Data Analysis (EDA) is classified into Graphical or non-graphical and Univariate or multivariate. Univariate data consider one data column at a time while multivariate method considers more than two variables while analyzing. The diagnostic methods of diseases are of two types namely, Invasive and Non-invasive.



1.2 PURPOSE:

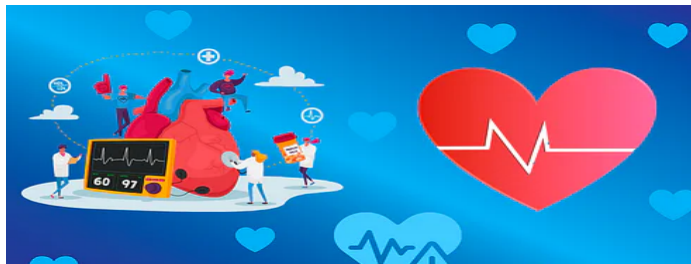
Healthcare industries generate enormous amount of data, so called big data that accommodates hidden Knowledge or pattern for decision making. The huge volume of data is used to make decision which is more accurate than intuition. Exploratory Data Analysis (EDA) detects mistakes, finds appropriate data, checks assumptions and determines the correlation among the explanatory variables. In the context, EDA is considered as analysing data that excludes inferences and statistical modelling. Analytics is an essential technique for any profession as it forecast the future and hidden pattern. Data analytics is considered as a cost effective technology in the recent past and it plays an essential role in healthcare which includes new research findings, emergency situations and outbreaks of disease. The use of analytics in healthcare improves care by facilitating preventive care and EDA is a vital step while analysing data. In this paper, the risk factors that causes heart disease is considered and predicted using K-means algorithm and the analysis is carried out using a publicly available data for heart disease. The dataset holds 209 records with 8 attributes such as age, chest pain type, blood pressure, blood glucose level, ECG in rest, heart rate and four types of chest pain. To predict the heart disease, K-means clustering algorithm is used along with data analytics and visualization tool.

2. LITRATURE SURVEY:

2.1 EXISTING PROBLEM:

[1] Akash Chauhan et al. (2018) presented "Heart disease prediction using Evolutionary Rule Learning". This study eliminates the manual task that additionally helps in extracting the information (data) directly from the electronic records. To generate strong association rules, we have applied frequent pattern growth association mining on patient's dataset. This will facilitate (help) in decreasing the amount of services and shown that overwhelming majority of the rules helps within the best prediction of coronary sickness.

[2] Ashir Javeed, Shijie Zhou et al. (2017) designed "An intelligent Learning System based on random search algorithm and optimized Random Forest Model for Improved Heart Disease Detection". This paper uses random search algorithm (RSA) for factor and random forest model for diagnosing the cardiovascular disease. This model is principally optimized for using grid search algorithmic program. Two forms of experiments are used for cardiovascular disease prediction. In the first form, only random forest model is developed and within the second experiment the proposed random search algorithm based random forest model is developed. This methodology is efficient and less complex than conventional random forest it produces 3.3 percentage higher accuracy.



2.2 REFERENCES:

1. V. Manikantan & S. Latha, "Predicting the Analysis of Heart Disease Symptoms Using Medicinal Data Mining Methods", International Journal on Advanced Computer Theory and Engineering, Volume-2, Issue-2, pp.5-10, 2013.
2. Dr. A. V. Senthil Kumar, "Heart Disease Prediction Using Data Mining preprocessing and Hierarchical Clustering", International Journal of Advanced Trends in Computer Science and Engineering, Volume-4, No.6, pp.07-18, 2015.
3. Uma. K, M. Hanumathappa, "Heart Disease Prediction Using Classification Techniques with Feature Selection Method", Adarsh Journal of Information Technology, Volume-5,

Issue-2, pp.22-29, 2016

4. Himanshu Sharma, M.A.Rizvi, "Prediction of Heart Disease using Machine Learning Algorithms:A Survey",International Journal on Recent and Innovation Trends in Computing and Communication,Volume5,Issue-8,pp.99-104, 2017.
5. S.Suguna, Sakthi Sakunthala.N ,S.Sanjana, S.S.Sanjhana, "A Survey on Prediction of Heart Disease using Big data Algorithms", International Journal of Advanced Research in Computer Engineering & Technology,Volume-6,Issue-3,pp.371-378,2017.

2.3 PROBLEM STATEMENT:

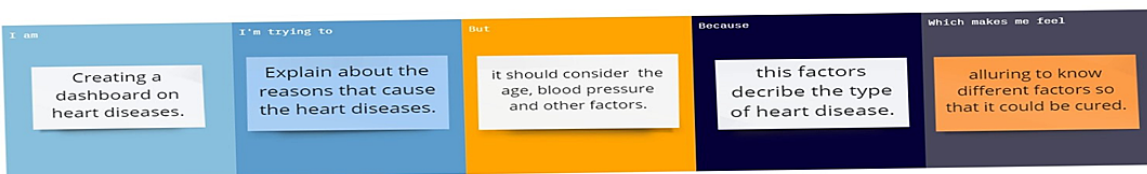
Ideation Phase Define the Problem Statements

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases using an interactive dashboard.
Maximum Marks	2 Marks

Customer Problem Statement Template:

Creating a problem statement that predict the heart diseases on the basis of factors like blood pressure, age, gender, and so on. This makes to learn more bot the symptoms and other factors that case the heart diseases.

The problem statement is on the topic visualizing and predicting the heart diseases on interactive dashboard.



miro

3. IDEATION AND PROPOSED SOLUTION:

3.1 EMPATHY MAP CANVAS:

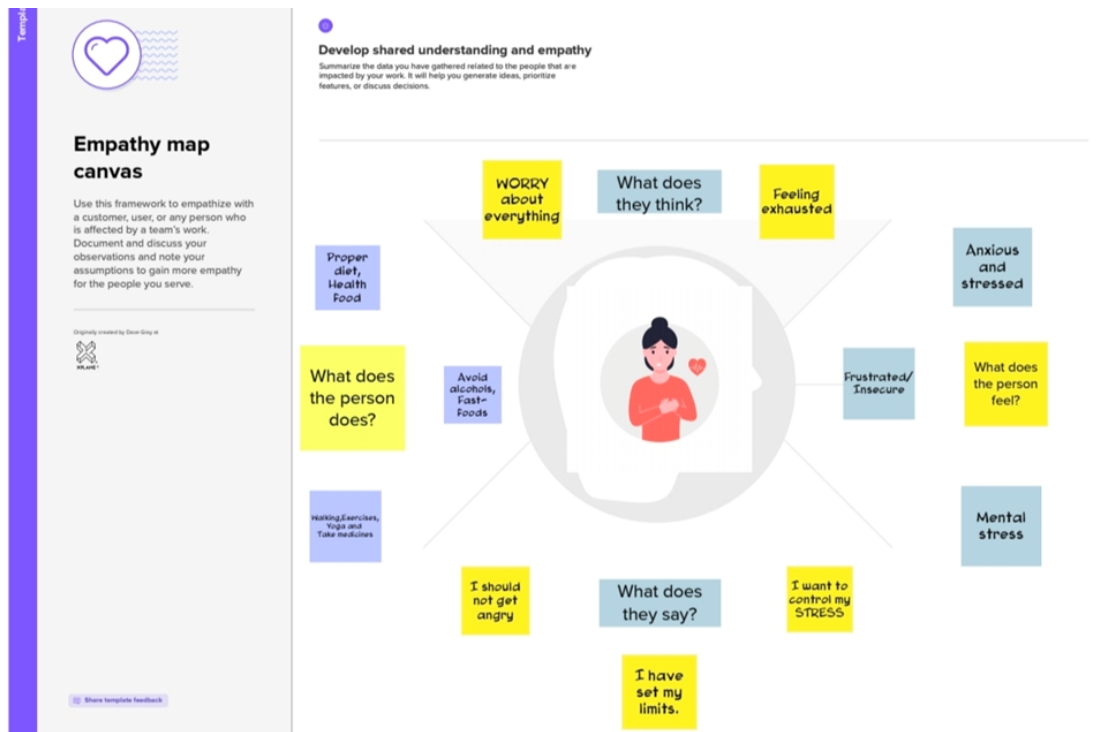
Ideation Phase Empathize & Discover

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases with an interactive dashboard.
Maximum Marks	4 Marks

Empathy Map Canvas:

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to help teams better understand their users.



3.2 IDEATION & BRAINSTORMING:

Ideation Phase Brainstorm & Idea Prioritization Template

Team ID	PNT2022TMID35144
Project Name	Visualizing and predicting heart diseases with an interactive dashboard.
Maximum Marks	4 Marks

Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
👥 1 hour to collaborate
👤 2-8 people recommended

[Share template feedback](#)

- Before you collaborate**
- A little bit of preparation goes a long way with this session. Here's what you need to do to get going.
- ⌚ 10 minutes
- Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
 - Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.
 - Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.
- [Open article](#) →

1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

The leading cause of death in the developed world is heart disease. Therefore, there needs to be work done to help prevent the risk of having a heart attack or stroke.

Key rules of brainstorming
To run an smooth and productive session

- Stay in topic.
- Defer judgment.
- Go for volume.
- Encourage wild ideas.
- Listen to others.
- If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

2 Brainstorm

Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

SUBITHA N

INFORMATION ON USE

RESULTS ON RISK

LEARNING THE FACTS

UNDERSTAND THE DILEMMA

VINISHA L

BY MAKING USE OF BIG DATA

ANALYSING A BIG AMOUNT

KEEPING UP WITH CURRENT TRENDS

EXPLORING THE POSSIBLE SOLUTIONS

SUJETHA S

LEARNING LEARNING TECHNIQUES

EXPLANATION OF DATA

DATA MINING TECHNIQUES

KNOWING THE PROJECT FLOW

THANUSHA B

ANALYSING DATA TRENDS

WEEKLY DATA REPORTING

DETAILS OF BIG

VIZUAL TECHNIQUES, ARTICLES

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

⌚ 20 minutes

Expectations from the dashboard

Frequent updates

Regular checkup

Data Visibility

CHARTS

BAZS

SCAPHS

TOOLS

BIG DATA

BIG CLOUD

CUSTOMER

Health professionals

Healthcare providers

Other people

REQUIREMENTS

IN-DOOR OPERATIONAL LEVEL

PUBLIC

HEALTH DATA

BODY TEMPERATURE

IN-DOOR PERSONAL

Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

**3.3 PROPOSED SOLUTION:**

Project Design Phase-I
Proposed Solution Template

Date	4 October 2022
Team ID	PNT2022TMID35144
Project Name	Visualizing and Predicting Heart Disease using interactive Dashboard
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
-------	-----------	-------------

1.	Problem Statement (Problem to be solved)	✓ To develop an interactive dashboard to predict the heart disease accurately with few tests and attributes the presence of heart disease.
2.	Idea / Solution description	✓ Analyzing data and identifying the heart disease using Cognos analysis.
3.	Novelty / Uniqueness	✓ Hoping to achieve maximum accuracy to provide prior treatment to the patients and reduce the fatality rate.
4.	Social Impact / Customer Satisfaction	<ol style="list-style-type: none"> 1. Saving lives, User friendly interactive dashboard. 2. Reduces the exorbitant medical cost of the patients. 3. Reduces the biases and mistakes caused by the decisions of doctors based on their intuitions and experiences.
5.	Business Model (Revenue Model)	<ol style="list-style-type: none"> 1. Data security. 2. Easy to use. 3. Constant updates according to necessity.
6.	Scalability of the Solution	<ol style="list-style-type: none"> 1. Can be used in any platform (Windows, mac, etc.). 2. Adding new feature doesn't affect the performance of the system. 3. Scalable dataset.

3.4 PROBLEM SOLUTION FIT:

Project Title: Visualizing and predicting heart diseases with an interactive dashboard
Project Design Phase-I - Problem solution fit
Team ID: PNT2022TMID35144



4. REQUIREMENT ANALYSIS:

4.1 FUNCTIONAL REQUIREMENTS:

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases with an interactive dashboard.

Maximum Marks	4 Marks
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Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Visualizing Data	User can visualize the conditions on the heart disease through Dashboard created using IBM Cognos Analytics.
FR-4	Generating Report	User can view his/her health report.

4.2 NON FUNCTIONAL REQUIREMENTS:

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases with an interactive dashboard.
Maximum Marks	4 Marks

Non Functional Requirements:

Following are the non functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The application will have a simple and user friendly graphical interface. Users will be able to understand and use all the features of the application easily. Any action has to be

		performed with just a few clicks.
NFR-2	Security	For security of the application the technique known as database replication should be used so that all the important data should be kept safe. In case of crash, the system should be able to backup and recover the data.
NFR-3	Reliability	The application has to be consistent at every scenario and has to work without failure in any environment.
NFR-4	Performance	Performance of the application depends on the response time and the speed of the data submission.
NFR-5	Availability	The application has to be available 24 x 7 for users without any interruption.
NFR-6	Scalability	The application can withstand the increase in the no. of users and has to be able to develop Higher versions.

5. PROJECT DESIGN:

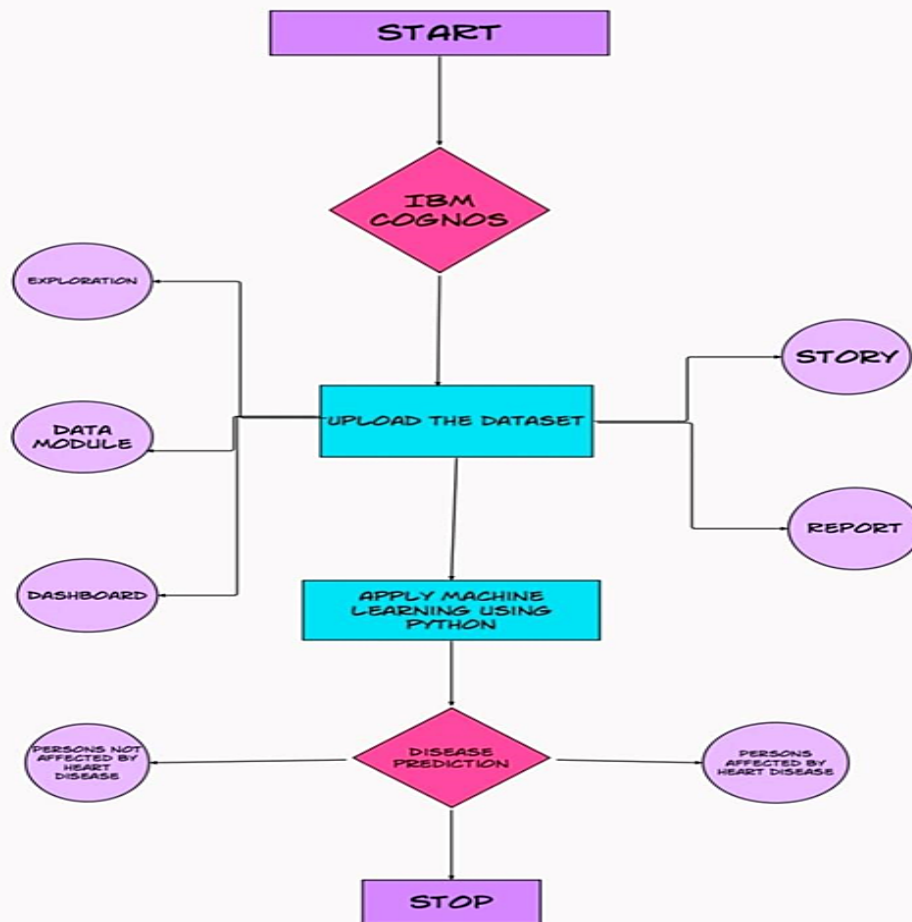
5.1 DATA FLOW DIAGRAMS:

Project Design Phase-II Data Flow Diagram

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases with an interactive dashboard.
Maximum Marks	4 Marks

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

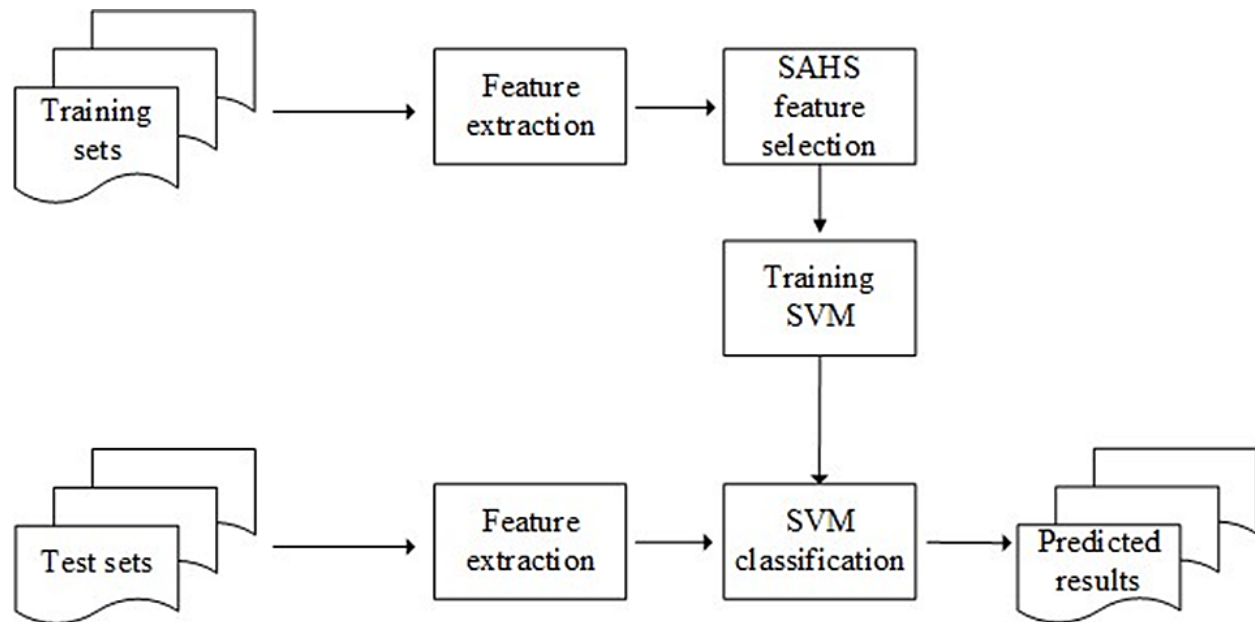


5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

SOLUTION ARCHITECTURE:

Project Design Phase-I Solution Architecture

Team ID	PNT2022TMID35144
Project Name	Visualizing and Predicting Heart Diseases with an Interactive Dash Board
Maximum Marks	4 Marks



1. The leading cause of death in the developed world is heart disease. Therefore, there needs to be work done to help prevent the risks of having a heart attack or stroke. This dataset to predict which patients are most likely to suffer from a heart disease in the near future using the features given.
2. Heart disease is one of the biggest causes of morbidity and mortality among the population of the world. Prediction of cardiovascular disease is regarded as one of the most important subjects in the section of clinical data analysis. The amount of data in the healthcare industry is huge.

3. Data mining turns the large collection of raw healthcare data into information that can help to make informed decisions and predictions.
4. The dataset consists of 303 individuals' data. There are 14 columns in the dataset, which are described below.

IMPORT DATASET

5. After downloading the dataset from Kaggle, we saved it to my working directory with the name dataset.csv. Next, we used read.csv () to read the dataset and save it to the dataset variable. Before any analysis, I just wanted to take a look at the data. So, we used the info () method. There are a total of 13 features and 1 target variable. Also, there are no missing values so we don't need to take care of any null values. Next, we used to describe () method.

Parameters:

1. Age
2. Sex
3. Chest pain type
4. BP
5. Cholesterol
6. FBS over 120
7. EKG results
8. Max HR
9. Exercise angina
10. ST depression
11. Slope of ST
12. Number of vessels fluro
13. Thallium
14. Heart Disease

TECHNOLOGY STACK ARCHITECTURE:

Project Design Phase-II Technology Stack (Architecture & Stack)

Team ID	PNT2022TMID35144
Project Name	Project – Visualizing and predicting heart diseases with an interactive dashboard.

Maximum Marks

4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

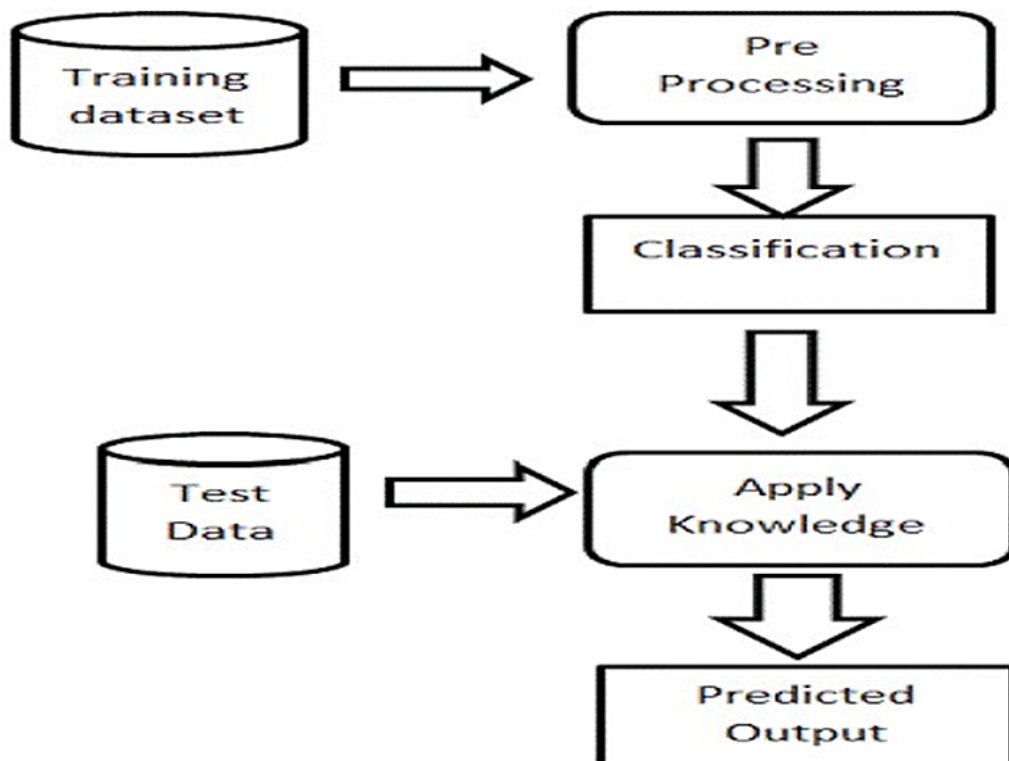


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Importing data	Data Import lets you upload data from external sources and combine it with data you collect via Analytics	Python, numpy, pandas.
2.	Data Cleaning	Data cleaning is a process by which inaccurate, poorly formatted, or otherwise	Python, numpy, pandas

		messy data is organized and corrected	
3.	Data Preprocessing	Data preprocessing, a component of data preparation, describes any type of processing performed on raw data to prepare it for another data processing procedure	Python, numpy, scipy, pandas
4.	Training data	Training data is the subset of original data that is used to train the machine learning model,	Numpy, scipy, pandas
5.	Testing data	Test data is data which has been specifically identified for use in tests, typically of a computer program.	Numpy, scipy, pandas
6.	Machine learning model	A machine learning model is a file that has been trained to recognize certain types of patterns. You train a model over a set of data, providing it an algorithm that it can use to reason over and learn from those data	Numpy, scipy, pandas, sklearn
7.	Improve model performance	Accuracy is one metric for evaluating classification models. Informally, accuracy is the fraction of predictions our model got right.	sklearn
8.	Checking accuracy	A data accuracy check, sometimes called a data sanity check, is a set of quality validations that takeplace before using data.	Sklearn

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
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1.	Collection of data	Data collection is the process of gathering, measuring, and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions, evaluate outcomes, and forecast trends and probabilities	IBM Cognos, Python.
2.	EDA Analysis	Exploratory Data Analysis (EDA) is an approach to analyze the data using visual techniques. It is used to discover trends, patterns, or to check assumptions with the help of statistical summary and graphical representations	Python, EDA tools
3.	Train & Test split of data	The train-test split is used to estimate the performance of machine learning algorithms that are applicable for prediction-based Algorithms/Applications. This method is a fast and easy procedure to perform such that we can compare our own machine learning model results to machine results.	IBM Cloud, Python.
4.	Model prediction	Predictive modelling is a commonly used statistical technique to predict future behaviour.	Creation of Dashboard using IBM Cognos.

5.3 USER STORIES:

The user stories are given below.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Mobile Number	I can register & access the dashboard with Mobile Number	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can register & access the dashboard with Gmail Login.	High	Sprint-1
	Dashboard	USN-6	Profile - view & update your profile	I can see the profile.	Medium	Sprint-2
		USN-7	Change Password - user can change the password	I can able to change the password.	High	Sprint-1
		USN-8	Home - Analyze your Heart	I can detect the health condition from where ever I want.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING:

6.1 SPRINT PLANNING AND ESTIMATION:

MILESTONE AND ACTIVITY LIST

Team ID	PNT2022TMID35144
Project Name	Project - Visualizing and Predicting Heart Diseases with an Interactive Dashboard
Maximum Marks	2 Marks

Activity Number	Activity Name	Detailed Activity Description	Assigned To	Status / Comments
1	Preparation Phase	<ol style="list-style-type: none">1. Access the resources (courses) in project dashboard2. Access the guided project workspace3. Create GitHub account & collaborate with Project Repository in project workspace4. Set-up the Laptop / Computers based on the prerequisites for each technology track	SUBITHA N VINISHA L SUJITHA S THANUSHA B	It refers to done the listed activities in the preparation phase and done Prerequisites, Registration, Environment setup

2	Ideation Phase	<ul style="list-style-type: none"> Literature survey on the selected project & Information Gathering Preparation of Empathy Map Canvas to capture the user Pains & Gains, Preparelist of problem statements List the ideas by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance 	SUBITHA N VINISHA L SUJITHA S THANUS HA B	The activities in ideation phase refers to when gathering the idea for project information and picturize in Empathy map, referring the literature survey & brain storming the ideas for this project.
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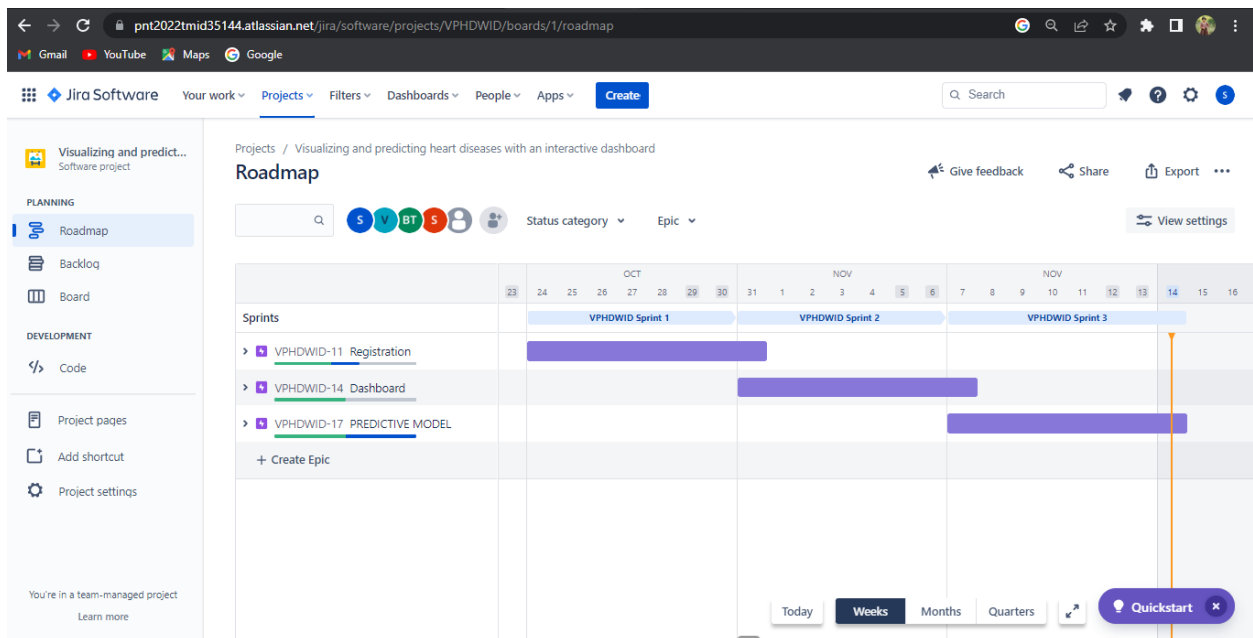
6.2 SPRINT DELIVERY SCHEDULE:

The Objectives of the project must have to be must be separated in forms of sprints and separated to all the team members accordingly.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Subitha N Vinisha L Sujitha S Thanusha B
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Subitha N Vinisha L Sujitha S Thanusha B
Sprint-2		USN-3	As a user, I can register for the application through Facebook	2	Low	Subitha N Vinisha L Sujitha S Thanusha B
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	Subitha N Vinisha L Sujitha S Thanusha B
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Subitha N Vinisha L Sujitha S Thanusha B

6.3 REPORTS FROM JIRA:

Jira Software is part of a family of products designed to help teams of all types manage work. Originally, Jira was designed as a bug and issue tracker. But today, Jira has evolved into a powerful work management tool for all kinds of use cases, from requirements and test case management to agile software development.



7. Coding and Solution:

7.1 Feature 1:

EMBED CODE:

```
<html>

  <body>

<h1>HDPIBMDB21 DASHBOARD</h1>

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pathRef=.my_folders%2FHDPIBMDB21%2BDASHBOARD&
closeWindowOnLastView=true&ui_appbar=false&
ui_navbar=false&shareMode=embedded&
action=view&mode=dashboard" width="320" height="200" frameborder="0"
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  </body>
</html>

<html>

  <body>

<h1>HDPIBMDB21 REPORT</h1>

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frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen="">
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7.2 FEATURE 2:

EMBED CODE:

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<h1>HDPIBMD21 STORY</h1>

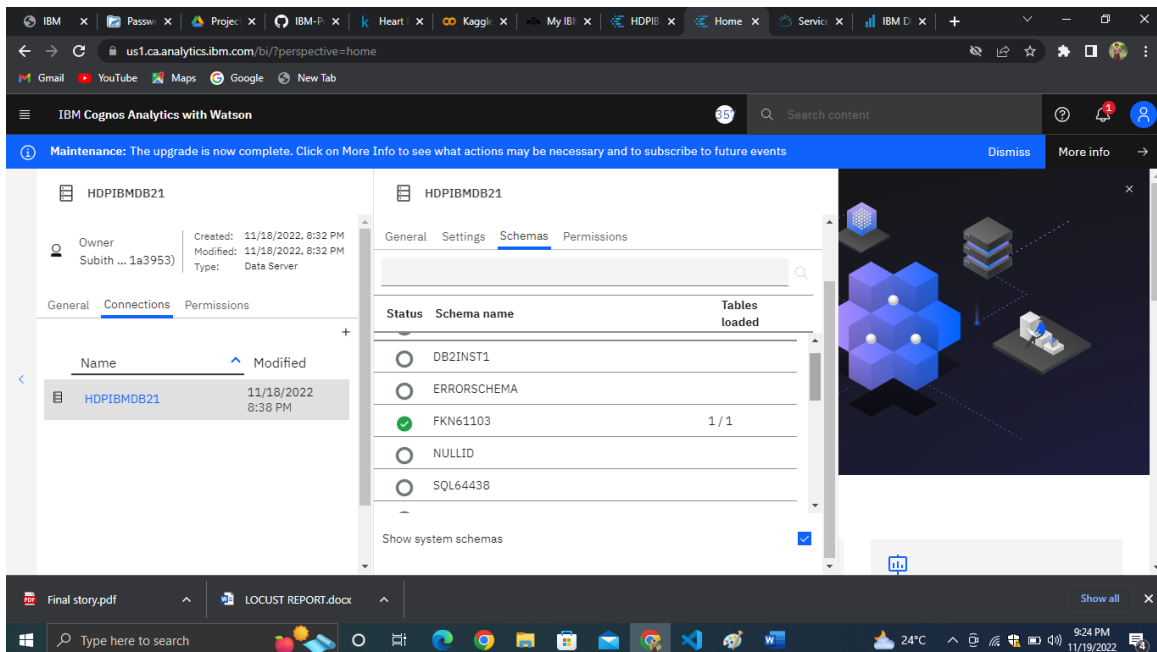
>

<iframe src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2FStory%253A%2BHDPIBMD21%2BSTORY&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=story" width="320" height="200" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

</body>

</html>

7.3 Database Schema



8. Testing :

8.1 Test Cases:

Test case ID	Feature Type	Component	Test Scenario	The Rationale	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Yes/No)	Priority (Low/High)	Executed By
5	BP	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Working as expected	A user entered a dataset and the data depending on what you are doing on the report may be as expected	yes	high	
6	Cholesterol	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Working as expected	Entered a report dataset and the data depending on what you are doing on the report may be as expected	yes	high	
7	Thyroid	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Not Working as expected	The report is dependent on the data entered in the data entry to predict the report of thyroid and percent accurate. It is not working as expected for a variety of reasons. For example, a user can enter data that is not accurate if someone has entered the data in the data entry to predict the report of thyroid	no	low	
8	BGL	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Working as expected		yes	high	
	Obesity	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Not Working as expected		no	medium	
	ST Depression	dashboard/reportatory	Cognos analytics	Verify the dataset for accurate performance	A quarterly dataset	1. Upload the dataset 2. explore the data 3. create dashboard/reportatory	accurate prediction		Not Working as expected		no	low	

8.2 User Acceptance Testing:

User Acceptance Testing(UAT), which is performed on most UIT projects, sometimes called beta testing or end-user testing, is a phase of software development in which the software is tested in the "real world" by the intended audience or business representative.

9. Results:

9.1 PERFORMANCE METRICS:



→ ↻ File | E:\Heart-Disease-Predictor\html\login.html

Gmail YouTube Maps

life_Predictor

Login here!...

Username

xx@

Password

SUBMIT

Don't have an account? Register

Heart Disease Pre...zip

← → ↻ File | E:\Heart-Disease-Predictor\html\predict.html

Gmail YouTube Maps

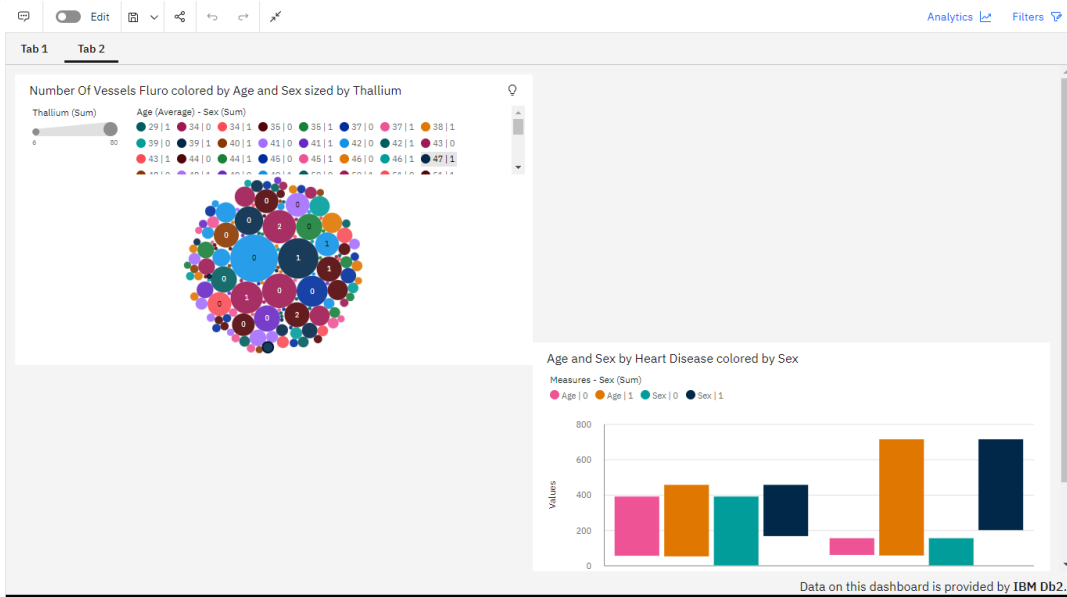
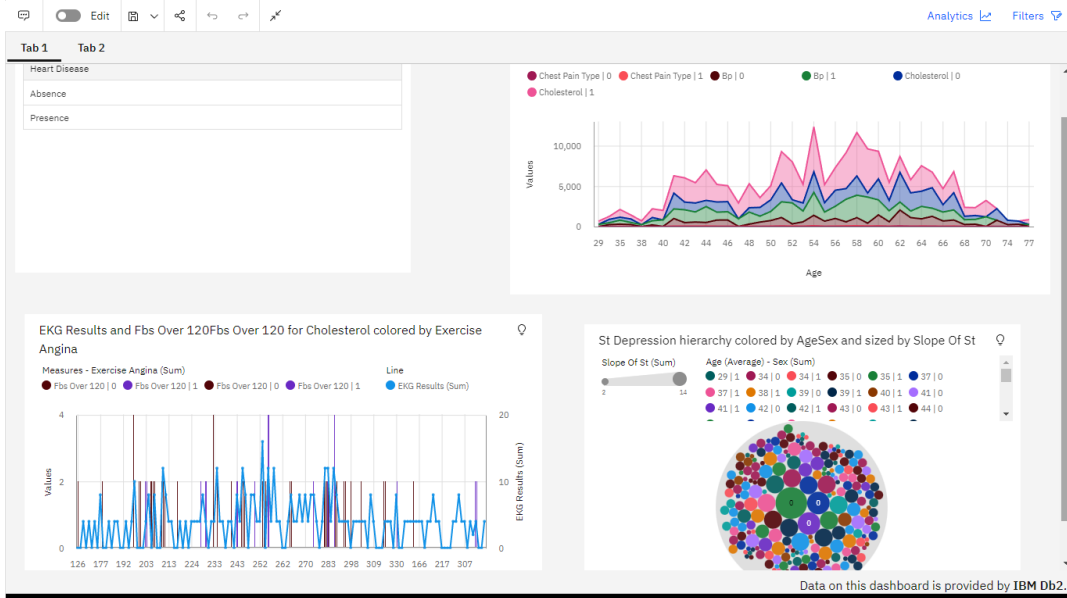
PREDICTION

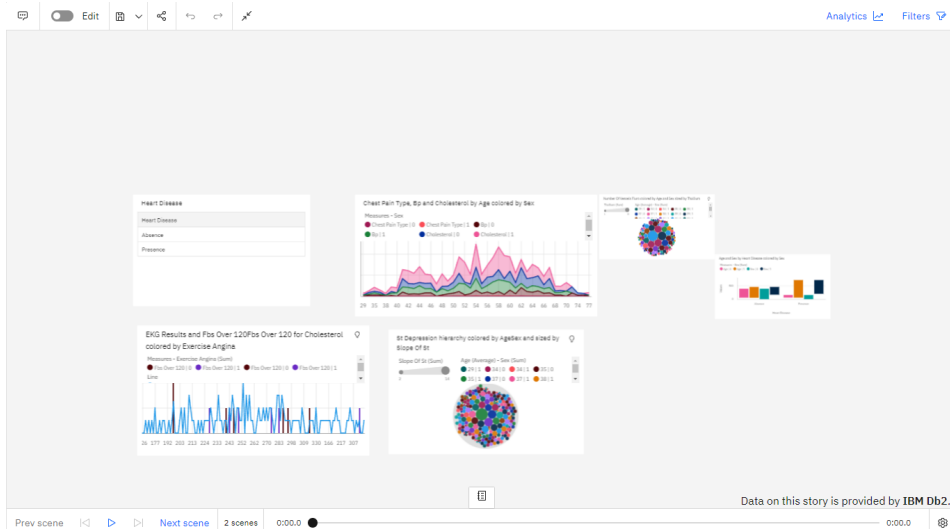
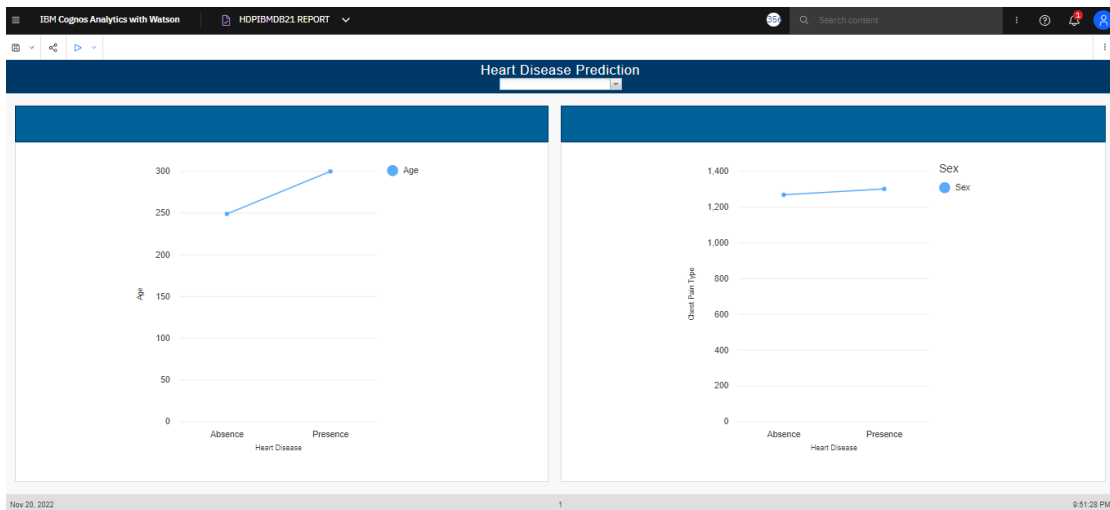
Age	Gender Male (yes)
Heart Problem	Cholesterol
Choking (ever) (yes)	Wrist Rest
How often chest pain	Arteriosclerosis (yes)
ST Depression	Arterial St
Number of times observed by cardiologist	Exercise

Gender

☒ Male
 ☐ Female
 ☐ Prefer not to say

PREDICT





10. ADVANTAGES & DISADVANTAGES:

Heart disease is one of the biggest causes of morbidity and mortality among the population of the world. Prediction of cardiovascular disease is regarded as one of the most important subjects in the section of clinical data analysis. The amount of data in the healthcare industry is huge. The EHDPS predicts the likelihood of

patients getting heart disease. It enables significant knowledge, example, relationships between medical factors related to heart disease and patterns, to be established. Medical diagnosis is considered as a significant yet intricate task that needs to be carried out precisely and efficiently. The automation of the same would be highly beneficial. Clinical decisions are often made based on doctor's intuition and experience rather than on the knowledge rich data hidden in the database.

This practice leads to unwanted biases, errors and excessive medical costs which affects the quality of service provided to patients. Data mining has the potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions.

11. CONCLUSION:

This project predicts people with cardiovascular disease by extracting the patient medical history that leads to a fatal heart disease from a dataset that includes patients' medical history such as chest pain, sugar level, blood pressure, etc.

12. FUTURE SCOPE:

Here the scope of the project is that integration of clinical decision support with computer-based patient records could reduce medical errors, enhance patient safety, decrease unwanted practice variation, and improve patient outcome. This suggestion is promising as data modeling and analysis tools, e.g., data mining, have the potential to generate a knowledge-rich environment which can help to significantly improve the quality of clinical decisions.

13. APPENDIX:

SOURCE CODE :

TYPE html>

```
<html>
<head>
<meta name="viewport" content="width=device-width, initial
-scale=1">
<title> Login Page </title>
<style>
Body {
font-family: Calibri, Helvetica, sans-serif;
```



```

        background-color: pink;
    }
    button {
        background-color: #4CAF50;
        width: 100%;
        color: orange;
        padding: 15px;
        margin: 10px 0px;
        border: none;
        cursor: pointer;
    }
    form {
        border: 3px solid #f1f1f1;
    }
    input[type=text], input[type=password] {
        width: 100%;
        margin: 8px 0;
        padding: 12px 20px;
        display: inline-block;
        border: 2px solid green;
        box-sizing: border-box;
    }
    button:hover {
        opacity: 0.7;
    }
    .cancelbtn {
        width: auto;
        padding: 10px 18px;
        margin: 10px 5px;
    }
    .container {
        padding: 25px;
        background-color: lightblue;
    }
</style>
</head>
<body>
    <center> <h1> Student Login Form </h1> </center>
    <form>
        <div class="container">
            <label>Username : </label>
            <input type="text" placeholder="Enter Username"
                name="username" required>

```

```

        <label>Password : </label>
        <input type="password" placeholder="Enter Password
            " name="password" required>
        <button type="submit">Login</button>
        <input type="checkbox" checked="checked"> Remember
            me
        <button type="button" class="cancelbtn"> Cancel
            </button>
        Forgot <a href="#"> password? </a>
    </div>
</form>
</body>
</html>
<!DOCTYPE html>
<!-- Created By CodingLab - www.codinglabweb.com -->
<html lang="en" dir="ltr">
    <head>
        <meta charset="UTF-8">
        <!--<title> Responsive Registration Form | CodingLab
            </title>-->
        <link rel="stylesheet" href="style.css">

        <meta name="viewport" content="width=device-width,
            initial-scale=1.0">
    </head>
    <body>
        <div class="container">
            <div class="title">PREDICTION</div>
            <div class="content">
                <form action="#">
                    <div class="user-details">
                        <div class="input-box">
                            <span class="details">Age</span>
                            <input type="text" placeholder="" required>
                        </div>
                        <div class="input-box">
                            <span class="details">Chest Pain Type</span>
                            <input type="text" placeholder="" required>
                        </div>
                        <div class="input-box">
                            <span class="details">Blood Pressure</span>
                            <input type="text" placeholder=" " required>
                        </div>
                        <div class="input-box">

```

```

        <span class="details">Cholestrol</span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">Fasting Blood Sugar</span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">EKG Result</span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">Maximum Heart Rate</span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">Exercise Induced Angina
            </span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">ST Depression</span>
        <input type="text" placeholder=" " required>
    </div>
    <div class="input-box">
        <span class="details">Slope of ST</span>
        <input type="text" placeholder="" required>
    </div>
    <div class="input-box">
        <span class="details">Number of Vessels coloured
            by Flouroscope</span>
        <input type="text" placeholder="" required>
    </div>
    <div class="input-box">
        <span class="details">Thallium</span>
        <input type="text" placeholder="" required>
    </div>
</div>
<div class="gender-details">
    <input type="radio" name="gender" id="dot-1">
    <input type="radio" name="gender" id="dot-2">
    <input type="radio" name="gender" id="dot-3">
    <span class="gender-title">Gender</span>

```

```

        <div class="category">
            <label for="dot-1">
                <span class="dot one"></span>
                <span class="gender">Male</span>
            </label>
            <label for="dot-2">
                <span class="dot two"></span>
                <span class="gender">Female</span>
            </label>
            <label for="dot-3">
                <span class="dot three"></span>
                <span class="gender">Prefer not to say</span>
            </label>

        </div>
    </div>
    <div class="button">
        <input type="submit" value="PREDICT">

    </div>
</form>
</div>
</div>

</body>
</html>

```

```
<html>
```

```
<h1>HDPIBMDB21 DASHBOARD WEB APPPLICATION</h1>
```

```

<iframe src="https://us1.ca.analytics.ibm.com/bi/?perspective=
dashboard&pathRef=.my_folders%2FHDPIBMDB21%2BDASHBOARD&
amp;closeWindowOnLastView=true&ui_appbar=false&
ui_navbar=false&shareMode=embedded&action=view&
mode=dashboard&subView=model0000001848dc4944b_000000000"
width="1500" height="1000" frameborder="0" gesture="media"
allow="encrypted-media" allowfullscreen=""></iframe>

```

```
<h1>HDPIBMDB21 REPORT</h1>
```

```

<iframe src="https://us1.ca.analytics.ibm.com/bi/?pathRef=
.my_folders%2FHDPIBMDB21%2BREPORT&closeWindowOnLastView=
true&ui_appbar=false&ui_navbar=false&

```

```
shareMode=embedded&action=run&prompt=false"
width="320" height="200" frameborder="0" gesture="media"
allow="encrypted-media" allowfullscreen=""></iframe>
```

```
<h1>HDPIBMD21 STORY</h1>
```

```
<iframe src="https://us1.ca.analytics.ibm.com/bi/?
perspective=story&pathRef
=.my_folders%2FStory%253A%2BHDPIBMD21%2BSTORY&
closeWindowOnLastView=true&ui_appbar=false&
ui_navbar=false&shareMode=embedded&action=view&
sceneId=-1&sceneTime=0" width="1500" height="1000"
frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
```

```
</html>
```

GITHUB AND PROJECT DEMO LINK:

IBM-EPBL IBM-Project-44737-1660726529

