VISUALIZING AND PREDICTING HEART DISEASES WITH AN INTERACTIVE DASHBOARD

Submitted by

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of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

UNIVERSITY COLLEGE OF ENGINEERING KANCHIPURAM

ANNA UNIVERSITY: CHENNAI

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University college of engineering, kanchipuram

(A constitution college of Anna University)

(Approved by AICTE and Affiliated to Anna University, Chennai)

ACCREDITED BY NAAC WITH "A" GRADE

BONAFIDE CERTIFICATE

Certified that this project report titled **"VISUALIZING AND PREDICTING HEART DISEASES WITH AN INTERACTIVE DASHBOARD"** is the bonafide work of "**SRINIVASAN S (513419104043), VASANTHAVASAN G (513419104053), SARAVANAN G G (513419104037), FAAYIZ KHAN N (513419104014)"** who carried out the project workunder my supervision.

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University College of Engineering

Kanchipuram

This Project report is submitted for Autonomous Project Viva-Voce examination held on ……...

INTERNAL EXAMINER

EXTERNAL EXAMINER

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TABLE OF THE CONTENT

CHAPTER 1

INTRODUCTION:

1.1 : PROJECT OVERVIEW

The terms "heart disease" and "cardiovascular disease" are frequently used interchangeably. Heart disease is a general term that covers a wide range of heart related medical conditions. The irregular health state that directly affects the heart and all of its components is characterized by these medical conditions. In order to forecast cardiac disease, this study discusses various data mining, big data, and machine learning techniques. Building an important model for the medical system to forecast heart disease or cardiovascular illness requires the use of data mining and machine learning. Our application helps the user in finding out if they have heart disease or not. They can find out by entering details such as their heart rate, cholesterol, blood pressure etc. A dashboard is also attached along with the results for better understanding where they can compare their blood pressure and similar metrics with other users. This project focuses on Random Forest Classifier. The accuracy of our project is 87% for which is better than most other systems in terms of achieving accuracy quickly.

1.2 : PURPOSE

This project's goal is to determine, depending on the patient's medical characteristics—such as gender, age, chest pain, fasting blood sugar level, etc.—whether they are likely to be diagnosed with any cardiovascular heart illnesses. The leading cause of death in the developed world is heart disease. Heart disease cases are rising quickly every day, thus it's crucial and worrisome to predict any potential illnesses in advance. This diagnosis is a challenging taskthat requires accuracy and efficiency. Therefore, there needs to be work done to help prevent the risks of having a heart attack or stroke. It is the main factor in adult deaths. By using a person's medical history, our initiative can identify thosewho are most likely to be diagnosed with a cardiac condition. It can assist in identifying disease with less medical tests and effective therapies, so that patients can be treated appropriately. It can identify anyone who is experiencing any heart disease symptoms, such as chest pain or high blood pressure. Around the world, machine learning is applied in many different fields. There is no exception in the healthcare sector. Machine learning may be crucial in determining whether locomotor disorders, heart illnesses, and other conditions are present or absent. If foreseen well in advance, such information can offer valuable insights to doctors, who can then customise their diagnosis and course of care for each patient.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Heart attack disease is one of the most common problems that results in the loss of a huge number of people. This project is the project that is very helpful to the people from the people, losses and also it is a great point for the savage of the human. First of all, we build models via the machine learning algorithms such as the decision tree, logistic regression, random forest and K neighbors. These are supervised learning algorithms in machine learning. In this project we find out the heart attack disease and normal results of disease on the basis of the different attributes like few of them are age of patient, sex of patient, chest pain type of patient, number of major vessels that are 0 to 3, Resting blood pressure in mm Hg, cholesterol in the mg, fasting blood sugar, and rest ECG. We find out the disease with **86%** accuracy.

2.2 REFERENCES

1. **Title**: Heart Attack Disease Data Analytics and Machine Learning.
   Author: Muhammad Nabeel et al...

2. **Title**: Heart Disease Prediction using Machine Learning and Data Analytics approach
   Author: Sanath Kapoor, Lekhraj Kasar*, Ashutosh Mandole and Dr Jayant Mahajan

3. **Title**: Forecasting of Heart Diseases in Early Stages Using Machine Learning approach
   Author: Khushi Kumari Jha1 et al…

4. **Title**: Ensemble Based Prediction of Cardiovascular Disease Using Bigdata approach

   Author: D.R. Krithika

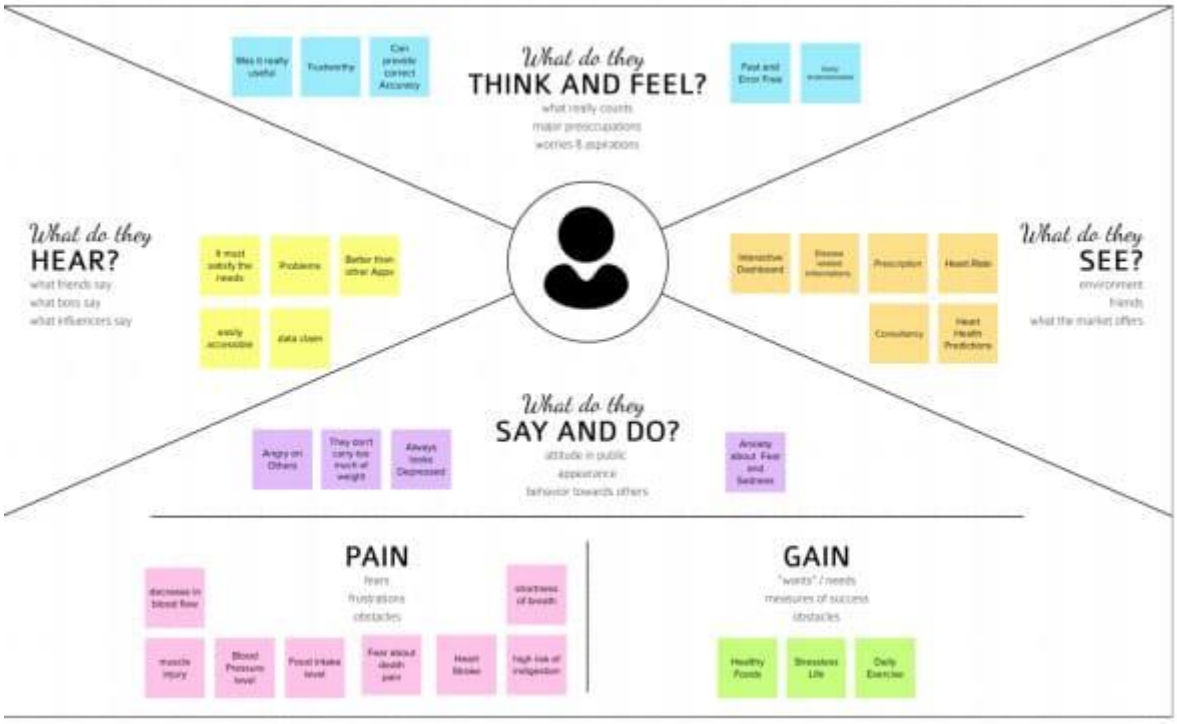
5. **Title**: Cardiovascular Disease Prediction using Deep Learning

   Author: Paranthaman M et al…

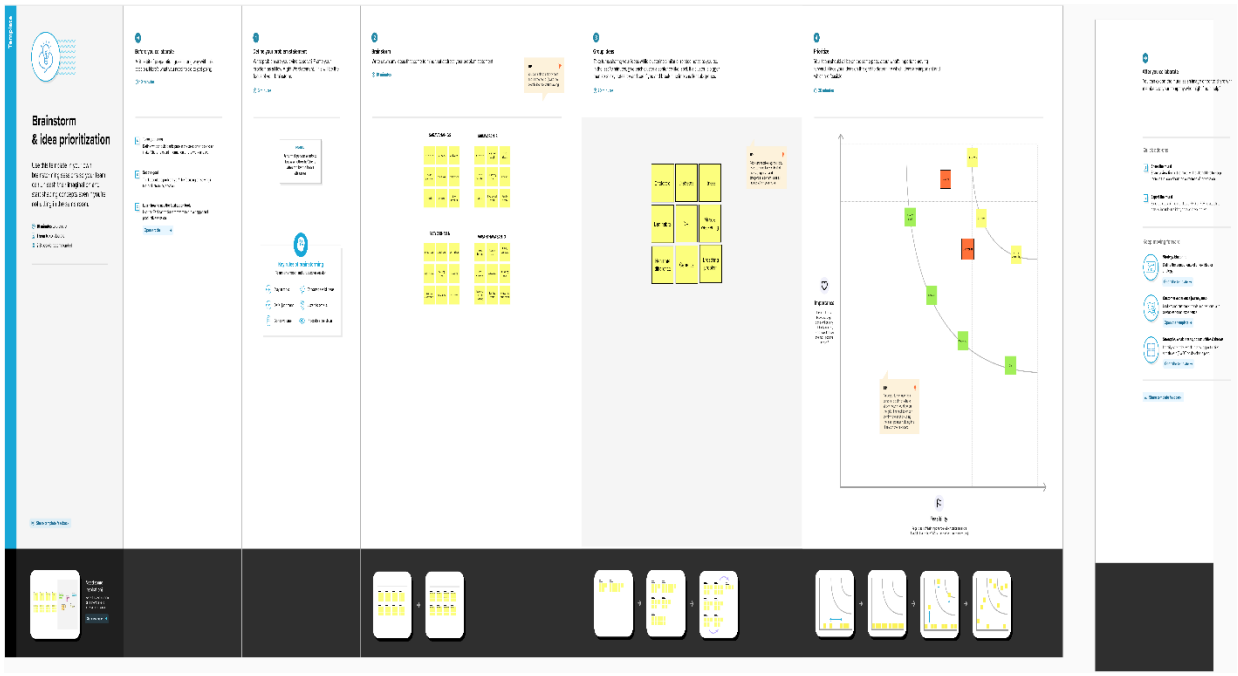
CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING



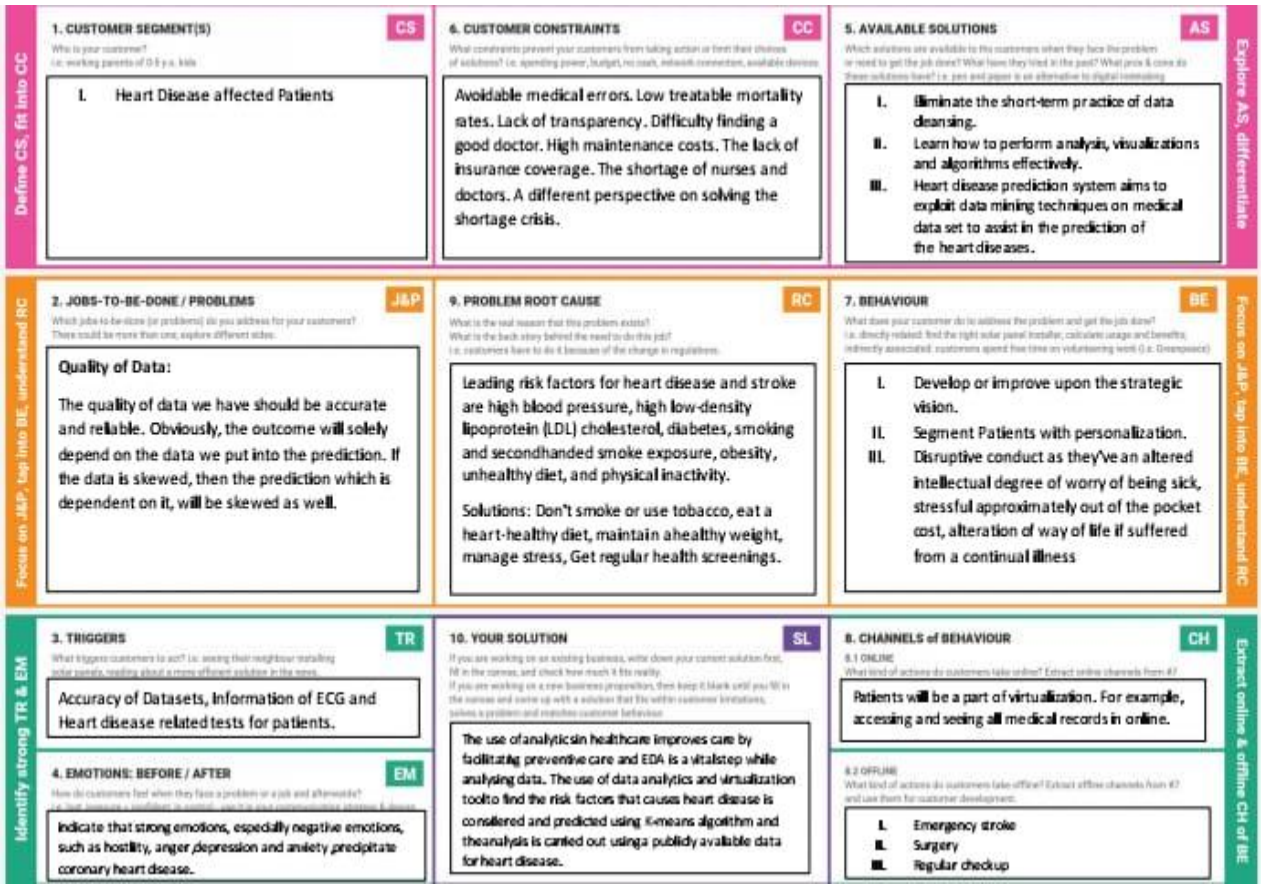
3.3 PROPOSED SOLUTION

Our application helps the user in finding out if they have heart disease or not. They can find out by entering details such as their heart rate, cholesterol, blood pressure etc. A dashboard is also attached along with the results for better understanding where they can compare their blood pressure and similar metrics with other users. Our application has one of the smoothest user interfaces on the internet making it easy for the user to find their needs quickly and efficiently. And the tool utilizes best machine learning algorithms for better prediction.There's separate sections for viewing treatment options, warning signs of cardiac arrest, risk factors and causes of various types of heart diseases.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To Develop a interactive dashboard to predict the Heart Disease accurately with few data's given by patient.
2.	Idea / Solution description	Analyzing the patient symptoms and identifying the heart related symptom using cognos analytics.
3.	Novelty / Uniqueness	It Achieve maximum accuracy to provide prior treatment to the patients and reduce the fatality rate.
4.	Social Impact / Customer Satisfaction	User friendly (anyone can identify the problem using the interactive dashboard). Reduce the cost of the patient.
5.	Business Model (Revenue Model)	Data security. It has a huge revenue when it comes to the market.
6.	Scalability of the Solution	It can be used in any Platform (windows, max, etc..) Adding new feature doesn't affect the performance of the system.

3.4 PROBLEM SOLUTION FIT

The Problem-Solution Fit simply means that we have found a problem with our customer and that the solution we have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why. The purpose is to solve complex problems in a way that fits the state of your customers and succeed faster and increase your solution adoption by tapping into existing mediums and channels of behaviour.



CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

- Users have to register.
- Function to view the homepage by the user.
- Function to display information related to heart diseases on the website.
- Function to provide textboxes to enter medical results.
- Function to predict heart disease using ML model.
- Function to display visualisations of the final results.
- Function to provide dashboard to user

4.2 NON-FUNCTIONAL REQUIREMENTS

Following are the non-functional requirements of the proposed solution.

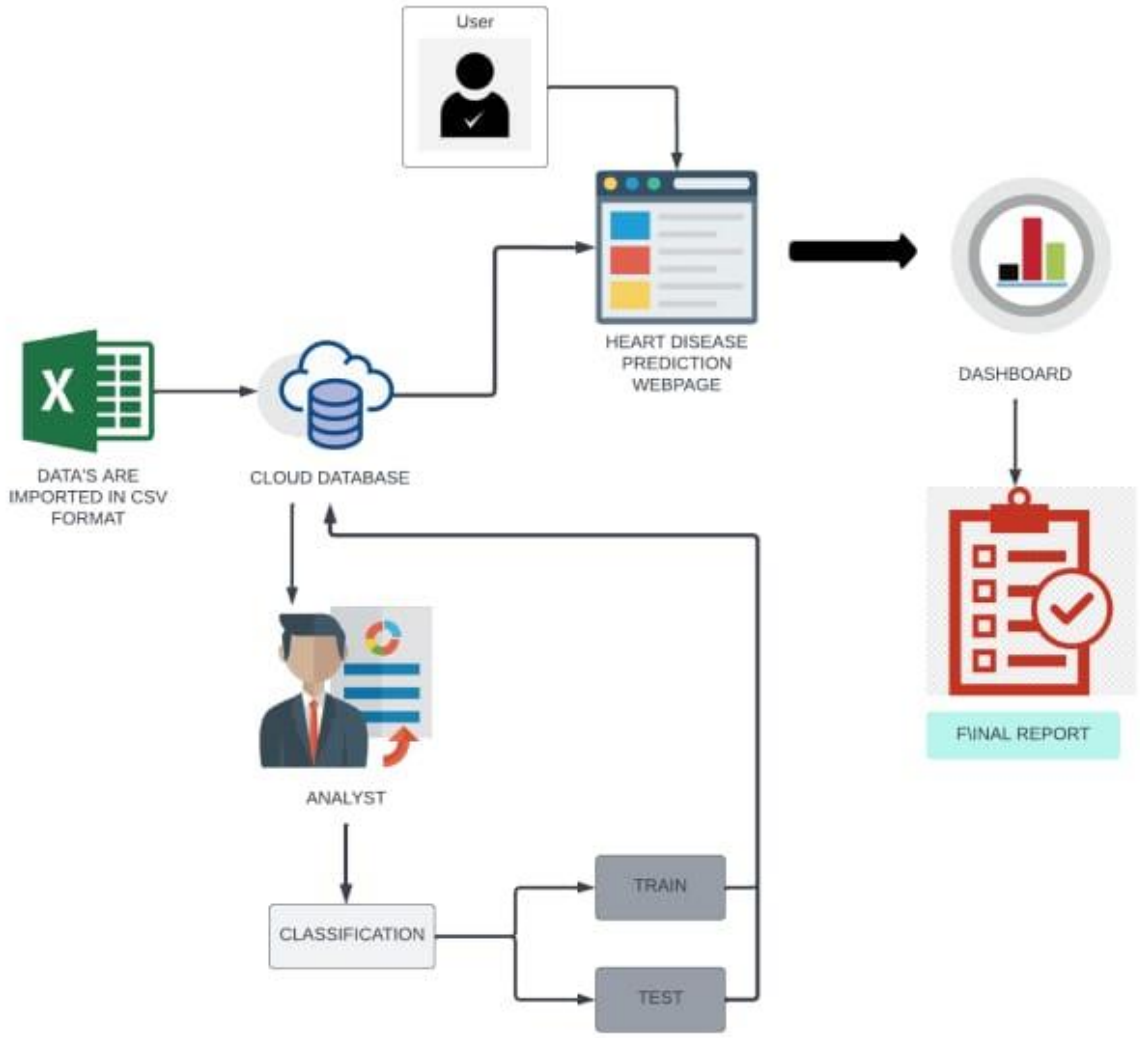
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The website will utilise better user interface for easy navigation. The process of finding out the results will be smooth and easy for the user.
NFR-2	**Security**	The website will be protected against SQL injection, DDoS attacks and SHA are used making the website very safe for use.
NFR-3	**Reliability**	The tool will give accurate and reliable results most of the time.
NFR-4	**Performance**	The website will be well optimized which includes fast rendering of the pages, providing a bug-free, smooth and hassle-free experience for the user.
NFR-5	**Availability**	The tool will be available for users most of the time.
NFR-6	**Scalability**	The system will be scalable enough to support a lot of users at the same time while maintaining optimal performance.

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

5.2 SOLUTION & TECHNICAL ARCHITECTURE



5.3 USER STORIES:

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 Gmail	I can receive conformation email	Medium	Sprint-1
Customer (Web user)	Login	USN-4	As a user, I can log into the application by entering email & password	I can access my account using my details	High	Sprint-1
	Dashboard	USN-5	User can view his/her complete medical analysis and accuracy of disease prediction	I can view my medical analysis and accuracy	High	Sprint-2
	Dashboard	USN-6	User can view the accuracy of occurrence of heart disease through report generation	I can view the accuracy of heart disease in the dashboard	high	Sprint-2
Customer Care Executive	Helpdesk	USN-7	As a customer care executive, he/she can view the customer queries.	I can post my queries in the dashboard	Medium	Sprint-3
		USN-8	As a customer care executive, he/she can answer the customer queries	I can get support from helpdesk	High	Sprint-3

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator	User profile	USN-9	As an admin, he/she can update the health details of users.	I can view my updated health details	High	Sprint-4
		USN-10	As an admin, he/she can add or delete users.	I can access my account / Dashboard when logged in	High	Sprint-4
		USN-11	As an admin, he/she can manage the user details.	I can view the organized data of myself.	High	Sprint-4

CHAPTER 6

PROJECT PLANNING & SCHEDULING

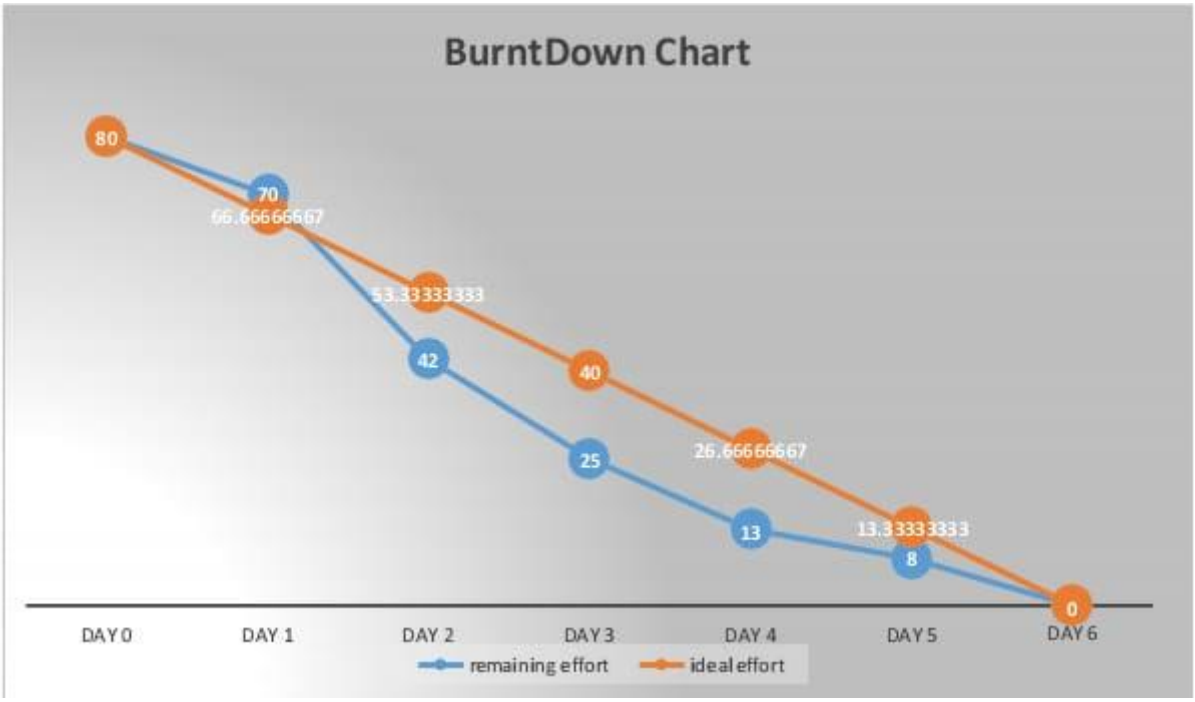
6.1 SPRINT PLANNING & ESTIMATION

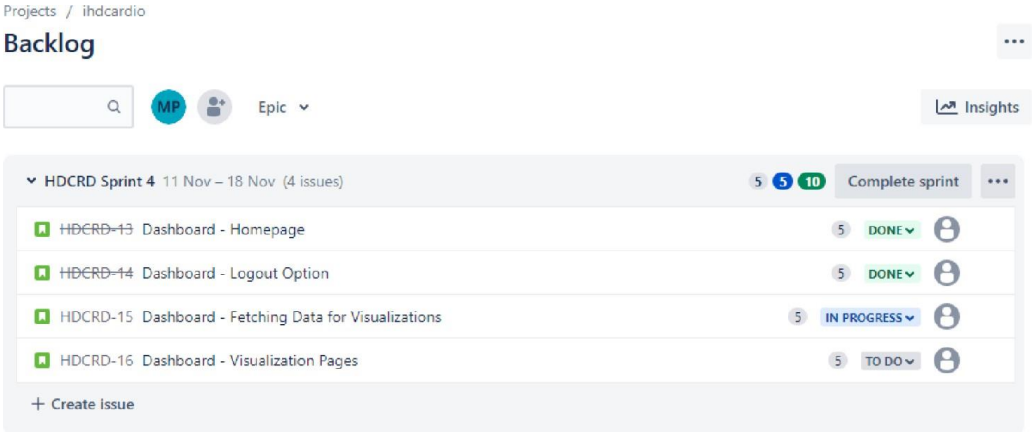
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story points	Priority	Team Members
Sprint1	Data Preprocessing and Exploratory Data Analysis(EDA)	USN-1	Data cleaning is implemented to check whether, there are any null values or any outliers are found	10	Medium	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG
		USN-2	Testing and Training the data model is implemented using Jupyter notebook	10	High	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG
Sprint2	Working with dataset	USN-3	Working with the Dataset. Understand Dataset Load the Dataset Explore the Data Visualize the Data.	20	Medium	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG
Sprint3	Data Visualization	USN-4	we plan to create various graphs and charts to highlight the insights and visualizations with the given attributes	20	High	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG
Sprint4	Dashboard	USN-5	Dashboard Showing Different Types Of Visuals	15	High	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG
		USN-6	User can able to generate Report and Story	5	Medium	Srinivasan S Vasanthavasan G Faayiz khan N Saravanan GG

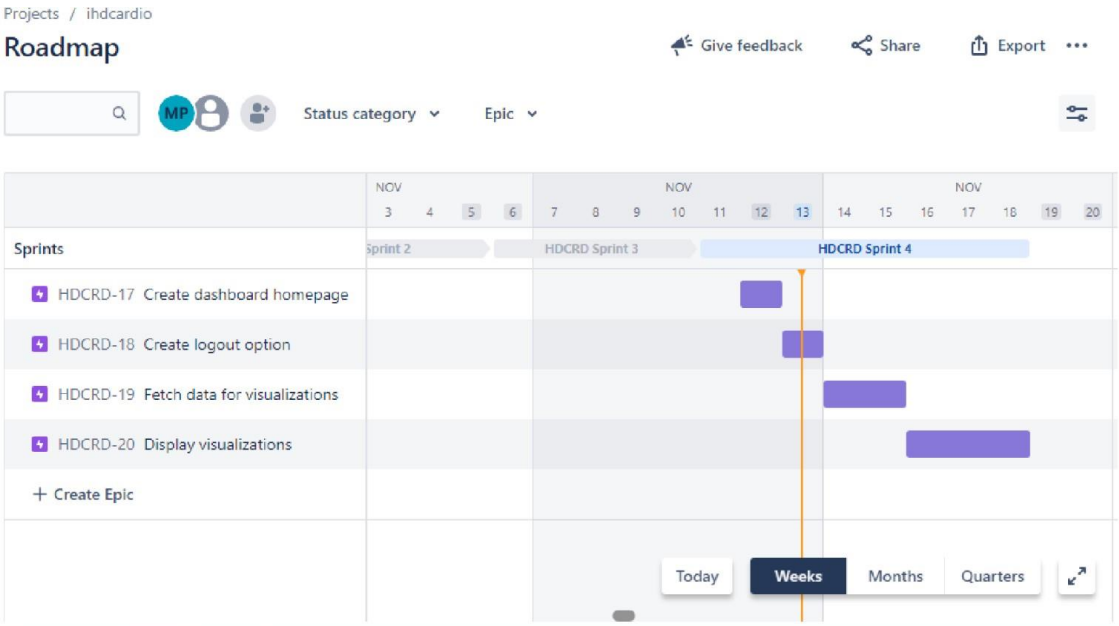
6.2 SPRINT DELIVERY SCHEDULE

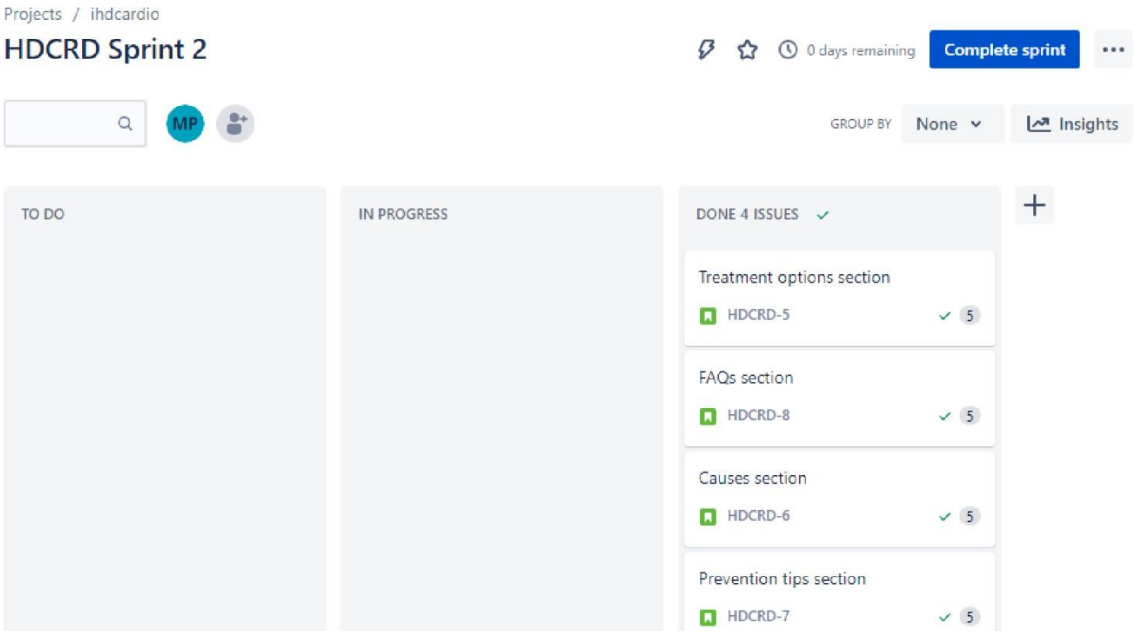
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	26 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	02 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	09 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	16 Nov 2022

6.3 REPORTS FROM JIRA






Projects / ihdcardio
Roadmap
Give feedback
Share
Export
MP
Status category
Epic
NOV
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Sprints
Sprint 2
HDCRD Sprint 3
HDCRD Sprint 4
HDCRD-17 Create dashboard homepage
HDCRD-18 Create logout option
HDCRD-19 Fetch data for visualizations
HDCRD-20 Display visualizations
Create Epic
Today
Weeks
Months
Quarters


Projects / ihdcardio
HDCRD Sprint 2
0 days remaining
Complete sprint
MP
GROUP BY
None
Insights
TO DO
IN PROGRESS
DONE 4 ISSUES
Treatment options section
HDCRD-5
5
FAQs section
HDCRD-8
5
Causes section
HDCRD-6
5
Prevention tips section
HDCRD-7
5

CHAPTER 7

CODING & SOLUTIONING

7.1 FEATURE 1

Prediction Model: When applied to a nonlinear data set, the random forest technique performs better than the decision tree. The collection of decision trees known as a random forest was produced by several root nodes. The random forest algorithm can achieve more accuracy quickly and produce expected results.

Algorithm:

Step 1: Input the required details

Step 2: The model processes the input with the help of random forest algorithm

Step 3: The results are displayed

Webiste Code:

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="utf-8">
    <meta content="width=device-width, initial-scale=1.0" name="viewport">

    <title>Visualizing and predicting of heart disease</title>
    <meta content="" name="description">
    <meta content="" name="keywords">

    <!-- Favicons -->
    <link href="assets/img/download.jpg" rel="icon">
    <link href="assets/img/download.jpg" rel="apple-touch-icon">

    <!-- Google Fonts -->
    <link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,60
0i,700,700i|Raleway:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300
i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">

    <!-- Vendor CSS Files -->
```

```
    <link href="assets/vendor/fontawesome-free/css/all.min.css"
rel="stylesheet">
    <link href="assets/vendor/animate.css/animate.min.css" rel="stylesheet">
    <link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
    <link href="assets/vendor/bootstrap-icons/bootstrap-icons.css"
rel="stylesheet">
    <link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
    <link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
    <link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
    <link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

    <!-- Template Main CSS File -->
    <link href="assets/css/style.css" rel="stylesheet">

    <!-- =======================================================
  * Template Name: Medilab - v4.9.1
  * Template URL: https://bootstrapmade.com/medilab-free-medical-bootstrap-
theme/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
  ======================================================== -->
</head>

<body>

    <!-- ======= Top Bar ======= -->


    <!-- ======= Header ======= -->
    <header id="header" class="fixed-top">
        <div class="container d-flex align-items-center">

            <h1 class="logo me-auto"><a href="index.html">IBM Project</a></h1>
            <!-- Uncomment below if you prefer to use an image logo -->
            <!-- <a href="index.html" class="logo me-auto"><img
src="assets/img/logo.png" alt="" class="img-fluid"></a>-->

            <nav id="navbar" class="navbar order-last order-lg-0">
                <ul>
                    <li><a class="nav-link scrollto active"
href="#hero">Home</a></li>
                    <li><a class="nav-link scrollto"
href="#about">About</a></li>
                    <li><a class="nav-link scrollto"
href="#gallery">Gallery</a></li>
                    <li><a class="nav-link scrollto"
href="https://github.com/IBM-EPBL/IBM-Project-2577-1658475332"
target="_blank">Github-rep</a></li>
                </ul>
                <i class="bi bi-list mobile-nav-toggle"></i>
            </nav>
```

```
            <!-- .navbar -->



        </div>
    </header>
    <!-- End Header -->

    <!-- ======= Hero Section ======= -->
    <section id="hero" class="d-flex align-items-center">
        <div class="container">
            <h1 style="background-color: aliceblue;">Visualization and
Predicting Heart Disease with an Interactive Dashboard</h1>

            <a href="https://vasivasanth.github.io/heart-disease-prediction-
website/" target="_blank" class="btn-get-started scrollto">Predict</a>
        </div>
    </section>
    <!-- End Hero -->

    <main id="main">

        <!-- ======= Why Us Section ======= -->
        <section id="why-us" class="why-us">
            <div class="container">

                <div class="row">
                    <div class="col-lg-4 d-flex align-items-stretch">
                        <div class="content">
                            <h3>What is heart disease?</h3>
                            <p>
                                The term “heart disease” refers to several types
of heart conditions. The most common type of heart disease in the United States
is coronary artery disease (CAD), which affects the blood flow to the heart.
Decreased blood flow can cause a heart attack.
                            </p>
                            <div class="text-center">
                                <a href="https://towardsdatascience.com/heart-
disease-prediction-73468d630cfc" target="_blank" class="more-btn">Learn More <i
class="bx bx-chevron-right"></i></a>
                            </div>
                        </div>
                    </div>
                    <div class="col-lg-8 d-flex align-items-stretch">
                        <div class="icon-boxes d-flex flex-column justify-
content-center">
                            <div class="row">
                                <div class="col-xl-4 d-flex align-items-
stretch">
                                    <div class="icon-box mt-4 mt-xl-0">
                                        <i class="bx bx-receipt"></i>
```

```
                                        <h4>Dashboard</h4>
                                        <hr>
                                        <p> A dashboard is a visual display of
all of your data. While it can be used in all kinds of different ways, its
primary intention is to provide information at-a-glance, such as KPIs.</p>
                                        <a
href="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_fol
ders%2Fheart%2Bdisease%2Bdashboard&action=view&mode=dashboard&subView=model00000
18441fd6f46_00000000" target="_blank"> <button>Show</button></a>
                                    </div>
                                </div>
                                <div class="col-xl-4 d-flex align-items-
stretch">
                                    <div class="icon-box mt-4 mt-xl-0">
                                        <i class="bx bx-cube-alt"></i>
                                        <h4>Story</h4>
                                        <hr>
                                        <p> A narrative, story, or tale is any
account of a series of related events or experiences, whether nonfictional or
fictiona</p>
                                        <a
href="https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders
%2FStory%2FHeart%2BDisease%2Bstory&action=view&sceneId=model0000018446afb98e_000
00000&sceneTime=9250" target="_blank"> <button>Show</button></a>
                                    </div>
                                </div>
                                <div class="col-xl-4 d-flex align-items-
stretch">
                                    <div class="icon-box mt-4 mt-xl-0">
                                        <i class="bx bx-images"></i>
                                        <h4>Report</h4>
                                        <hr>
                                        <p> A report is a document that presents
information in an organized format for a specific audience and purpose. Although
summaries of reports may be delivered orally, complete reports are almost always
in the form
                                            of written documents</p>
                                        <a
href="https://us3.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2Fdata%2Bmodule%2
FHeart%2BDisease%2Breport&action=run&prompt=false" target="_blank">
<button>Show</button></a>

                                    </div>
                                </div>
                            </div>
                        </div>
                        <!-- End .content-->
                    </div>
                </div>
```

```
            </div>
        </section>
        <!-- End Why Us Section -->

        <!-- ======= About Section ======= -->
        <section id="about" class="about">
            <div class="container-fluid">



                <div class="row" style="justify-content: center;" >
                    <div class="col-xl-7 col-lg-6 icon-boxes d-flex flex-column
align-items-stretch justify-content-center py-5 px-lg-5">
                        <h3>Major objectives of a heart disease predictor</h3>
                        <p> The EHDPS predicts the likelihood of patients
getting heart disease. It enables significant knowledge, eg, relationships
between medical factors related to heart disease and patterns, to be
established.
                        </p>

                        <div class="icon-box">
                            <div class="icon"><i class="fa fa-
heartbeat"></i></div>
                            <h4 class="title"><a href="">  Serum
Cholesterol</a></h4>
                            <p class="description"> A high level of
triglycerides, a type of blood fat related to your diet, also ups your risk of a
heart attack.</p>
                        </div>

                        <div class="icon-box">
                            <div class="icon"><i class="fa fa-user-
md"></i></div>
                            <h4 class="title"><a href=""> Resting Blood
Pressure</a></h4>
                            <p class="description"> Over time, high blood
pressure can damage arteries that feed your heart. High blood pressure that
occurs with other conditions, such as obesity, high cholesterol or diabetes,
increases your risk even more.</p>
                        </div>

                        <div class="icon-box">
                            <div class="icon"><i class="fa fa-
stethoscope"></i></div>
                            <h4 class="title"><a href=""> Resting ECG</a></h4>
                            <p class="description"> For people at low risk of
cardiovascular disease, the USPSTF concludes with moderate certainty that the
potential harms of screening with resting or exercise ECG equal or exceed the
potential benefits.</p>
                        </div>
```

```
                </div>
            </div>


        </div>
    </section>
    <!-- End About Section -->

    <!-- ======= Counts Section ======= -->
    <section id="counts" class="counts">
        <div class="container">

            <div class="row">

                <div class="col-lg-3 col-md-6">
                    <div class="count-box">

                        <span data-purecounter-start="0" data-purecounter-
end="131.3" data-purecounter-duration="1" class="purecounter"></span>
                        <p>Blood Pressure Average</p>
                    </div>
                </div>

                <div class="col-lg-3 col-md-6 mt-5 mt-md-0">
                    <div class="count-box">

                        <span data-purecounter-start="0" data-purecounter-
end="249.7" data-purecounter-duration="1" class="purecounter"></span>
                        <p>Cholestrol Average</p>
                    </div>
                </div>

                <div class="col-lg-3 col-md-6 mt-5 mt-lg-0">
                    <div class="count-box">

                        <span data-purecounter-start="0" data-purecounter-
end="161.94" data-purecounter-duration="1" class="purecounter"></span>
                        <p>Maximum Heart Rate</p>
                    </div>
                </div>

                <div class="col-lg-3 col-md-6 mt-5 mt-lg-0">
                    <div class="count-box">

                        <span data-purecounter-start="0" data-purecounter-
end="1" data-purecounter-duration="1" class="purecounter"></span>
                        <p>Most Chest Pain Type</p>
                    </div>
                </div>
```

```
                </div>

            </div>
        </section>
        <!-- End Counts Section -->


       <!-- ======= Gallery Section ======= -->
       <section id="gallery" class="gallery">
        <div class="container">

            <div class="section-title">
                <h2>Gallery</h2>
                <p>Attributes Visualization using <b>IBM Cognos
Analytics</b></p>
            </div>
        </div>

        <div class="container-fluid">
            <div class="row g-0">

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-11-05.png"
class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-11-
05.png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-10-29.png"
class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-10-
29.png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-10-29
(1).png" class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-10-29
(1).png" alt="" class="img-fluid">
                        </a>
                    </div>
```

```
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-10-29
(2).png" class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-10-29
(2).png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-11-05
(1).png" class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-11-05
(1).png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-11-05
(2).png" class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-11-05
(2).png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/Screenshot-2022-11-05
(4).png" class="galelry-lightbox">
                            <img src="assets/img/gallery/Screenshot-2022-11-05
(4).png" alt="" class="img-fluid">
                        </a>
                    </div>
                </div>

                <div class="col-lg-3 col-md-4">
                    <div class="gallery-item">
                        <a href="assets/img/gallery/unnamed.png" class="galelry-
lightbox">
                            <img src="assets/img/gallery/unnamed.png" alt=""
class="img-fluid">
                        </a>
                    </div>
```

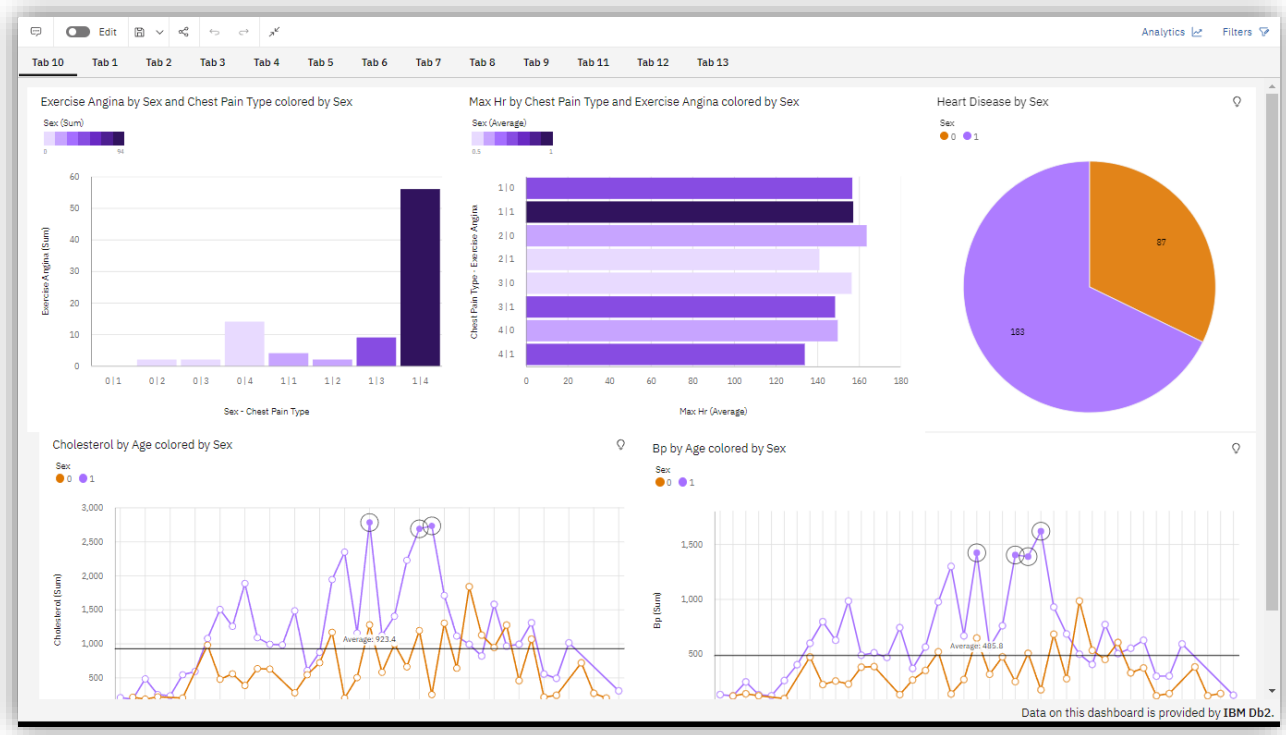
```
                </div>

            </div>

        </div>
    </section>
    <!-- End Gallery Section -->

        <!-- ======= Doctors Section ======= -->
        <section id="doctors" class="doctors">
            <div class="container">

                <div class="section-title">
                    <h2>Team Members</h2>
                    <p>Team id - PNT2022TMID40418 </p>
                </div>

                <div class="row">

                    <div class="col-lg-6">
                        <div class="member d-flex align-items-start">
                            <div class="pic"><img
src="assets/img/doctors/8dda39d89cea777270772bb62782035c.jpg" class="img-fluid"
alt=""></div>
                            <div class="member-info">
                                <h4>SRINIVASAN S</h4>
                                <span>Team Leader</span>
                                <p>University College Of Engineering,
Kancheepuram</p>
                                <br>
                                 <a href="https://github.com/SRINIVASAN2001"
target="_blank"><i class="fa-brands fa-github" style="font-size:36px;"></i></a>
                                  <a
href="https://www.linkedin.com/in/srinivasan-s-bab702216" target="_blank"><i
class="fa-brands fa-linkedin" style="font-size:36px;color:rgb(37, 57,
235);"></i></a>



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

                    <div class="col-lg-6 mt-4 mt-lg-0">
                        <div class="member d-flex align-items-start">
                            <div class="pic"><img
src="assets/img/doctors/pngtree-cartoon-color-simple-male-avatar-png-
image_1934459.jpg" class="img-fluid" alt=""></div>
                            <div class="member-info">
                                <h4>VASANTHAVASAN G</h4>
```

```
                                <span>Team Member</span>
                                <p>University College Of Engineering,
Kancheepuram</p>
                                <br>
                                <a href="https://github.com/vasivasanth"
target="_blank"><i class="fa-brands fa-github" style="font-size:36px;"></i></a>
                                <a
href="https://www.linkedin.com/in/vasanthavasan-g-936763219" target="_blank"><i
class="fa-brands fa-linkedin" style="font-size:36px;color:rgb(37, 57,
235);"></i></a>
                            </div>
                        </div>
                    </div>

                    <div class="col-lg-6 mt-4">
                        <div class="member d-flex align-items-start">
                            <div class="pic"><img
src="assets/img/doctors/depositphotos_73039841-stock-illustration-male-avatar-
icon.jpg" class="img-fluid" alt=""></div>
                            <div class="member-info">
                                <h4>FAAYIZ KHAN N</h4>
                                <span>Team Member</span>
                                <p>University College Of Engineering,
Kancheepuram</p>
                                <br>
                                <a href="https://github.com/khanworks"
target="_blank"><i class="fa-brands fa-github" style="font-size:36px;"></i></a>
                                <a href="https://www.linkedin.com/in/faayiz-
khan-252a36255" target="_blank"><i class="fa-brands fa-linkedin" style="font-
size:36px;color:rgb(37, 57, 235);"></i></a>
                            </div>
                        </div>
                    </div>

                    <div class="col-lg-6 mt-4">
                        <div class="member d-flex align-items-start">
                            <div class="pic"><img src="assets/img/doctors/man-
character-face-avatar-glasses-260nw-562077406.webp" class="img-fluid"
alt=""></div>
                            <div class="member-info">
                                <h4>SARAVANAN G G</h4>
                                <span>Team Member</span>
                                <p>University College Of Engineering,
Kancheepuram</p>
                                <br>
                                <a href="https://github.com/Ggsaraniv"
target="_blank"><i class="fa-brands fa-github" style="font-size:36px;"></i></a>
                                <a
href="https://www.linkedin.com/in/%ED%9E%88%EC%99%80%ED%83%80%EB%A6%AC-
```

```
%E0%B9%80%E0%B8%A5%D0%BA-578740250" target="_blank"><i class="fa-brands fa-
linkedin" style="font-size:36px;color:rgb(37, 57, 235);"></i></a>

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

            </div>

        </div>
    </section>
    <!-- End Doctors Section -->


                </div>
                <div class="swiper-pagination"></div>
            </div>

        </div>
    </section>




</main>

<script src="assets/vendor/purecounter/purecounter_vanilla.js"></script>
<script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
<script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
<script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
<script src="assets/vendor/php-email-form/validate.js"></script>

<!-- Template Main JS File -->
<script src="assets/js/main.js"></script>

</body>

</html>
```

7.2 FEATURE 2

Dashboard: Our application helps the user in finding out if they have heart disease or not. They can find out by entering details such as their heart rate, cholesterol, blood pressure etc. A dashboard is also attached along with the results for better understanding where they can compare their blood pressure and similar metrics with other users.



CHAPTER 8

RESULTS

8.1 PERFORMANCE METRICS

1. Hours worked: 50 hours

2. Stick to Timelines: 100%

3. Stay within budget: 100%

4. Consistency of the product: 95%

5. Efficiency of the product: 95%

6. Quality of the product: 100%

CHAPTER 9

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Smooth User Interface
- Accuracy is achieved quickly

DISADVANTAGES:

- Random forest can be used for both classification and regression tasks, but it is not more suitable for Regression tasks.

CHAPTER 10

CONCLUSION

This overview of the project conveys the idea that numerous methods have been investigated for diagnosing cardiovascular disease. Big data, machine learning, and data mining can be used to great success to analyse the prediction model with the highest degree of accuracy. The primary goal of this project is to diagnose cardiovascular disease or heart disease utilizing a variety of techniques and procedures to obtain a prognosis.

CHAPTER 11

FUTURE SCOPE

A future update shall comprise of section for viewing renowned cardiologists and scan centers in their city. The obtained output can be further processed and sent to smart devices to provide necessary assistance. Constant monitoring can provide necessary data to recommend to consult a doctor in case of an emergency. In Future more new classification is used to predict the datasets from effectively. Here, we used Random Forest Classifier to predict the accuracy which gives 86% than other predictive models.

CHAPTER 12

APPENDIX

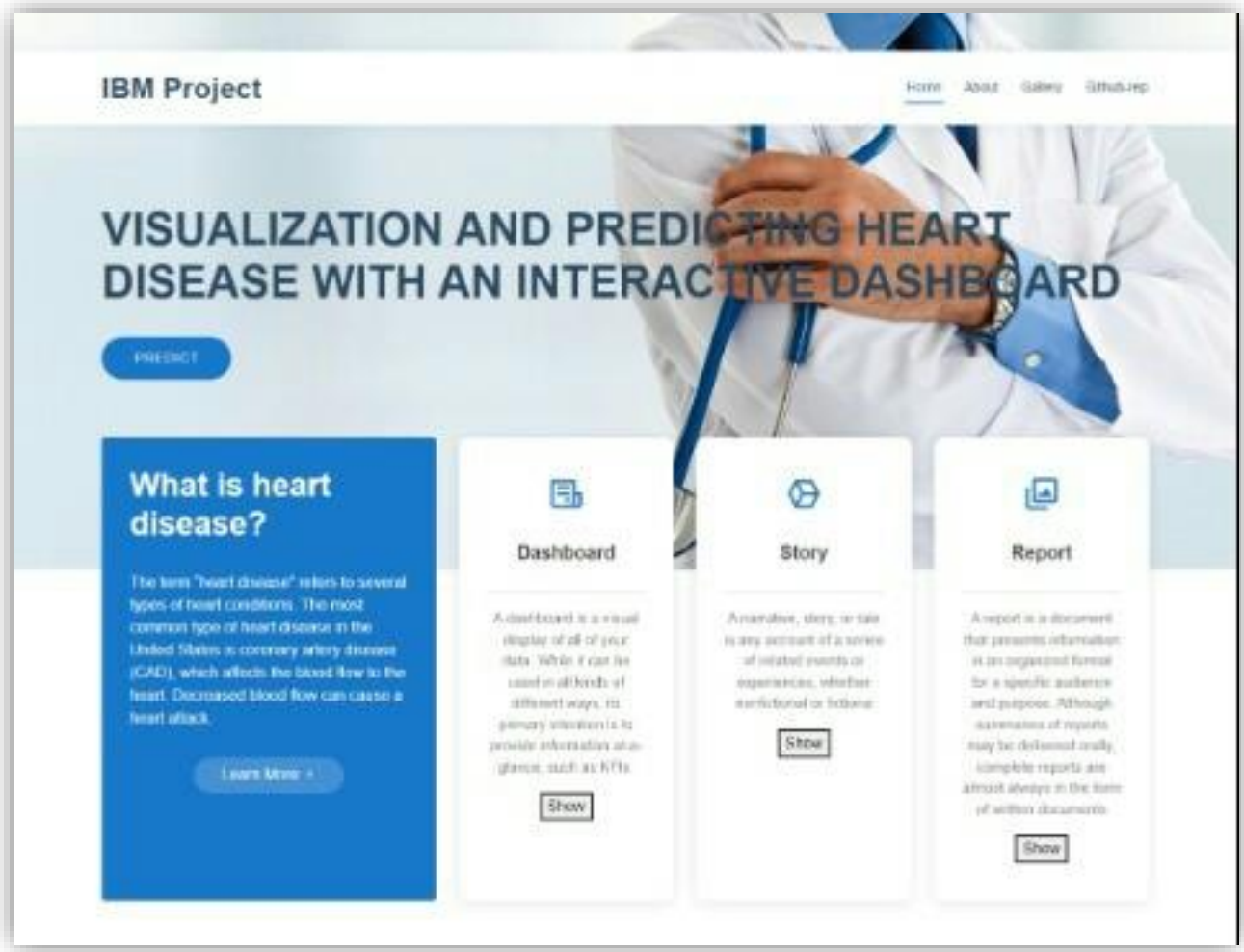
PROJECT DEMONSTRATION LINK:
https://drive.google.com/file/d/1bXaJ1XyV7lkna2QAnki9pnMCNMdLLY5E/view?usp=sharing

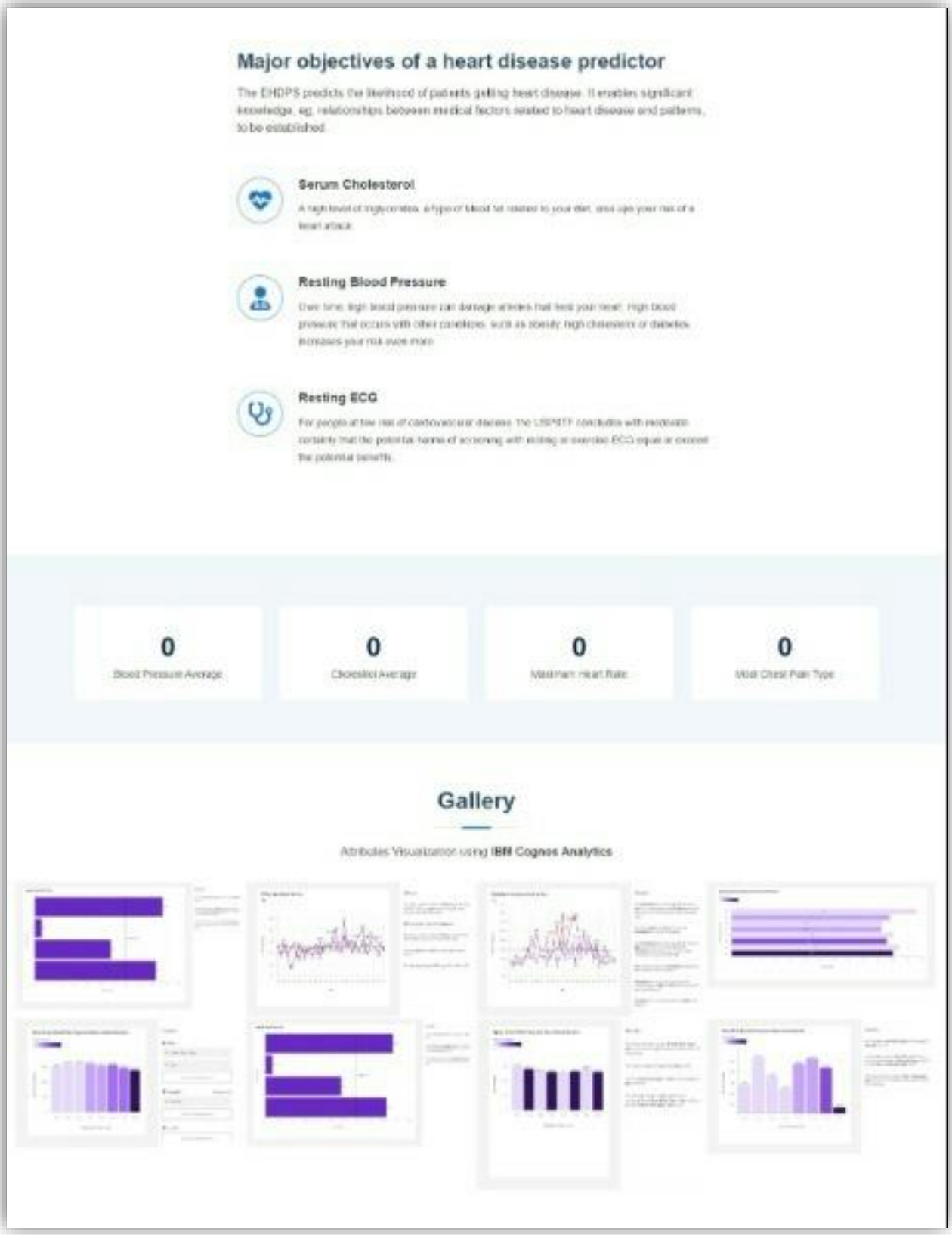
GITHUB LINK: https://github.com/IBM-EPBL/IBM-Project-2577-1658475332

WEBSITE LIVELINK:

WEBSITE DEMO LIVE LINK

APPENDIX A1: SCREENSHOTS




Major objectives of a heart disease predictor
The EHDPS predicts the likelihood of patients getting heart disease. It enables significant knowledge, eg. relationships between medical factors related to heart disease and patterns, to be established.
Serum Cholesterol
A high level of triglycerides, a type of blood fat related to your diet, also ups your risk of a heart attack.
Resting Blood Pressure
Over time, high blood pressure can damage arteries that feed your heart. High blood pressure that occurs with other conditions, such as obesity, high cholesterol or diabetes, increases your risk even more.
Resting ECG
For people at low risk of cardiovascular disease, the USPSTF concludes with moderate certainty that the potential harms of screening with resting or exercise ECG equal or exceed the potential benefits.
0
Blood Pressure Average
0
Cholestrol Average
0
Maximum Heart Rate
0
Most Chest Pain Type
Gallery
Attributes Visualization using IBM Cognos Analytics