PROJECT REPORT

TEAM ID	PNT2022TMID21580
PROJECT NAME	Visualizing and Predicting Heart with an Interactive Dashboard

1. INTRODUCTION

1.1 Project Overview

Among various life-threatening diseases, heart disease has garnered a great deal of attention in medical research. The diagnosis of heart disease is a challenging task, which can offer automated predictions about the heart condition of a patient so that further treatment can be made effective.Here the main aim of the project is to predict cardiovascular disease to the required patients. So basically cardiovascular disease is a A type of disease that affects the heart or blood vessels. The risk of certain cardiovascular diseases may be increased by smoking, high blood pressure, high cholesterol, unhealthy diet, lack of exercise, and obesity. Cardiovascular diseases have become a cause of concern in increasing the mortality rate. So in order to prevent these diseases we need a solid prediction system in place to effectively diagnose these diseases at a pretty faster rate and save many human lives. Also we need a powerful visualizing system to make graphical representation of a patient's medical history which would ease the process of determining the further treatments. 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 advanced data mining techniques are used. We are planning to develop an effective heart disease prediction system which predicts the likelihood of patients getting heart disease. The system uses 15 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction. Our system enables significant knowledge, eg, relationships between medical factors related to heart disease and patterns, to be established. Our proposed system can be used to classify whether a person is suffering from heart disease or not. Determine an exact hidden knowledge, ie, patterns and relationships associated with heart disease from a historical heart disease database. It can also answer the complex queries for diagnosing heart disease; therefore, it can be helpful to health care practitioners to make intelligent clinical decisions.

1.2 Purpose

This is to help the patients who are unable to predict whether they are being affected by cardiovascular disease. Those patients who are at risk of cardiovascular disease (cvd) might be undergoing some common symptoms like chest pain, obesity,etc., so this project is to make an accurate prediction of cardiovascular disease. By consolidating all the symptoms, using appropriate algorithms it is able to identify whether the particular person is being affected by cvd.

2. LITERATURE SURVEY

2.1 Existing problem

A Comprehensive Review on Heart Disease Prediction Using Data Mining and Machine Learning Techniques.

Heart disease is one of the major causes of life complications and subsequently leading to death. The heart disease diagnosis and treatment are very complex, especially in the developing countries, due to the rare availability of efficient diagnostic tools and shortage of medical professionals and other resources which affect proper prediction and treatment of patients. Inadequate preventive measures, lack of experienced or unskilled medical professionals in the field are the leading contributing factors. Although, large proportion of heart diseases are preventable, they continue to rise mainly because preventive measures are inadequate. In today's digital world, several clinical decision support systems on heart disease prediction have been developed by different scholars to simplify and ensure efficient diagnosis. This paper investigates the state of the art of various clinical decision support systems for heart disease prediction, proposed by various researchers using data mining and machine learning techniques. Classification algorithms such as the Naïve Bayes (NB), Decision Tree (DT), and Artificial Neural Network (ANN) have been widely employed to predict heart diseases, where various accuracies were obtained. Hence, only a marginal success is achieved in the creation of such predictive models for heart disease patients therefore, there is need for more complex models that incorporate multiple geographically diverse data sources to increase the accuracy of predicting the early onset of the disease.

Big data analysis for heart disease detection system using map reduce technique.

In today's world, the enormous amount of information in health care is to be processed in order to identify, diagnose, detect and prevent the various diseases. Big

data analysis is the challenging one because big data contains a large amount of records. It is proposed to develop a centralized patient monitoring system using big data. In the proposed system, a large set of medical records are taken as input. From this medical dataset, it is aimed to extract the needed information from the record of heart patients using map reduce technique. Heart disease is a major health problem and it is the leading cause of death throughout the world. Early detection of heart disease has become an important issue in the medical research fields. For heart disease detection, some features are analyzed such as RR interval, QRS interval and QT interval. The classification process states whether the patient is normal or abnormal and in the detection step using map reduce technique to detect the disease and reduce the dataset. Thus, the proposed system helps to classify a large and complex medical dataset and detect heart disease.

Big Data Analytics in Heart Attack Prediction.

Acute myocardial infarction (heart attack) is one of the deadliest diseases patients face. The key to cardiovascular disease management is to evaluate large scores of datasets, compare and mine for information that can be used to predict, prevent, manage and treat chronic diseases such as heart attacks. Big Data analytics, known in the corporate world for its valuable use in controlling, contrasting and managing large datasets can be applied with much success to the prediction, prevention, management and treatment of cardiovascular disease. Data mining, visualization and Hadoop are technologies or tools of big data in mining the voluminous datasets for information. This review offers the latest information on Big Data analytics in healthcare, predicting heart attack, and tailoring medical treatment to the individual. The results will guide providers, healthcare organizations, nurses, and other treatment providers in using Big Data technologies to predict and manage heart attack as well as what privacy concerns face the use of Big Data analytics in healthcare. Effective and tailored medical treatment can be developed using these technologies

A Review on Heart Disease Prediction using Machine Learning and Data Analytics Approach.

Heart is the next major organ compared to brain which has more priority in Human body. It pumps the blood and supplies to all organs of the whole body. Prediction of occurrences of heart diseases in medical field is significant work. Data analytics is useful for prediction from more information and it helps medical center to predict of various disease. Huge amount of patient related data is maintained on monthly basis. The stored data can be useful for source of predicting the occurrence of future disease. Some of the data mining and machine learning techniques are used to

predict the heart disease, such as Artificial Neural Network (ANN), Decision tree, Fuzzy Logic, K-Nearest Neighbour(KNN), Naïve Bayes and Support Vector Machine (SVM). This paper provides an insight of the existing algorithm and it gives an overall summary of the existing work.

2.2 References

- https://www.researchgate.net/profile/Lidong-Wang/publication/316851031_Big_Data_Analytics_in_Heart_Attack_Prediction/links/595fd6c4a6fdccc9b1c47e90/Big-Data-Analytics-in-Heart-Attack-Prediction.pdf
- https://www.researchgate.net/publication/327722009_A_Review_on_Heart_Disease_Prediction_using_Machine_Learning_and_Data_Analytics_Approach
- https://www.researchgate.net/publication/344998779_A_Comprehensive_Review_on_Heart_Disease_Prediction_Using_Data_Mining_and_Machine_Learning_Techniques
- https://ieeexplore.ieee.org/abstract/document/7725360

2.3 Problem Statement Definition:

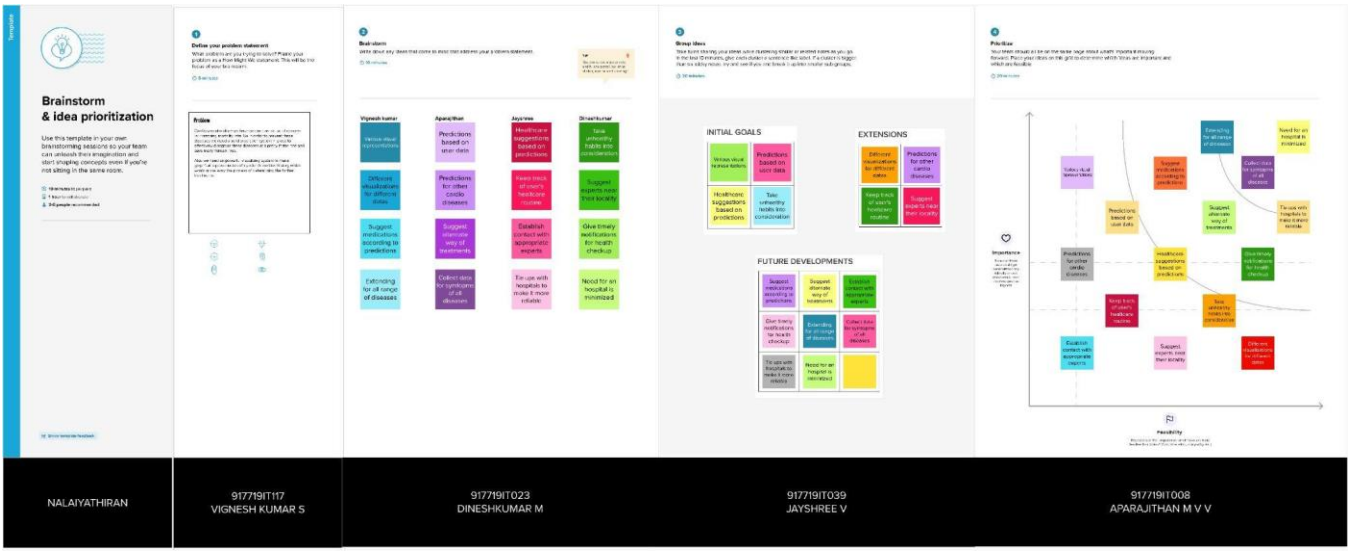
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Patient	List my symptoms	Not sure about results	It's not been diagnosed by the doctors	Get confused and fear.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

A common visualization tool in the realm of UX and HCI practice is an empathy map. An empathy map's main objective in connection to empathic design is to bridge the understanding of the end user. This tool is used to create a shared knowledge of the user's demands within the context of its application and to give context to a user-centered solution.

3.2 Ideation & Brainstorming



3.3 Proposed Solution

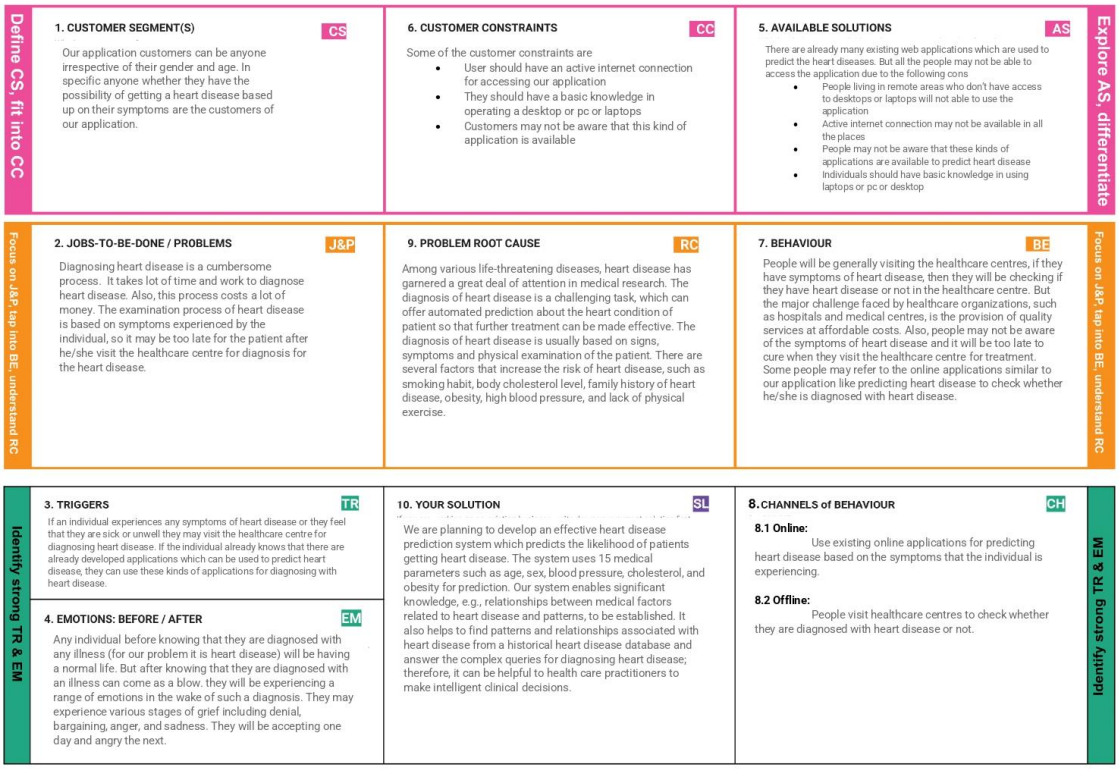
S.No:	Parameter	Description
1.	Problem Statement(Problem to be solved)	**VISUALIZING AND PREDICTING HEART DISEASE WITH AN INTERACTIVE DASHBOARD** The largest problem in medicine is predicting and identifying heart disease. Due to the lack of doctors and diagnostic tools that affect the treatment of cardiac patients, the diagnosis and treatment processes are currently quite difficult. On the basis of a patient's medical history, an expert's symptom analysis report, and physical laboratory results, invasive procedures are used to identify cardiac problems. Furthermore, because of human intervention, it delays and results in inaccurate diagnosis. At the moment of assessment, it is time-consuming, computationally demanding, and expensive. Based on a variety of symptoms, including age, gender, pulse rate, physical examination, symptoms and signs of the patient, etc., heart disease can be predicted.

2.	Idea/ Solution Description	The main idea of our project is to use classification and regression techniques in supervised learning in Machine learning. Where supervised learning models can be a valuable solution for eliminating manual classification work and for making future predictions based on labeled data. However, formatting your machine learning algorithms requires human knowledge and expertise to avoid overfitting data models. With this, predicting heart disease is much more efficient and accurate.
3.	Novelty/ Uniqueness	The basic workflow and the uniqueness here is collection and selection of different heart disease datasets in order to train various machine learning algorithms. Comparison of various data mining algorithms accuracy and performance in predicting heart disease. Storing of doctor and patient information following registration of patients and doctors through the application in cloud based server for analysis.
4.	Social Impact/ Customer Satisfaction	The primary goal of this project is to get to know a patient's health situation more accurately. Heart diseases are often complex cases that have many unanswered questions within itself. These questions can be answered by finding relevant patterns and hidden knowledge from various patient histories. These datasets may contain various types of data. These raw datasets are first cleaned and standardized and then processed to extract the necessary information, which will further help the professionals to handle the patient's treatment in an efficient manner.
5.	Business Model(Revenue Model)	The dataset is first cleaned and a series of pre-processing steps are undertaken. Then the data is split into 2 datasets namely train and test dataset. This train dataset is further split into various

		divisions and each division is trained under a different algorithm and different models are built. Then the test data sets are tested under these newly built models and the prediction results are measured for accuracy. These steps are repeated until we get the best possible accuracy. Then these are loaded with a dashboard that makes the model interactive with the user.
6.	Scalability of the Solution	● Decreased mortality ● Reduced time consumption ● Accurate predictions ● Earlier diagnosis ● Regular check on healthcare vitals ● Extended analysis on risk factors ● Visual representation of healthcare data

3.4 Problem Solution fit

Project Title: Visualizing and Predicting Heart with an Interactive Dashboard **Project Design Phase-I – Solution Fit** **Team ID:** PNT2022TMID21580



4. REQUIREMENT ANALYSIS

Requirements analysis is a key component of systems engineering and software engineering. It concentrates on the tasks that identify the requirements for a new or modified product or project, taking into account the potentially conflicting requirements of the various stakeholders, and analyses, documents, validates, and manages software or system requirements.

4.1 Functional requirement

A functional requirement, which is used in software engineering and systems engineering, specifies the behavior between inputs and outputs for a system or one of its components.

FR NO	Functional Requirement	Subtask / Sub requirement
FR 1	User Registration	Registration using Google Registration using Facebook Registration using other
FR 2	Account creation	Email and password for account creation
FR 3	Dashboard	Dashboard where the user can enter his health data so that the application can predict whether the user is diagnosed with heart disease or not.
FR 4	Personal Details	Personal details and medical related details for basic health maps.
FR 5	Frequent updates	Frequent visualizations and updates regarding the health conditions of the user.

4.2 Non-Functional requirements

A non-functional requirement (NFR) is a requirement that, rather than defining specific behaviors, specifies criteria that can be used to assess how well a system performs. Functional requirements, which specify particular behavior or functions, are contrasted with them.

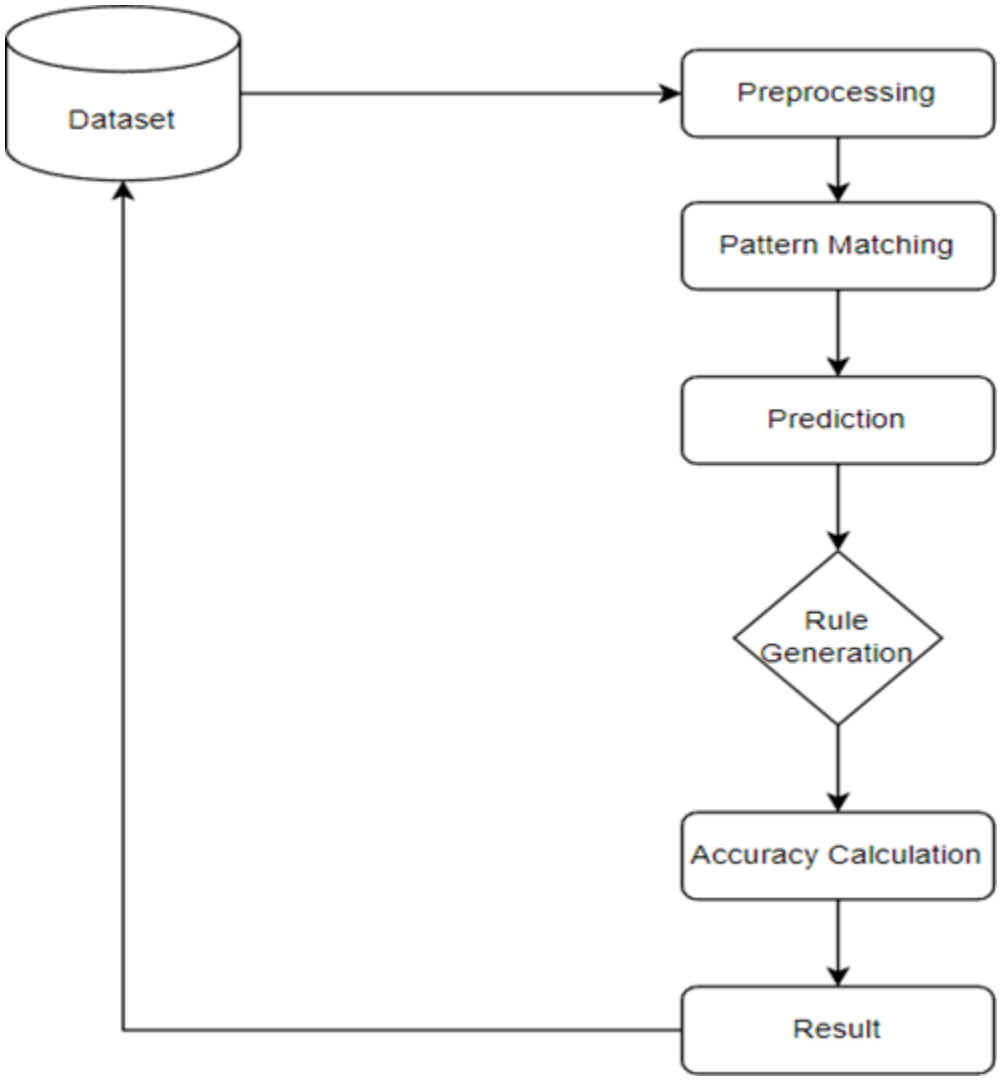
NFR NO	Non-functional requirement	Subtask / Sub requirement
NFR 1	**Usability**	Many navigation and lots of options for the user to choose from adds frustration to the user experience. We have planned our application in such a way that the user gets what he wants with a minimum number of clicks and a clear cut with minimal options and a lot of information. We use the universal language English to make the application more user friendly.
NFR 2	**Security**	Security is an important NFR in our application as we are dealing with a lot of sensitive and personal information such as medical records and other healthcare measures. Each and every user

		has their own access credentials and can strictly view only their own dashboard and no other's data. Frequent security updates are made to the application. Two factor authentication can be enabled if the user wishes for an extended layer of security.
NFR 3	**Reliability**	The application is open to use whenever required. The application is regularly modified and updated with respect to the requirements of the user. Application is made reliable by giving bug free simple operations with a much better response time. The app provides stability whenever required.
NFR 4	**Performance**	The performance of the application will be noticeably good. Every page needs to render quickly as the user might be in any form of emergency. As most of the users are potential patients, performance should be fast and should not cause any unwanted delay.
NFR 5	**Availability**	The application is available 24/7. The application should be hosted and frequently maintained. Updates should be regular, so that users wouldn't feel any latency.
NFR 6	**Scalability**	The application is open for scaling. It should be able to handle an exponential increase in the number of users. It should also be available to scale into the next higher versions of the application.

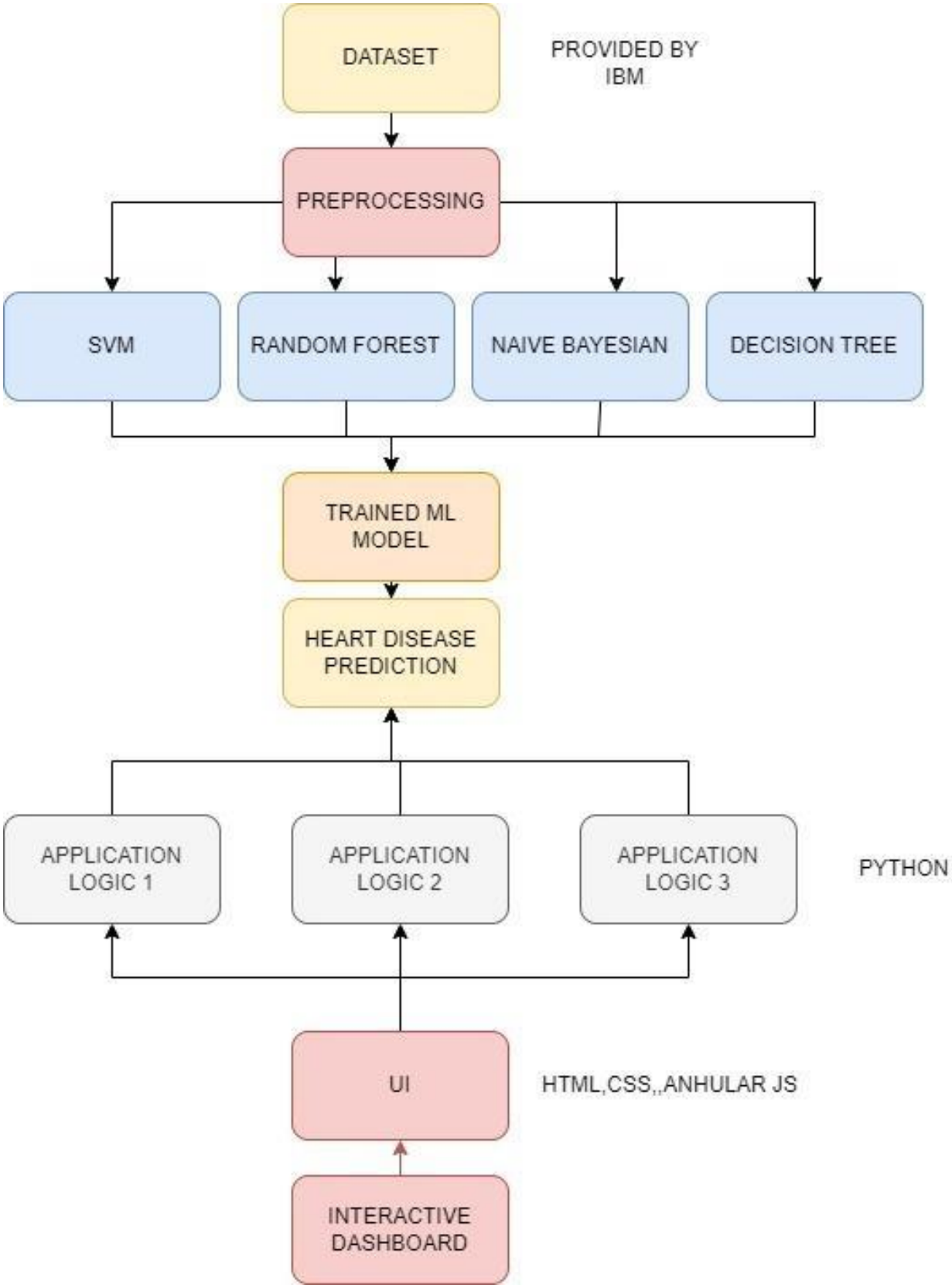
5. PROJECT DESIGN

5.1 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 Architecture



5.3 Technical Architecture

5.4 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web User)	Registration	USN-1	As a Customer, I can register for the application by entering my email, password, and confirming my password so that I can log into the application.	I can register to the application and become a user of the application.	High	Sprint-1
		USN-2	As a customer, after registration I will receive OTP via	I can receive OTP and confirm it	High	Sprint-1

			registered email so that I can have additional security and verify that it's me.	thus completing the registration process.		
		USN-3	As a customer, I can register through one time sign in feature using google, Facebook and other social platforms so that it makes my registration process easier.	I can register to the application through google, Facebook and other social platforms thus completing the registration process..	Low	Sprint-2
	Login	USN-5	As a Customer, I can log into the application by entering email & password so that I can have privacy and increased security	I can login to the application and view my preferred information.	High	Sprint-1
	Dashboard	USN-6	As a customer, I can access the dashboard, so that I can access the features of the application.	I can view the dashboard and navigate to various features of application.	High	Sprint-2
		USN-7	As a customer, I can enter details such as age, sex, chest pain, cholesterol level,	I can know whether I am diagnosed with heart disease or not.	High	Sprint-2

			resting blood pressure and various attributes related to health conditions so that the application predicts whether I am diagnosed with have a heart disease or not.			
		USN-8	As a Customer, I can view my past data such as resting blood pressure, cholesterol level and various attributes related to health conditions so that I can know how my health conditions are different now from the past data.	I can view my past health conditions data.	Medium	Sprint-3
		USN-9	As a user, I can logout of the application, so that I can stop using the application or login with my other account.	I can logout from the application	Medium	Sprint-1
Administrator	Login	USN-10	As an admin I can log into the application (admin panel) by entering email & password so that I can access the application in admin mode with higher level of access.	I can login to the application and view my preferred information.	High	Sprint-4
	Manipulation	USN-11	As an admin, I can able to manipulate data so	I can able to alter the data and have	High	Sprint-4

			that the customers will be displayed with correct data and have a good user experience.	higher level of access to the application.		

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint 1	Registration	USN-1	As a Customer, I can register for the application by entering my email, password, and confirming my password so that I can log into the application.	6	High	M.V.V. Aparajithan
Sprint 1		USN-2	As a customer, after registration I will receive OTP via registered email so that I can have additional security and verify that it's me	6	High	M.Dineshkumar
Sprint 2		USN-3	As a customer, I can register through one time sign in feature using google, Facebook and	6	Low	V.Jayshree

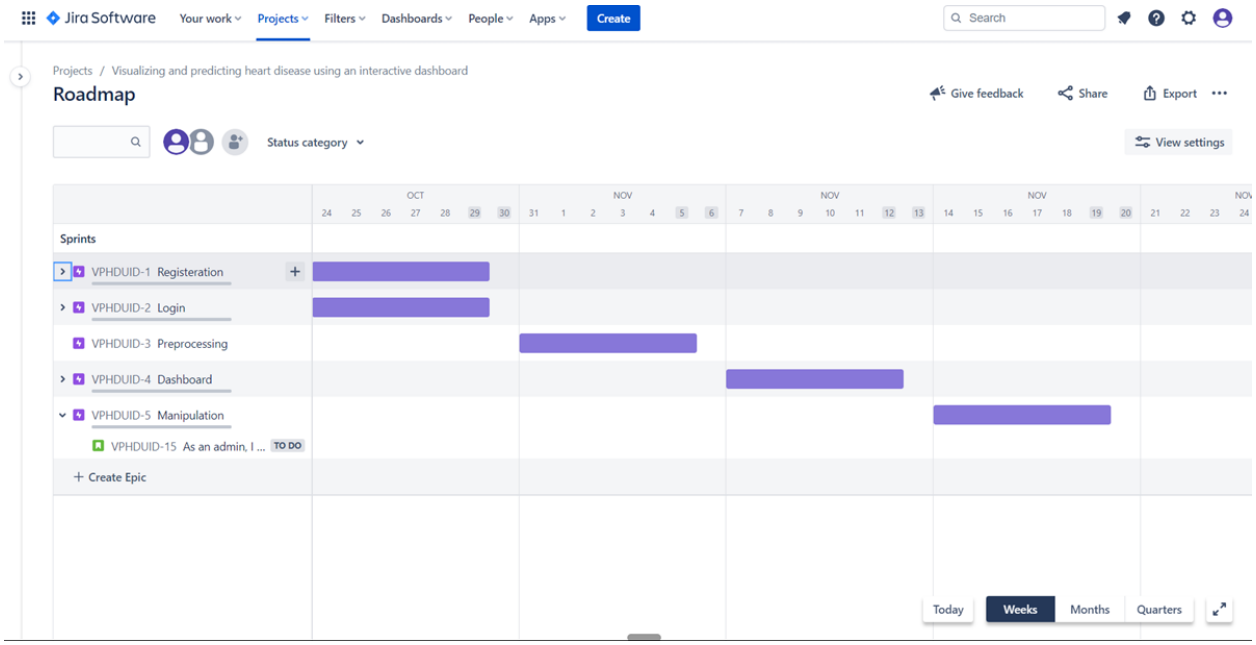
			other social platforms so that it makes my registration process easier			
Sprint 1	Login	USN-4	As a Customer, I can log into the application by entering email & password so that I can have privacy and increased security	6	High	S.Vigneshkumar
Sprint 2	Dashboard	USN-5	As a customer, I can access the dashboard, so that I can access the features of the application.	7	High	M.V.V. Aparajithan
Sprint 2		USN-6	As a customer, I can enter details such as age, sex, chest pain, cholesterol level, resting blood pressure and various attributes related to health conditions so that the application predicts whether I am diagnosed with have a heart disease or not.	7	High	M.Dineshkumar
Sprint 3		USN-7	As a Customer, I can view my past data such as resting blood pressure, cholesterol level and various attributes related to health conditions so that I can know how my health conditions	20	Medium	V.Jayshree

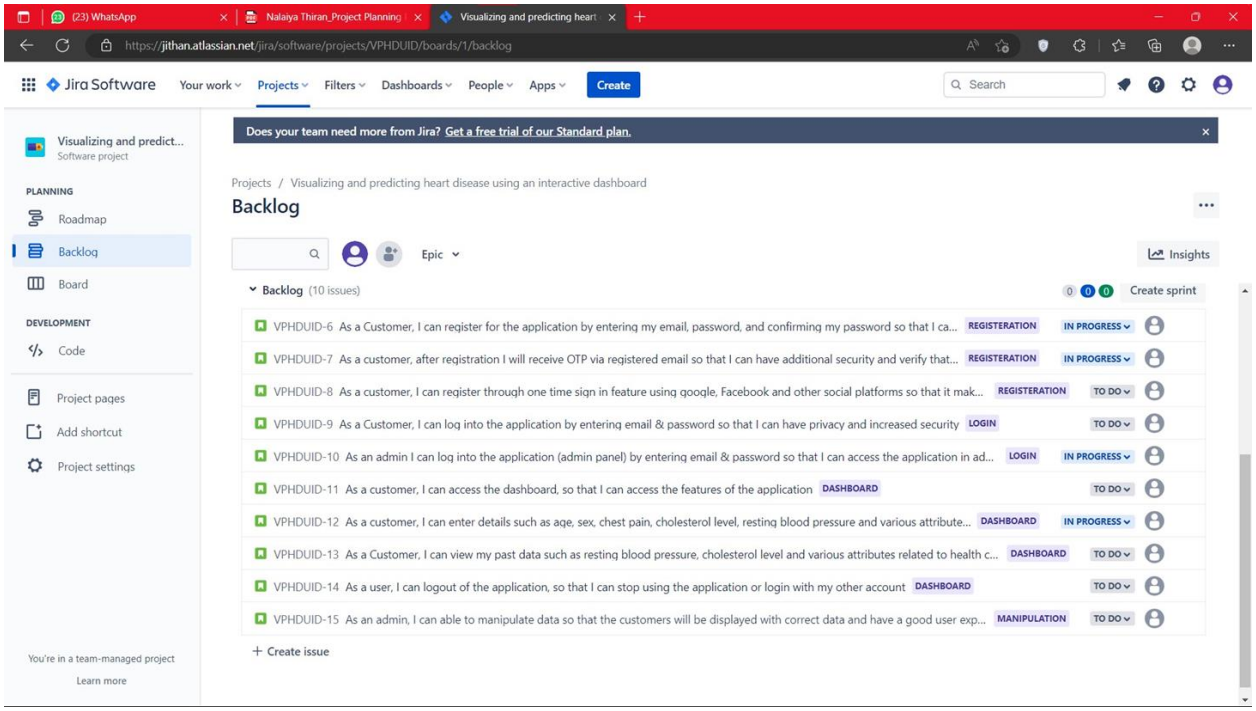
			are different now from the past data.			
Sprint 1		USN-8	As a user, I can logout of the application, so that I can stop using the application or login with my other account.	2	Medium	S.Vigneshkumar
Sprint 4	Login(admin)	USN-9	As an admin I can log into the application (admin panel) by entering email & password so that I can access the application in admin mode with higher level of access.	10	High	M.V.V. Aparajithan
Sprint 4	Manipulation	USN-10	As an admin, I can able to manipulate data so that the customers will be displayed with correct data and have a good user experience.	10	High	M.Dineshkumar

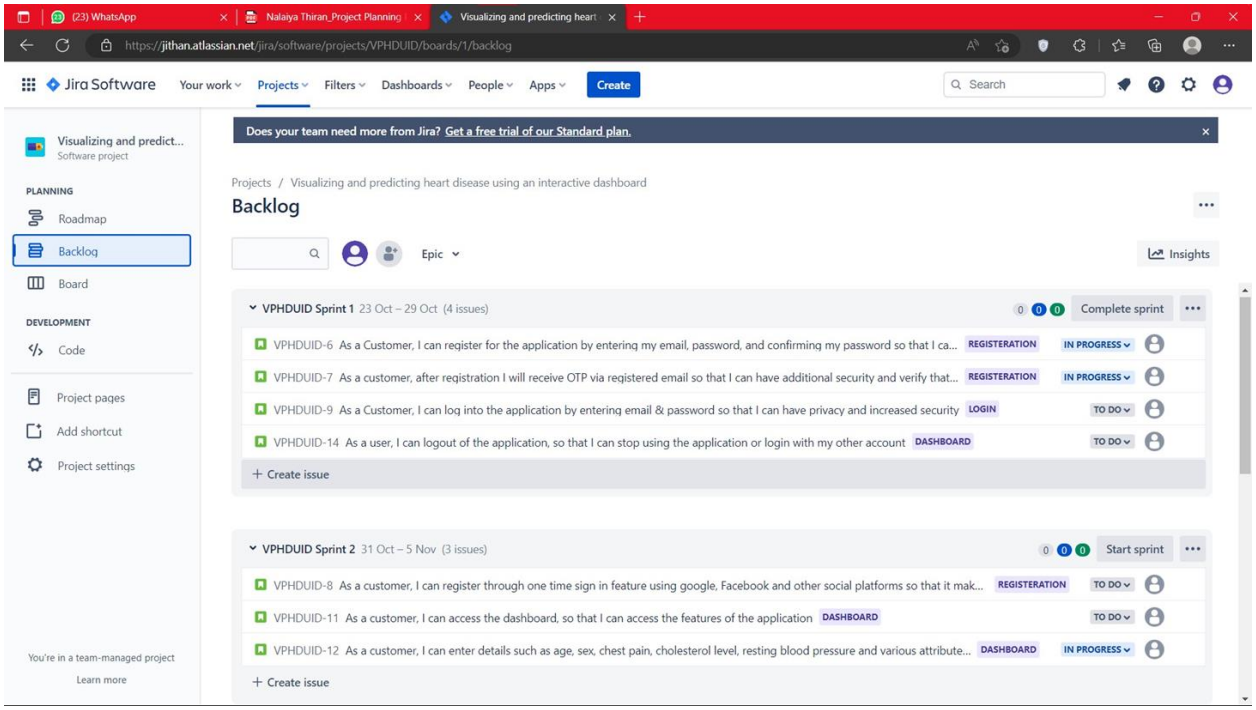
6.2 Sprint Delivery Schedule

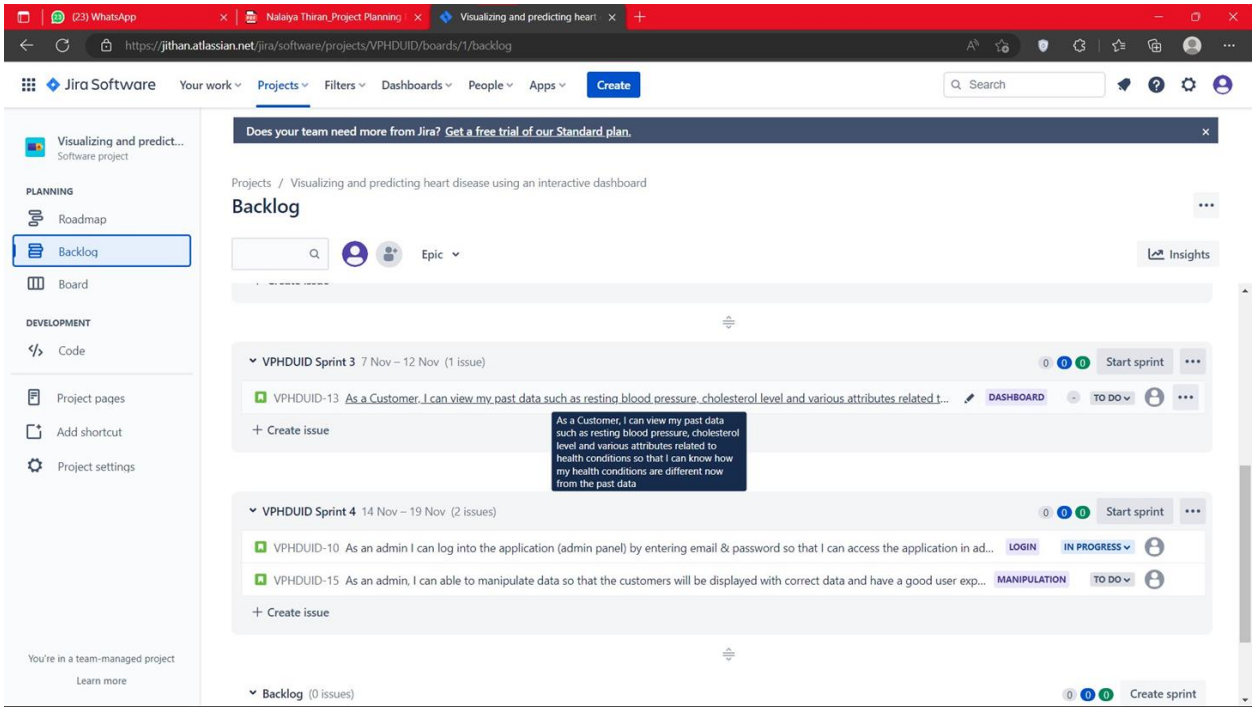
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed(as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022		
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	20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

6.3 Reports from JIRA




(23) WhatsApp
Nalaiya Thiran_Project Planning
Visualizing and predicting heart
https://jithan.atlassian.net/jira/software/projects/VPHDUID/boards/1/backlog
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Visualizing and predict...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / Visualizing and predicting heart disease using an interactive dashboard
Backlog
Epic
Insights
Backlog (10 issues)
Create sprint
VPHDUID-6 As a Customer, I can register for the application by entering my email, password, and confirming my password so that I ca... REGISTERATION IN PROGRESS
VPHDUID-7 As a customer, after registration I will receive OTP via registered email so that I can have additional security and verify that... REGISTERATION IN PROGRESS
VPHDUID-8 As a customer, I can register through one time sign in feature using google, Facebook and other social platforms so that it mak... REGISTERATION TO DO
VPHDUID-9 As a Customer, I can log into the application by entering email & password so that I can have privacy and increased security LOGIN TO DO
VPHDUID-10 As an admin I can log into the application (admin panel) by entering email & password so that I can access the application in ad... LOGIN IN PROGRESS
VPHDUID-11 As a customer, I can access the dashboard, so that I can access the features of the application DASHBOARD TO DO
VPHDUID-12 As a customer, I can enter details such as age, sex, chest pain, cholesterol level, resting blood pressure and various attribute... DASHBOARD IN PROGRESS
VPHDUID-13 As a Customer, I can view my past data such as resting blood pressure, cholesterol level and various attributes related to health c... DASHBOARD TO DO
VPHDUID-14 As a user, I can logout of the application, so that I can stop using the application or login with my other account DASHBOARD TO DO
VPHDUID-15 As an admin, I can able to manipulate data so that the customers will be displayed with correct data and have a good user exp... MANIPULATION TO DO
Create issue


(23) WhatsApp
Nalaiya Thiran_Project Planning
Visualizing and predicting heart
https://jithan.atlassian.net/jira/software/projects/VPHDUID/boards/1/backlog
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Visualizing and predict...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / Visualizing and predicting heart disease using an interactive dashboard
Backlog
Epic
Insights
VPHDUID Sprint 1 23 Oct – 29 Oct (4 issues)
Complete sprint
VPHDUID-6 As a Customer, I can register for the application by entering my email, password, and confirming my password so that I ca... REGISTERATION IN PROGRESS
VPHDUID-7 As a customer, after registration I will receive OTP via registered email so that I can have additional security and verify that... REGISTERATION IN PROGRESS
VPHDUID-9 As a Customer, I can log into the application by entering email & password so that I can have privacy and increased security LOGIN TO DO
VPHDUID-14 As a user, I can logout of the application, so that I can stop using the application or login with my other account DASHBOARD TO DO
Create issue
VPHDUID Sprint 2 31 Oct – 5 Nov (3 issues)
Start sprint
VPHDUID-8 As a customer, I can register through one time sign in feature using google, Facebook and other social platforms so that it mak... REGISTERATION TO DO
VPHDUID-11 As a customer, I can access the dashboard, so that I can access the features of the application DASHBOARD TO DO
VPHDUID-12 As a customer, I can enter details such as age, sex, chest pain, cholesterol level, resting blood pressure and various attribute... DASHBOARD IN PROGRESS
Create issue



7. CODING & SOLUTIONING

7.1 Home

This is the homepage of the Application. This is the first page of the application user lands when the user launches the Application.

```
<html>
 <head>
  <title>
   LifeCare
  </title>
  <link rel="stylesheet" type="text/css" href="{{ url_for('static', filename='css/home.css')}}">
  <style>
   body {
    background: linear-gradient(rgba(0, 0, 2, 0.7), rgba(1, 0, 0, 0)), url("../static/images/internet-heartbeat.gif");
    background-repeat: no-repeat;
    background-size: 100% 100%;
    overflow: hidden;
```

```
    }
    .bgcolor {
      background-color:#46866C;
      transition: all ease-in-out 300ms;
      width: 100%;
    }
    section img {
      position: absolute;
      top: 0px;

    }
  </style>
</head>
<body>
<div>
  <nav id="navbar" style="font-family: 'Open Sans', sans-serif">
 <ul><center>
  <a href="/" style="text-decoration: none;color: white;"><li>Home</li></a>
  <a href="/about" style="text-decoration: none;color: white;"><li>About</li></a>
  <a href="/original" style="text-decoration: none;color: white;"><li>Predict</li></a>
  {% if session["loggedin"] == True%}
    <a href="/logout" style="text-decoration: none;color: white;"><li>Logout</li></a>
  {% else %}
    <a href="/register" style="text-decoration: none;color: white;"><li>Login</li></a>
  {% endif %}
  <li class="slide"></li>
 </center>
 </ul>
</nav>
</div><br><br><br><br><br>
<section>
 <div class="title1"><img src="{{ url_for('static', filename='images/logo.png')}}"
style="width:200px; height:200px;">
 <div class="title"><br><span>Welcome</span>
```

```
 <span>  We are LifeCare.<a href="/about">Know about us</a><br><br>  To use our application.<a href="/login">Click Here</a></span>
</div></div>
</section>

 </body>
</html>
```

7.2 About

The About page of this web-app shows the functionality of the application it performs. Simple it describes whom we are and what we do in this application

```
<html>
 <head>
  <title>
   LifeCare
  </title>
  <link rel="stylesheet" type="text/css" href="{{ url_for('static', filename='css/home.css')}}">
  <link rel="stylesheet" type="text/css" href="{{ url_for('static', filename='css/main.css')}}">
  <style>
   body {
    background: linear-gradient(rgba(0, 0, 2, 0.7), rgba(1, 0, 0, 0)), url("../static/images/internet-heartbeat.gif");
    background-repeat: no-repeat;
    background-size: 100% 110%;
    overflow: hidden;
   }
   .bgcolor {
    background-color:#46866C;
    transition: all ease-in-out 300ms;
    width: 100%;
```

```
    }
    section img {
      position: absolute;
      top: 0px;

    }
  </style>
  <script>
    function changeBg()
    {
      let navbar= document.getElementById("navbar");
      let scrollbar= window.scrollY;
      if (scrollbar < 80) {
        navbar.classList.remove("bgcolor");
      }
      else {
        navbar.classList.add("bgcolor")
      }
    }
    window.addEventListener('scroll', changeBg);
  </script>
</head>
<body style="overflow: auto">
  <div>
    <nav id="navbar" style="font-family: 'Open Sans', sans-serif">
      <ul>
        <center>
          <a href="/" style="text-decoration: none;color: white;"><li>Home</li></a>
          <a href="/about" style="text-decoration: none;color: white;"><li>About</li></a>
          <a href="/original" style="text-decoration: none;color: white;"><li>Predict</li></a>
          {% if session["loggedin"] == True%}
            <a href="/logout" style="text-decoration: none;color: white;"><li>Logout</li></a>
```

```
            {% else %}
              <a href="/register" style="text-decoration: none;color: white;"><li>Login</li></a>
            {% endif %}
            <li class="slide"></li>
          </center>
        </ul>
      </nav>
    </div>
    <div class="about-content">
      <div style="width:600px;height: 64%;">
        <img class = "aboutus-icon" src="{{ url_for('static', filename='images/aboutustopic.png')}}">
        <h3>WHO WE ARE ?</h3>
        <h4 style="color: white">
        We are helping the health sector
        </h4>
        <p style="color: lightgray;line-height: 22px;font-size:16px">
          Among various life-threatening diseases, heart disease has garnered a great deal of attention in medical research. The diagnosis of heart disease is a challenging task, which can offer automated predictions about the heart condition of a patient so that further treatment can be made effective. Cardiovascular diseases have become a cause of concern in increasing the mortality rate. So in order to prevent these diseases we need a solid prediction system in place to effectively diagnose these diseases at a pretty faster rate and save many human lives. So in order to make a clear vision for patients who are really confused about their symptoms, our application would be useful for them to predict whether they are being diagnosed by the cardiovascular disease.
        </p>
      </div>
      <img class = "women-image" src="{{ url_for('static', filename='images/about.jpg')}}">
    </div>
</body>
</html>
```

7.3 Login and signup

This is the page where the user could either login or sign-up, if the user already has an account he/she could login using the appropriate credentials. Suppose if an incorrect username/password is provided then it throws an error to enter the correct username/password. If the user does not have account they are redirected to create an account using username and password.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Lifecare|Register</title>
  <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/home.css')}}">
  <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/register.css')}}">
</head>
<body>
  <div>
    <nav id="navbar" style="font-family: 'Open Sans', sans-serif">
      <ul>
        <center>
          <a href="/" style="text-decoration: none;color: white;"><li>Home</li></a>
          <a href="/about" style="text-decoration: none;color:
    white;"><li>About</li></a>
          <a href="/original" style="text-decoration: none;color:
    white;"><li>Predict</li></a>
          {% if "loggedin" in session %}
          <a href="/logout" style="text-decoration: none;color:
    white;"><li>Logout</li></a>
          {% else %}
          <a href="/register" style="text-decoration: none;color:
    white;"><li>Login</li></a>
```

```
            {% endif %}
            <li class="slide"></li>
          </center>
        </ul>
    </nav>
</div>
<div class = "wrapper">
<div class="container" id="container">
    <div class="form-container sign-up-container">
        <form action="/register" id = "registerForm" method="post">
            <h1>Create Account</h1>
            <input type="text" name = "name" placeholder="Name" required/>
            <input type="email" name = "email" placeholder="Email" required/>
            <input type="password" id = "password" name = "password" placeholder="Password" required/>
            <input type="password" id = "confirm_password" placeholder="Confirm Password" required/>
            <p style="position: absolute; top: 300px"><span hidden id = "error" style="color: red">password and confirm password doesn't match!<span><br><br><p>
            <button type = "submit" onclick="validation()">Sign Up</button>
        </form>
    </div>
    <div class="form-container sign-in-container">
        <form action="/login" method="post">
            <h1>Log in</h1>
            <input type="email" name = "email" placeholder="Email" required/>
            <input type="password" name = "password" placeholder="Password" required/>
            <a href="#">Forgot your password?</a>
            {% if loginError == True %}
              <h1 style="position: absolute; top: 350px;"><span style="color: red">Invalid Credentials !!<span></h1>
            {% endif %}
```

```
        <button type="submit">Sign In</button>
      </form>
    </div>
    <div class="overlay-container">
      <div class="overlay">
        <div class="overlay-panel overlay-left">
          <h1>Welcome Back!</h1>
          <p>To keep connected with us please login with your personal info</p>
          <button class="ghost" id="signIn">Sign In</button>
        </div>
        <div class="overlay-panel overlay-right">
          <h1>Hello, User!</h1>
          <p>Enter your personal details and start journey with us</p>
          <button class="ghost" id="signUp">Sign Up</button>
        </div>
      </div>
    </div>
  </div>
  </div>
  <script>
    const signUpButton = document.getElementById('signUp');
    const signInButton = document.getElementById('signIn');
    const container = document.getElementById('container');

    signUpButton.addEventListener('click', () => {
      container.classList.add("right-panel-active");
    });

    signInButton.addEventListener('click', () => {
      container.classList.remove("right-panel-active");
    });
    let form = document.querySelector("#registerForm");
    let validation = () => {
      console.log("hii");
```

```
        let password = document.getElementById("password");
        let confirm_password = document.getElementById("confirm_password");
        if(password.value != confirm_password.value) {
          document.querySelector("#error").removeAttribute("hidden");
          console.log("bee");
          event.preventDefault();
        }
        else{
          document.querySelector("#error").setAttribute("hidden", "hidden");
        }
      }
    </script>
</body>
</html>
```

7.4 Heart Disease Predictor

This feature is about predicting whether the patient is affected with cardiovascular disease or not. There are some entities which has to be filled by the users some of those are age,sex,bp level,cholestral etc., once the user filled these columns he is directed to the result page.

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <title>Heart Disease Prediction</title>
    <meta charset="utf-8">
    <link rel="stylesheet"
    href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css"
    integrity="sha384-
    MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPM
    O" crossorigin="anonymous">
    <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/Style.css')}}">
    <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/home.css')}}">
```

```
<style>
    body {
 background: linear-gradient(rgba(0, 0, 2, 0.7), rgba(1, 0, 0, 0)),
url("../static/images/prediction.gif");
 background-repeat: no-repeat;
 background-size: 100% 100%;
}

  footer a{
    color: #fff;
  }
  footer a:hover{
    color: #fff;
  }
  .centerdiv{
    height: 15vh;
    display: flex;
    justify-content: center;
    align-items: center;
  }
  .centerdiv a{
    height: 30px;
    width: 30px;
    background-color: #f5f6fa;
    border-radius: 50px;
    text-align: center;
    margin: 5px;
    line-height: 30px;
    box-shadow: 1px 4px 2px 2px #dcdde1;
    position: relative;
    overflow: hidden;
  }
  .centerdiv a i{
    transition: all 0.3s linear;
```

```
}
.centerdiv a:hover i{
  transform: scale(1.5);
  color: #f5f6fa;
}
.centerdiv a:before{
  content: "";
  width: 120%; height: 120%;
  position: absolute;
  top: 90%; left: -50%;
  background-color: #00a8ff;
  transform: rotate(60deg);
}

.centerdiv a:hover:before{
  animation: socialicons 0.8s 1;
  animation-fill-mode: forwards;
}
@keyframes socialicons {

  0%{ top: 90%; left: -50%;}
  50%{ top: -60%; left: -10%;}
  100%{ top: -10%; left: -10%}
}

.fa-facebook-f{
  color: #e84393;
}
.fa-instagram{
  color: #e84393;
}
.fa-github{
  color: #e84118;
}
```

```
    .fa-linkedin{
      color: #0097e6;
    }
    .fa-twitter{
      color: #0097e6;
    }
  </style>
</head>
<body>
  <div>
    <nav id="navbar" style="font-family: 'Open Sans', sans-serif">
      <ul>
        <center>
          <a href="/" style="text-decoration: none;color: white;"><li>Home</li></a>
          <a href="/about" style="text-decoration: none;color:
  white;"><li>About</li></a>
          <a href="/original" style="text-decoration: none;color:
  white;"><li>Predict</li></a>
          {% if session["loggedin"] == True%}
          <a href="/logout" style="text-decoration: none;color:
  white;"><li>Logout</li></a>
        {% else %}
          <a href="/register" style="text-decoration: none;color:
  white;"><li>Login</li></a>
        {% endif %}
          <li class="slide"></li>
        </center>
      </ul>
    </nav>
</div>
<button class = "button" style="top: 150px; left: 1000px;"><a style = "text-decoration:
  none; color: white" href = '{{url_for("pastdata")}}'>PAST DATA</a></button>
  <h1 style="position: relative; top: 200px">
    <div style ="text-align:center">
```

```
      <font color='white'>
        Heart Disease Prediction
      </font>
    </div>
  </h1>
  <br>
  <center>
  <button onclick = "visible()" class = "button">
    predict
  </button>
</center>
<!-- <button onclick = "visible();">&times;</button> -->
 <div class="wrapper animate">
  <span class = "close-button" onclick = "closer();">&times;</span>
  <center><h1 style="color: #DE7900; position: relative; top: 20px;">ENTER BELOW
  DETAILS</h1></center>
   <div class="container my-5">
    <div class="row">
      <div class="col-md-10 col-sm-6 mx-auto">
        <form class="" action="/predict" method="post">

          <div style="display: flex; justify-content: space-around;gap: 30px">
            <div class="form-group">
              <input type="number" name="age" id="age" class="form-control" required>
              <label for="age" class="ph-area">Enter Your Age</label>
            </div>

            <div class="form-group">
              <select class="form-control" name="sex" required="required">
                <option value="" selected>Select Gender</option>
                <option value="1">Male</option>
                <option value="0">Female</option>
              </select>
            </div>
```

```
      </div>
      <div style="display: flex; justify-content: space-around;gap: 30px">
       <div class="form-group">
        <select class="form-control chosenn" name="cp" required="required">
         <option value="" selected>Select Chest Pain Type(cp)</option>
         <option value="0">Typical Angina</option>
         <option value="1">Atypical Angina</option>
         <option value="2">Non Anginal Pain</option>
         <option value="3">Asymptomatic</option>
        </select>
       </div>

       <div class="form-group">
        <input type="number" name="trestbps" id="trestbps" class="form-control"
required>
        <label for="trestbps" class="ph-area">Enter Resting Blood Pressure (mm
Hg)(trestbps)</label>
       </div>
      </div>
      <div style="display: flex; justify-content: space-around;gap: 30px">
       <div class="form-group">
        <input type="number" name="chol" id="chol" class="form-control" required>
        <label for="chol" class="ph-area">Enter Serum Cholestoral
(mg/dl)(chol)</label>
       </div>

       <div class="form-group">
        <select class="form-control" name="fbs" required="required">
         <option value="" selected>Fasting Blood Sugar > 120 (mg/dl)(fbs)</option>
         <option value="1">Yes</option>
         <option value="0">No</option>
        </select>
       </div>
       </div>
```

```
        <div style="display: flex; justify-content: space-around;gap: 30px">
        <div class="form-group">
         <select class="form-control chosenn" name="restecg" required="required">
          <option value="" selected>Rresting Electrocardiographic Results(restecg)</option>
          <option value="0">Normal</option>
          <option value="1">Abnormal</option>
          <option value="2">Probable</option>
         </select>
        </div>

        <div class="form-group">
         <input type="number" name="thalach" id="thalach" class="form-control" required>
         <label for="thalach" class="ph-area">Enter Maximum Heart Rate Achieved (thalach)</label>
        </div>
        </div>
        <div style="display: flex; justify-content: space-around;gap: 30px">
        <div class="form-group">
         <select class="form-control" name="exang" required="required">
          <option value="" selected>Select Exercise Induced Angina (exang)</option>
          <option value="1">Yes</option>
          <option value="0">No</option>
         </select>
        </div>

        <div class="form-group">
         <input type="text" name="oldpeak" id="oldpeak" class="form-control" required>
         <label for="oldpeak" class="ph-area">Enter Your Oldpeak(oldpeak)</label>
        </div>
        </div>
        <div style="display: flex; justify-content: space-around;gap: 30px">
```

```
<div class="form-group">
 <select class="form-control chosenn" name="slope" required="required">
  <option value="" selected>Select Peak Exercise ST Segment (Slope)</option>
  <option value="0">Upsloping</option>
  <option value="1">Flat</option>
  <option value="2">Downsloping</option>
 </select>
</div>

<div class="form-group">
 <select class="form-control chosenn" name="ca" required="required">
  <option value="" selected>Number of Major Vessels (ca)</option>
  <option value="0">Zero</option>
  <option value="1">One</option>
  <option value="2">Two</option>
  <option value="3">Three</option>
  <option value="4">Four</option>
 </select>
</div>
</div>
<center>
<div class="form-group">
 <select class="form-control chosenn" name="thal" required="required">
  <option value="" selected>Select Thal Type (thal)</option>
  <option value="0">Normal</option>
  <option value="1">Fixed</option>
  <option value="2">Defect</option>
  <option value="3">Reversable</option>
 </select>
</div>
</center>
<div style="display: flex; justify-content: space-around;gap: 40px">
<div class="form-group">
<input type="submit" class="btn btn-primary" value="Submit">
```

```
        <input type="reset" class="btn btn-danger" value="Reset">
        </div>
        </div>
     </form>
     </div>
    </div>
  </div>
</div>
<script>
  let visible = () => {
    console.log(1);
    let form = document.querySelector(".wrapper");
    form.style.visibility = "visible";
    // form.style.display = "block";
  }
  let closer = () => {
    console.log("bee");
    let form = document.querySelector(".wrapper");
    form.style.visibility = "hidden";
    // form.style.display = "none";
  }
</script>
<script src="https://code.jquery.com/jquery-3.3.1.slim.min.js"
integrity="sha384-
 q8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo"
 crossorigin="anonymous"></script>
<script
 src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js"
integrity="sha384-
 ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIPm49"
 crossorigin="anonymous"></script>
<script
 src="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/js/bootstrap.min.js"
```

```
  integrity="sha384-
   ChfqqxuZUCnJSK3+MXmPNIyE6ZbWh2IMqE241rYiqJxyMiZ6OW/JmZQ5stwEULTy"
   crossorigin="anonymous"></script>
 </body>
</html>
```

7.5 Heart Disease Predicted Result

This is the page where the user is redirected once they have filled with the entities. Here the result is shown to the users whether they are being affected by cardiovascular disease or not.

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
 <head>
   <title>Heart Disease Prediction</title>
   <meta charset="utf-8">
   <link rel="stylesheet"
   href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css"
   integrity="sha384-
   MCw98/SFnGE8fJT3GXwEOngsV7Zt27NXFoaoApmYm81iuXoPkFOJwJ8ERdknLPM
   O" crossorigin="anonymous">
   <link rel="stylesheet" type="text/css" href="/css/global.css">
   <link rel="stylesheet" type="text/css" href="{{ url_for('static',
   filename='css/Style.css')}}">

   <style>
     body{
      display: flex;
      background: linear-gradient(rgba(0, 0, 2, 0.9), rgba(1, 0, 0, 0.5)),
   url("../static/images/predictor.jpg");
      background-repeat: no-repeat;
      /* background-size: 100% 110%; */
      height: 100vh;
      overflow: hidden;
```

```
 align-items: center;
 justify-content: center;
 flex-direction: column;
}
footer a{
  color: #fff;
}
footer a:hover{
  color: #fff;
}
.centerdiv{
  height: 15vh;
  display: flex;
  justify-content: center;
  align-items: center;
}
.centerdiv a{
  height: 30px;
  width: 30px;
  background-color: #f5f6fa;
  border-radius: 50px;
  text-align: center;
  margin: 5px;
  line-height: 30px;
  box-shadow: 1px 4px 2px 2px #dcdde1;
  position: relative;
  overflow: hidden;
}
.centerdiv a i{
  transition: all 0.3s linear;
}
.centerdiv a:hover i{
  transform: scale(1.5);
  color: #f5f6fa;
```

```
}
.centerdiv a:before{
  content: "";
  width: 120%; height: 120%;
  position: absolute;
  top: 90%; left: -50%;
  background-color: #00a8ff;
  transform: rotate(60deg);
}

.centerdiv a:hover:before{
  animation: socialicons 0.8s 1;
  animation-fill-mode: forwards;
}
@keyframes socialicons {

  0%{ top: 90%; left: -50%;}
  50%{ top: -60%; left: -10%;}
  100%{ top: -10%; left: -10%}
}

.fa-facebook-f{
  color: #e84393;
}
.fa-instagram{
  color: #e84393;
}
.fa-github{
  color: #e84118;
}
.fa-linkedin{
  color: #0097e6;
}
.fa-twitter{
```

```
        color: #0097e6;
       }
    </style>

 </head>

<body>



<h1>
 <div style ="text-align:center">
  <font color='white'>
   Heart Disease Prediction
  </font>
 </div>
</h1>
<br>


<!-- <section id="facilities"> -->
 <div class="container">
  <div class="card" style= "max-width: 500px; margin:0 auto;">
   <div class="card-body">
  <div class="title">
   <h3>
    <font color='Black'>Our model predict you are </font>
   </h3>
   <font color='white'>
    <h1>
     <font color="blue">{{ prediction}}</font>
    </h1>
   </font>
   <h3>
```

```
      <font color='Black'>by Heart Disease</font>
     </h3>
    </div>
   </div>
   </div>
   </div>
 <!-- </section> -->


<script src="https://code.jquery.com/jquery-3.3.1.slim.min.js"
integrity="sha384-
    q8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo"
    crossorigin="anonymous"></script>
<script
    src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.3/umd/popper.min.js"
integrity="sha384-
    ZMP7rVo3mIykV+2+9J3UJ46jBk0WLaUAdn689aCwoqbBJiSnjAK/l8WvCWPIPm49"
    crossorigin="anonymous"></script>
<script
    src="https://stackpath.bootstrapcdn.com/bootstrap/4.1.3/js/bootstrap.min.js"
integrity="sha384-
    ChfqqxuZUCnJSK3+MXmPNIyE6ZbWh2IMqE241rYiqJxyMiZ6OW/JmZQ5stwEULTy"
    crossorigin="anonymous"></script>
</body>
</html>
```

7.6 Patient history

This page shows all the records of the user once they have used our web-app. Like it would list all the patient record history details.

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

```
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Document</title>
  <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/home.css')}}">
  <link rel="stylesheet" type="text/css" href="{{ url_for('static',
    filename='css/main.css')}}">
</head>
<body class = "pastdata">
  <div>
    <nav id="navbar" style="font-family: 'Open Sans', sans-serif; background:
    transparent;">
     <ul>
       <center>
         <a href="/" style="text-decoration: none;color: white;"><li>Home</li></a>
         <a href="/about" style="text-decoration: none;color:
    white;"><li>About</li></a>
         <a href="/original" style="text-decoration: none;color:
    white;"><li>Predict</li></a>
         {% if session["loggedin"] == True%}
         <a href="/logout" style="text-decoration: none;color:
    white;"><li>Logout</li></a>
         {% else %}
         <a href="/register" style="text-decoration: none;color:
    white;"><li>Login</li></a>
         {% endif %}
         <li class="slide"></li>
       </center>
     </ul>
    </nav>
  </div>
  <div class="table-content">
    <table>
```

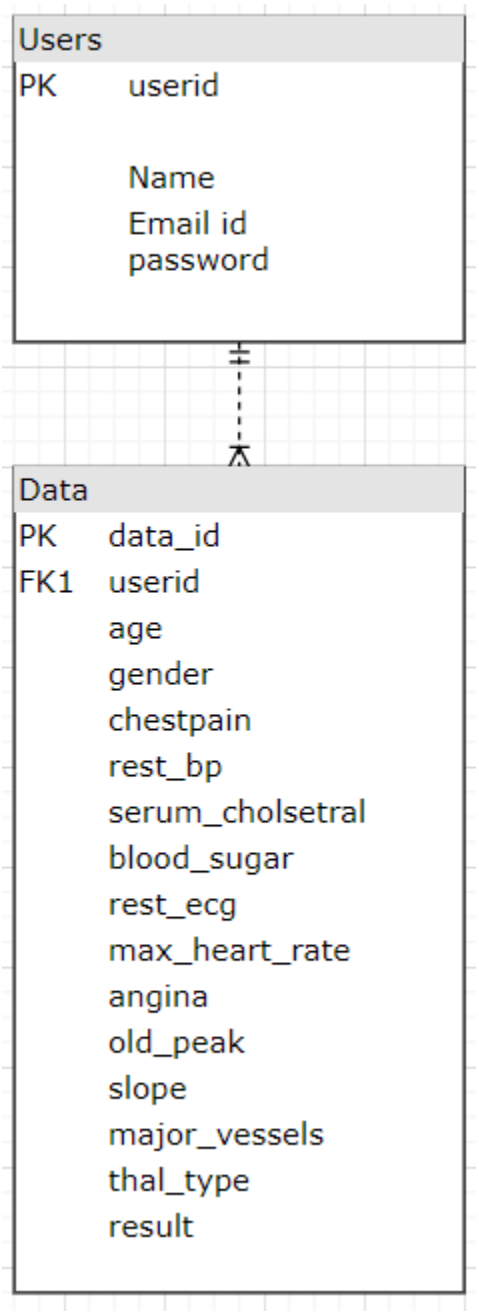
```
        <tr>
          <th>
            AGE
          </th>
          <th>
            GENDER
          </th>
          <th>
            CHEST PAIN TYPE
          </th>
          <th>
            RESTING BP
          </th>
          <th>
            SERUM CHOLESTROL
          </th>
          <th>
            FASTING BLOOD SUGAR
          </th>
          <th>
            REST ECG
          </th>
          <th>
            MAX HEART RATE
          </th>
          <th>
            INDUCED AGINA
          </th>
          <th>
            OLD PEAK
          </th>
          <th>
            PEAK ST
          </th>
```

```
            <th>
              NO OF MAJOR VESSELS
            </th>
            <th>
              RESULT
            </th>
          </tr>
          {% for data in result %}
          <tr>
            {% if data["gender"] == 1 %}
              <td>Male</td>
            {% else %}
              <td>Female</td>
            {% endif %}

            {% if data["chest_pain"] == 0 %}
              <td>Typical Angina</td>
            {% elif data["chest_pain"] == 1 %}
              <td>Atypical Angina</td>
            {% elif data["chest_pain"] == 2 %}
              <td>non anginal pain</td>
            {% else %}
              <td>Asymptomatic</td>
            {% endif %}

            <td>{{data["rest_bp"]}}</td>

            <td>{{data["serum_cholestrol"]}}</td>

            {% if data["blood_sugar"] == 1 %}
              <td>Yes</td>
            {% else %}
              <td>No</td>
            {% endif %}
```

```
{% if data["rest_ecg"] == 0 %}
<td>Normal</td>
{% elif data["rest_ecg"] == 1 %}
   <td>Abnormal</td>
{% else %}
   <td>Probable</td>
{% endif %}

<td>{{data["max_heart_rate"]}}</td>

{% if data["angina"] == 1 %}
   <td>Yes</td>
{% else %}
   <td>No</td>
{% endif %}

<td>{{data["old_peak"]}}</td>

{% if data["slope"] == 0 %}
<td>Unsloping</td>
{% elif data["slope"] == 1 %}
   <td>Flat</td>
{% else %}
   <td>Downsloping</td>
{% endif %}

<td>{{data["major_vessels"]}}</td>

{% if data["thal_type"] == 0 %}
<td>Normal</td>
{% elif data["thal_type"] == 1 %}
   <td>Fixed</td>
{% elif data["thal_type"] == 2 %}
```

```
            <td>Defect</td>
          {% elif data["thal_type"] == 3 %}
            <td>Reversable</td>
          {% endif %}

          <td>{{data["result"]}}</td>
        </tr>
        {% endfor %}
    </table>
  </div>
</body>
</html>
```

7.7 Database schema



8. TESTING

8.1 Test Cases

- **LoginPage_TC_OO1 :** User is able to view the login popup after clicking on the login button on home page
- **LoginPage_TC_OO2:** Verify the UI elements in Login/Signup popup
- **LoginPage_TC_OO3:** Verify user is able to log into application with Valid credentials
- **LoginPage_TC_OO4 , LoginPage_TC_OO5 , LoginPage_TC_OO6:** Verify user is able to log into application with InValid credentials
- **Signup_TC_001:** Verify the UI elements in Sign Up page
- **Signup_TC_002:** Verify is user able to register himself as a new user using valid credentials
- **Signup_TC_003:** Verify if the user is not able to register himself as new user using invalid credentials
- **About_TC_001:** Verify all the elements of the page are in perfect position and there no syntactical errors
- **Predict_tc_001:** Verify whether all the UI elements required for predicting process are in place
- **Predict_tc_002:** Verify whether all the UI fields are accessible by the user
- **Predict_TC_003:** Verify whether the user is able to predict his health condition using the predict feature
- **Predict_TC_004:** Verify how the model performs with insufficient data
- **Past_TC_001:** Verify the past data table is well placed and well oriented

8.2 User Acceptance Testing

Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Visualizing and predicting heart disease using an interactive dashboard project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	12	3	1	4	20
Duplicate	1	0	3	0	4
External	1	5	0	0	6
Fixed	10	3	5	19	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	3	2	1	6
Totals	24	14	13	25	76

Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested

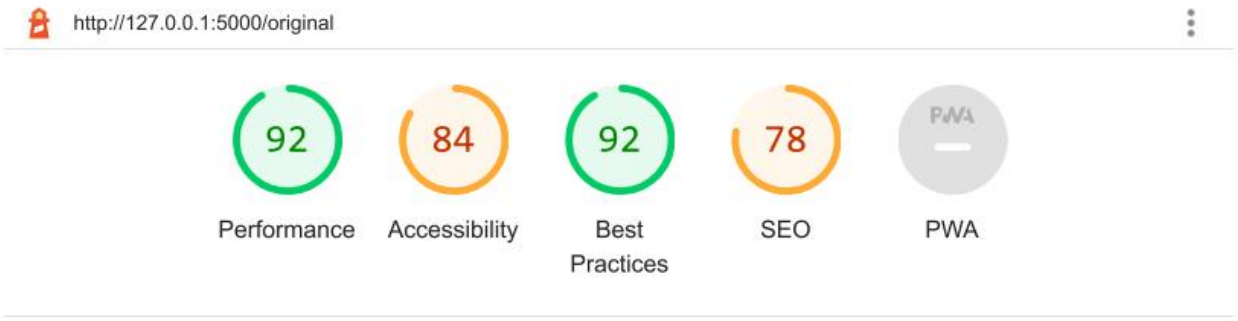
Section	Total Cases	Not Tested	Fail	Pass
Dashboard	**17**	**0**	**0**	**17**
Client Application	**31**	**0**	**0**	**31**
Security	**6**	**0**	**0**	**6**
Predictive model	**15**	**0**	**0**	**15**
Visualizations	**19**	**0**	**0**	**19**
Design and UI	**4**	**0**	**0**	**4**
Version Control	**1**	**0**	**0**	**1**

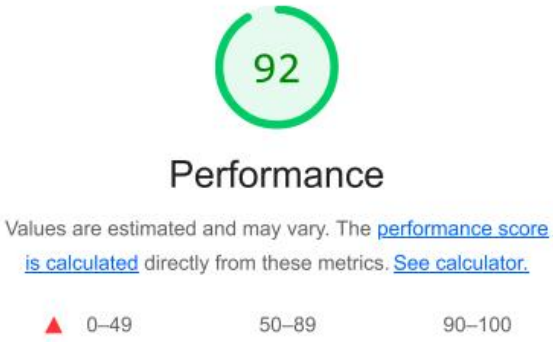
9. RESULTS

9.1 Performance Metrics

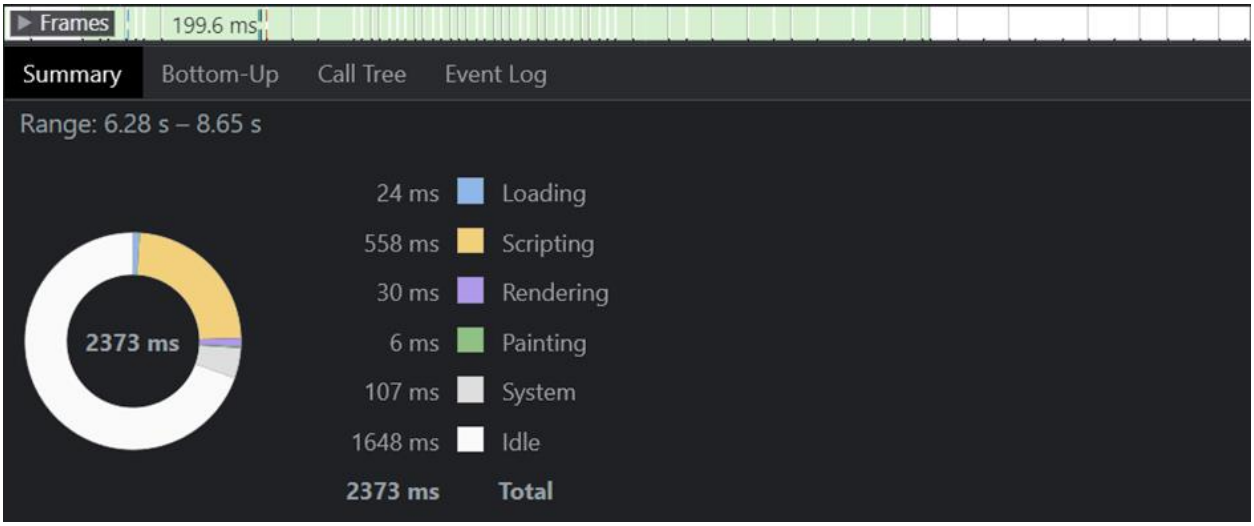
We have measured the performance of our application using Google lighthouse. This tool is used to measure the performance of the designed webpage. The lighthouse results are posted below. Our predictive model using SVM gives out an accuracy of 89%, which is pretty good for any predictive model. We have also attached our applications data responsiveness metrics and database metrics below.

❖ Performance and other metrics

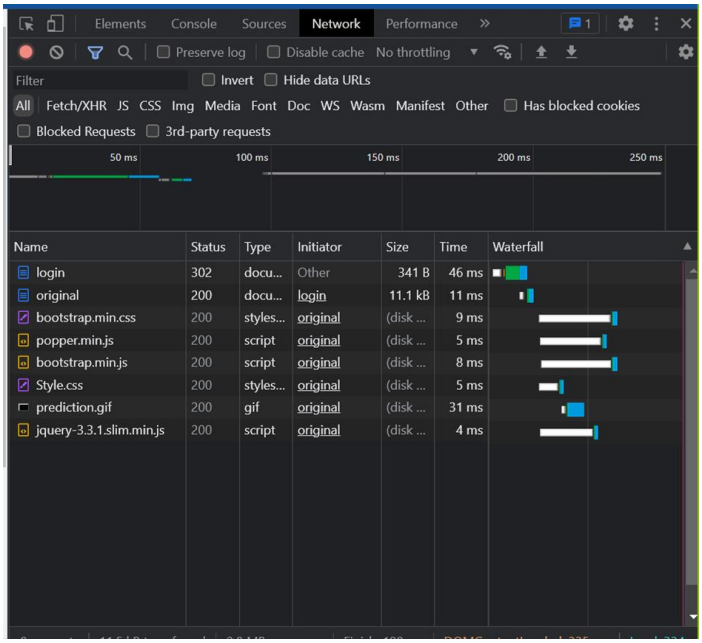




❖ Data responsiveness

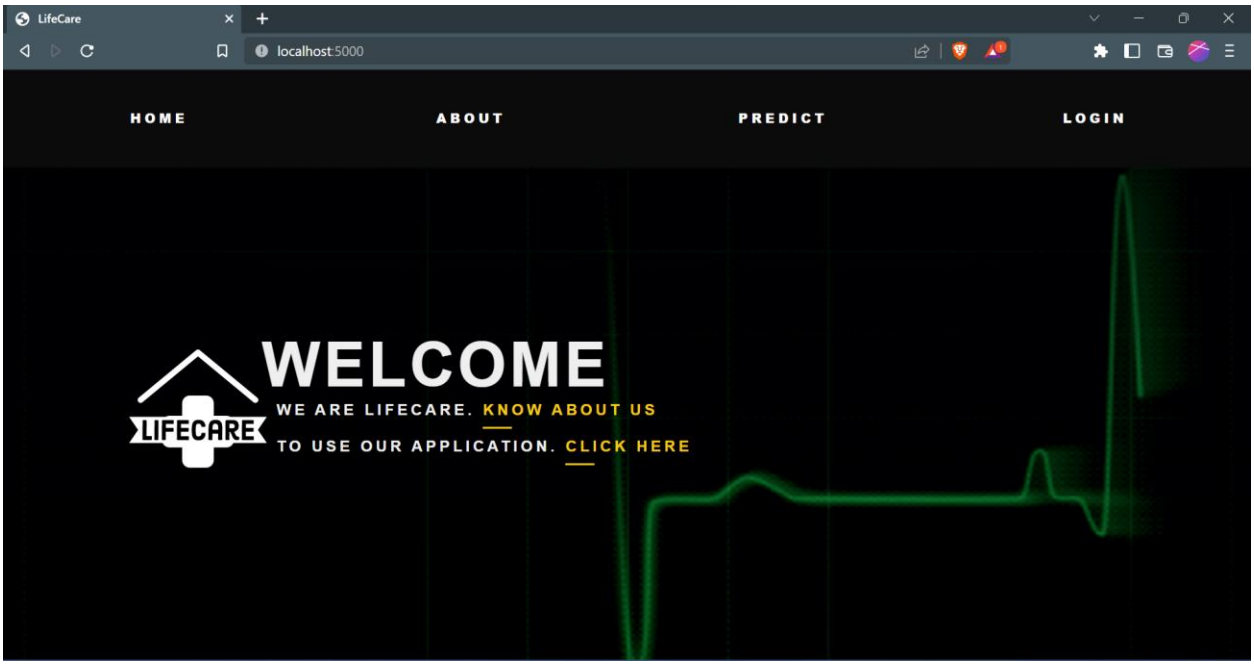


❖ Amount Data to Rendered (DB2 Metrics)



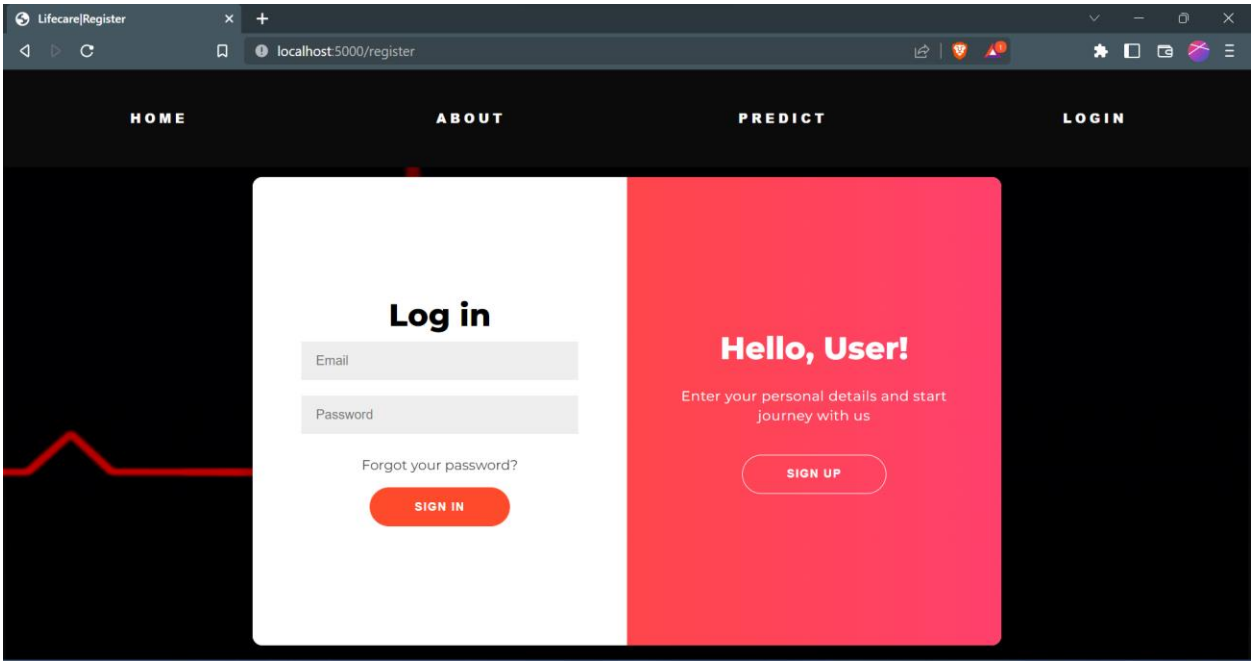
❖ Effective user story

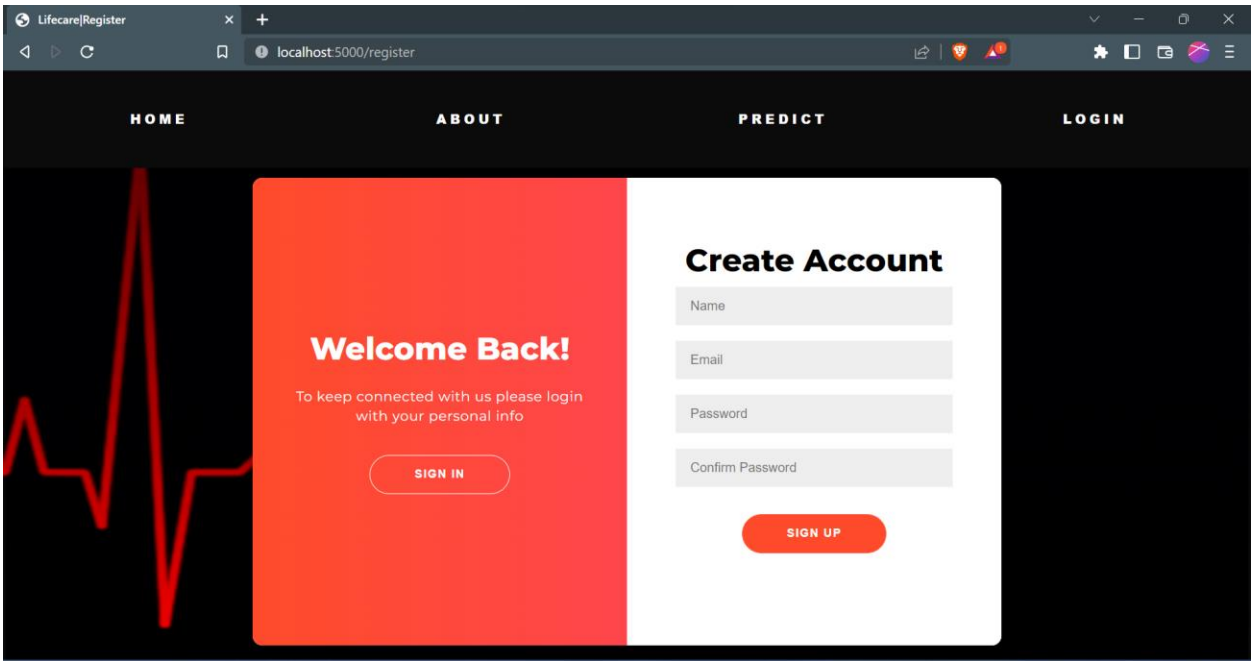
Scenario 1



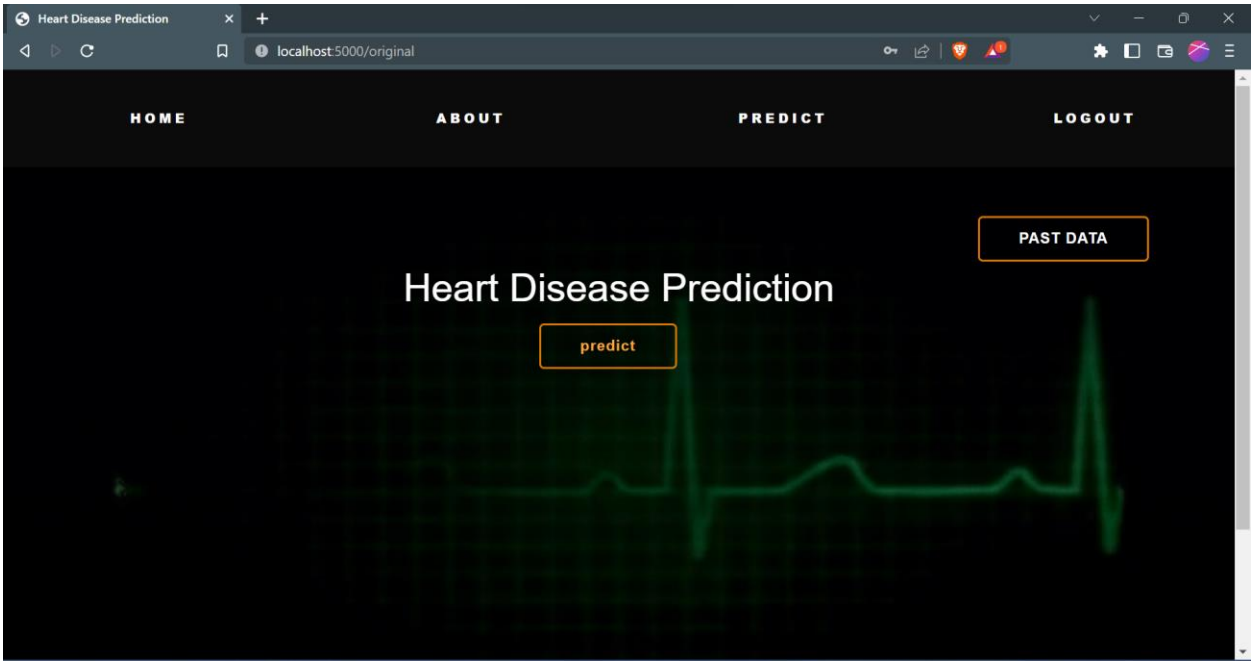
Scenario 2

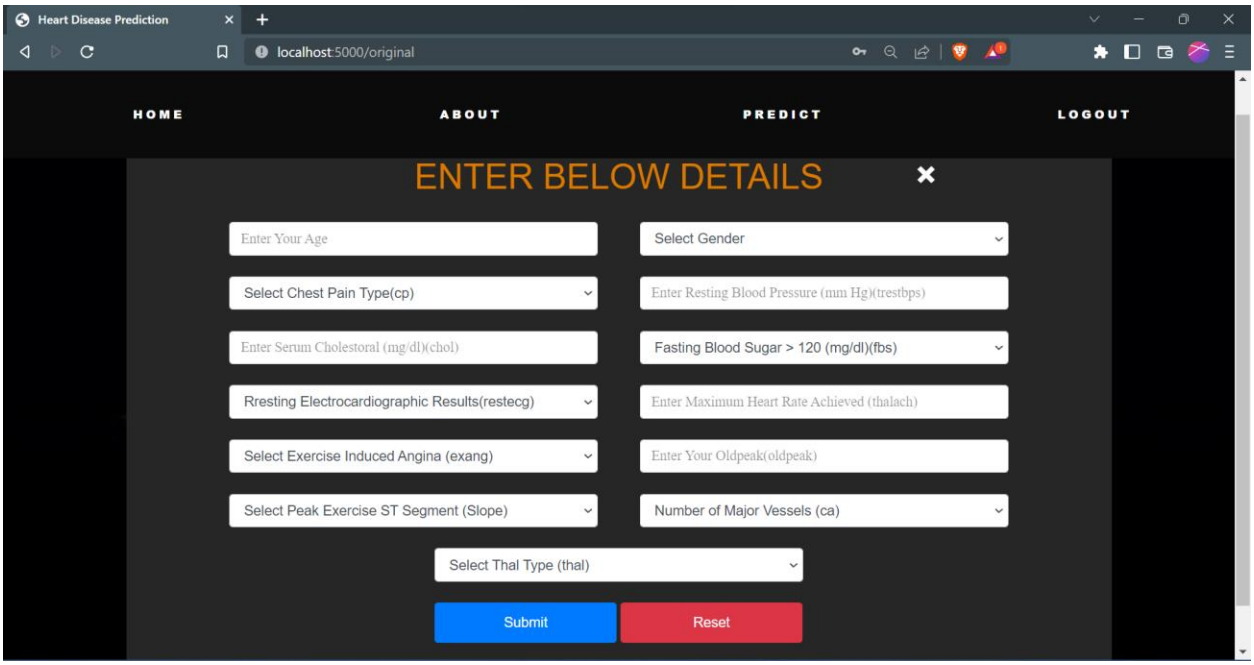
Scenario 3



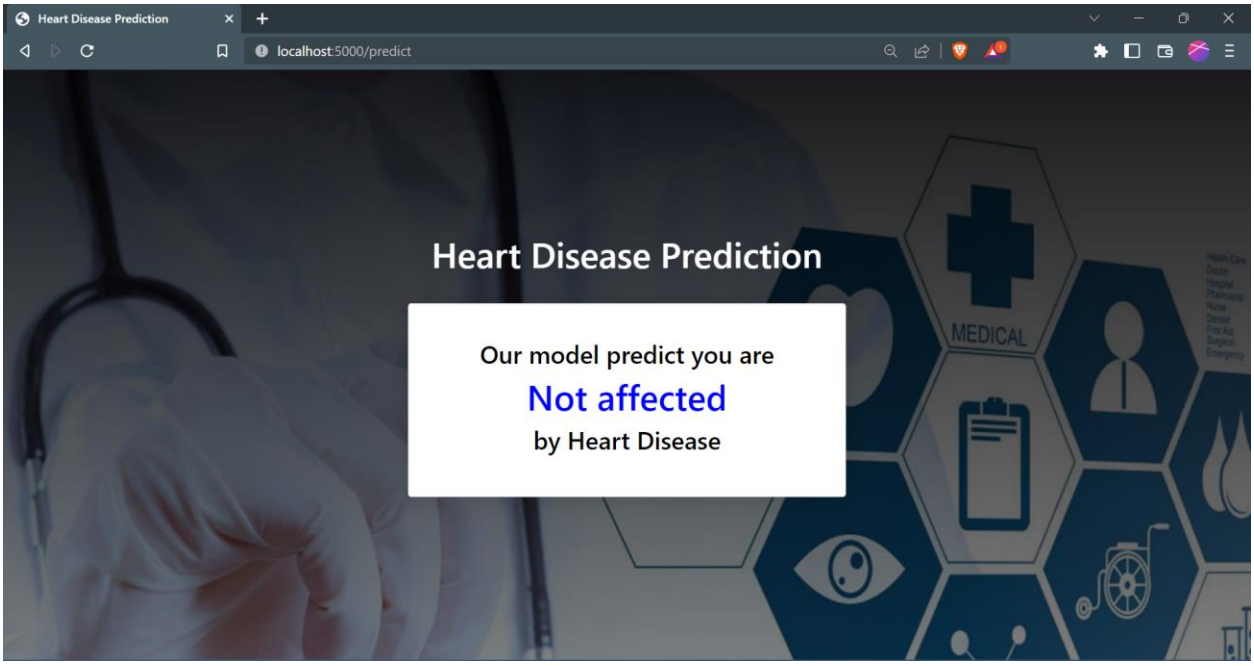

Lifecare|Register
localhost:5000/register
HOME
ABOUT
PREDICT
LOGIN
Welcome Back!
To keep connected with us please login with your personal info
SIGN IN
Create Account
Name
Email
Password
Confirm Password
SIGN UP

Scenario 4

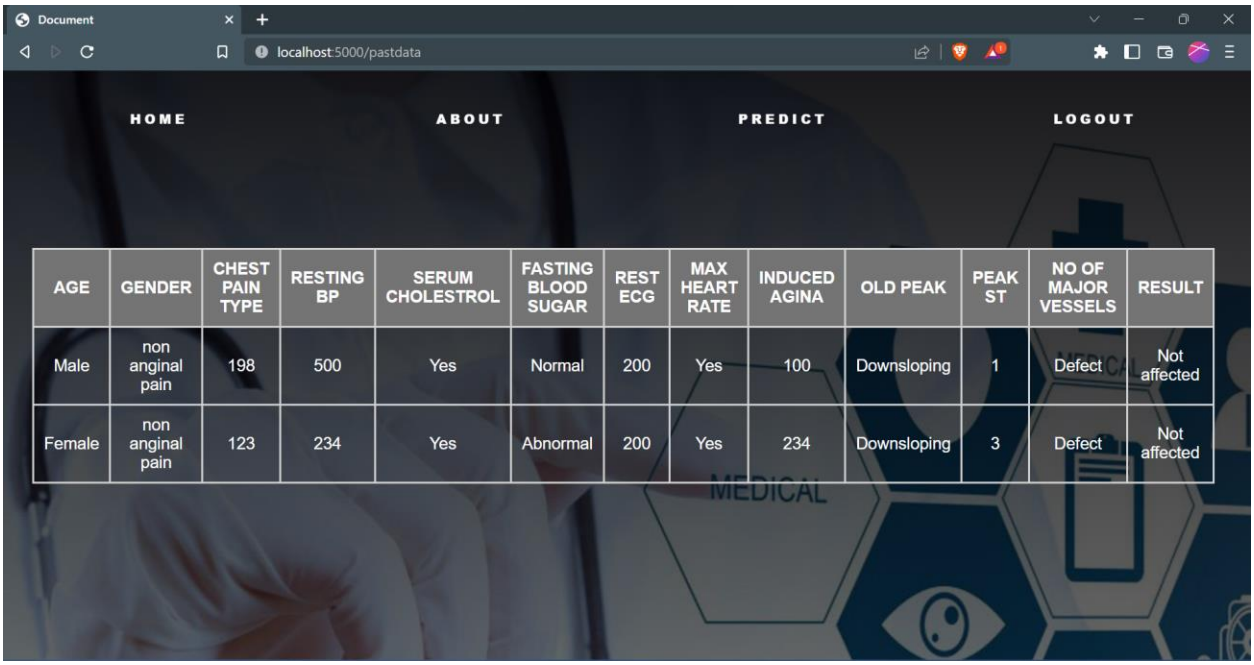

Heart Disease Prediction
localhost:5000/original
HOME
ABOUT
PREDICT
LOGOUT
PAST DATA
Heart Disease Prediction
predict



Scenario 5



Scenario 6



10. ADVANTAGES AND DISADVANTAGES

Advantages

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.There are quite lots of advantages for predicting heart disease prior some of those are Reducing costs on appointment no show and readmission penalties, Increasing patient engagement and outreach.basically Machine learning in healthcare is used to draw insights from large medical data sets to enhance clinicians' decision-making, improve patient outcomes, automate healthcare professionals' daily workflows, accelerate medical research, and enhance operational efficiency.

Disadvantages

There are few disadvantages in predicting heart disease using machine learning and data analytics like sometimes Prediction of cardiovascular disease results is not accurate, Data mining techniques does not help to provide effective decision making, Cannot handle enormous datasets for patient records.

11. CONCLUSION

We can conclude from this project that our website will be more helpful to the underprivileged sector of the society who couldn't afford modern medications and fancy hospitals. We hope this project will produce results that actually help people in a financial way and bring peace and awareness among the general public.

12. FUTURE SCOPE

The future of this project is the most important part of all. We plan on developing this website in such a manner that it can identify different sorts of chest pain and suggest medications accordingly. Although these developments sound critical and risky, if they came into existence it would be highly helpful for people. We can also integrate expert opinions while suggesting medicines which would make the process more efficient and reliable. We were also planning on predicting using scan images of a patient's heart instead of relying purely on numerical medical data, as graphical data would give much clarity about the current condition of the patient.

13. APPENDIX

SourceCode:https://github.com/IBM-EPBL/IBM-Project-34535-1660237585/tree/main/Final%20deliverables

Github: https://github.com/IBM-EPBL/IBM-Project-34535-1660237585

ProjectDemo:https://drive.google.com/file/d/1gJGsk-Arx4rNoKssHTqZ1RhrOC8l0sQm/view?usp=sharing