Visualizing and Predicting Heart Diseases with an Interactive DashBoard

IBM PROJECT REPORT

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Submitted by

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Project Report

Team ID	***PNT2022TMID31851***
Project Name	***Visualizing and Predicting Heart Diseases with an Interactive Dashboard***

1. INTRODUCTION

1.1 Project Overview

Heart stroke and vascular disease are the major cause of disability and premature death. Chest pain is the key to recognize the heart disease. In this work, the heart diseases are predicted by considering major factors with four types of chest pain. K-means clustering is one of the simplest and popular unsupervised machine learning algorithms. Here the datasets are clustered and based upon the clusters the happening of chest pain is predicted. The role of exploratory data using tableau provided a visual appealing and accurate clustering experience.

1.2 Purposes

Predictive research is chiefly concerned with **forecasting (predicting) outcomes, consequences, costs, or effects**. This type of research tries to extrapolate from the analysis of existing phenomena, policies, or other entities in order to predict something that has not been tried, tested, or proposed before.It is better to predict by using data analytics.

2. LITERATURE SURVEY

2.1 Related work

Many researchers are developing new approaches and techniques for using Big Data machine learning algorithms to prevent health issues at the very early stages of diseases. Spark processes large quantities of data very easily because it uses the structure of parallel computing to handle the data streams from big data sources. Researchers are using the power of analytics, pattern recognition, neurocomputing, data processing, machine learning, deep learning, artificial intelligence (AI), databases, knowledge discovery, and exploration of information to achieve the meaning of the data and make it understandable.

2.2 References

[1] V. Manikantan & S.Latha,"Predicting the Analysis of Heart Disease Symptoms Using Medicinal Data Mining Methods", International Journal on Advanced Computer Theory and Engineering, Volume-2, Issue-2, pp.5-10, 2013.

[2] Dr.A.V.Senthil Kumar, "Heart Disease Prediction Using Data Mining preprocessing and Hierarchical Clustering", International Journal of Advanced Trends in Computer Science and Engineering, Volume-4, No.6, pp.07-18, 2015.

[3] Uma.K, M.Hanumathappa, "Heart Disease Prediction Using Classification Techniques with Feature Selection Method", Adarsh Journal of Information Technology, Volume-5, Issue-2, pp.22-29, 2016 .

[4] Himanshu Sharma, M.A.Rizvi, "Prediction of Heart Disease using Machine Learning Algorithms:A Survey",International Journal on Recent and Innovation Trends in Computing and Communication,Volume5,Issue-8,pp.99-104, 2017.

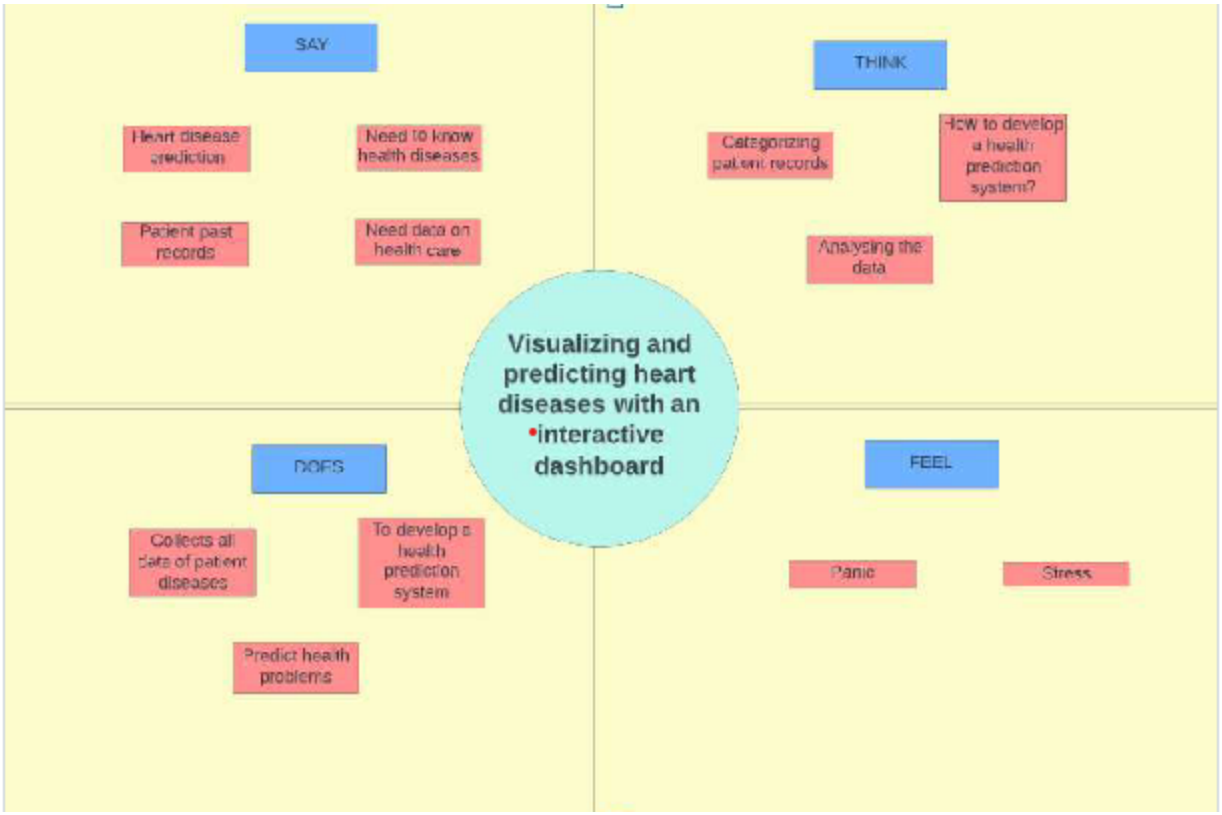
[5] S.Suguna, Sakthi Sakunthala.N ,S.Sanjana, S.S.Sanjhana, "A Survey on Prediction of Heart Disease using Big data Algorithms", International Journal of Advanced Research in Computer Engineering & Technology,Volume-6,Issue-3,pp.371-378,2017.

[6] A. L. Bui, T. B. Horwich, and G. C. Fonarow, "Epidemiology and risk profile of heart failure," Nature Reviews Cardiology, vol. 8, no. 1, pp. 30–41, 2011.

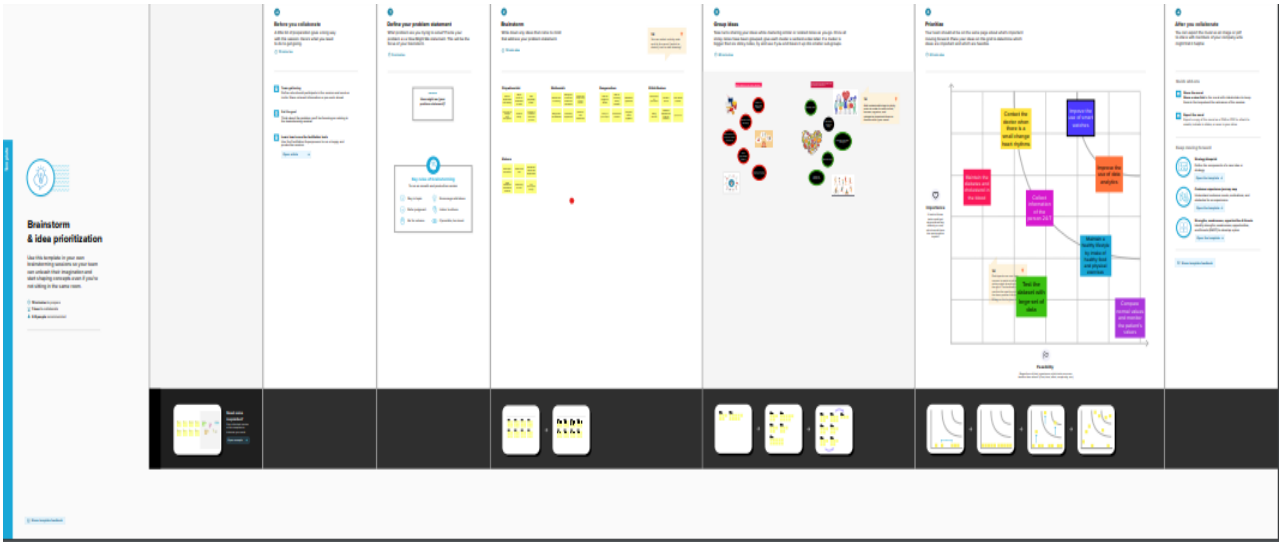
[7] J.Mourão-Miranda,A.L.W.Bokde,C.Born,H.Hampel,and M. Stetter, "Classifying brain states and determining the discriminatingactivationpatterns:supportvectormachineon functionalMRIdata,"NeuroImage,vol.28,no.4,pp.980–995, 2005.

3. Proposed Solution

3.1 Empathy Map



3.2 Ideation & Brainstorming

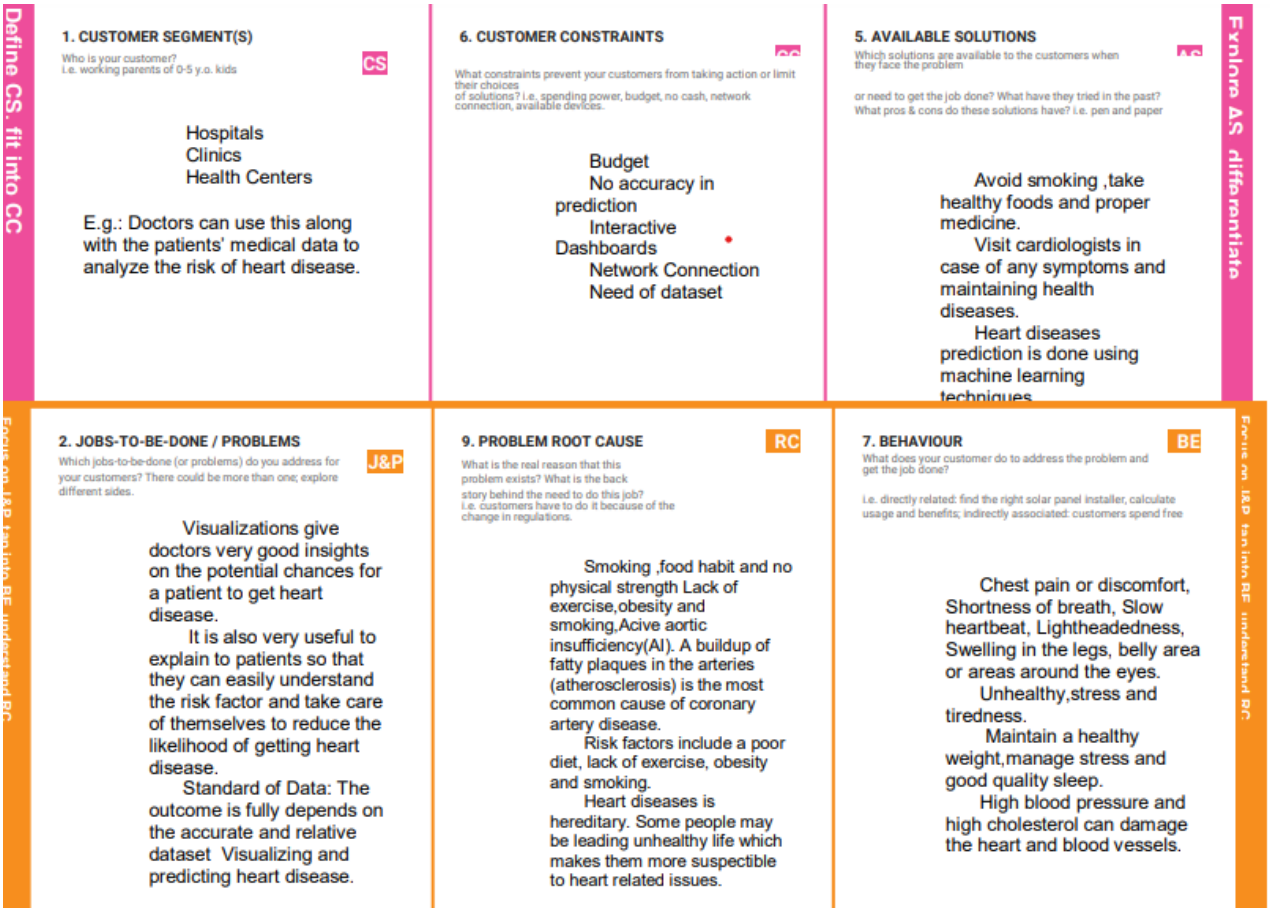


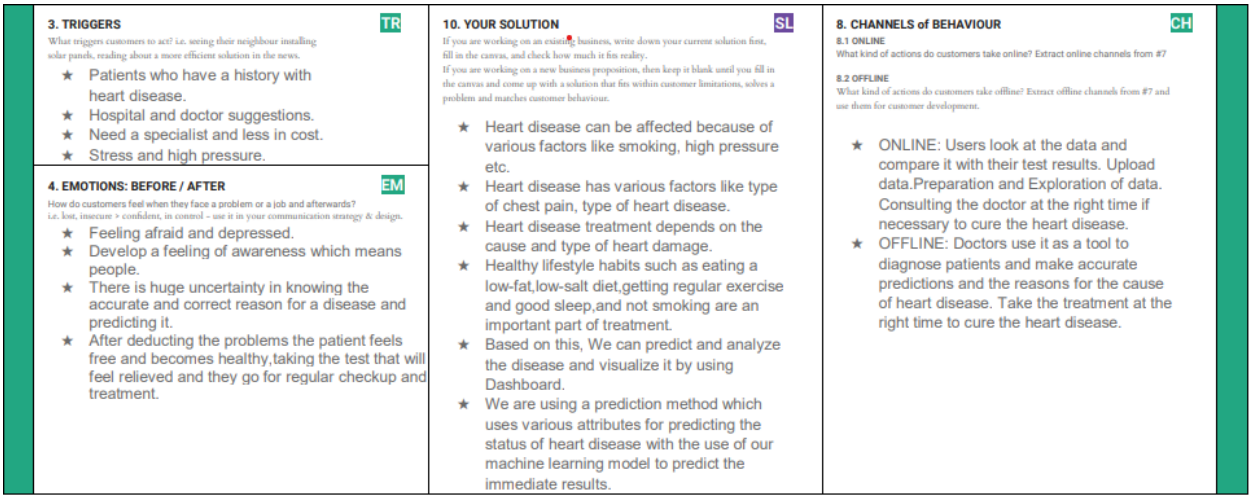
3.3 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	High blood pressure is one of the major causes of heart failure as it damages arteries. Blood pressure combined with diabetes can increase the risk further. Blood pressure increases the heart rate which results in heart failure. The symptoms of heart disease include dizziness, nausea, chest pain and pain at the shoulder of left hand. The change in lifestyle and irregular sleep is also a major reason for heart failure.
2.	Idea / Solution description	The use of data analytics and data visualization can be used to predict the factors causing heart diseases. The analysis can be carried out in large stream to find the risk and monitor the person in risk. The use of data analytics in healthcare improves preventive measures at the initial stage itself
3.	Novelty / Uniqueness	The person can be identified at initial stage and can be cured with a small expense. Patients who are at risk can be identified and handled with preventive measures. The data is compared to the current functions of the heart and if any changes is found, it is treated immediately.
4.	Social Impact / Customer Satisfaction	Better diagnosis is given as per the data of the person. Patient is saved from the risk of failure of heart hence the customer is satisfied. By data analytics there is low risk of deaths.

5.	Business Model (Revenue Model)	It is a successful strategy to prevent heart diseases and stroke and distributed as business primarily through employer and by other organizations. This assists in areas such as: ⇒ Promoting adequate cost coverage or reimbursement for prescription drugs required. ⇒ Providing health care coverage for employeesand their families which includes primary and secondary prevention services addressing heart disease and stroke. ⇒ It also provides prevention services as rehabilitation services for heart attack and stroke survivors. ⇒ Assuring detection and follow-up serviceswith employees at the worksite to control high blood pressure and cholesterol. ⇒ Managing employees health condition to supervise the work given to the employee.

3.4 Problem Solution Fit





4. REQUIREMENT ANALYSIS

4.1 Functional Requirements

FR No	Functional Requirement(Epic)	Sub Requirement(Story/Sub task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Data Preparation	After user login they can upload a dataset and prepare the data.
FR-4	Visualizing Data	Users can visualize the conditions on the heart disease through Dashboard created using IBM Cognos Analytics.
FR-5	Generating Report	Users can view health reports and can make decisions according to their corresponding health condition.

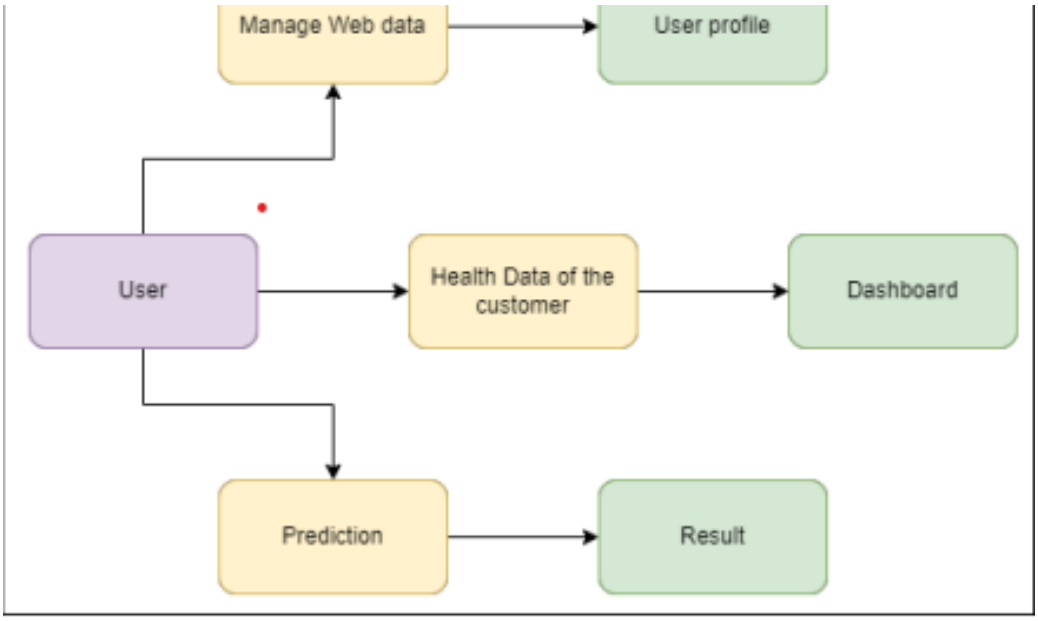
4.2 Non-Functional Requirements

FR No	Non-Functional Requirement	Description
NFR-1	Usability	The application will have a simple and user friendly graphical interface. Users will be able to understand and use all the features of the application easily and can know about their health condition according to their heart function visualization.
NFR-2	Security	For Security of application, data replication technique is used. So that all the important data are kept safe. In case of any crash in the system, it should be able to backup and recover the data.Data privacy is also a kind of security provided.

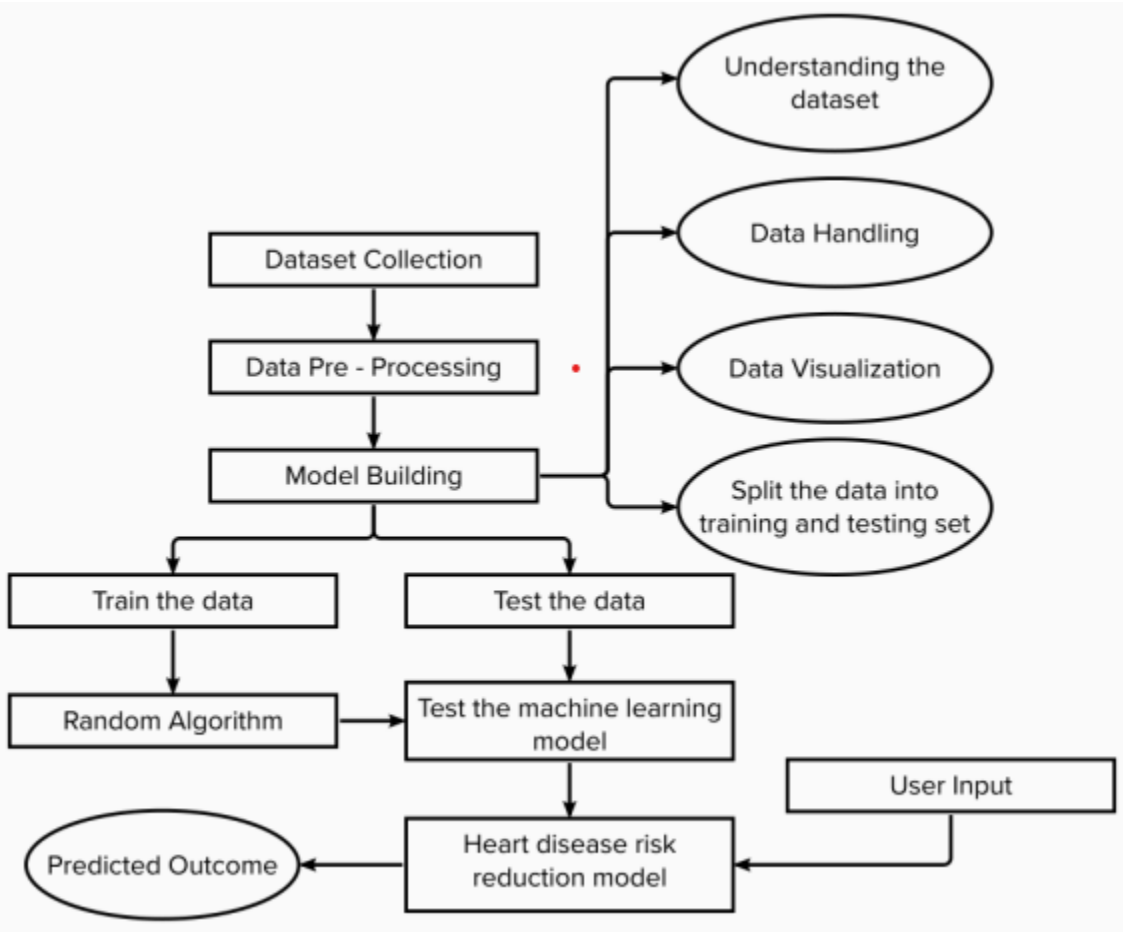
NFR-3	Reliability	The application must be consistent at every situation and must work without any failure in any environment.
NFR-4	Performance	Performance of the application depends on the response time and the speed of the data submission. The application is direct and faster which depends on the efficiency of the implemented algorithm.
NFR - 5	Availability	The application will be available 24x7 for users without any interruption.
NFR - 6	Scalability	The application can withstand an increase in number of users and be able to develop higher versions in future which depends on future developments in technology.

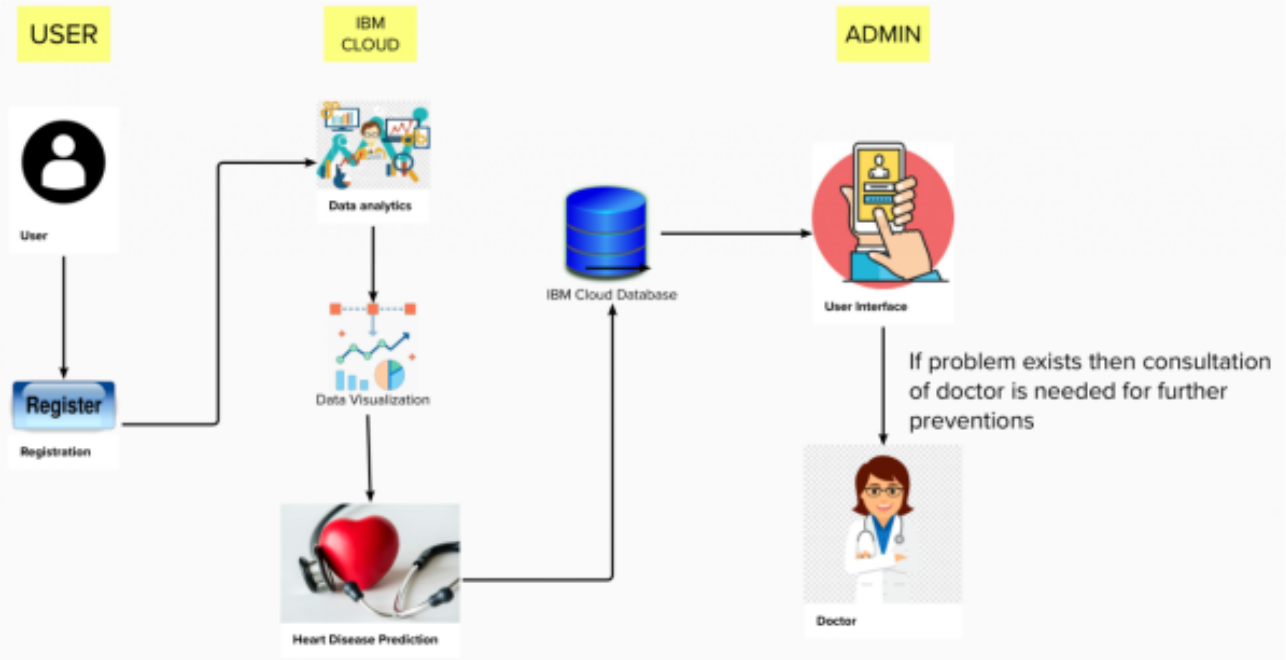
5. PROJECT DESIGN

5.1 Data Flow Diagram



5.2 Solution and Technical Architechture





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 Facebook.	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail.		Medium	Sprint-1
Customer (Web user)	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	User can able to view only his medical records.	I can view it in Dashboard	High	Sprint-2
		USN-7	User can able to view the possibilities of occurrence of heart disease.	I can view it in the analysis reports.	High	Sprint-2
Customer Care Executive	Helpdesk	USN-8	Able to view the queries	I can able to post queries on dashboard	Medium	Sprint-3
		USN-9	Able to answer queries	I can able to view the answers for those queries	High	Sprint-3
Administrator	User Profile	USN-10	Able to update the users medical records	I can view my updated health details.	High	Sprint-4
		USN-11	Able to add or delete users	I can access my accounts when logged in.	High	Sprint-4
		USN-12	Able to manage the user details	I can view the organized data of myself.	High	Sprint-4

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 user, I can register for the application by entering my email, password, and confirming my password.	3	High	Divyadharshini.K
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	3	High	Muthamizh.P, Ranganathan.P, Rithik Roshan.P
Sprint-1		USN-3	As a user, I can register for the application through Facebook	5	Low	Kishore.B, Divyadharshini.K
Sprint-1		USN-4	As a user, I can register for the application through Gmail	3	Medium	Muthamizh.P
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	6	High	Ranganathan.P, Rithik Roshan.P, Kishore.B, Divyadharshini.K, Muthamizh.P
Sprint-2	Dashboard	USN-6	Attractive dashboard For the Application	3	Medium	Ranganathan.P, Rithik Roshan.P, Kishore.B
Sprint-2		USN-7	Profile - view & update your profile	5	Low	Divyadharshini.K, Muthamizh.P
Sprint-2		USN-8	Home - Analyze your Heart problem	2	High	Ranganathan.P, Rithik Roshan.P, Kishore.B, Divyadharshini.K
Sprint-2		USN-9	User fill the details to predict the disease	7	High	Muthamizh.P, Ranganathan.P
Sprint-3	Support	USN-10	Get feedback from users	10	Medium	Rithik Roshan.P, Kishore.B, Divyadharshini.K
Sprint-3		USN-11	Responds to user queries via telephone, email etc.	3	Medium	Muthamizh.P, Ranganathan.P
Sprint-3		USN-12	The team must respond immediately to the queries based on the priority	5	High	Rithik Roshan.P, Kishore.B, Divyadharshini.K, Muthamizh.P, Ranganathan.P
Sprint-4	System Requirements	USN-13	Hardware Requirement 1. Laptop or PC • i5 processor system or higher • 4 GB RAM or higher • 128 GB ROM or higher 2. Mobile (12.0 and above)	5	Low	Rithik Roshan.P, Kishore.B
Sprint-4		USN-14	Software Requirement 1. Laptop or PC • Windows 10 or higher Android Studio	8	Medium	Divyadharshini.K, Muthamizh.P, Ranganathan.P, Rithik Roshan.P, Kishore.B

6.2 Sprint Delivery & Schedule

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	29 Oct 2022
Sprint-2	20	6 Days	30 Oct 2022	04 Nov 2022	17	06 Nov 2022
Sprint-3	20	6 Days	05 Nov 2022	11 Nov 2022	18	11 Nov 2022
Sprint-4	20	6 Days	12 Nov 2022	17 Nov 2022	13	19 Nov 2022

Velocity:
Imagine we have a 6-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

AV = Sprint duration / velocity = 20 / 6 = 3

7. CODING & SOLUTION

(explain the fetures added in the project along with the code)

7.1 Feature 1

Global superstore dataset is required data set for our data analytics. Using analytical visualizations in IBM Cognos Analytics tool required dashboard, report and story has been created. Kaggel API has been . Purpose of external API has been used in the application. IBMDB2 database is used for uploading the dataset to the cloud database for performing basic sql operations and then connected to IBM cognos analytics platform. Open source frameworks has been used for embedding the dashboard , report and story using HTML and Bootstraps

7.2 Feature 2

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xlr4YRNDmNFahnyXFQaYchnHypBAIYRJfSaojyDx4GluaII1oJBLDlO787kEIwyOCsprtDkf0cqoEAS
NqZCaiCYRKWqoHAdaS0HScY2kdSNRBAF1fCDgQrKZepBgLYfVB8PxaYicwfcU6kaiBYSFEJMCU
vagwwVA0EUCUUl4dG6r6buakiCGCstOiWjbCrry6hLLMiCKBCrxcsrbYk7WZREQSL4sYRQlFGw1p
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hIDMvr1KIcAVaUdtzoH2SpBbrF8tBB1cjpV7HXTRdme63Ma9aiEg1VJ6TnmA9/yT3bBRMQTKGmFg
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VX9JVHXtFw1KAdWUvsGZ8ikg8OwD3OOrGtY8ZilcHgACABjldDB/CgiUyaxO3gFTr7u9dTd4D8/k8
KLjLf8M2Vs9UvocEHjCTjVIk5pj1TXdmo3d6dSd6ZpFFohRWufeZ4HAA2GrMzs8qqrjkUp7r15K2N6
N0ueBAHYWAD280aVjGfr2UGoD82eCwKNufzfTNM3wqG5oug48yVB2C/8ngwBRd9Jee9SeXP6VD
Qw+IwR/mb4g+ILAg+C/S6xwq3TaBDYAAAAASUVORK5CYII=" alt="">
<!-- Uncomment below if you prefer to use an image logo -->
<!-- <h1 class="logo me-auto">Medicio</h1> -->

<nav id="navbar" class="navbar order-last order-lg-0">

Home
About
Dashboard
Report
Story
Contact

</nav><!-- .navbar -->

Make an Appointment

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

```
  <!-- ======= Hero Section ======= -->
  <section id="hero">
    <div id="heroCarousel" data-bs-interval="5000" class="carousel slide carousel-fade" data-bs-ride="carousel">

      <ol class="carousel-indicators" id="hero-carousel-indicators"></ol>

      <div class="carousel-inner" role="listbox">

        <!-- Slide 1 -->
        <div class="carousel-item active" style="background-image: url(assets/img/slide/slide-1.jpg)">
          <div class="container">
            <h2>Visualizing and Predicting Heart Diseases with an Interactive Dashboard</h2>
            <p>Heart disease is one of the biggest causes of morditity and mortality among the population of the world. Prediction of cardio vascular disease is regarded as one of the most important subject in the section of clinical data analysis.</p>
            <a href="#about" class="btn-get-started scrollto">Read More</a>
          </div>
        </div>

        <!-- Slide 2 -->
        <div class="carousel-item" style="background-image: url(assets/img/slide/slide-2.jpg)">
          <div class="container">
            <h2>Data Analytics</h2>
            <p>The goal is to turn data into information and information into insight.</p>
            <a href="#about" class="btn-get-started scrollto">Read More</a>
          </div>
        </div>

        <!-- Slide 3 -->
        <div class="carousel-item" style="background-image: url(assets/img/slide/slide-3.jpg)">
          <div class="container">
            <h2>Prevention of Heart Diseases</h2>
            <p>Eat a healthy, balanced diet. Be more physically active. Keep to a healthy weight. Reduce alcohol consumption. Keep your blood pressure under control.</p>
            <a href="#about" class="btn-get-started scrollto">Read More</a>
          </div>
        </div>

      </div>
```

```
    <a class="carousel-control-prev" href="#heroCarousel" role="button" data-bs-slide="prev">
      <span class="carousel-control-prev-icon bi bi-chevron-left" aria-hidden="true"></span>
    </a>

    <a class="carousel-control-next" href="#heroCarousel" role="button" data-bs-slide="next">
      <span class="carousel-control-next-icon bi bi-chevron-right" aria-hidden="true"></span>
    </a>

  </div>
 </section><!-- End Hero -->

 <main id="main">

  <!-- ======= Featured Services Section ======= -->
  <section id="featured-services" class="featured-services">
   <div class="container" data-aos="fade-up">

    <div class="row">
     <div class="col-md-6 col-lg-3 d-flex align-items-stretch mb-5 mb-lg-0">
      <div class="icon-box" data-aos="fade-up" data-aos-delay="100">
       <div class="icon"><i class="fas fa-heartbeat"></i></div>
       <h4 class="title"><a href="">SPRINT 1</a></h4>
       <p class="description">Cholesterol Level</p>
       <p>It is a scientific fact that your body will not absorb cholesterol if you take it from another person's plate.</p>
      </div>
     </div>

     <div class="col-md-6 col-lg-3 d-flex align-items-stretch mb-5 mb-lg-0">
      <div class="icon-box" data-aos="fade-up" data-aos-delay="200">
       <div class="icon"><i class="fas fa-pills"></i></div>
       <h4 class="title"><a href="">SPRINT 2</a></h4>
       <p class="description">Thallium</p>
       <p>Your diet is a bank account. Good food choices are good investments.</p>
      </div>
     </div>

     <div class="col-md-6 col-lg-3 d-flex align-items-stretch mb-5 mb-lg-0">
      <div class="icon-box" data-aos="fade-up" data-aos-delay="300">
       <div class="icon"><i class="fas fa-thermometer"></i></div>
       <h4 class="title"><a href="">SPRINT 3</a></h4>
```

```
            <p class="description">Exercise Angina</p>
            <p>Exercise should be regarded as tribute to the heart.</p>
          </div>
        </div>

        <div class="col-md-6 col-lg-3 d-flex align-items-stretch mb-5 mb-lg-0">
          <div class="icon-box" data-aos="fade-up" data-aos-delay="400">
            <div class="icon"><i class="fas fa-dna"></i></div>
            <h4 class="title"><a href="">SPRINT 4</a></h4>
            <p class="description">ST Depression</p>
            <p>Depression is not a war to win, It's a battle you fight everyday with yours heart.</p>
          </div>
        </div>

      </div>

    </div>
  </section><!-- End Featured Services Section -->

  <!-- ======= Cta Section ======= -->
  <section id="cta" class="cta">
    <div class="container" data-aos="zoom-in">

      <div class="text-center">
        <h3>In an emergency? Need help now?</h3>
        <a class="cta-btn scrollto" href="#appointment">Make an Make an Appointment</a>
      </div>

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

  <!-- ======= About Us Section ======= -->
  <section id="about" class="about">
    <div class="container" data-aos="fade-up">

      <div class="section-title">
        <h2>About Us</h2>
        <p>Heart disease (HD) is a major cause of mortality in modern society. Medical diagnosis is an extremely important but complicated task that should be performed accurately and efficiently.
          Cardiovascular disease is difficult to detect due to several risk factors, including high blood
```

pressure, cholesterol, and an abnormal pulse rate.

Based on the analytics we can analyze which patients are most likely to suffer from heart disease in the near future and based on the patient details we will take decisions to cure them.</p>

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

<!-- ======= Dashboard ======= -->
<section id="services" class="services services">

<h2>Dashboard</h2>

<iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FSprint%2B3&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=dashboard&subView=model00000184800159bb_00000000" width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen="">
</iframe>

</section><!-- End Dashboard Section -->

<!-- ======= Appointment Section ======= -->
<section id="appointment" class="appointment section-bg">

<h2>Make an Appointment</h2>

<form action="forms/appointment.php" method="post" role="form" class="php-email-form" data-aos="fade-up" data-aos-delay="100">

```
          <div class="col-md-4 form-group">
            <input type="text" name="name" class="form-control" id="name" placeholder="Your Name"
required>
          </div>
          <div class="col-md-4 form-group mt-3 mt-md-0">
            <input type="email" class="form-control" name="email" id="email" placeholder="Your Email"
required>
          </div>
          <div class="col-md-4 form-group mt-3 mt-md-0">
            <input type="tel" class="form-control" name="phone" id="phone" placeholder="Your Phone"
required>
          </div>
        </div>
        <div class="row">
          <div class="col-md-4 form-group mt-3">
            <input type="datetime" name="date" class="form-control datepicker" id="date"
placeholder="Appointment Date" required>
          </div>
          <div class="col-md-4 form-group mt-3">
            <select name="department" id="department" class="form-select">
              <option value="">Select Age</option>
              <option value="Department 1">18-25</option>
              <option value="Department 2">26-40</option>
              <option value="Department 3">Above 40</option>
            </select>
          </div>
          <div class="col-md-4 form-group mt-3">
            <select name="doctor" id="doctor" class="form-select">
              <option value="">Select Cholesterol Level</option>
              <option value="Doctor 1">Below 20 - Level:110-129</option>
              <option value="Doctor 2">Above 20 - Level:130-159</option>
              <option value="Doctor 3">Above 20 - Level:160-200</option>
            </select>
          </div>
        </div>

        <div class="form-group mt-3">
          <textarea class="form-control" name="message" rows="5" placeholder="Message
(Optional)"></textarea>
        </div>
        <div class="my-3">
```

```
          <div class="loading">Loading</div>
          <div class="error-message"></div>
          <div class="sent-message">Your appointment request has been sent successfully. Thank
you!</div>
        </div>
        <div class="text-center"><button type="submit">Make an Appointment</button></div>
      </form>

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

  <!-- ======= Report ======= -->
  <section id="departments" class="departments">
    <div class="container" data-aos="fade-up">

      <div class="section-title">
        <h2>Report</h2>
      </div>

      <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FReport&amp;closeWindowOnLastVie
w=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=edit"
width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>

    </div>
  </section><!-- End Report -->

  <!-- ======= Story ======= -->
  <section id="doctors" class="doctors section-bg">
    <div class="container" data-aos="fade-up">

      <div class="section-title">
        <h2>Story</h2>
      </div>
      <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2FStory&amp;c
loseWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded
&amp;action=view&amp;sceneId=model000001848413aefa_00000000&amp;sceneTime=4000"
width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
```

```
    </div>
  </section><!-- End Story -->

  <!-- ======= Gallery Section ======= -->
  <section id="gallery" class="gallery">
    <div class="container" data-aos="fade-up">

      <div class="section-title">
        <h2>Gallery</h2>
      </div>

      <div class="gallery-slider swiper">
        <div class="swiper-wrapper align-items-center">
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
1.jpg"><img src="assets/img/gallery/gallery-1.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
2.jpg"><img src="assets/img/gallery/gallery-2.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
3.jpg"><img src="assets/img/gallery/gallery-3.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
4.jpg"><img src="assets/img/gallery/gallery-4.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
5.jpg"><img src="assets/img/gallery/gallery-5.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
6.jpg"><img src="assets/img/gallery/gallery-6.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
7.jpg"><img src="assets/img/gallery/gallery-7.jpg" class="img-fluid" alt=""></a></div>
          <div class="swiper-slide"><a class="gallery-lightbox" href="assets/img/gallery/gallery-
8.jpg"><img src="assets/img/gallery/gallery-8.jpg" class="img-fluid" alt=""></a></div>
        </div>
        <div class="swiper-pagination"></div>
      </div>

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

  <!-- ======= Frequently Asked Questioins Section ======= -->
  <section id="faq" class="faq section-bg">
    <div class="container" data-aos="fade-up">
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```
<div class="section-title">
  <h2>Frequently Asked Questioins</h2>
</div>

<ul class="faq-list">

  <li>
    <div data-bs-toggle="collapse" class="collapsed question" href="#faq1">What is the most reliable factor to predict heart health?<i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
    <div id="faq1" class="collapse" data-bs-parent=".faq-list">
      <p>Having either high LDL cholesterol (“bad” cholesterol) or low HDL cholesterol (“good” cholesterol)—or both—is one of the best predictors of your risk of heart disease. A blood lipid profile measures both your cholesterol numbers and your triglycerides, another type of fat in the blood that is a risk factor.
      </p>
    </div>
  </li>

  <li>
    <div data-bs-toggle="collapse" href="#faq2" class="collapsed question">What is the objective of heart disease prediction?<i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
    <div id="faq2" class="collapse" data-bs-parent=".faq-list">
      <p>
        The objective of this project is to check whether the patient is likely to be diagnosed with any cardiovascular heart diseases based on their medical attributes such as gender, age, chest pain, fasting sugar level, etc. A dataset is selected from the UCI repository with patient's medical history and attributes.
      </p>
    </div>
  </li>

  <li>
    <div data-bs-toggle="collapse" href="#faq3" class="collapsed question">Is age a predictor of heart disease? <i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
    <div id="faq3" class="collapse" data-bs-parent=".faq-list">
      <p>
        Your risk for heart disease increases with age, especially with people of color and for those who are over 65. While the average age for a heart attack is 64.5 for men, and 70.3 for women, nearly 20 percent of those who die of heart disease are under the age of 65.
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          </p>
        </div>
      </li>

      <li>
        <div data-bs-toggle="collapse" href="#faq4" class="collapsed question">What percentage of heart disease is genetic? <i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
        <div id="faq4" class="collapse" data-bs-parent=".faq-list">
          <p>
            Approximately 40% of the risk for cardiovascular disease lies in hereditary factors.
          </p>
        </div>
      </li>

      <li>
        <div data-bs-toggle="collapse" href="#faq5" class="collapsed question">Which is the best test to predict coronary heart disease risk? <i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
        <div id="faq5" class="collapse" data-bs-parent=".faq-list">
          <p>
            Cholesterol test. A cholesterol test, also called a lipid panel or lipid profile, measures the fats in the blood. The measurements can help determine the risk of having a heart attack or other heart disease.
          </p>
        </div>
      </li>

      <li>
        <div data-bs-toggle="collapse" href="#faq6" class="collapsed question">What are the 5 risk factors of heart disease? <i class="bi bi-chevron-down icon-show"></i><i class="bi bi-chevron-up icon-close"></i></div>
        <div id="faq6" class="collapse" data-bs-parent=".faq-list">
          <p>
            The Nation's Risk Factors and CDC's Response. Leading risk factors for heart disease and stroke are high blood pressure, high low-density lipoprotein (LDL) cholesterol, diabetes, smoking and secondhand smoke exposure, obesity, unhealthy diet, and physical inactivity.
          </p>
        </div>
      </li>

    </ul>
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    </div>
  </section><!-- End Frequently Asked Questioins Section -->

  <!-- ======= Contact Section ======= -->
  <section id="contact" class="contact">
    <div class="container">

      <div class="section-title">
        <h2>Contact</h2>
      </div>

    </div>

    <div class="container">

      <div class="row mt-5">

        <div class="col-lg-6">

          <div class="row">
            <div class="col-md-12">
              <div class="info-box">
                <h3>Github</h3>
                <a href="https://github.com/IBM-EPBL/IBM-Project-39924-1660568608" class="github"><i
class="bi bi-github"></i></a>
              </div>
            </div>
            <div class="col-md-6">
              <div class="info-box mt-4">
                <i class="bx bx-envelope"></i>
                <h3>Email Us</h3>
                <a href="721219106012@smartinternz.com">721219106012@smartinternz.com</a>
                <a href="721219106023@smartinternz.com">721219106023@smartinternz.com</a>
                <a href="721219106033@smartinternz.com">721219106033@smartinternz.com</a>
                <a href="721219106041@smartinternz.com">721219106041@smartinternz.com</a>
                <a href="721219106042@smartinternz.com">721219106042@smartinternz.com</a>
              </div>
            </div>
            <div class="col-md-6">
```

```
            <div class="info-box mt-4">
              <i class="bx bx-phone-call"></i>
              <h3>Call Us</h3>
              <p>+1 5589 55488 55<br>+1 6678 254445 41</p>
            </div>
          </div>
        </div>

      </div>

      <div class="col-lg-6">
        <form action="forms/contact.php" method="post" role="form" class="php-email-form">
          <div class="row">
            <div class="col-md-6 form-group">
              <input type="text" name="name" class="form-control" id="name" placeholder="Your Name"
required="">
            </div>
            <div class="col-md-6 form-group mt-3 mt-md-0">
              <input type="email" class="form-control" name="email" id="email" placeholder="Your
Email" required="">
            </div>
          </div>
          <div class="form-group mt-3">
            <input type="text" class="form-control" name="subject" id="subject" placeholder="Subject"
required="">
          </div>
          <div class="form-group mt-3">
            <textarea class="form-control" name="message" rows="7" placeholder="Message"
required=""></textarea>
          </div>
          <div class="my-3">
            <div class="loading">Loading</div>
            <div class="error-message"></div>
            <div class="sent-message">Your message has been sent. Thank you!</div>
          </div>
          <div class="text-center"><button type="submit">Send Message</button></div>
        </form>
      </div>

    </div>
```

```
    </div>
  </section><!-- End Contact Section -->

</main><!-- End #main -->

<!-- ======= Footer ======= -->
<footer id="footer">
  <div class="footer-top">
    <div class="container">
      <div class="row">

        <div class="col-lg-3 col-md-6">
          <div class="footer-info">
            <h5>TEAM ID : PNT2022TMID31851</h5>
            <div class="social-links mt-3">
              <a href="#" class="twitter"><i class="bx bxl-twitter"></i></a>
              <a href="#" class="facebook"><i class="bx bxl-facebook"></i></a>
              <a href="#" class="instagram"><i class="bx bxl-instagram"></i></a>
              <a href="#" class="google-plus"><i class="bx bxl-skype"></i></a>
              <a href="#" class="linkedin"><i class="bx bxl-linkedin"></i></a>
            </div>
          </div>
        </div>
      </div>
    </div>
  </div>

</footer><!-- End Footer -->

<div id="preloader"></div>
<a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i class="bi bi-arrow-up-short"></i></a>

<!-- Vendor JS Files -->
<script src="assets/vendor/purecounter/purecounter_vanilla.js"></script>
<script src="assets/vendor/aos/aos.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>
```

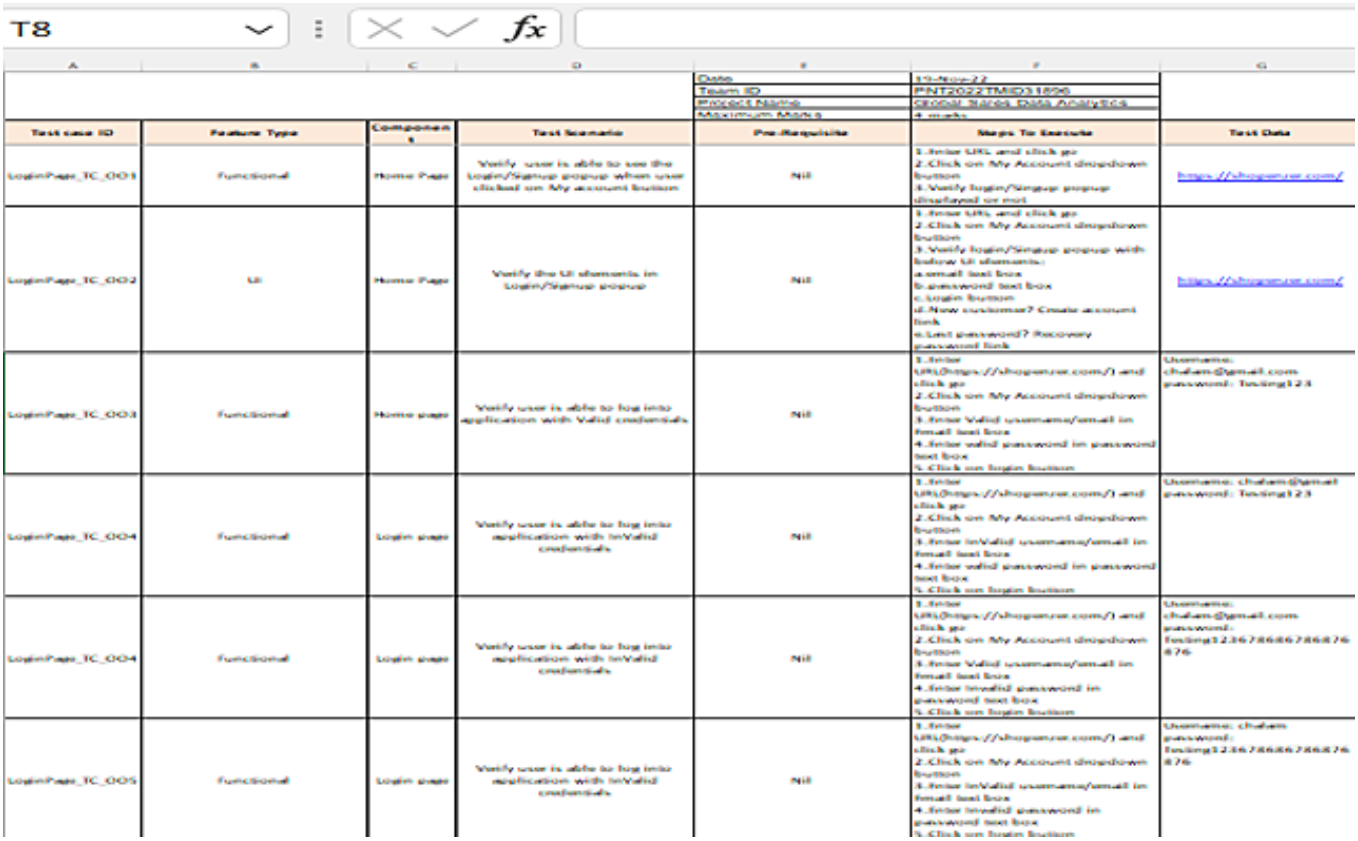
```
  <!-- Template Main JS File -->
  <script src="assets/js/main.js"></script>

</body>

</html>
```

8. TESTING

8.1 Test Cases



				Date	19-Nov-22	
				Team ID	PNT2022TMID31896	
				Project Name	Global Sales Data Analytics	
				Maximum Marks	4 marks	
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	Nil	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup displayed or not	https://shopzeus.com/
LoginPage_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup	Nil	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Lost password? Recovery password link	https://shopzeus.com/
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials	Nil	1.Enter URL(https://shopzeus.com/) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in email text box 4.Enter valid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopzeus.com/) and click go 2.Click on My Account dropdown button 3.Enter InValid username/email in email text box 4.Enter valid password in password text box 5.Click on login button	Username: chalam@gmail password: Testing123
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopzeus.com/) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in email text box 4.Enter invalid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing12367868786876876
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopzeus.com/) and click go 2.Click on My Account dropdown button 3.Enter InValid username/email in email text box 4.Enter invalid password in password text box 5.Click on login button	Username: chalam password: Testing12367868786876876

8.2 User Acceptance Testing

8.2.1 Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	9	3	2	3	18
Duplicate	1	0	2	0	4
External	2	3	1	1	6
Fixed	10	2	3	18	38
Not Reproduced	0	2	1	0	1
Skipped	0	0	1	0	2
Won't Fix	1	4	2	1	7
Totals	23	14	12	22	76

8.2.2 Testcase Analysis

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	1	0	6
Client Application	49	2	1	46
Security	2	0	0	2
Outsource Shipping	2	0	0	2
Exception Reporting	7	0	0	7
Final Report Output	6	0	0	6
Version Control	2	0	0	2

9. RESULTS

9.1 Performance Metrics

- Greater visibility
- Measurable
- Easy to understand and predict
- Timesaving Efficiency
- Better for decision making
- Better for forecasting

10. ADVANTAGES & DISADVANTAGES

10.1 Advantages:

- Enhanced Visibility: Dashboards provide greater visibility with information available whenever it is required to ensure the condition of our heart is better and healthier.

- Timesaving Efficiency: With dashboards, we are no longer wasting valuable time generating reports from multiple systems. Instead, data is drawn from a source and displayed as an easy to interpret visual overview .

- Better Forecasting: With greater insight into the data, future demand can be more accurately predicted using historic information. Businesses can be more effectively planned for demand fluctuations, setting measurable goals and deliverables for greater success.

- Better Decision Making: Whether you’re providing reporting and analysis for the entire organisation or functional areas of the business, a dashboard allows companies to analyse key data quickly and meticulously. Visualised interactivity serves to deliver overwhelming amounts of data in a way that is easy to understand. With the ability to easily identify what the data really means; better decisions can be made relevant to the health.

10.2 Disadvantages:

- Flashy or cluttered design, with users attempting to incorporate too much information without understanding constraints or considering their specific needs from the range of different measurables detailed data analysis provides.
- The technology used in the development of dashboards differs from other software solutions already employed in organisations and can be initially difficult to understand.
- Heart disease has no predetermined rules and hierarchies for how dashboard metrics are used. This means each user can use the metrics in different ways, resulting in a diverse set of data being reported.

11. CONCLUSION

From this project, we have successfully,

- Created multiple analysis charts / graphs .
- Used the analysed chart for creation of dashboard .
- Used the analysed chart for creation of report and story.
- Saved and visualized the dashboard, report and story in web application using HTML and bootstrap.

12. FUTURE SCOPE

Various charts can be prepared like BP and Cholesterol, Thallium and ST Depression, Age and Chest Pain Type, Maximum Hr, Exercise Angina and Fbs over 120, EKG Results and Sex etc...can be visualized. Interactive dashboards can be created with more number of visualization. User friendly and interactive web application can be created with latest technology for different type of datasets.

GitHub Link :

https://github.com/IBM-EPBL/IBM-Project-39924-1660568608

Project Demo Link :

https://drive.google.com/file/d/1zCVOyerFixixLjBkaLDF13nMIAXshuRJ/view?usp=share_link