Project Report

Team ID	PNT2022TMID10855
Project Name	visualizing and predicting heart disease with an interactive dashboard

1. INTRODUCTION

1.1 Project Overview

This project overview is mainly composed of data analytics and dataset provided it predicts the heart disease based on the symptoms and the dataset given. Early detection of cardiac diseases and continuous supervision of clinicians report reduces the rate of mortality. The data analytics gives the overview to the patient and the organisation about thier disease and thier medication.

1.2 Purpose

The purpose of this project is to visualize and predict the type of heart disease which is analysed by the dataset given and processed in platform of cognos analytics. The purpose mainly concerns on treatment on risk factors such as heart attack and stroke; prevention of repeat cardiovascular events; and reduction in deaths from cardiovascular disease.

2. LITERATURE SURVEY

2.1   Existing problem

Having high cholesterol increases the risk of atherosclerosis.

Atherosclerosis has been linked to heart attacks and strokes. Diabetes increases the risk of heart disease. Obesity and high blood pressure increase the risk of diabetes and heart disease. Excess weight typically worsens other heart disease risk factors. The Existing problem mainly concerns on manual screening .

2.2. References

1. Rosamond W, Flegal K, Furie K, et al. Heart disease and stroke statistics—2008 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation. 2008;117(4):e25–146. [PubMed]

2. National Heart Lung and Blood Institute Fact Book, Fiscal Year 2006. Bethesda, Md: National Heart Lung and Blood Institute, National Institutes of Health; 2006. [12 April 2011]. Last accessed at http://www.nhlbi.nih.gov/about/factbook-06/toc.htm on.

3. Expert panel on detection evaluation and treatment and Treat high level cholestrol in adults .Third Report of National Education Program(NCEP)[PUB_MED].

4. Tunstall pedoe.H The Dundee Coronary risk Management.BMJ;2001:323(7304):75-81
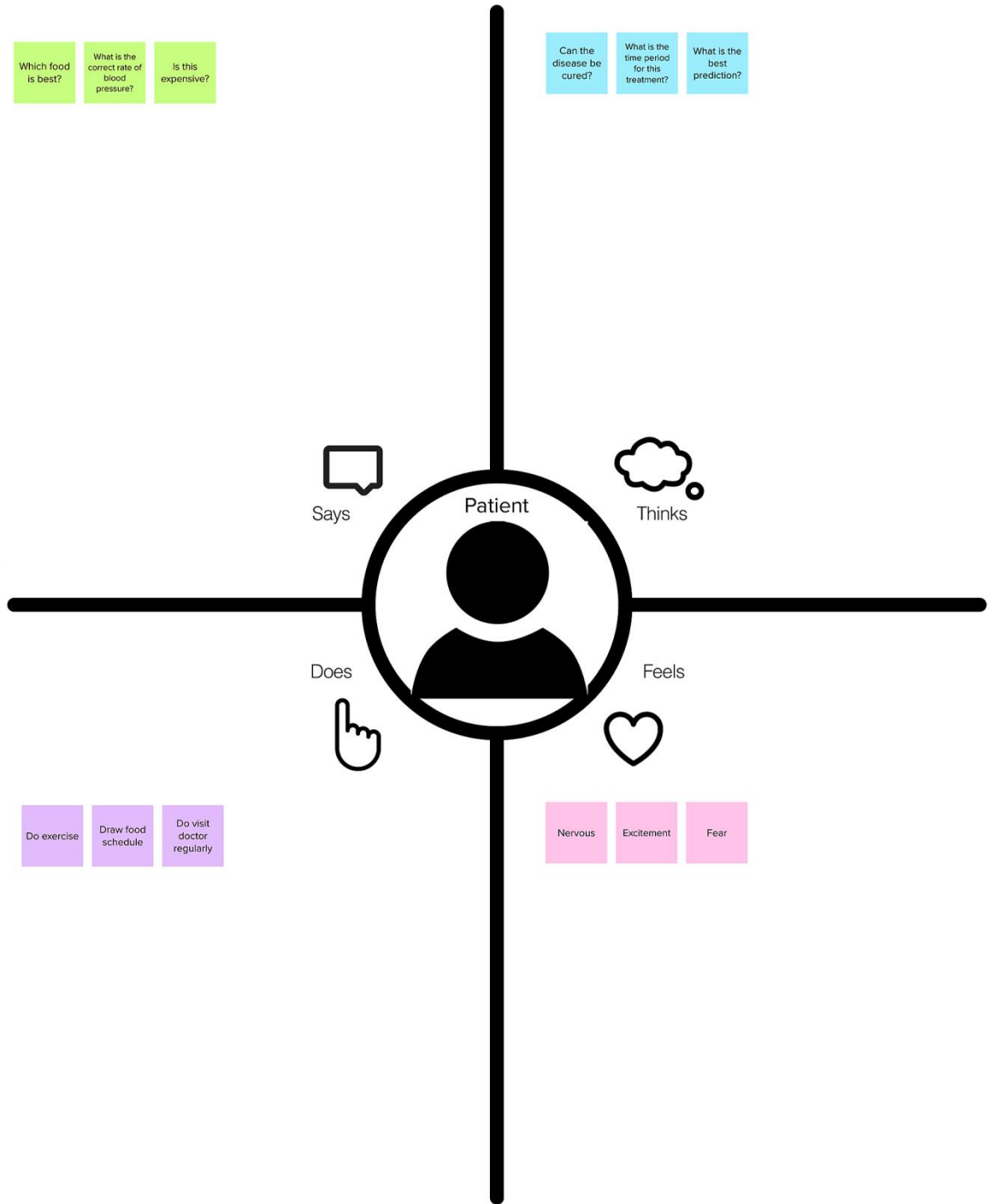
2.3 Problem Statement Definition

Heart disease analysis is determined as the cause of emerging rates to scrutinize the effect of deadly causes which can be resolved by accurate analysis. TWhat can be the appropriate analysis for effective functioning?The output of the algorithm after it has been trained on a historical dataset and

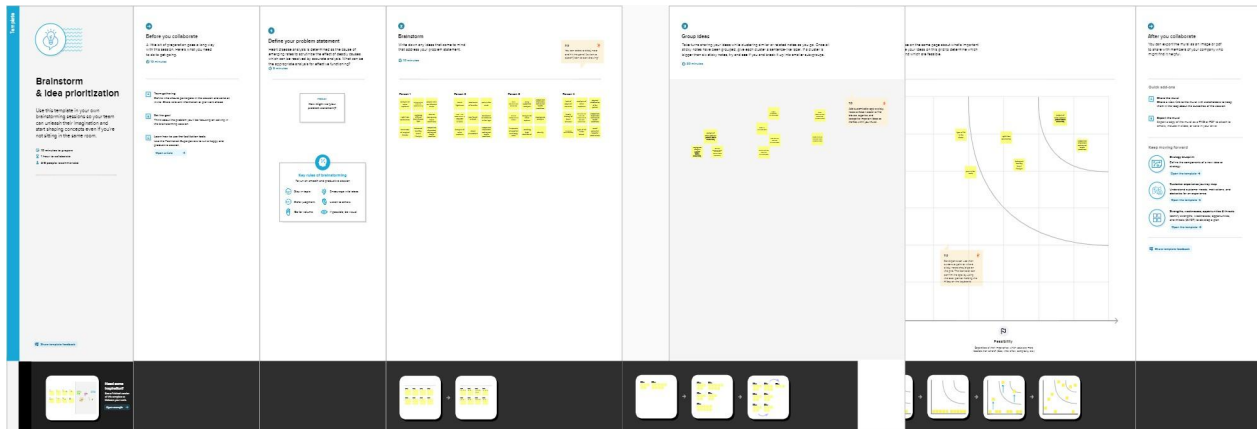applied to new data when forecasting the likehood of a particular outcome.

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3. IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas

Empathy map with Patient at the center.

Says
- Which food is best?
- What is the correct rate of blood pressure?
- Is this expensive?

Thinks
- Can the disease be cured?
- What is the time period for this treatment?
- What is the best prediction?

Does
- Do exercise
- Draw food schedule
- Do visit doctor regularly

Feels
- Nervous
- Excitement
- Fear

3.2 Ideation & Brainstorming

3.3 Proposed Solution

In this phase the requirement are collected and accessed .thisproject predicts people with cardiovascular disease by extracting the patient medical history and previous analysis on trauma data . analysis in medicine is becoming more and

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Heart disease analysis is determined as the cause of emerging rates to scrutinize the effect of deadly causes which can be resolved by accurate analysis what can be the appropriate analysis for effective functioning?
2.	Idea / Solution description	In this phase the requirement are collected and accessed .this project predicts people with cardiovascular disease by extracting the patient medical history and previous analysis on trauma data . analysis in medicine is becoming more and more frequent to clarify analyses and optimal prediction of results
3.	Novelty / Uniqueness	This work is particularly interested in the category of data obtained this research work aims to design a frame work for heart disease prediction by using major risk factors based on different algorithms and dashboard as an optimal technique
4.	Social Impact / Customer Satisfaction	The customer satisfaction on this data analysis is effective because the treatment can be precisely and effectively made to the patients at emergency condition .it can be even more cost effective as it rely on the analysis and immediate cure instead of evaluating with all testing procedures.

more frequent to clarify analyses and optimal prediction of results .The proposed solution customizes on the prediction with the symptoms such as lightheadness,chestpain,vomiting relating the symptoms with the dataset.

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3.4 Problem Solution fit

Problem-Solution fit canvas 2.0   Purpose / Vision

Define CS, fit into CC

1. CUSTOMER SEGMENT(S)   CS
Who is your customer?
i.e. working parents of 0-5 y.o. kids

Men age 45 and older and women age 55 and older have a greater risk.some risk factor may affect heart disease risk differently in women than in men…

6. CUSTOMER CONSTRAINTS   CC
What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Some people are not willing to go to hospital due to Financial Constraint and some staying
at remote locations.
Difficulty in finding a good doctor.High Maintenance costs.The shortage of nurses and Doctor.

5. AVAILABLE SOLUTIONS   AS
Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

Visiting the Experienced Cardiologist to Verify.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS   J&P
Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

Control your blood pressure.

Dont' smoke.

Manage Stress.

Stay at a healthy weight.

9. PROBLEM ROOT CAUSE   RC
What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

Reason of increase in heart disease will not be rootly identified.
Because Heart Disease is hereditary.
Difficulty of Predicting a Heart Disease.
The main reason of getting congenital heart defect blood pressure,smoking and mental Depression .

7. BEHAVIOUR   BE
What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

First of all the customer or patient should report
what problem they are undergoing according to their health condition.then they should, Schedule an appointment
Search for The best Cardiologist online.
Speak to family or friends regarding solution.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS   TR
What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.

Diets high in fat,salt,sugar and Cholesterol have been linked to heart disease..

4. EMOTIONS: BEFORE / AFTER   EM
How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Depression
Anxiety
Isolation

10. YOUR SOLUTION   SL
If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

Our Solution is about to find out the persons where all on the edge to gescought by heart disease.for this we taking a survey on people health conditions by age gender,and what type of looks they are in by this we predict and visualize the people .

8. CHANNELS of BEHAVIOUR   CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

Talk with friends and family.
patient will be part of virtualization

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

Reach out to the nearest Cardiologist

Extract online & offline CH of BE

★ AMALTAMA

4. REQUIREMENT ANALYSIS

4.1 Functional requirements

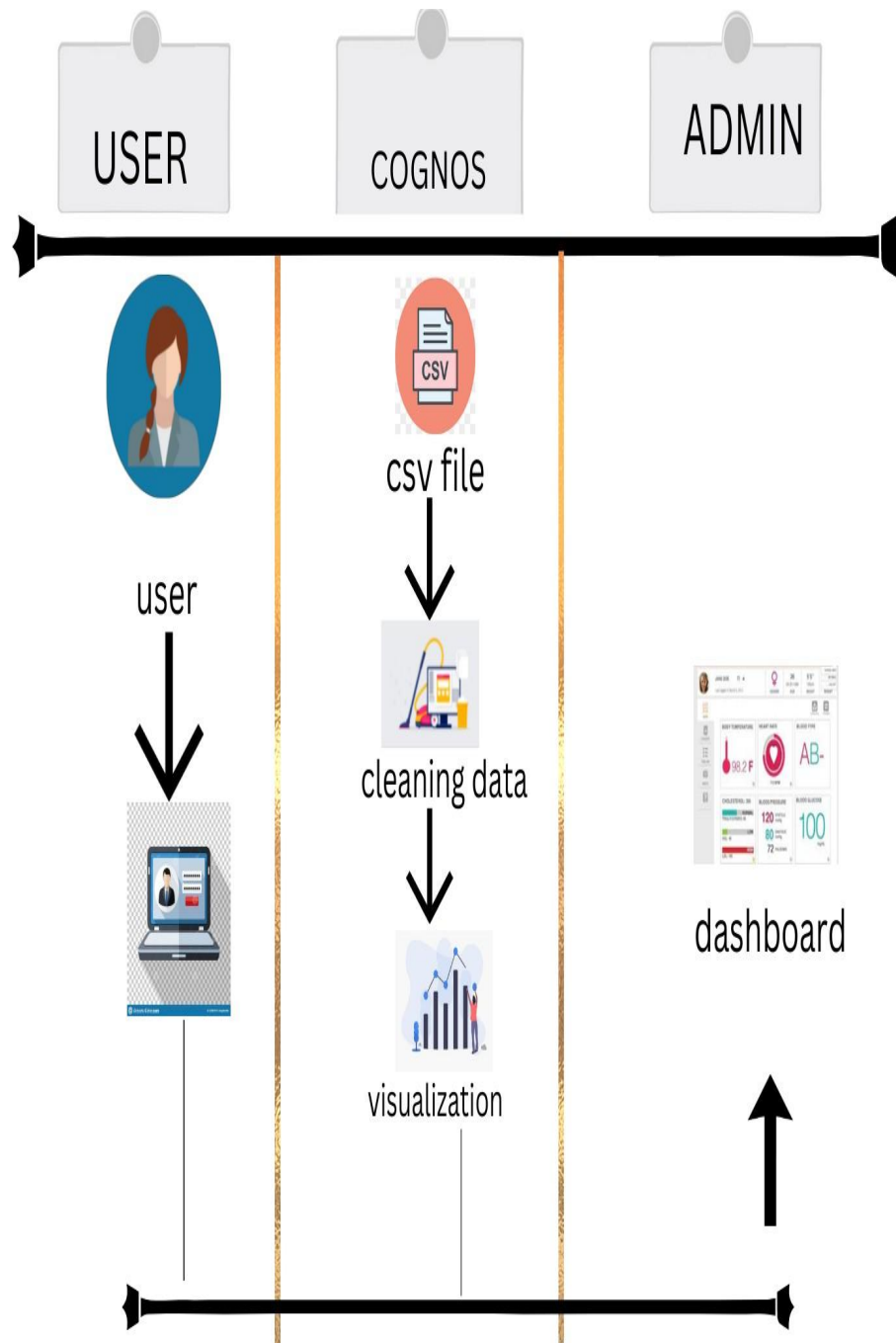| FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	Login using Username and Password Login using Mobile No or Email Id

4.2   Non Functional Requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	In order to overcome this issue, this work proposes a new architecture for real time health status prediction and It involves watching a group of users interacting with your dashboard.
NFR-2	Security	Providing a secure platform to users is crucial as it involves user upload their report details on the

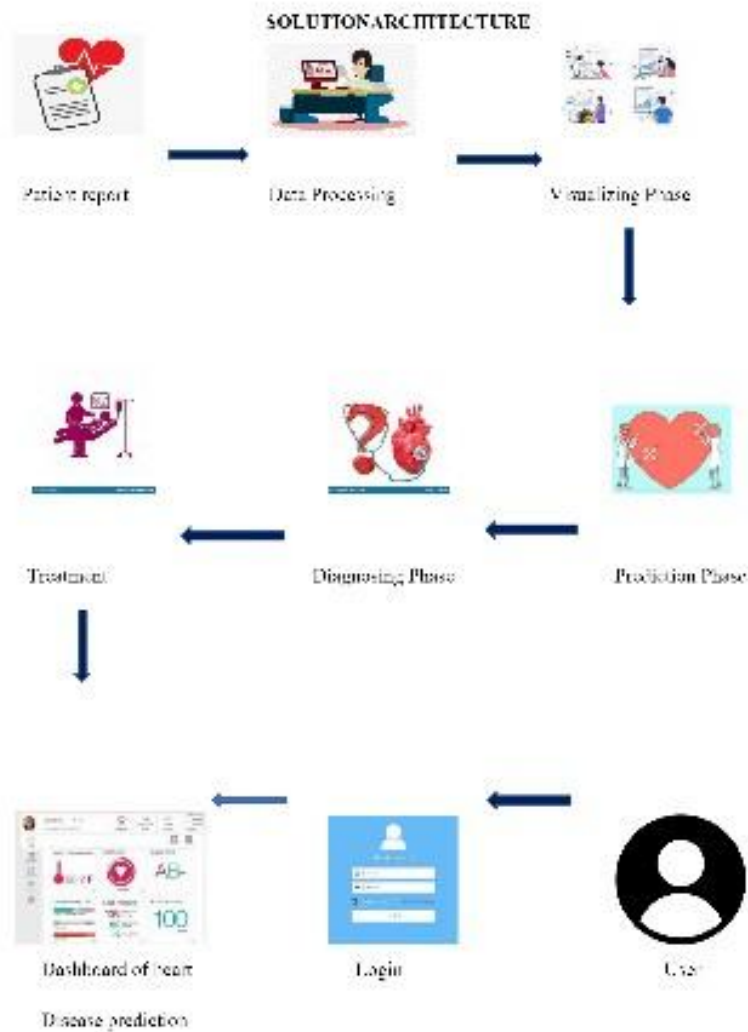|		dashboard.
NFR-3	**Reliability**	Specification can be depended on to be accurate and the quality of being trustworthy or of performing consistently well.
NFR-4	**Availability**	To make sure that the dashboard is easily accessible and the quality of being able to be used or obtained.
NFR-5	**Scalability**	The ability of a computing process to be used or the measure of the dashboard's ability to increase or decrease in performance and produced in a range of capabilities.

5.PROJECT DESIGN

5.1 Data Flow Diagrams

USER

COGNOS

ADMIN

csv file

user

cleaning data

AB-

dashboard

visualization

5.2 Solution & Technical Architecture

SOLUTION ARCHITECTURE

Patient report → Data Processing → Visualizing Phase

Treatment ← Diagnosing Phase ← Prediction Phase

Dashboard of heart Disease prediction ← Login ← User

5.3 User Stories
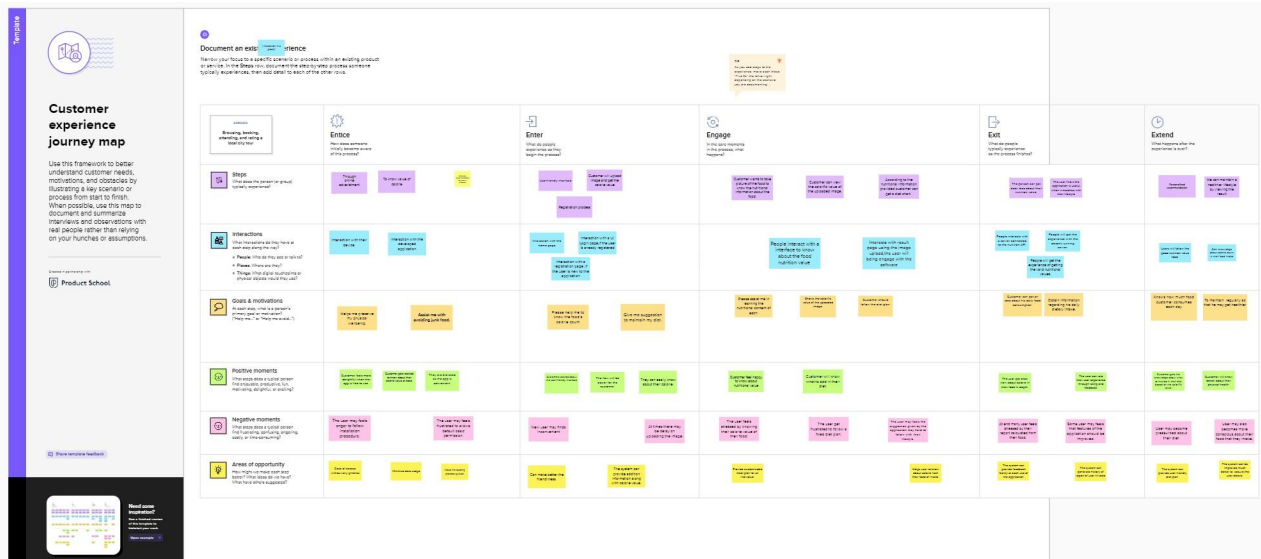
6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Spr int	Functio nal Requir ement (Epic)	Us er Sto ry Numbe r	User Story / Task	Sto ry Poi nts	Prio rity	Tea m Me mbe rs

Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	9	High	Durga
			As a user, I will receive confirmation email once Ihave registered for the application.	4	Low	Kiruba

|		USN-2	As a user, I can register for the application through Gmail.	7	Medium	Karapag. alakshmi
	Login	USN-3	As a user, I can log into the application by entering email & password.	9	High	Aiswary a jeya brinda
Sprint-2	Working g with the Dataset	USN-4	Importing the dataset on cognos platform and understand, clean and prepare the dataset.	9	High	Durga

		USN-5	After importing the dataset, we create some visualizations to understand more about the predicting heart diseases.	7	Medium	Kiruba
Sprint-3	Creating the Dashboard	USN-6	Creating the dashboard to display the visualizations which gives insights of predicting the Heart diseases.	9	High	Karpagalakshmi
Sprint-4	Export the Analytics	USN-7	Exporting the created dashboard to showcase the work to others.	9	High	Aiswaryajeyabrinda

6.2   Sprint Delivery Schedule

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

6.3 REPORTS FROM JIRA

Chart Title

PLANNED   ACTUAL

11
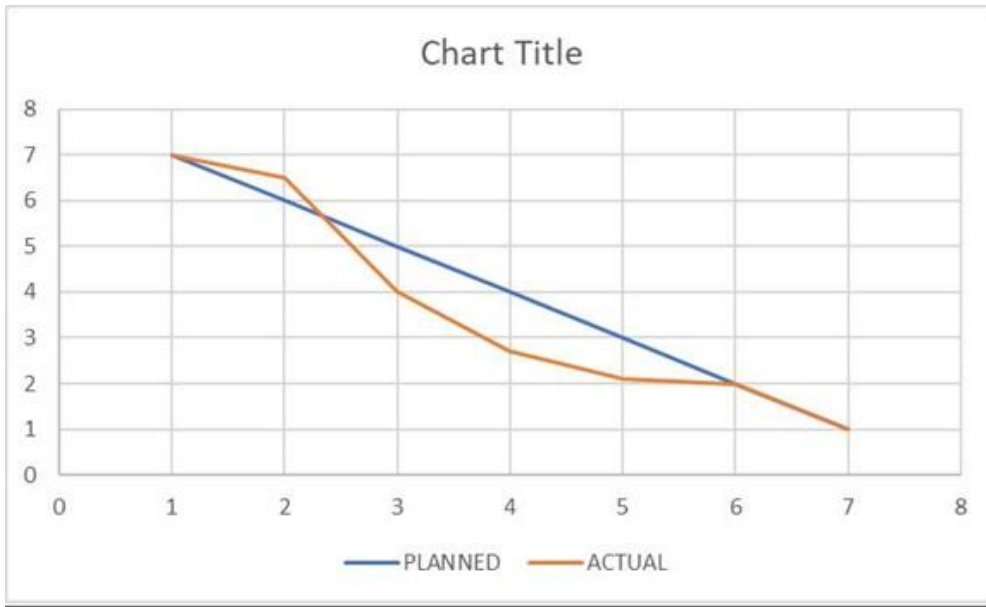
7. CODING & SOLUTIONING

7.1 Feature 1

REGISTRATION:

The new user sholud register with user name, password and the email id to access the website. After registering, user's login credentials will be stored in the database.

Coding:

```html
<div class="container">
<body background="hospital_loop.gif"/>
<center>
 <h1>REGISTRATION FORM</h1>
 <form name="registration" class="registration-form"
onsubmit="return formValidation()">
  <table>
   <tr>
    <td><b><label for="name">Name:</label></b></td>
    <td><input type="text" name="name" id="name"
placeholder="yourname"></td>
   </tr>
   <tr>
    <td><b><label for="email">Email:</label></b></td>
```

```
<td><input type="text" name="email" id="email" placeholder="youremail"></td>
```

```html
        </tr>
        <tr>
         <td><b><label for="password">Password:</label></b></td>
         <td><input type="password" name="password"
         id="password"></td>
        </tr>
        <tr>
         <td><b><label for="phoneNumber">Phone
         Number:</label></b></td>
        <td><input type="number" name="phoneNumber"
        id="phoneNumber"></td>
        </tr>
        <tr>
         <td><b><label for="gender">Gender:</label></b></td>
         <td>Male: <input type="radio" name="gender"
          value="male"> Female: <input type="radio"
          name="gender" value="female"> Other: <input
          type="radio" name="gender" value="other"></td>
        </tr>
        <tr>
         <td><b><label for="language">language</label></b></td>
         <td>
          <select name="language" id="language">
           <option value="">Select language</option>
```

```html
<option value="English">English</option>
<option value="Spanish">Spanish</option>
<option value="Hindi">Hindi</option>
<option value="Arabic">Arabic</option>
<option value="Russian">Russian</option>
```

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```html
        </select>
      </td>
    </tr>
<tr>

    <td><b><label for="address">Address:</label></b></td>
    <td><textarea name="address" id="address"
placeholder="Write youraddress..."></textarea></td>
    </tr>
    <tr>

    <td><b><label for="zipcode">Zip Code:</label></b></td>
    <td><input type="number" name="zipcode"
    id="zipcode"></td>
    </tr>
 </table>
<p>By creating an account you agree to our Terms & Privacy.</p>
<button type="submit"
 class="registerbtn"><strong><a
href="https://colab.research.google.com/drive/1K4AonvF-
l4oozaEbZEr9OVLIW5H0yqGK#scrollTo=54mnPMaupFME">Re
gister</a></strong></button>

</div>
<div class="container signin">
```

```
<center>

<p>Already have an account? <a href="loo.html">Sign in</a>.</p>

</center>
```

```
</b>
</table>
 </form>
</center>
</div>
```

7.2 Feature 2

Working with colab:

we are visualzing and predicting heart disease with an interactive dashboard by using the colab as well as with ibm cognos and cloud.

```
import numpy
as np import
pandas as pd
import matplotlib.pyplot as
plt from matplotlib import
rcParams from
matplotlib.cm import
rainbow
%matplotlib
inline import
warnings
```

```python
warnings.filterwarnings('ignore')
from sklearn.neighbors import
KNeighborsClassifier from sklearn.tree
import DecisionTreeClassifier
from sklearn.ensemble import
RandomForestClassifier df =
pd.read_csv('dataset.csv')
df.info()
df.describ
e()
import seaborn as sns
```

15

```python
#get correlations of each features in
datasetcorrmat = df.corr()
top_corr_features = corrmat.index
plt.figure(figsize=(20,20))
#plot heat map
g=sns.heatmap(df[top_corr_features].corr(),annot=True,c
map="RdYlGn")df.hist()
sns.set_style('whitegrid')
sns.countplot(x='target',data=df,palette='R
dBu_r')
dataset = pd.get_dummies(df, columns = ['sex', 'cp', 'fbs',
'restecg', 'exang', 'slope','ca', 'thal'])
from sklearn.model_selection import
train_test_splitfrom sklearn.preprocessing
import StandardScaler standardScaler =
StandardScaler()
columns_to_scale = ['age', 'trestbps', 'chol',
'thalach', 'oldpeak']dataset[columns_to_scale] =
standardScaler.fit_transform(dataset[columns_t
o_scale]) dataset.head()
y = dataset['target']
X = dataset.drop(['target'], axis = 1)
from sklearn.model_selection import
cross_val_scoreknn_scores = []
```

```python
for k in range(1,21):
    knn_classifier = KNeighborsClassifier(n_neighbors = k)
    score=cross_val_score(knn_classifier,X,y,cv=10)
    knn_scores.append(score.mean())
plt.plot([k for k in range(1, 21)], knn_scores, color = 'red')
```

16

```
for i in range(1,21):
  plt.text(i, knn_scores[i-1], (i,
knn_scores[i-1]))plt.xticks([i for i in
range(1, 21)]) plt.xlabel('Number of
Neighbors (K)') plt.ylabel('Scores')
plt.title('K Neighbors Classifier scores for
different K values')knn_classifier =
KNeighborsClassifier(n_neighbors = 12)
score=cross_val_score(knn_classifier,X,y,cv=1
0) score.mean()
from sklearn.ensemble import RandomForestClassifier
randomforest_classifier=
RandomForestClassifier(n_estimators=10)score.mean()
```

RANDOM FOREST ALGORITHM:

      Random forest is a Supervised Machine Learning Algorithm that is usedwidely in Classification and Regression problems.
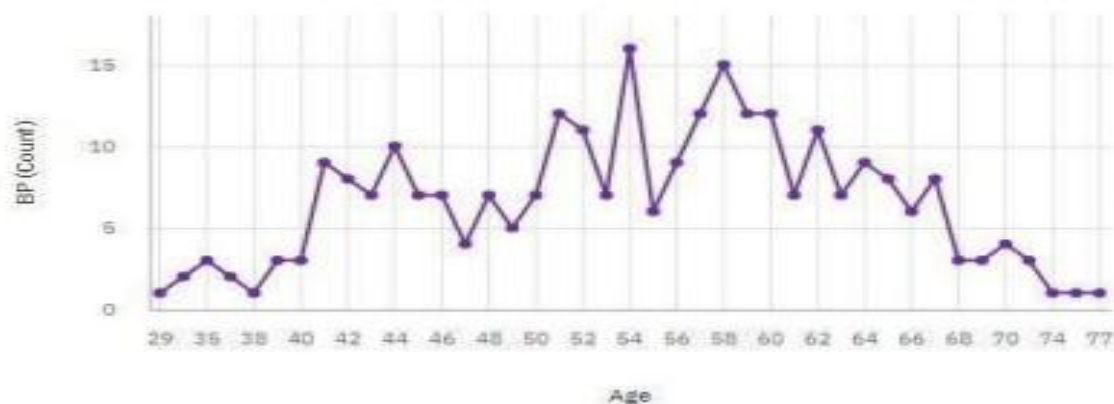
K-NEAREST NEIGHBOR ALGORITHM:

      The k-nearest neighbors algorithm, also known as KNN or k-NN, is anon-parametric, supervised learning classifier, which uses proximity to make classifications or predictions about the grouping of an individual data point

Age and Age for Chest pain type colored by Sex

Sex (Sum)
16   94

Line
● Age (Average)

Chest pain type
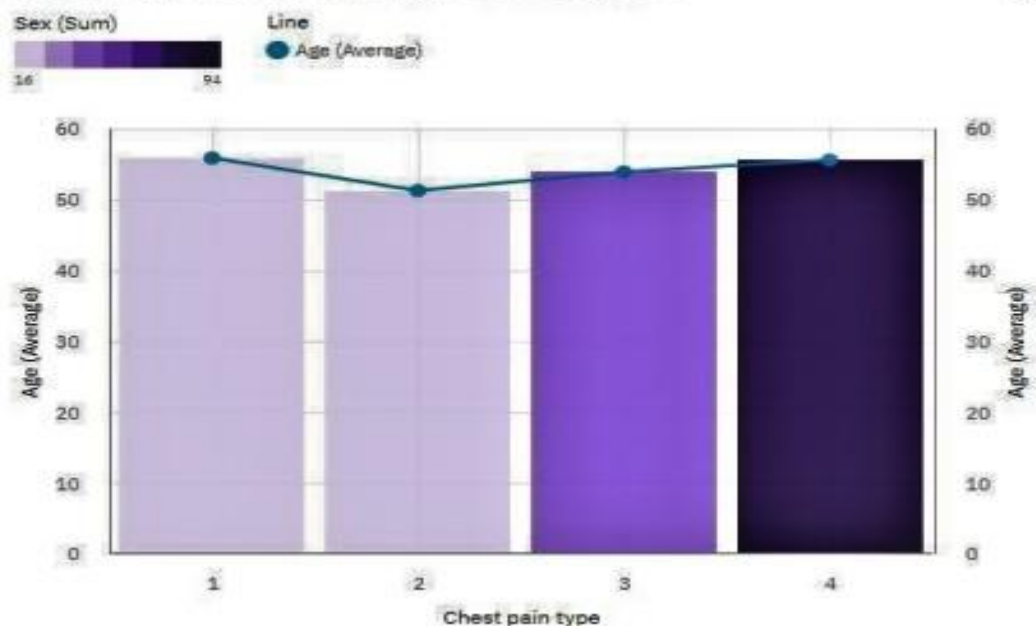
BP by Age

Age

Cholesterol by Sex and Age colored by Sex

Cholesterol (Sum)

8. TESTING

8.1 Test Cases

Test caseID	Feature Type	Component	Test Scenario
LoginPage _TC_ OO 1	Functional	Home Page	Verify user is able to see the Login/Signup popupwhen userclicked on My accountbutton
LoginPage _TC_ OO 2	UI	Home Page	Verify the UI elements in Login/Signup popup

LoginPage _TC_ OO3	Functio nal	Home page	Verify user is able to log into application with Valid credentials
LoginPage _TC_ OO4	Functio nal	Login page	Verify user is able to log intoapplication with InValid credentials

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Testcase ID	Feature Type	Component	TestScenario
LoginPage _TC_ OO4	Functio nal	Login page	Verify user is able to log intoapplication with InValid credentials

Testcase ID	Feature Type	Component	TestScenario
LoginPage _TC_ OO5	Functi onal	Login page	Verify user is able to log intoapplication with InValid credentials
LoginPage _TC_OO6	Functional	Login page	Verify user is able to the log into application with valid credentials.
LoginPage _TC_OO7	Functional	Home page	User must be able to navigate between different sections.

LoginPage _TC_OO8	Functional	Home page	User must be able to change the visualization according to their requirements.
LoginPage _TC_OO9	Functional	Home page	User must be able to navigate to different tabs using the given link.

8.2   USER ACCEPTANCE

TESTING PURPOSE :

The purpose is to brefly explain the test coverage and open issues of

the 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 show they were resolved.

Reso luti on	Sev eri t	Severit y2	Severit y3	Severit y4	Subt otal

	y1				
By Design	8	2	2	3	17
Duplicate	1	0	3	0	4
External	3	2	0	1	6
Fixed	9	2	4	16	29
Not Reproduced	0	0	1	0	1
Skipped	0	0	0	0	0
Won'tFix	0	5	2	1	8
Totals	21	11	12	22	65

TEST CASE ANALYSIS:

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

Section	TotalCases	Not Tested	Fail	Pass
PrintEngine	7	0	0	7
ClientApplication	51	0	3	48
Security	2	0	1	1
OutsourceShipping	3	0	2	1
ExceptionReporting	9	0	0	9
FinalReportOutput	4	0	0	4
VersionControl	2	0	1	1

9. RESULTS

9.1 Performance Metrics

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visualizations / Graphs - 6
2.	Data Responsiveness	People experiencing the chest pain • Average BP during the chest pain • Maximum heart rate during the chest pain • BP along with age • Cholesterol by age and gender
3.	Amount Data to Rendered (DB2 Metrics)	The dataset is trained and visualized using Cognos and it is connected to the IBM cloud.
4.	Utilization of Data Filters	Visualizations are utilized in order to filter the data.

5.	Effective User Story	No of Scene Added - 6
6.	Descriptive Reports	No of Visualizations / Graphs - 6
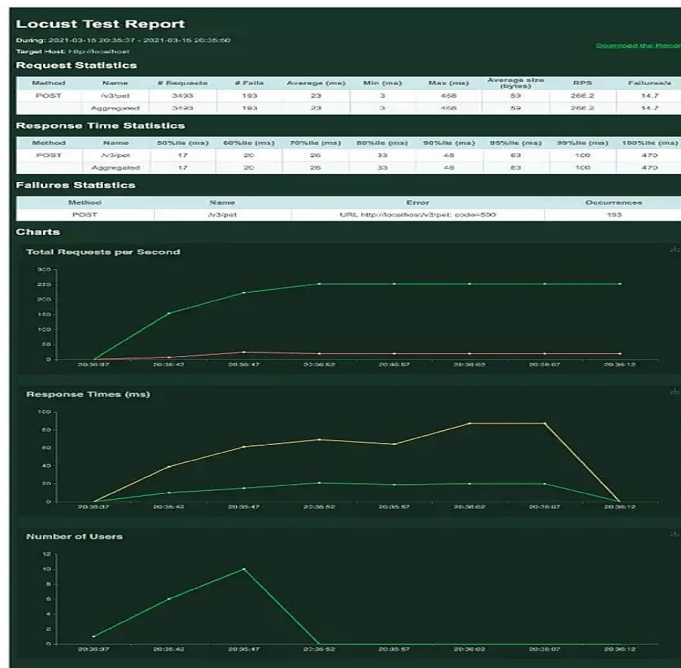
10. ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- The system uses 15 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction.

DISADVANTAGES:

- Data mining techniques does not help to. provide effective decision making.
- Cannot handle enormous datasets for.

11. CONCLUSION

This Heart Disease detection system assists a patient based on his/her clinical information of them been diagnosed with a previous heart disease. The algorithms used in building the given model are Logistic regression, Random Forest Classifier and KNN [22]. The accuracy of our model is 87.5%.

12. FUTURE SCOPE

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.

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13. APPENDIX

Source Coding:

```html
<div class="container">
<body background="hospital_loop.gif"/>
<center>
 <h1>REGISTRATION FORM</h1>
 <form name="registration" class="registration-form"
onsubmit="returnformValidation()">
  <table>
   <tr>
    <td><b><label for="name">Name:</label></b></td>
    <td><input type="text" name="name" id="name"
placeholder="yourname"></td>
   </tr>
   <tr>
    <td><b><label for="email">Email:</label></b></td>
    <td><input type="text" name="email" id="email"
placeholder="youremail"></td>
   </tr>
   <tr>
    <td><b><label for="password">Password:</label></b></td>
```

```
  <td><input type="password" name="password"
  id="password"></td>

</tr>

<tr>
```

25

```html
        <td><b><label for="phoneNumber">Phone
        Number:</label></b></td>
        <td><input type="number" name="phoneNumber"
        id="phoneNumber"></td>
</tr>
    <tr>
        <td><b><label for="gender">Gender:</label></b></td>
        <td>Male: <input type="radio" name="gender"
          value="male"> Female: <input type="radio"
          name="gender" value="female"> Other: <input
          type="radio" name="gender" value="other"></td>
    </tr>
    <tr>
        <td><b><label for="language">language</label></b></td>
        <td>
          <select name="language" id="language">
            <option value="">Select language</option>
            <option value="English">English</option>
            <option value="Spanish">Spanish</option>
            <option value="Hindi">Hindi</option>
            <option value="Arabic">Arabic</option>
<option value="Russian">Russian</option>
          </select>
        </td>
```

```html
        </tr>
<tr>
    <td><b><label for="address">Address:</label></b></td>
    <td><textarea name="address" id="address"
    placeholder="Write your
```

```html
address..."></textarea></td>
    </tr>
    <tr>
     <td><b><label for="zipcode">Zip Code:</label></b></td>
     <td><input type="number" name="zipcode"
     id="zipcode"></td>
    </tr>
 </table>
<p>By creating an account you agree to our Terms & Privacy.</p>
<button type="submit"
 class="registerbtn"><strong><a
href="https://colab.research.google.com/drive/1K4AonvF-
l4oozaEbZEr9OVLIW5H0yqGK#scrollTo=54mnPMaupFME">Re
gister</a></strong></button>

</div>
<div class="container signin">
<center>
<p>Already have an account? <a href="loo.html">Sign
in</a>.</p>
</center>
</b>
```

```
</table>

    </form
        >

</center
        >
```

27

```
</div>
```

LOGIN FORM:

```
<head>
 <link rel="stylesheet" type="text/css" href="css/style.css"/>
</head>
<!DOCTYPE html>
<html>
<head>
<center>
  <title>Login Form</title>
  <link rel="stylesheet" type="text/css" href="css/style.css">
</center>
</head>
<body background="login gif.gif"/>
<center>
  <h2>Login Page</h2><br>
  <div class="login">
  <form id="login" method="get" action="login.php">
    <label><b>User Name
    </b>
    </label>
    <input type="text" name="Uname" id="Uname"
    placeholder="Username">
    <br><br>
```

```
<label><b>Password
</b>
</label>
```

28

```html
    <input type="Password" name="Pass" id="Pass"
    placeholder="Password">
    <br><br>
    <button type="submit"
 class="loginbtn"><strong><a
href="https://colab.research.google.com/drive/1K4AonvF-
l4oozaEbZEr9OVLIW5H0yqGK?authuser=3">login</a></strong>
</button>
 </form>
</div>
</center>
</body>
</html>
```

VISUALIZING AND PREDICTING HEART DISEASE

```python
import numpy
as npimport
pandas as pd
import matplotlib.pyplot as
plt from matplotlib import
rcParams from
matplotlib.cm import
rainbow
%matplotlib
inlineimport
```

```python
warnings
warnings.filterwarnings('ignore')
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
df = pd.read_csv('dataset.csv')
df.info()
df.describe()
import seaborn as sns
```

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```python
#get correlations of each features in
datasetcorrmat = df.corr()
top_corr_features = corrmat.index
plt.figure(figsize=(20,20))
#plot heat map
g=sns.heatmap(df[top_corr_features].corr(),annot=True,c
map="RdYlGn")df.hist()
sns.set_style('whitegrid')
sns.countplot(x='target',data=df,palette='R
dBu_r')
dataset = pd.get_dummies(df, columns = ['sex', 'cp', 'fbs',
'restecg', 'exang', 'slope','ca', 'thal'])
from sklearn.model_selection import
train_test_splitfrom sklearn.preprocessing
import StandardScaler standardScaler =
StandardScaler()
columns_to_scale = ['age', 'trestbps', 'chol',
'thalach', 'oldpeak']dataset[columns_to_scale] =
standardScaler.fit_transform(dataset[columns_t
o_scale]) dataset.head()
y = dataset['target']
X = dataset.drop(['target'], axis = 1)
from sklearn.model_selection import
cross_val_scoreknn_scores = []
```

```python
for k in range(1,21):
    knn_classifier = KNeighborsClassifier(n_neighbors = k)
    score=cross_val_score(knn_classifier,X,y,cv=10)
    knn_scores.append(score.mean())
plt.plot([k for k in range(1, 21)], knn_scores, color = 'red')
```

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```
for i in range(1,21):
  plt.text(i, knn_scores[i-1], (i,
knn_scores[i-1]))plt.xticks([i for i in
range(1, 21)]) plt.xlabel('Number of
Neighbors (K)') plt.ylabel('Scores')
plt.title('K Neighbors Classifier scores for
different K values')knn_classifier =
KNeighborsClassifier(n_neighbors = 12)
score=cross_val_score(knn_classifier,X,y,cv=1
0) score.mean()
from sklearn.ensemble import RandomForestClassifier
randomforest_classifier=
RandomForestClassifier(n_estimators=10)score.mean()
```

PROJECT DEMO LINK:
      https://www.youtube.com/watch?v=mDpl3f2SlNg

GITHUB :
 https://github.com/IBM-EPBL/IBM-Project-8476-1658920544

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