IBM NALAIYA THIRAN

PROJECT REPORT

VISUALIZING AND PREDICITING HEART DISEASE WITH AN INTERACTIVE DASHBOARD

TEAM ID:PNT2022TMID50017

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CHAPTER 1
INTRODUCTION

PROJECT OVERVIEW

Heart is one of your body's most important organs. Essentially a pump, the heart is a muscle made up of four chambers separated by valves and divided into two halves. Each half contains one chamber called an atrium and one called a ventricle. The atria (plural for atrium) collect blood, and the ventricles contract to push blood out of the heart. The right half of the heart pumps oxygen-poor blood (blood that has a low amount of oxygen) to the lungs where blood cells can obtain more oxygen. Then, the newly oxygenated blood travels from the lungs into the left atrium and the left ventricle. The left ventricle pumps the newly oxygen-rich blood to the organs and tissues of the body. This oxygen provides your body with energy and is essential to keep your body healthy .The general term used to cover malfunctions of the heart is Heart Disease, or sometimes Cardiac Disease ("Cardiac" is a Latin term for the heart). Though there are multiple forms of heart disease, our discussion focuses on the two most common: Heart Attack and Heart Failure. This document is designed to teach you about heart attacks and heart failure: what causes these diseases, what forms these diseases take, and what can be done to treat these diseases when they occur. As both of these diseases are to some extent avoidable, we have also provided a discussion of preventative steps you can take to decrease your chances of having to deal with heart disease, or to minimize the negative effects of existing heart disease.

PURPOSE

We create a Heart disease visualizing interactive dashboard. The aim of this dashboard to do diagnosis of heart disease in early stage for patient and also diagnosis more accurately . The Heart disease is consist of major risk factor and also life causing concern for the patient so that this visualizing tool helps to predict the disease causing factor such as Arrhythmia , coronary artery disease and myocardial infraction based on digital visualizing ECG monitor data. The output of measurement of heart rate is get more accurately in this tool so that the wave of ECG is more accurate. So this Visualizing and predicting heart disease on interactive dashboard is more efficient.

CHAPTER 2

LITRATURE SURVEY

2.1 Literature Review:

A lot of research has been carried out in the field of visualizing and predicting Heart disease. A large variety of Heart visualizing systems already exists that try provide one or other aspect of information by applying different methods. The key problem is the diagnosis of Heart disease is a complicated task that should be performed accurately and efficiently to cure them. The diagnosis of Heart disease based on taking number test to locate the disease causing factor the test such as electrocardiogram , echocardiogram , stress test , Heart MRI etc. Such noninvasive test taken to detect the disease cause factor. This may cause time increase factor and also delay the early stage diagnosis of disease is difficult

2.2 Existing Solution:

The Heart Disease Visualizing Dashboard which already exist is to provide better visualization of heart disease to analyze the risk factor of heart. The Analyzing of Heart Disease is based on taking test for diagnosis processes of heart disease. The Existing Solution for visualizing Heart disease is based on using Health monitoring bands, smart watches apps such as QLAY etc. These are recording the heart beat rate by Photoplethysmography measurement method. After that it analyze the data and interpret measurement of heart beat rate data through the algorithms such as kB (kordia Band) KB Algorithm and Atrial Fibrillation algorithm and finally delivered the Visualizing dashboard of Heart disease through digital screen

REFERENCES

1.Title : Smart Watch Algorithm for Automated Detection of Atrial Fibrillation

Source : Science Direct.

Author : Joseph M.Bumgarner

Date : May2018

Website : www.sciencedirect.com/science/article/pii/S0735109718334867

2.**Title** **:** Screening for Atrial fibrillation using Smart phone based technology

Source : Science Direct

Author : Dr. Rachel

Date : November 2021

Website : https://www.researchgate.net/publication/325697854_Job_

2.3 PROBLEM DEFINITION STATEMENT:

Heart is one of your body's most important organs. Essentially a pump, the heart is a muscle made up of four chambers separated by valves and divided into two halves. Each half contains one chamber called an atrium and one called a ventricle. The atria (plural for atrium) collect blood, and the ventricles contract to push blood out of the heart. The right half of the heart pumps oxygen-poor blood (blood that has a low amount of oxygen) to the lungs where blood cells can obtain more oxygen. Then, the newly oxygenated blood travels from the lungs into the left atrium and the left ventricle. The left ventricle pumps the newly oxygen-rich blood to the organs and tissues of the body. This oxygen provides your body with energy and is essential to keep your body healthy .The general term used to cover malfunctions of the heart is Heart Disease, or sometimes Cardiac Disease ("Cardiac" is a Latin term for the heart). Though there are multiple forms of heart disease, our discussion focuses on the two most common: Heart Attack and Heart Failure. This document is designed to teach you about heart attacks and heart failure: what causes these diseases, what forms these diseases take, and what can be done to treat these diseases when they occur. As both of these diseases are to some extent avoidable, we have also provided a discussion of preventative steps you can take to decrease your chances of having to deal with heart disease, or to minimize the negative effects of existing heart disease

CHAPTER 3
IDEATION AND PROPOSED SOLUTION

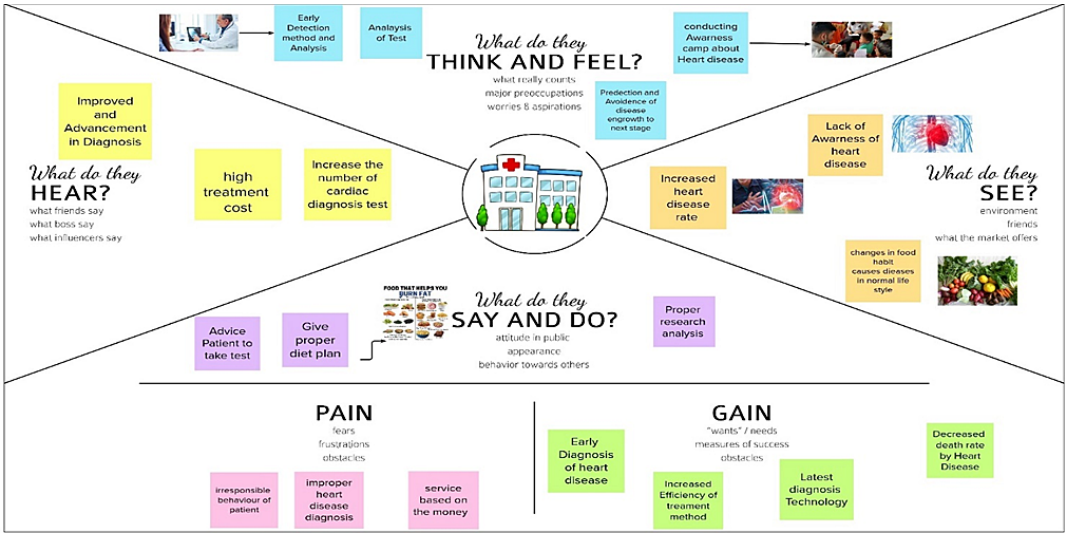
3.1Empathy Map Canvas

An empathy map canvas is a more in-depth version of the original empathy map, which helpsidentify and describe the user's needs and pain points. And this is valuable information for improving the user experience.

Teams rely on user insights to map out what is important to their target audience, what influences them, and how they present themselves. This information is then used to create personas that help teams visualize users and empathize with them as individuals, rather than just as a vague marketing demographic or account number.

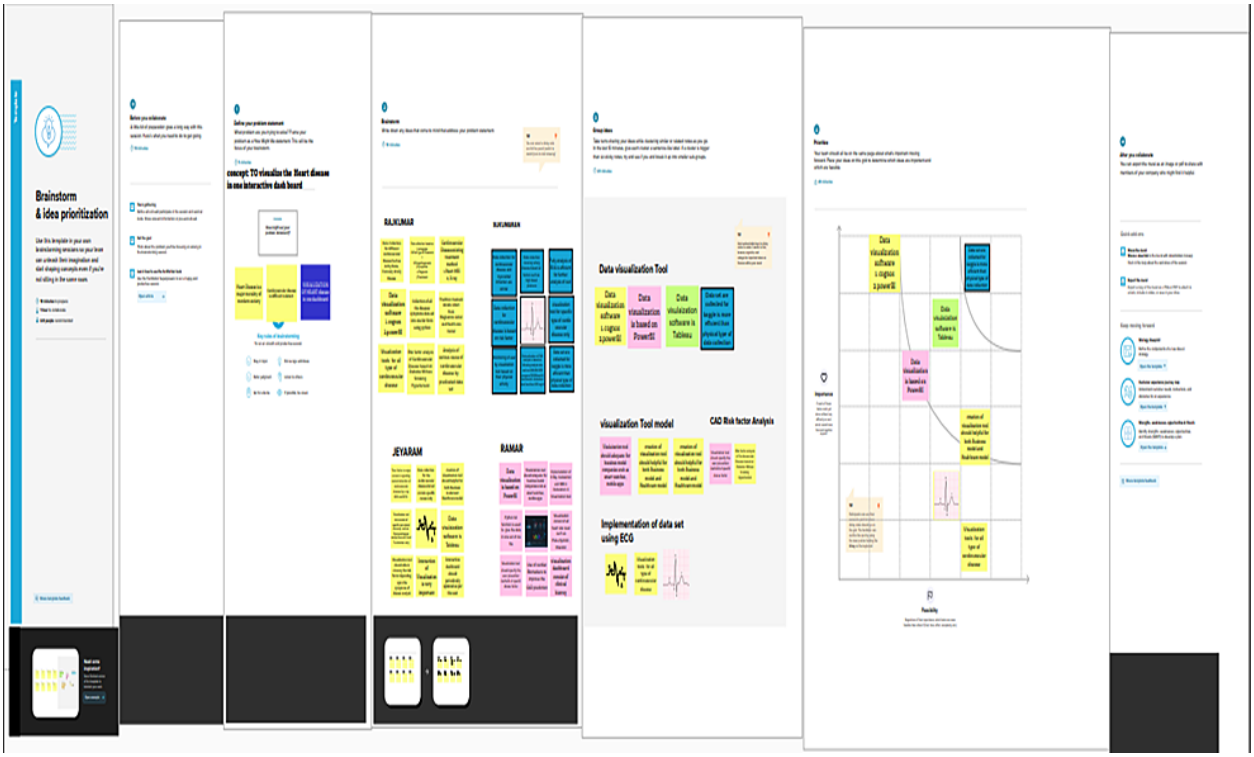
An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mindset of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvases of similar quality.

Empathy Map Canvas Visualizing and Predicting Heart Diseases with an Interactive Dashboard:



3.2BRAINSTROMING

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

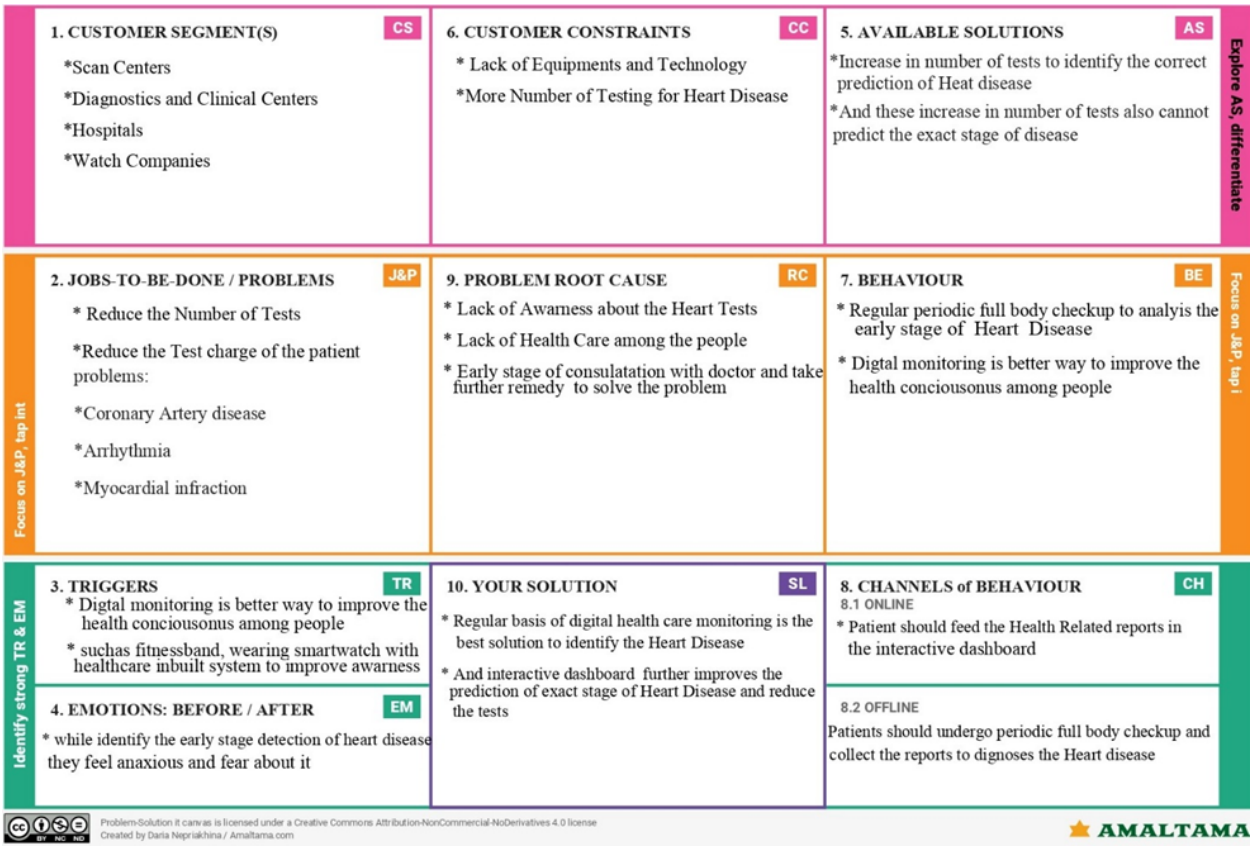


3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	Usually for treating the heart disease patient by taking some tests to predict what exactly the person actually suffering from the test such as ECG , EKG and Heart MRI and also checking Blood cholesterol level, stress level and so on Then details are given as hot copiesto the patient and then they consult with doctor. But this process has lack of efficiency in it we can not predict all heart relateddisease in eachindividual test.
2.	Idea / Solution description	To predict all kind of heart related disease inOn interactive dashboard and visualizing dashboard, by doing so ondashboard to visualize all heart relatedproblems
3.	Novelty / Uniqueness	All the coronary artery disease are visualized inone dashboard
4.	Social Impact / Customer Satisfaction	Patient canget all the heartrelated disease issuesin one dashboard. Reduce number of testes. Save lives and healthmonitoring
5.	Business Model (Revenue Model)	We can provide this dashboard to hospitals, diagnostics center and smart watch companies.
6.	Scalability of the Solution	All the cardiac related issues are able to visualizethrough one dashboard

3.4 Problem Solution fit

The Problem-Solution Fit simply means that you have found a problemwith your customerand that the solution you have realized for it actually solves the customer's problem



CHAPTER 4
REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	User Registration	Enables User to register thesmart watch throughsmartwatch id with relevant application
FR-2	User Confirmation	Once after registration, the userget conformation fromthe app and
FR-3	Data preparation	After user loginin to the health monitoring application then the Heartrate data can be obtained as csv file
FR-4	Visualizing Data	User can visualize the trends on the heart disease throughDashboard created in IBM Cognos Analytics
FR-5	Generating Report	User can view health reports and can make decisions accordingly.

4.2 **Non-Functional Requirement**

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The application will have a simple and user-friendly graphical interface. Users willbe able to understandanduse all the features of the application easily.
NFR-2	**Security**	For Security of application, data replication technique is used. So that allthe important data should be kept safe.In case of crash, thesystem should be able to backup and recover thedata.
NFR-3	**Reliability**	The application must be reliable and strong in givingthe functionalities.
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 dependson the efficiency of implemented algorithm.
NFR-5	**Availability**	The application will be available 24x7 for userswithout any interruption.

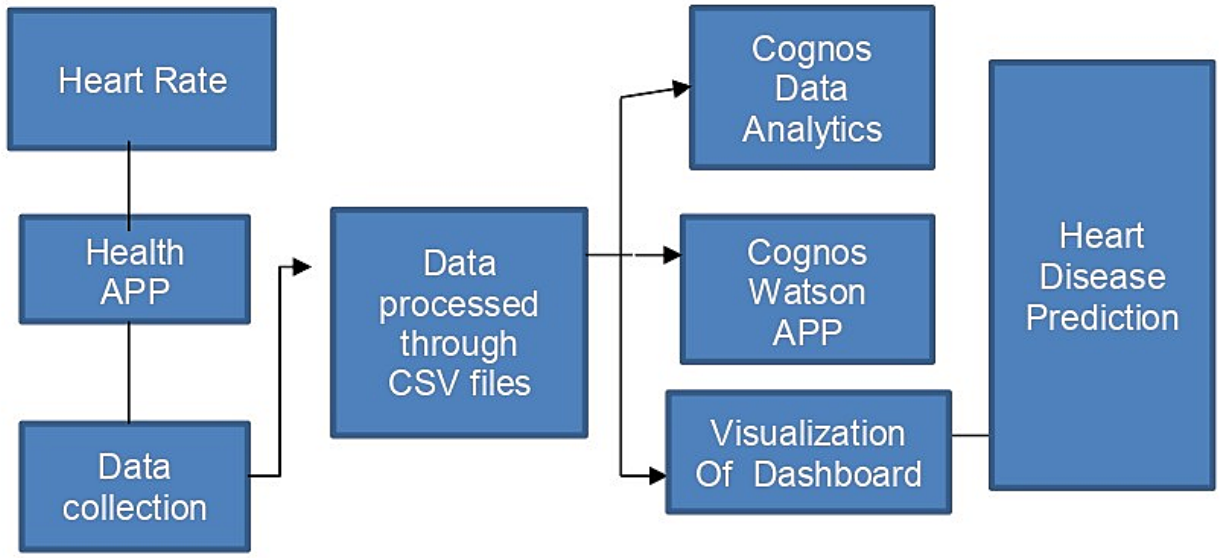
CHAPTER 5
PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

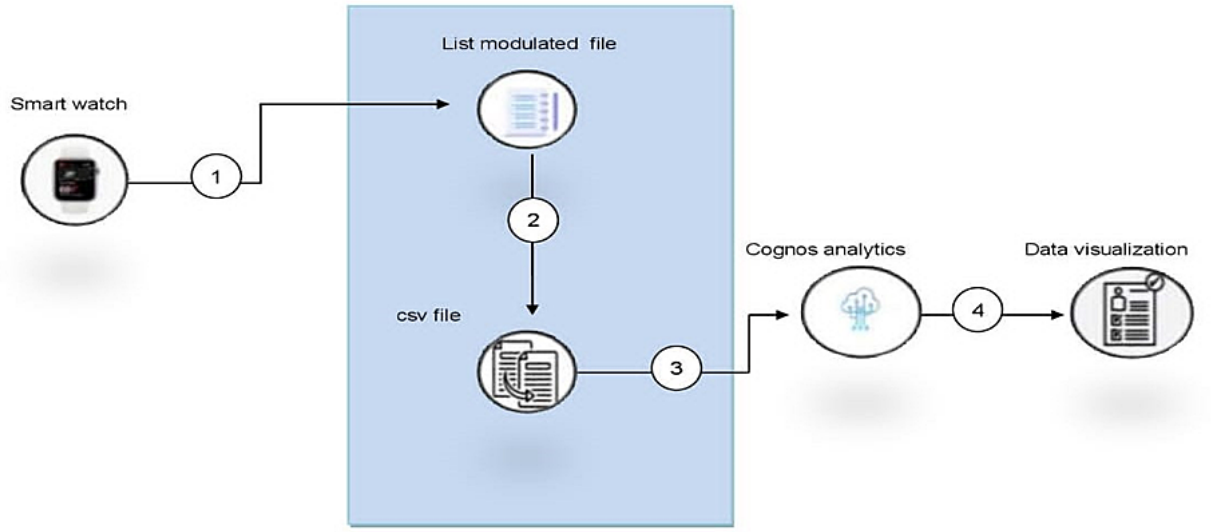
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depictthe right amountof the system requirement graphically. It shows how data enters and leaves the system, what changesthe information, and where data is stored.

Data Flow Diagram for Heart DiseasePrediction Dashboard:

DFD LEVEL 0:



DFD LEVEL 1:



5.2 Solution and Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gapbetween business problems and technology solutions. Its goals are to:

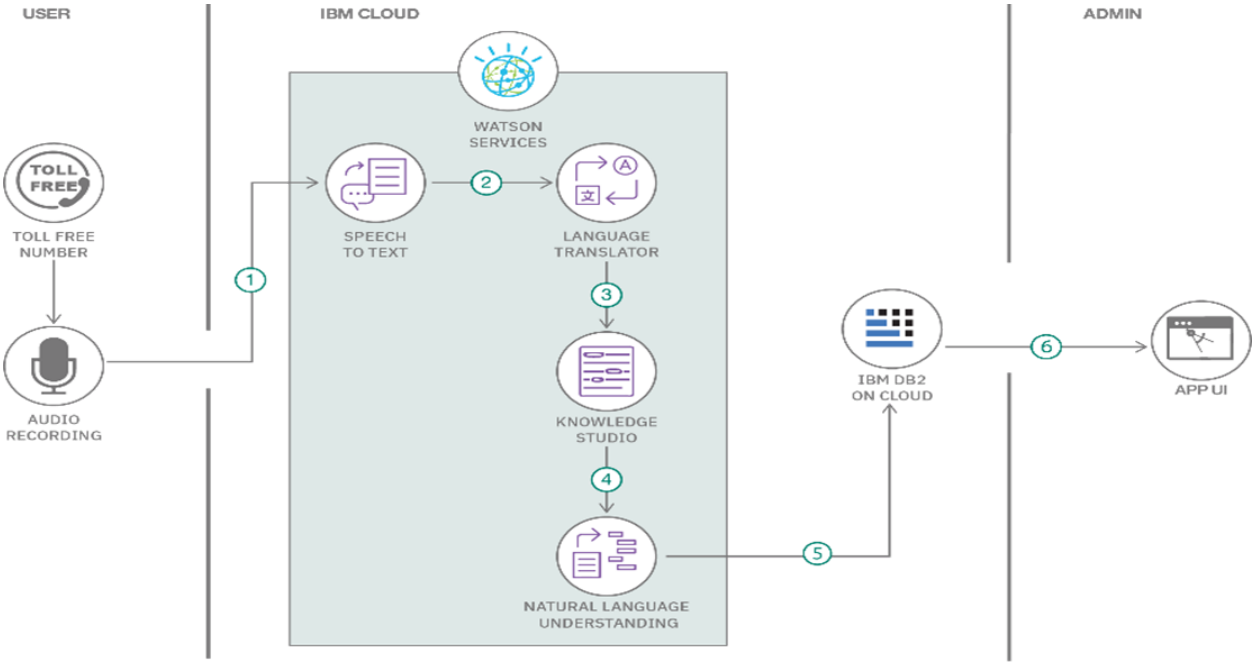
i. Find the best tech solution to solve existing business problems.

ii. Describe the structure, characteristics, behaviour, and other aspects of thesoftware to project stakeholders.

iii. Define features, development phases, and solutionrequirements.

iv. Provide specifications according to which the solution is defined, managed, anddelivered.

Solution Architecture Diagram:



Technology Stack (Architecture &Stack):

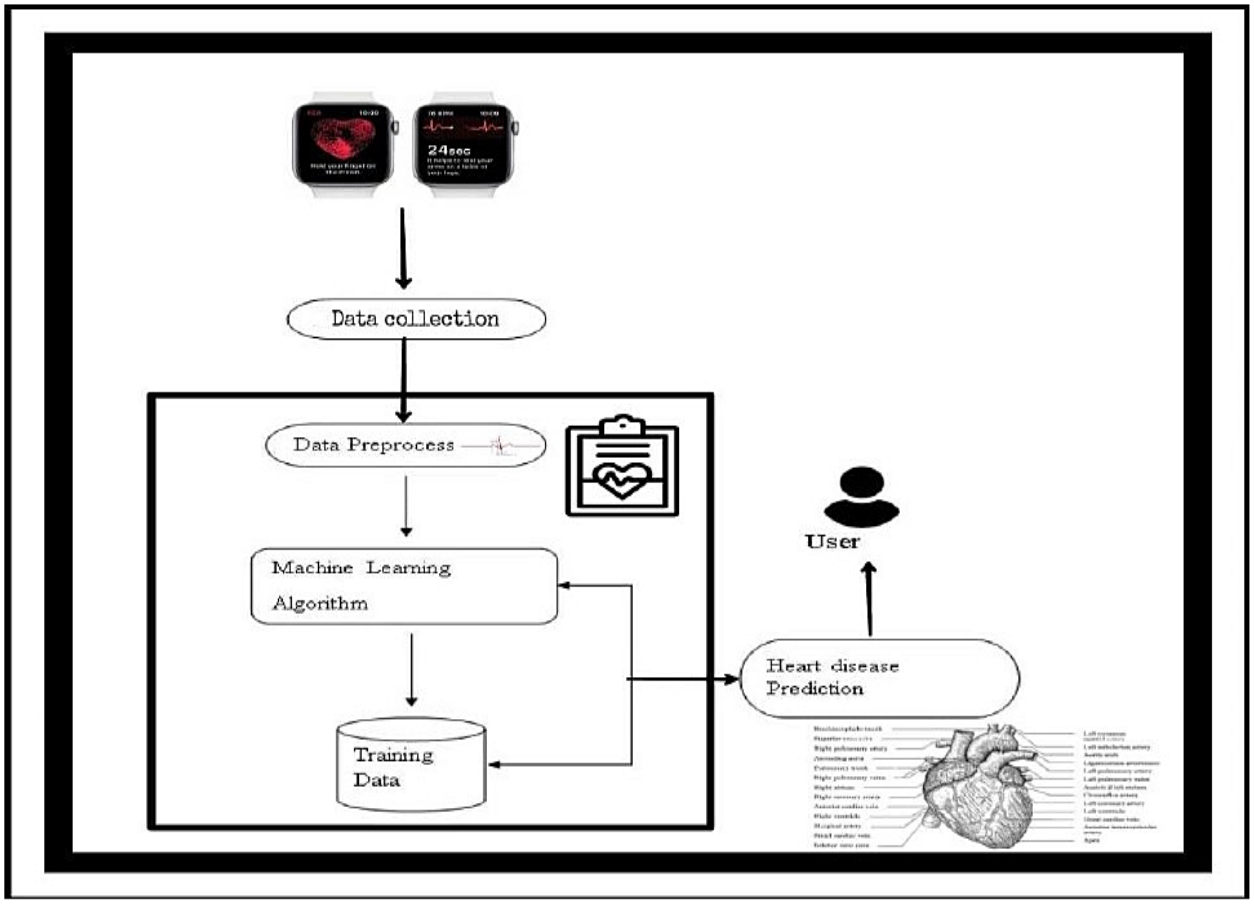


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. WebUI, Mobile App, Chatbotetc.	HTML, CSS, JavaScript / Angular Js /ReactJs etc.
2.	Application Logic-1	Logic fora process in the application	Python
3.	Application Logic-2	Logic fora process in the application	IBM Watson,IBM Cognos Analytics
4.	Application Logic-3	Logic fora process in the application	IBM CognosAnalytics
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, Cloudant DB ,OLAP
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or LocalFilesystem
8.	External API-1	Purpose of External API used in the application	IBM WatsonAPI
9.	Machine Learning Model	Purpose of Machine Learning Model	Regression Model,Classification Model, Clustering Model,Object Recognition Model,etc.,

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Power BI is truly an interactive tool that gets connected with online platforms to fetch the data for you. With the connectors and pre-installed dashboards, Power BI can analyze the data and present visually creative reports by connecting with Google Analytics, Salesforce, and other important software.	Microsoft PowerBI, IBM Cognos
2.	Security Implementations	Authenticated users Hosted on Cloud-based servers, it offers strong, multilayer security to all data exchanged, alsoremains protected fromCyber attacks	IBM Cloud
3.	Scalable Architecture	Support feature increase in throughput and able to handle data of any patient at any given point of time withoutaffecting the stability.	Cognos BI
4.	Availability	Ensure that data is available to the end users, Reliable accessto data.	AWS, Cloudplatforms, Microsoft Power BI
5.	Performance	The process of quickly examining extremely largedata sets to find insights. Thisis done by usingthe parallel processing of high performance computingto run powerful analytic software.	IBM CognosAnalytics

5.3User Stories

User Type	Functional Requirement (Epic)	User StoryNumber	User Story / Task	Acceptance criteria	Priority	Release
Patient (Smart Watch user)	Use the smart watch	USN-1	As a user,I can wear the smartwatch to monitor the Heart Rate	I can access the data through app such asHealth apps	High	Sprint-1
		USN-2	As a user, I will receivethe Heart Ratedata as csv file	I can get data through the registered health monitor app	High	Sprint-1
		USN-3	As a user, I compress the Heart Datathrough list type	I can compress data through jupyternotebook	Low	Sprint-2
		USN-4	As a user, I upload thecompressed data to cognos cloud		Medium	Sprint-1
	Login	USN-5	As a user, I can acessmy dashboard through my user id		High	Sprint-1
	Dashboard		Dashboard to visualize Heart rate to predict theHeart Disease			

CHAPTER 6
PROJECT SHEDULING AND PLANNING

6.1

Use the below templateto create product backlogand sprint schedule

Sprint	Functional Requirement (Epic)	User StoryNumber	User Story/ Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I wear my smart watch and measure my Heart rate	2	High	Rajkumar Sugumaran
Sprint-1		USN-2	As a user, I use health monitoring app to collect the Heart beat data	1	High	Jeyaram Ramar
Sprint-2		USN-3	As a user, I can collaborate the data and modulated as csv file	2	Low	Sugumaran Rajkumar Ramar
Sprint-1		USN-4	As a user, I collaborate the data with cognos data analytics tool	2	Medium	Rajkumar Jeyaram Ramar
Sprint-1	Login	USN-5	As a user, I use cognos Watson API to visualize the Heart disease	1	High	Rajkumar sugumaran Ramar Jeyaram
	Dashboard		The Heart Disease Visualize the in the dashboard			

6.2

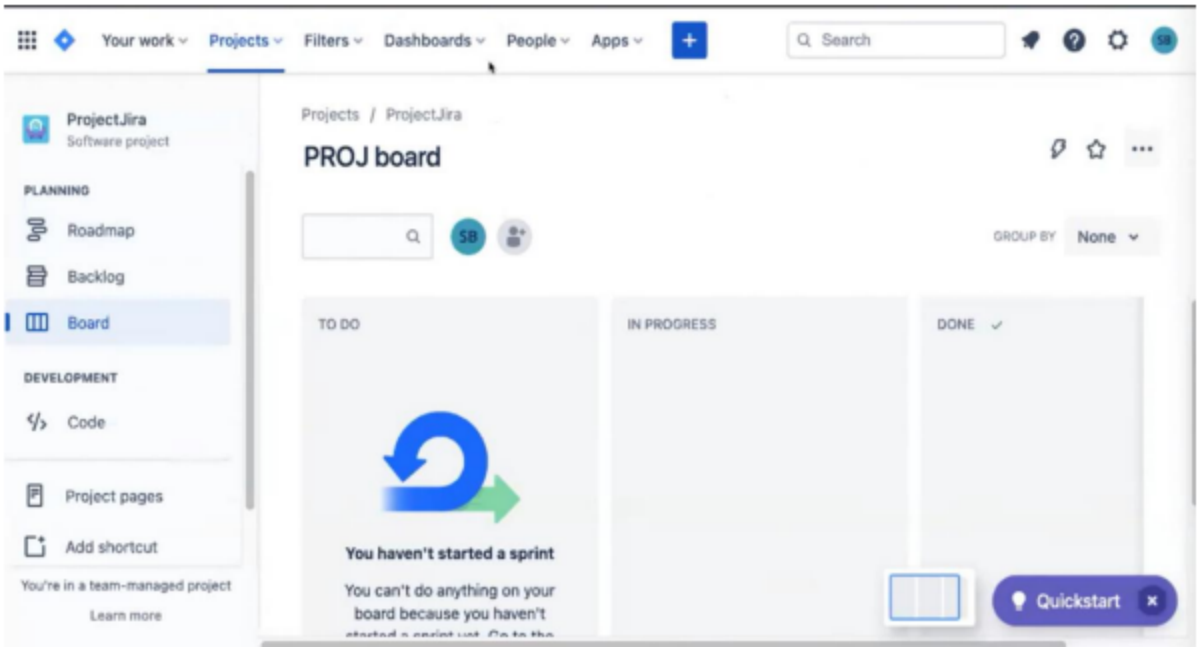
Project Tracker, Velocity & Burndown Chart:

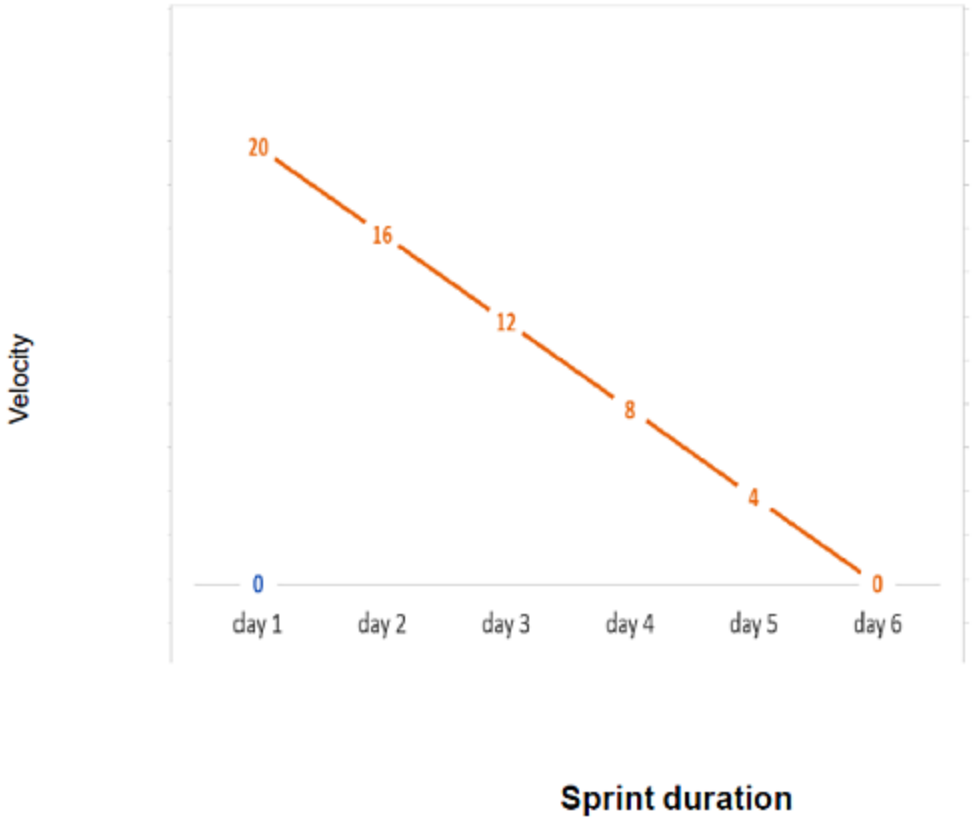
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint ReleaseDate(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	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

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (pointsper sprint). Let’s calculate the team’s averagevelocity (AV) per iteration unit (story points per day)

6.3 Report from JIRA




Velocity
20
16
12
8
4
0
0
day 1
day 2
day 3
day 4
day 5
day 6
Sprint duration

CHAPTER 7
CODING AND SOLUTION

7.1 RANDOM FOREST

Random Forest is a supervised learning algorithm. Random forest can be used for bothclassification and regression problems, by using random forest regressor we can use random forest on regression problems. But we have used random forest on classification in this internship project so we will only consider the classification part

I Random Forest pseudocode

1. Randomly select “k” features from total “m” features. Where k <<m
2. Among the “k” features, calculate the node “d” usingthe best split point.
3. Split the node into daughter nodes using the best split.
4. Repeat 1 to 3 steps until the “l” number of nodes has been reached.
5. Build forest by repeating steps 1 to 4 for “n” number times to create “n” number oftrees.

II Random Forestprediction pseudocode

Takes the test features and use the rules of each randomly created decision tree topredictthe outcome and stores the predicted outcome (target).

Calculate the votes for each predicted target.
Consider the highly voted predicted target as the final prediction from the randomforestalgorithm.

CODE:

```
max_accuracy = 0

for x in range(500):
    rf_classifier = RandomForestClassifier(random_state=x)
    rf_classifier.fit(X_train,Y_train)
    Y_pred_rf = rf_classifier.predict(X_test)
    current_accuracy = round(accuracy_score(Y_pred_rf,Y_test)*100,2)
    if(current_accuracy>max_accuracy):
        max_accuracy = current_accuracy
        best_x = x

print(max_accuracy)
print(best_x)

rf_classifier = RandomForestClassifier(random_state=best_x)
rf_classifier.fit(X_train,Y_train)
Y_pred_rf = rf_classifier.predict(X_test)
Y_pred_rf.shape
score_rf = round(accuracy_score(Y_pred_rf,Y_test)*100,2)
score_rf
```

7.2 K-Nearest Neighbors

We can implement a KNN model by following the below steps:

1. Load the data
2. Initialize the value of k
3. For getting the predicted class, iterate from 1 to total number of training data points

Calculate the distance between test data and each row of training data. Here we will use Euclideandistance as our distance metricsince it's the most popularmethod. The othermetricsthat can beused are Chebyshev, cosine, etc.

1. Sort the calculated distances in ascending order based on distance values
2. Get top k rows from the sortedarray
3. Get the most frequent class of these rows
4. Return the predicted class

CODE:

```
knn_classifier= KNeighborsClassifier(n_neighbors=31,leaf_size=30)
knn_classifier.fit(X_train,Y_train)
Y_pred_knn = knn_classifier.predict(X_test)
score_knn = round(accuracy_score(Y_pred_knn,Y_test)*100,2)
score_knn
```

7.3 NAÏVE BAYES THEOREM

Bayes'Theorem is stated as:

$$P(h|d) = (P(d|h) * P(h)) / P(d)$$

P(h|d) is the probability of hypothesis h given the data d. This is called the posterior probability.

P(d|h) is the probability of datad given that the hypothesis h was true.

P(h) is the probability of hypothesis h being true (regardless of the data). This is called the prior probability of h.

P(d) is the probability of the data (regardless of the hypothesis).

We are interested in calculating the posterior probability of P(h|d) from the priorprobability p(h) with P(D) and P(d|h). After calculating the posterior probability for a number of different hypotheses, we will select the hypothesis with the highest probability. This is the maximum probable hypothesis and may formally be called the (MAP) hypothesis.

This can be writtenas:

$$MAP(h) = max(P(h|d)) \text{ or}$$

MAP(h) = max((P(d|h) * P(h)) / P(d)) orMAP(h) = max(P(d|h) * P(h))

The P(d) is a normalizing term which allows us to calculate the probability. We candrop it when we are interested in the most probable hypothesis as it is constant and only used to normalize. Back to classification, if we have an even number of instances in each class in our training data, then the probability of each class (e.g. P(h)) will be equal. Again,this would be a constant term in our equation, and we could drop it so that we end up with:

$$MAP(h) = max(P(d|h))$$

Naive Bayes is a classification algorithm for binary (two-class) and multi-class classification problems. The techniqueis easiest to understand when described using binary or categorical input values. It is called Naive Bayes or Idiot Bayes because the calculation of the probabilities for each hypothesis are simplified to make their calculation tractable. Rather than attempting to calculate the values of each attribute value P (d1, d2, d3|h), they are assumed to be conditionally independent given the targetvalue and calculated as P(d1|h) * P(d2|H) and so on. This is a very strong assumption that is most unlikelyin real data, i.e. that the attributes do not interact. Nevertheless, the approach performssurprisingly well on data where this

assumption does not hold.

$$MAP(h) = max(P(d|h) * P(h))$$

Gaussian Naïve Bayes:

mean(x) = 1/n * sum(x)

Where n is the number of instances and x are the values for an input variable in your training data. We can calculatethe standard deviation using the following equation:

*standard deviation(x) = sqrt (1/n * sum(xi-mean(x)^2))*

This is the square root of the average squareddifference of each value of x from the mean value of x, where n is the number of instances, sqrt() is the square root function, sum() is the sum function, xi is a specific value of the x variable for the i'th instance and mean(x) is described above, and ^2 is the square. Gaussian PDF with a new input for the variable, and in return the Gaussian PDF will providean estimate of the probability of that new input value for that class.

*pdf (x, mean, sd) = (1 / (sqrt (2 * PI) * sd)) * exp (-((x-mean^2)/(2*sd^2)))*

Where pdf(x) is the Gaussian Probability Density Function (PDF), sqrt () is the squareroot, mean and sd are the mean and standard deviation calculated above, Pi is the numerical constant, exp () is the numerical constant e or Euler's numberraised to power and x is the input valuefor the input variable.

Code:

```
nb_classifier = GaussianNB(
var_smoothing=1e-50)
nb_classifier.fit(X_train,Y_train)
nb_classifier.predict(X_test)
Y_pred_nb = nb_classifier.predict(X_test)
score_nb =
```

round(accuracy_score(Y_pred_nb,Y_test)*100,

2)score_nb

WEB APP CODE

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Heart Disease Prediction</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.1/dist/css/bootstrap.min.css" rel="stylesheet">
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.1/dist/js/bootstrap.bundle.min.js"></script>
</head>
<body>
<div class="container-fluid p-5 bg-primary text-white text-center"> <h1> Visualizing and Predicting Heart Diseases with an Interactive Dashboard</h1>
<p>Heart Disease Prediction dashboard</p>
<p><iframe src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FVisualizing%2Band%2Bpredicting%2Bheart%2Bdisease%2Bwith%2Binteractive%2Bdashboard%2B1&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model0000018481363d53_00000000" width="1024" height="768" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe></iframe></p>
</div>
</body>
</html>
```

CHAPTER 8
TESTING

8.1

a. Testing*Acceptance Testing*

UAT Execution& Report Submission

Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [Visualizing and Predicting Heart Diseases]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 are resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
BP	12	4	1	3	20
Cholesterol	10	7	0	5	24
Thallium	5	3	5	1	6
ECG	8	2	8	18	40
Obesity	7	6	4	0	16
St depression	2	4	6	2	8
Totals	44	26	24	29	114

Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
BP	23	0	0	21
Cholesterol	36	0	0	26
Thallium	2	0	0	4
ECG	51	0	0	45
Obesity	8	0	0	8
ST depression	1	0	0	3

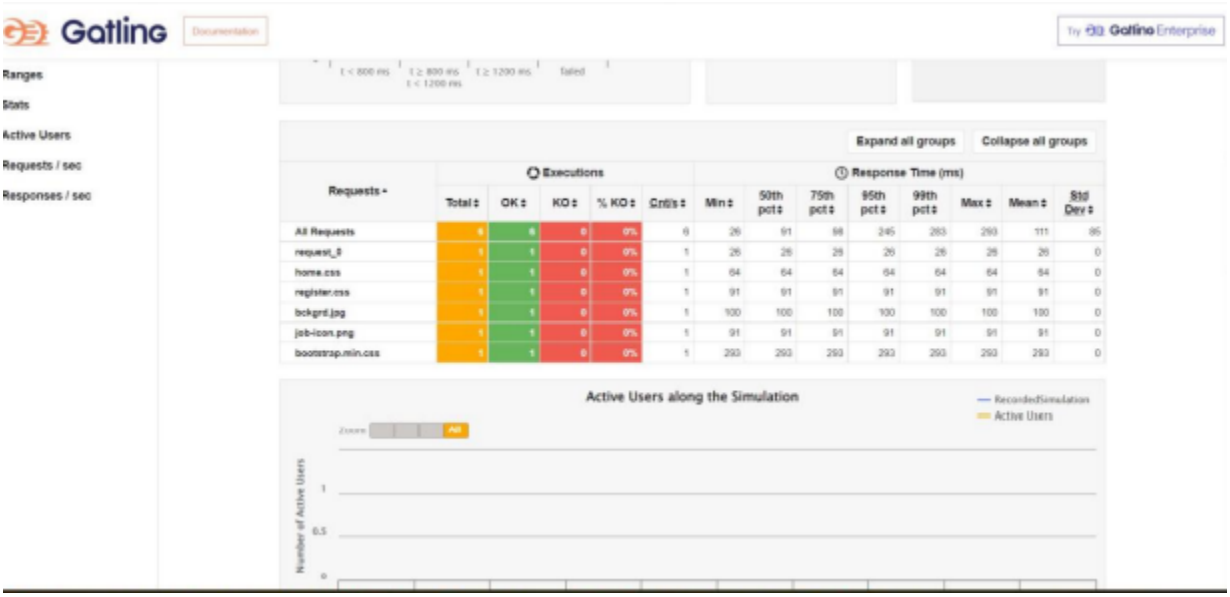
8.2 Test Case Report

Date	13-Nov-22	
Team ID	PNT2022TMID50017	
Project Name	Project - Visualizing and Predicting Heart Diseases with an Interactive Dashboard	
Maximum Marks	4 marks	

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID	Executed By
BP	dashboard/report, story	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Working as expected	Pass	Cognos analytics to accurate predict of patients Bp	yes	high	RAJKUMAR
Cholesterol	Dashboard/report, report	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Working as expected	pass	Cognos analytics to accurate predict of patients Cholesterol	yes	high	SUGUMARAN
Thallium	Dashboard/report, Story	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Not Working as expected	fail	some data not accuracy	no	low	JEYARAM
ECG	Dashboard/report, Story	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Working as expected	pass	Cognos analytics to accurate predict of patients Bp	yes	high	RAMAR
Obesity	Dashboard/report, Story	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Not Working as expected	fail		no	medium	JAYARAM RAMAR
ST Depression	Dashboard/report, Story	Cognos Analytics	Verify the dataset for accurate performance	A quality dataset	1.Upload the dataset 2.Explore the data 3.Create dashboard/Report, Story	https://github.com/IBM-EPBL/IBM-Project-41128-1660639596/blob/main/Final%20Delivarables/Datasets/HeartDataset.csv	Accurate Prediction	Working as expected	pass		yes	high	RAJKUMAR SUGUMARAN

CHAPTER 9
RESULTS

9.1 Performance Metrix



CHAPTER 10
ADVANTAGE AND DISADVANTAGE

PROS OF VISUALIZING DASHBOARD:

- The visualizing dashboard is used to visualize the all the major heart disease problems
- Every catagory of disease can be visualized and it helps the patients to get the treatment better
- The repeatation of individual heart disease test is decrease

Cons of Dashboard:

- The Dashboard generated from the dataset should have to be accurate is one of the major concern
- The dataset is need to accurate regarding the Heart Disease

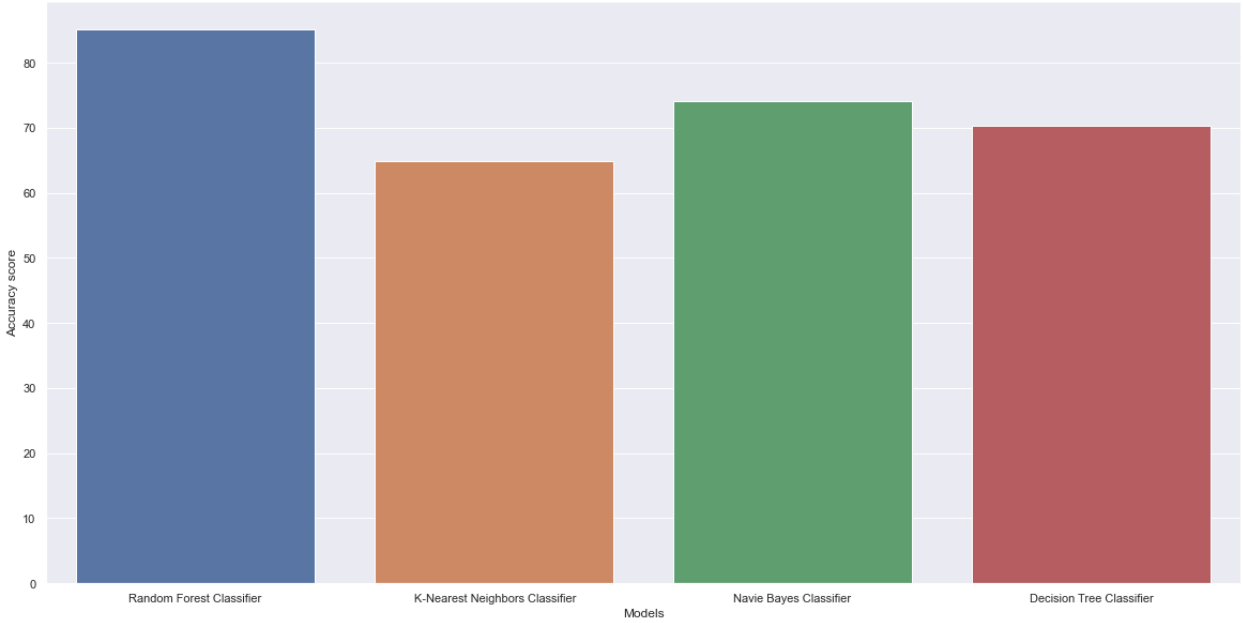
CHAPTER 11
CONCLUSION

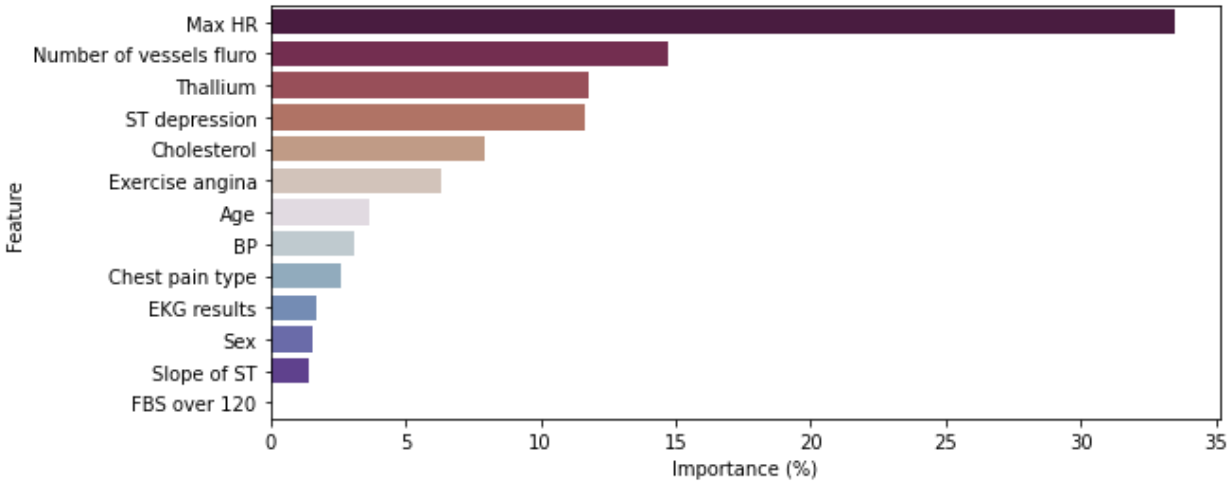
In this paper, we Heart disease visualizing interactive dashboard. The aim of this dashboard to do diagnosis of heart disease in early stage for patient and also diagnosis more accurately . The Heart disease is consist of major risk factor and also life causing concern for the patient so that this visualizing tool helps to predict the disease causing factor such as Arrhythmia , coronary artery disease and myocardial infraction based on digital visualizing ECG monitor data. The output of measurement of heart rate is get more accurately in this tool so that the wave of ECG is more accurate. So this Visualizing and predicting heart disease on interactive dashboard is more efficient.

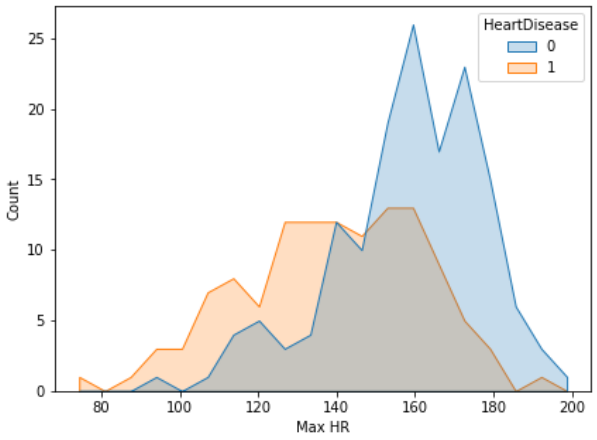
11.2 Future Scope

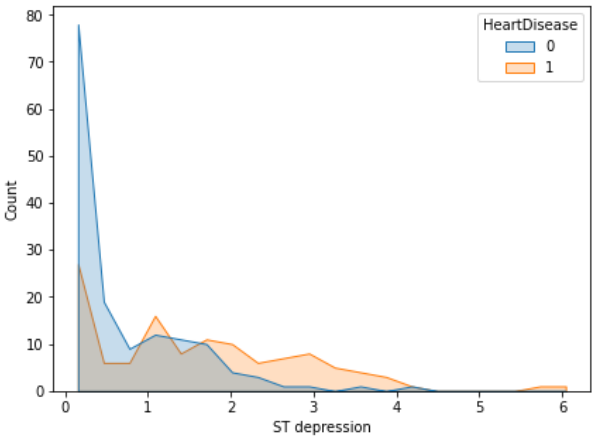
Heart disease visualizing interactive dashboard. The aim of this dashboard to do diagnosis of heart disease in early stage for patient and also diagnosis more accurately . The Heart disease is consist of major risk factor and also life causing concern for the patient so that this visualizing tool helps to predict the disease causing factor such as Arrhythmia , coronary artery disease and myocardial infraction based on digital visualizing ECG monitor data. The output of measurement of heart rate is get more accurately in this tool so that the wave of ECG is more accurate. So this Visualizing and predicting heart disease on interactive dashboard is more efficient. The future Scope of the project to update the dataset of patient heart rate report need to update accuratly and need to visualize the dashboard based on the machine

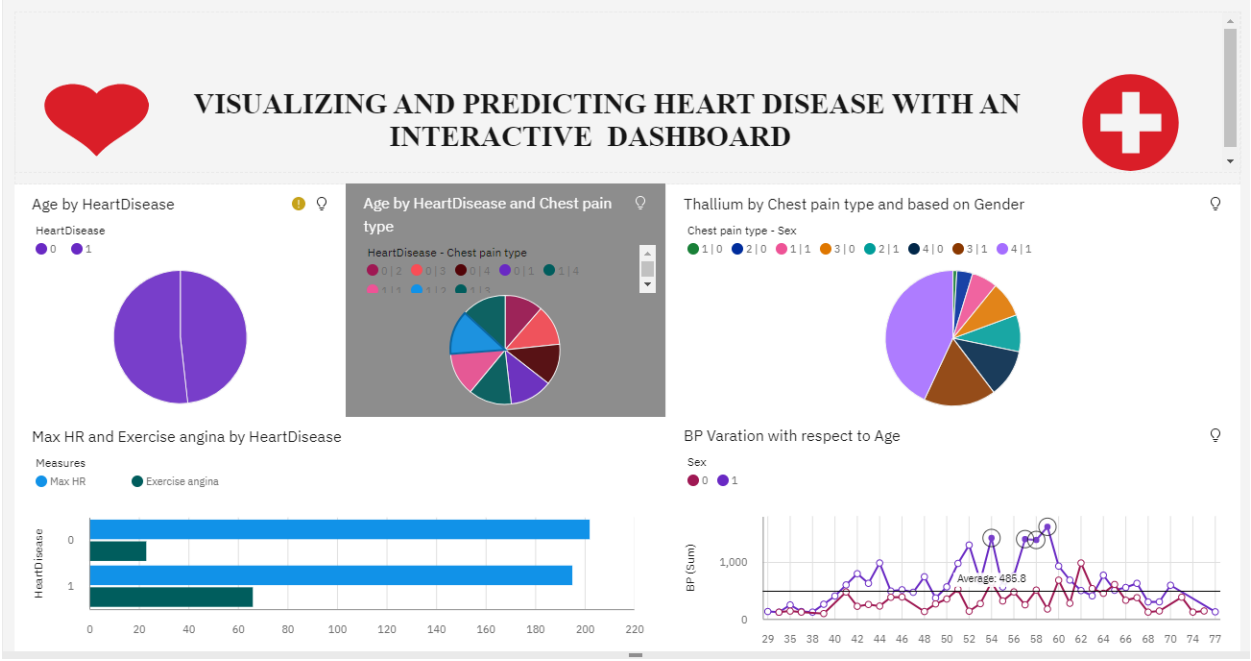
CHAPTER 12
Appendix











GITHUB LINK :https://github.com/IBM-EPBL/IBM-Project-41128-1660639596

DEMO VIDEO : https://youtu.be/S9r0t99mS3A