A NAALAIYA THIRAN PROJECT REPORT ON

VISUALIZING AND PREDICTING HEART DISEASE WITH AN INTERACTIVE DASHBOARD

TEAM ID: PNT2022TMID34243

SUBMITTED BY

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IN

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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CHAPTER 1

INTRODUCTION

Heart disease describes a range of conditions that affect your heart. Diseases under the heart disease umbrella include blood vessel diseases, such as coronary artery disease, heart rhythm problems and heart defects yo u're born with (congenital heart defects), among others. The ter m "hea t disease" is often used interchangeably with the term "cardiovascular disease". Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke

1.1 Project Overview

Machine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting outcomes without being explicitly programmedto do so. Machine learning algorithms use historical data as input to predict new output values. Machine learning Incorporates various classifiers of Supervised, Unsupervised and Ensemble Learning which are used to predict and Find the Accuracy of the given dataset. We are using machine learning in our project that helps to Predict Heart Disease it will help a lot of people. Machine learning can be used to detect whether a person is suffering from a cardiovascular disease by considering certain attributes like chest pain, cholesterol level, age of the person and some other attributes. Classification algorithms based on supervised learning which is a type of machine learning can makediagnoses of cardiovascular diseases easy.

This project focuses on mainly on data mining technique namely Logistic regression. The accuracy of our project is 82.7% which is better than the previous system. Logistic regression fallsunder the category of supervised learning. Only discrete values are used in logistic regression. 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 Kaggle. By using this dataset, we predict whether the patient can have a heart disease or not. To predict this, we use 13 medical attributes of a patient and classify them if the patients likely to have a heart disease. We have also trained a additional dataset with additional parameters that is of total 14 medical attributes in which we areusing different mining techniques such as 1) Logistic Regression 2) K-nearest neighbor classifier 3) Support Vector Classifier 4)Random Forest Classifier 5) Decision Tree Classifier these mining

techniques helped us for prediction with additional parameters with the accuracy of 82.67% which isalmost equal to the previous parameters.

1.2 Purpose

We all know that heart is the vital part that keeps a person alive other than brain. The heart is important because it pumps blood around your body, delivering oxygen and nutrients to your cells and removing waste products. If the heart does not function properly then it will lead to serious health conditions including death. For having a healthy heart, there are many solutions available in the market. Exercise can also play an important role for maintaining heart health. Apart from medical treatments, technology can also prove to be very useful in treating any heart disease. Any heart disease is predicted beforehand, then curing it would be not much complex . But predicting would be a tough task. Medical science has made excellent use often technological breakthrough storage of the standard of healthcare. These technological developments have opened the path for precise illness diagnosis and prognosis Machine learning might be a great option for you obtain a high level of accuracy when it comes to forecasting heart illnesses with the help of algorithms.

CHAPTER 2
LITERATURE SURVEY

2.1 Existing problem

Before we did the experiments, we did research on how people explored heart disease prediction so that we can broaden our horizons and learn from them. In 2017, Cheryl Ann Alexander, Li dong Wang predicted the key to cardiovascular disease management is to evaluate large scores of datasets, compare and mine for information that can be used to predict, prevent, manage and treat chronic diseases such as heart attacks. Big Data analytics, known in the corporate world for its valuable use in controlling, contrasting and managing large datasets can be applied with much success to the prediction, prevention, management and treatment of cardiovascular disease. Per the studies analyzed, Big Data analytics is useful in predicting heart attack, and the technologies used inBig Data are extremely vital to the management and tailoring of treatment for cardiovascular disease. And as the use of Big Data in healthcare increases, more useful personalized medicine will beavailable to individual patients.

Healthcare industries generate enormous amount of data, so called big data that accommodates hidden knowledge or pattern for decision making. The huge volume of data is used to make decision which is more accurate than intuition. Exploratory Data Analysis (EDA) detects mistakes, finds appropriate data, checks assumptions and determines the correlation among the explanatory variables. In the context, EDA is considered as analyzing data that excludes inferences and statistical modelling.

Analytics is an essential technique for any profession as it forecast the future and hidden pattern. Data analytics is considered as a cost-effective technology in the recent past and it plays an essential role in healthcare which includes new research findings, emergency situations and outbreaks of disease. The use of analytics in healthcare improves care by facilitating preventive care and EDA is a vital step while analyzing data.

Heart Disease Prediction using Exploratory Data Analysis
R. Indrakumari, T.Poongodi, Soumya Ranjan Jena

In this paper, the risk factors that causes heart disease is considered and predicted using K-means algorithm and the analysis is carried out using a publicly available data for heart disease. The dataset holds 209 records with 8 attributes such as age, chest pain type, blood pressure, blood glucose level, ECG in rest, heart rate and four types of chest pain. To predict the heart disease, K-means clustering algorithm is used along with data analytics and visualization tool. The paper discusses the pre-processing methods, classifier performances and evaluation metrics. In the result section, the visualized data shows that the prediction is accurate.

Prediction of heart disease at early stage using data mining and big data analytics: A survey

N. K. Salma Banu, Suma Swamy

Several studies have been carried out for developing prediction model using individual technique and also by combining two or more techniques. This paper provides a quick and easy review and understanding of available prediction models using data mining from 2004 to 2016. The comparison shows the accuracy level of each model given by different researchers.

2.2 References

- https://www.techtarget.com/searchenterpriseai/definition/machine-learning-ML
- https://www.sciencedirect.com/science/article/pii/S1877050920315210
- https://iopscience.iop.org/article/10.1088/1757-899X/1022/1/012046#:~:text=Machine%20learning%20can%20be%20used,www.who.int/cardiovascular_diseases/en/
- https://www.researchgate.net/publication/354901103_Using_Data_Visualization_to_Analyze_the_Correlation_of_Heart_Disease_Triggers_and_Using_Machine_Learning_to_Predict_Heart_Disease
- https://www.semanticscholar.org/paper/HEART-DISEASE-PREDICTION-USING-DATA-MINING-Sairam-Voruganti/269ba59bc918f43e55971d3641dd0376aed91d53
- https://www.ijert.org/heart-disease-prediction-using-data-mining-techniques

2.3 Problem Statement Definition

The USER needs a way to identify:

-whether he/she is affected by Heart disease by analyzing symptoms

-whether he/she need to or need not to consult a doctor

-notify when he/she is in risk

-improve diagnosis & quality of care

-keep up to date medical records by analyzing for predicting diseases

-advice for heart disease prevention

Problem statement:

1. Ayesha is feeling afraid that she is experiencing symptoms like high blood pressure & swollen feet. she thinking that she may suffer from heart disease. She is afraid of visiting doctors. So, she needs to know what is her condition without consulting doctor.

2. Dsouza has a chance of having a heart disease genetically. So she want to keep up date of her medical condition without going to hospital for earlier prediction.

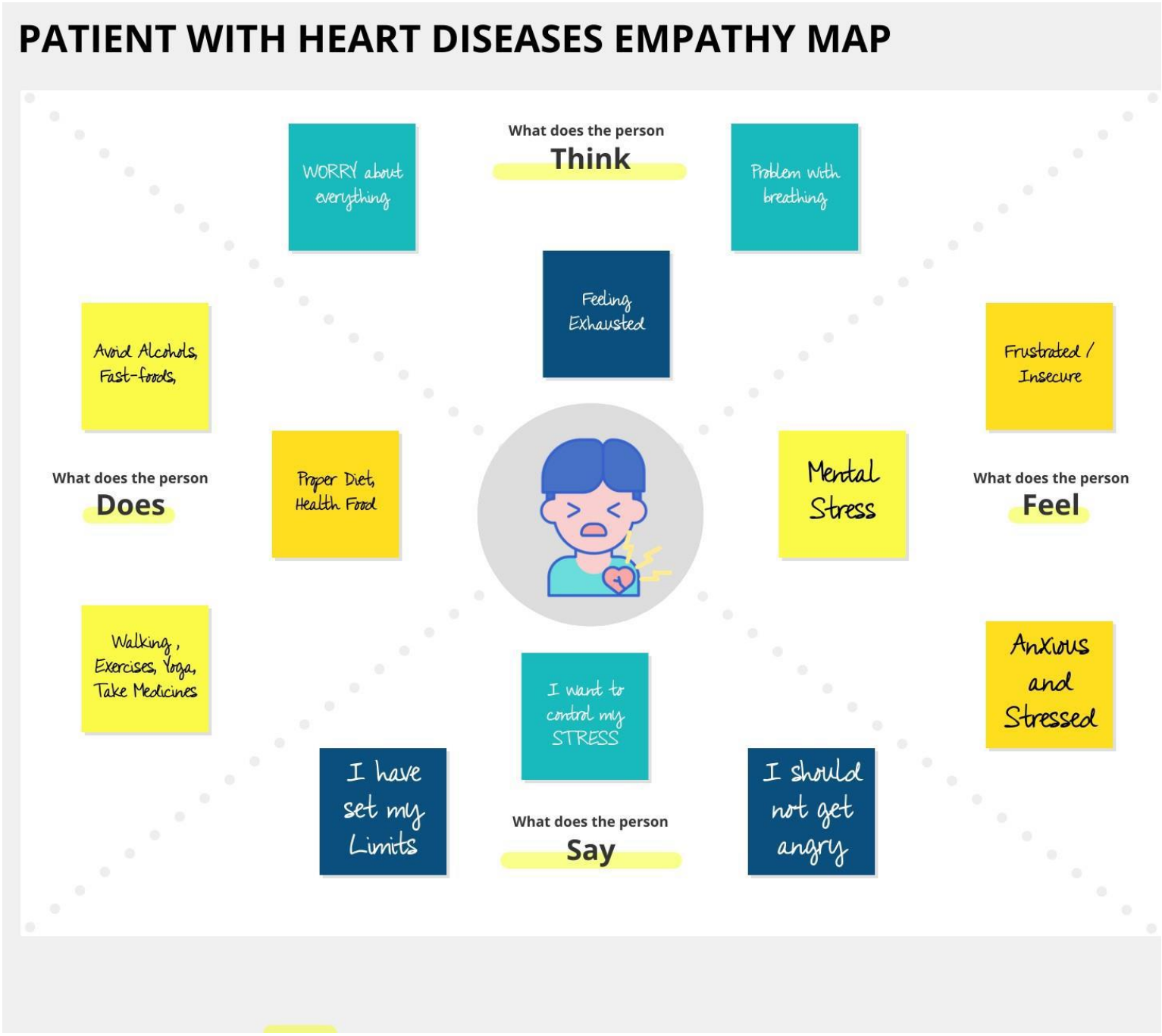
3. Suresh Gupta is a man who thinks all proper advice / treatment is provided directly by visiting doctors. suddenly one day, he had a slight symptoms of heart disease during lockdown. So how can he visit his doctor

4. Zhan ge who is a heart patient & walking on the road side. he wore a smart watch. Suddenly he fainted but there is no one around.

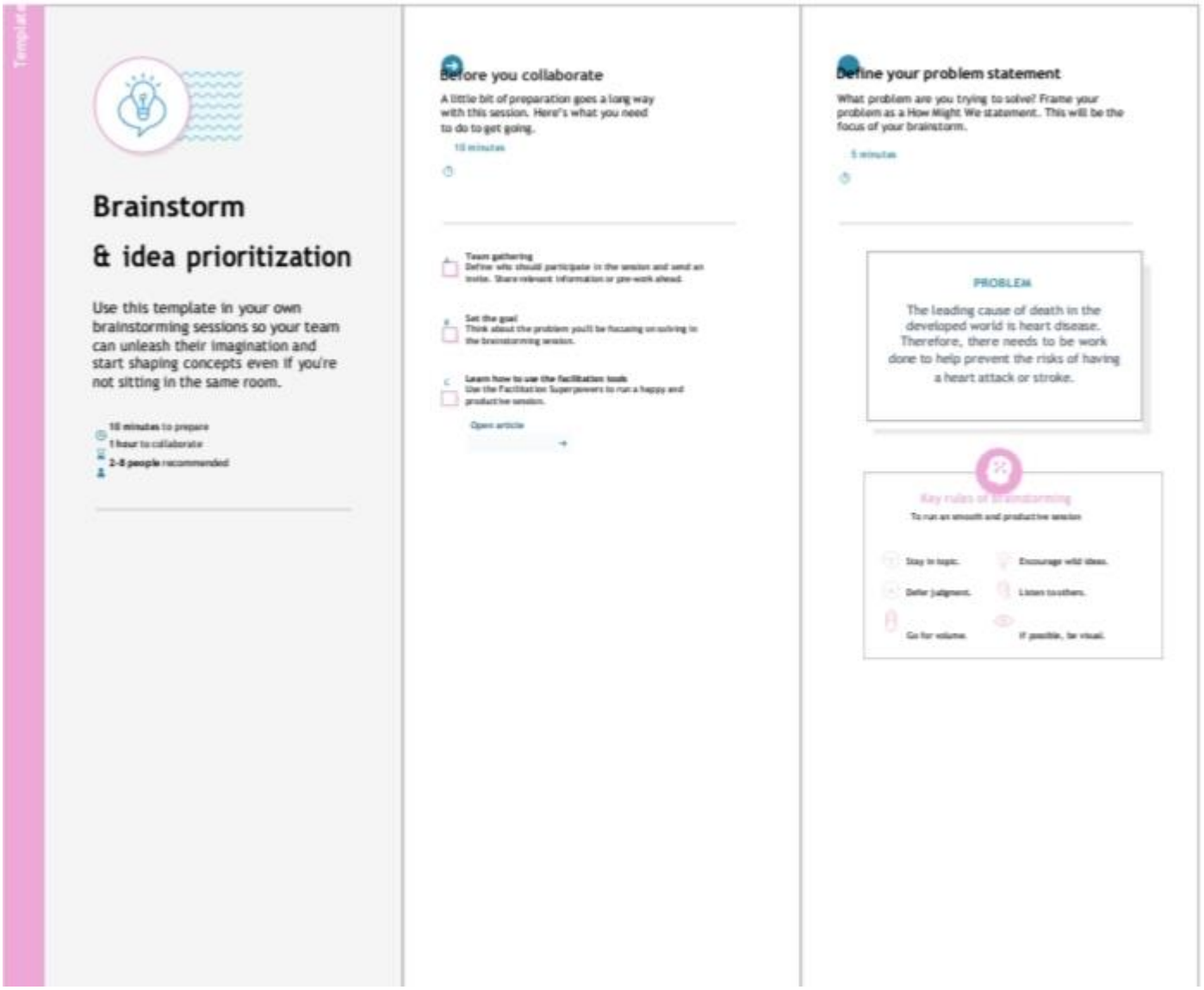
5. Prahan had a loss of breath and irregular heartbeat which is serious heart disease condition but he didn't know about it and never visited doctor about these conditions.

CHAPTER 3
IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



Brainstorm

& idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

10 minutes to prepare
1 hour to collaborate
2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

The leading cause of death in the developed world is heart disease. Therefore, there needs to be work done to help prevent the risks of having a heart attack or stroke.

Key rules of brainstorming

To run an smooth and productive session

Stay in topic.
Encourage wild ideas.
Defer judgment.
Listen to others.
Go for volume.
If possible, be visual.

Brainstorm

Write down any ideas that come to mind that address your problem statement.

GOPIKA S

Visualize the dataset

Understand the dataset

LESRIN SONA K

ANANTHI M

By making use of IBM cloud

Achieving a high accuracy

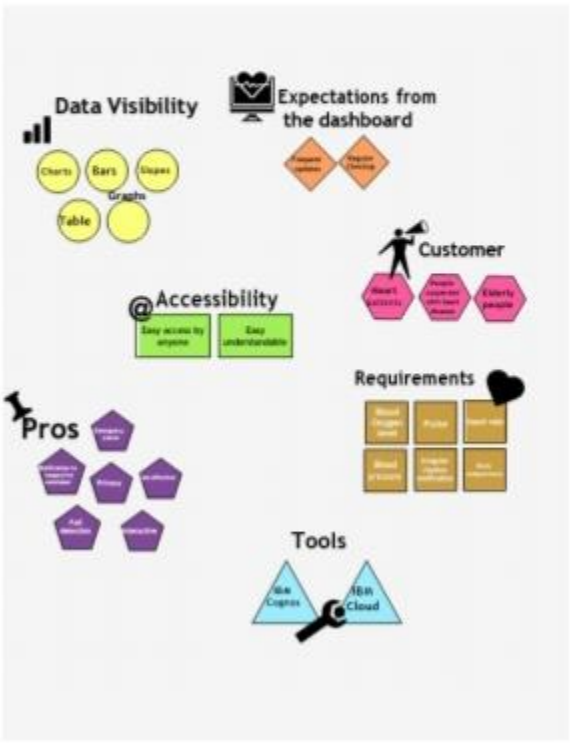
Keeping up with current trends

Collecting the proper datasets

MAGESHWARI P

Group ideas

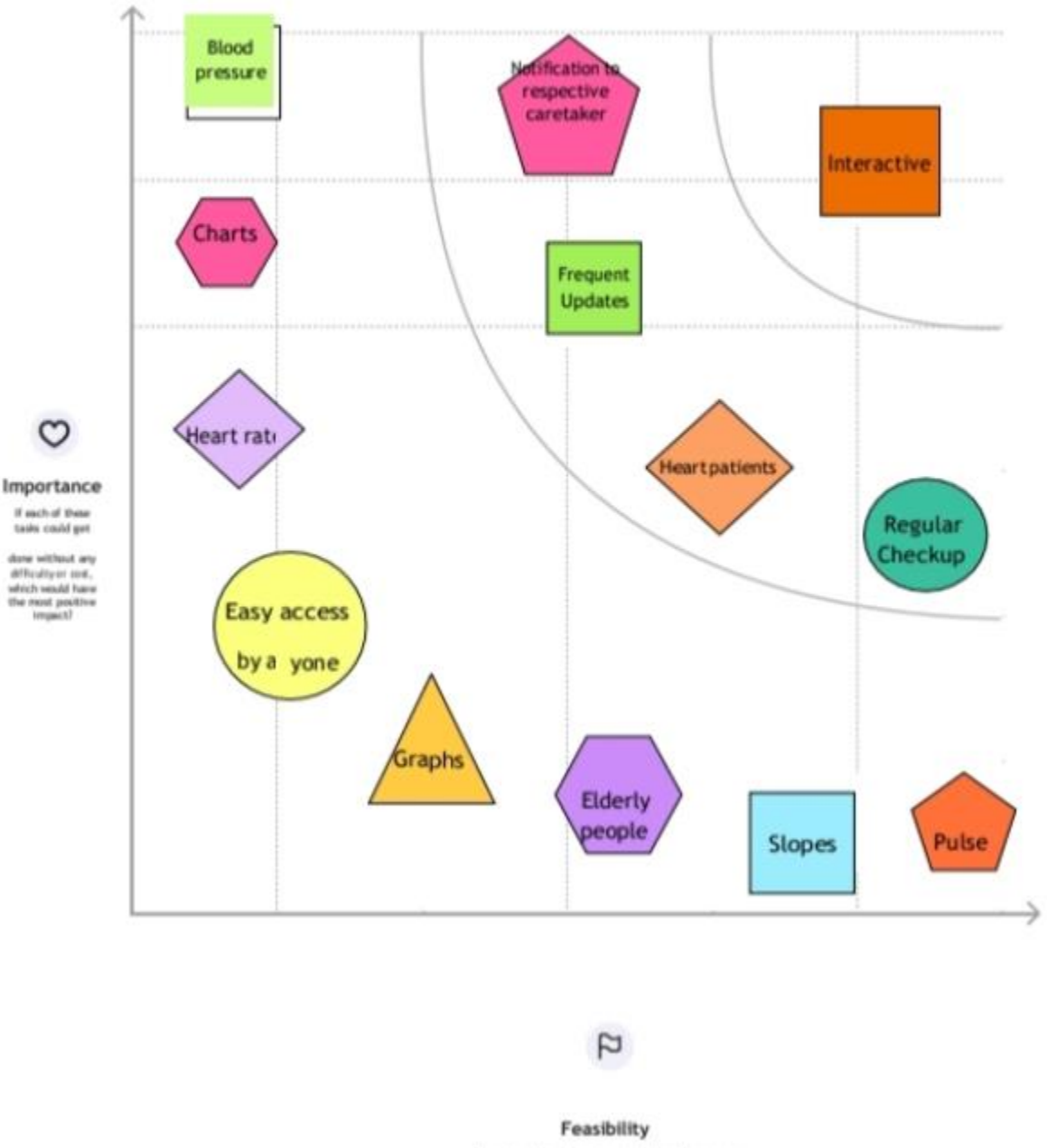
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.



Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



3.3 Proposed Solution

S.NO	Parameter	Description
1.	Problem Statement (Problem to Be Solved)	➢ To develop an interactive dashboard to predict the heart disease accurately with few tests and attributes the presence of heart disease.
2.	Idea / Solution description	➢ Analyzing data and identifying the heart disease using Cognos analysis.
3.	Novelty / Uniqueness	➢ Hoping to achieve maximum accuracy to provide prior treatment to the patients and reduce the fatality rate.
4.	Social Impact/ Customer Satisfaction	➢ Saving lives, User friendly interactive dashboard. ➢ Reduces the exorbitant medical cost of the patients. ➢ Reduces the biases and mistakes caused by the decisions of doctors based on their intuitions and experiences.
5.	Business Model (Revenue Model)	➢ Data security. ➢ Easy to use. ➢ Constant updates according to necessity.
6.	Scalability of the Solution	➢ Can be used in any platform (Windows, mac, etc., ➢ Adding new feature doesn't affect the performance of the system. ➢ Scalable dataset

3.4 Problem Solution fit

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 make registration for the application through Gmail.
FR-2	User Confirmation	Once after registration, the user will get confirmation via email.
FR-4	Visualizing data	User can visualize the trends on the heart disease through Dashboard created using IBM Cognos Analytics.
FR-5	Generating Report	User can view his/her health report and can make decisions accordingly.

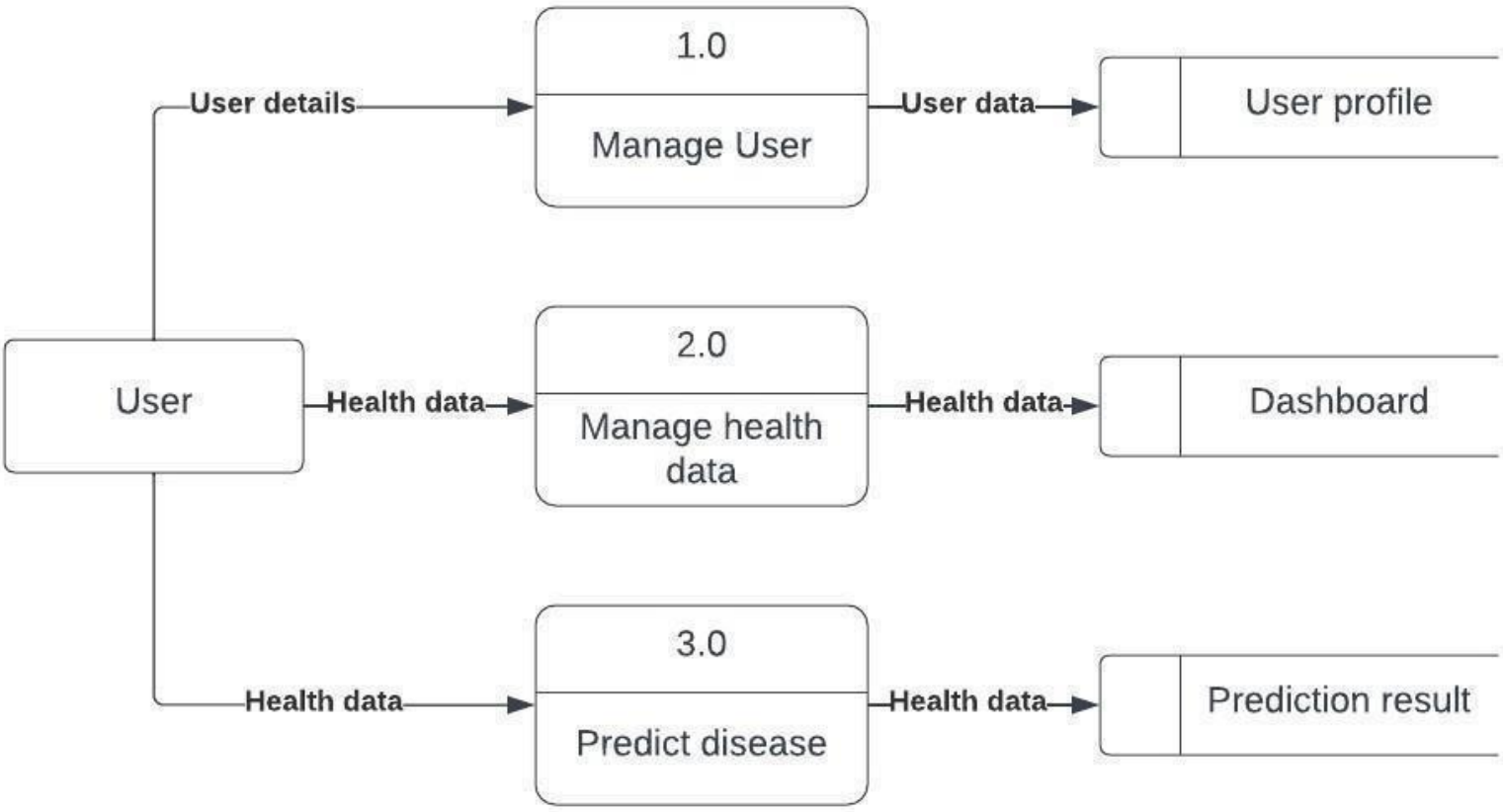
4.2 Non-functional requirements

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. Any action has to be performed with just a few clicks.

NFR-2	**Security**	For security of the application the technique known as database replication should be used so that all the important data should be kept safe. In case of crash, the system should be able to backup and recover the data
NFR-3	**Reliability**	The application has to be consistent at every scenario and has to work without failure in any environment.
NFR-4	**Performance**	Performance of the application depends on the response time and the speed of the data submission. The response time of the application is direct and faster which depends on the efficiency of implemented algorithm.
NFR-5	**Availability**	The application has to be available 24 x 7 for users without any interruption
NFR-6	**Scalability**	The application can withstand the increase in the no. of users and has to be able to develop Higher versions.

CHAPTER 5 PROJECT DESIGN

5.1 Data flow Diagrams



5.2 Solution & Technical Architecture

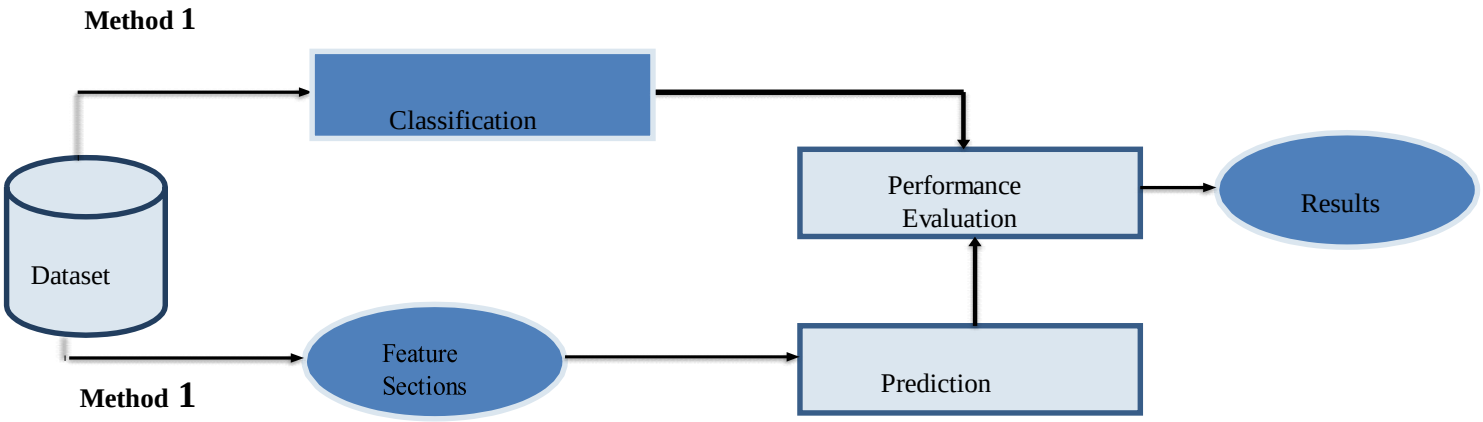


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	Importing data	Data Import lets you upload data from external sources and combine it with data you collect via Analytics	Python, numpy, pandas,
2.	Data Cleaning	Data cleaning is a process by which inaccurate, poorly formatted, or otherwise messy data is organized and corrected.	Python, numpy, pandas.
3.	Data Preprocessing	Data preprocessing, a component of data preparation, describes any type of processing performed on raw data to prepare it for another data processing procedures.	Python, numpy, scipy, pandas
4.	Training data	Training data is the subset of original data that is used to train the machine learning model.	Numpy, scipy, pandas
5.	Testing data	Test data is data which has been specifically identified for use in tests, typically of a computer program	Numpy, scipy, pandas
6.	Machine learning model	A machine learning model is a file that has been trained to recognize certain types of patterns. You train a model over a set of data, providing it an algorithm that it can use to reason over and learn from those data.	Numpy, scipy, pandas, sklearn
7.	Improve model performance	Accuracy is one metric for evaluating classification models. Informally, accuracy is the fraction of predictions our model got right.	sklearn
8.	Checking Accuracy	A data accuracy check, sometimes called a data sanity check, is a set of quality validations that take place before using data	sklearn

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Collection of Data	Data collection is the process of gathering, measuring, and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions, evaluate outcomes, and forecast trends and probabilities	Python,numpy,pandas
2.	EDA Analysis	Exploratory Data Analysis (EDA) is an approach to analyze the data using visual techniques. It is used to discover trends, patterns, or to check assumptions with the help of statistical summary and graphical representations	. Python, EDA tools
3.	Train & Test split of data	The train-test split is used to estimate the performance of machine learning algorithms that are applicable for prediction-based Algorithms/Applications. This method is a fast and easy procedure to perform such that we can compare our own machine learning model results to machine results	Basic imports of python such as scipy, numpy, pandas
4.	Model Prediction	Predictive modeling is a commonly used statistical technique to predict future behavior	Sklearn import package

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Registration	USN-1	As a 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
	Login	USN-3	As a user, I can log into the application by entering email & password	I can access my account / Dashboard when logged in	High	Sprint-1
Customer (Web user)	Dashboard	USN-4	User can view his/her complete medical analysis and prediction of heart disease in a dashboard	I can view my medical analysis in the dashboard	High	Sprint-2
		USN-5	User can view accuracy of occurrence of heart disease	I can view the accuracy of heart disease in the dashboard	High	Sprint-2
Customer Care Executive	Helpdesk	USN-6	As a customer care executive, he/she can view the customer queries.	I can post the queries in the dashboard	Medium	Sprint-3
		USN-7	As a customer care executive, he/she can answer the customer queries	I can get support from helpdesk	High	Sprint-3

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator	User profile	USN-8	As an admin, he/she can update the health details of users	I can view my updated health details	High	Spíint-4
		USN-9	As an admin, he/she can add or delete users.	I can access my account / Dashboard when logged in	High	Spíint-4
		USN-10	As an admin, he/she can manage the user details	I can view the organized data of myself	High	Spíint-4

CHAPTER 6
PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Cholesterol level	USN-1	Cholesterol is essential for your body to work, although too much 'bad cholesterol' can lead to fatty deposits building up in your arteries. These fatty deposits can increase your risk of developing heart conditions	2	High	Ananthi M Gopika S Lesrin sona K Mageshwari P
Sprint-2	Thallium	USN-2	As in humans, animal studies indicate that exposure to large amounts of thallium for brief periods of time can damage the nervous system and heart and can cause death	1	Low	Ananthi M Gopika S Lesrin sona K Mageshwari P
Sprint-3	EKG(Electrocardiogram)	USN-3	An electrocardiogram (ECG or EKG) records the electrical signal from the heart to check for different heart conditions. Electrodes are placed on the chest to record the heart's electrical signals, which cause the heart to beat	2	High	Ananthi M Gopika S Lesrin sona K Mageshwari P
Sprint-3	Exercise Angina	USN-4	Angina is a symptom of coronary artery disease. A type of chest pain caused by reduced blood flow to the heart	2	High	Ananthi M Gopika S Lesrin sona K Mageshwari P

Sprint-4	ST Depression	USN-5	An ST-elevation myocardial infarction (STEMI) is a type of heart attack that is more serious and has a greater risk of serious complications and death.	1	Medium	Ananthi M Gopika S Lesrin sona K Mageshwari P
	Dashboard	USN-6				

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 ReleaseDate (Actual)**
Spíint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Spíint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Spíint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Spíint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

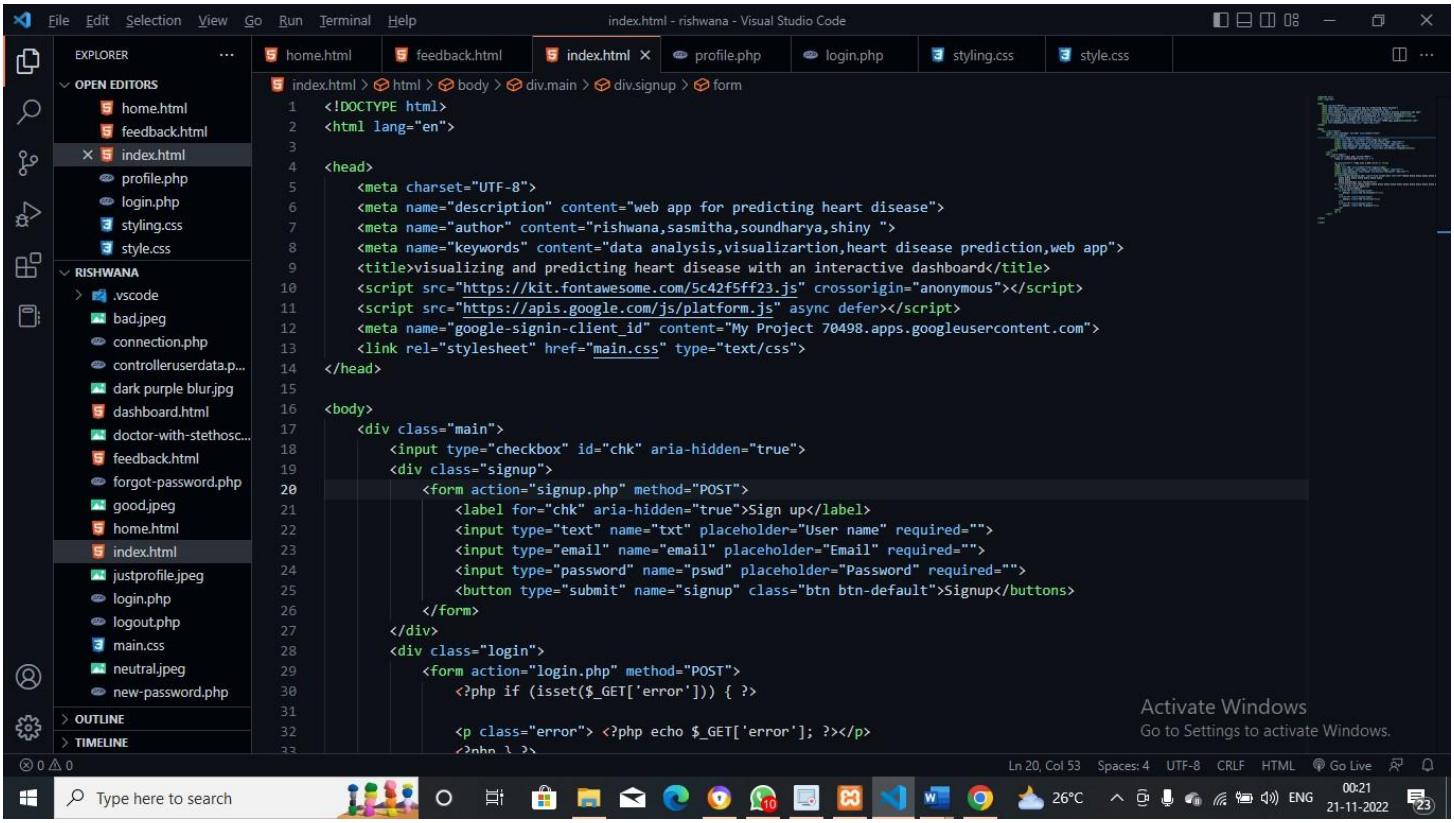
Velocity:

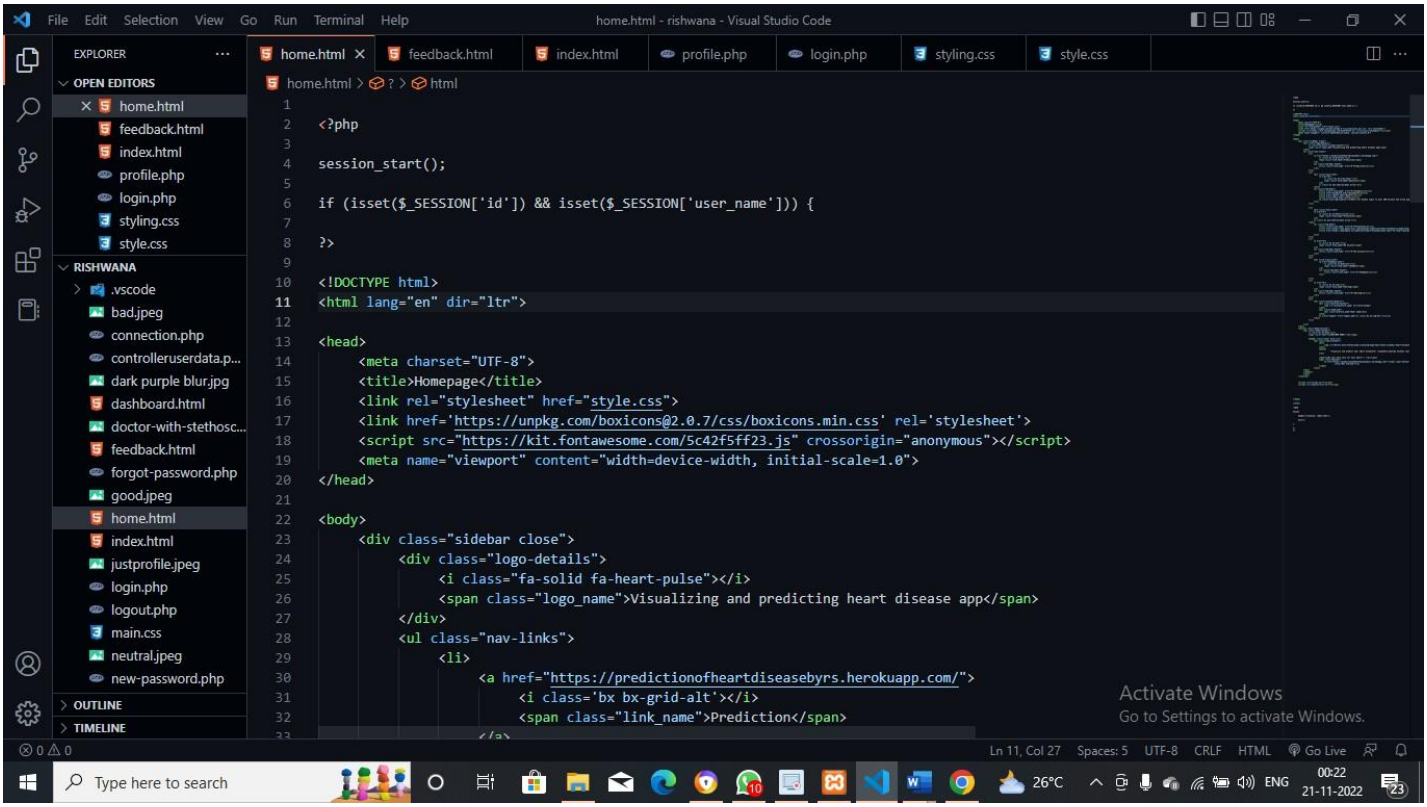
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

AV = Sprint duration/Velocity = 20/10= 2

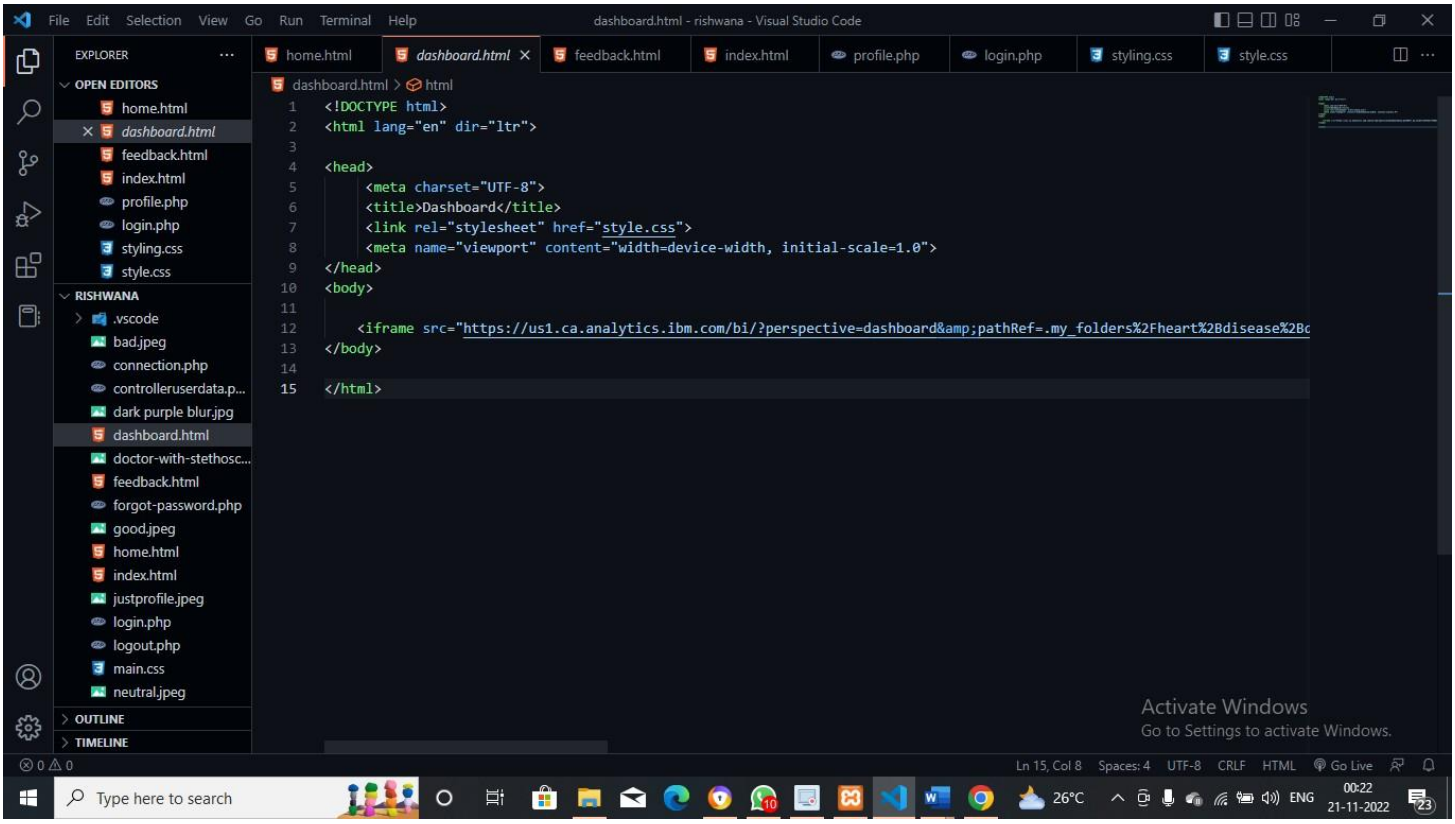
CHAPTER 7
CODING & SOLUTIONING

7.1 feature 1:



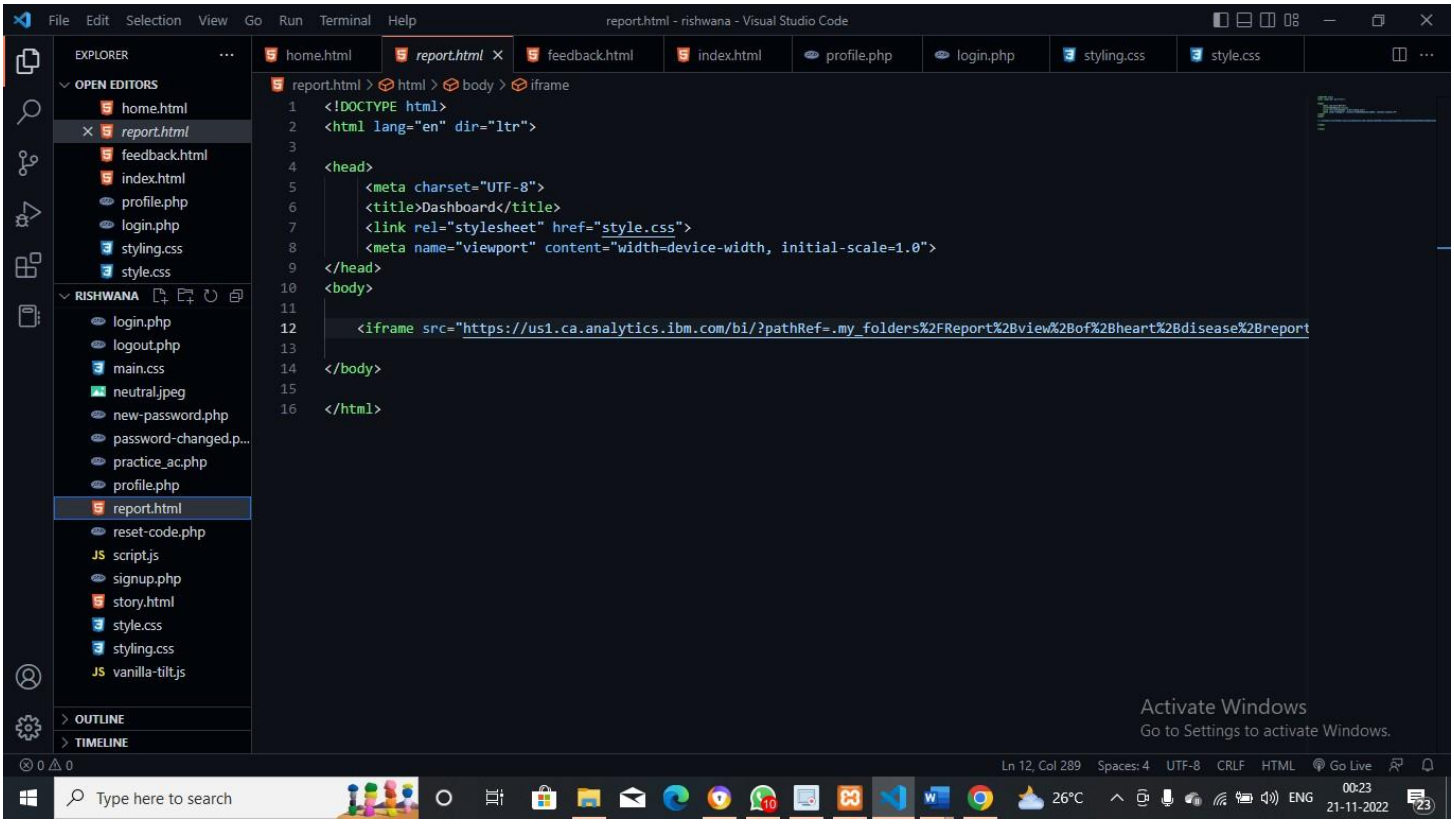


7.1.1 Dashboard



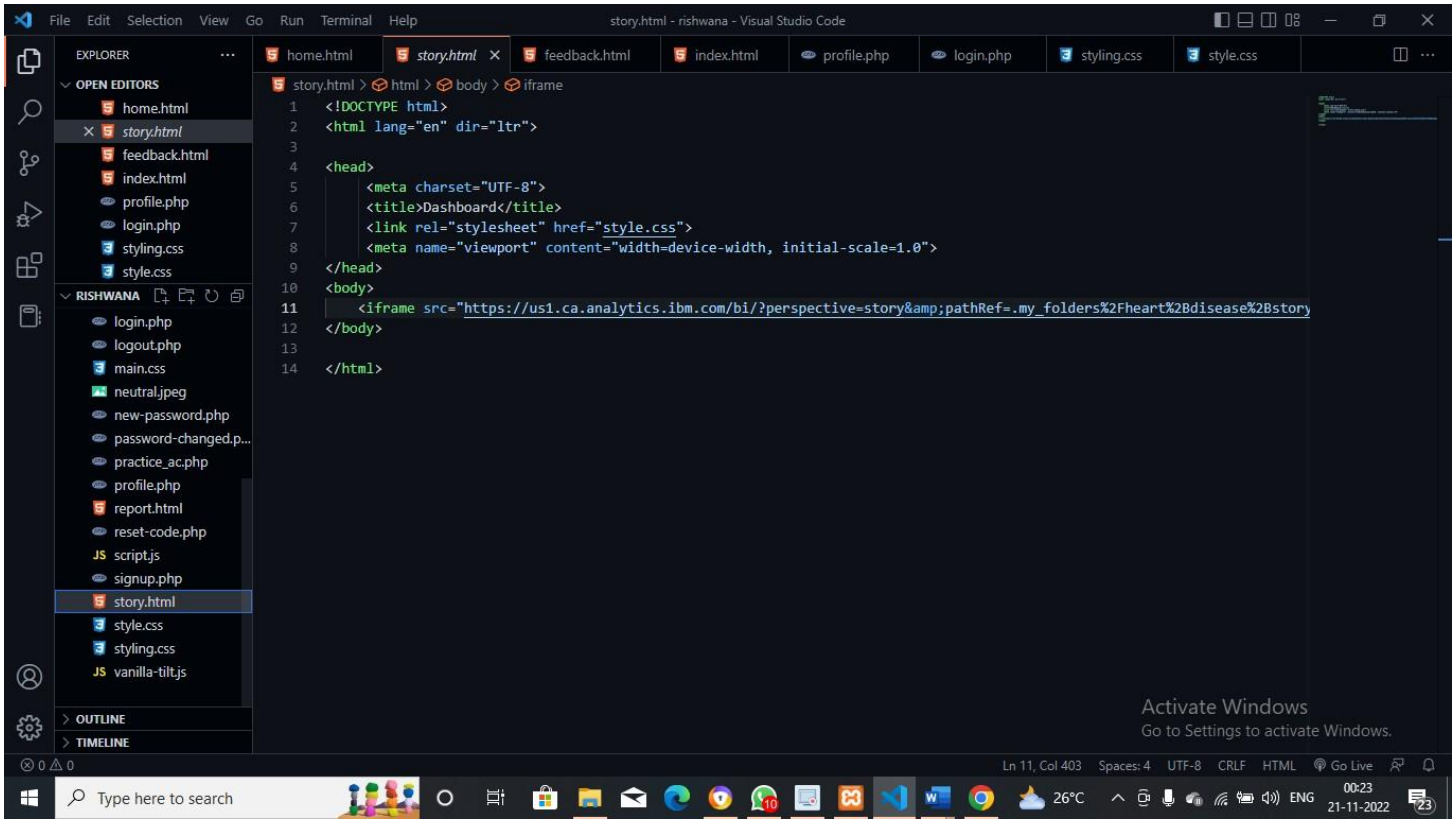
Using Cognos Analytics, dashboard is created which shows the relation between attributes and how they are responsible for chances of heart disease. The dashboard is incorporated in website using iframe. It is mandatory to have an IBM account to view the dashboard. As soon as the page is loaded,it asks to sign in to the IBM account. Once signed in, user can view the dashboard. Dashboard has multiple tabs, each containing a chart of relation between attributes. The above code shows how dashboard is included in the website.

7.1.2 Report



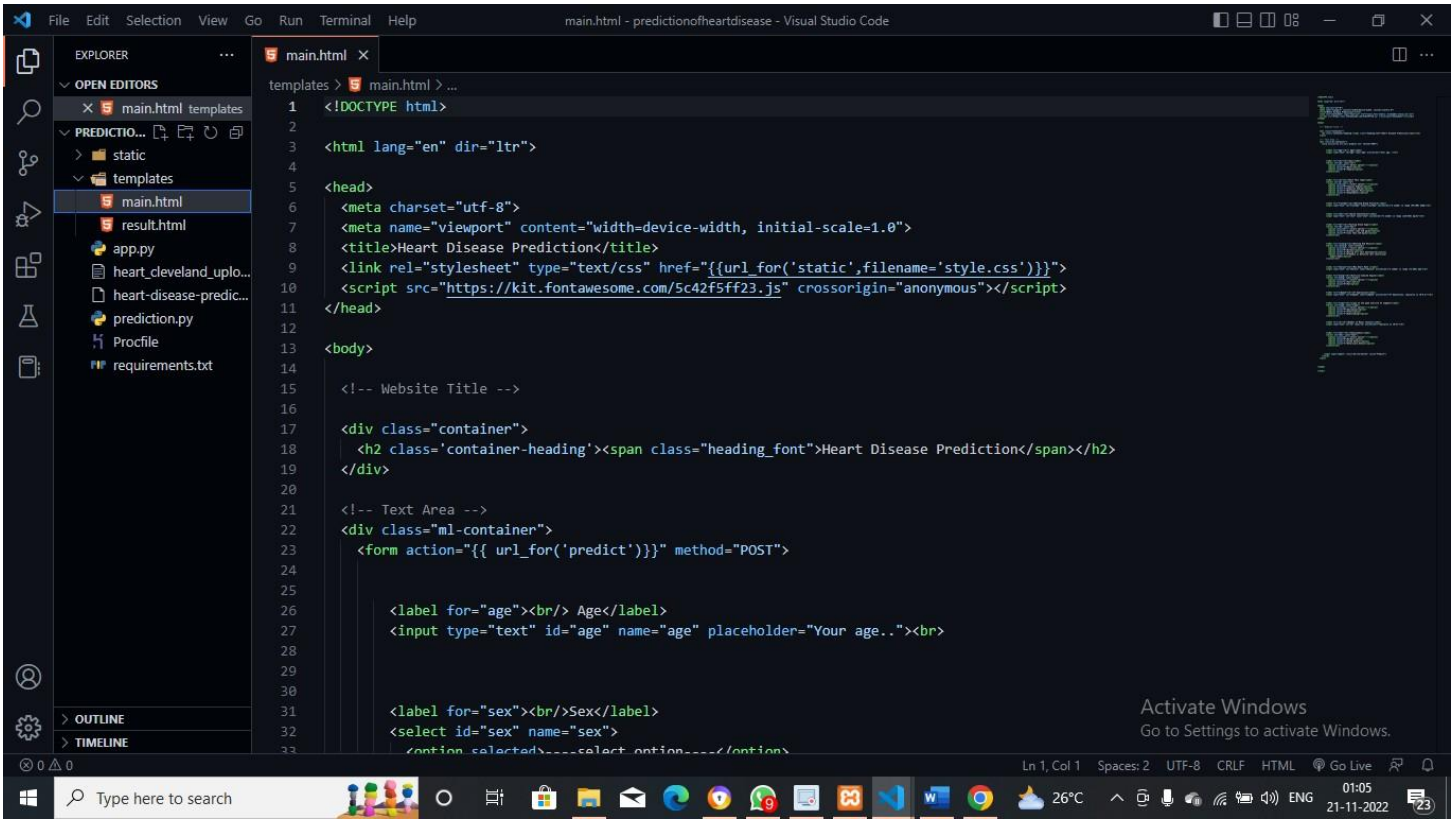
Using Cognos Analytics, Report is created which shows the relation between attributes and how they are responsible for chances of heart disease. The Report is incorporated in website using iframe. It is mandatory to have an IBM account to view the Report. As soon as the page is loaded, it asks to sign in to the IBM account. Once signed in, user can view the Report. The above code shows how Report is included in the website.

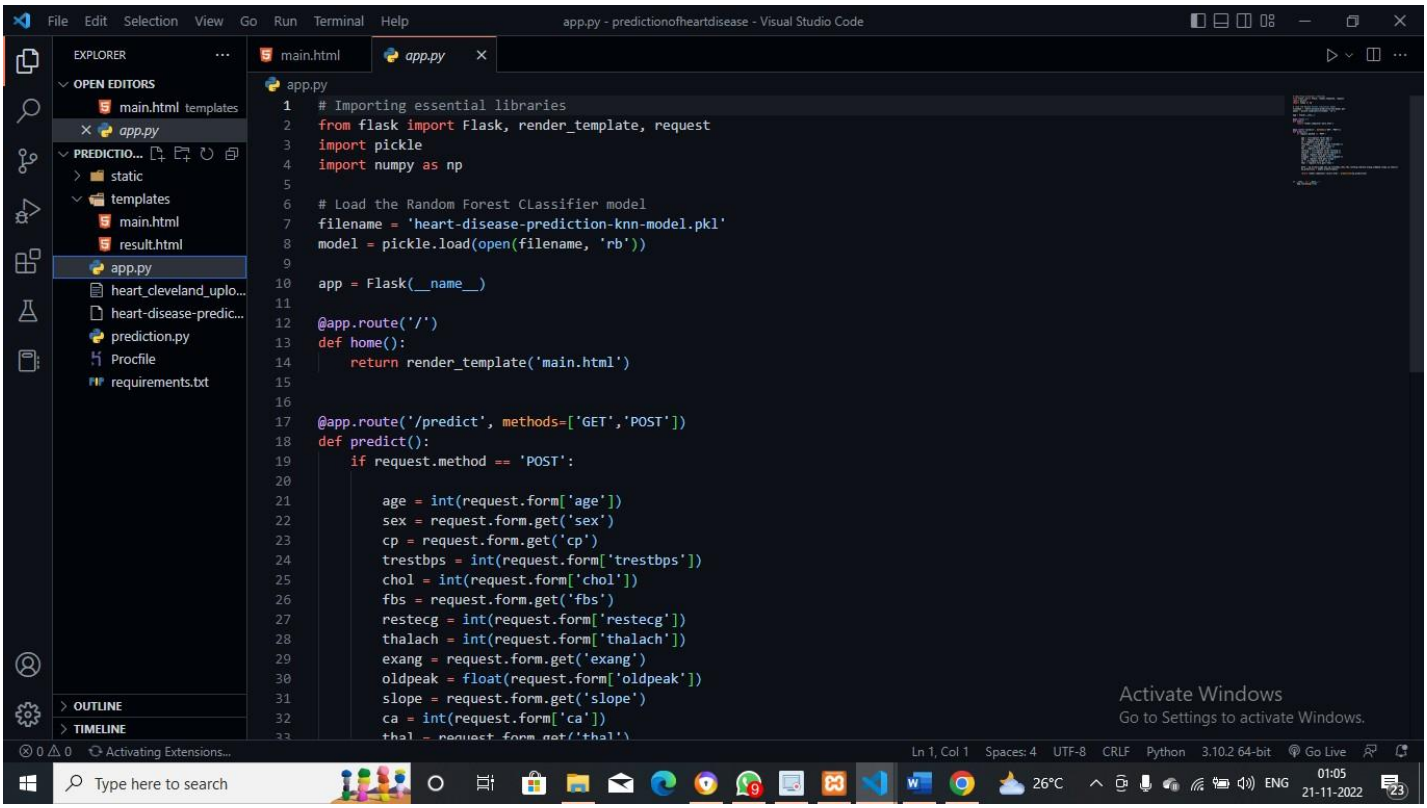
7.1.3 Story

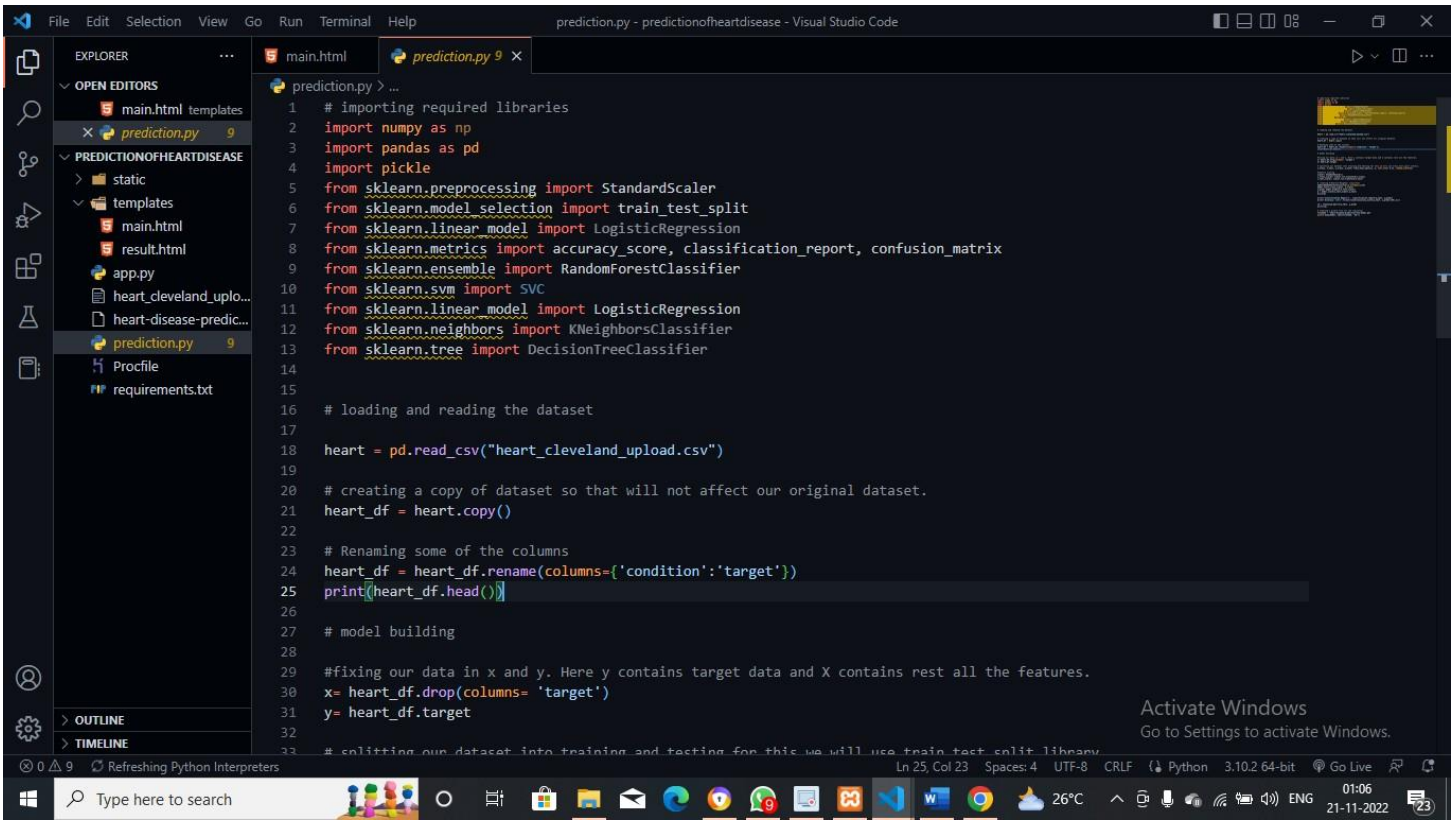


Using Cognos Analytics, Story t is created which shows the relation between attributes and how they are responsible for chances of heart disease. The story is incorporated in website using iframe. It is mandatory to have an IBM account to view the story. As soon as the page is loaded, it asks to sign into the IBM account. Once signed in, user can view the story. story has multiple scenes, eachcontaining a chart of relation between attributes. The above code shows how story is included in the website.

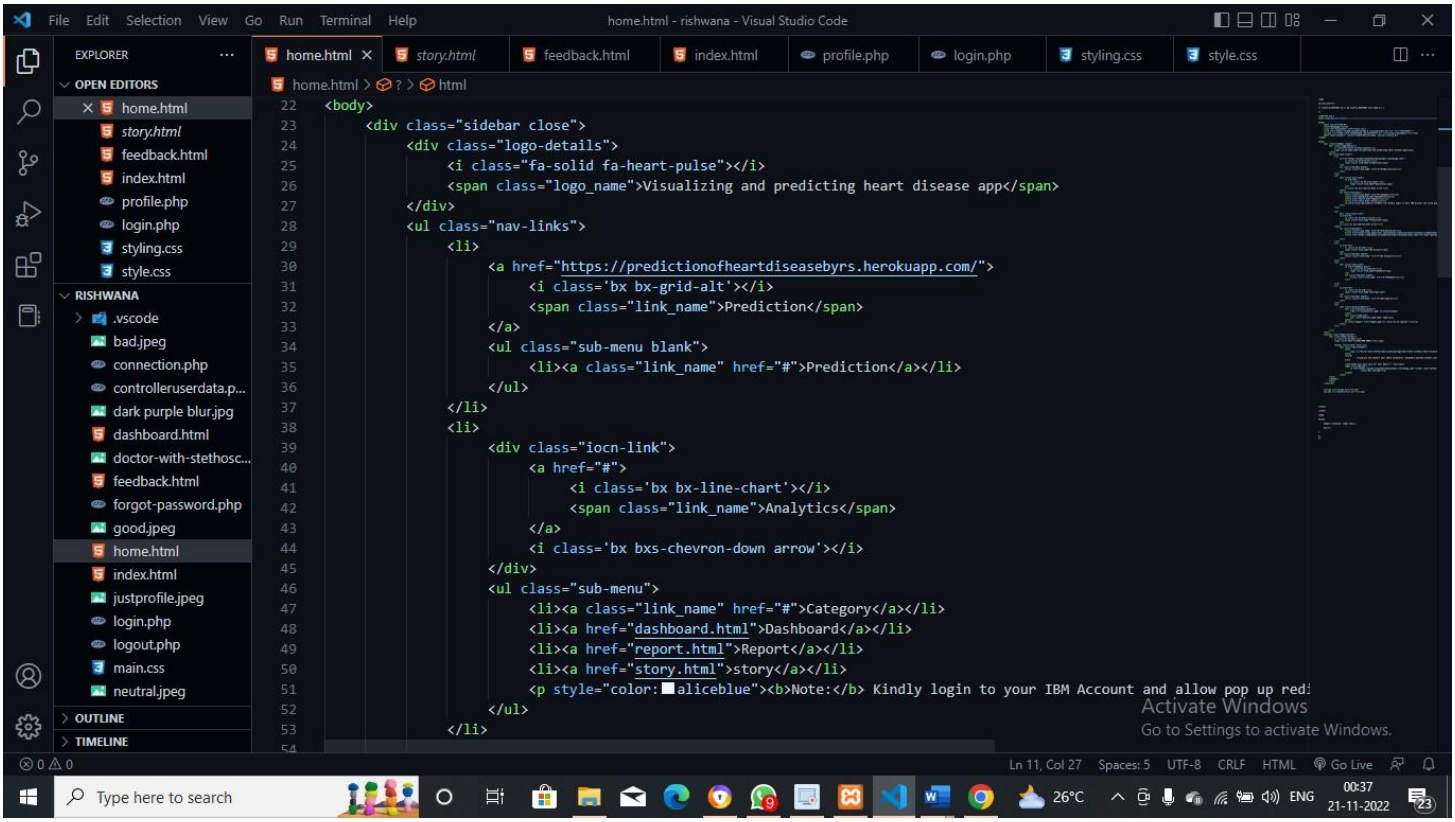
7.2 Feature 2: heart disease Prediction app







The above code shows how user input is got as form and how it is processed and given as input to machine learning model. Which in turn gives if heart disease is present or absent. This model is created using flask and deployed on Heroku cloud. That link is embedded in the main web app.



The above code shows how heart disease prediction app which is deployed on Heroku cloud is included in the website.

CHAPTER 8
TESTING

8.1 Test Cases

				19-Nov-22				
				PNT2022TMID34243				
				Project - Visualizing and Predicting Heart Disease with an Interactive Dashboard				
				4 marks				
Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Steps To Execute**	**Test Data**	**Expected Result**	**Actual Result**	**Status**
SignupPage_TC_001	Functional	Login page	Email Verification	1.Enter URL and click go 2.Enter user details 3.Checking whether the mail id is valid or not	gopikasankar@.com	"." is used in wrong position in ."com"	Working as expected	Pass
SignupPage_TC_002	Functional	Login Page	The required field must be filled	1.Enter URL and click go 2.It is directed to signup page 3.Required credentials must be filled correctly	Username:Gopika Email id:gopikasankar@gmail.com password:200209	The user received the mail after required credentials are filled	Working as expected	Pass
SignupPage_TC_003	Functional	Login page	Confirmation mail for successful signup	1.Enter URL and click go. 2.It is directed to signup page 3.Required credentials must be filled correctly 4.Mail is sent to the user on successful creation of the account	Username: Gopika mailid:gopikasankar@gmail.com password: 200209	Confirmation mail is received by the user	Working as expected	Pass
SignupPage_TC_004	Functional	Home page	On Successful signup it is redirected to homepage	1.Enter URL and click go. 2.It is directed to signup page 3.Required credentials must be filled correctly 4.Mail is sent to the user on successful creation of the account 5.After siqup it is redirected to homepage	Get started	Successful opening of homepage	Working as expected	pass
LoginPage_TC_001	Functional	forgot password page	Reset new password	1.Enter URL and click go 2.It is directed to signup page 3.Click on forgot password 4.And then it is directed to forgot password page. 5.Enter your registered mail id 6.Verification code is sent to registered mail 7.When you enter the correct verification code it allows you to reset your password. 8.Enter your new password and click change and then finally your password will be changed.	New password: ananthi	New password is updated	Working as expected	pass
LoginPage_TC_002	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter URL and click go 2.Click on My Account dropdown button 3.Enter Invalid password in password text box 4.Click on login button	Username: Gopika mail id : ananthia347@gmail.com password: ananthi	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials	1.Enter URL and click go 2.Click on My Account dropdown button 3.Enter valid password in password text box 4.Click on login button and it is redirected to home page	Username: Gopika mail id : gopikasankar@gmail.com password: ananthi	Application will be directed to home page of the account holder	Working as expected	pass
LoginPage_TC_004	Functional	Loginpage	The required field must be filled	1.Enter URL and click go 2.It is directed to signup page 3.Required credentials must be filled correctly	Username: Gopika mail id : gopikasankar@gmail.com password: ananthi	It is redirected to homepage.	Working as expected	pass
				1.After signup/login it is directed to homepage 2.User can	Age,Sex,Chest pain	Oops, You have chances of	working as	

heart disease app testcase

					4 marks				
	Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status
14	HomePage_TC_001	Functional	Prediction page	User health details such as Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results and so on..	1.After signup/login it is directed to homepage. 2.User can enter details to start prediction. 3.Health condition of the user will be predicted.	Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results,EKG results,Max HR,Exercise angina, ST depression,Slope of ST,Number of vessels fluro Thallium	Oops...You have chances of heart disease. Hurray...You don't have any chances of heart disease.	working as expected	Pass
15	HomePage_TC_002	Functional	Dashboard	User health details such as Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results and so on..	1.After signup/login it is directed to homepage. 2.User can enter the details to view their health condition in the form of dashboard	Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results,EKG results,Max HR,Exercise angina, ST depression,Slope of ST,Number of vessels fluro Thallium	User can view their health condition in the form of graph,pie chart,bar chart	Working as expected	Pass
16	HomePage_TC_003	Functional	Report	User health details such as Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results and so on..	1.After signup/login it is directed to homepage. 2.User can enter the details to view their health condition in the form of report	Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results,EKG results,Max HR,Exercise angina,ST depression,Slope of ST,Number of vessels fluro	User can view their health condition in the form of pie chart,bar chart	Working as expected	Pass
17	HomePage_TC_004	Functional	Story	User health details such as Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results and so on..	1.After signup/login it is directed to homepage. 2.User can enter the details to view their health condition in the form of story	Age,Sex,Chest pain type,Resting Blood Pressure,Serum Cholesterol,Fasting Blood Sugar,Resting ECG results,EKG results,Max HR,Exercise angina, ST depression,Slope of Thallium	User can view their health condition in the form of graph,pie chart,bar chart.Here we can use only two parameters	Working as expected	Pass
18	HomePage_TC_005	Functional	Prevention	It tells the user how to prevent them from heart disease	1.After signup/login it is directed to homepage. 2.User can learn about prevention of heart disease	Healthy diet chart and so on	Measures and schedules to be followed are displayed	Working as expected	Pass
19	HomePage_TC_006	Functional	My Account	The details of the user are present	1.After signup/login it is directed to homepage. 2.User can check their details that has been stored	User details	User details can be viewed	Working as expected	Pass
20	HomePage_TC_007	Functional	Feedback	The user rate our application based on their expeience while using their app	1.After signup/login it is directed to homepage. 2.There is seotion for feedback in which the user can rate our app based on their opinions	Feedback form	Feedback based on app function can be given	Working as expected	Pass
	HomePage_TC_008	Functional	Settings	Delete Account	1.After signup/login it is directed to homepage. 2.User can delete their account if not needed	Account deletion form	The user who are do not need the account or wrong details has been added and wish to delete their account can delete it	Working as expected	Pass

8.2 User Acceptance Testing

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	7	3	3	3	16
Duplicate	1	1	2	2	6
External	4	4	1	3	12
Fixed	12	8	6	8	34
Not Reproduced	0	0	0	0	0
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	24	16	12	16	68

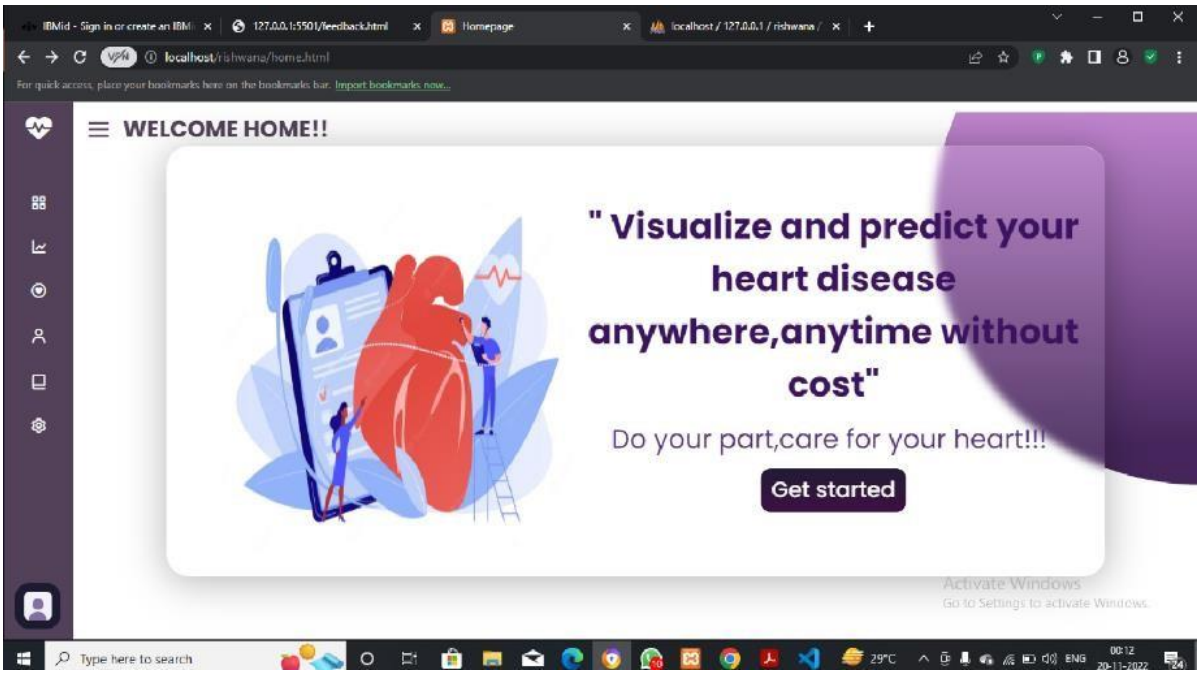
2. Test Case Analysis

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

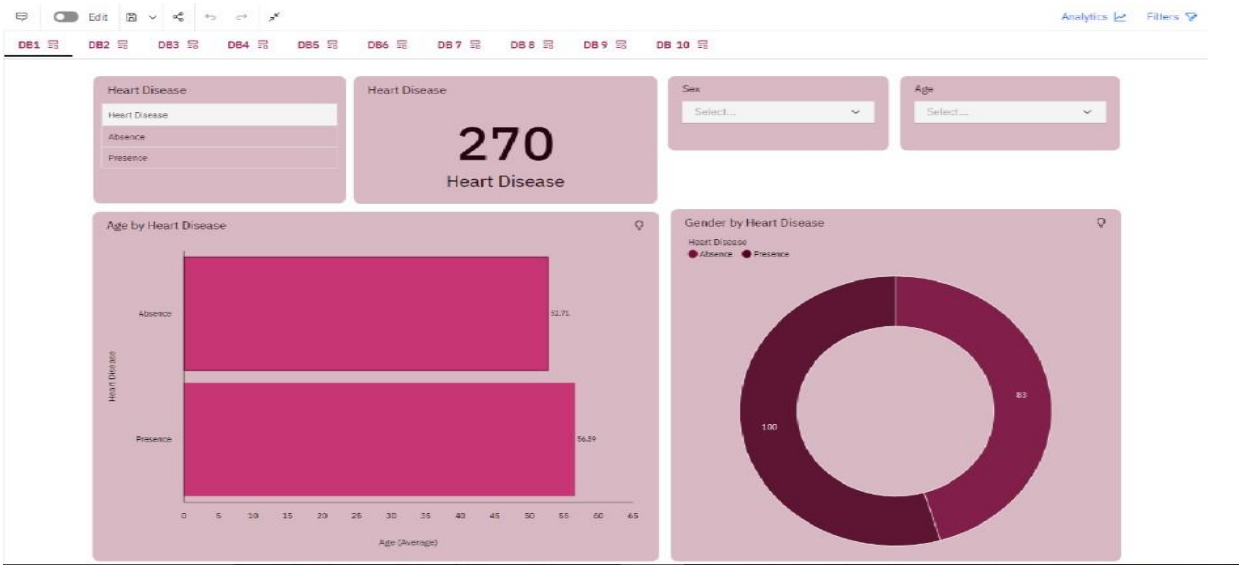
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	13	0	0	13
Client Application	50	0	0	50
Security	1	0	0	1
Exception Reporting	1	0	0	1
Final Report Output	4	0	0	4
Version Control	1	0	0	1

CHAPTER 9
RESULTS

Homepage



Dashboard

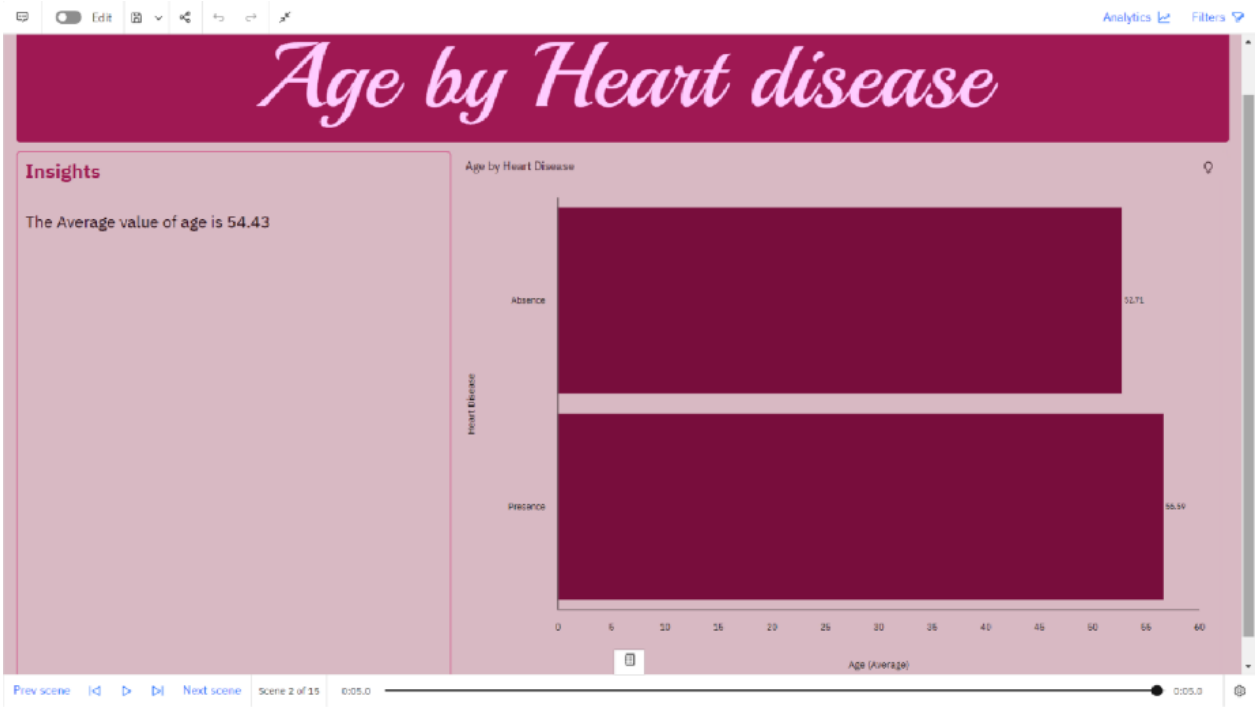



Edit
Analytics
Filters
DB1
DB2
DB3
DB4
DB5
DB6
DB7
DB8
DB9
DB 10
Age
Select...
Sex
Select...
Heart Disease
270
Heart Disease
Average Cholesterol
249.659
Cholesterol
Cholesterol by Age and Gender
Sex
0
1
Cholesterol (Sum)
Age

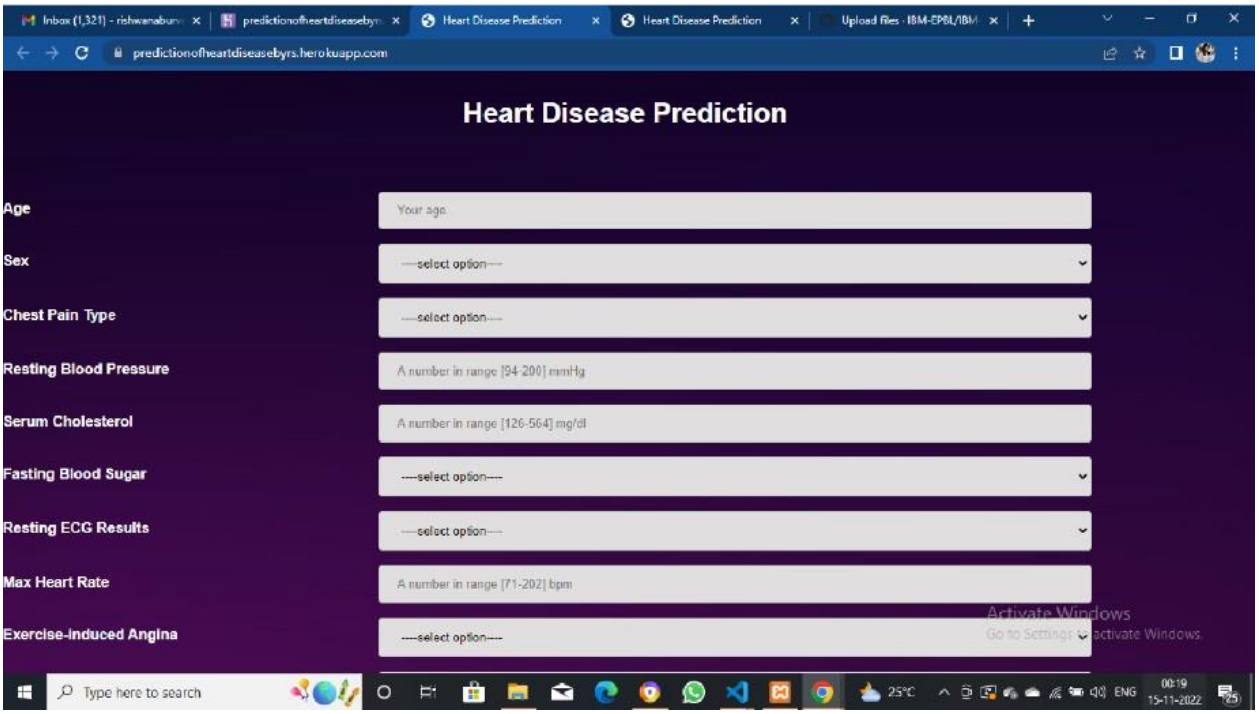
Report

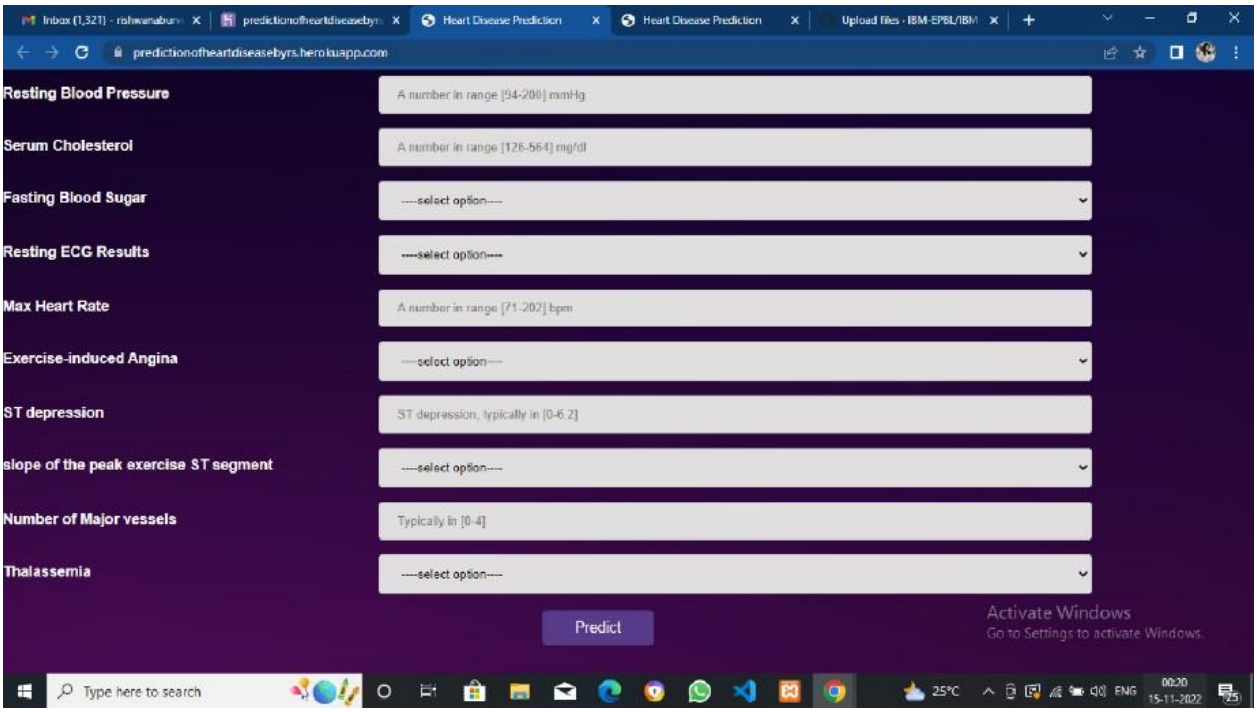

My IBM
heart disease report
New report
heart disease report
New report
us1.ca.analytics.ibm.com/bi/?perspective=authoring
IBM Cognos Analytics with Watson
New report
Search content
Maintenance: Cognos Analytics will undergo Maintenance: Nov 19 10:00 UTC to bring you the latest updates to Cognos Analytics
Dismiss
More info
Filters
Measures
Chest pain type
Exercise angina
Values
434
66
423
23
Presence
Absence
Chest pain type ranges from 423, when Heart Disease is Absence, to 434, when Heart Disease is Presence.Exercise angina ranges from 23, when Heart Disease is Absence, to 66, when Heart Disease is Presence.The total number of results for Exercise angina, across all heart diseases, is 270.Over all heart diseases, the average of Exercise angina is 0.3296.The most common value of Heart Disease is Absence, occurring 150 times, which is 55.6 % of the total.The total number of results for Chest pain type, across all heart diseases, is 270.Over all heart diseases, the average of Chest pain type is 3.174.
Top
Page up
Page down
Bottom
Type here to search
29°C
OneDrive - Personal
Paused
14:41
19-11-2022

Story

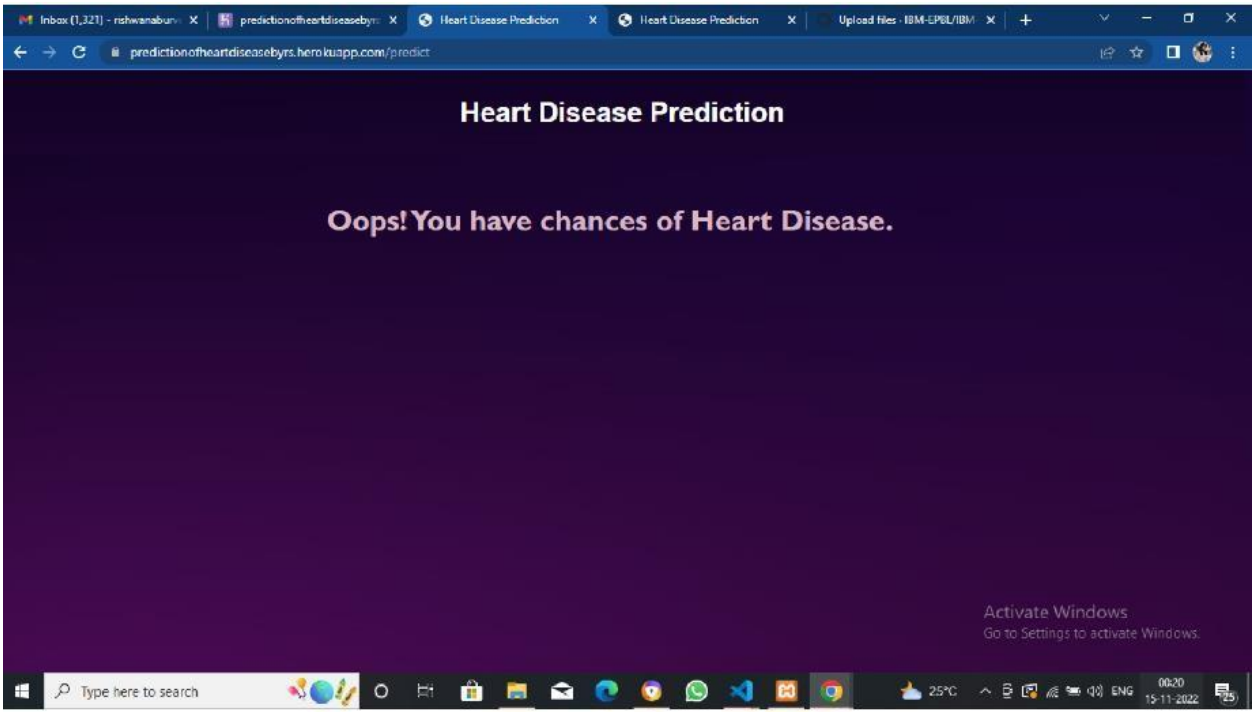


Prediction Form





Prediction Result



9.1.1. Performance Metrics

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visualizations / Graphs - 10
2.	Data Responsiveness	**HEART DISEASE PREDICTION DATABASE** This dataset contains 14 columns and This dataset consists of features that can be used to predict which patients have a high risk of heart disease such as age, sex, Chest pain type, Resting Blood Pressure, Serum Cholesterol, Fasting Blood Sugar, Resting ECG results, EKG results, Max HR, Exercise angina, ST depression, Slope of ST, Number of vessels fluro and Thallium
3.	Amount Data to Rendered (DB2 Metrics)	270 values
4.	Utilization of Data Filters	Utilization of data filters – 62
5.	Effective User Story	No of Scene Added – 15
6.	Descriptive Reports	No of Visualizations / Graphs - 7

CHAPTER 10
ADVANTAGES & DISADVANTAGES

10.1 Advantages

1. Helps in reduction of work for doctors
2. Users can know the result anywhere and anytime without any delay
3. Can change parameters of charts in dashboard
4. This is saving cost and time to undergo medical tests and check-ups and ensuring that the patient can monitor his health on his own

10.2 Disadvantages

1. Can have unwanted biases and errors
2. Diagnosis from doctor is more trusted than an online predictor
3. The result of the application depends upon the accuracy of the algorithms

CHAPTER 11
CONCLUSION

This project predicts if people have cardiovascular disease using their medical history. Using a dataset that includes parameters such as chest pain, sugar level, blood pressure, etc., a dashboard is constructed which showcases the relation between attributes. A machine learning model is also created with the same dataset that helps to predict the chances of a user having heart disease. The proposed application uses Risk Factors, which need to be identified by Medical Professionals before using the application. The result may vary based on the identified Risk Factors. If the Risk Factors identified are less accurate or wrong, the application may give wrong results

CHAPTER 12

FUTURE SCOPE

Using more accurate dataset with more necessary parameters, the accuracy of prediction can be increased. In collaboration with hospitals, doctors can be suggested with contact information. The dashboard can be expanded to have more charts and relations. Can also be connected to smart watch that helps to notify hospitals nearby if the user gets a sudden heart attack.

CHAPTER 13

APPENDIX

Git link (source code) -

https://github.com/IBM-EPBL/IBM-Project-49721-1660836926

Demo link –

https://drive.google.com/drive/folders/16TuMYfbs8pkIFoZ_jgEpvC6asYVx-Ppv