Visualizing and Predicting Heart Diseases With an Interactive Dashboard

NALAIYA THIRAN PROJECT REPORT

2022

Submitted by

Kamal R	**110319104021**
Raman K B	**110319104034**
Tharun R	**110319104048**
Pavan Kumar B	**110319104301**

TeamID: PNT2022TMID36078

CONTENT

1. INTRODUCTION

Heart disease has been the leading cause of death for decades in the United States so it's no surprise that heart failure rates, which is a specific type of heart disease characterized by when the heart is too weak to pump blood throughout the body, are on the rise. In fact, the number of American adults with heart failure is expected to increase by 46 percent by 2030. That means eight million people will have heart failure by then; and about half of people who have heart failure die within five years of diagnosis.

Heart failure is very hard to detect early, but with the help of a National Institutes of Health (NIH) grant, Over the last three years, using the latest advances in artificial intelligence (AI) like natural language processing, machine learning and big data analytics, the team trained models to identify heart failure one to two years earlier than a typical diagnosis today. This research uncovered important insights about the practical tradeoffs and types of data needed to train models, and developed new application methods that could allow future models to be more easily adopted.

It helps to the major number of people's who injured in their personal problems of their health issues they may identify their problems with their smart mobile itself.

1.1 Project Overview

Visulaizing and predicting heart diseases is the project. Heart diseases are fata land if not taken care of at the right time, they can be fatal. In India , heart diseases and strokes contribute to 12% to 15% of our annual death rate. A large majority of the fatal strokes are unforeseen and can strike to seemingly healthy individuals. Doctors have proved that even though the strokes and other heart diseases seem unprecedented to an individual ,they can be prevented by following certain healthy which implies that there is a pattern ora correlation between the person's habits and therisk of stroke orotherheart diseases . This has motivate dusto study the health care data ofeartpatients and compare it with other healthy people. We developed a machine learning model which will take a variety of inputs and predict whether a person issusceptibleto heardiseases or not . This way they can start taking precautions early on an davert therisk of having a stroke.

1.2 Purpose

Our project work is to create a system for predicting potential Heart Diseases in people using Machine Learning algorithms. The algorithms include dare KNeighboursClassifier,SupportVectorClassifier,DecisionTreeClassifier,RandomForestClassifierandNeuralNetworks. The dataset has been taken from Kaggle. Our objective is to analyse predictionsystems for Heart disease using a greater number of input attributes.ThesystemusesmedicaltermssuchasSex,Age,bloodpressure,cholesterollike13attributestopredictthelikelihoodofpatientgettingaHeartdisease.

Wewillalsocomparetheaccuracybywhichthesealgorithmscanpredicttheheartdisease.This project helps the general people to identify and predict them self for their problems.

2. LITERATURE SURVEY

✓ V. Manikantan & S.Latha,"Predicting the Analysis of Heart Disease Symptoms UsingMedicinal Data Mining Methods", International Journal on Advanced Computer Theory andEngineering,Volume-2,Issue-2, pp.5-10, 2013.

✓ Dr.A.V.Senthil Kumar, "Heart Disease Prediction Using Data Mining preprocessing andHierarchical Clustering", International Journal of Advanced Trends in Computer Science andEngineering,Volume-4,No.6, pp.07-18, 2015.

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

✓ Himanshu Sharma, M.A.Rizvi, "Prediction of Heart Disease using Machine LearningAlgorithms:A Survey",International Journal on Recent and Innovation Trends in Computing andCommunication,Volume5,Issue-8,pp.99-104,2017.

✓ S.Suguna, Sakthi Sakunthala.N ,S.Sanjana, S.S.Sanjhana, "A Survey on Prediction of HeartDisease using Big data Algorithms", International Journal of Advanced Research in ComputerEngineering&Technology,Volume-6,Issue-3,pp.371-378,2017.

✓ A. L. Bui, T. B. Horwich, and G. C. Fonarow, "Epidemiology and risk profile of heartfailure," NatureReviewsCardiology,vol. 8, no. 1,pp.30–41, 2011.

✓ J.Mourão-Miranda,A.L.W.Bokde,C.Born,H.Hampel,and M. Stetter, "Classifying brain statesanddeterminingthediscriminatingactivationpatterns:supportvectormachineon functionalMRIdata,"NeuroImage,vol.28,no.4,pp.980–995,2005.

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✓ Q. K. Al-Shayea, “Artificial neural networks in medical diagnosis,” International Journal ofComputerScienceIssues, vol. 8, no. 2, pp. 150–154, 2011.

✓ K.VanisreeandJ.Singaraju,“Decisionsupportsystemforcongenitalheartdiseasediagnosisbased on signs and symptoms using neural networks,” International Journal of ComputerApplications,vol. 19, no. 6, pp. 6–12, 2011.

✓ AlMamoonI,SaniAS,IslamAM,YeeOC,KobayashiF,KomakiS(2013)Aproposalofbodyimplementableearlyheart attack detectionsystem, 1-4.

✓ PattersonK(2016)MatthiasNahrendorf.CircRes119:790-793.

✓ Soni, J., Ansari, U., Sharma, D., & Soni, S. (2011). Predictive data mining for medicaldiagnosis: An overview of heart disease prediction.International Journal of ComputerApplications,17(8), 43-48.Masethe, H. D., & Masethe, M. A. (2014, October). Prediction of heart disease usingclassification algorithms. In Proceedings of the world congress on engineering and computerscience (Vol. 2, pp. 22-24).

✓ Methaila, P. Kansal, H. Arya, and P. Kumar, “Early heart disease prediction using datamining techniques,” in Proceedings of Computer Science & Information Technology (CCSIT-2014),vol. 24, pp. 53–59, Sydney, NSW, Australia, 2014.

2.1 Existing Problem

- **The EHDPS** predicts the likelihood of patients getting heart disease. It enables significant knowledge, eg, relationships between medical factors related to heart disease and patterns, to be established. We have employed the multilayer perceptron neural network with backpropagation as the training algorithm.
- Disease prediction system **provides only possible outcomes** it does not guarantee that it will predict the disease correctly. But it has significantly higher accuracy for predicting possible diseases. In our research, we have analyzed the accuracy of this system for 5 different diseases and our accuracy can go up to 87%.

2.2 References

1. Palaniappan S, Awang R. Intelligent heart disease prediction system using data mining techniques. *Int J Comput Sci Net Secur.* 2008;**8**:343–350. [Google Scholar]

2. Sayad AT, Halkarnikar PP. Diagnosis of heart disease using neural network approach.

Int J Adv Sci Eng Technol. 2014;**2**:88–92. [Google Scholar]

3. Gudadhe M, Wankhade K, Dongre S. Decision support system for heart disease based on support vector machine and Artificial Neural Network. Computer and Communication

Technology (ICCCT), 2010 International Conference on; 2010. pp. 741–745.

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4. Rumelhart DE, Hinton GE, Williams RJ. Learning representations by back-propagating error. *Nature.* 1986;**323**:533–536. [Google Scholar]

2.3 Problem Statement Definition

CustomerProblemStatement :

- ✓ Create a problem statement to understand your customer's point of view.
- ✓ The CustomerProblem Statement template helps you focus on what matters to create experiences peoplewilllove.
- ✓ A well-articulated customer problem statement allows you and your team to find the idealsolution for the challenges your customers face.
- ✓ Throughout the process, you'll also be ableto empathize with your customers, which helps you better understand how they perceiveyour productorservice.

Example:

Problem Statement(PS)	I am (Customer)	I'mtryingto	But	Because	Whichmakes mefeel
PS-1	APatient	To check thehealthin hospitals	Healthr eport iscome in late	Lot of testfor checkhe art disease	Is nofeelgood
PS-2	APatient	To use appfor healthche ck	Someti mes notprop erlywor k internet	Loss thedata inuploadti me	All are good work tofeelhap py

3. IDEATION & PROPOSED SOLUTION

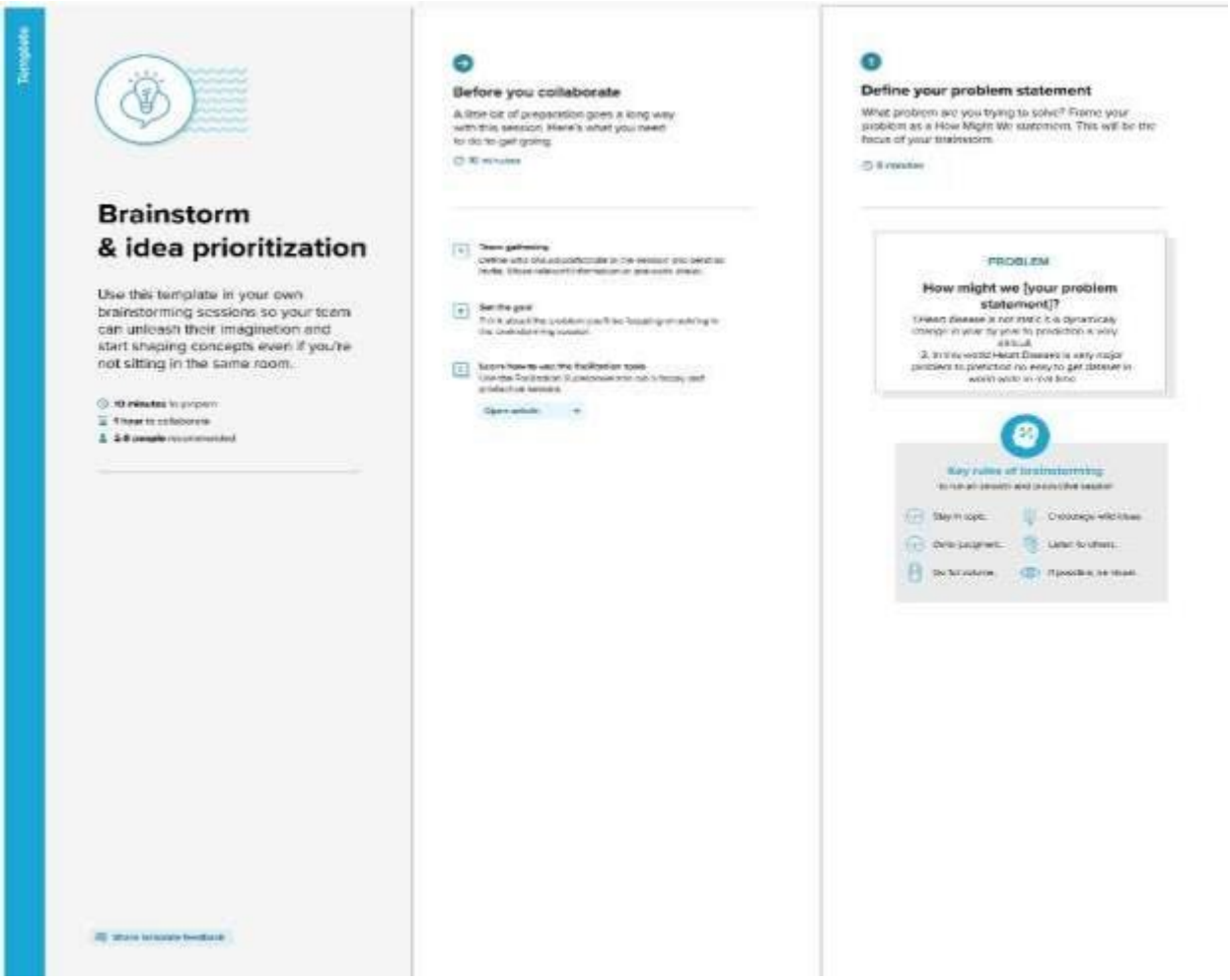
3.1 Empathy Map Canvas

- ✓ An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.
- ✓ It is a useful tool to help steams better understand their users.
- ✓ Creating an effective solution requires understanding the true problem and the person who is experiencing it.
- ✓ The exercise of creating the map helps participants consider things from the user's perspective along with his orhergoals and challenges.
- ✓ Example:VisualizingandPredictingHeart DiseaseswithanInteractiveDashBoard

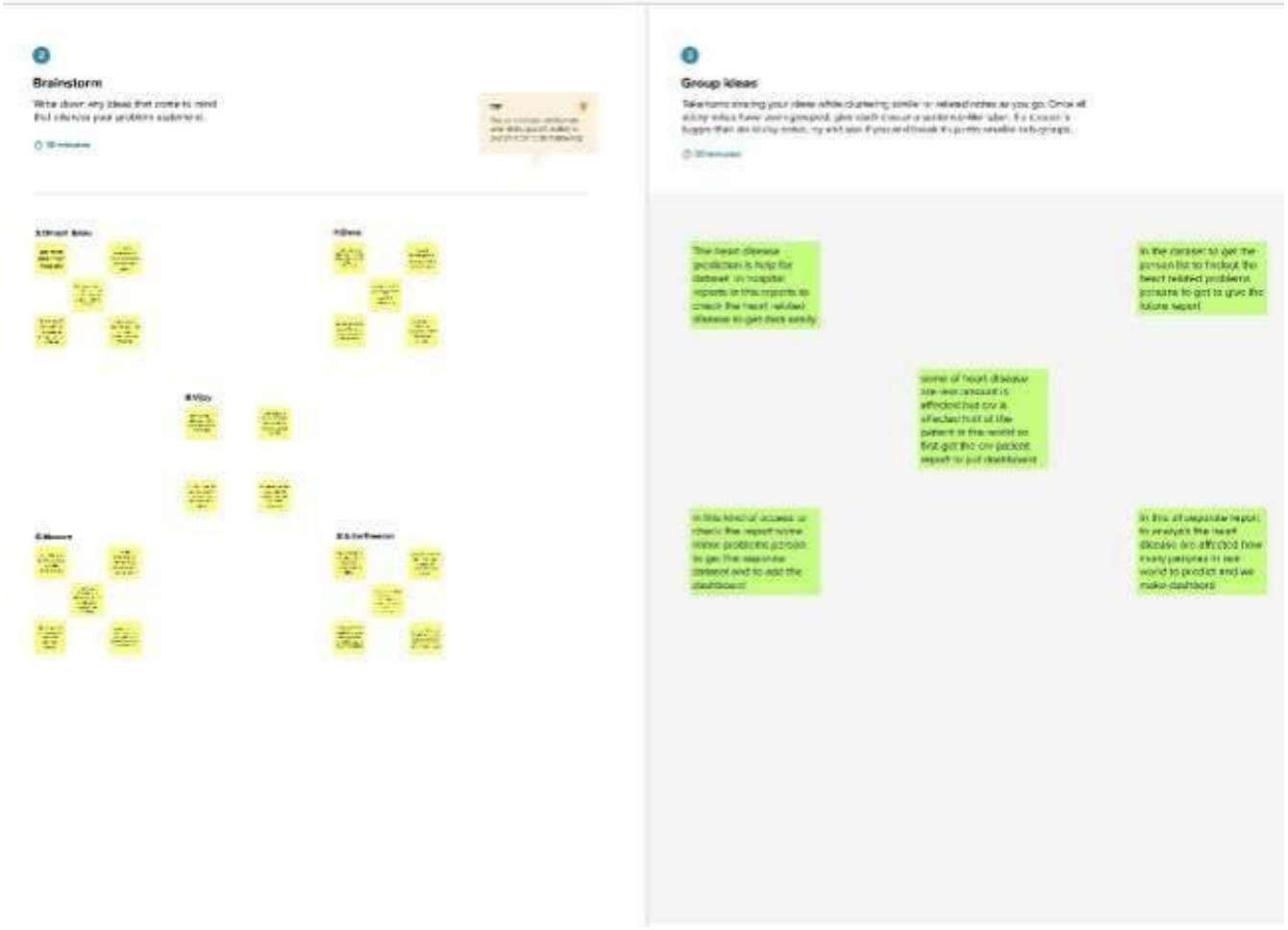
3.2 Ideation & Brainstorming

- ✓ Brainstormingprovidesafreeandopenenvironmentthatencourageseveryonewithinateamto participate in the creative thinking process that leads to problem solving.
- ✓ Prioritizingvolumeovervalue,out-of-the box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping eachother develop arichamount of creative solutions.
- ✓ Usethistemplateinyourownbrainstormingsessionssoyourteamcanunleashtheirimagination andstart shaping concept seven if you're not sitting in the same room.

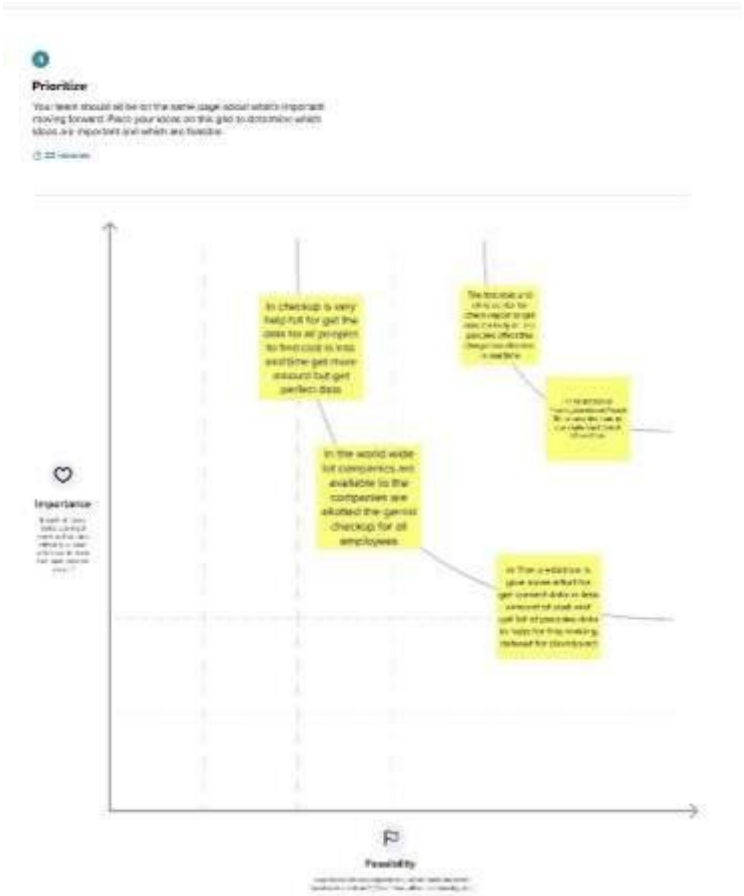
Step-1:TeamGathering,CollaborationandSelectttheProblemStatement



Step-2:Brainstorm,IdeaListingandGrouping



Step-3:IdeaPrioritization



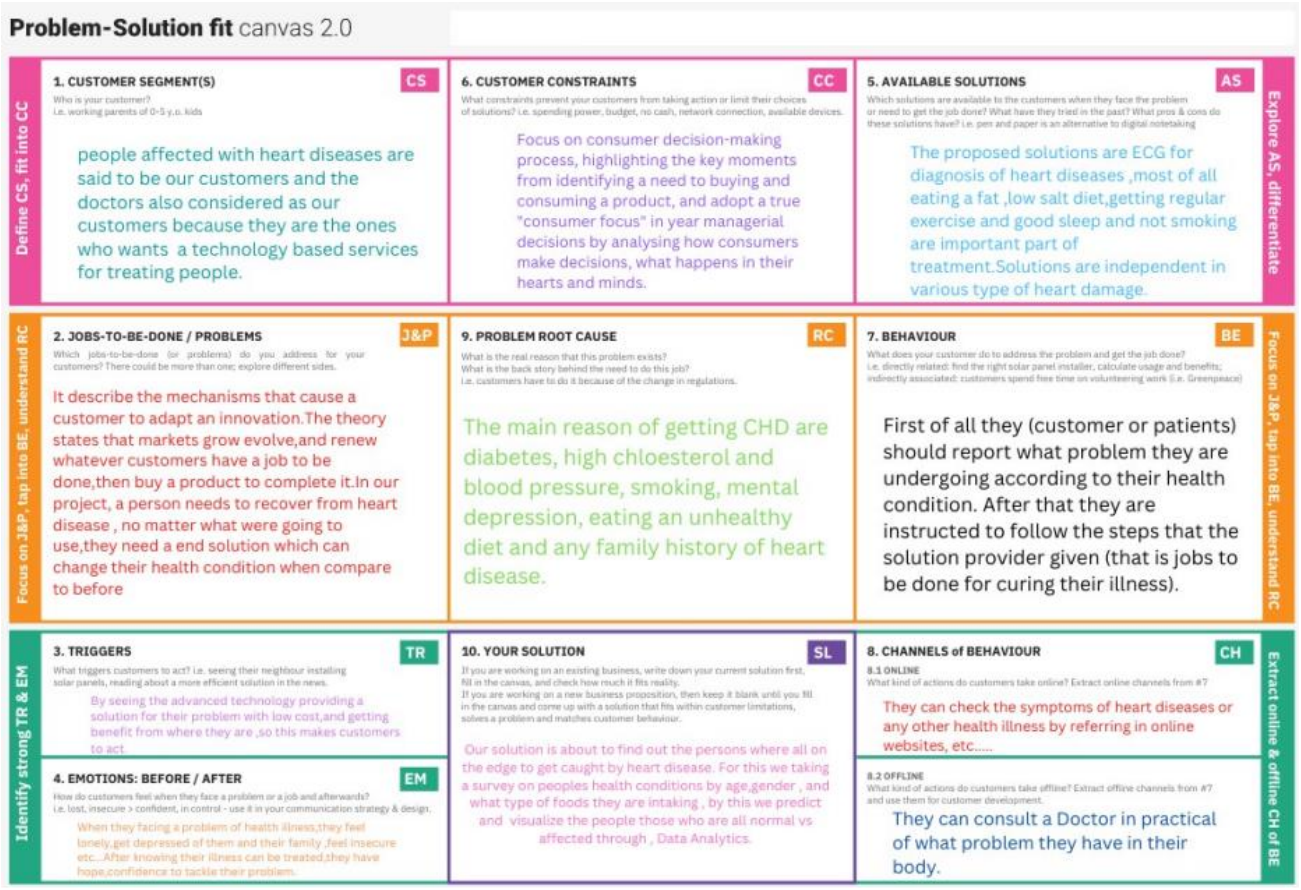
3.3 Proposed Solution

Project team shall fill the following information in proposed solution.

S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	• Theleadingcauseofdeathinthedevelopedworldisheartdiseases. • Therefore,thereneedstobeworkdonetohelppreventtherisksofhavingaheartdisease.
2.	Idea/Solutiondescription	• Itcanbepreventedbycreatinganinteractive dashboardbydataanalytics. • Bydoingthiswecanpredicttheforecomingdangerousevents.
3.	Novelty/Uniqueness	• Itcangive correctageandplace to live. • Togiveaccurateinformationdatatogive thehospital.
4.	SocialImpact/ CustomerSatisfaction	• Inthepointofsocialimpactithasagreatinteractivedashboardforpredictingthediseases. • In the data to predict the heart diseasetousedatasetofcollectionofinformation

5.	BusinessModel(RevenueModel)	• Ithasahugerevenuewhenitcomestothe market. • Itgivelotofopeningmarketshaeitgiveso me demanditems also. • Itgetthemedicineisverydifficultsoratei s high.
6.	Scalabilityofthe Solution	• Itishas the easymanipulationofdata. • Inthisdataforeasytofindthediseasepers ontotakequicktreatment.

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional Requirement

Followingarethefunctionalrequirementsoftheproposed solution.

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 verification	Verification through CAPTCHA Verification through I’m nota robot.
FR-4	User Authentication	Recognition of correct person Resending the code in Case of forgot password.
FR-5	User validation	Reconfirming the new password Sending a two digit number in (Google account) your Old devices, so that you can enter into an ew device By entering the two Digit number.
FR-6	User Submission	Submission through Google form Submission through Email.

4.2 Non-Functional Requirement

Followingarethe non-functionalrequirementsoftheproposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The EHDPS predicts the likelihood of patients gettingheart disease. It enables significant knowledge, eg,relationshipsbetweenmedicalfactors relatedto heartdisease andpatterns,to beestablished.
NFR-2	**Security**	When it deals with(comes to)health factors, weshould provide more security services. Thereshouldn't be no errors, lagging , base of data of apatientprofile,whileworkingonthesoftwareor product.
NFR-3	**Reliability**	Our app is made accessible whenever needed. ItResponds within the time frame needed It isregularly updatedormodifiedas needed bythe user. Provide securityandprivacytotheextent
		needed by the user. Provide bug free operation that is simple and easily predictable
NFR-4	**Performance**	The performance should be fast relaying. This prediction system should be made available in cloud to ensure better accessibility and setting a milestone in providing good quality affordable healthcare.
NFR-5	**Availability**	By setting up An Application Performance Monitoring (APM) system that helps to monitor the availability of application. Consistent performance monitoring and optimization help you to tackle issues as quickly as they show up. The Availability of getting used to this software or product design is through by accessing IBM cognos Analytics and IBM cloud.
NFR-6	**Scalability**	A scalable app can easily accommodate double, triple, or even ten times its current amount of users by withstanding no crashes, no downtime, Fast loading speeds, Top -notch security. We're gonna make our app more scalable by using right Tech stack & Infrastructure scaling to process millions of data with bug free , multiple database servers that accommodate millions of user to secure our app's fail -safe performance, using caching and stateless approach to reduce the load, Content Delivery Networks (CDN) to minimal response time

5. PROJECT DESIGN

5.1 Data Flow Diagrams

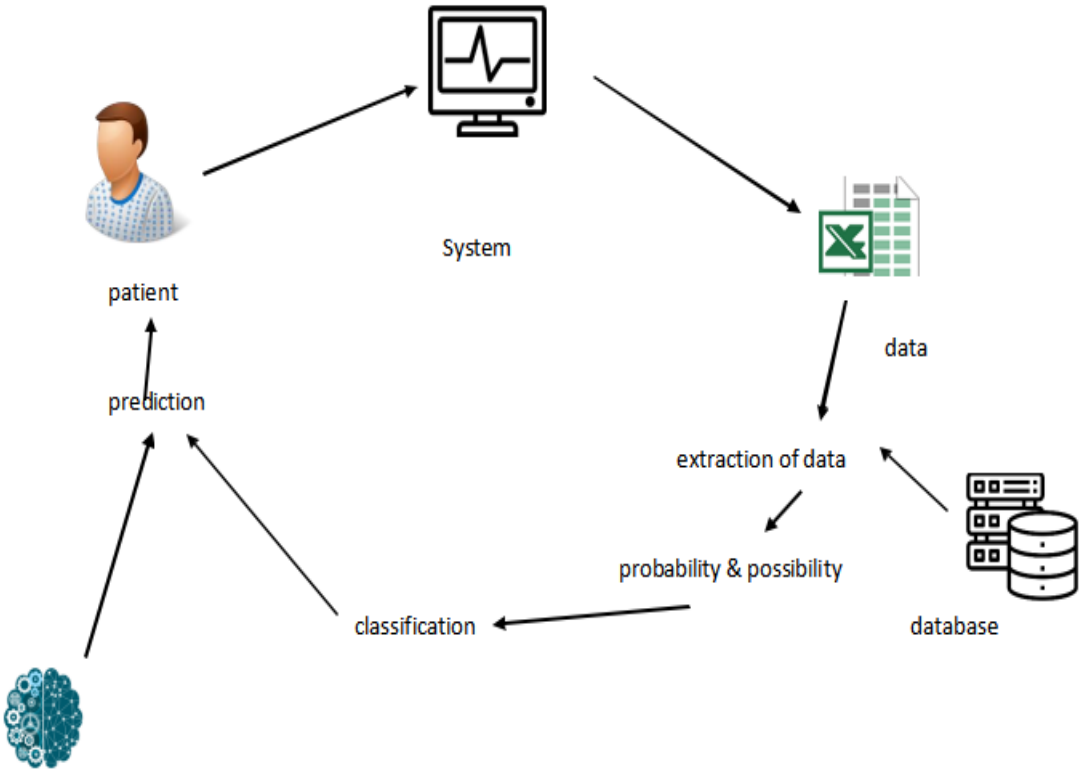
- ✓ A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system.
- ✓ A neat and clear DFD can depict the rightamount of the system requirement graphically.
- ✓ It shows how data enters and leaves the system, what changes the information, and where data isstored.

5.2 Solution & Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridgesthegapbetweenbusinessproblemsandtechnologysolutions.Itsgoalsareto:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed , and delivered.

Solution Architecture Diagram:



5.3 User Stories

Use the below template to list all the user stories for the product.

UserType	Functional Requirement(Epic)	UserStoryNumber	UserStory/Task	Acceptancecriteria	Priority	Release
Customer (Mobileuser)	Registration	USN-1	As a user, I can register for the application byenteringmyemail,password, andconfirmingmy password.	Icanaccessmyaccount/ dashboard	High	Sprint-1

		USN-2	Asauser, Iwillreceiveconfirmationemailonce Ihaveregisteredforthe application	Icanreceiveconfirmationemail&clickconfirm	High	Sprint-1
		USN-3	Asauser,Icanregisterfortheapplicationthroughfacebook	Icanregister&accesthe dashboard withFacebookLogin	Low	Sprint-2
		USN-4	Asauser,Icanregisterfortheapplicationthroughgmail	Icanregister& accessthedashboardwithGmailLogin	Medium	Sprint-1
	Login	USN-5	Asauser,Icanlog intothe applicationbyentering email& password	I can register & accessthedashboardwithGmailLogin	High	Sprint-1
	Dashboard	USN-6	Profile-view &updateyourprofile	Icanseetheprofile.	Medium	Sprint-2
		USN-7	Change Password-usercanchange the password	Ican able tochangethe password.	High	Sprint-1
		USN-8	Home -Analyze yourHeart	I can detect the healthconditionfrom where everI want.	High	Sprint-1
		USN-9	Theuser willhavetofillinthebelow13fieldsfor the system to predict a disease -Age in Year -Gender -Chest Pain Type -Fasting Blood Sugar -Resting Electrographic Results(Restecg) -ExerciseInduced Angina(Exang) -The slope of the peakexercise ST segment -CA – Number of majorvessels colored by fluoroscopy -Thal -Trest BloodPressure -Serum Cholesterol -Maximum heartrateachieved(Thalach) -STdepressioninduced byexercise(Oldpeak)	These are the categoriesavailable in thatapplication.	High	Sprint-2

UserType	**Functional Requirement(Epic)**	**UserStoryNumber**	**UserStory/Task**	**Acceptancecriteria**	**Priority**	**Release**
		USN-10	ViewDoctors -view doctordetailbysearchingbynamesor filterbyspecialty	Using this application,peoplecanknownthat thespecialitydoctors.	Medium	Sprint-1

Customer (Webuser)	System Requirement	USN-11	I.HardwareRequirement i.LaptoporPC • I5processorsystemorhigher • 4 GBRAMorhigher • 128 GB ROM or higher ii. Android Phone (12.0andabove)	These are all thespecification available inyourPC.	High	Sprint-2
		USN-12	II.SoftwareRequirement iii.LaptoporPC • Windows10or higher • AndroidStudio	Install your application.This system can be usedtopredictthepresenceof heart disease.	Medium	Sprint-2
		USN-13	Reference-https://ieeexplore.ieee.org/document/9619208/	GoandCheckour Reference link.	Medium	Sprint-1
Customer CareExecutive	Dashboard	USN-14	Query	You can post your queriesinthetext boxavailable inthat application.	High	Sprint-1
		USN-15	TollFree	Askyour doubtsingiven number(8365492107).	High	Sprint-1
		USN-16	Ratings	Giveyour ratings asyour wish.	Medium	Sprint-1
Administrator	Dashboard	USN-17	Verification	Verification throughCAPTCHAVerification throughI'mnotarobot	Hign	Sprint-1
		USN-18	validation	Reconfirming the newpassword Sending a twodigit number in (Googleaccount) your Olddevices,so thatyoucan enter into anewdevice	High	Sprint-2

UserType	Functional Requirement(Epic)	UserStoryNumber	UserStory/Task	Acceptancecriteria	Priority	Release
				By enteringthetwo digit number.		
		USN-19	Feedback - sendfeedbackto theAdmin.	Please sendyour feedba cktohost.	Medium	Sprint-2

6. PROJECT PLANNING & SCHEDULING

Product Backlog , Sprint Schedule , and Estimation.

Use the below template to create product back log and sprint schedule

Sprint	Functional Requirement (Epic)	UserStory Number	UserStory/Task	StoryPoints	Priority	Team Members
Sprint-1	Registration	USN-1	Asauser,Icanregisterforthe applicationby enteringmyemail,password,and confirmingmypassword.	3	High	1
Sprint-1		USN-2	Asauser,Iwillreceiveconfirmation emailonceIhaveregisteredfor the application	3	High	3
Sprint-1		USN-3	Asauser,Icanregisterforthea pplicationthroughFacebook	5	Low	2
Sprint-1		USN-4	Asauser,Icanregisterforthea pplicationthroughGmail	3	Medium	1
Sprint-1	Login	USN-5	Asauser,Icanlog intothe applicationbyentering email& password	6	High	5
Sprint-2	Dashboard	USN-6	Attractivedashboard FortheApplication	3	Medium	3
Sprint-2		USN-7	Profile- view&update your profile	5	Low	2
Sprint-2		USN-8	Home-AnalyzeyourHeartproblem	2	High	4
Sprint-2		USN-9	Userfillthedetailstopredictthedisease	7	High	2
Sprint-3	Support	USN-10	Getfeedbackfromusers	10	Medium	3

Sprint	Functional Requirement (Epic)	UserStory Number	UserStory/Task	StoryPoints	Priority	Team Members
Sprint-3		USN-11	Responds to user queries via telephone,emailetc.	3	Medium	2
Sprint-3		USN-12	Theteammustrespondimmediatelytothequeriesbasedonthe priority	5	High	5

Sprint-4	SystemRequirements	USN-13	HardwareRequirement 1. Laptopor PC • i5processorsystemorhigher • 4GBRAMorhigher • 128GBROM orhigher 2. Mobile • (12.0andabove)	5	Low	2
Sprint-4		USN-14	SoftwareRequirement 1. Laptopor PC • Windows10or higher • AndroidStudio	8	Medium	4

Project Tracker,Velocity&BurndownChart: (4Marks)

Sprint	**TotalStoryPoints**	**Duration**	**SprintStartDate**	**SprintEndDate(Planned)**	**StoryPoints Completed (as onPlanned EndDate)**	**SprintReleaseDate(Actual)**
Sprint-1	20	6Days	24Oct2022	29Oct2022	20	29Oct2022
Sprint-2	20	6Days	30Oct2022	04Nov2022	17	04Nov2022
Sprint-3	20	6Days	05Nov2022	11Nov2022	18	11Nov2022
Sprint-4	20	6Days	12Nov2022	17Nov2022	19	17Nov2022

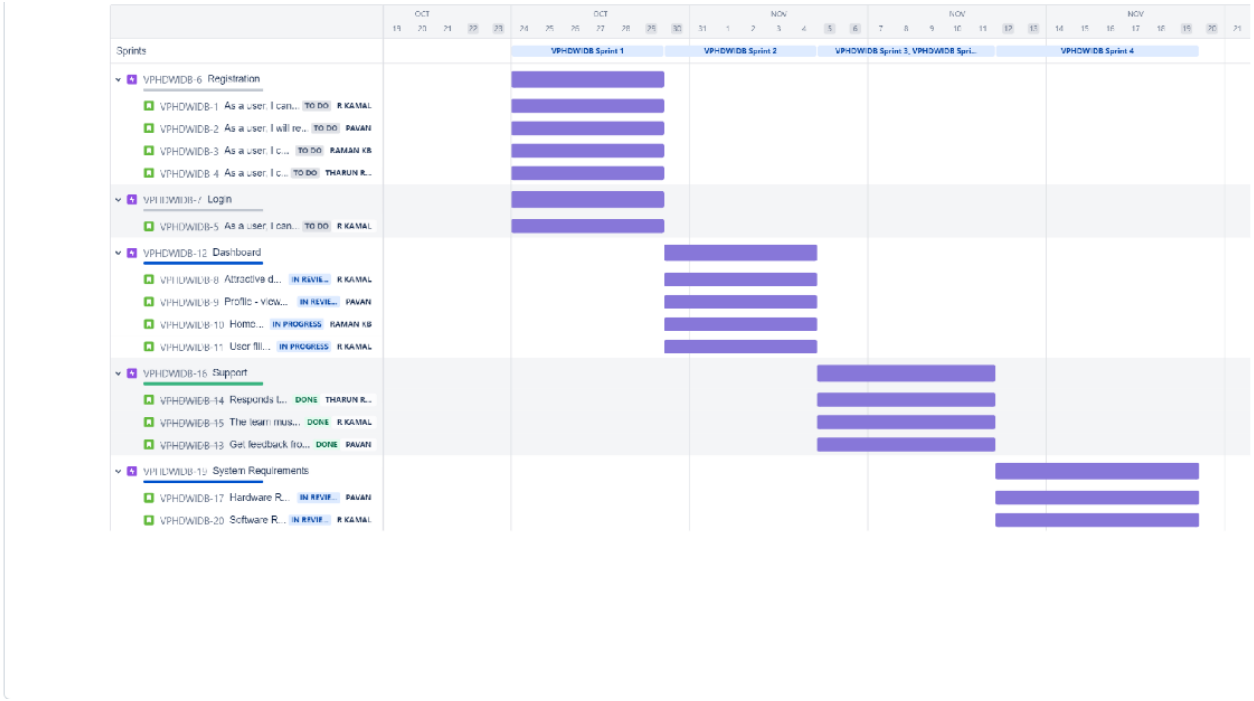
Velocity:

Imaginewehavea6-daysprint duration,andthevelocityoftheteamis20(pointspersprint).
Let'scalculatetheteam'saveragevelocity(AV)periterationunit(storypointsperday)

AV=Sprintduration/velocity=20/6=3

Burn down Chart:

- ✓ A burn down chart is a graphical representation of work left to do versus time.
- ✓ It is often used in agile software development methodologies suchas Scrum. How ever burn down chartscanbe appliedto anyprojectcontainingmeasurableprogressovertime.



7.CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1Feature 1

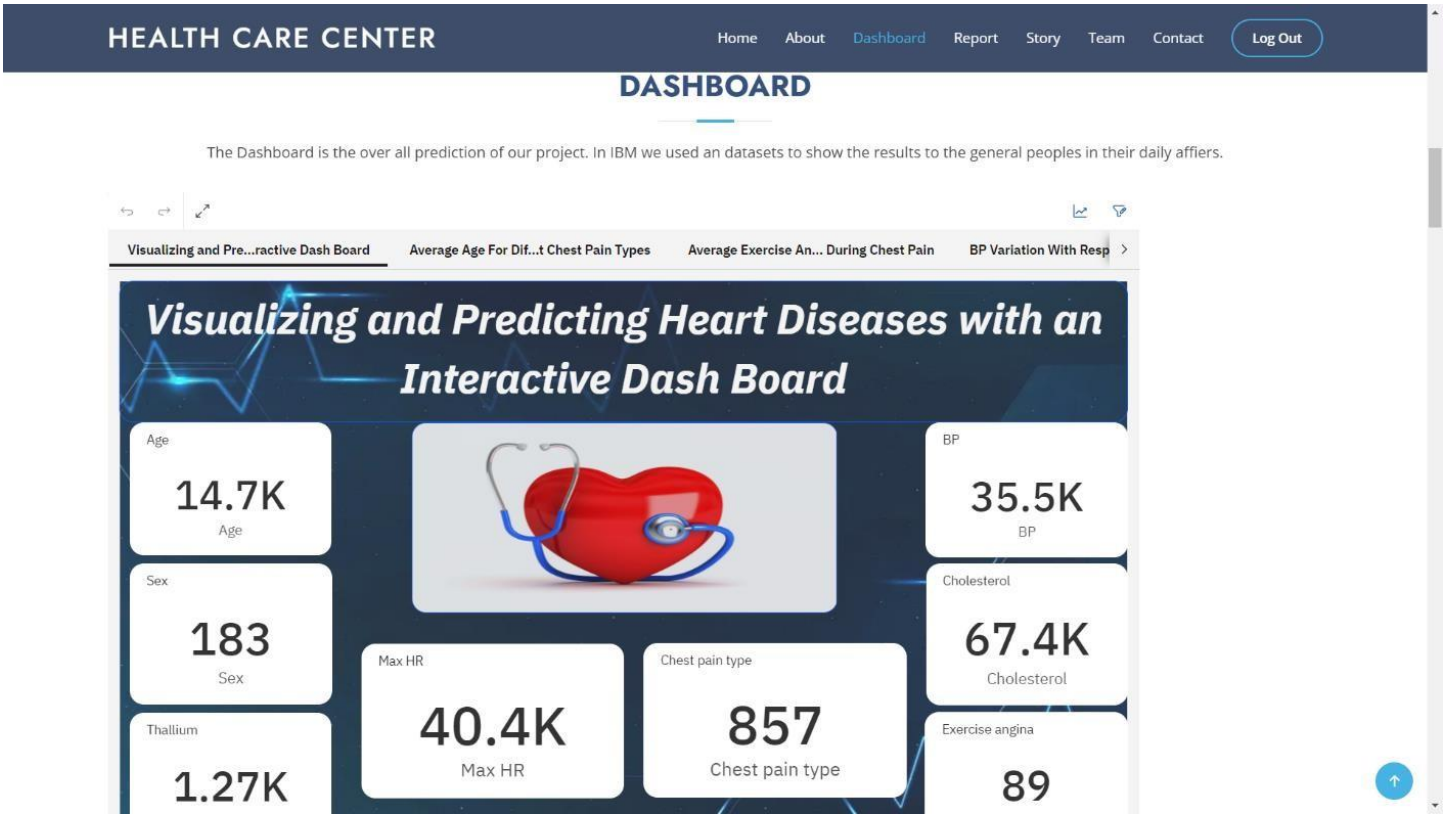
Dashboard

Code:

```
<html>
<title>Healthcare</title>
<body>
<section id="Dashboard" class="Dashboard">
<div class="container" data-aos="fade-up">
 <div class="section-title">
  <h2>Dashboard</h2>
  <p>The Dashboard is the over all prediction of our project. In IBM we used an datasets to showthe results to the general peoples in their daily affiers.</p>
```

```
</div>
<center>
<iframe class="ibm" src="https://us1.ca.analytics.ibm.com /bi/?perspective =
dashboard&pathRef=.my_folders%2FData%2BModules%2FHD%2BDashboard&cl
oseWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedde
d&action=view&mode=dashboard&subView=model0000018469caba3f_00000001"
width="1050" height="725" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
</center>
</div>
</section>
</body>
</html>
```

Output :



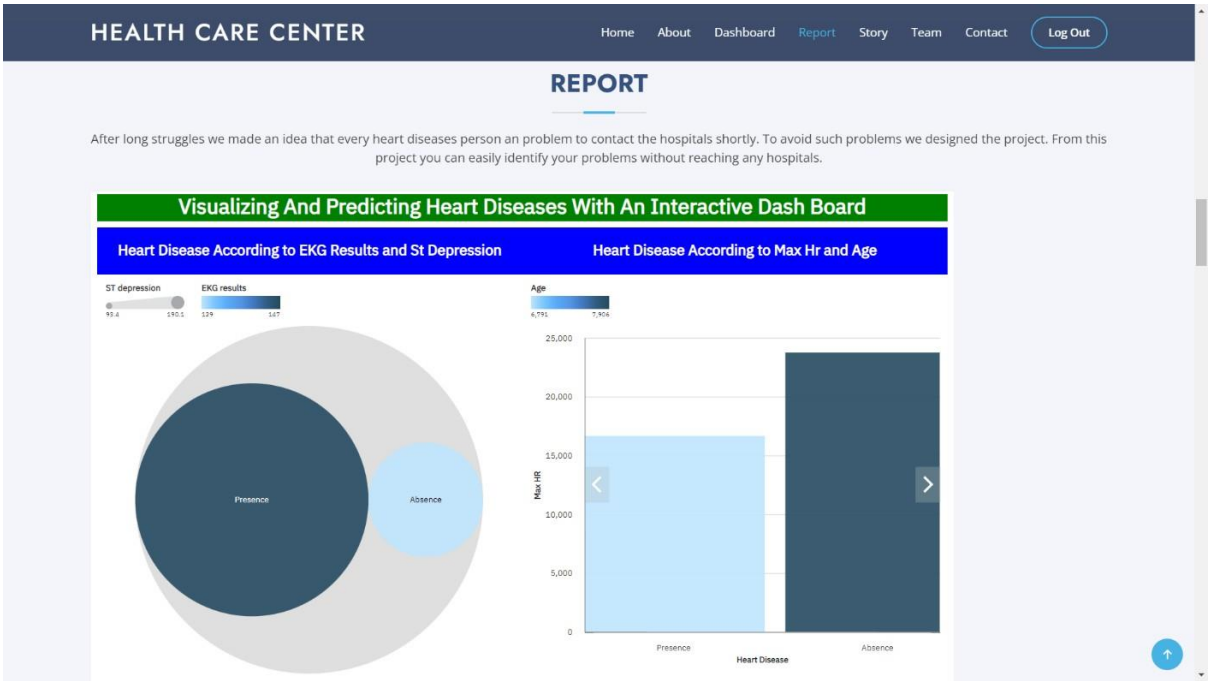
7.2Feature2

Report

Code:

```
<html>

<title>Healthcare</title>
<body>

<section id="Reports" class="Reports section-bg">
<div class="container" data-aos="fade-up">
 <div class="section-title">
  <h2>Report</h2>

        <p>After long struggles we made an idea that every heart diseases person an problem to contact the hospitals shortly. To avoid such problems we designed the project. From this project you can easilyidentify your problems without reaching any hospitals.</p>

 </div>
        <center>

<iframe class="ibm" src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FData%2BModules%2FHD%2BReport &closeWindowOnLastView =true &ui_appbar=false&ui_navbar=false&shareMode=embedded&action=run&format=HTML&prompt=false" width="1050" height="1250" frameborder="0" gesture = "media" allow="encrypted-media" allowfullscreen=""></iframe>

 </center>
 </div>
</section>

</body>

</html>
```

Output:



8.TESTING

8.1.Test Cases

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Out source Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

8.2.User Acceptance TestingDefect Analysis

This report shows the number of re solved or closed bugs at eachseverity level, and how they were resolved

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	11	3	2	3	18
Duplicate	1	0	3	0	4
External	2	4	0	2	6
Fixed	10	2	4	19	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	1	5	3	1	8
Totals	25	14	13	26	75

9. RESULTS

9.1.Performance Metrics

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visulizations / Graphs – 8
2.	Data Responsiveness	No of Scene Added – 8
3.	Amount Data toRendered (DB2 Metrics)	No of Scene Added – 1
4.	Utilization of DataFilters	No of Scene Added – 2

5.	Effective User Story	No of Scene Added – 1
6.	Descriptive Reports	No of Visulizations / Graphs – 4

10. ADVANTAGES & DISADVANTAGES

10.1.Advantages

- The system uses 15 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction.
- The EHDPS predicts the likelihood of patients getting heart disease.
- **It enables significant knowledge, eg, relationships between medical factors related to heart disease and patterns, to be established**.
- Predicting **encourages children to actively think ahead and ask questions**.
- It also allows students to understand the story better, make connections to what they are reading, and interact with the text.
- Making predictions is also a valuable strategy to improve reading comprehension
- These techniques can **provide managers and executives with decision-making tools to influence upselling, sales and revenue forecasting, manufacturing optimization, and even new product development**..

10.2.Disadvantages

- Prediction of cardiovascular disease. results is not accurate.
- International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056. ...
- Data mining techniques does not help to. provide effective decision making.
- Cannot handle enormous datasets for.
- Those with heart failure can develop **swelling, dizziness, and other symptoms that can affect their ability to complete daily tasks**.

- A person with diagnosed heart disease must also live with the stress of knowing they have a long-term illness that could result in a cardiac event, such as heart attack or stroke.

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 . The accuracy of our model is 87.5%.Use of more training data ensures the higher chances of the model to accurately predict whether the given person has a heart disease or not . By using these, computer aided techniques we can predict the patient fast and better and the cost can be reduced very much. There are a number of medical databases that we can work on as these Machine learning techniques are better and they can predict better than a human being which helps the patient as well as the doctors. Therefore, in conclusion this project helps us predict the patients who are diagnosed with heart diseases by cleaning the dataset and applying logistic regression and KNN to get an accuracy of an average of 87.5% on our model which is better than the previous models having an accuracy of 85%. Also, it is concluded that accuracy of KNN is highest between the three algorithms that we have used i.e. 88.52%. 44% of people that are listed in the dataset are suffering from Heart Disease.

12.FUTURE SCOPE

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.

13.APPENDIX

Source Code

INDEX.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">
  <title>Health Care</title>
  <meta content="" name="description">
  <meta content="" name="keywords">
  <!-- Favicons -->
  <link href="assets/img/icon.png" rel="icon">
  <link href="assets/img/icon.png" rel="icon">
  <!-- Google Fonts -->
  <link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,
700i|Jost:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i
,600,600i,700,700i" rel="stylesheet">
  <!-- Vendor CSS Files -->
  <link href="assets/vendor/aos/aos.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
  <link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
  <link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
  <link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
  <link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">
  <!-- Template Main CSS File -->
  <link href="assets/css/style.css" rel="stylesheet">

  <!-- =======================================================
  * Template Name: Arsha - v4.9.1
  * Template URL: https://bootstrapmade.com/arsha-free-bootstrap-html-template-
corporate/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
```

```
    ======================================================== -->
  </head>
  <body>
    <!-- ======= Header ======= -->
    <header id="header" class="fixed-top ">
      <div class="container d-flex align-items-center">
        <h1 class="logo me-auto"><a href="index.html">Health Care Center </a></h1>
        <!-- Uncomment below if you prefer to use an image logo -->
        <!-- <a href="index.html" class="logo me-auto"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->
        <nav id="navbar" class="navbar">
          <ul>
            <li><a class="nav-link scrollto active" href="#hero">Home</a></li>
            <li><a class="nav-link scrollto" href="#about">About</a></li>
            <li><a class="nav-link scrollto" href="#Dashboard">Dashboard</a></li>
            <li><a class="nav-link scrollto" href="#Reports">Report</a></li>
            <li><a class="nav-link   scrollto" href="#portfolio">Story</a></li>
            <li><a class="nav-link scrollto" href="#predict">Prediction</a></li>
            <li><a class="nav-link scrollto" href="#team">Team</a></li>
            <li><a class="nav-link scrollto" href="#contact">Contact</a></li>
            <li><a class="getstarted scrollto" href="Login.html">Log Out</a></li>
          </ul>
          <i class="bi bi-list mobile-nav-toggle"></i>
        </nav><!-- .navbar -->
      </div>
    </header><!-- End Header -->

    <!-- ======= Hero Section ======= -->
    <section id="hero" class="d-flex align-items-center">

      <div class="container">
        <div class="row">
          <div class="col-lg-6 d-flex flex-column justify-content-center pt-4 pt-lg-0 order-2 order-lg-1" data-aos="fade-up" data-aos-delay="200">
            <h1>Step in  For Your Healthy Life</h1>
            <h2> Just Make a analysis of your health</h2>
            <div class="d-flex justify-content-center justify-content-lg-start">
```

```
            <a href="#about" class="btn-get-started scrollto">Get Started</a>
            <a href="https://www.youtube.com/watch?v=jDDaplaOz7Q" class="glightbox btn-watch-video"><i class="bi bi-play-circle"></i><span>Watch Video</span></a>
          </div>
        </div>
        <div class="col-lg-6 order-1 order-lg-2 hero-img" data-aos="zoom-in" data-aos-delay="200">
          <img src="assets/img/hero-img2.jpg" class="img-fluid animated" alt="">
        </div>
      </div>
    </div>
  </section><!-- End Hero -->
  <main id="main">
    <!-- ======= Clients Section ======= -->
    <section id="clients" class="clients section-bg">
      <div class="container">
        <div class="row" data-aos="zoom-in">
          <div class="col-lg-2 col-md-4 col-6 d-flex align-items-center justify-content-center">
            <img src="assets/img/clients/client-7.png" class="img-fluid" alt="">
          </div>
          <div class="col-lg-2 col-md-4 col-6 d-flex align-items-center justify-content-center">
            <img src="assets/img/clients/client-8.png" class="img-fluid" alt="">
          </div>
          <div class="col-lg-2 col-md-4 col-6 d-flex align-items-center justify-content-center">
            <img src="assets/img/clients/client-9.png" class="img-fluid" alt="">
          </div>
          <div class="col-lg-2 col-md-4 col-6 d-flex align-items-center justify-content-center">
            <img src="assets/img/clients/client-10.png" class="img-fluid" alt="">
          </div>
          <div class="col-lg-2 col-md-4 col-6 d-flex align-items-center justify-content-center">
            <img src="assets/img/clients/client-11.png" class="img-fluid" alt="">
          </div>
```

<img src="assets/img/clients/client-12.png" class="img-fluid" alt="">

</section><!-- End Cliens Section -->
<!-- ======= About Us Section ======= -->
<section id="about" class="about">

<h2>About Us</h2>

Heart disease is one of the major causes of life complicacies and subsequently leading to death. The heart disease diagnosis and treatment are very complex, especially in the developing countries, due to the rare availability of efficient diagnostic tools and shortage of medical professionals and other resources which affect proper prediction and treatment of patients. Inadequate preventive measures, lack of experienced or unskilled medical professionals in the field are the leading contributing factors.

Although, large proportion of heart diseases is preventable but they continue to rise mainly because preventive measures are inadequate. In today's digital world, several clinical decision support systems on heart disease prediction have been developed by different scholars to simplify and ensure efficient diagnosis. This paper investigates the state of the art of various clinical decision support systems for heart disease prediction, proposed by various researchers using data mining and machine learning techniques.

 Classification algorithms such as
 Naive Bayes (NB)
 Decision Tree (DT)
 Artificial Neural Network

(ANN)
have been widely employed to predict heart diseases

Where various accuracies were obtained. Hence, only a marginal success is achieved in the creation of such predictive models for heart disease patients therefore, there is need for more complex models that incorporate multiple geographically diverse data sources to increase the accuracy of predicting.

Learn More

</section><!-- End About Us Section -->
<!-- ======= Dashboard Section ======= -->
<section id="Dashboard" class="Dashboard">

<h2>Dashboard</h2>
The Dashboard is the over all prediction of our project. In IBM we used an datasets to show the results to the general peoples in their daily affiers.

<iframe src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2Fibm&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=dashboard&subView=model000001846f616190_00000005" width="1100" height="725" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

</section><!-- End Dashboard Section -->
<!-- ======= Services Section ======= -->
<section id="Reports" class="Reports section-bg">

<h2>Report</h2>
After long struggles we made an idea that every heart diseases person an

problem to contact the hospitals shortly. To avoid such problems we designed the project. From this project you can easily identify your problems without reaching any hospitals.

<iframe src="https://us3.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2Fibm%2Breport&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=run&format=HTML&prompt=false" width="1100" height="1250" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

</section><!-- End Services Section -->
<section id="Story" class="Story">

<h2>Story</h2>
The moral story of this project is to check whether the patient is likely to be diagnosed with any cardiovascular heart diseases based on their medical attributes such as gender, age, chest pain, fasting sugar level, etc. A dataset is selected from the UCI repository with patient's medical history and attributes.

<iframe src="https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2Fibm%2Bstory&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&sceneId=model0000018474a02184_00000001&sceneTime=20000" width="1050" height="780" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

</section>
<section id="predict" class="predict">

<h2>Prediction</h2>
To Predict Your Herat Disease Risk using this form to give all your correct health data

```
<div class="row story-container" data-aos="fade-up" data-aos-delay="200">
<center>
<form class="prediction" name="Framingham08_M_Patient_form" id="xhash_Framingham08_M_Patient_form" action="" onsubmit="return false;" onkeydown="formKeyDown(event);" onkeypress="resetInTime(); return validNumberField(event);" onkeyup="Framingham08_M_Patient_fx();" onreset="document.getElementById('inputchk').innerHTML=inputchktxt; ">
<br> <br>
<div id="calc_main" >
<center>
<span class="dis" >
Input
</span>
<br> <br>
<table cellpadding="3" cellspacing="0" summary="EBMcalc Table">
<tbody><tr><td align="right" width="42%"><span class="medCalcFontOneBold">Age</span> </td>
<td align="left" valign="top" nowrap="nowrap" width="5%">  <input class="box" type="text" name="Age_param" size="6" value="" onblur="Framingham08_M_Patient_fx(); minMaxCheck();" onchange="Framingham08_M_Patient_fx();" aria-label="Use this input box to enter the value Age"></td>
<td align="left" valign="top"> <select class="select" name="Age_unit" onchange="Framingham08_M_Patient_fx(); minMaxCheck();" style="width:115px;" class="medCalcFontSelect" aria-label="Use this pulldown selector to set the unit of measure for the value Age">
<option value="1|0|yr" selected="selected">yr</option>
</select></td></tr>

<tr><td align="right" width="42%"><span class="medCalcFontOneBold">Systolic blood pressure</span> </td>
<td align="left" valign="top" nowrap="nowrap" width="5%">  <input class="box" type="text" name="Systolic_blood_pressure_param" size="6" value="" onblur="Framingham08_M_Patient_fx(); minMaxCheck();" onchange="Framingham08_M_Patient_fx();" aria-label="Use this input box to enter the value Systolic blood pressure"></td>
<td align="left" valign="top"> <select class="select"
```

name="Systolic_blood_pressure_unit" onchange="Framingham08_M_Patient_fx(); minMaxCheck();" style="width:115px;" class="medCalcFontSelect" aria-label="Use this pulldown selector to set the unit of measure for the value Systolic blood pressure">
<option value="1|0|mmHg" selected="selected">mmHg</option></select></td></tr>
<tr><td align="right" width="42%">Total cholesterol </td>
<td align="left" valign="top" nowrap="nowrap" width="5%"> <input class="box" type="text" name="Total_cholesterol_param" size="6" value="" onblur="Framingham08_M_Patient_fx(); minMaxCheck();" onchange="Framingham08_M_Patient_fx();" aria-label="Use this input box to enter the value Total cholesterol"></td>
<td align="left" valign="top"> <select class="select" name="Total_cholesterol_unit" onchange="Framingham08_M_Patient_fx(); minMaxCheck();" style="width:115px;" class="medCalcFontSelect" aria-label="Use this pulldown selector to set the unit of measure for the value Total cholesterol">
<option value="1|0|mg/dL_Chol" selected="selected">mg/dL</option>

</select></td></tr>

<tr><td align="right" width="42%">HDL cholesterol </td>
<td align="left" valign="top" nowrap="nowrap" width="5%"> <input class="box" type="text" name="HDL_cholesterol_param" size="6" value="" onblur="Framingham08_M_Patient_fx(); minMaxCheck();" onchange="Framingham08_M_Patient_fx();" aria-label="Use this input box to enter the value HDL cholesterol"></td>
<td align="left" valign="top"> <select class="select" name="HDL_cholesterol_unit" onchange="Framingham08_M_Patient_fx(); minMaxCheck();" style="width:115px;" class="medCalcFontSelect" aria-label="Use this pulldown selector to set the unit of measure for the value HDL cholesterol">
<option value="1|0|mg/dL_HDL" selected="selected">mg/dL</option>
</select></td></tr>
<tr><td align="right">On blood pressure medication</td>
<td colspan="2" align="left"> <select class="select" name="On_blood_pressure_medication_pulldown" onchange="Framingham08_M_Patient_fx();" class="medCalcFontSelect"

```
style="width:170px;">
	<option value="1.93303">No (1.93303)</option>
	<option value="1.99881">Yes (1.99881)</option>
	</select>
	</td></tr>
	<tr><td align="right"><span class="medCalcFontOneBold">Cigarette smoker</span></td>
	<td colspan="2" align="left">  <select class="select" name="Cigarette_smoker_pulldown" onchange="Framingham08_M_Patient_fx();" class="medCalcFontSelect" style="width:170px;">
	<option value="0">No (0)</option>
	<option value="0.65451">Yes (0.65451)</option>
	</select>
	</td></tr>
	<tr><td align="right"><span class="medCalcFontOneBold">Diabetes present</span></td>
	<td colspan="2" align="left">  <select class="select" name="Diabetes_present_pulldown" onchange="Framingham08_M_Patient_fx();" class="medCalcFontSelect" style="width:170px;">
	<option value="0">No (0)</option>
	<option value="0.57367">Yes (0.57367)</option>

	</select>
	</td></tr>

	</tbody></table>

	</center>
	<br> <br><center><span class="medCalcFontIO">Results<span id="inputchk" class="medCalcFontOne"><br> <br><b>Important:</b> Inputs must be complete to perform calculation. <br></span></span>

	<br> <br>
	<table summary="EBMcalc Table" class="medCalcResultBox" cellpadding="4">
	<tbody><tr><td colspan="3"> <br></td></tr>
	<tr>
	<td align="right"><span class="medCalcFontResultParam">Risk</span></td>
```

```
<td valign="top" nowrap="nowrap">  <input class="box" type="text" name="Risk_param" size="6" aria-readonly="true" aria-label="This output box will display the calculated value Risk"></td>
<td valign="top" align="left"><span class="medCalcFontResultParam">
<select class="select" name="Risk_unit" onchange="Framingham08_M_Patient_fx();" style="width:115px;" class="medCalcFontSelect" aria-label="Use this pulldown selector to set the unit of measure for the result value Risk">
<option value="1|0|%" selected="selected">%</option>
<option value="100|0|fraction">fraction</option>
<option value="100|0|ratio">ratio</option>
</select>
</span></td>
</tr>
<tr><td colspan="3"> <br></td></tr>
</tbody></table>
</center><br> <br>
<div id="calc_buttons">
<center>
<span class="medCalcFontOne">
<input class="btn" type="reset" name="resetbutton" value="Reset form">
</span>
</center>
</div>
</div><div id="pretextrefs">
 
</div>
<div id="calc_tables_above_notes">
</div>
<br> <br>
<div id="calc_equation">
<div class="medCalcFontTwo">
  </div>
</div>
</form>
</center>
      </div>
    </div>
```

```
    </section>
    <!-- ======= Team Section ======= -->
    <section id="team" class="team section-bg">
      <div class="container" data-aos="fade-up">

        <div class="section-title">
          <h2>Team</h2>
          <p>For this visualizing and predicting heart disease with an interactive dashboard. We need some invention ideas and creativity towards the prediction project. So we made an team with strong ideas to work together in the environment.</p>
        </div>

        <div class="row">
  <div class="pro">
          <div class="col-lg-6">
            <div class="member d-flex align-items-start" data-aos="zoom-in" data-aos-delay="100">
              <div class="pic"><img src="assets/img/team/team.png" class="img-fluid" alt=""></div>
              <div class="member-info">
                <h4>KAMAL R</h4>
                <span>Team Leader</span>
                <p>GRT Institute Of Engineering And Technology</p>
                <div class="social">
                  <a href=""><i class="ri-twitter-fill"></i></a>
                  <a href=""><i class="ri-facebook-fill"></i></a>
                  <a href=""><i class="ri-instagram-fill"></i></a>
                  <a href=""> <i class="ri-linkedin-box-fill"></i> </a>
                </div>
              </div>
            </div>
          </div>
        </div>

          <div class="col-lg-6">
            <div class="member d-flex align-items-start" data-aos="zoom-in" data-aos-delay="100">
```

```
            <div class="pic"><img src="assets/img/team/team.png" class="img-fluid" alt=""></div>
            <div class="member-info">
              <h4> PAVAN KUMAR B </h4>
              <span>Team Member 1</span>
              <p>GRT Institute Of Engineering And Technology</p>
              <div class="social">
                <a href=""><i class="ri-twitter-fill"></i></a>
                <a href=""><i class="ri-facebook-fill"></i></a>
                <a href=""><i class="ri-instagram-fill"></i></a>
                <a href=""> <i class="ri-linkedin-box-fill"></i> </a>
              </div>
            </div>
          </div>
        </div>

        <div class="col-lg-6 mt-4 mt-lg-0">
          <div class="member d-flex align-items-start" data-aos="zoom-in" data-aos-delay="200">
            <div class="pic"><img src="assets/img/team/team.png" class="img-fluid" alt=""></div>
            <div class="member-info">
              <h4> THARUN R</h4>
              <span>Team Number 2</span>
              <p>GRT Institute Of Engineering And Technology</p>
              <div class="social">
                <a href=""><i class="ri-twitter-fill"></i></a>
                <a href=""><i class="ri-facebook-fill"></i></a>
                <a href=""><i class="ri-instagram-fill"></i></a>
                <a href=""> <i class="ri-linkedin-box-fill"></i> </a>
              </div>
            </div>
          </div>
        </div>

        <div class="col-lg-6 mt-4">
          <div class="member d-flex align-items-start" data-aos="zoom-in" data-aos-
```

```
delay="300">
                <div class="pic"><img src="assets/img/team/team.png" class="img-fluid" alt=""></div>
                <div class="member-info">
                  <h4>RAMAN K B</h4>
                  <span>Team Member 3</span>
                  <p>GRT Institute Of Engineering And Technology</p>
                  <div class="social">
                    <a href=""><i class="ri-twitter-fill"></i></a>
                    <a href=""><i class="ri-facebook-fill"></i></a>
                    <a href=""><i class="ri-instagram-fill"></i></a>
                    <a href=""> <i class="ri-linkedin-box-fill"></i> </a>
                  </div>
                </div>
              </div>

            </div>

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

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

            <div class="section-title">
              <h2>Contact</h2>
              <p>Visualizing and predicting heart disease with an interactive dashboard is made of our knowledge with the creativity for the future generation. If you have any doubts regarding this project you may contact our team.</p>
            </div>

            <div class="row">

              <div class="col-lg-5 d-flex align-items-stretch">
                <div class="info">
```

```
                <div class="address">
                  <i class="bi bi-geo-alt"></i>
                  <h4>Location:</h4>
                  <p>Tiruttani,Thiruvallur(DT),TN Zip Code : 631209</p>
                </div>

                <div class="email">
                  <i class="bi bi-envelope"></i>
                  <h4>Email:</h4>
                  <p>IbmHealthcare@gmail.com</p>
                </div>

                <div class="phone">
                  <i class="bi bi-phone"></i>
                  <h4>Call:</h4>
                  <p>+91 84818 96628</p>
                </div>
                <iframe
src="https://www.google.com/maps/embed?pb=!1m18!1m12!1m3!1d1872.955646786618!2
d79.61282060297269!3d13.179547624245911!2m3!1f0!2f0!3f0!3m2!1i1024!2i768!4f13.1!
3m3!1m2!1s0x3a52a4e4f25f2dbd%3A0x9acb9d879e9d2fe6!2sTiruttani!5e0!3m2!1sen!2sin!
4v1668234421555!5m2!1sen!2sin" frameborder="0" style="border:0; width: 100%; height:
290px;" allowfullscreen></iframe>
              </div>

            </div>

            <div class="col-lg-7 mt-5 mt-lg-0 d-flex align-items-stretch">
              <form action="forms/contact.php" method="post" role="form" class="php-
email-form">
                <div class="row">
                  <div class="form-group col-md-6">
                    <label for="name">Your Name</label>
                    <input type="text" name="name" class="form-control" id="name" required>
                  </div>
                  <div class="form-group col-md-6">
                    <label for="name">Your Email</label>
```

```
                <input type="email" class="form-control" name="email" id="email" required>
              </div>
            </div>
            <div class="form-group">
              <label for="name">Subject</label>
              <input type="text" class="form-control" name="subject" id="subject" required>
            </div>
            <div class="form-group">
              <label for="name">Message</label>
              <textarea class="form-control" name="message" rows="10" required></textarea>
            </div>
            <div class="my-3">
              <div class="loading">Loading</div>
              <div class="error-message"></div>
              <div class="sent-message">Your message has been sent. Thank you!</div>
            </div>
            <divclass="text-center"><buttontype="submit">Send Message</button></div>
          </form>
        </div>

      </div>

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

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

<!-- ======= Footer ======= -->
<footer id="footer">

  <div class="footer-top">
    <div class="container">
      <div class="row">
```

```
<div class="col-lg-3 col-md-6 footer-contact">
  <h3>Health Care</h3>
  <p>
    Tiruttani,Thiruvallur(DT) <br>
    Tamil Nadu, Zip Code : 631209 <br>
    India <br><br>
    <strong>Phone:</strong>+91 84818 96628<br>
    <strong>Email:</strong> IbmHealthcare@gmail.com<br>
  </p>
</div>

<div class="col-lg-3 col-md-6 footer-links">
  <h4>Useful Links</h4>
  <ul>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Home</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">About us</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Services</a></li>
  </ul>
</div>

<div class="col-lg-3 col-md-6 footer-links">
  <h4>Our Services</h4>
  <ul>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Prediction</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">visualization</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Dashboard</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Report</a></li>
    <li><i class="bx bx-chevron-right"></i> <a href="#">Health Support</a></li>
  </ul>
</div>

<div class="col-lg-3 col-md-6 footer-links">
  <h4>Our Social Links</h4>
  <div class="social-links mt-3">
    <a href="#" class="twitter"><i class="bx bxl-twitter"></i></a>
    <a href="#" class="facebook"><i class="bx bxl-facebook"></i></a>
    <a href="#" class="instagram"><i class="bx bxl-instagram"></i></a>
```

```
              <a href="#" class="linkedin"><i class="bx bxl-linkedin"></i></a>
            </div>
          </div>

        </div>
      </div>
    </div>

    <div class="container footer-bottom clearfix">
      <div class="copyright">
        &copy; Copyright <strong><span>IBM Health Care Team</span></strong>. All Rights Reserved
      </div>
      <div class="credits">
        <!-- All the links in the footer should remain intact. -->
        <!-- You can delete the links only if you purchased the pro version. -->
        <!-- Licensing information: https://bootstrapmade.com/license/ -->
        <!-- Purchase the pro version with working PHP/AJAX contact form: https://bootstrapmade.com/arsha-free-bootstrap-html-template-corporate/ -->
        Designed by <a href="#hero">IBM Health Care Team</a>
      </div>
    </div>
  </footer><!-- End Footer -->

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

  <!-- Vendor JS Files -->
  <script src="assets/vendor/aos/aos.js"></script>
  <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
  <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
  <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
  <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
  <script src="assets/vendor/waypoints/noframework.waypoints.js"></script>
  <script src="assets/vendor/php-email-form/validate.js"></script>
```

```
  <!-- Template Main JS File -->
  <script src="assets/js/main.js"></script>
 <script id="desktopCalcScriptJs">//@ sourceURL=calculatorScript

/* <![CDATA[ */

var lastChar = '';

function log(i){
return Math.log(i) * Math.LOG10E;
}

function ln(i){
return Math.log(i);
}

function sq(i){
return i * i;
}

function sqr(i){
return Math.sqrt(i);
}


function power(x,y){
return Math.pow(x,y);
}

function eTo(x){
return Math.exp(x);
}


function fixDP(r, dps) {
if (isNaN(r)) return "NaN";
var msign = '';
```

```
if (r < 0) msign = '-';
x = Math.abs(r);
if (x > Math.pow(10, 21)) return msign + x.toString();
var m = Math.round(x * Math.pow(10, dps)).toString();
if (dps == 0) return msign + m;
while (m.length <= dps) m = "0" + m;
return msign + m.substring(0, m.length - dps) + "." + m.substring(m.length - dps);
}

function alertNaN(){
alert('This field is improperly formatted. You may only input the digits 0-9 and a decimal point.');
doCalc = false;
clrResults();
}
function validNumberField(event) {
var field = event.target;
if(field && field != 'undefined' && field.attributes.type.nodeValue && (field.attributes.type.nodeValue == 'number')) {
var val = field.value;
var charCode = event.charCode;
var key = String.fromCharCode(charCode);
if(charCode == 0 || charCode == 13) {
  return true;
}
if(key == ' ') {
alert('Numeric field cannot contain spaces.');
  return false;
}
if(key == '.') { return validDecimalPoint(val, key); }
if(key == '-') { return validMinus(val, key); }

if(isNaN(parseInt(key))) {
alertNaN();
return false;
}
return validFloat(val, key);
```

```
}
return true;
}
function validDecimalPoint(val, key) {
if(val.length == 0 && lastChar != '.') {
  lastChar = '.';
  return true;
}
if(val.indexOf('.') >= 0 || lastChar == '.') {
 alertNaN();
 return false;
}
if(validFloat(val, key)) {
 lastChar = key;
 return true;
}
lastChar = '';
return false;
}
function validMinus(val, key) {
if(val.length == 0) {
  return true;
}
if(val.length > 1) {
 alertNaN();
 return false;
}
return validFloat(val, key);
}
function validFloat(val, key) {
var currentVal = parseFloat(val + key);
if(isNaN(val + key) || isNaN(currentVal)) {
alertNaN();
return false;
}
return true;
}
```

```
function formKeyDown(event) {var field = event.target;

if(field && field != 'undefined' && field.attributes.type.nodeValue &&
(field.attributes.type.nodeValue == 'number')) {
  var val = field.value;
  var keyCode = event.keyCode;
  if(keyCode == 8 || keyCode == 127) {
    // backspace or delete
    if(lastChar == '.') {
      lastChar = '';
    }
    if(field.value.length == 3 && field.value[0] == '0' && field.value[1] == '.') {
      // this handles a backspace on an input like ".5", which is saved internally as "0.5"
      //   otherwise, if you leave the field after the backspace, it retains "0.5" as the value,
most likely an iOS bug
      field.value = '';
    }
  }
}
clrResults();
}
function clrValue(field) {
 field.value = '';
 lastChar = '';
}
var currenttimeout;
function resetInTime(){
if (currenttimeout) clearTimeout(currenttimeout);
currenttimeout = setTimeout('minMaxCheck();', 3000);
}var curelement;
function togCB(thisid){
thischeckbox = document.getElementById(thisid);
if (thischeckbox.checked){ thischeckbox.checked = false; }
else { thischeckbox.checked = true; }
Framingham08_M_Patient_fx();
}
function setRB(thisid){
```

```
document.getElementById(thisid).checked = true;
Framingham08_M_Patient_fx();
}
var calctxt = '';
var xmltxt = '';
var xmlresult = '';
var htmtxt = '';
var postNow = false;
var printing = false;
var interptxt = '';
var interphtm = '';
var interpxml = '';
var rbchk = false;
var inputchktxt = '<br /> <br /><b>Important:</b> Inputs must be complete to perform calculation. <br />'
function Framingham08_M_Patient_fx() {
with(document.Framingham08_M_Patient_form){
doCalc = true;
param_value = parseFloat(Age_param.value);
if (isNaN(param_value)){param_value = ""; doCalc = false;}
unit_parts = Age_unit.options[Age_unit.selectedIndex].value.split('|');
Age = param_value * parseFloat(unit_parts[0]) + parseFloat(unit_parts[1]);
param_value = parseFloat(Systolic_blood_pressure_param.value);
if (isNaN(param_value)){param_value = ""; doCalc = false;}
unit_parts = Systolic_blood_pressure_unit.options[Systolic_blood_pressure_unit.selectedIndex].value.split('|');
Systolic_blood_pressure = param_value * parseFloat(unit_parts[0]) + parseFloat(unit_parts[1]);
param_value = parseFloat(Total_cholesterol_param.value);
if (isNaN(param_value)){param_value = ""; doCalc = false;}
unit_parts = Total_cholesterol_unit.options[Total_cholesterol_unit.selectedIndex].value.split('|');
Total_cholesterol = param_value * parseFloat(unit_parts[0]) + parseFloat(unit_parts[1]);
param_value = parseFloat(HDL_cholesterol_param.value);
if (isNaN(param_value)){param_value = ""; doCalc = false;}
```

```
	unit_parts = HDL_cholesterol_unit.options[HDL_cholesterol_unit.selectedIndex].value.split('|');
	HDL_cholesterol = param_value * parseFloat(unit_parts[0]) + parseFloat(unit_parts[1]);
	On_blood_pressure_medication = parseFloat(On_blood_pressure_medication_pulldown.options[On_blood_pressure_medication_pulldown.selectedIndex].value);
	Cigarette_smoker = parseFloat(Cigarette_smoker_pulldown.options[Cigarette_smoker_pulldown.selectedIndex].value);
	Diabetes_present = parseFloat(Diabetes_present_pulldown.options[Diabetes_present_pulldown.selectedIndex].value);
	dp = 1;
	Risk_Factors = (ln(Age) * 3.06117) + (ln(Total_cholesterol) * 1.12370) - (ln(HDL_cholesterol) * 0.93263) + (ln(Systolic_blood_pressure) * On_blood_pressure_medication) + Cigarette_smoker + Diabetes_present - 23.9802;
	Risk =  100 * (1 - power(0.88936, eTo(Risk_Factors)));
	unit_parts = Risk_unit.options[Risk_unit.selectedIndex].value.split('|');
	if (doCalc) Risk_param.value = fixDP((Risk - parseFloat(unit_parts[1])) / parseFloat(unit_parts[0]), dp);
	}
	if (doCalc) document.getElementById('inputchk').innerHTML = '';
	else document.getElementById('inputchk').innerHTML = inputchktxt;
	}
	function minMaxCheck(){
	if (printing) return;
	with(document.Framingham08_M_Patient_form){
	if (Age_param.value && isNaN(Age_param.value)){ clrValue(Age_param); alertNaN('Age'); }
	if (Age_param.value && (Age < (10 - 0.00001))) {
	Age = 0;
	clrValue(Age_param);
	clrResults();
	doCalc = false;
	 alert("The minimum value for Age is 10 yr.");
	}
```

```
if (Age_param.value && Age > 74) {
clrValue(Age_param);
clrResults();
Age = 0;
doCalc = false;
 alert("The maximum value for Age is 74 yr.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
if (Systolic_blood_pressure_param.value && isNaN(Systolic_blood_pressure_param.value)){ clrValue(Systolic_blood_pressure_param); alertNaN('Systolic blood pressure'); }
if (Systolic_blood_pressure_param.value && (Systolic_blood_pressure < (90 - 0.00001))) {
Systolic_blood_pressure = 0;
clrValue(Systolic_blood_pressure_param);
clrResults();
doCalc = false;
 alert("The minimum value for Systolic blood pressure is 90 mmHg.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
if (Systolic_blood_pressure_param.value && Systolic_blood_pressure > 200) {
clrValue(Systolic_blood_pressure_param);
clrResults();
Systolic_blood_pressure = 0;
doCalc = false;
 alert("The maximum value for Systolic blood pressure is 200 mmHg.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
if (Total_cholesterol_param.value && isNaN(Total_cholesterol_param.value)){ clrValue(Total_cholesterol_param); alertNaN('Total cholesterol'); }
if (Total_cholesterol_param.value && (Total_cholesterol < (10 - 0.00001))) {
Total_cholesterol = 0;
clrValue(Total_cholesterol_param);
clrResults();
doCalc = false;
 alert("The minimum value for Total cholesterol is 10 mg/dL.\nIf you are specifying a value with a different unit, change the unit selector first.");
```

```
}
if (Total_cholesterol_param.value && Total_cholesterol > 500) {
clrValue(Total_cholesterol_param);
clrResults();
Total_cholesterol = 0;
doCalc = false;
 alert("The maximum value for Total cholesterol is 500 mg/dL.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
if (HDL_cholesterol_param.value && isNaN(HDL_cholesterol_param.value)){ clrValue(HDL_cholesterol_param); alertNaN('HDL cholesterol'); }
if (HDL_cholesterol_param.value && (HDL_cholesterol < (0 - 0.00001))) {
HDL_cholesterol = 0;
clrValue(HDL_cholesterol_param);
clrResults();
doCalc = false;
 alert("The minimum value for HDL cholesterol is 0 mg/dL.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
if (HDL_cholesterol_param.value && HDL_cholesterol > 100) {
clrValue(HDL_cholesterol_param);
clrResults();
HDL_cholesterol = 0;
doCalc = false;
 alert("The maximum value for HDL cholesterol is 100 mg/dL.\nIf you are specifying a value with a different unit, change the unit selector first.");
}
}
}
function clrResults(){
with(document.Framingham08_M_Patient_form){
Risk_param.value = '';
}
}
var Age = null,
Systolic_blood_pressure = null,
Total_cholesterol = null,
```

```
HDL_cholesterol = null,
On_blood_pressure_medication = null,
Cigarette_smoker = null,
Diabetes_present = null,
Risk_Factors = null,
Risk = null,
param_value = null;
/* ]]> */
</script>
</body>
</html>
```

SIGN IN.html:

```
<html>
<head>
<title> Login </title>
 <link rel="stylesheet" type="text/css" href="login.css">
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-
  awesome/4.7.0/css/font-awesome.min.css">
    <script type="text/javascript">
       function validate(){
    var Username = document.login.Username.value;
    var password = document.login.password.value;

    if(Username == "admin" && password == "admin")
    {
          alert("Login Successfully");
          return true;
    }
    else
    {
          alert("Login Failed");
          return false;
    }
    }
    function myfunction(){
```

```
        var x =document.getElementById("password");

        if(x.type === "password"){
           x.type = "text";
        }
        else{
           x.type = "password";
        }
      }
        </script>
        </head>
        <body>
           <div class="container">
           <div class="form">
              <div class="login">
        <form action="index.html" method="post" name="login" onsubmit="return validate()">
           <h1> Login </h1>
           <div class="Username"> <label>Username : </label>
           <input type="text" name="Username" placeholder="Username" size="20" id="Username"></div>
           <div class="password"><label>password : </label>
           <input type="password" name="pass" placeholder="Password" size="20" id="password"></div>
           <p>To use (Username : admin && Password : admin)</p>
           <div class="forgot"><a href="" class="text signup-link">Forgot Password?</a> <input type="checkbox" onclick="myfunction()" class="show"><a class="text1"> Show Password</a></div>
           <div><center><buttonid="btn" type="submit">Login</button></center></div>
           <div class="social-icons">
              <divclass="social-iconfacebook"><ahref="https://www.facebook.com/login.php?skip_api_login=1&api_key=113869198637480&kid_directed_site=0&app_id=113869198637480&signed_next=1&next=https%3A%2F%2Fwww.facebook.com%2Fv15.0%2Fdialog%2Foauth%3Fapp_id%3D113869198637480%26auth_type%26cbt%3D1667802295776%26channel_url%3Dhttps%253A%252F%252Fstaticxx.facebook.com%252Fx%252Fconnect%252Fxd_arbiter%252F%253Fversion%253D46%2523cb%253Df1ba6276f1c262%2526domain%253Ddevelopers.facebook.co
```

m%2526is_canvas%253Dfalse%2526origin%253Dhttps%25253A%25252F%25252Fdevelopers.facebook.com%25252Ff36234788d48a12%2526relation%253Dopener%26client_id%3D113869198637480%26config_id%26display%3Dpopup%26domain%3Ddevelopers.facebook.com%26e2e%3D%257B%257D%26fallback_redirect_uri%3Dhttps%253A%252F%252Fdevelopers.facebook.com%252Fdocs%252Ffacebook-login%252Fweb%252Flogin-button%252F%26force_confirmation%3Dfalse%26id%3Dfe32f008e45d24%26locale%3Den_US%26logger_id%3D09623361-33c2-4bc1-a39b-ad67149fb531%26messenger_page_id%26origin%3D1%26plugin_prepare%3Dtrue%26redirect_uri%3Dhttps%253A%252F%252Fstaticxx.facebook.com%252Fx%252Fconnect%252Fxd_arbiter%252F%253Fversion%253D46%2523cb%253Df3efef6fe7d85ba%2526domain%253Ddevelopers.facebook.com%2526is_canvas%253Dfalse%2526origin%253Dhttps%25253A%25252F%25252Fdevelopers.facebook.com%25252Ff36234788d48a12%2526relation%253Dopener.parent%2526frame%253Dfe32f008e45d24%26ref%3DLoginButton%26reset_messenger_state%3Dfalse%26response_type%3Dsigned_request%252Ctoken%252Cgraph_domain%26scope%26sdk%3Djoey%26size%3D%257B%2522width%2522%253A600%252C%2522height%2522%253A679%257D%26url%3Ddialog%252Foauth%26version%3Dv15.0%26ret%3Dlogin%26fbapp_pres%3D0%26tp%3Dunspecified&cancel_url=https%3A%2F%2Fstaticxx.facebook.com%2Fx%2Fconnect%2Fxd_arbiter%2F%3Fversion%3D46%23cb%3Df3efef6fe7d85ba%26domain%3Ddevelopers.facebook.com%26is_canvas%3Dfalse%26origin%3Dhttps%253A%252F%252Fdevelopers.facebook.com%252Ff36234788d48a12%26relation%3Dopener.parent%26frame%3Dfe32f008e45d24%26error%3Daccess_denied%26error_code%3D200%26error_description%3DPermissions%2Berror%26error_reason%3Duser_denied&display=popup&locale=en_GB&pl_dbl=0">

<divclass="social-icongoogle"><spanclass="fafa-google">

Not a member?

```
            <a href="signup.html" class="text signup-link">Registration now</a>
            </span>
        </div>
        </form>
        </div>
        </div>
        </div>
    </body>
</html>
```

LOG IN.html:

```
<html>
    <head>
        <title>Registration Page</title>
        <link rel="stylesheet" type="text/css" href="signup.css">
            <script type="text/javascript">
            function validate(){
var Username = document.signup.Username.value;
var Email = document.signup.Email.value;
var Name = document.signup.name.value;
var Mobile = document.signup.Mobile.value;
var Blood = document.signup.Blood.value;
var Date = document.signup.Date.value;
var password = document.signup.password.value;
var password1 = document.signup.password1.value;
var Gender = document.signup.Gender;
var x = document.signup.password;
var sel = document.getElementById("Blood");
var selectedText = sel.options[sel.selectedIndex].text;


if(Username == null || Username == "")
{
    alert("Enter Username Name");
    return false;
}
```

```
else if(Name == null || Name == "")
{
   alert("Enter Email ID");
   return false;
}
else if(Email == null || Email == "")
{
   alert("Enter Email ID");
   return false;
}
else if(Mobile == null || Mobile == "")
{
   alert("Enter Mobile no");
   return false;
}
else if(document.signup.Blood.selectedIndex=="")
{
alert ( "Please select Blood!");
return false;
}

else if(Date == null || Date == "")
{
   alert("Enter Date Of Birth");
   return false;
}
else if (Gender[0].checked == false && Gender[1].checked == false)
{
   alert("please enter gender");
   return false;
}
else if(password == null || password == "")
{
   alert("Enter valid password");
   return false;
}
else if(password1 == null || password1 == "")
```

```
{
   alert("Enter vald confrim password");
   return false;
}
else if(password != password1)
{
   alert("password and confrim password not match");
   return false;
}
}
function showing(){
   var x =document.getElementById("password");
   var y =document.getElementById("password1")

   if(x.type === "password"){
      x.type = "text";
   }
   else{
      x.type = "password";
   }
   if(y.type === "password"){
      y.type = "text";
   }
   else{
      y.type = "password";
   }
}
   </script>

   </head>
   <body>
<div class="container">
      <div class="form">
         <div class="signup">
<form action="" name="signup" onsubmit=" validate(); return false">
      <h1> Registration </h1>
      <div class="Username"> <label> Username : </label>
```

```
<input type="text" name="Username" placeholder="Username" size="20" id="Username" pattern="[a-Z0-9]"></div>
<div class="name"> <label> Name : </label>
<input type="text" name="name" placeholder="name" size="20" id="name" pattern="[a-Z0-9]"></div>
<div class="Email"> <label> Email : </label>
<input type="Email" name="Email" placeholder="Email" size="20" id="Email" pattern="[a-Z0-9]+@+[a-Z]+.+[a-Z]"></div>
<div class="Mobile"> <label> Mobile : </label>
<input type="tel" name="Mobile" placeholder="Mobile Number" size="20" id="Mobile" pattern="[6-9]{1}[0-9]{9}"></div>
<div class="Blood"> <label> Blood Group : </label>
  <select name="Blood" id="Blood" class="required">
    <option value="select">Select</option>
    <option value="A+">A+</option>
    <option value="B+">B+</option>
    <option value="AB+">AB+</option>
    <option value="O+">O+</option>
    <option value="A-">A-</option>
    <option value="B-">B-</option>
    <option value="AB-">AB-</option>
    <option value="O-">O-</option>
  </select></div>
<div class="Date"> <label> DOB : </label>
<input type="Date" name="Date" placeholder="Date of Birth" size="20" id="Date"></div>
<div class="Gender"> <label>Gender : </label><input type="radio" name="Gender" value="Male" id="Male">Male
 
<input type="radio" name="Gender" value="Female" id="Female">Female</div>
<div class="password"> <label> password : </label>
<input type="password" name="password" placeholder="Password" size="20" id="password"></div>
<div class="password1"> <label> Confrim password : </label>
<input type="password" name="password1" placeholder="confrim Password" size="20" id="password1"></div>
<error id="alert"></error>
```

```
        <div class="check"> <label><input type="checkbox" id="check" onclick="showing()" >Show Password</label></div>
        <div> <center><button id="btn" type="submit">Register Now</button></center></div>
        <div class="login-signup">
        <span class="text">Already member?
          <a href="login.html" class="text login-link">Login now</a>
          </span>
        </form>
          </div>
      </div>
        </d
    iv>
      </body>
    </html>
```

Github Link: https://github.com/IBM-EPBL/IBM-Project-28950-1660119282

Project Demo Link:

https://drive.google.com/file/d/1OIHlGICva_gyR7WQebgopCUSn2_ZsN4w/view?usp=drivesdk