Visualizing and Predicting Heart Diseases with an Interactive Dashboard

NALAIYA THIRAN PROJECT REPORT

2022

Submitted by

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CHAPTER 1

INTRODUCTION

In an effortto become famous and wealthy,people today lead lavish lives and put in long hours like robots. Because of their stressful lives and busy schedules, people frequently overlook to take care of their health. The food they consume and their manner of life are altered as a result. Only young individuals who suffer strain and stress in their life developblood pressure, diabetes,and other illnesses. All of these factors contribute to heart disease attacks. The most important organ in the human body is the heart, and when it is hurt, other organs are also impacted. Given how challenging it is to pinpoint the root cause of a patient's heart condition, this technology can provide automated predictions regarding the patient's heart condition to increase the efficacy of subsequent therapies. The heart is an important bodily organ. It moves blood through the blood vessels of the circulatory system. The circulatory system is particularly important since it regulates actions like giving blood, oxygen, and other supplies to the body's numerous organs. The heart is the most important component of the circulatory system. Serious health issues and occasionally even death can result from a malfunctioning heart. Based on the patient's physical examination, symptoms, and signs, heart disease is identified. The likelihood of acquiring heart disease is influenced by many variables, including smoking, body cholesterol, family history of the disease, obesity, high blood pressure, and inactivity. The existing system does not effectively manage the clinical details. The existing system will be ineffective if there are any gaps in or errors in the data.

The current automated method uses the classifier model to extract significant patterns or features from the medical data. Patients must wait for the arrival of the hospital report. The doctor must spend a lot of time learning about the patient's conditionbeforedeciding on the best courseof action.

1.1 Project Overview

A Variety of disorders that affect the heart are referred to as heart diseases. Heart conditions comprise:

i. diseases of the blood vessels,such as coronary arterydisease
ii. abnormal heartbeats (arrhythmias)
iii. Heart problems are a birth defect (congenital heart defects)
iv. muscular disease of the heart
v. Heart valve dysfunction

1.2 Purpose

The healthcare sector gathers a huge quantity of data, some of which is confidential information that can be used to guide decisions. Some sophisticated data mining techniques are utilised to produce trustworthy results and render data-based conclusions that are sound. In this study, a neural network is used to construct an efficient system for forecasting the risk of heart disease (EHDPS).

The algorithm makes forecasts based on 15 medical factors, including age, sex, blood pressure, cholesterol, and obesity. The EHDPS calculates a patient's chance of developing heart disease.It enables the creation of useful knowledge, such as links between patterns and areas of medicine related to heart disease. A multilayer perceptron neural network with back propagation was the training method we employed.

CHAPTER 2

LITERATURE SURVEY

TITLE: URBANDATA MANAGEMENT SYSTEM TOWARDS BIG DATAANALYTICS

AUTHOR: BabarMand Arif F YEAR OF PUBLICATION: 2019

Big data processing is a barrier to the ongoing development of a flexible urban setup. It may be difficult to understand the vast amounts of data created in a smart urban environment for decision-making. To learn relevant information about the enormous amounts of data, big data analytics is applied. Due to the vast volume of data, the currently used traditional methodologies are inadequate for producing a meaningful insight. Large-scale data processing and computation are referred to as "Big Data" analytics. A Hadoop-based architecture is presented in this study to control the loading and processing of massive amounts of data. The suggested architecture is made up of two distinct modules: large data processing and big data loading. The efficiency and performance of the process, i.e. Hadoop, are assessed to give a customised technique for data loading. Data loading is carried out and regularly contrasted against various decisions in order to analyse data feeding into Hadoop. Trial results are recorded for different attributes together with manual and conventional data loading to show the efficacy of our suggested method. For several qualities, trial results are kept track of together with manual and traditional data to demonstrate the effectiveness of our recommended approach.

TITLE: INTERNET OF THINGS AND ITS IMPACTS IN COMPUTING INTELLIGENCE

AUTHOR: BABAR M AND ARIF F

YEAR OF PUBLICATION: 2019

The internet of things (IoT) is a divisive topic in the age of the information superhighway. Globally, the usage of digital communications has grown dramatically, setting the present apart from the past. The internet and other connecting technologies are the fundamental building blocks for the digitization of the entire cosmos. "Internet of things" devices are those that are connected to the internet. The Internet of Things has a big impact on present computational analyses and transactions. In addition to providing examples of how M2M messaging, cloud-based embedded computing, mobile computing, and cellular networking technologies can be used in conjunction with IoT devices, sensors, gadgets, etc., this contribution also discusses how to detect location spoofing for the IoT and use clustering tools for the next-generation IoT.The networking of multiple physical items, such as smartphones, cars, and other electronic equipment, is referred to as the "Internet of Things," or IoT, for short. Numerous electrical components, sensors, actuators, and software are installed on top of that physical equipment in order to make the process dynamic and gather and communicate transactional data. IoT enablesparticular devices to perceive the physical environment and respond appropriately. All of the information is produced at a rapid rate, is multidimensional, structured, semi-structured, and occasionally unstructured.

TITLE: INVESTIGATING THE ADAPTION OF BIG DATA ANALYTICS IN HEALTHCARE

AUTHOR: ShahbazM and Gao CYEAR OF PUBLICATION: 2019

The innovative impact of big data analytics on strategic planning and decision-making across the healthcare industry is drawing a lot of attention. Using the task-technology fit paradigm and the technological acceptance model, this study investigated the mechanisms underlying the adoption of big data analytics in healthcare organisations.By utilising AMOS v21 to analyse 224 valid responses to a survey,we were able to evaluatethe hypotheses. Our study shows that task-technology fit and the technology acceptance model's credentials significantly improve behavioural intentions to utilise big data analytics systems in healthcare, which in turn results in actual use. Additionally, behavioural intention for utilisation was positively impacted by confidence in the security of the information system. Employee resistance to change, which has been shown in this study to negatively mediate the association between intention to use and actual utilisation of big data analytics in healthcare, is largely responsible for the failure of innovative systems in organisations. Our findings can be used by healthcare organisations to help staff members feel more psychologically empowered and to help them understand how to use big data analytics.

TITLE: DEVELOPMENT OF SMARTHEALTHCARE SYSTEM BASED ONSPEECHRECOGNITION

AUTHOR:Ismail A and Abdlerazek S

YEAR OF PUBLICATION: 2019

This project proposesan efficient voice recognition-based solutionfor providing a straightforward control system to older people, patients, and people with impairments. To enable immediate access to Internet of Things (IoT) devices installed in smart homes and hospitals without relying on a centralised supervisory system, a low-cost voice recognition system is currently being developed. The suggested method for enabling wireless smartphone administration of home appliances made use of a Raspberry Pi gadget. The major objective of this technology is to streamline voice-based IoT connectivity between users and household appliances. Through the integration of a hybrid Support Vector Machine (SVM) and Dynamic Time Warping (DTW) technique, the proposed framework dramatically enhances voice recognition. The outcomes make it easy for patients and elderly people to access and manage IoT devices that are compatible with our system using speech recognition. The recommended voice recognition system can be adapted to meet current smart IoT devices and is adaptable and expandable. It provides patient device handling privacy as well. This article suggests using speech recognition to operate appliances in smart homes or smart medical facilities. Many researchers have created voice-activated systems. The study provides a useful technique for integrating patient assistance systems in medical facilities.

TITLE: HYBRID GENETIC-DISCRETIZED ALGORITHM TO HANDLE DATAUNCERTAINTY IN DIAGNOSING STENOSIS OF CORONARY ARTERIES

AUTHOR: Alizadehsani R and Roshanzamir M

YEAR OF PUBLICATION: 2020

The biggest cause of death worldwide is cardiac illness (CAD). Although expensive and painful, invasive coronary angiography is the most effective method of diagnosing CAD. As a result, analytical techniques like data mining and machine learning are fast gaining popularity. Despite the fact that doctors must be aware of which arteries are stenotic, few studies have explicitly looked at the stenosis of the right coronary artery (RCA), left circumflex (LCX), and left anterior descending (LAD) arteries. However, the majority of research focuses solely on CAD detection. The great majority of datasets in this field are currently noisy (data uncertainty). To the best of our knowledge, no research has been done to tackle this significant issue. In this work, the Z-Alizadeh Sani dataset expansion is used. 303 records and 54 different traits altogether. An entirely new feature selection algorithm is suggested in this work. To reduce the uncertainty in CAD prediction in the interim, we apply data discretization. As far as we are aware, this study is the first to address ambiguity in CAD prediction. Finally, the support vector machine's (SVM) kernel hyper-parameters are chosen using the evolutionary process (GA). We have achieved high specificity for each primary coronary artery stenosis diagnosis. The results of this study can be used by doctors to support their manual diagnoses of coronary stenosis.

2.1 Existing Problem

Information for this system's input comes from the patient. Then, based on user inputs, heart disease is evaluated using ML techniques. The results of other modelsthat have been applied in the same domain are now compared to the generated findings in order to decide which models need to be improved. NN, DT, SVM, and Naive Bayes are used to find patterns in the data of heart disease patients collected from the UCI laboratory. The performance and accuracy of the output using various methods are compared. The suggested hybrid method competes with the other current methods, providing values for the F-measure of 87%. Heart disease is even being emphasised as a silent killer that causes a person to pass away without showing any outward signs. Growing concern about the illness and its effects is a result of the disease's nature. Despite the fact that heart disease can manifest itself in various ways, there is a common set of basic risk factors that determine whether or not someone would ultimately be at risk for heart disease.This technique can be extremely effectively applied to the task of heart diseaseprediction. According to the World Health Organization (WHO), cardiac disorders are thought to be the cause of 12 million deaths worldwide each year. Heart disorders are responsible for about 25% of deaths in those betweenthe ages of 25 and 69. Information for this system's input comes from the patient.Then, based on user inputs, heart diseaseis assessed using data analytics.

2.2 References

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2.1 Problem statement definition

Effective management of heart disease can be achieved through a mix of medication, lifestyle modifications, and, occasionally, surgery. With the proper care, heart disease symptoms can be lessened and heart function can be enhanced. Predicted outcomes can be utilised to avoid, and hence lower,the need for expensive surgicalprocedures. The overallgoal is to accurately predictthe presence of heart disease using few tests and features. Tests are mostly based on the attributes taken into account, and the findings are often reliable. There are a lot more input attributes that can be used, but our objectiveis to estimate the risk of developing heart disease with the fewestattributes and greatest speed. Instead than relying on the knowledge-rich data that is concealed in the data set and databases, doctors frequently make decisions based on their intuition and experience. The level of care given to patients is impacted by his practice's unintended biases, blunders,and exorbitant medicalcosts.

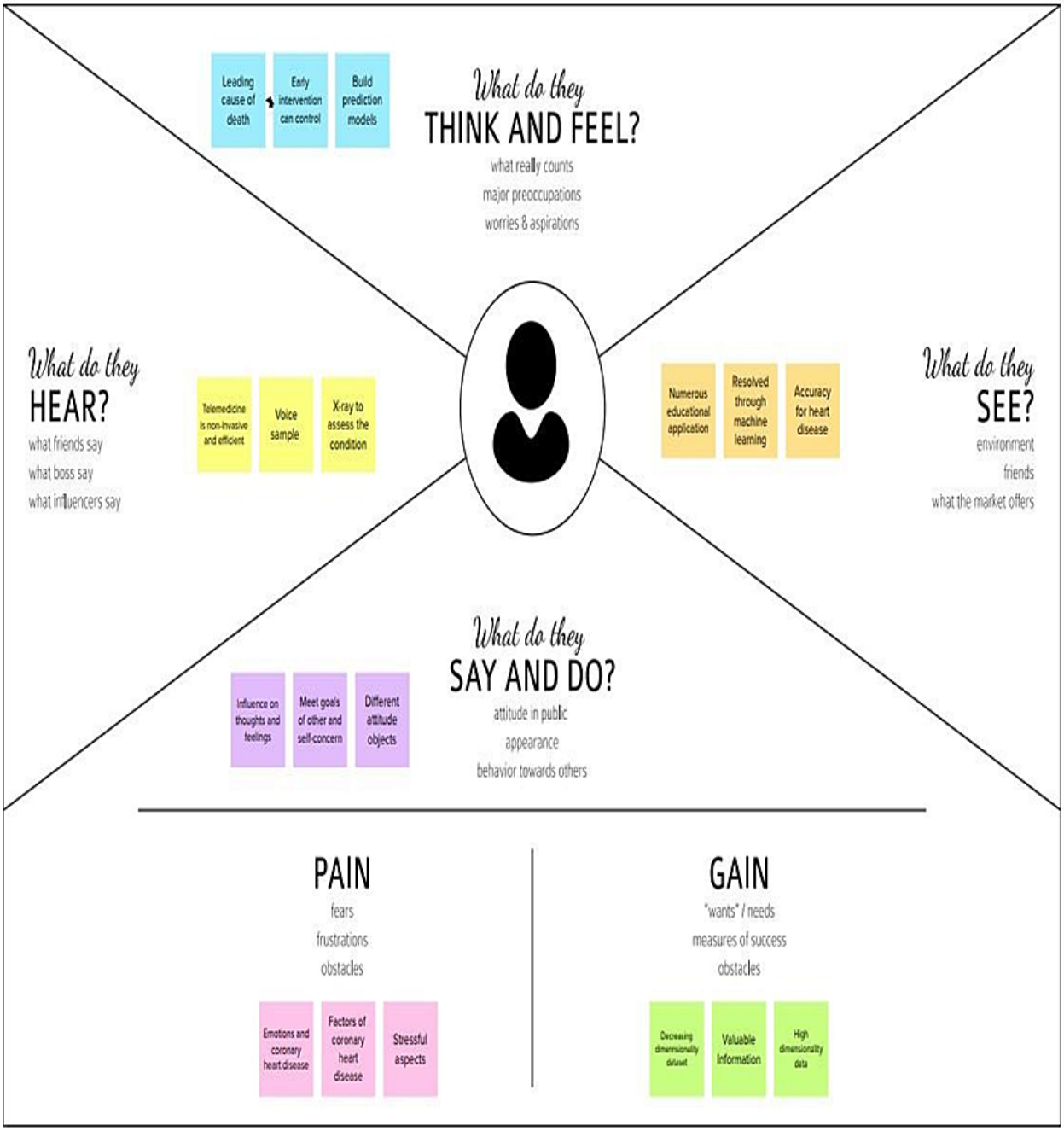
CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as acustomer segment. The agile community has embraced the empathy map, which was first developed by Dave Gray. Anytime you feel the need to fully immerse yourself in a user's environment, empathy maps can be used. Everyone wouldadd at least one stickyto every section.You might ask questions, such as:

i. What would the user be thinking and/or feeling?What are some of their worries andaspirations?
ii. What would their friends, colleagues, and boss be likely to say while the user is using ourproduct? What would the user hear in these scenarios?
iii. What would the user see while using our productin their environment?
iv. What might the user be saying and/or doing while using our product?How would thatchange in a public or private setting?
v. What are some ofthe user’s pain points or fears when using our product?



EMPATHY MAP CANVAS

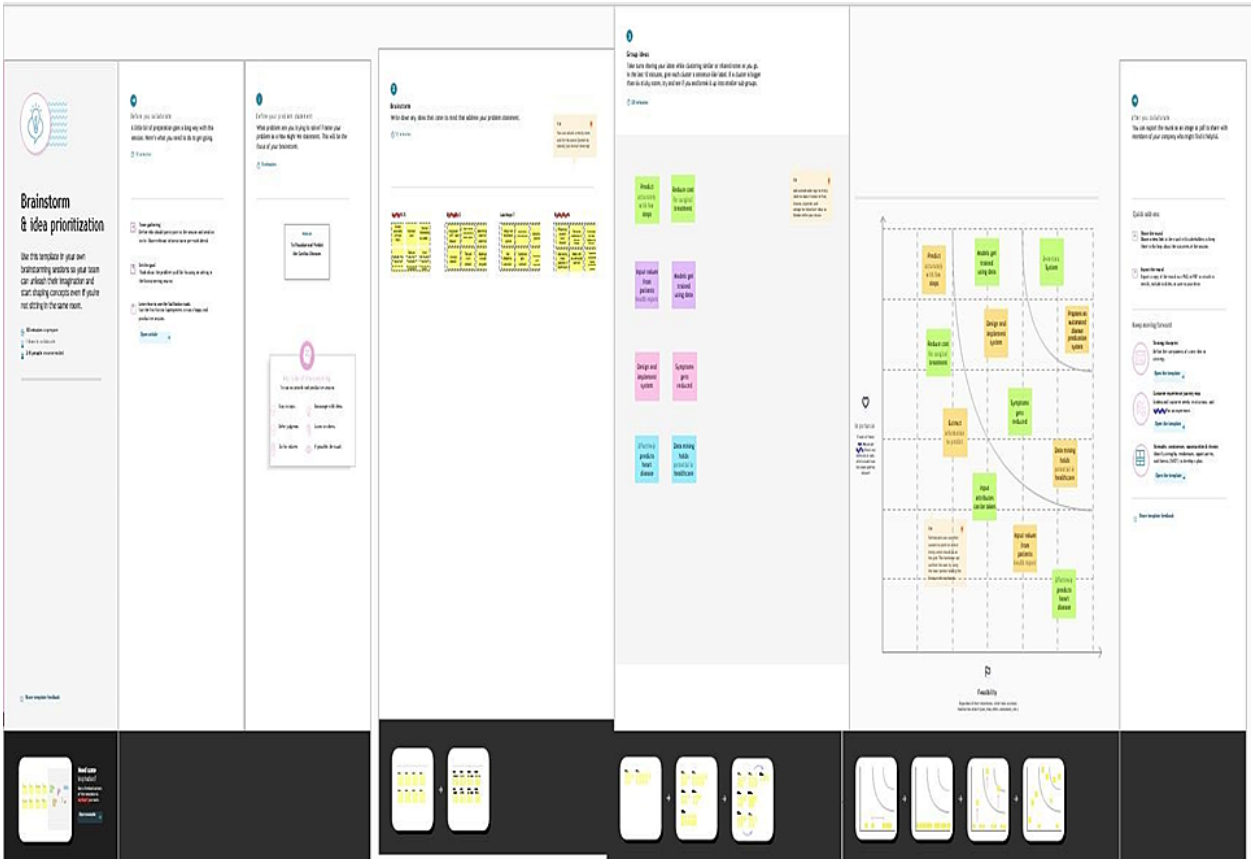
3.2 Ideation and brainstorming

Ideation and the practise of brainstorming, a particular method for coming up with fresh ideas, are frequently closely related. The main distinction between ideation and brainstorming is that whereas brainstorming is nearly often done in groups, ideation is typically seen as being more of a solitary endeavour. A group of people are frequently gathered for a brainstorming session to generate either fresh, general ideas or solutions to specific problems or circumstances.

For example, a major corporation that recently learned it is the object of a major lawsuit may want to gather together top executives for a brainstorming session on how to publicly respond to the lawsuit being filed.

In a brainstorming session, participants are encouraged to freely share any ideas that may come to mind. The thinking is that by generating a large number of ideas, the brainstorming group is likelyto come up with a suitable solution for whateverissue they are addressing.

The lines betweenideation and brainstorming have become a bit more blurred with the development of several brainstorming software programs, such as Bright idea and Idea wake. These software programs are designed to encourage employees of companies to generate new ideas for improving the companies' operations and, ultimately, bottom-line profitability.



BRAINSTORMING AND IDEA PRIORITIZATION

3.3 Proposed Solution

The phrase "proposed solution" refers to the combination of all services (including any installation, implementation, training, maintenance, and support services) necessary to fulfil the goal specified by the vendor in its proposal, as well as any software, hardware, other goods or equipment.

Project team shall fill the following information in proposedsolution;

1. Problem Statement (Problem to be solved)

The overall objective of my work will be to predict accurately with few tests and attributes the presence of heart disease. Attributes considered form the primary basis for tests and give accurate results more or less. Many more input attributes can be taken but our goal is to predict withfew attributes and faster efficiencythe risk of having heart disease.

2. Idea / Solution description

Our heart disease prediction project seeks to establish whether or not a patient should receive a heart disease diagnosis, which is a binary result.

3. Novelty / Uniqueness

This system aims at giving more sophisticated prediction models, risk calculation toolsand feature extraction tools for other clinical risks.

4. Social Impact / Customer Satisfaction

Direct communication with their doctor will help increasepatient satisfaction. You can consider exchanging secure messages and building systems that open the lines of communication between you and the patient. This will not only encourage long-term relationships but will also result in better healthoutcomes.

5. Business Model (RevenueModel)

Business reporters and producers at local newspaper, television, and radio outlets; Healthand business beat reporters from the Associated Press wire service whose news stories are often published in large and small newspapers across the state; and Reporters at local and national businessnewspapers, magazines, and websites.

6. Scalabilityof the Solution

The evolution of technology has enabled to process such large data, and accurately predict interested outcomes. Propose a scalable framework that uses healthcare datato predict heart disease based on certain attributes.

3.4 Problem solution fit

The Problem-Solution is a tool for entrepreneurs, marketers, and corporate innovators that helpsto find ideas with higherodds of solution adoption, minimise time spent on solutiontesting, and gain a betterunderstanding of the existing situation. Such information is generallyacquired "on the fly," following rounds of revisions and consumer interviews, but it is critical to your success.This canvas contains everything you need to find patternsand realise what would work and why, based on the ideas of Lean Startup, and User Experience design. Simply be where your consumers are and address a genuine need, whether it's the same problem done differently or something new presented in a familiar way. In this project this arethe needs for that.

1. CUSTOMER SEGMENT(S)

Cardiac Patients

Cardiologists

2. JOBS-TO-BE-DONE / PROBLEMS

Analyze the problem

Identify the problems

3. TRIGGER

Trust ValueTime

4. EMOTIONAL BARRIERS

Feels great in that platformand can easilyanalyse the problem

5. AVAILABLE SOLUTIONS

Give the time to fix the problem

Keep the records

6. CUSTOMER CONSTRAINTS

Contains more facilities

Behavioural factors

7. BEHAVIOUR

In this system,prediction can be made by using the dataset

8. CHANNELS OF BEHAVIOUR

Each sector memberplays a specialized role in the user

9. PROBLEMS ROOT CAUSE

The nature of heart diseaseis complex

The diagnosis is based on signs and symptoms

10. YOUR SOLUTION

To predict the heart diseaseimmediately

CHAPTER 4

REQUIREMENT ANALYSIS

Requirements analysis, also called requirements engineering, is the process of determining user expectations for a new or modified product. These features, called requirements, must be quantifiable, relevant and detailed. In software engineering, such requirements are often called functional specifications. Requirements analysis is an important aspect of project management.

In order to resolve disagreement or ambiguity in requirements as needed by different users or groups of users, eliminate feature creep, and document every step of the project development process from beginning to end, requirements analysis requires continuous communication with system users. Instead of attempting to shape user expectations to match the requirements, effort should be focused on ensuring that the end system or product adheres to client needs.

Collaboration is important for requirements analysis, which calls for knowledge of hardware, software, and human factors engineering as well as interpersonal skills. The Requirements Analysis Phase's goal is to turn the needs and high-level requirements defined in prior phases into requirements that are clear, complete, consistent, traceable, and approved by all relevant stakeholders.

4.1 Functional Requirement

Functional requirements specify what a system should be able to do through computations, technical details, data manipulation and processing, and other specialised functions. The use cases that are used by the system to implement the functional requirements are reflected in the behavioural requirements.

Following are the functional requirements of the proposedsolution.

1. **User Registration**

   The systemallows users to createan account and login.

2. **User confirmation**

   Confirmation is done usingemail and with OTP.

3. **Load Dataset**

   Dataset is loaded from Kaggle.

4. **Remove Dataset**

   To removeinappropriate datasets and code.

5. **Analysis**

   Exploration and visualization of data in IBM Cognos.

6. **Disease Prediction**

   The systemallows the users to predictheart disease.

4.2 Non-Functional requirements

A non-functional requirement (NFR) is a requirement that, rather of defining specific behaviours, specifies criteria that can be used to assess how well a system performs. Functional requirements, on the other hand, define particular behaviours or functions. The system design includes a thorough plan for putting functional requirements into practise.

Following are the non-functional requirements of the proposed solution.

1. Usability

Effectively predicts if the patientsuffers from heart disease by the input values from thepatient’s health report.

2. Security

The best suitableapproach for heart disease predictionwith providing securityto healthdataset.

3. Reliability

The structure must be reliableand strong in giving the functionalities. The movementsmust be made unmistakable by the structure when a customer has revealed a couple of enhancements.

4. Performance

The framework will be utilized by numerous representatives all the while.Since the system will be encouraged on a single web server with a lone database server outside of anyone's ability to see,execution transforms into a significant concern.

5. Availability

Availability of services is essential for those who havehighly disease affected patients.

6. Scalability

Scalable framework that forecasts cardiac illnesses based on characteristics using healthcare data.

CHAPTER 5

PROJECT DESIGN

The conventional visual representation of how information moves through a system is a data flow diagram (DFD). A tidy and understandable DFD can graphically represent the appropriate quantity of the system demand. It can be done manually, automatically, or both.It demonstrates how information enters and exits the system, what modifies the data, and where information is kept.

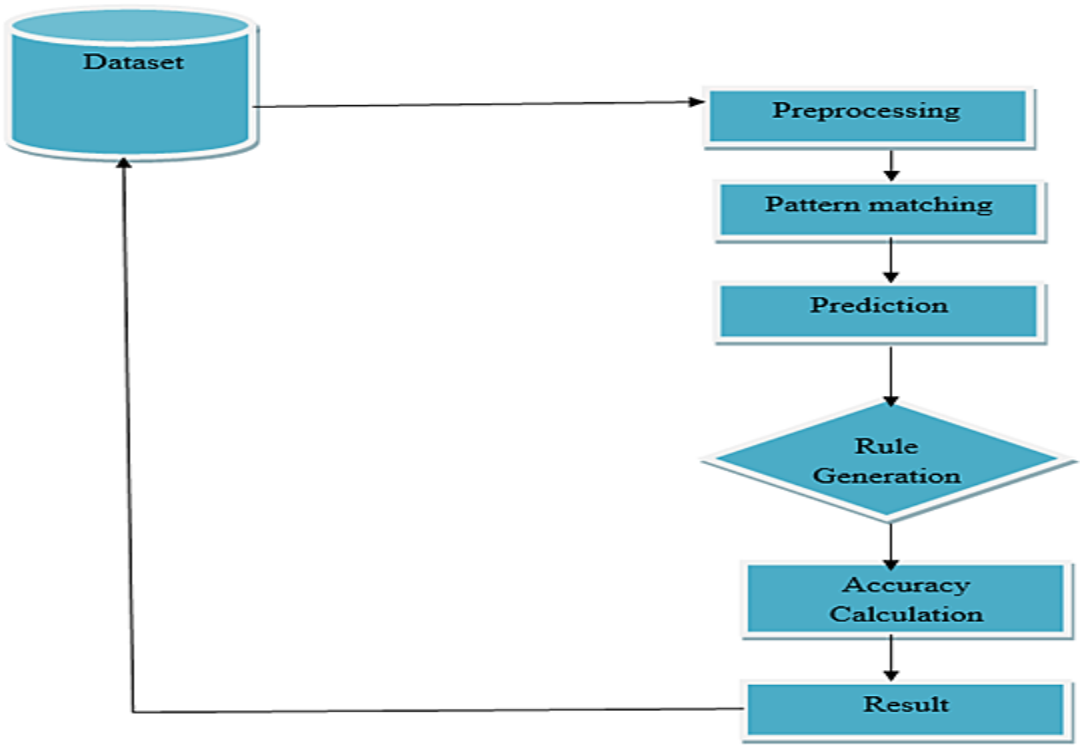
A DFD's goal is to outline the boundaries and scope of a system as a whole. It can be utilised as a communication tool between a system analyst and any participant in the sequence that serves as the foundation for system redesign. The DFD is also known as a bubble chart or data flow graph.

A area for the collecting of data items is indicated by a series of parallel lines. A data store denotes the storage of data that can be used later or by various processes in a different order. The data storage may contain one or more components. Any level of abstraction for a system or piece of software can be performed using the DFD. Levels that correspond to increasing information flow and functional detail may be partitioned into DFDs. The system is then broken down and represented as a DFD with several bubbles. The system components that each of these bubbles represents are then broken down and documented as ever-more-detailed DFDs.

5.1 Data flow diagram

The conventional visual representation of how information moves through a system is a data flow diagram (DFD). A tidy and understandable DFD can graphically represent the appropriate quantity of the system demand. It can be done manually, automatically, or both.

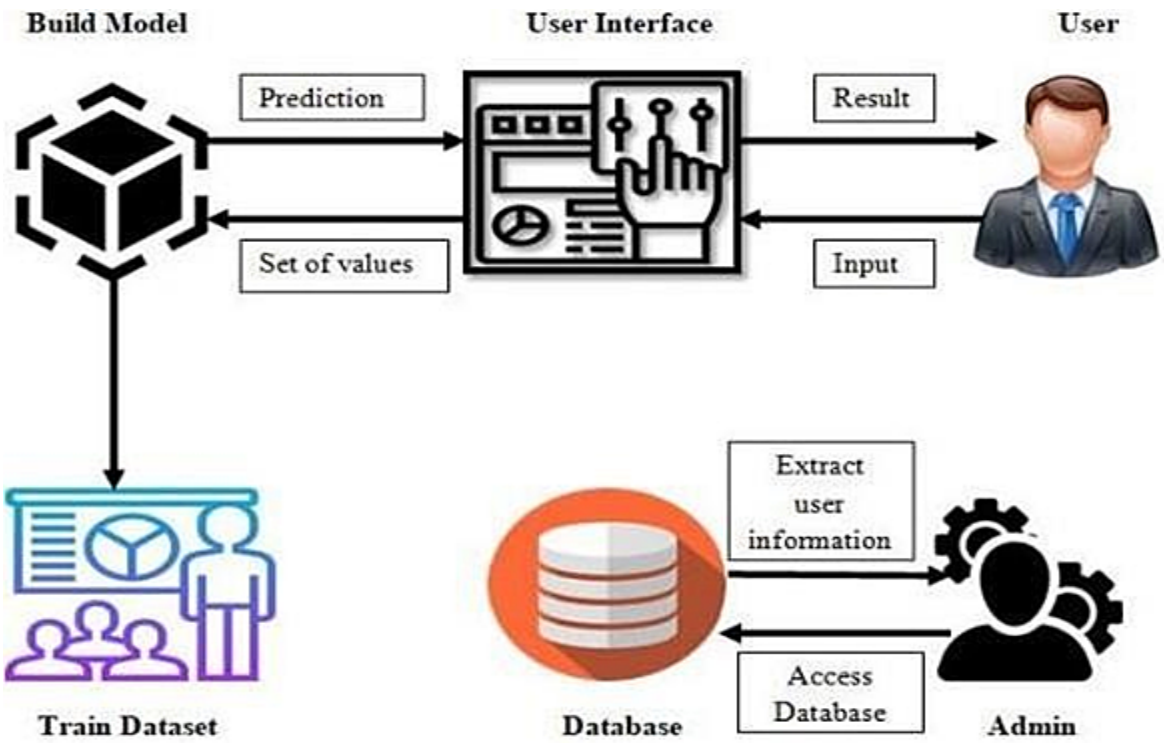
It demonstrates how information enters and exits the system, what modifies the data, and where information is kept.



DATA FLOW DIAGRAM

5.2 Solution & Technical Architecture

Solution Architects are most similar to project managers, ensuring that all parties, including stakeholders, are on the same page and moving in the right direction at all stages. Technical architects manage all activities leading to the successful implementation of a new application. They propose a combination of building blocks that provides the best possible fix. The technological architecture and enterprise architecture are connected by this method, which is particularly detail-oriented. It also calls for a depth of understanding of the company's technological and administrative operations.



TECHNOLOGY STACK

5.3 User Stories

The smallest piece of work in an agile system is a user story. It is a final objective, not a feature, as seen through the eyes of a software user.A user story is an informal, generalexplanation of a software featurewritten from the perspective of the end user or customer.

The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer. Note that "customers" don'thave to be external end users in the traditional sense, they can also be internal customers or colleagues within your organization who depend on your team.

User stories are a few sentences in simple languagethat outline the desired outcome.They don't go intodetail. Requirements are added later, once agreed upon by the team.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (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 register for the application	I can register & access the dashboard	Low	Sprint-2
	Dashboard	USN-4	As a user, I can register for the application		Medium	Sprint-3
	Visualization	USN-5	As a user, Visualization is viewd in an interactive dashboard		High	Sprint-4
User	Exploration		As a user, I will predict the systemoutcome using the features extracted.	I can receive confirmation email & click confirm	Medium	Sprint-4
Executor	Dashboard		As an executive , I will determine if a patient should be diagnosed with heart disease or not, which is a binary outcome	I can access my dashboard.	High	Sprint-3
Administrator	Administration		As an admin, I will upload the dataset into the database.	I can access the complete system.	High	Sprint-1

CHAPTER 6

PROJECT PLANNING &SCHEDULING

Planning - Planning pertains to the process of creating a plan of which materials and resources will be required to fulfil incomingand forecasted demand.This step is crucial to ensure that you have enough materials and resource capacity available to produce your orders on time. This component pertains to the ‘what’ and ‘how’ of any project: what exactly needs to be achieved and how it will be accomplished.

Scheduling - The time of the utilisation of specific organisational resources is determined by scheduling. In manufacturing, scheduling entails creating schedules for personnel, machinery, and supplies. It reflects on the ‘when’ of a project, by assigning the appropriate resources to get the production plan completed within a period of time. Creating optimized production schedules ensures that your facility is able to reduce costs, increase productivity, and deliver goods to customers on time.

In order to create accurate and realistic production plans that allow manufacturers to react quickly to changes, it is important to have a production plan that is aligned with the resource and material scheduling process. Any difference or divergence between planning and scheduling results in inefficiencies that might be expensive for your company. The cost increases with the degree of divergence.

6.1 Sprint planning and estimation

Planning:

In Sprint Planning, the team decideswhat it will build in the upcomingSprint and how they willbuild it. The team commits to the Sprint goal after breaking down user stories into tasks and doing task-level estimation. The Product Owner, Scrum Master, and Team coordinate sprint planning.

Each project in Scrum is divided into sprints, which are time chunks that are typically 2-4 weeks long. The Scrum Team, Scrum Product Manager, and Scrum Master gather for a sprint planning meeting to decide which backlog items will be tackled during the following sprint.

Estimation

During the Sprint Planning Meeting, the entire team estimates in Scrum projects. The goal of the estimation would be to prioritise the User Stories for the Sprint and assess the team's capacity to complete them inside the Sprint's Time Box. Product Owner ensuresthat the prioritized User Stories are clear, can be subjectedto estimation, and they are brought to the beginningof the Product Backlog.

As the Scrum Team in total is responsible for the delivery of the product increment, care would be taken to select the User Stories for the Sprint based on the size of the Product Increment andthe effort requiredfor the same.

The size of the Product Increment is estimated in terms of User Story Points. Once the size is determined, the effort is estimated by means of the past data, i.e., effort per User Story Point called Productivity.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, the user of the application can start registering for the application by entering their phone no, name, mail id, password,and confirming their password. Passwordand mail Id should be remembered for next time login.	8	High	Aarthi K R
Sprint-1		USN-2	As a user, I will receive confirmation otp in my email once the user has successfully registered in the application.	7	High	Latchaya T
Sprint-1		USN-3	As a user, I can Use the application by logging in by entering the registered mail id & password.	4	Medium	Dhivega G
Sprint-1	Login	USN-4	As a user, I can view my detailed report after the prediction is done with the details given as the input like: a. age b. gender c. pulse rate d. cholesterol level e. blood pressure f. ECG readings g. Blood sugar: i)Fasting ii)post prandial h. echo readings	6	High	Brundha M
Sprint-2	Dashboard	USN-5	As a user I can view my profile & add extra information about like photo if the user wishes.	8	High	Aarthi K R
Sprint-2		USN-6	As a user, I can change my password by getting conformation mail again.	8	High	Latchaya T
Sprint-3	Guidelines	USN-7	As a user, I can get my report whether the user has heart disease or not.	8	Medium	Dhivega G
Sprint-4	User profile	USN-9	As a user, I can know whether to consult Doctors in the current stage or not.	6	High	Brundha M
Sprint-4		USN-10	As a user I can raise any queries regarding the application	4	High	Aarthi K R
Sprint-4		USN-11	The requirements of the hardware and software for user should be specified.	9	High	Brundha M

PLANNING & ESTIMATION

6.2 Sprint delivery schedule

Since sprints take place over a fixed period of time, it's critical to avoid wasting time during planning and development. And this is preciselywhere sprint scheduling enters the equation.

In case you're unfamiliar, a sprint schedule is a document that outlines sprint planning from end to end. It's one of the first steps in the agile sprint planning process—and something that requires adequateresearch, planning, and communication.

Teams often run into troublewhen they createmore than few schedules. This can createconflict and derail projects midway through their cycles. To ensure things stay on track, one schedule makes sense.

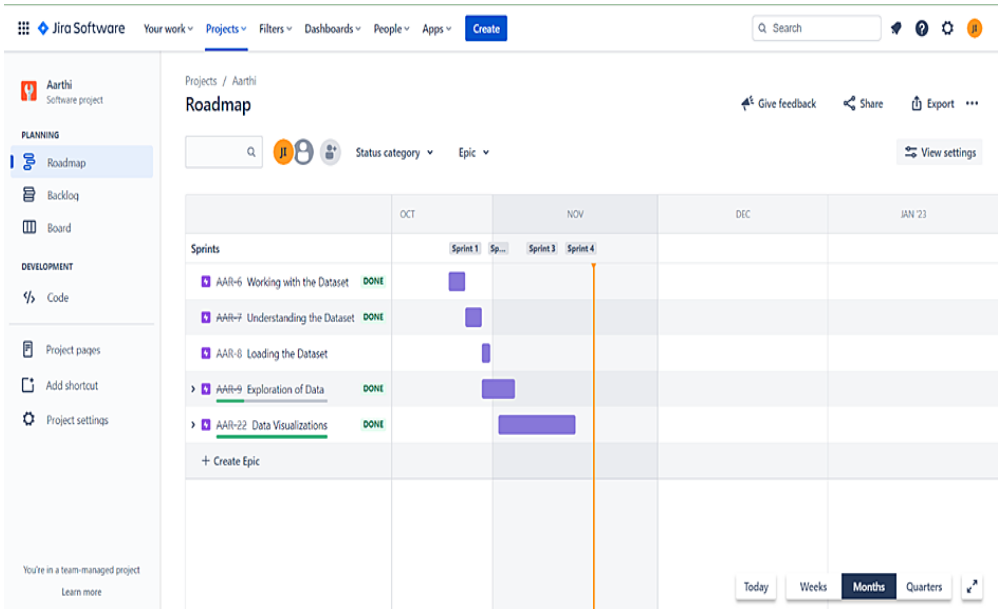
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	25 Oct 2022	28 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	30 Oct 2022	04 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	08 Nov 2022	11 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	18 Nov 2022	20	19 Nov 2022

VELOCITY:

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

SPRINT DELIVERY SCHEDULE

6.3 Reports from JIRA



CHAPTER 7

CODING AND SOLUTIONING

7.1 Feature 1

To present your insights and analysis, IBM Cognos Analytics offers dashboards and stories. A view that includes visualisations, such as a graph, chart, plot, table, map, or any other type of visual representation of data, can be put together.

7.2 Feature 2

Discover trends and correlations that have an influence on your business by exploring stunning data visualisations in IBM Cognos Analytics. By presenting criticalinsights and analysesabout your data on one or more pages or screens, a dashboard enables you to keep track of events or actions at a glance.

The following are themodules in our work:

1. Working With The Dataset
2. Data Visualization Charts
3. Creating The Dashboard

7.3 DATABASE SCHEMA

Users regularly use databases, which are specialised collections of data elements. The dashboards, stories, or explorations that use that data collection are updated as you make changesto it the next time you run them.

1. Prior to loadinga database to the cloud,one must understand it.

2. Create the necessary visalizations to offer different visualanalytic solutions.

2. Task in workingwith dataset

1. Understanding The Database

Column	Description
case_id	Case_ID registered in Hospital
Hospital_code	Unique code for the Hospital
Hospital_type_code	Unique code for the type of Hospital
City_Code_Hospital	City Code of the Hospital
Hospital_region_code	Region Code of the Hospital
Available Extra RoomsinHospital	Number of Extra roomsavailable in theHospital
Department	Department overlooking thecase
Ward_Type	Code for the Ward type
Ward_Facility_Code	Code for the Ward Facility
Bed Grade	Condition of Bed in theWard
Patientid	Unique Patient Id
City_Code_Patient	City Code for the patient
Type of Admission	Admission Type registered by the Hospital
Severity of Illness	Severity of the illness recorded at the time of admission

Visitors with Patient	Number of Visitors with the patient
Age	Age of the patient
Admission_Deposit	Deposit at theAdmission Time
Stay	Stay Days by the patient

Database

2. Loading The Database

1. You must connect your data to IBM Cognos before you can create a view and analyse yourdata.
2. Cognos allows users to connect to a large range of data that iskept in many locations.
3. Your computermay have a text or spreadsheet file ora spreadsheet where the data is kept.

CHAPTER 8

TESTING

8.1 Test cases

Checking is the goal of testing. Testing is the process of creating an attempt to find every feasibleflaw or weakness in a particular work product. It explains how to picturepieces, sub-assemblies, assemblies, and/or a finishedproduct in practise.It is a technique for physically testingsoftware to ensurethat it fulfils its requirements, satisfies user expectations, and doesn't malfunction in an unacceptable way.

8.2 User Acceptance Testing

Acceptance by users Any project's testing phase may be crucial, and the tool user's participation is crucial. Additionally, it guarantees that the systemsatisfies real-world requirements. At this point,all check cases are executedto ensure that the programme is accurate and complete.

Before the customerwill accept the programme, the test must be passed successfully. After customer personnelhave verified that the preliminary production statistics load is accurate and that the test suite has been completed flawlessly, the customer formallyaccepts the deliveryof this system.

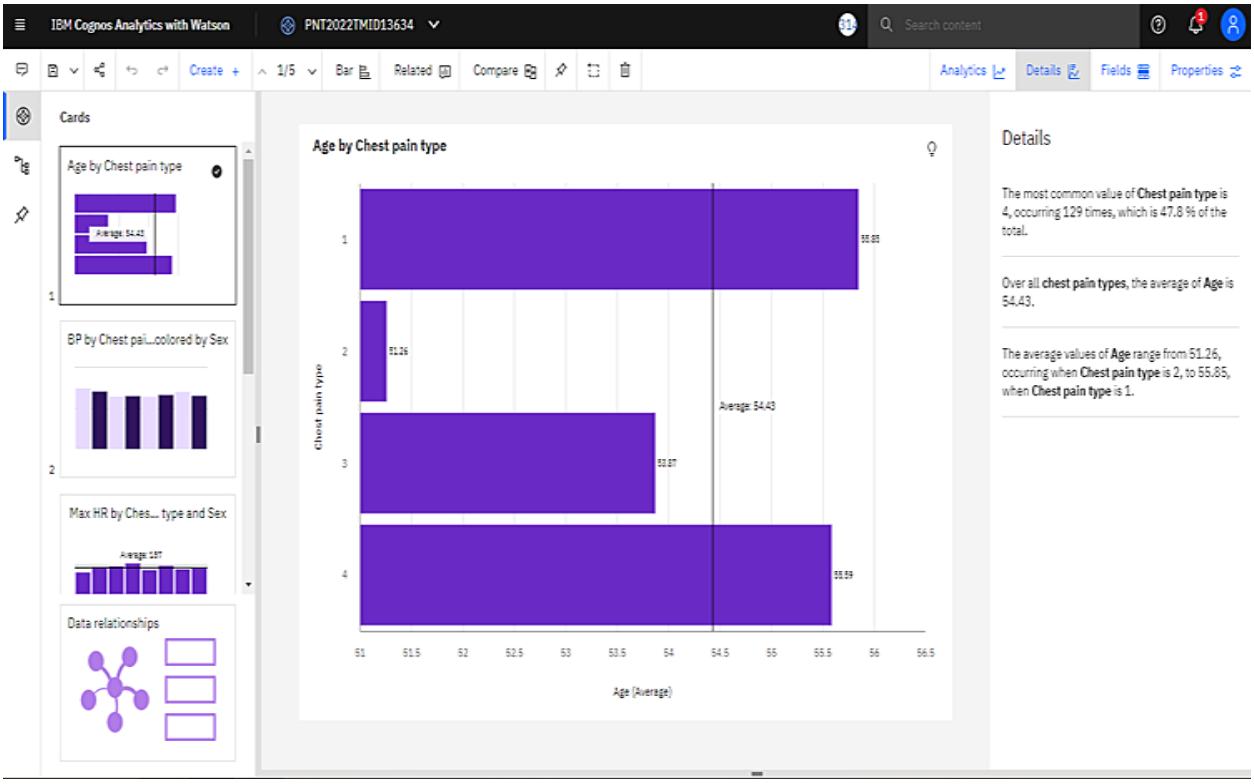
CHAPTER 9

RESULTS

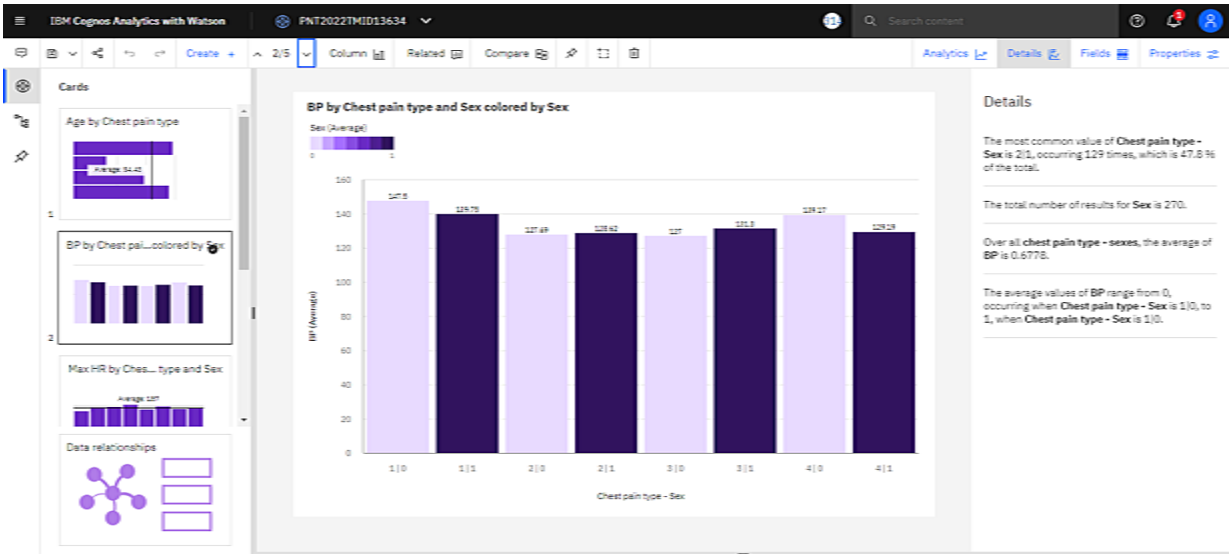
9.1 Performance Matrices

Using the Heart disease prediction dataset,we plan to create various graphs and chartsto highlight the insights and visualizations.

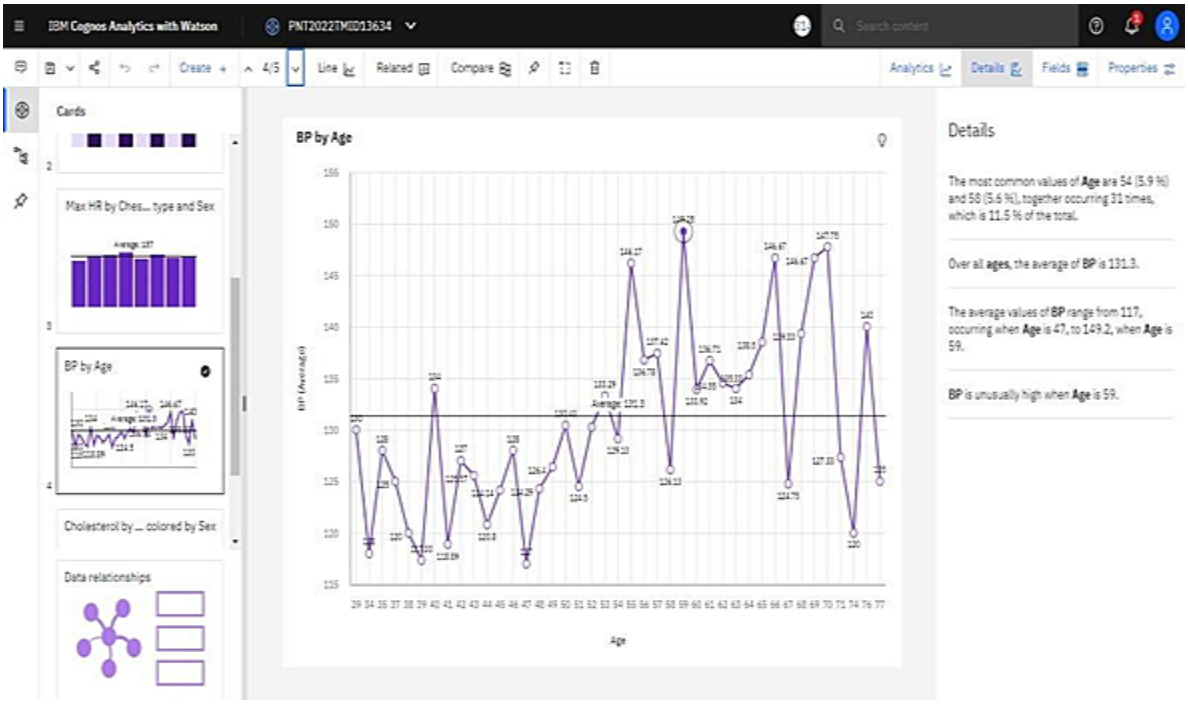
1. AGE BY CHEST PAIN



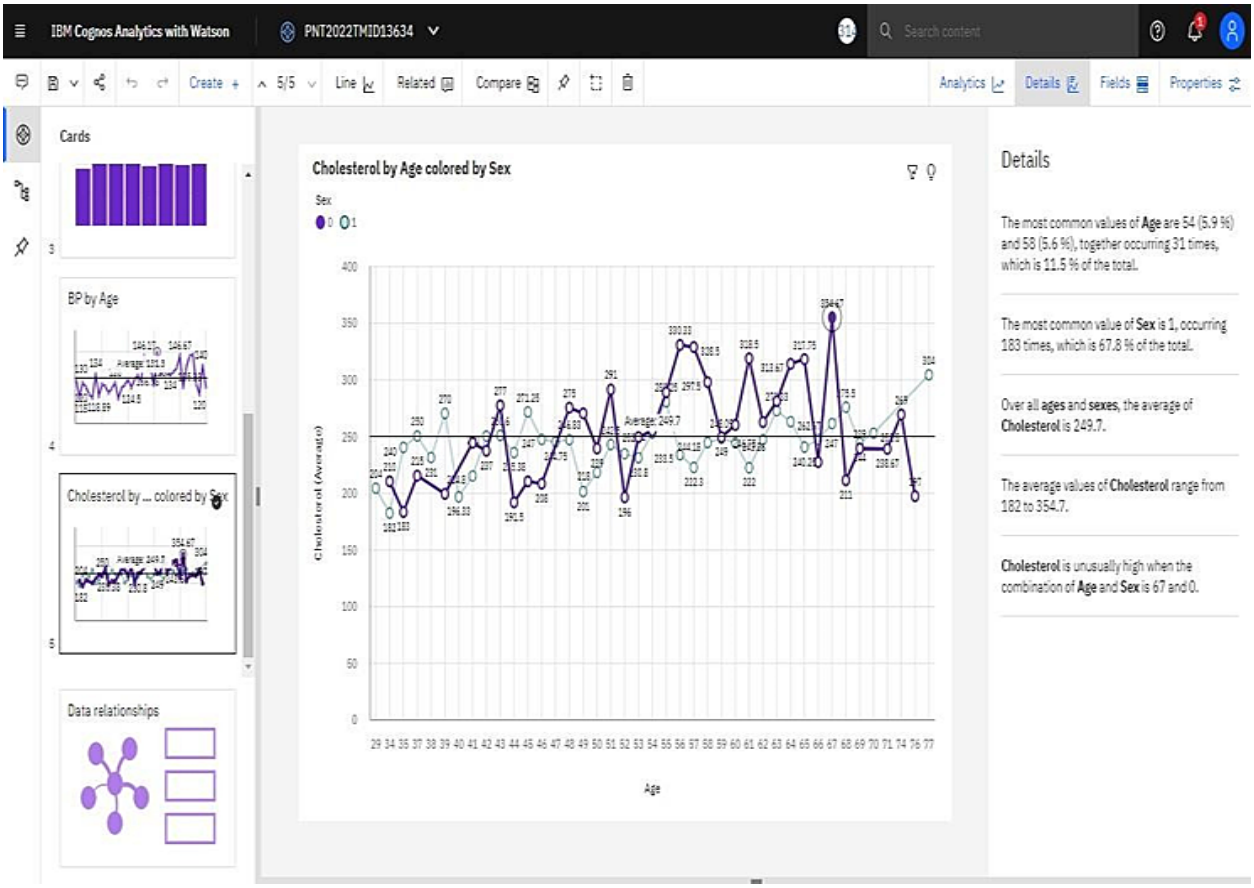
2. BP BY CHEST PAIN TYPE



3. BP IN AGE



4. CHOLESTEROL BY AGE COLORED BY SEX



CHAPTER 10

ADVANTAGES &DISADVANTAGES

10.1 ADVANTAGES

1. Increased accuracyfor effective heart disease diagnosis.

2. Reduce the time complexity of doctors.

3. Cost effective for patients.

10.2 DISADVANTAGES

1. Swelling, light headedness, and other symptomsthat can impairdaily activities can appear in people with heart failure.

2. A personwith heart disease who has been diagnosed must also deal with the anxiety of having a chronic illness that could cause a cardiac event, such as a heart attack or stroke.

CHAPTER 11
CONCLUSION

By extracting the patientmedical history that results in a fatal heart illnessfrom a dataset that contains patients' medical histories such as chest pain, sugar level, blood pressure, etc., this method predicts persons with cardiovascular disease. Based on clinical information about a patient's prior heart disease diagnosis, thisheart disease detection system helps the patient. Our model has an accuracy rate of 87.5%. The likelihood that the model will correctlyidentify whether a specific personhas heart diseaseor not increases with the use of more trainingdata. These computer-assisted tools allow us to anticipate the patient quickly,more accurately, and at a significantly lower cost. By incorporating multiple class labels into the prediction process,the performance of the health diagnostic can be greatly enhanced, which is another productive study area. The heart informationin DM warehouse is typically highly dimensional, making it difficult for future study to identify and choose key qualities for improving heart disease detection. An unclean dataset with missing values performs substantially worse than one that has been properly cleaned and trimmed. The creation of prediction systems with improved accuracy will result from the use of appropriate data cleaning procedures in conjunction with appropriate classification algorithms.

CHAPTER 12

FUTURE SCOPE

In the future, an intelligent system might be created that can guide the patient with heart diseasein choosing the best courseof therapy. Makingmodels that can forecast whether a patient is likely to acquire heart disease or not has previously required a lot of study. Once a patient has been identified with a specific type ofcardiac disease, there are numerous therapy options available. By collecting knowledge from these pertinent databases, data mining can be a very useful tool in determining the course of treatment to be taken .The machine learning model will eventually use a larger training dataset, possibly exceeding one million unique data points stored in the electronic health record system. A system based on artificial intelligence might enable the doctorto choose the appropriate courseof action for the worried patient as soon as possible, despite the significant leap in computer power and software sophistication required. To enable patients to access health websites and apps without paying a fee, a software API can be created. The probability prediction would be processed instantlyor very instantly.

CHAPTER 13

APPENDIX

Source Code

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>Heart disease- Index</title>
  <meta content="" name="description">
  <meta content="" name="keywords">

  <!-- Favicons-->
  <link href="assets/img/favicon.png" rel="icon">
  <link   href="assets/img/apple-touch-icon.png"   rel="apple-touch-icon">

  <!-- Google Fonts -->
  <link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,6
```

```
00,600i,700,700i|Roboto:300,300i,400,400i,500,500i,600,600i,700,700i|Poppin
s:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">

  <!-- VendorCSS Files -->
  <link   href="assets/vendor/fontawesome-free/css/all.min.css"   rel="stylesheet">
  <link   href="assets/vendor/animate.css/animate.min.css"   rel="stylesheet">
  <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/swiper/swiper-bundle.min.css"   rel="stylesheet">

  <!-- TemplateMain CSS File -->
  <link href="assets/css/style.css" rel="stylesheet">

  <!--
==========================================================
```

1. Template Name: Medicio - v4.9.1
2. Template URL: https://bootstrapmade.com/medicio-free-bootstrap-theme/
3. Author: BootstrapMade.com

4. License: https://bootstrapmade.com/license/

```
  ======================================================
-->
</head>

<body>

  <!-- ======= Top Bar ======= -->
  <div id="topbar" class="d-flex align-items-center fixed-top">
    <div class="container d-flexalign-items-center justify-content-center justify-content-md-between">
      <div class="align-items-center d-noned-md-flex">
        <i class=" "></i>
      </div>
      <div class="d-flex align-items-center">
        <i class=" "></i>
      </div>
    </div>
  </div>

  <!-- =======Header ======= -->
  <header id="header" class="fixed-top">
```

```
    <div class="container d-flexalign-items-center">


      <a href="index.html" class="logo me-auto"><img
src="assets/img/logo.png" alt=""></a>
      <nav id="navbar" class="navbar order-last order-lg-0">
        <ul>
          <li><a class="nav-link scrollto" href="#hero">Home</a></li>
          <li><a class="nav-link scrollto" href="#about">About</a></li>
          <li><a class="nav-linkscrollto" href="#services">Services</a></li>
          <li><a class="nav-link scrollto" href="#doctors">Doctors</a></li>
          <li class="dropdown"><a href="#"><span>Drop Down</span> <i
class="bi bi-chevron-down"></i></a>
            <ul>
              <li><a href="#">Drop Down 1</a></li>
              <li class="dropdown"><a href="#"><span>Deep Drop Down</span>
<i class="bi bi-chevron-right"></i></a>
                <ul>
                  <li><a href="#">Deep Drop Down 1</a></li>
                  <li><a href="#">Deep Drop Down 2</a></li>
                  <li><a href="#">Deep Drop Down 3</a></li>
                  <li><a href="#">Deep Drop Down 4</a></li>

                  <li><a href="#">Deep Drop Down 5</a></li>
```

```
            </ul>
          </li>
          <li><a href="#">Drop Down 2</a></li>
          <li><a href="#">Drop Down 3</a></li>
          <li><a href="#">Drop Down 4</a></li>
        </ul>
      </li>
      <li><a class="nav-link scrollto" href="#contact">Contact</a></li>
    </ul>
    <i class="bi bi-list mobile-nav-toggle"></i>
  </nav><!-- .navbar-->

  <a href="#appointment" class="appointment-btn scrollto"><span class="d-none d-md-inline">Make an</span> Appointment</a>

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

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

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

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

        <!-- Slide 1-->

        <div class="carousel-item active" style="background-image:
url(assets/img/slide/slide-1.jpg)">
          <div class="container">
            <h2>CARDIAC SAVER<span></span></h2>
            <a href="#about" class="btn-get-started scrollto">DASHBOARD</a>
          </div>
        </div>

        <!-- Slide 2-->
        <div class="carousel-item" style="background-image:
url(assets/img/slide/slide-2.jpg)">
          <div class="container">
            <h2>STORY</h2>
            <a href="#about" class="btn-get-started scrollto">STORY</a>
          </div>
        </div>
```

```
        <!-- Slide 3-->
        <div class="carousel-item" style="background-image:
url(assets/img/slide/slide-3.jpg)">
          <div class="container">
            <h2>REPORT</h2>
            <a href="#about" class="btn-get-started scrollto">REPORT</a>
          </div>
        </div>

      </div>

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

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

    </div>
```

```
  </section>
 </body>
 </html>
```

GitHub & Project Demo Link

GitHub Link - https://github.com/IBM-EPBL/IBM-Project-1160-1658376687

Project Link - https://youtu.be/LNrlQSM8Vj8