Visualizing and Predicting Heart Diseases with an Interactive Dashboard

NALAIYA THIRAN PROJECT REPORT
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Submitted by

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CHAPTER 1
INTRODUCTION

In an effort to 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 develop blood pressure, diabetes, and other illnesses. All of these factors contribute to heart disease attacks. The heart is the most significant organ in the human body, and when it is injured, other organs are also affected. 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. Through the circulatory system's blood vessels, it transports blood. Since it controls processes like providing blood, oxygen, and other resources to the body's multiple organs, the circulatory system is very significant. The heart is the most important component of the circulatory system. Serious health issues and occasionally even death can result from a malfunctioning heart. Heart disease is determined based on the patient's physical examination, symptoms, and indicators. 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 condition before deciding on the best course of 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 artery disease
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 industry collects enormous amounts of data, some of which is secret information that can be utilised to inform choices. For the purpose of generating reliable results and rendering sound conclusions based on data, some complex data mining techniques are used. In this study, an effective system for predicting the risk of heart disease is created using a neural network (EHDPS). The system uses 15 medical variables, such as age, sex, blood pressure, cholesterol, and obesity, to create predictions. The likelihood that a patient may develop heart disease is estimated by the EHDPS. 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: URBAN DATA MANAGEMENT SYSTEM TOWARDS BIG DATA ANALYTICS

AUTHOR: Babar M and Arif F

YEAR OF PUBLICATION: 2019

A obstacle to the continual expansion of a flexible urban setup is big data processing. The large volumes of data generated in a smart urban environment for decision-making may be challenging to comprehend. To learn relevant information about the enormous amounts of data, big data analytics is applied. The currently employed conventional approaches are not suited for generating a significant insight due to the enormous amount of data. The term "Big Data" analytics refers to the processing and computing of large amounts of data. This paper offers a Hadoop-based architecture to manage the loading and processing of enormous 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. To demonstrate the effectiveness of our suggested technique, trial results are documented for several qualities together with manual and traditional data loading. Trial results are recorded for numerous qualities together with manual and traditional data to show the efficacy of our suggested method.

TITLE: INTERNET OF THINGS AND ITS IMPACTS IN COMPUTING INTELLIGENCE

AUTHOR: BABAR M AND ARIF F

YEAR OF PUBLICATION: 2019

In the age of the information superhighway, the internet of things (IoT) is a contentious subject. The use of digital communications has significantly risen globally, drawing a distinction between the past and the present. The basic foundation for the digitization of the entire cosmos is the internet and other connecting technologies. Internet-connected devices are referred to as "internet of things" devices. The current computational analyses and transactions are significantly impacted by the Internet of Things. This contribution recognises the importance of big data in the internet of things (IoT), and it gives 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., as well as 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 enables particular 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: Shahbaz M and Gao C

YEAR OF PUBLICATION: 2019

Big data analytics is getting a lot of attention because of its innovative influence on strategic development and decision-making throughout the healthcare sector. This study examined the mechanism of big data analytics adoption in healthcare organisations using the task-technology fit paradigm and the technological acceptance model. By utilising AMOS v21 to analyse 224 valid responses to a survey, we were able to evaluate the hypotheses. According to our research, task-technology fit and the technology acceptance model's credentials greatly increase behavioural intentions to utilise big data analytics systems in healthcare, which in turn results in actual use. Meanwhile, trust in the security of the information system also had a positive impact on behavioural intention for usage. The failure of innovative systems in enterprises is largely attributed to employee resistance to change, which has been demonstrated in this study to negatively mediate the association between intention to use and actual utilisation of big data analytics in healthcare. Healthcare organisations can make use of our findings to help staff employees feel more psychologically empowered and to better grasp how to apply big data analytics.

TITLE: DEVELOPMENT OF SMART HEALTHCARE SYSTEM BASED ON SPEECH RECOGNITION

AUTHOR:Ismail A and Abdlerazek S

YEAR OF PUBLICATION: 2019

This project proposes an efficient voice recognition-based solution for providing a straightforward control system to older people, patients, and people with impairments. A low-cost speech recognition system is being developed to enable instant access to Internet of Things (IoT) devices installed in smart homes and hospitals without relying on a centralised supervisory system. A Raspberry Pi device was used in the recommended solution to enable wireless smartphone administration of household appliances. The main goal of this technology is to simplify user connections to home appliances using IoT communications based on voice commands. By combining a hybrid Support Vector Machine (SVM) and Dynamic Time Warping (DTW) algorithm, the proposed framework contribution enhances voice recognition. The results made it simpler for patients and senior citizens to use voice recognition to access and manage IoT devices that are compatible with our system. The suggested speech recognition system is customizable, scalable, and available to fit current smart IoT devices. It also offers anonymity when handling patient devices. This paper proposes a speech recognition system to control devices in smart homes or smart hospitals. Voice-activated systems have been developed by many researchers. The study provides a useful strategy for integrating the systems of medical facilities to help patients and the elderly.

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

AUTHOR: Alizadehsani R and Roshanzamir M

YEAR OF PUBLICATION: 2020

Cardiac disease is the leading cause of death worldwide (CAD). Invasive coronary angiography is the most efficient way to diagnose CAD, while being pricy and uncomfortable. As a result, analytical techniques like data mining and machine learning are becoming more and more common. A small number of studies have specifically examined the stenosis of the right coronary artery (RCA), left circumflex (LCX), and left anterior descending (LAD) arteries, despite the fact that doctors must be aware of which arteries are stenotic. The majority of research, however, concentrates only on the detection of CAD. Currently, the vast majority of datasets in this subject are noisy (data uncertainty). To our best knowledge, no research has been conducted to address this important problem. This study makes advantage of the Z-Alizadeh Sani dataset extension. 303 records with 54 attributes in all. An entirely new feature selection algorithm is suggested in this work. In the meantime, we use data discretization to control the uncertainty in CAD prediction. This study is the first to address ambiguity in CAD prediction, as far as we are aware. Finally, the evolutionary algorithm is used to select the hyper-parameters for the kernels of the support vector machine (SVM) (GA). We have achieved high specificity for the stenosis diagnosis of each principal coronary artery. The results of this study can be used by doctors to corroborate their manual diagnoses of coronary stenosis in the RCA, LCX, and LAD arteries.

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 models that have been applied in the same domain are now compared to the generated findings in order to decide which models need to be improved. Patterns are discovered in the data of heart disease patients gathered from the UCI laboratory using NN, DT, SVM, and Naive Bayes. 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 disease prediction. 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 between the ages of 25 and 69. Information for this system's input comes from the patient. Then, based on user inputs, heart disease is assessed using data analytics.

2.2 References

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2.3 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 surgical procedures. The overall goal is to accurately predict the 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 objective is to estimate the risk of developing heart disease with the fewest attributes 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 medical costs.

CHAPTER 3

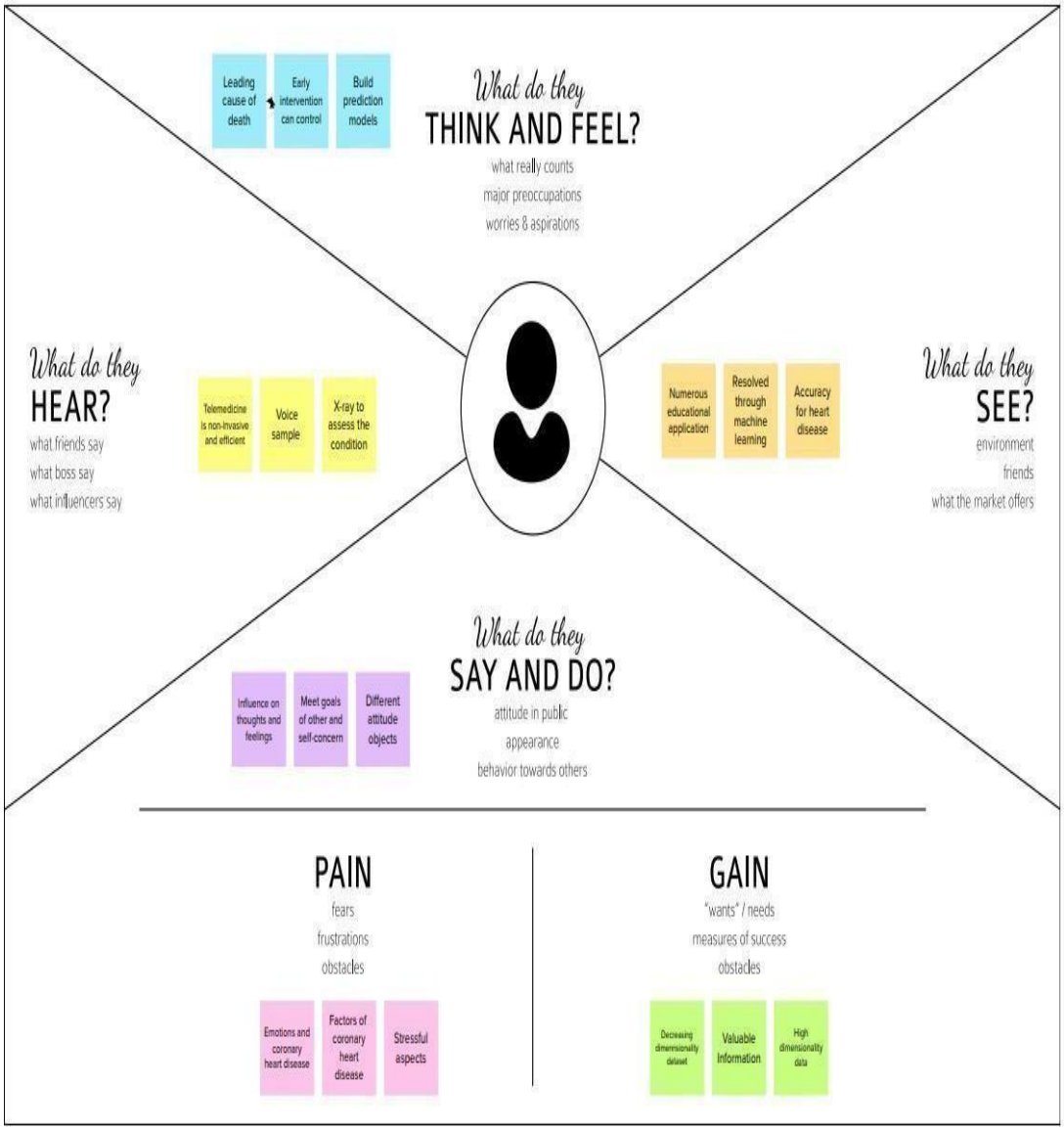
IDEATION & PROPOSED SOLUTION

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 a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community. Empathy maps can be used whenever you find a need to immerse yourself in a user's environment.

Everyone would add at least one sticky to every section. You might ask questions, such as:

- What would the user be thinking and/or feeling? What are some of their worries and aspirations?
- What would their friends, colleagues, and boss be likely to say while the user is using our product? What would the user hear in these scenarios?
- What would the user see while using our product in their environment?
- What might the user be saying and/or doing while using our product? How would that change in a public or private setting?
- What are some of the user's pain points or fears when using our product?
- What gains might the user experience when using our product?



EMPATHY MAP CANVAS

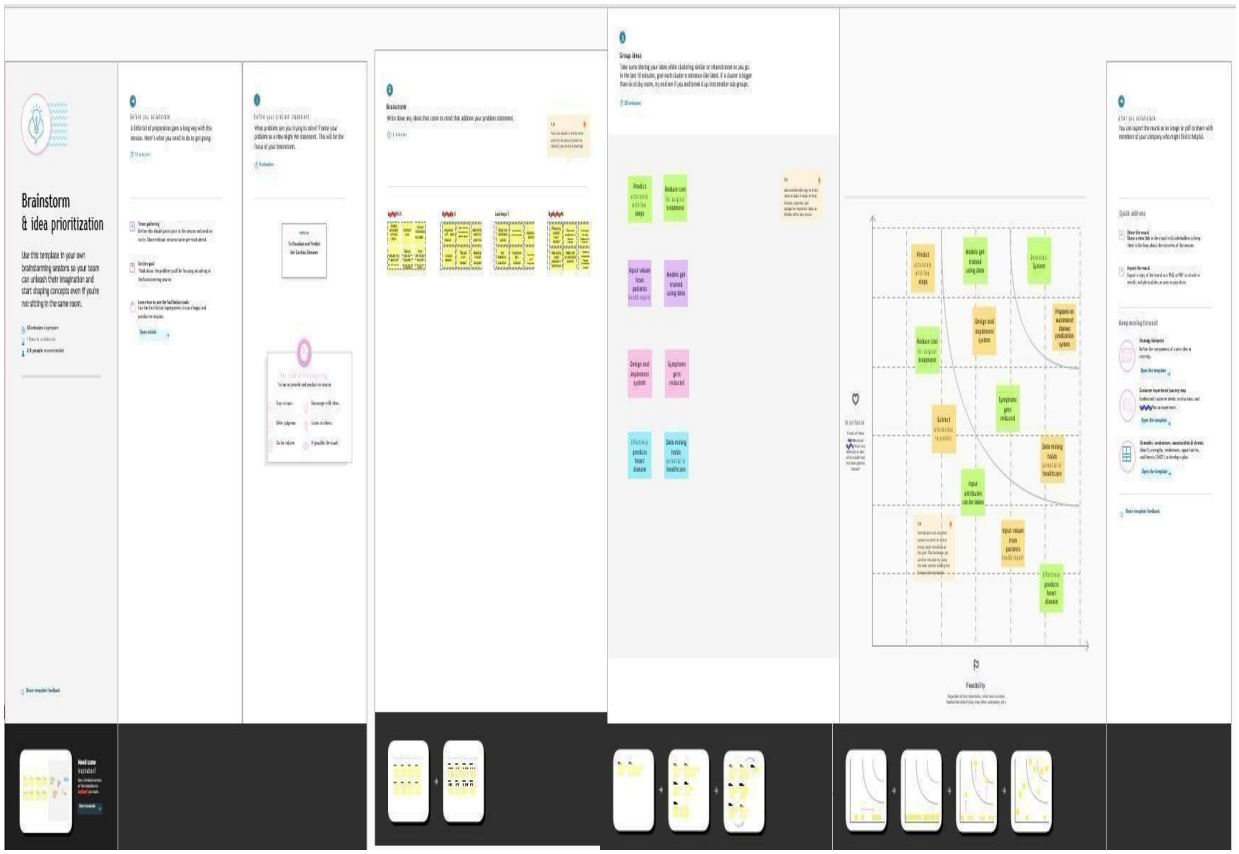
3.2 Ideation and brainstorming

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity. Brainstorming is usually conducted by getting a group of people together to come up with either general new ideas or ideas for solving a specific problem or dealing with a specific situation.

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.

Participants in a brainstorming session are encouraged to freely toss out whatever ideas may occur to them. The thinking is that by generating a large number of ideas, the brainstorming group is likely to come up with a suitable solution for whatever issue they are addressing.

The lines between ideation 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

Proposed Solution refers to the combination of software, hardware, other items or equipment and all services (including any installation, implementation, training, maintenance, and support services) required to achieve the solution indicated by Vendor in its Proposal.

Project team shall fill the following information in proposed solution;

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 with few attributes and faster efficiencythe risk of having heart disease.

2. Idea / Solution description

The goal of our heart disease prediction project is to determine if a patient should be diagnosed with heart disease or not, which is a binary outcome.

3. Novelty / Uniqueness

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

4. Social Impact / Customer Satisfaction

Direct communication with their doctor will help increase patient 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 (Revenue Model)

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 business newspapers, magazines, and websites.

6. Scalability of 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 helps to find ideas with higher odds of solution adoption, minimise time spent on solution testing, and gain a better understanding of the existing situation. Such information is generally acquired "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 patterns and 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 are the 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

Value

Time

4. EMOTIONAL BARRIERS

Feels great in that platform and can easily analyse 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 member plays a specialized role in the user

9. PROBLEMS ROOT CAUSE

The nature of heart disease is complex

The diagnosis is based on signs and symptoms

10. YOUR SOLUTION

To predict the heart disease immediately

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.

Requirements analysis involves frequent communication with system users to determine specific feature expectations, resolution of conflict or ambiguity in requirements as demanded by the various users or groups of users, avoidance of feature creep and documentation of all aspects of the project development process from start to finish. Energy should be directed towards ensuring that the final system or product conforms to client needs rather than attempting to mold user expectations to fit the requirements.

Requirements analysis is a team effort that demands a combination of hardware, software and human factors engineering expertise as well as skills in dealing with people.

The purpose of the Requirements Analysis Phase is to transform the needs and high-level requirements specified in earlier phases into unambiguous (measurable and testable), traceable, complete, consistent, and stakeholder-approved requirements.

4.1 Functional Requirement

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish. Behavioural requirements describe all the cases where the system uses the functional requirements, these are captured in use cases.

Following are the functional requirements of the proposed solution.

1. **User Registration**

   The system allows users to create an account and login.

2. **User confirmation**

   Confirmation is done using email and with OTP.

3. **Load Dataset**

   Dataset is loaded from Kaggle.

4. **Remove Dataset**

   To remove inappropriate datasets and code.

5. **Analysis**

   Exploration and visualization of data in IBM Cognos.

6. **Disease Prediction**

   The system allows the users to predict heart disease.

4.2 Non-Functional requirements

In systems engineering and requirements engineering, a non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours. They are contrasted with functional requirements that define specific behaviour or functions. The plan for implementing functional requirements is detailed in the system design.

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

1. Usability

Effectively predicts if the patient suffers from heart disease by the input values from the patient's health report.

2. Security

The best suitable approach for heart disease prediction with providing security to health dataset.

3. Reliability

The structure must be reliable and strong in giving the functionalities. The movements must 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 have highly disease affected patients.

6. Scalability

Scalable framework that uses healthcare data to predict the heart diseases based on attributes.

CHAPTER 5

PROJECT DESIGN

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 right amount of the system requirement graphically. It can be manual, automated, or a combination of both.

It shows how data enters and leaves the system, what changes the information, and where data is stored.

The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. The DFD is also called as a data flow graph or bubble chart.

A set of parallel lines shows a place for the collection of data items. A data store indicates that the data is stored which can be used at a later stage or by the other processes in a different order. The data store can have an element or group of elements. The DFD may be used to perform a system or software at any level of abstraction. DFDs may be partitioned into levels that represent increasing information flow and functional detail. Then the system is decomposed and described as a DFD with multiple bubbles. Parts of the system represented by each of these bubbles are then decomposed and documented as more and more detailed DFDs.

5.1 Data flow diagram

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 right amount of the system requirement graphically. It can be manual, automated, or a combination of both.

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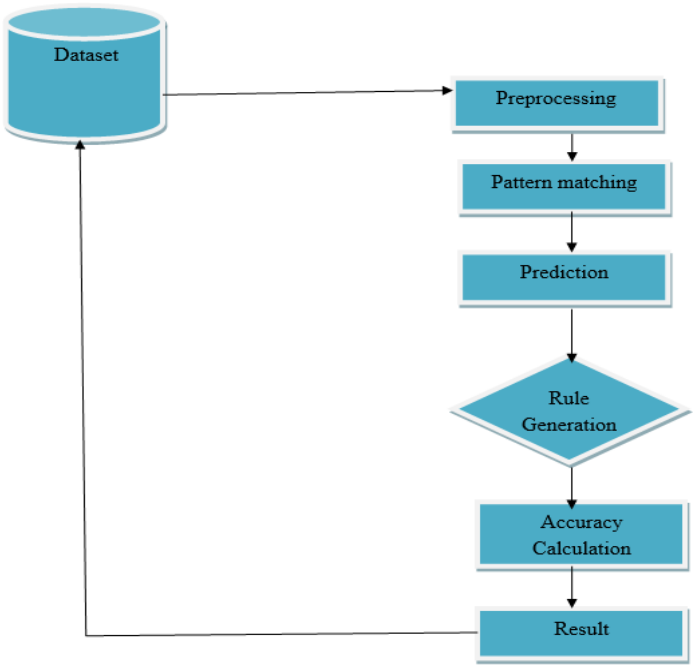
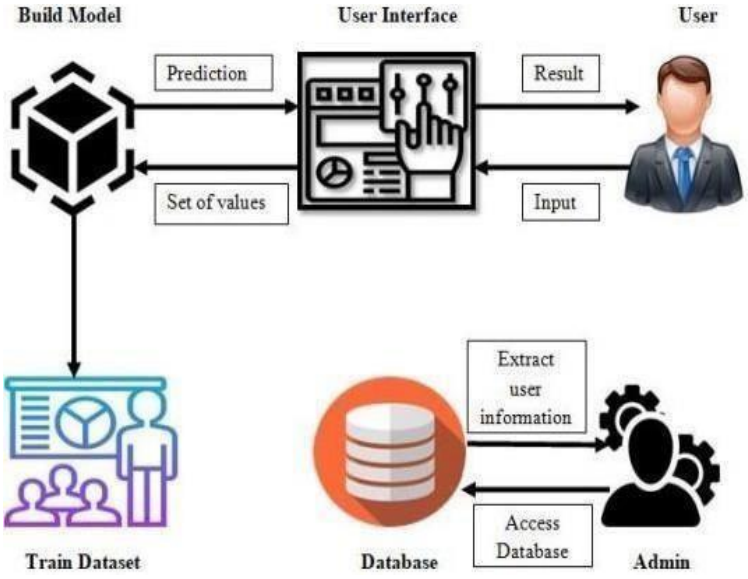


DATA FLOW DIAGRAM

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. This process is very detail-oriented and serves as a connecting piece between enterprise architecture and technical architecture. It also requires a breadth of knowledge in the technical and business inner workings of the company.



TECHNOLOGY STACK

5.3 User Stories

A user story is the smallest unit of work in an agile framework. It's an end goal, not a feature, expressed from the software user's perspective.

A user story is an informal, general explanation of a software feature written 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't have 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 language that outline the desired outcome. They don't go into detail. 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 incoming and 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 - Scheduling pertains to establishing the timing of the use of specific resources of that organization. In production, scheduling involves developing schedules for workers, equipment, and materials. 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. Having any discrepancy or divergence between the planning and scheduling process creates inefficiencies that can be costly for your business. The bigger the divergence, the larger the cost.

6.1 Sprint planning and estimation

Planning:

In Sprint Planning, the team decides what it will build in the upcoming Sprint and how they will build it. The team commits to the Sprint goal after breaking down user stories into tasks and doing task-level estimation. Sprint Planning is done by the Product Owner, Scrum Master, and the Team.

In Scrum, every project is broken into time blocks called sprints, usually 2-4 weeks long. A sprint planning meeting is when the team (including the Scrum Master, Scrum Product Manager, and Scrum Team) meets to determine which backlog items will be handled in the next sprint.

Estimation

In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Product Owner ensures that the prioritized User Stories are clear, can be subjected to estimation, and they are brought to the beginning of 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 and the effort required for 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 precisely where 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 adequate research, planning, and communication.

Teams often run into trouble when they create more than few schedules. This can create conflict and derail projects midway through their cycles. To ensure things stay on track, one schedule makes sense.

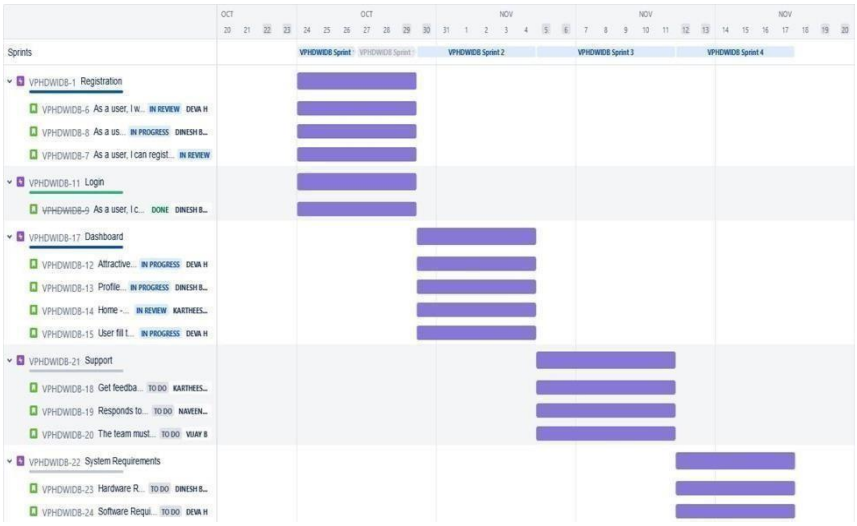
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	25 Oct 2022	28 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	30 Oct 2022	04 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	08 Nov 2022	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 critical insights and analyses about 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 the modules in our work:

- Working With The Dataset
- Data Visualization Charts
- 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 changes to it the next time you run them.

- Prior to loading a database to the cloud, one must understand it.

- Create the necessary visalizations to offer different visual analytic solutions.

  - Task in working with dataset

    i. 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 Roomsin Hospital	Number of Extra rooms available in the Hospital
Department	Department overlooking the case
Ward_Type	Code for the Ward type
Ward_Facility_Code	Code for the Ward Facility
Bed Grade	Condition of Bed in the Ward
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 the Admission Time
Stay	Stay Days by the patient

Database

ii. Loading The Database

• You must connect your data to IBM Cognos before you can create a view and analyse your data.

• Cognos allows users to connect to a large range of data that is kept in many locations.

• Your computer may have a text or spreadsheet file or a 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 feasible flaw or weakness in a particular work product. It explains how to picture pieces, sub-assemblies, assemblies, and/or a finished product in practise. It is a technique for physically testing software to ensure that 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 system satisfies real-world requirements. At this point, all check cases are executed to ensure that the programme is accurate and complete.

Before the customer will accept the programme, the test must be passed successfully. After customer personnel have verified that the preliminary production statistics load is accurate and that the test suite has been completed flawlessly, the customer formally accepts the delivery of this system.

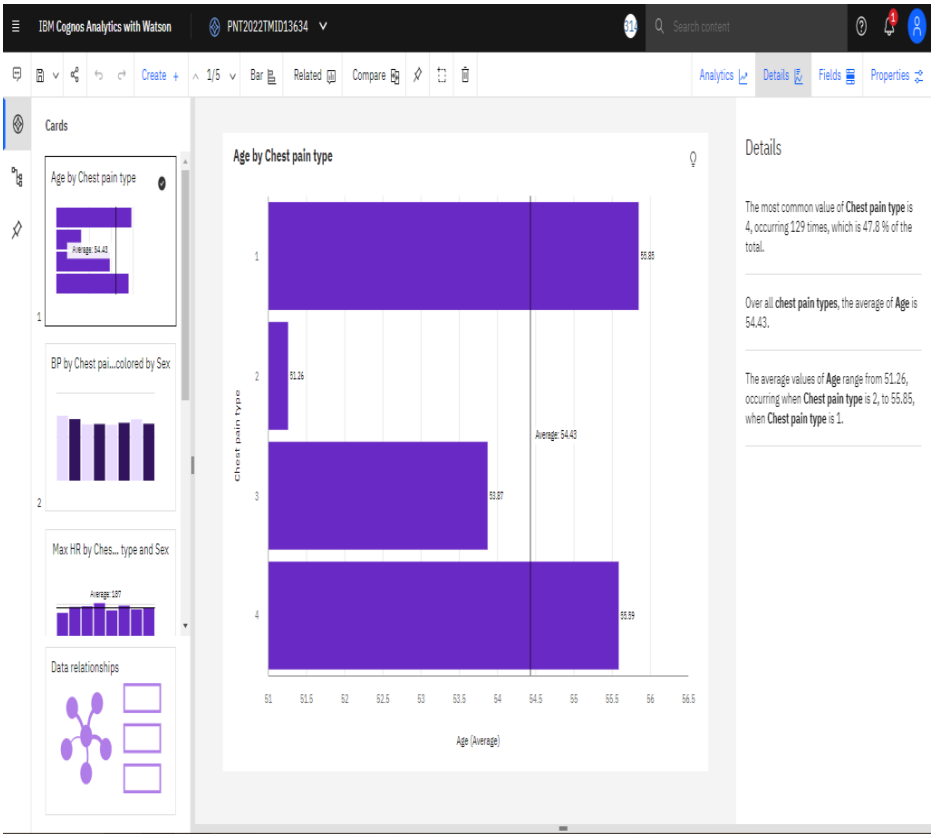
CHAPTER 9

RESULTS

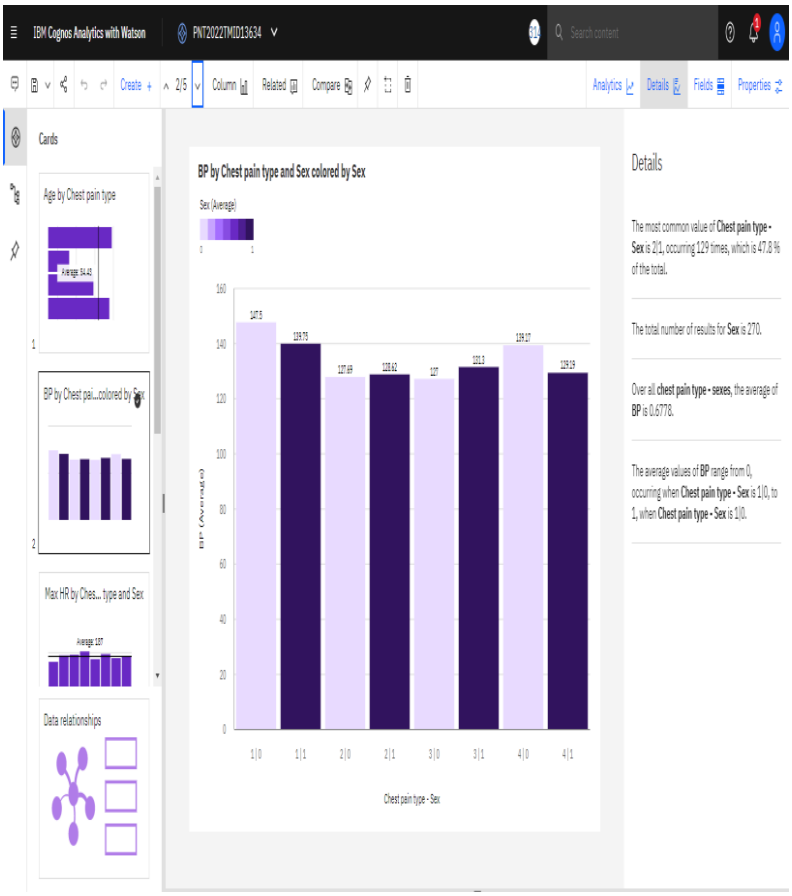
9.1 Performance Matrices

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

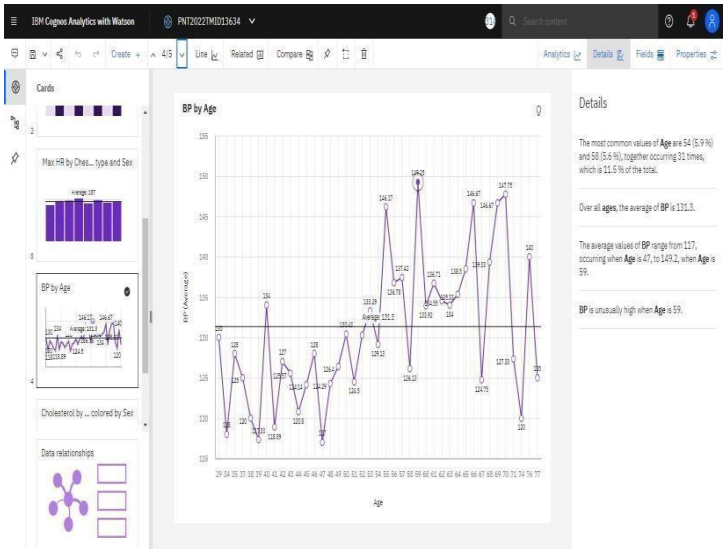
1. AGE BY CHEST PAIN



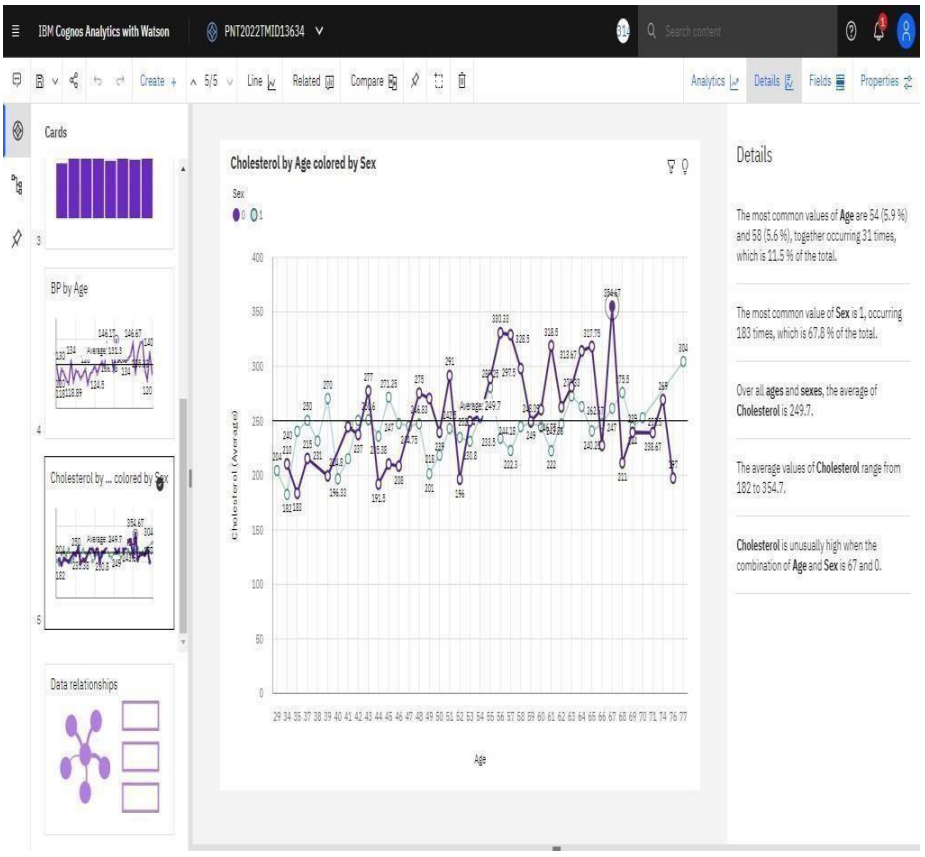
2. BP BY CHEST PAIN TYPE



3. BP IN AGE



4. CHOLESTEROL BY AGE COLORED BY SEX



CHAPTER 10
ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES

1. Increased accuracy for 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 symptoms that can impair daily activities can appear in people with heart failure.
2. A person with 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 patient medical history that results in a fatal heart illness from 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, this heart disease detection system helps the patient. Our model has an accuracy rate of 87.5%. The likelihood that the model will correctly identify whether a specific person has heart disease or not increases with the use of more training data. 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 information in 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 disease in choosing the best course of therapy. Making models 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 of cardiac 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 doctor to choose the appropriate course of 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 instantly or 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">

  <!-- Vendor CSS 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">

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

  <!--
========================================================
  * Template Name: Medicio - v4.9.1
  * Template  URL:   https://bootstrapmade.com/medicio-free-bootstrap-theme/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
  ========================================================
-->
</head>

<body>

  <!-- ======= Top Bar ======= -->
  <div id="topbar" class="d-flex align-items-center fixed-top">
    <div class="container d-flex align-items-center justify-content-center justify-
content-md-between">
      <div class="align-items-center d-none d-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-flex  align-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-link scrollto" 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 slide carousel-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

ProjectLink- https://youtu.be/rbAhw2JtUtM