

ANALYTICS FOR HOSPITALS' HEALTHCARE DATA PROJECT REPORT

SUBMITTED BY

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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

Data analytics in clinical settings attempts to reduce patient wait times via improved scheduling and staffing, give patients more options.

Scheduling appointments and receiving treatment, and reduce readmission rates by using population health data to predict which patients are at greatest risk.

1.2 PURPOSE

This is the purpose of healthcare data analysis: using data-driven findings to predict and solve a problem before it is too late, but also assessed methods and treatments faster, keep better track of inventory, involve patients more in their own health, and empower them with the tools to do so.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Covid-19 recently One of the most neglected areas to concentrate on has come under scrutiny due to the pandemic: healthcare management. Patient duration of stay is a crucial statistic to monitor and forecast if one wishes to increase the effectiveness of healthcare management in a hospital, even if there are many use cases for data science in healthcare management.

- No remote access
- Insufficiency and errors in data sharing
- Absence of supply management system
- Data security
- Lack of real time situation management

2.2 REFERENCES

- Exploring big data analytics in health care - Ashwin Belle, Fatimah Navidi
<https://www.sciencedirect.com/science/article/pii/S2666603020300154>
- Exploring big data analytics in health care - Elsevier B.V
<https://www.sciencedirect.com/science/article/pii/S2666603020300154>
- Machine Learning in Healthcare - Natalie Tkachenko
<https://nix-united.com/blog/machine-learning-in-healthcare-12-real-world-use-cases-to-know/>
- Understanding data visualization techniques - Dinesh
<https://www.mygreatlearning.com/blog/understanding-data-visualization-techniques/>

LITERATURE SURVEY:

TITLE	AUTHOR	ALGORITHM	ADVANTAGES	DISADVANTAGES
Analysis for Hospital's Health Care-Data	Mohammad Ahmad Alkhatib Amir Talaei-Khoei Amir Hossein Ghapanchi	Data Analytics	It will promise to leverage the amount of healthcare data properly,since doctors and nurses will be able to determine diseases and risks easily like certain types of cancer,diabetes and blood pressure,as well as provide needed treatment at the right time.Identifying risks early and mitigating them as much as possible.	Here,OLTP systems are used and it faces hardware failures,then online transactions get severely affected.OLTP systems allow multiple users to access and change the same data at the same time,which many times creates an unprecedented situation.
Big Data Analytics in Healthcare	Ismail Brahim Abbo Dr. Suchithra R	Big Data Analytics	Relative efficacy research to determine more clinically pertinent and cost-effective ways to diagnose and care for patients. Faster development of more correctly targeted vaccines, example of choosing the annual influenza strains;	Big data analytics have been quite helpful in healthcare industries in offering quality and efficient healthcare delivery in the areas of preventing diseases, predicting medical outcomes, reducing medical errors, and boosting all aspects of healthcare.
Big data Analytics in healthcare	Cheryl Ann Alexander	Linear regression	In recent years, healthcare management worldwide has been changed from a disease-centered model to a patient-centered model, even in a value-based healthcare delivery model . In order to meet the requirements of this model and provide effective patient-centered care, it is necessary to manage and analyze healthcare data.	Traditional privacy and security measures work on small datasets; capability to use the same measures on massive and streaming datasets is possibly a problem, particularly when dealing with a patient's health data. It affects reliable insights from the data and decision-making for patients' healthcare.
Big data in healthcare: management, analysis and future prospects	Sabyasachi Dash Sushil Kumar Shakywar	Artificial intelligence (AI) algorithms and Novel Fusion algorithms	The use of big data from healthcare shows promise for improving health outcomes and controlling costs. In the context of healthcare data, the data collected using the sensors can be made available on a storage cloud with pre-installed software tools developed by analytic tool developers.	Patients may or may not receive their care at multiple locations. In the former case, sharing data with other healthcare organizations would be essential. During such sharing, if the data is not interoperable then data movement between disparate organizations could be severely curtailed. This could be due to technical and organizational barriers.

2.1 PROBLEM STATEMENT

Problem Statement 1

Data analysis is the next step in the evolution of health care, and it uses data-driven insights to predict and solve health problems. Applying data analytics to health care can have life-saving results, as it can use data on a subset of specific individuals to prevent potential epidemics, cure diseases, and reduce healthcare costs. The main objective is to accurately predict the Length of Stay for each patient on a case-by-case basis so that the Hospitals can use this information for optimal resource allocation and better functioning. The length of stay is divided into 11 different classes ranging from 0-10 days to more than 100 days.

Problem Statement 2

Medicare and Medicaid are government healthcare programs that provide healthcare coverages to patients. Their repayment structures vary significantly and need to maintain an orchestrated management process. The procedures for filing and receiving Medicare and Medicaid are very different and are an extra task on the to-do list of healthcare professionals. The regulations also need them to store and record patient records in a particular format for the services rendered. Whenever treatment is available under Medicare, the doctors need to fill out the prescribed electronic forms as proof that the patient has, in fact, received the healthcare service. The rules and regulations have made it mandatory for healthcare pros to follow the process to get paid, adding significantly to the problems.

Problem Statement 3

Hospitals have limited preventive health care and services to promote optimal health and wellness, and avert worsening of sequelae for children and adults with disabilities. Doctors interact with multiple patients on an everyday basis so it's hard to keep track of the parameters of each patient and it's time-consuming so they need a way to

visualize the severity of illness of each patient so that they can make quick and better decisions on the treatment that is needed to be given.

Problem Statement 4

Across the healthcare continuum, integrated approaches are needed to simultaneously address the many risk factors and conditions, as well as the medical, functional and societal limitations including determinants that influences the health and wellbeing of persons with disabilities.

Problem Statement 5

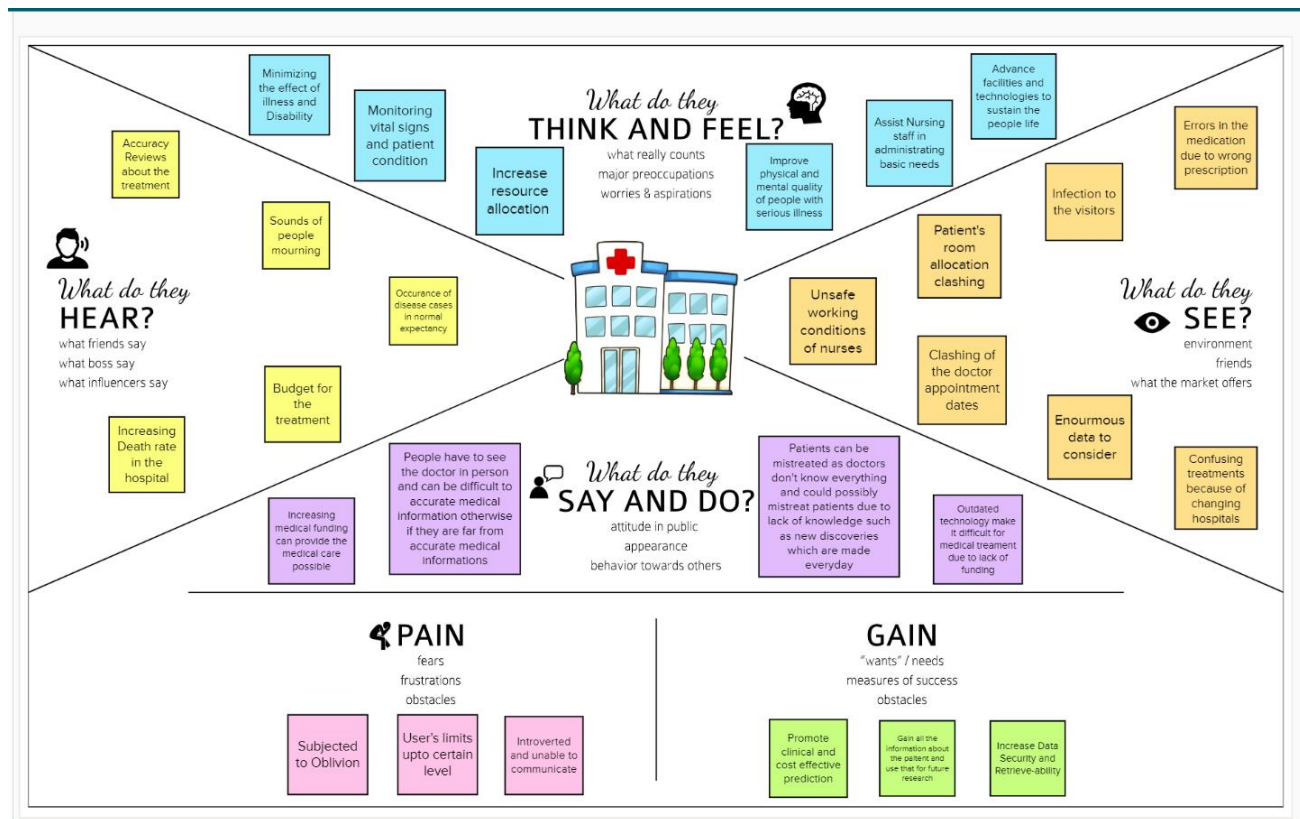
Patient-related data is one of the most overwhelming aspects of healthcare. With each new addition to the patient database, the existing pool of data becomes still bigger. Consequently, it becomes even tougher to manage this data. As much as we may expect the existing traditional infrastructure to manage and secure the data, it is only an unrealistic expectation. The storage and the retrieval of this patient data, when needed, is a challenge that the hospitals need to address. Data overload and mismanagement often lead to wrong diagnoses, compromise in data security, improper treatment, lapsed appointments, and failure to keep up with the changes in progress or regression of the patient's condition, etc. The implications can be catastrophic for both doctors as well as patients.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

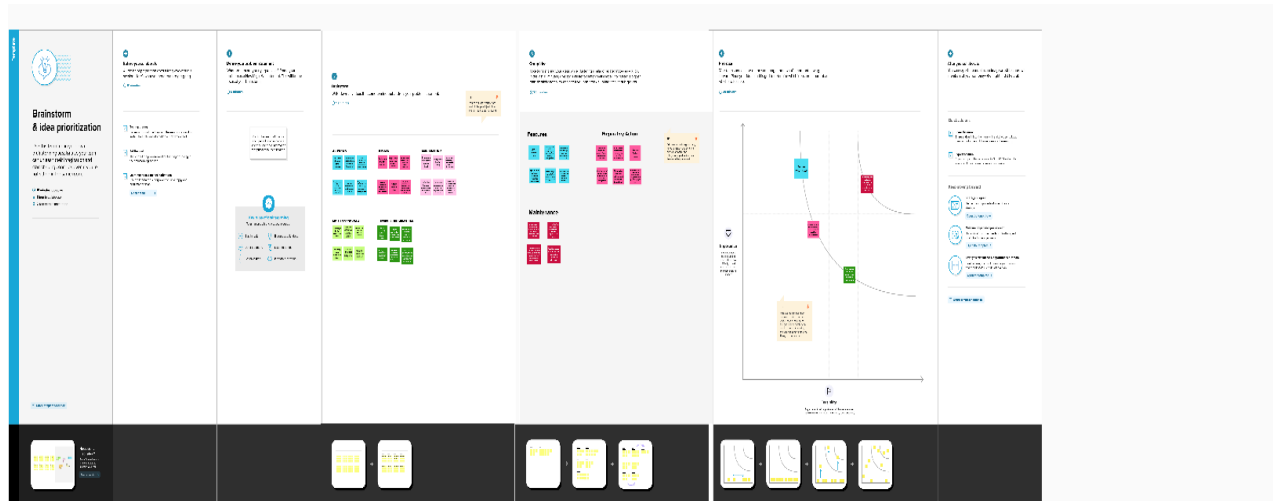
3.1 EMPATHY MAP CANVAS

- An empathy map is a tool which aids in understanding another person's perspective.
- Empathy maps have up until now not been used in a medical education setting.
- Objective: To assess the attitudes towards, applicability and usefulness of empathy maps as part of medical student's communication skills training.



3.2 IDEATION & BRAINSTORMING

To try to solve a problem or come up with new ideas by having a discussion that includes all members of a group: to discuss a problem or issue and suggest solutions and ideas.



3.3 PROPOSED SOLUTION

- **Identify key hurdles to healthcare sustainability in India and propose a set of solutions that mutually benefit and the pharmaceutical industry** Pragmatic literature review of 43 articles published by regional and international organizations.
- **UNIVERSAL HEALTHCARE COVERAGE** Attainment of UHC comes with the hurdle of having to provide care to a higher number of patients.
- **EVOLVING DEMOGRAPHICS** Population aging has resulted in a growing number of elderly dependents at higher risk of disease and complications.
- **RISING COST OF R&D** Today, the cost of developing a medicine can exceed USD 2.6 B compared to USD 179 M in the 1970s.
- **WIN-WIN SOLUTIONS ARE NEEDED TO ATTAIN SUSTAINABILITY** Mutually beneficial solutions that allow for productive movement towards sustainable value-based healthcare systems should be explored.
- **VALUE ADDED SERVICES** The pharmaceutical industry should move ‘beyond the pill’ and collaborate with to design and offer programs aimed at improving healthcare sustainability (e.g., training, administrative support, etc).

- **MULTI-STAKEHOLDER COALITIONS** Multi-stakeholder coalitions can serve as a platform to discuss healthcare challenges and co-create healthcare solutions to achieve defined common goals.
- **INTEGRATED HEALTHCARE MODEL** Investment in integrated healthcare systems that focus on prevention and early diagnosis is key to move towards sustainability in the LA region.

S.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	To accurately predict the Length of Stay for each patient on case-by-case basis so that the Hospitals can use this information for optimal resource allocation and better functioning. The length of stay is divided into 11 different classes ranging from 0-10 days to more than 100 days.
2.	Idea / Solution description	The goal is to predict the length of stay using predictive analytic tools such as neural network and decision trees that makes predictions using historical data combined with statistical modelling. We are collecting and interpreting data from multiple sources like cost reports, electronic health record (EHR), etc. and then building models and analysing data to uncover the trends and patterns using data visualization techniques.

3.	Novelty / Uniqueness	Healthcare data tends to reside in multiple places. Aggregating this data into a single, central system, makes our solution unique moreover the use of specific algorithms help us achieve more accuracy.
4.	Social Impact / Customer Satisfaction	Data Analytics offers predictive solutions that are able to anticipate visits and admission rates. These solutions reduce labour costs and improve customer service, as well as reducing wait times and providing better quality care. The symptoms of diseases can be detected at a very early stage using data mining techniques, so that number of days for recovery can be predicted easily. It helps to boost productivity in diagnosis and treatment.
5.	Business Model (Revenue Model)	The length of stay (LOS) of a patient and the available resources go hand in hand. By understanding the average LOS, we would definitely be able to plan better and provide immediate help with both resources and medical support. Our model helps with understanding the pattern behind the disease, the LOS and the resource utilised. Also, as the more number of predictions we make the better the accuracy gets. This way hospitals are able to accommodate

		well without spending too much or too little money on resources.
6.	Scalability of the Solution	Hospital's data grows day by day and with more data we would be able to provide more accuracy. Data Mining and prediction techniques are used here for tracking the availability of resources for handling emergencies. This is why scalability is seen as an advantage over here

3.4 PROBLEM SOLUTION FIT

- The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it solves the customer's problem
- In an age where medical science has made noteworthy advancements, inefficiencies and healthcare errors are still persistent because of the healthcare industry's traditional technology for management.
- One specific area of concern is the exchange of patient data in case of patient transfer from one department or hospital to another. Patient record sharing, when done the traditional way, is time-consuming and inefficient and exposes patient information to a breach.
- To deliver a holistic and satisfactory patient experience, different parties involved in healthcare – doctors, scheme providers, insurance providers, doctors, and patients – should be able to exchange information among themselves securely.

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) Who is your customer? i.e., working parents of 0-5 y.o. kids CS Hospital management who manage all the data.	6. CUSTOMER CONSTRAINTS CC What constraints prevent your customers from taking action or limit their choices of solutions? i.e., spending power, budget, no cash, network connection, available devices. Maintenance, budget, System maintenance problem, No cash, Network Errors, Data privacy and security, Regulations and compliance, difficulty in training users technically, shortage of health informatics professionals, data interoperability, Less experienced staff Shortage in equipment facilities, low knowledge in using High end professional devices	5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking. Most healthcare organizations collect EMR abstracts, claims data, and data about enrollment and medical programs. Only leading organizations additionally use electronic EMR feeds and disease management program data. Very few organizations use non-health data sources that can be used to augment formal medical data, such as patient lifestyle information, remote monitoring and wearable devices, and survey data about patient experience.	Explore AS, differentiate
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Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS J&P Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. The goal is to predict the length of stay using predictive analysis tools that makes predictions using historical data combined with statistical modelling. Patterns and relationships among the diseases, frequency in the season and number of days for recovery and are identified using data visualization. Techniques by using the processed data.	9. PROBLEM ROOT CAUSE RC What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations. Process of examining raw datasets to find trends, draw conclusions and identify the potential for improvement. Health care analytics uses current and historical data to gain insights, macro and micro, and support decision-making at both the patient and business level. The use of health data analytics allows for improvements to patient care, faster and more accurate diagnoses, preventive measures, more personalized treatment and more informed decision-making. At the business level, it can lower costs, simplify internal operations and more.	7. BEHAVIOUR BE What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) It identifies the patient's admission, attending, and frequency of the stay they have in the particular hospital. And majorly to manage the accounts and data that are to be handled by making physical documents and records and finally they are uploaded in the method of software-oriented Files and it is monitored by Data Analysts to decide the results.	Focus on J&P, tap into BE, understand RC
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Identify Strong TR & TM	<div>3. TRIGGERS</div> <div>TR</div> <p>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</p> <p>The covid-19 pandemic proved the importance of resource management. Several people died due to unavailability of hospital beds, ventilators etc. It is during such crucial moments; we step back and realize the importance of planning the length of stay (LOS) of patients before hand</p>	<div>10. YOUR SOLUTION</div> <div>SL</div> <p>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.</p> <p>If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behavior.</p> <p>Collecting data from patients Analyzing the needs of hospitals Structuring and sorting the data for use Performing Data Analytics using various tools Implementing algorithms on the data to extract insights Building predictive models with the development team</p>	<div>8. CHANNELS of BEHAVIOUR</div> <div>CH</div> <div>8.1 ONLINE</div> <p>What kind of actions do customers take online? Extract online channels from #7</p> <p>To handle all the documents and Records of the length of stay about the patients and manage them in a proper way. They must give proper details about the patient and accurate medications that are advised to follow.</p> <div>8.2 OFFLINE</div> <p>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</p> <p>The treatment and consultation that are to be done in offline that must be of full effective to the patients as they follow the Physician's advice and allowing their admission in respective beds and the major equipment for the treatment.</p>	Identify Strong TR & TM
	<div>4. EMOTIONS: BEFORE / AFTER</div> <div>EM</div> <p>How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure > confident, in control - use it in your communication strategy & design.</p> <p>Before: There is no proper data collection and analysis. Lack of privacy and security After: monitoring of patient's data, tracking of medical inventory and assets, organizing collected data and visualization of data on the dashboard and the reports</p>			

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Collect data	Data from various sources are collected using different methods in order to provide optimized results.
FR-2	Data Cleaning and Wrangling	When combining multiple data sources, there are many opportunities for data to be duplicated or mislabeled hence we cleanse the data
FR-3	Creating data model	The process of analyzing and defining all the data, as well as the relationships between those bits of data comes under this.
FR-4	Prediction and Analysis	The hidden trends are analyzed and the final results are predicted using machine learning and AI algorithms.

4.2NON-FUNCTIONAL REQUIREMENTS:

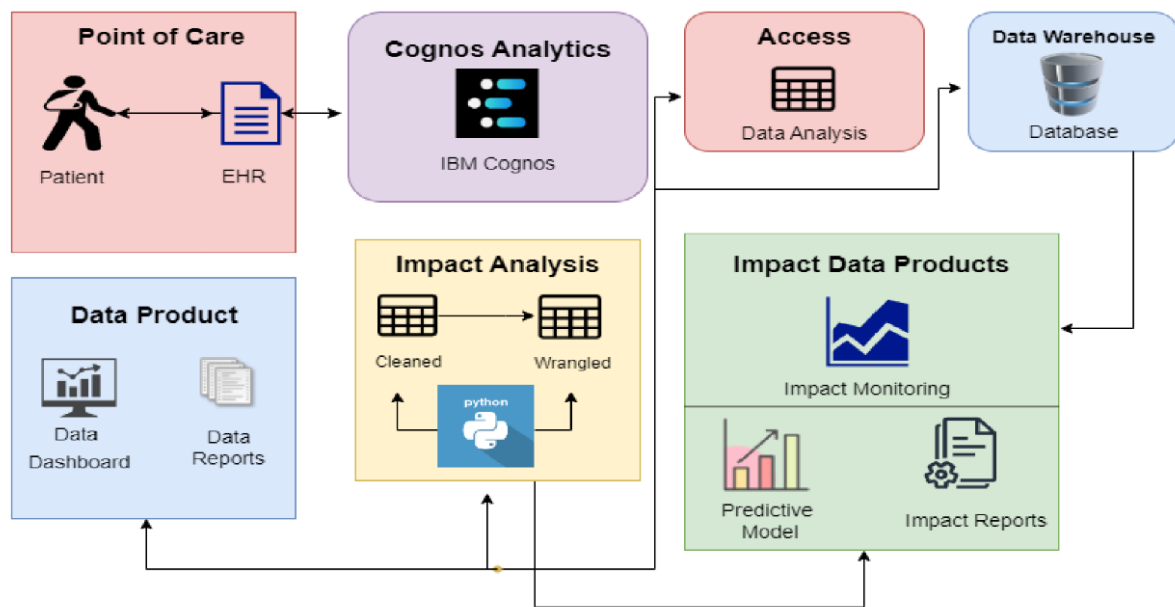
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The project must be easy to use. The user needs to have a good experience while working with the interface.
NFR-2	Security	Every user can access the website only if they posses the password. The database is secured with encryption techniques which provides high levels of security
NFR-3	Reliability	The project must have minimal degree of failure under normal usage and how often does the user get access to this work
NFR-4	Performance	The project must respond quickly to the user's actions or even if the user has to wait the waiting period must be short.
NFR-5	Availability	The project is platform independent. It runs perfectly on almost every platform.
NFR-6	Scalability	The project allows multiple users to handle the data at the same time. It is highly scalable since adding features and making advancements in the website is uncomplicated.

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

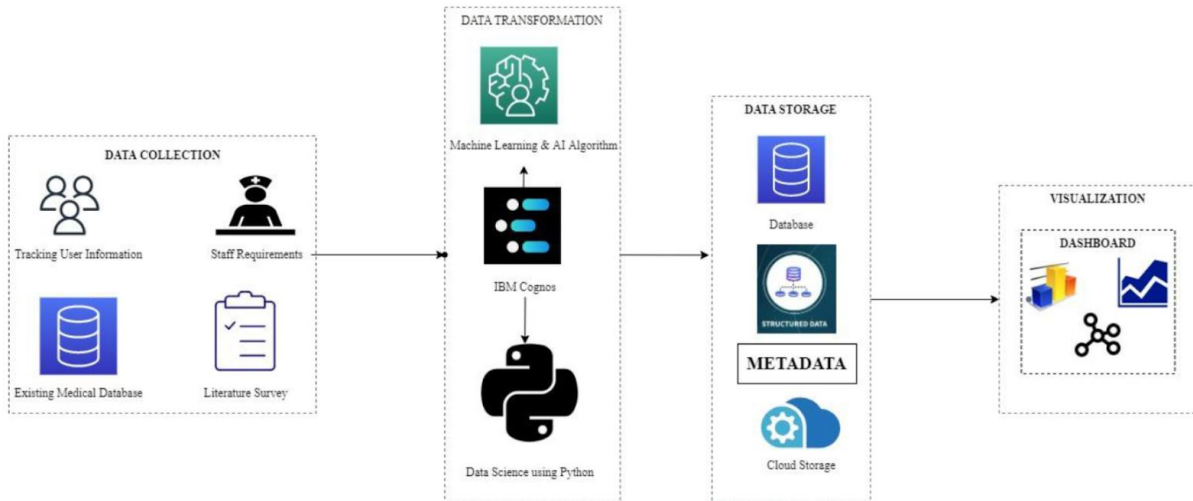
A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various sub processes the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships.



5.2 SOLUTION & TECHNICAL ARCHITECTURE

5.2.1 SOLUTION ARCHITECTURE

- Solution Architects are most like 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.



5.2.2 TECHNICAL ARCHITECTURE

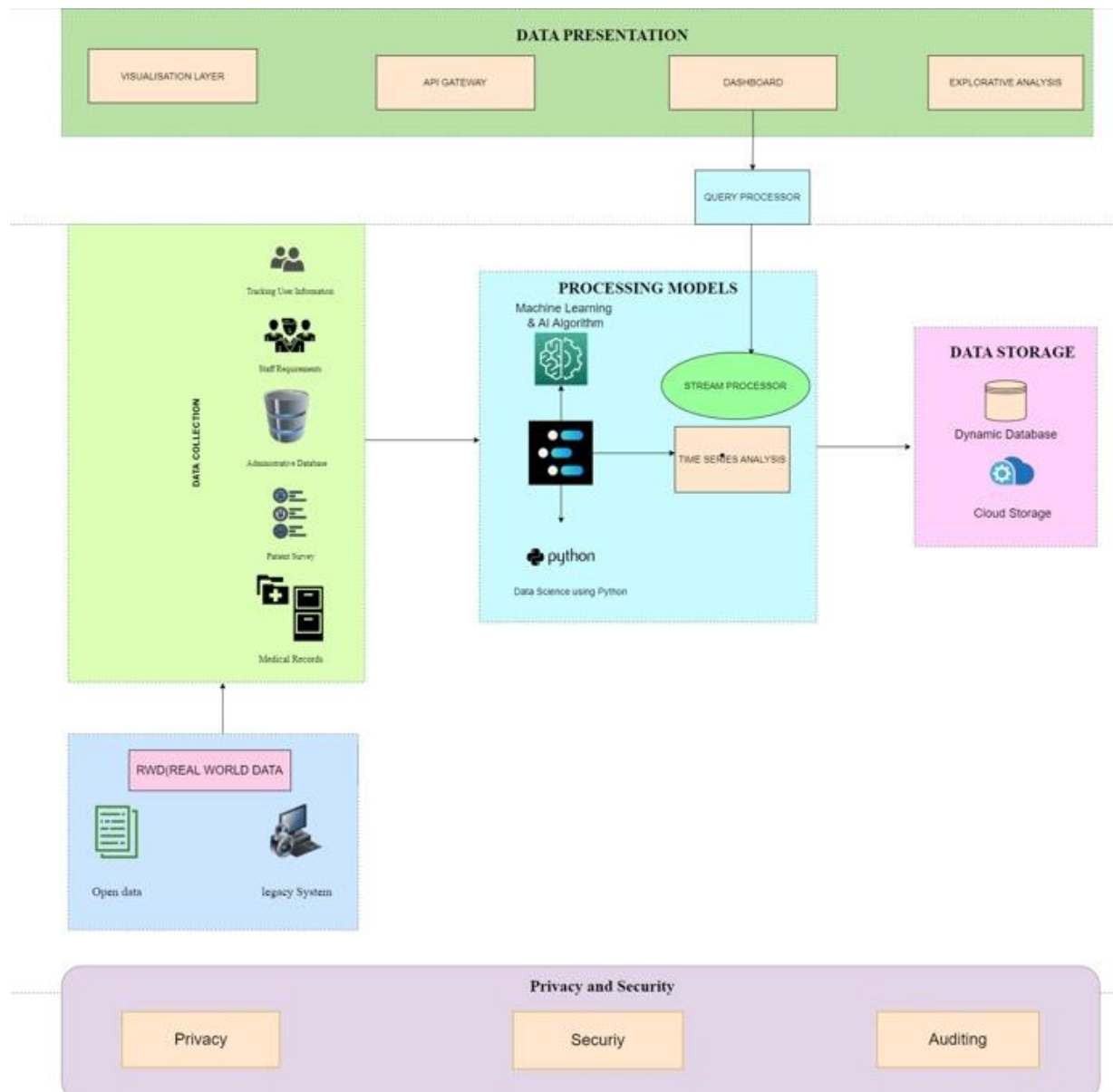


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	A powerful opportunity to influence user behavior and boost retention rates.	IBM Dashboard
2.	Application Logic-1	The raw data is obtained in this format	Excel/CSV
3.	Application Logic-2	Build conversational interfaces into any application, device, or channel.	IBM Watson Assistant
4.	File Storage	The data is saved in files and folders, and presented to both the system storing it and the system retrieving it in the same format.	Local Filesystem,Cloud
5.	Time Series Algorithm	This algorithm is used prediction	Python
6.	Machine Learning Model	Machine learning technique is used to forecast target value based solely on a known history of target values. This is used for predicting the future needs.	Time Series Algorithm(Python)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Security Implementations	Every user can access the website only if they possess the password. The database is secured with encryption techniques which provides high levels of security	IAM Controls,IBM Cognos
2.	Scalable Architecture	The project allows multiple users to handle the data at the same time. It is highly scalable since adding features and making advancements in the website is uncomplicated	IBM Cognos
3.	Availability	The project is platform independent. It runs perfectly on almost every platform.	IBM Cognos
4.	Performance	The project must respond quickly to the user's actions or even if the user has to wait the waiting period must be short.	IBM Cognos

5.3 USER STORIES

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, One can register for IBM Cognos by entering email and password	2	High	MELPHIN MADONNA A,MADHUMITHA R
		USN -2	As a user, One will receive confirmation email.	2	High	MELPHIN MADONNA A,SHRINIDHI GOKULAKRISHNAN, ANUSUYA V
Sprint-2	Login	USN-3	As a user, One can log into the IBM Cognos by entering email & password	2	High	DHIVYA R, ANUSUYA V

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Activation	USN-4	As a user, one must activate their membership for IBM Cognos.	2	High	SHRINIDHI GOKULA KRISHNAN, DHIVYA R
Sprint-2	Collection of patient's data	USN-5	The people of the hospital management can collect the patient's data and feed them into the website.	2	Medium	MADHUMITHA R, ANUSUYA V
Sprint-2		USN-6	The collected patient's data can be used for analysis purposes.	5	High	MELPHIN MADONNA, SHRINIDHI GOKULAKRISHNAN, ANUSUYA V
Sprint-3	Analysing the patient's data	USN-7	The data is used as input for creating visualizations and analysis is thereby used to predict LOS of patients.	9	High	MADHUMITHA R
		USN-8	The analyzed data can be used to identify the trends and patterns of the frequency of occurrence of seasonal diseases and classify them under various categories which can be used for further future predictions.	9	High	DHIVYA R
Sprint-3	Dashboard	USN-9	The admin of the hospital management can view the prediction results along with a few details related to the prediction on the dashboard.	5	Medium	SHRINIDHI GOKULAKRISHNAN,ANUSUYA V

Sprint-3		USN-10	Classification of LOS for various diseases based on different age groups will be displayed on the dashboard.	7	High	MADHUMITHA R, DHIVYA R
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Sprint-4		USN-11	The LOS of patients is also affected based on their financial status this is also displayed on the dashboard.	7	High	MELPHIN MADONNA A
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CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

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	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

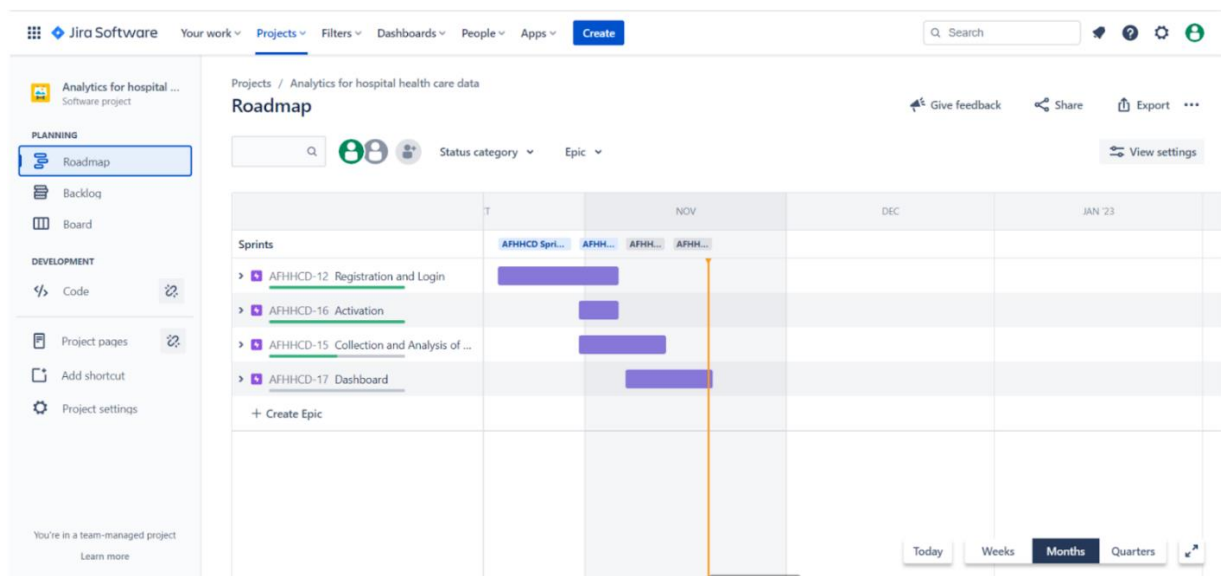
6.2 SPRINT DELIVERY SCHEDULE

Sprint	Functional Requirement (Epic)	User Number Story	User Story/Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a health care provider, I can create account in IBM cloud and the data are collected.	20	High	2 Members
Sprint-2	Analyze	USN-2	As a health care provider, all the data that are collected is cleaned and uploaded in the database or IBM cloud.	20	Medium	2 Members
Sprint-3	Dashboard	USN-3	As a health care provider, I can use my account in my dashboard for uploading dataset.	10	Medium	2 Members
Sprint-3	Visualization	USN-4	As a health care provider, I can prepare data for Visualization.	10	High	2 Members
Sprint-4	Visualization	USN-5	As a health care provider, I can present data in my dashboard.	10	High	2 Members
Sprint-4	Prediction	USN-6	As a health care provider, I can predict the length of stay	10	High	2 Members

6.3 Reports from JIRA

Road Map

A roadmap is a strategic plan that defines a goal or desired outcome and includes the major steps or milestones needed to reach it. It also serves as a communication tool, a high-level document that helps articulate strategic thinking—the why—behind both the goal and the plan for getting there.



Kanban Board

A Kanban board is an agile project management tool designed to help visualize work, limit work-in-progress, and maximize efficiency (or flow). It can help both agile and DevOps teams establish order in their daily work.

Burndown Chart

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

Jira Software

Your work

Projects

Filters

Dashboards

People

Apps

Create

Q Search

Analytics for hospital ...
Software project

PLANNING

Roadmap

Backlog

Board

DEVELOPMENT

Code

Project pages

Add shortcut

Project settings

You're in a team-managed project
Learn more

Does your team need more from Jira? Get a free trial of our Standard plan.

Projects / Analytics for hospital health care data

AFHHCD Sprint 3

0 days remaining

Complete sprint

...

Q

Epic

Sprint 1

Clear filters

GROUP BY

None

Insights

TO DO

IN PROGRESS 1 OF 1 ISSUE

DONE 3 OF 9 ISSUES

+

Classification of LOS for various diseases based on different age groups will be displayed on the dashboard

DASHBOARD

AFHHCD-10

10

The data is used as input for creating visualizations and analysis is thereby used to predict LOS of patients.

COLLECTION AND ANALYSIS OF PA...

AFHHCD-7

7

The analyzed data can be used to identify the trends and patterns of the frequency of occurrence of seasonal diseases and classify them under various categories which can be used for further future predictions

COLLECTION AND ANALYSIS OF PA...

AFHHCD-8

8

Jira Software

Your work

Projects

Filters

Dashboards

People

Apps

Create

Q Search

Analytics for hospital ...
Software project

PLANNING

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Backlog

...

Q

Epic

Insights

Epic

Issues without epic

Registration and Login

Activation

Collection and Analysis of patient's data

Dashboard

+ Create Epic

AFHHCD Sprint 1 19 Oct – 29 Oct (2 issues)

0 1 3

Complete sprint

...

AFHHCD-1 As a user, One can register for IBM Cognos by entering email and pas... REGISTRATION AND LOGIN 1 DONE

AFHHCD-2 As a user, One will receive confirmation email. REGISTRATION AND LOGIN 2 DONE

+ Create issue

AFHHCD Sprint 2 31 Oct – 5 Nov (4 issues)

0 11 7

Complete sprint

...

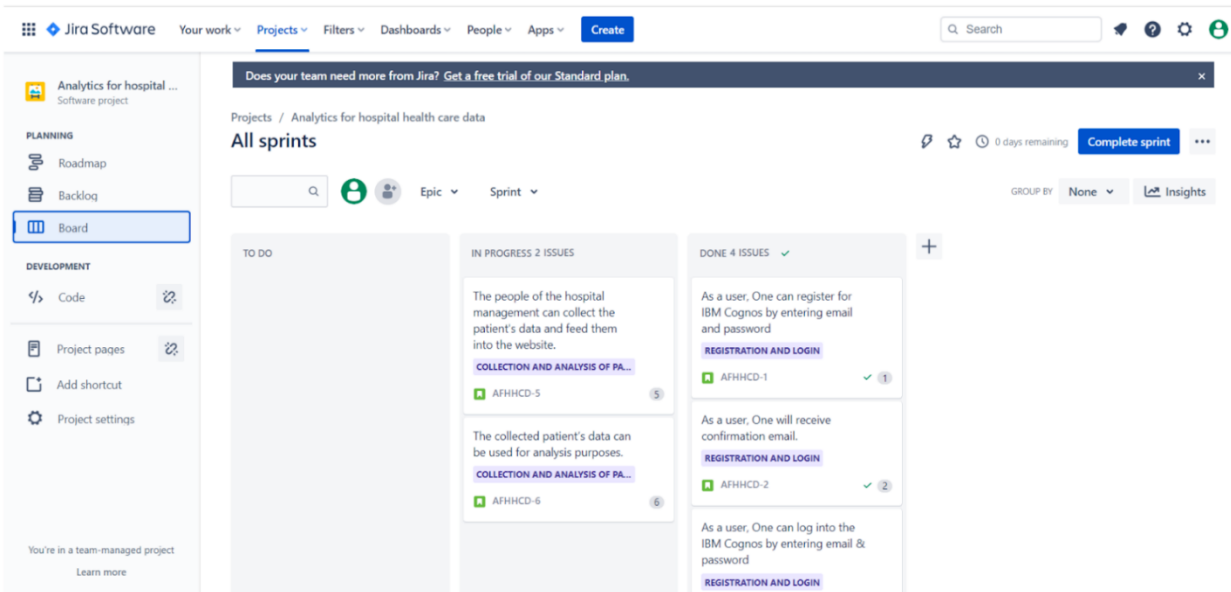
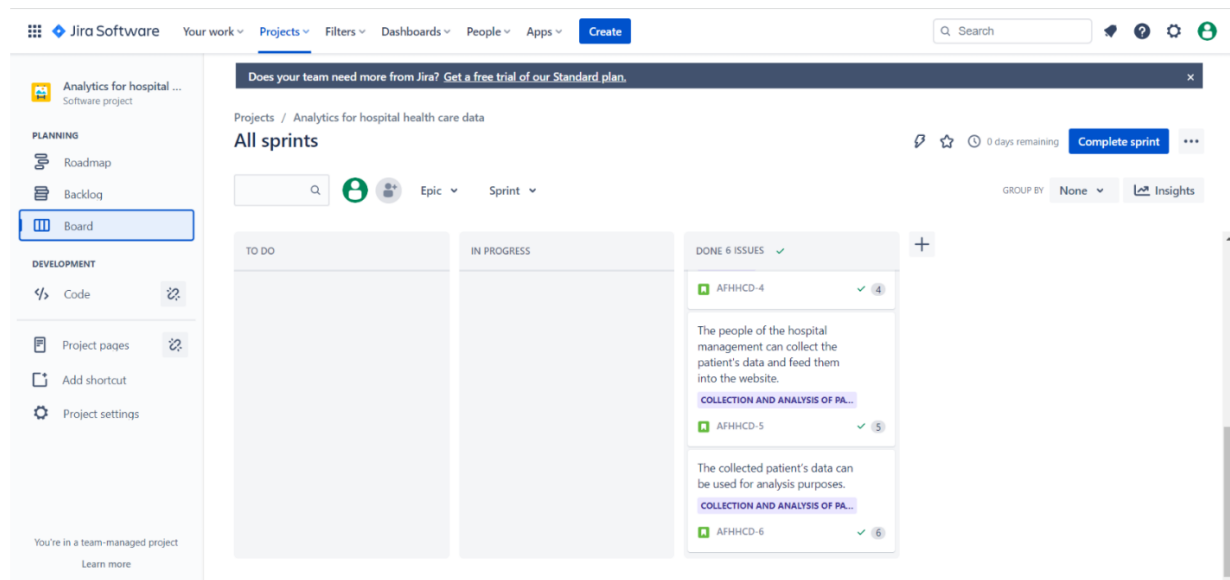
AFHHCD-3 As a user, One can log into the IBM Cognos by entering email & pass... REGISTRATION AND LOGIN 3 DONE

AFHHCD-4 As a user, one must activate their membership for IBM Cognos ACTIVATION 4 DONE

AFHHCD-5 The people of the hospital management can collect th... COLLECTION AND ANALYSIS OF PA... 5 IN PROGRESS

AFHHCD-6 The collected patient's data can be used for analysis pu... COLLECTION AND ANALYSIS OF PA... 6 IN PROGRESS

+ Create issue



VELOCITY

Average velocity for sprint - 1:

$$AV = 8/7 = 1.14$$

Average velocity for sprint - 2:

$$AV = 8/8 = 1$$

Average velocity for sprint - 3:

$$AV = 5/3 = 1.67$$

Average velocity for sprint - 4:

$$AV = 5/4 = 1.25$$

CHAPTER 7

CODING & SOLUTIONING

7.1 Feature 1

- Fetched the data from DB2 database.
- Creating responsive dashboard.
- Inserting filter for each chart.
- Creating report.
- Created reports using multiple graphs and charts.

7.2 Feature 2

- Creating stories and performed.
- Perform animation render image from website.
- Included graphs and charts.
- Creating web application using bootstrap.
- Embedded the cognos with web application.

7.3 Database Schema

- Case_id
- Hospital_code
- Hospital_type_code
- City_Code_Hospital
- Hospital_region_code
- Available Extra Rooms in Hospital
- Department
- Ward_Type
- Ward_Facility_Code
- Bed Grade

- Patient id
- City_Code_Patient
- Type of Admission
- Severity of Illness
- Visitors with Patient
- Age
- Admission Deposit
- Stay

CHAPTER 8

TESTING

8.1 Test Cases

- Verify user can see home page.
- Verify user can see Dashboard page.
- Verify user can navigate to Report page.
- Verify user can navigate to story page.
- Verify filters are working.

8.2 User Acceptance Testing

1. Purpose of Document

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

2. Defect Analysis

This reports how the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	5	5	3	0	13
Duplicate	0	0	0	0	0
External	7	5	1	0	13
Fixed	11	8	7	5	31
Not Reproduced	1	0	0	0	1
Skipped	0	0	0	0	0
Won'tFix	0	0	0	0	0
Totals	24	18	11	5	58

3. Test Case Analysis

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

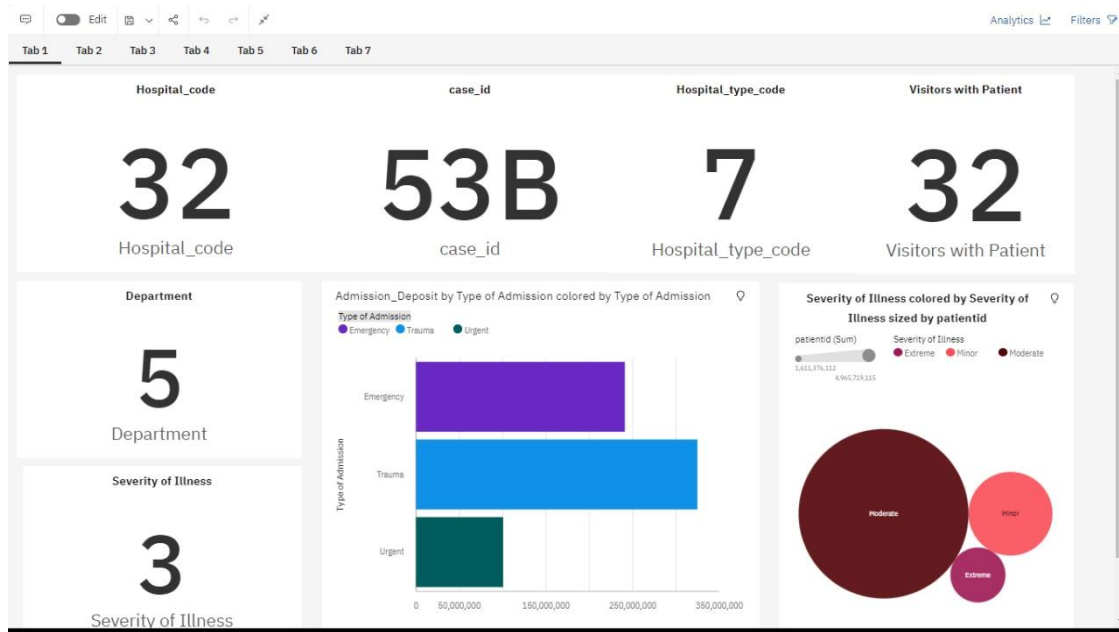
Section	TotalCases	Not Tested	Fail	Pass
PrintEngine	0	0	0	0
ClientApplication	0	0	0	0
Security	0	0	0	0
Outsource Shipping	0	0	0	0
ExceptionReporting	0	0	0	0
FinalReportOutput	0	0	0	0
VersionControl	0	0	0	0

CHAPTER 9

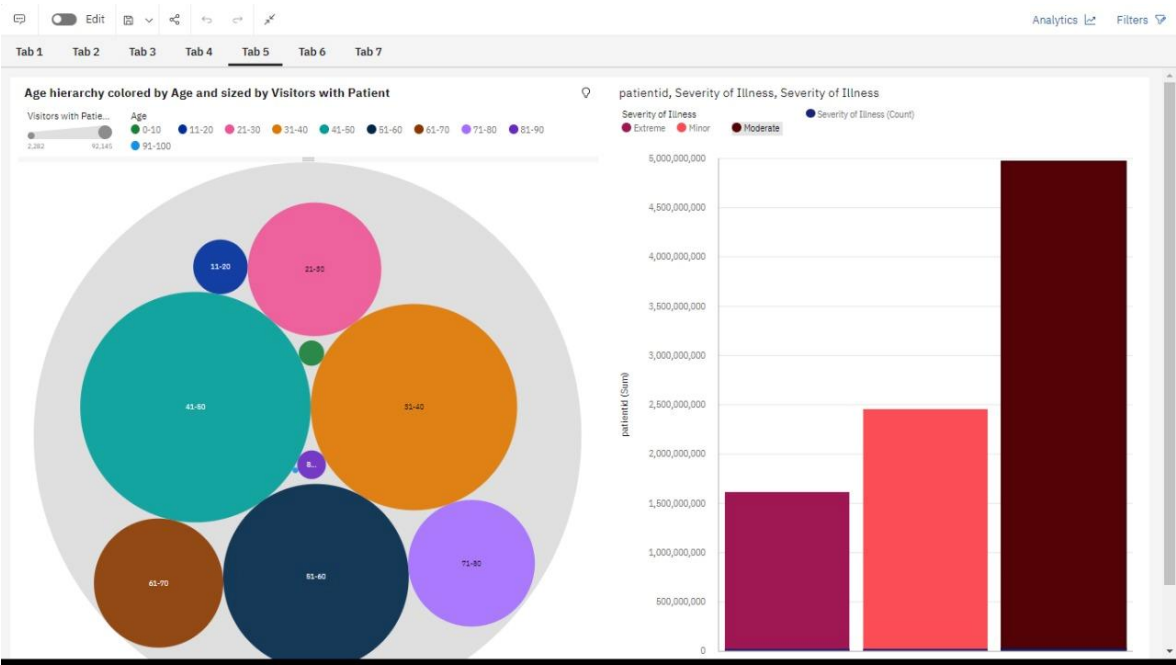
RESULTS

9.1 PERFORMANCE METRICS

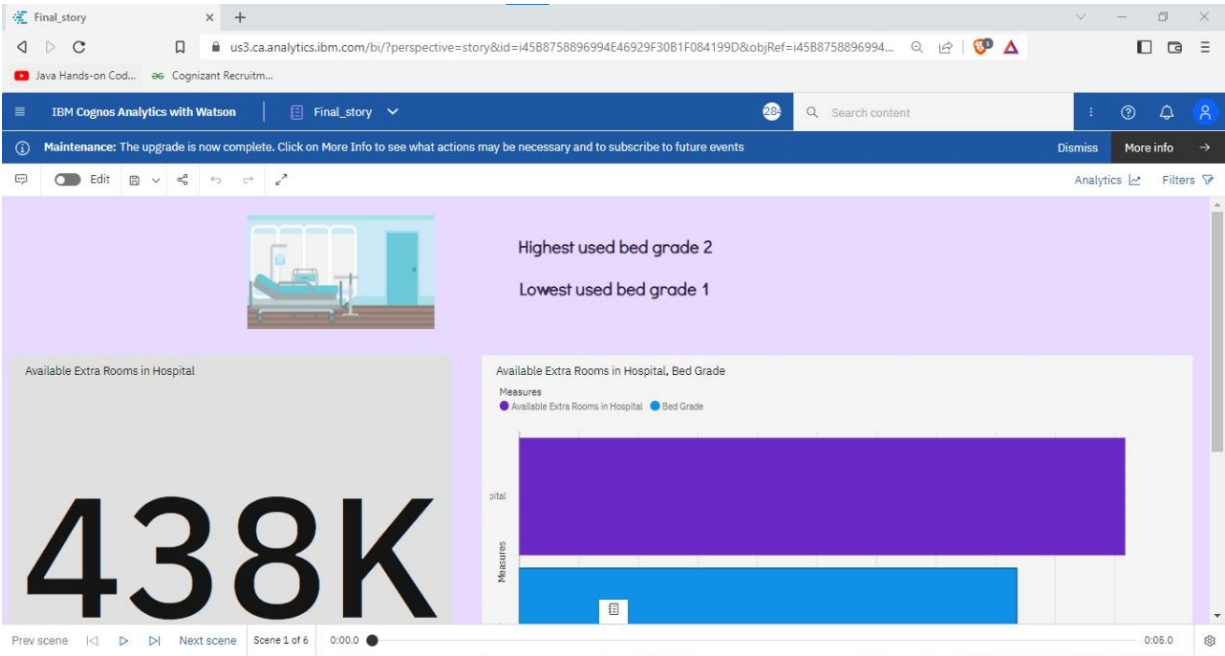
1. Dashboard design



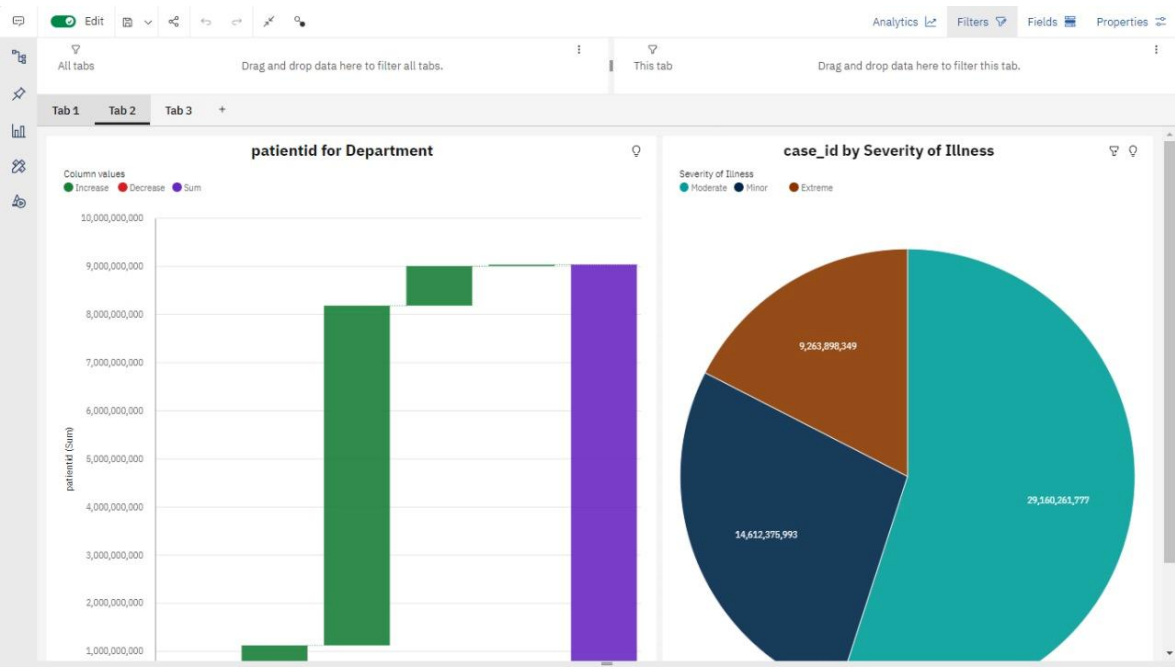
2.Data Responsiveness



3. Effective User Story



4. Descriptive Reports



CHAPTER 10

ADVANTAGES

- Improved research efforts
- Improved health outcomes
- Obtain operational insights
- Improved staffing
- Informed strategic planning
- Higher-Quality Care

DISADVANTAGES

- Privacy
- Replacing Doctors
- Frustration with poor implementation
- Cybersecurity risks
- Healthcare Regulatory Changes
- Healthcare Staffing Shortages

CHAPTER 11

CONCLUSION

- It also means describing how health plans, health care organizations, and clinicians should be accountable to patients and society and conversely. How individuals can take appropriate responsibility for their own health. Data analytics is the science of analysing raw datasets in order to derive a conclusion regarding the information they hold.
- It enables us to discover patterns in the raw data and draw valuable information from them.

CHAPTER 12

FUTURE SCOPE

- **Improved Decision Making:** Data Analytics eliminates guesswork and manual tasks. Be it choosing the right content, planning marketing campaigns, or developing products.
- Organizations can use the insights they gain from data analytics to make informed decisions. Thus, leading to better outcomes and customer satisfaction.
- Data analytics to achieve business goals of pharmaceutical companies, payers, insurance companies, physicians, hospitals, medical equipment companies, sales reps, and other stakeholders in the healthcare business, need for this have only increased after the Affordable Act came into being.

CHAPTER 13

APPENDICES

Source Code

Index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Data Analytics</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet"href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/
bootstrap.min.css">
<style>
    body{
        background-image: url('C://Users//dhivy//Downloads//img.jpg');
        width:"100%";
        height:"100%";
        background-repeat:no-repeat;
        background-size: cover;
    }
    .Team_id{
        border-radius: 50px;
        background-color:#78abf7;
        width: 300px;
        height: 50px;
```

```
border-width: 20px;
text-align: center;
margin-top: 60px;
margin-bottom: 100px;
margin-right: 200px;
margin-left: 280px;
}
.table-bordered{
border: 2px solid black;
border-radius: 12px;
margin-top: -50px;
overflow-x:auto;
width: 450px;
height: 190px;
/* margin-bottom: 170px; */
margin-left: 220px;
margin-right: 200px;
font-family:cursive;
font-size: medium;
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<nav class="navbar navbar-inverse">
```

```
<div class="container-fluid">
```

```
<div class="navbar-header">
```

```
<a class="navbar-brand" href="#">Analytics for Hospitals' Health-Care Data</a>
```

</div>

<ul class="nav navbar-nav">

<li class="active">Home

<li class="active">About

Dashboard

Report

Story

</div>

</nav>

<div class="Team_id">

<center> <h4><i>Team ID : PNT2022TMID23353</i></h4></center>

</div>

<div>

<table class="table-bordered">

<tbody>

<tr>

<td>Team Leader</td>

<td>MELPHIN MADONNA A</td>

</tr>

<tr>

<td>Team member</td>

<td>ANUSUYA V</td>

</tr>

<tr>

<td>Team member</td>

```
        <td>DHIVYA R</td>
    </tr>
    <tr>
        <td>Team member</td>
        <td>MADHUMIHA R</td>
    </tr>
    <tr>
        <td>Team member</td>
        <td>SHRINIDHI GOKULAKRISHNAN</td>
    </tr>
</tbody>
</table>
</div>
</body>
</html>
```

Report.html

```
<!DOCTYPE html>

<html lang="en">

<head>

<title>Data Analytics</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet"href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/
bootstrap.min.css">
```

```
</head>
<body>
<nav class="navbar navbar-inverse ">
  <div class="container-fluid">
    <div class="navbar-header">
      <a class="navbar-brand" href="#">Analytics for Hospitals' Health-Care
Data</a>
    </div>
    <ul class="nav navbar-nav">
      <li><a href="index.html">Home</a></li>
      <li><a href="about.html">About</a></li>
      <li><a href="dashboard.html">Dashboard</a></li>
      <li class="active"><a href="#">Report</a></li>
      <li><a href="story.html">Story</a></li>
    </ul>
  </div>
</nav>
<div class="container">
  <iframe
src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FSprint4%2Breport%2Bdashboard&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=view&mode=dashboard&subView=model000000184a5b27753_000000000"
width="1200" height="580" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
  </br>
</div>
```

</body>

</html>

Story.html

<!DOCTYPE html>

<html lang="en">

<head>

<title>Data Analytics</title>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/
bootstrap.min.css">

</head>

<body>

<nav class="navbar navbar-inverse ">

<div class="container-fluid">

<div class="navbar-header">

Analytics for Hospitals' Health-Care Data

</div>

<ul class="nav navbar-nav">

Home

About


```
<li><a href="dashboard.html">Dashboard</a></li>
<li><a href="report.html">Report</a></li>
<li class="active"><a href="#">Story</a></li>
</ul>
</div>
</nav>
<div class="container">
  <iframe
src="https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders
%2FFinal_story&closeWindowOnLastView=true&ui_appbar=false&ui_
navbar=false&shareMode=embedded&action=view&sceneId=model000
00184ae21c014_000000002&sceneTime=0"width="1200"height="580"
frameborder="0"gesture="media"allow="encrypted-media"
allowfullscreen=""></iframe>
</div>
</body>
</html>
```

about.html

```
<html>
  <head>
    <title>Data Analytics</title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/
bootstrap.min.css">
  </head>
  <style>
```

```
body{
    background-color:#78abf7;
    font-family:Georgia, 'Times New Roman', Times, serif;
    font-size: medium;
    font-style: italic;
}
```

</style>

</head>

<body>

<nav class="navbar navbar-inverse ">

<div class="container-fluid">

<div class="navbar-header">

Analytics for Hospitals' Health-Care
Data

</div>

<ul class="nav navbar-nav">

Home

About

<li class="active">Dashboard

Report

Story

</div>

</nav>

<h1>Analytics For Hospitals' Health-Care Data Category: Data Analytics</h1>

Project Description:

Recent Covid-19 Pandemic has raised alarms over one of the most overlooked areas to focus: Healthcare Management. While healthcare management has various use cases for using data science, patient length of stay is one critical parameter to observe and predict if one wants to improve the efficiency of the healthcare management in a hospital. This parameter helps hospitals to identify patients of high LOS-risk (patients who will stay longer) at the time of admission. Once identified, patients with high LOS risk can have their treatment plan optimized to minimize LOS and lower the chance of staff/visitor infection. Also, prior knowledge of LOS can aid in logistics such as room and bed allocation planning.

Suppose you have been hired as Data Scientist of Health Man – a not for profit organization dedicated to manage the functioning of Hospitals in a professional and optimal manner.

Goal:

The goal is to accurately predict the Length of Stay for each patient on case by case basis so that the Hospitals can use this information for optimal resource allocation and better functioning. The length of stay is divided into 11 different classes ranging from 0-10 days to more than 100 days.



dashboard.html

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Data Analytics</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css
/bootstrap.min.css">
</head>
<body>
<nav class="navbar navbar-inverse ">
  <div class="container-fluid">
    <div class="navbar-header">
      <a class="navbar-brand" href="#">Analytics for Hospitals' Health-Care
Data</a>
    </div>
    <ul class="nav navbar-nav">
      <li><a href="index.html">Home</a></li>
      <li><a href="about.html">About</a></li>
      <li class="active"><a href="dashboard.html">Dashboard</a></li>
      <li><a href="report.html">Report</a></li>
      <li><a href="story.html">Story</a></li>
    </ul>
  </div>
</nav>

<div class="container">
```

```
<iframe
src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_f
olders%2FFinal%2Bdashboard&closeWindowOnLastView=true&ui_appbar=
false&ui_navbar=false&shareMode=embedded&action=view&mod
e=dashboard&subView=model00000184a850b006_00000000"width="1200"
height="580"frameborder="0"gesture="media"allow="encrypted-media"
allowfullscreen=""></iframe>
</div>
</body>
</html>
```

GitHub link

[IBM-EPBL/IBM-Project-23009-1659864215](#)

Project Demo Link

[https://youtube.com/watch?v=qDP5b5qSbGY&feature=share](#)