PROJECT REPORT

Team ID	**PNT2022TMID28238**
Project name	**Analytics for Hospitals' Health-Care Data**

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.
- when scheduling appointments and receiving treatment, and reduce read mission rates byusing 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 assess 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.

2. LITERATURE SURVEY

2.1 Existing problem

- **No remote access**
  - Healthcare is associated with in-person consultations. This problem obligates the patients to run to the nearest healthcare center for treatment.
  - The COVID outbreak and lockdowns made it even worse.
  - The contagion effect of the virus restrained people within the four walls of theirhomes.

- So, what do they do if they need to see a doctor and have an emergency?The need for remote access or virtual consultations is the need of the hour, which needs to be taken care of to stay one step ahead in the technology adoption race.

Insufficiency and errors in data sharing

- 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.
- This is not just a hurdle in medical science; it causes regression because of the waste it generates.
- Not only do patients pay the price in the form of inconvenience and health, but we also see a rise in administrative expenses and litigation owing to these inefficiencies and errors.
- An incomplete or inefficient exchange of this data can be dangerous in patients needing urgent or complicated treatment

Absence of supply management system

- Traditional supply chain management is often wasteful and inefficient.
- It leads to money wasted on lost and damaged inventory, improper delivery of equipment or medication, and the damage caused to patients,all of which amount to massive financial losses for healthcare services.
- Supply shortages, misplaced inventory, and less-than-stellar preventative measuresregarding shrinkage, all play into the reality that hospitals are epicenters of wasteful operations without a proper supply management system.

Data security

- Another challenge mentioned by multiple respondents was data security. Between 2009 and 2020, 70% of the U.S. population was affected by healthcare data breaches—a trend that isn't likely to go away.
- Cigarillo believes the healthcare industry needs government funding to strengthen their IT resources.
- But there are also a number of best practices healthcare organizations can implement now that will help them more effectively secure valuable healthcare data, such as educating healthcare staff, restricting access to data and applications, implementing data usage controls, and more.

Lack of real time situation management

- True crises used to be few and far between, but the past year has

presented a perpetual state of crisis—a scenario that has posed an incredible challenge for healthcare organizations.

- According to Terry Zysk, CEO of LiveProcess, public health emergencies like COVID-19 require situation management: using real-time data analysis to understand how an event is unfolding, and reacting to it accordingly.
- It's the only way that critical healthcare resources can be delivered to the rightpeople at the right time during emergencies and natural disasters.
- A major problem with hospital management systems is they don't provide access to the kind of real-time metrics that could improve response times and outcomes—for example, how many beds are available at a facility at any given time or the location of critical supplies.

2.2 References

TITLE: Healthcare
AUTHOR: Dr.leena V Gangloi
TITLE: Information System Healthcare Sectors
AUTHOR: Wager
TITLE: Data Analytics in Healthcare
AUTHOR: J. Archenaa
TITLE: Historical Review Of Health Policy Making
AUTHOR: Ravi Duggal

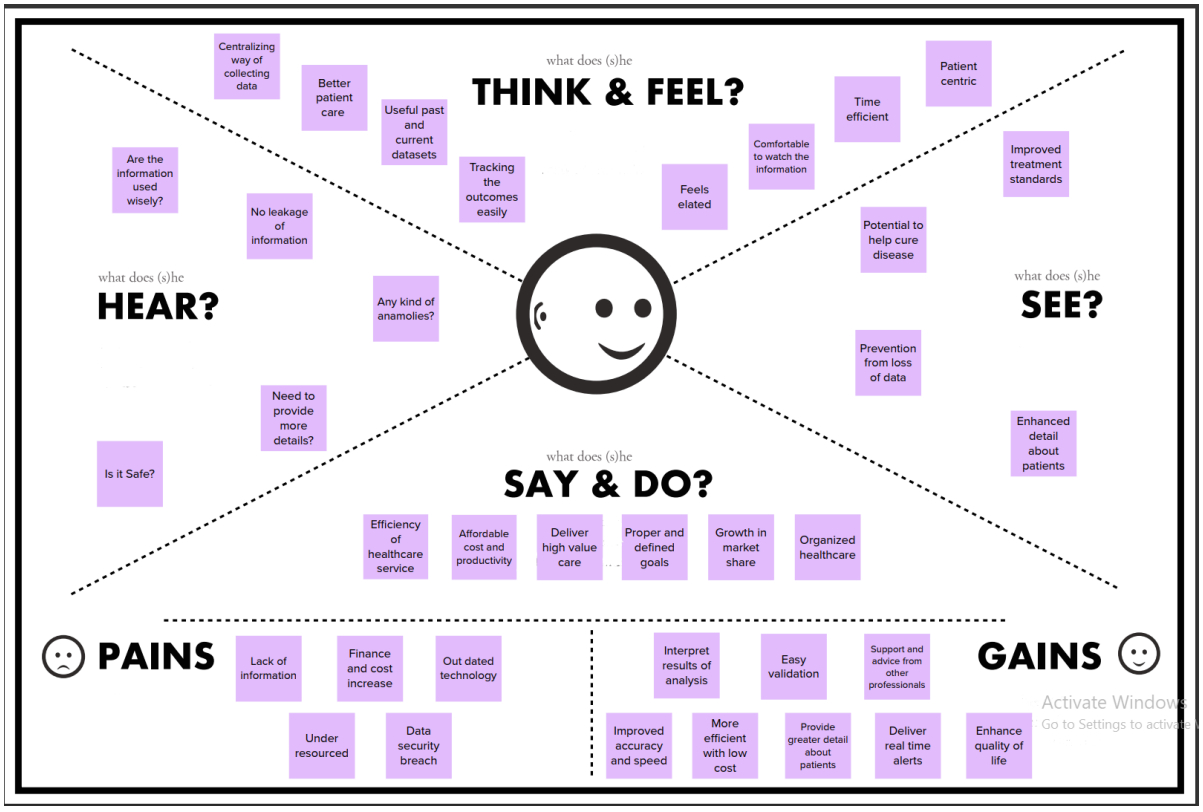
2.3 Problem Statement Definition

- Collection dataset.
- Upload the dataset into cognos . Open the
- properties->data module.
- If null value is present in character field use mode method.
- If the null value is present in continuous field use average or medium.Display
- the data in respective charts.
- Create conclusion using summary.

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 andsuggest solutions and ideas.

3.3 Proposed Solution

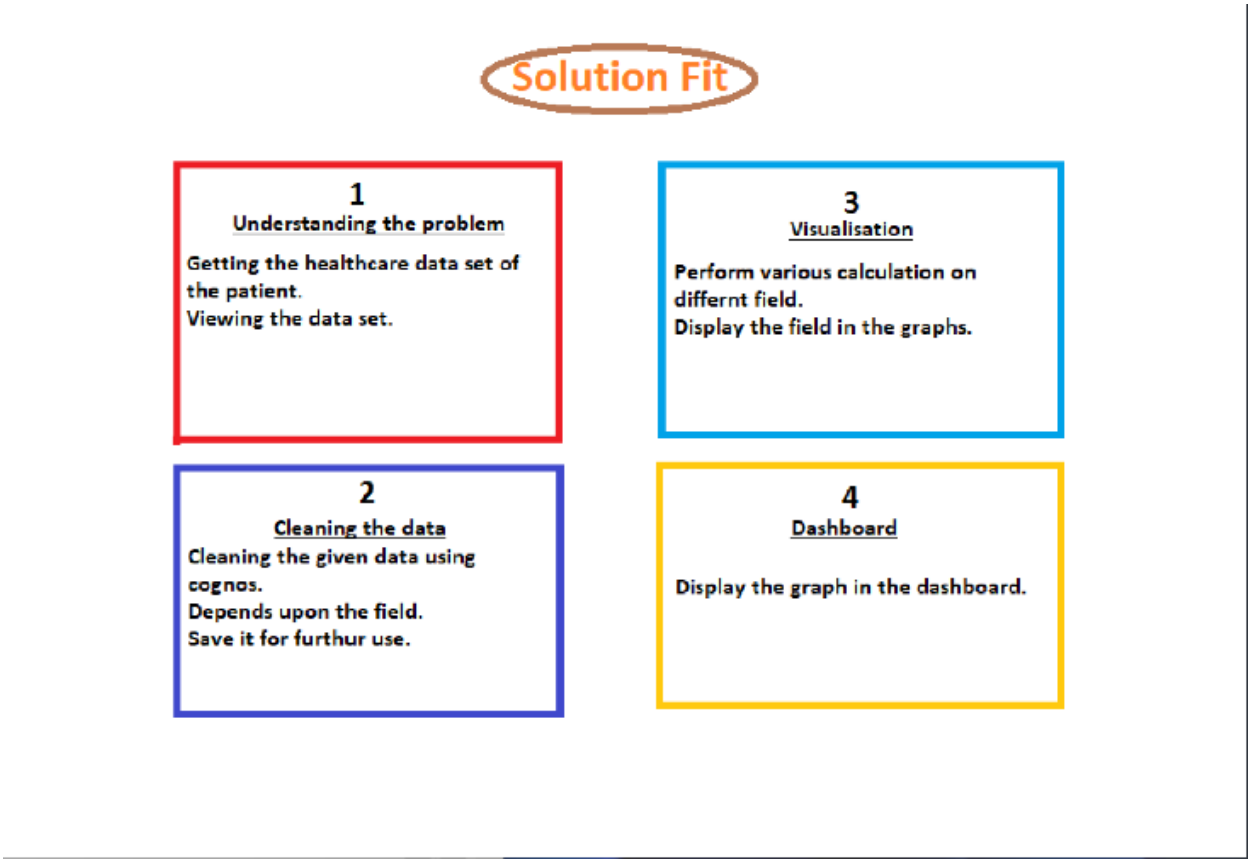
- Identify key hurdles to healthcare sustainability in india and propose a set of solutions that mutually benefit and the pharmaceutical industry Pragmatic literature review of 43 articles published by regional and international organizations.
- UNIVERSAL HEALTHCARE COVERAGE Attainment of UHC comes with the hurdle of having to provide care to a higher number of patients.
- EVOLVING DEMOGRAPHICS Population aging has resulted in a growing number ofelderly 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 achievedefined 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.

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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.
2.	Idea / Solution description	Algorithms like data mining will be used to provide an optimal accuracy for the problem by extracting information from the huge set of data which will be provided to the end user as a form of data visualisation facilitated with IBM cognos analytics.
3.	Novelty / Uniqueness	The primary focus is to protect patients, by verifying information, integrating reliable sources, and transmitting data to dependable recipients.
4.	Social Impact / Customer Satisfaction	Better relations with your patients are the key to success for healthcare facilities. You can get to know your audience better by gathering data from them which can then be used to provide them with the facilities they demand according to their preferences. This, in turn, strengthens the relations between patients and healthcare providers.
5.	Business Model (Revenue Model)	Data Analytics is the 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.
6.	Scalability of the Solution	The model which is framed is bound to be scalable as it is equipped with datasets which is recently framed.

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 actually 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 health care 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.



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

S.NO	Functional Requirements	Story
1	Data Gathering	Gathering data From kaagle
2	DB	Upload data in DB2
3	Connect DB with Cognos	Cleaning Data
4	Data Exploration	Explore the data in graphical format
5	Dashboard	Create Dashboard interactively
6	Report	Create report for variuous field
7	Story	Create story and animation

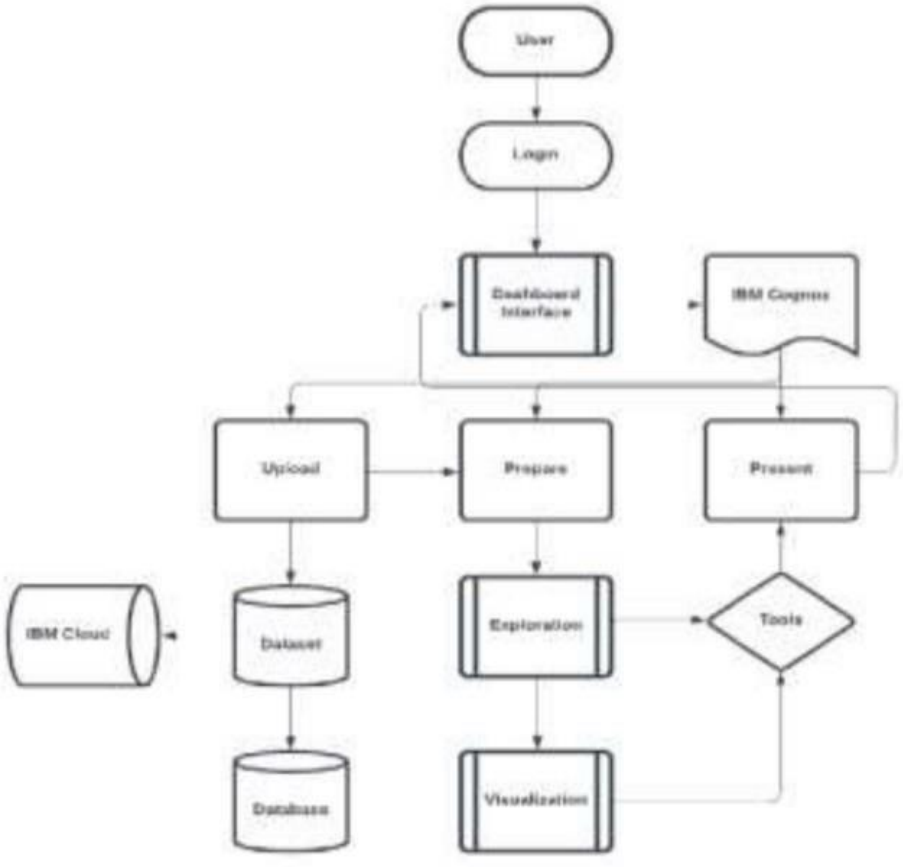
4.2 Non-Functional requirements

Working with open source plateform	GitHub
Prepare Step by Step process Doc	Project Documents

5. PROJECT DESIGN

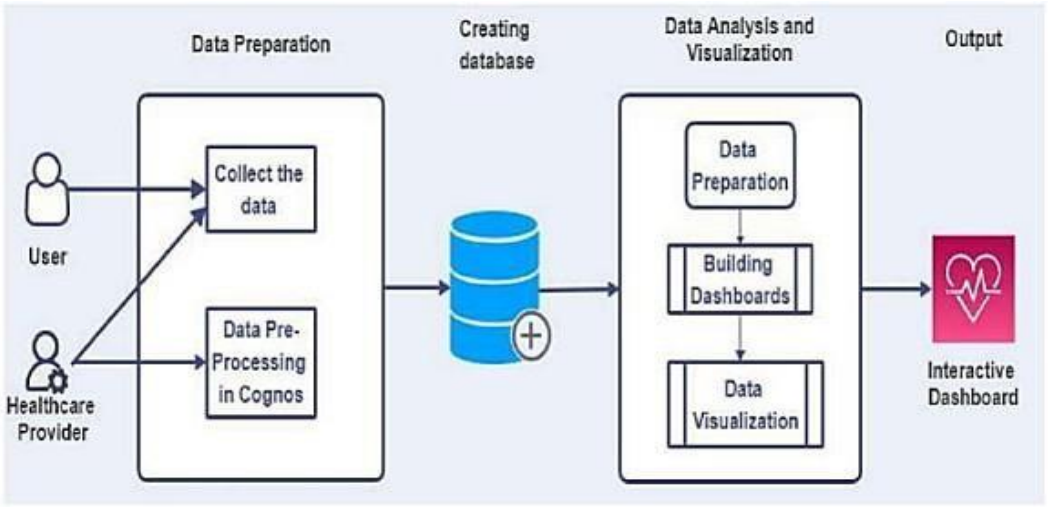
5.1 Data Flow Diagrams

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 subprocesses the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships.



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 newapplication.



Components & Technology

S.NO	Components	Description	Technology
1	Dataset	Gathering dataset from Internet	Kaagle API
2	Data PrePocessing	Cleaning the gathered data	Cognos
3	Visualization	Visualize the data	Cognos Exploration
4	Dashboard	Create intractive Dashboard	Cognos Dashboard
5	Reports	Create intractive Report	Cognos Report
6	Story	Creating various Story	Cognos Story
7	Web Appliction	Creating embedded web application	Cognos ,Bootstrap,HTML
8	Database	Uploading data in DB2	IBM DB2

Application Characteristics

Cognos	It is a Plateform used to create ,display data in graphical format
DB2	It is a database used to store the data (MYSQL)

5.3 User Stories

S.NO	Funnctional Requirements	User Story Number	Tasks	Acceptance Criteria	Priority	Release
1	Data Gathering	1	Gathering Data	Using API	High	Sprint1
2	Pre-processing	2	Cleaning the data in proper format	Cleaned Data	High	Sprint 1
3	Data Exploration	3	Explore the data	Display data in graph	High	Sprint1
4	Dashboard	4	Creating various chart	Intractive Dashboard	High	Sprint 2
5	Reports	5	Creating report for various field	Intractive Report	High	Sprint 3
6	Story	6	Creating Animation Using picture	Various animation and slides	High	Sprint 4
7	Web Application	7	Cognos Embeded Web application	Intractive Web Application	High	Sprint 4

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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

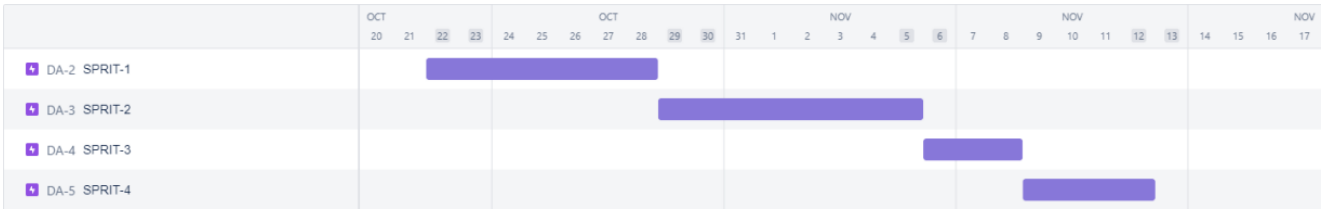
Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Retrieve Data	USN-1	As a user, I should get clearer clinical context for AIDS patient's unique case	10	Medium	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint-1	Visualize the data	USN- 2	As a user,I need nicely visualized dashboard of number of beds occupied and number of free beds in hospital.	20	High	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint-2	Track of patient visit of Hospital	USN-3	Tracking a patient Health care over years of visit and Screening of data they have in hospital.	10	Medium	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint -2	Dashboard	USN - 4	As a user , I want the interactive dashboard to analyze the data. Have the data in terms of Graph.	20	High	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint-3	Detailed EHR's of patient	USN-5	Provided greater details in the EHR's of individual patient with clear idea of what to do.	10	Medium	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint- 3	Story Creation	USN-6	As a user , I need the story animation of the data set with insights	20	High	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini
Sprint-4	Predict LOS	USN-7	As a user, I want the flawless system to predict the length of stay of the patients	20	High	Haritha Lakshmi Dhanusya Divya Bharathi Dharshini

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.

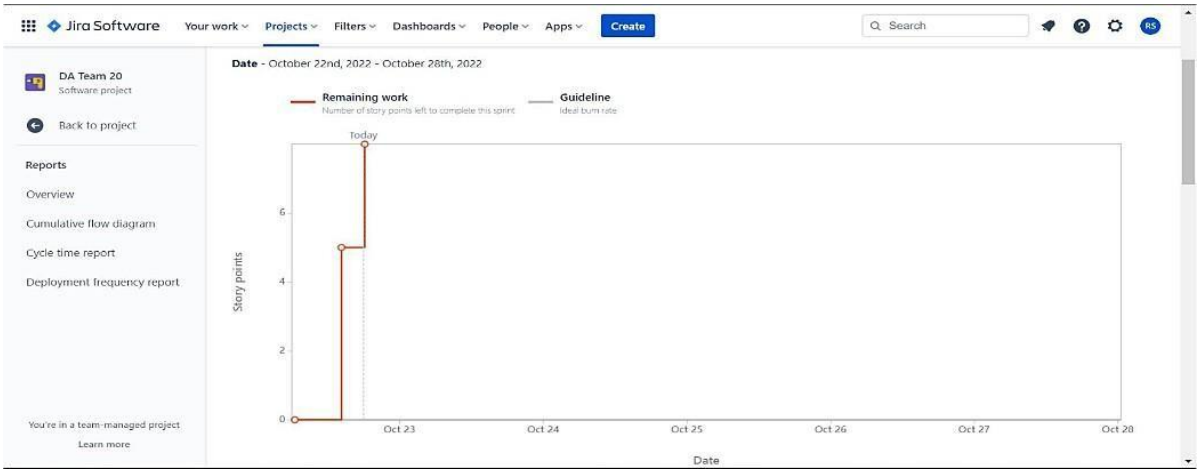


Kanban Board:

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 Develops teams establish order in their daily work.

BURNDOWN CHART



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

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

8. TESTING

8.1 Test Cases

- Verify user is able to see Home page.
- Verify user is able to see Dashboard page.

- Verify user is able to navigate to Report page.
- Verify user is able to 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 report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	8	5	0	3	16
Duplicate	1	0	5	0	6
External	0	3	2	1	6
Fixed	13	4	3	16	36
Not Reproduced	0	1	0	0	1
Skipped	0	1	0	1	2
Won't Fix	1	4	2	1	8
Totals	23	18	12	22	75

3. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	9	0	0	9
Client Application	43	0	0	43
Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Reporting	9	0	0	9
Final Report Output	10	0	0	10
Version Control	1	0	0	1

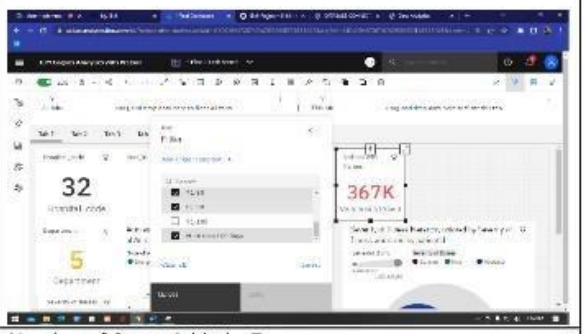
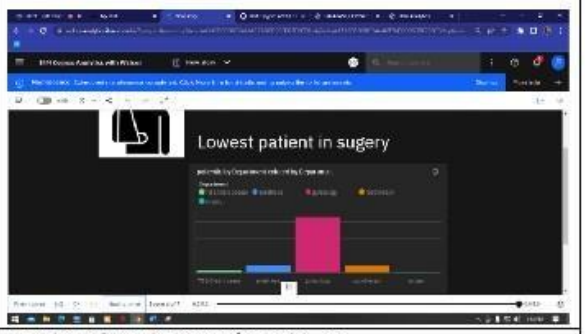
9. RESULTS

9.1 Performance Metrics

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	Number of Visulizations / Graphs – 22 Number of tabs – 5 
2.	Data Responsiveness	Data's will dynamically changed and graph also changed. 
3.	Amount Data to Rendered (DB2 Metrics)	Number of rows read – 318438 Number of rows loaded – 318438 Number of rows rejected – 0 

4.	Utilization of Data Filters	We created filters for Dashboards which is perfectly working. 
5.	Effective User Story	Number of Scene Added – 7 Animations are perfectly displayed. Images are perfectly rendered. 
6.	Descriptive Reports	Number of Visulizations / Graphs – 6

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

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 analyzing 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.

12. FUTURE SCOPE

- **Improved Decision Making**: Data Analytics eliminates guesswork and manual asks. 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 stackholders in the healthcare business, need for this have only increased afterthe Affordable Act came into being.

13. APPENDIX

Source Code

Dashborad

html

```
<!
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m
l>
      <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">
        <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
        <script
      src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></script>
      </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 class="active"><a href="#">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://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2F
Sprint%2B2%2FFinal%2BDashboard&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_n
avbar=false&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000
00184774a03ac_00000002"
  width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
</div>

</body>
</html>
```

Index html

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html>
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              <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">
                <script
              src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></scrip
              t>
                <script
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              ipt>
              </head>
              <body>


              <nav class="navbar navbar-inverse">
                <div class="container-fluid">
                  <div class="navbar-header">
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              Data</a>
                  </div>
                  <ul class="nav navbar-nav">
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                    <li><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="jumbotron">
 <center> <h4><i><b>Team ID : PNT2022TMID37553 </b></i></h4></center>

</div>
<table class="table table-bordered">

    <tbody>
      <tr>
        <td>Team Leader</td>
        <td>HARITHA LAKSKSHMI S </td>

      </tr>
      <tr>
        <td>Team member</td>
        <td>DHANUSYA S</td>

      </tr>
      <tr>
        <td>Team member</td>
        <td>DHARSHINI B</td>

      </tr>
          <tr>
        <td>Team member</td>
        <td>DIVYA BHARATHI J</td>

      </tr>
    </tbody>
  </table>
</body>
</html>
```

Report html

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TYPE
html>
        <html lang="en">
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 <title>Data Analytics</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
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href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
  <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
  <script
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</head>
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    </ul>
  </div>
</nav>

<div class="container">
  <iframe

src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FReport%2FFinal%2BRepor
t&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode
=embedded&amp;action=edit"
    width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
</br>

</div>

</body>
</html>
```

Story html

```
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YPE
htm
l>
        <html lang="en">
        <head>
          <title>Data  Analytics</title>
          <meta charset="utf-8">
          <meta  name="viewport"  content="width=device-width,  initial-scale=1">
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          <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script>
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        </head>
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            </ul>
          </div>
        </nav>

        <div class="container">
          <iframe

        src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2Fstory%2FNew%2Bstory&amp;clo
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        d=model0000184574031b2_00000002&amp;sceneTime=0"
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        allowfullscreen=""></iframe>
        </div>


        </body>
        </html>
```