# PROJECT REPORT

| | |
|---|---|
| **Team ID** | **PNT2022TMID09318** |
| **Project name** | **Analytics for Hospital Health Data** |

# 1. INTRODUCTION

## 1.1 Project Overview

- Data analytics in clinical settings attempts to reduce patient wait times viaimproved scheduling and staffing, give patients more options.
- when scheduling appointments and receiving treatment, and reduce readmissionrates 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 assess methods andtreatments faster, keep better track of inventory, involve patients more in theirown 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 oftheir homes.

- 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 preventativemeasures regarding shrinkage, all play into the reality that hospitals areepicenters of wasteful operations without a proper supply managementsystem.

## 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 analysisto understand how an event is unfolding, and reacting to it accordingly.
- It's the only way that critical healthcare resources can be delivered to theright people at the right time during emergencies and natural disasters.
- A major problem with hospital management systems is they don't provideaccess to the kind of real-time metrics that could improve response timesand 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

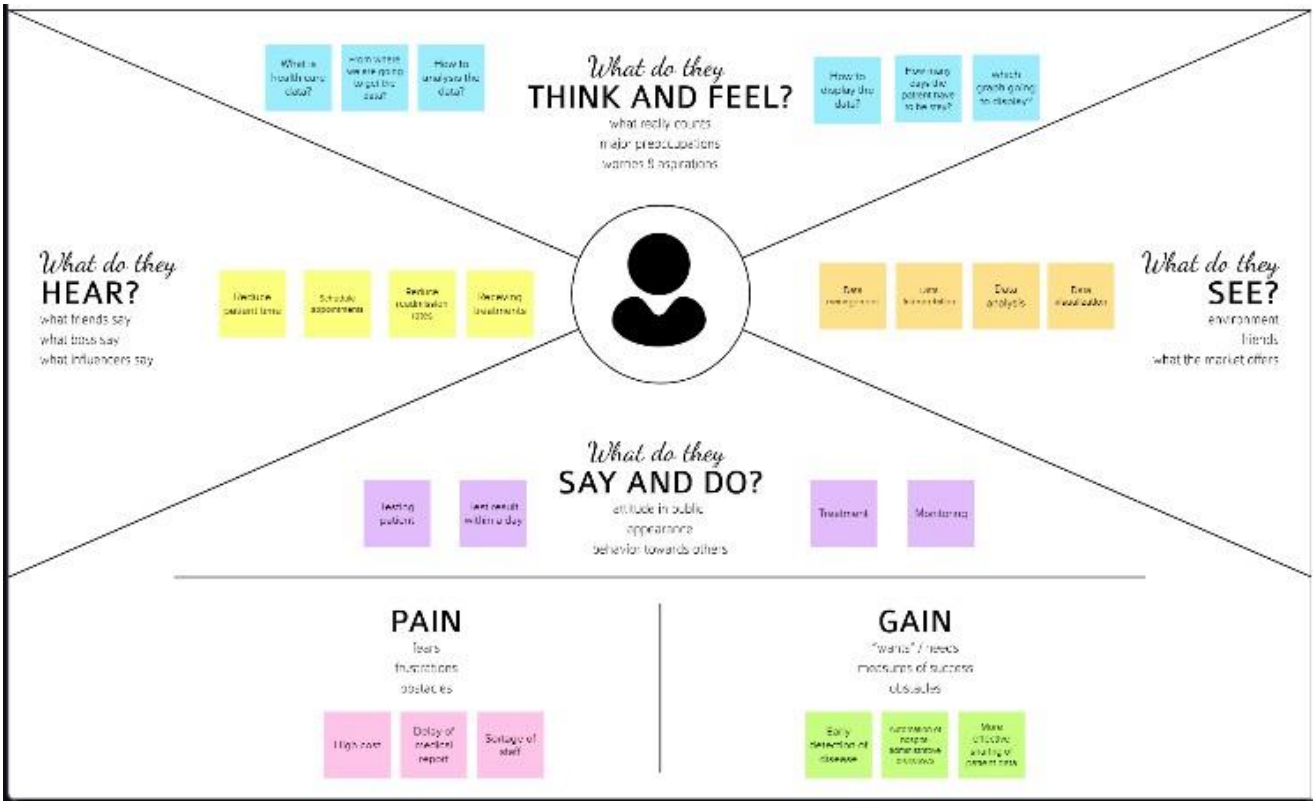

## 2.3 Problem Statement Definition

- 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

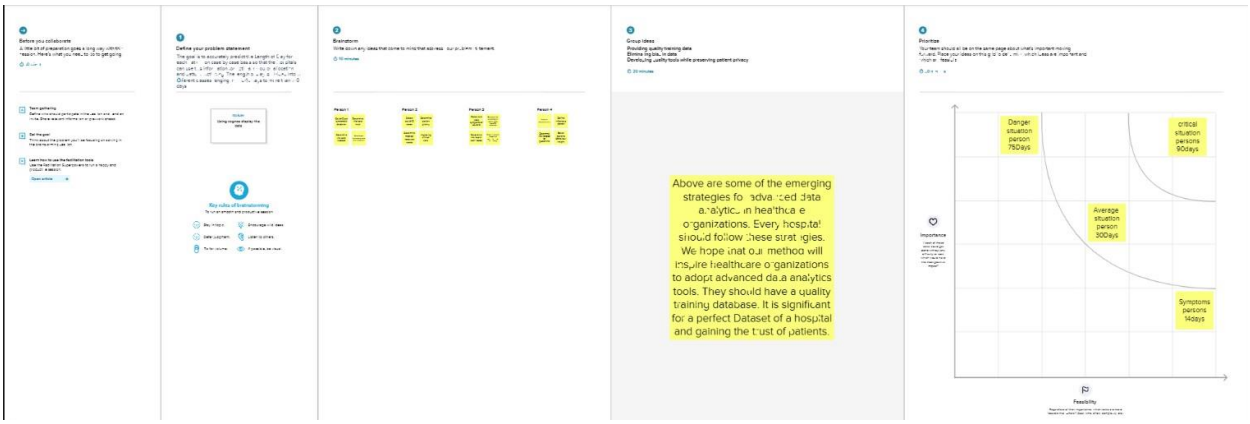
## 3.1 Empathy Map Canvas

- 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 ofempathy 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.



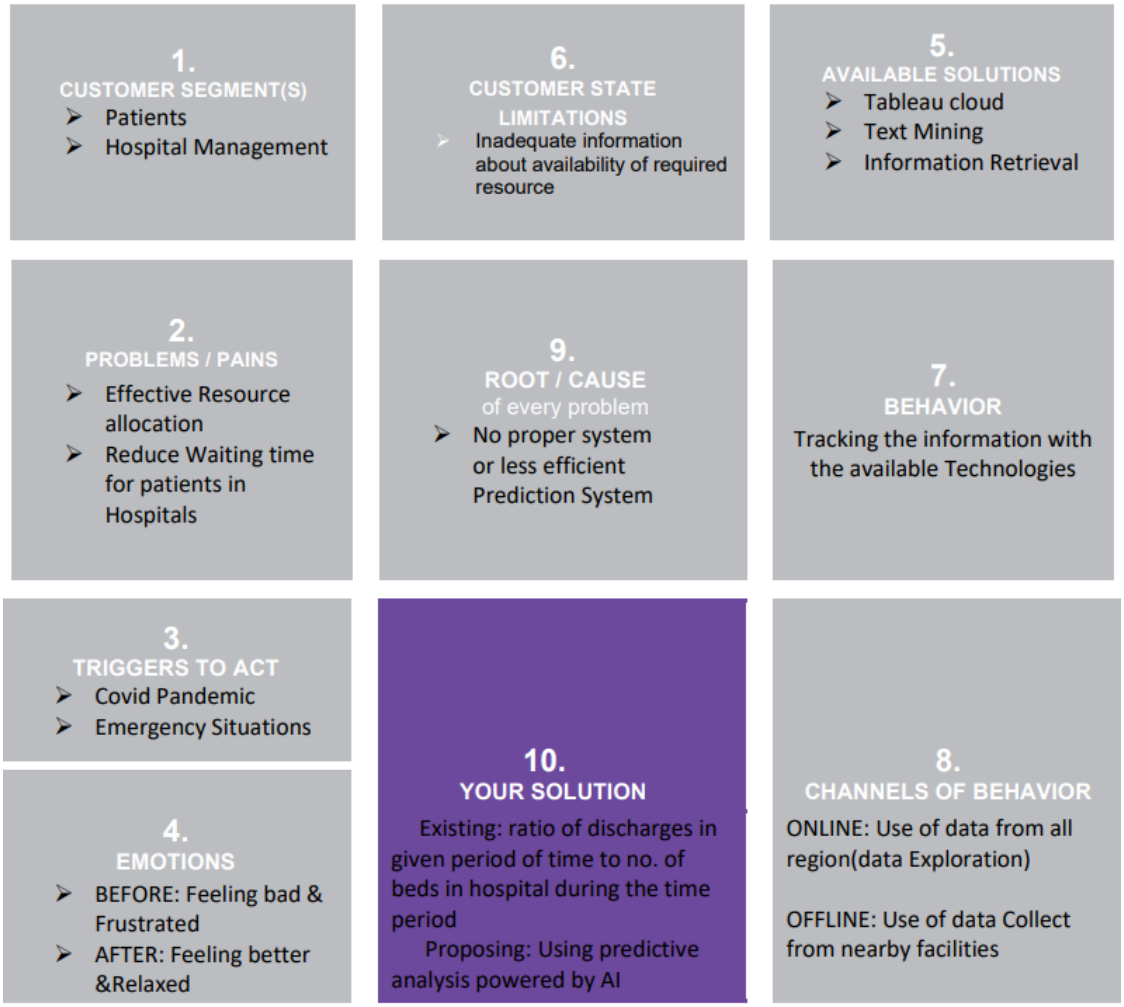

## 3.3 Proposed Solution

- Identify key hurdles to healthcare sustainability in india and propose a set ofsolutions that mutually benefit and the pharmaceutical industry Pragmaticliterature 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 numberof 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 sustainablevalue-based healthcare systems should be explored.
- VALUE ADDED SERVICES The pharmaceutical industry should move ‘beyond thepill’ 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 toachieve 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) | During the covid-19 pandemic, we have faced one of the difficult times of our life. Everyone seeks to survive from the great disaster. At the time of pandemic, noone get to know about which hospital has vacant beds(free beds) to admit themselves or others infected by covid. This situation made the death rate higher. |
| 2. | Idea / Solution description | Predictive analytics can create patient journey dashboards and disease trajectories that helps us to know about the patient's period of stay. It improves effective allocation of beds and other resources, treatment delivery, improves efficiencies, and so on. |
| 3. | Novelty / Uniqueness | Healthcare data frequently resides in several locations. The Collected data should be stored in central system(like centralized storage). This data becomes accessible and usable when it is combined into a single, central system, such as an enterprise data warehouse (EDW). Uniqueness of our project is that we can able to use data for different things such as which medicine is more effective and for understanding behavioural pattern of particular disease. |
| 4. | Social Impact / Customer Satisfaction | effective use of resource<br>Enhanced diagnosis<br>Improved Treatment<br>enhancing the overall quality of treatment and life of patients |
| 5. | Business Model (Revenue Model) | With the gathered data, redirecting the patients to particular hospital based on the vacancy, leading retailers used methods like market-basket analysis to discover insights about consumer purchase behaviour and used these insights to optimize the physical store experience, target relevant ads and streamline the supply chain, among other strategic initiatives. |
| 6. | Scalability of the Solution | A variety of institutions must store, evaluate, and take action on the massive amounts of data being produced by the health care sector as it expands quickly. India is a vast, culturally varied nation with a sizable population that is increasingly able to access centralised healthcare services. |

## *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 healthcareindustry'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, whendone 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 involvedin 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<br>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 |

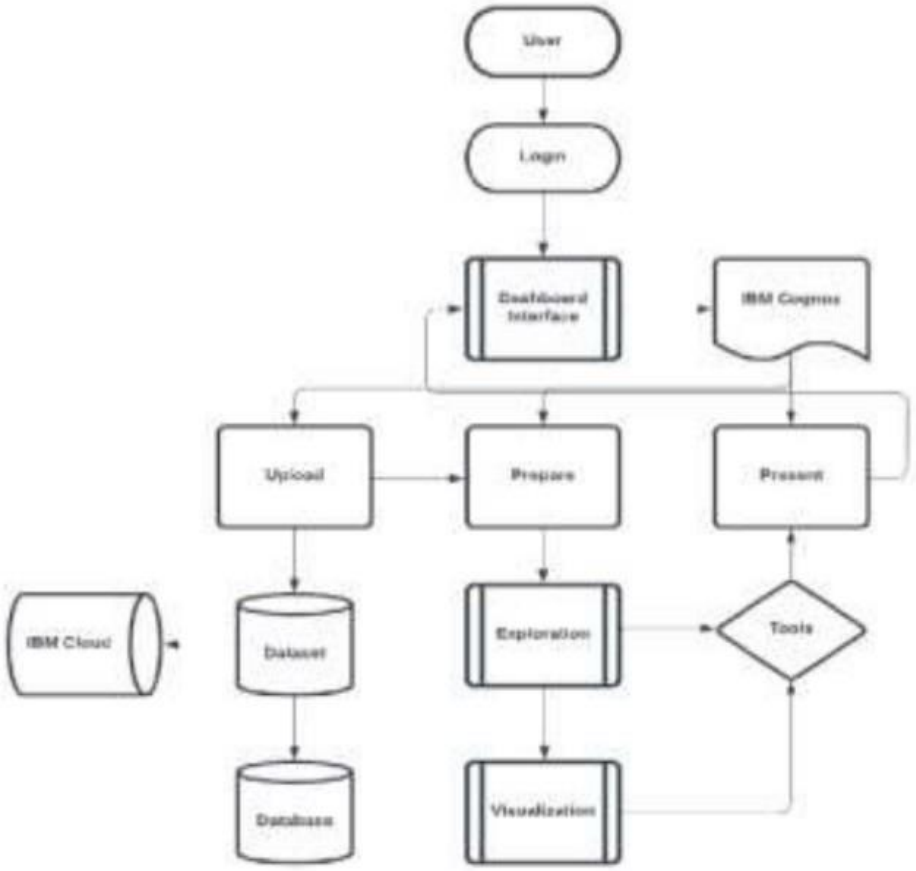
### 4.2 Non-Functional requirements

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

# 5. PROJECT DESIGN

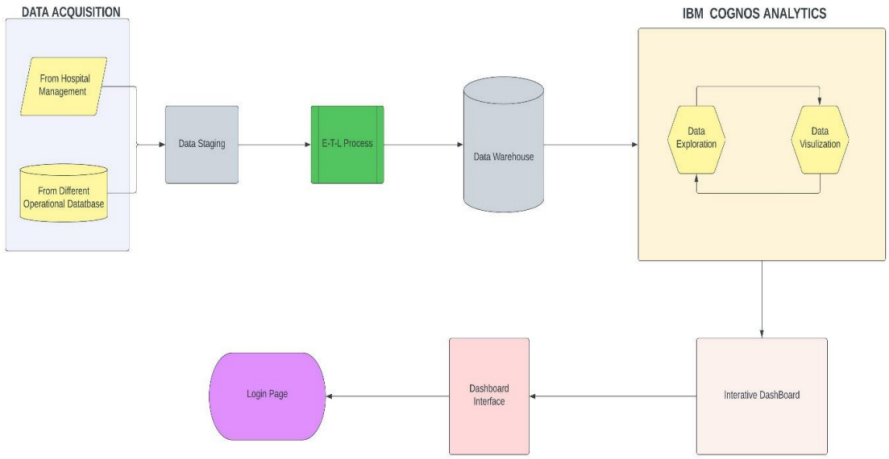
### 5.1 Data Flow Diagrams

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.

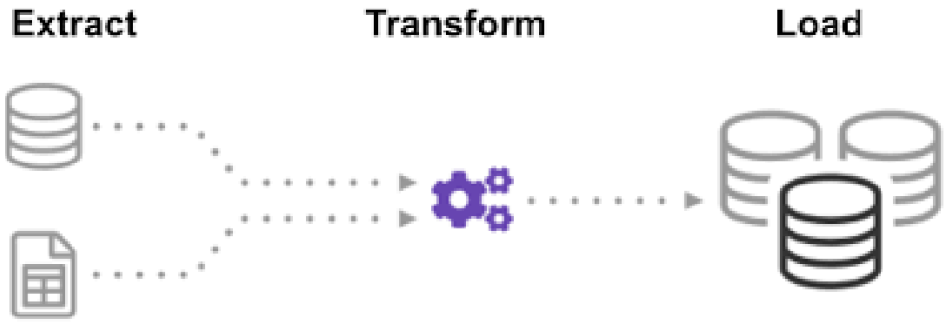


## 5.2 Solution & Technical Architecture

- Solution Architects are most similar to project managers, ensuring that all parties, including stakeholders, are on the same page and moving in the rightdirection at all stages.
- Technical architects manage all activities leading to the successful implementation ofa new application.




**ETL PROCESS (DATA INTEGRATION PROCESS):**



## 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 | 8 | 7 Days | 22 Oct 2022 | 28Oct 2022 | 28 OCT 2022 | 28 OCT 2022 |
| Sprint-2 | 8 | 8 Days | 29 Oct 2022 | 05 Nov 2022 | 05 NOV 2022 | 05 NOV 2022 |
| Sprint-3 | 5 | 3 Days | 06 Nov 2022 | 08 Nov 2022 | 03 NOV 2022 | 08 NOV 2022 |
| Sprint-4 | 5 | 4 Days | 09 Nov 2022 | 12 Nov 2022 | 12 NOV 2022 | 12 NOV 2022 |

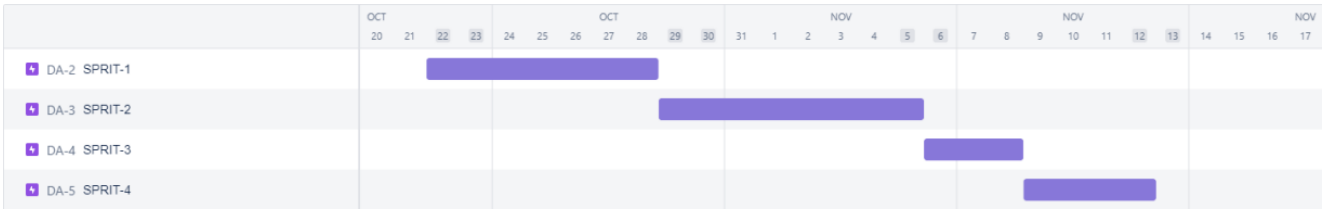
## 6.2 Sprint Delivery Schedule

| Sprint | Functional Requirement | User Story Number | User Story/Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint 1 | Analyse | USN-1 | As an admin, will analyze he given datase. (Data preprocessing) | 8 | High | Pradeep T |
| Sprint 2 | Predict | USN-2 | As an admin, will predict the length of stay (Prediction) | 8 | High | Mythreyee M |
| Sprint 3 | Visualization | USN-3 | As a user, can select the visualization type (Creating visualization) | 5 | Medium | Preethi Nikita Dung Dung |
| Sprint 4 | Dashboard | USN-1 | As a user. I can upload the datasets to the dashboard and view visualizations (Creating dashboard) | 5 | Medium | Sai Madhumita S S |

## *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—thewhy—behind both the goal and the plan for getting there.

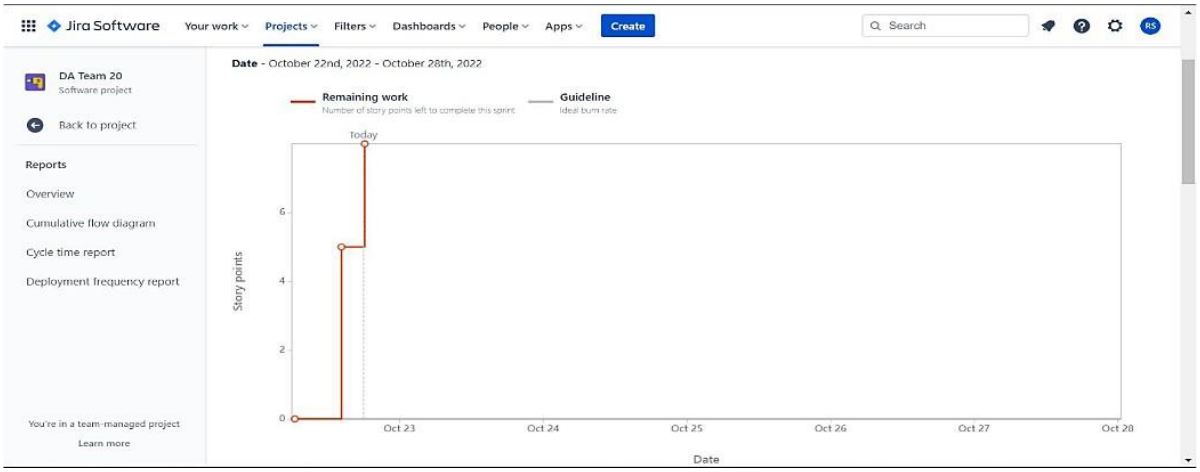



**Kanban Board:**

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




## 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

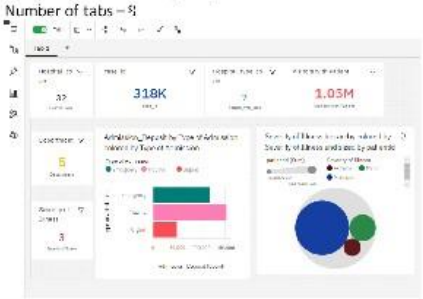
| Section | Total Cases | Not Tested | Fail | Pass |
|---|---|---|---|---|
| Print Engine | 9 | 0 | 0 | 9 |
| Client Application | 43 | 0 | 0 | 43 |
| Security | 1 | 0 | 0 | 1 |
| Outsource Shipping | 1 | 0 | 0 | 1 |
| Exception Reporting | 9 | 0 | 0 | 9 |
| Final Report Output | 10 | 0 | 0 | 10 |
|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

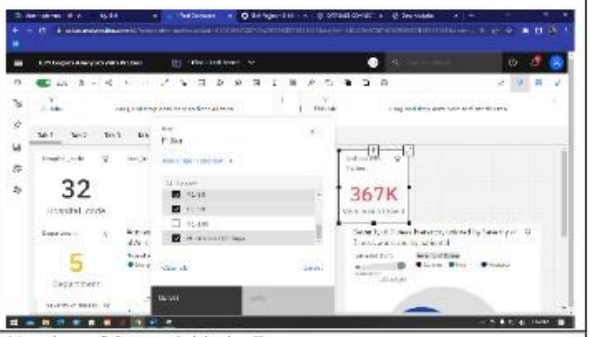
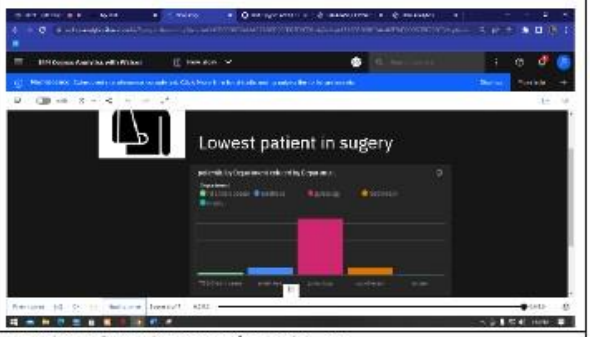
# 9. RESULTS

## 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<br>Number of tabs – 5<br>  |
| 2. | Data Responsiveness | Data's will dynamically changed and graph also changed.<br>  |
| 3. | Amount Data to Rendered (DB2 Metrics) | Number of rows read – 318438<br>Number of rows loaded – 318438<br>Number of rows rejected – 0<br>  |

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

| | | |
|---|---|---|
| | |  |

## 10. ADVANTAGES

- Improved research efforts Improved
- health outcomesObtain
- operational insightsImproved
- 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 manualtasks. 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 satisfactionData 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 haveonly increased after the Affordable Act came into being.

# 13. APPENDIX

## *Source Code*

## *Dashborad*

## *html*

```
<!
DO
CT
Y
PE
ht
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

```
<!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">
                <script
              src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></scrip
              t>
                <script
              src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js"></scr
              ipt>
              </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"><a href="#">Home</a></li>

                    <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 : PNT2022TMID09318 </b></i></h4></center>

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

    <tbody>
      <tr>
        <td>Team Leader</td>
        <td>Pradeep T</td>

      </tr>
      <tr>
        <td>Team member</td>
        <td>Mythreyee M</td>

      </tr>
      <tr>
        <td>Team member</td>
        <td>Preethi Nikita Dung Dung</td>

      </tr>
          <tr>
        <td>Team member</td>
        <td>Sai Madhumita S S</td>

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

## Report html

```
<!DOC
TYPE
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">
  <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">
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      <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://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

```
<!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">

  <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><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://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2Fstory%2FNew%2Bstory&amp;clo
seWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=view&amp;sceneI
d=model0000184574031b2_00000002&amp;sceneTime=0"
    width="1500" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
</div>


</body>

</html>
```

## GitHub link

https://github.com/IBM-EPBL/IBM-Project-37864-1660356832

## Project Demo Link

https://drive.google.com/file/d/1MK5KaaaG2b09JyCn8g5PYbggZZxVmHON/view?usp=sharing