Analytics of hospital health care data

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CHAPTER 1

INTRODUCTION

This project deals with the analytics for hospital's health   care data using data analytics. Data analytics (DA) is the process of examining data sets in order to trends and draw conclusions about the information they contain. Increasingly, data analytics is done with the aid of specialized systems and software.Data analytics technologies and techniques are widely used in commercial industries to enable organizations to make more informed business decisions.

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1.1 Project Overview:

Health care management is the planning, administration, and management of all health care systems, hospitals, and other medical facilities. Health care management roles are crucial to the overall operations of the health care system.

Covid-19 recently, one of the most neglected areas to concentrate on has come under scrutiny due to the pandemic: healthcare management.

While data science has many applications in healthcare administration, If one wants to increase the effectiveness of healthcare management in a hospital, patient length of stay is one crucial indicator to track and forecast. At the time of admission, this metric aids hospitals in identifying patients who are at high LOS-risk (patients who will stay longer). Once identified, patients at high risk for LOS can have their treatment plans improved to reduce LOS and reduce the risk of infection in staff or visitors. Additionally, prior awareness of LOS might help with planning logistics like room and bed allotment.

1.2 Purpose:

In healthcare, data analytics are crucial. According to the Harvard

Business School, it aids healthcare organisations in the evaluation and training of practitioners, the identification of scan

anomalies, and the forecasting of disease outbreaks.

Additionally, data analytics can improve business intelligence and cut expenses for healthcare firms. Hospital data analytics

can review patient records and any medication prescribed to identify improper dosages or prescriptions and notify doctors

and patients, reducing human error and hospital costs. As a result, better insights are gained, and healthcare professionals are

able to make wise decisions.

CHAPTER 2

LITERARTURE SURVEY

[1]   Data analytics for the sustainable use of resources in hospitals: Predicting the length of stay for patients with chronic

diseases 2020 Identifies variables related to patients' prior admissions as important factors in the prediction of LOS in

hospitals, thereby revising the current paradigm in which patients' medical histories are rarely considered for the prediction

of LOS. It uses Long Short-Term Memory (LSTM) and Convolutional

Neural Networks (CNN).

Advantages: 86 % and 91% accuracy for the COPD data set. 74 % and 85% accuracy for the pneumonia data set.

Disadvantages: The prediction of LOS in other diseases needed improvement. The optimal timespan for extracting patients'

historical information to obtain the best results in terms of both the predictions and time complexity of the computations

needed investigation.

[2]   Robust Length of Stay Prediction Model for Indoor Patients 2021. In Selected six Machine learning (ML) models

named: Multiple linear regression (MLR), Lasso regression (LR), Ridge regression (RR), Decision tree regression (DTR),

Extreme gradient boosting regression (XGBR), and Random Forest regression (RFR). The selected models' predictive

performance was checked using R square and Mean square error (MSE) as the performance evaluation criteria.

Advantages: Results revealed the superior predictive performance of the RFR model, both in terms of RS score (92%) and

MSE score (5), among all selected models. models. Exploratory data analysis (EDA) conclude that maximum stay was

between 0 to 5 days with the meantime.

Disadvantages: Need to involve more variables in the given dataset to build a more accurate model that could predict

hospital LOS more accurately.

[3]   Predicting length of stay in hospitals intensive care unit using general admission features A framework for predicting patient LOS in the ICU using different machine learning (ML) techniques are proposed. The ML techniques used in the proposed framework are Neural Networks (NN), Classification Trees (CT), Tree Bagger (TB),

Random Forest (RF), Fuzzy Logic (FL), Support Vector Machine (SVM), K-Nearest

Neighbour (KNN), Regression Tree (RT) and Naive Bayes (NB).

Advantages: The best prediction accuracy was achieved by fuzzy with accuracy reach 92%, while classification tree managed to achieve a prediction accuracy of 90% coming in the second place.

Disadvantages: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

[4]   Using Data Analytics to Improve Hospital Quality Performance Extracted data for 2,233,214 discharges in 2014 from 183 hospitals in the state. Found that 20.8% of the facilities were on the quality performance frontier—20.6% of the notfor-profit facilities and 21.4% of the other facilities.

Advantages: 79.2% of hospitals could improve their quality of care.

Disadvantages: As an upper bound, if all hospitals increased each quality factor performance to 100%, there would have been 11,722 (24.8%) fewer deaths, 17,840

(15.8%) fewer readmissions, and the statewide average length of stay would have been

0.71 days (13.5%) less.

[5]   Big Data analytics on Diabetic Retinopathy Study (DRS) on real-time data set identifying survival time and length of stay Using multivariate quantitative statistical method made observations on the effects of patients and hospital characteristics on diabetic in patients. For the given set of patients, observing the study has sufficient power >=0.795 and querying to identify the co-morbidities of diabetes and the behavior of patients among the types of diabetes. Chi-square, independent t-tests and ANOVA were used to detect the actual differences between the actual outcomes.

Advantages: The mean age of all patients was 63.72 (SD+- 13.33). Most of the secondary diagnosis were ranged from coronary atherosclerosis (,20%) to paroxysmal ventricular tachycardia(3.4%) which includes cardiogenic shock (1.4%) to hypotension (0.3%) .

Disadvantages: To put more Extensive effort into building these predictive models.

2.1 EXISTINGPROBLEM

- The already existing model istrained with minimal parameters

- Low accuracy in prediction

- No feature extractiondone

- High complexity

2.2 REFERENCES

[1] Data analytics for the sustainable use of resources in hospitals: Predicting the length of stay for patients with chronic diseases https://www.sciencedirect.com/science/article/pii/S0378720619301594 [2] Robust Length of Stay Prediction Model for Indoor Patients https://www.researchgate.net/publication/355174497_Robust_Length_of_Stay_Prediction_Mode l_for_Indoor_Patients

[3]   Predicting length of stay in hospitals intensive care unit using general admission features

https://www.sciencedirect.com/science/article/pii/S2090447921001349

[4]   Using Data Analytics to Improve Hospital Quality Performance

https://journals.lww.com/jhmonline/Fulltext/2020/08000/Using_Data_Analytics_to_Improve_Ho spital_Quality.9.aspx

[5]   Big Data analytics on Diabetic Retinopathy Study (DRS) on real-time data set identifying survival time and length of stay

https://www.sciencedirect.com/science/article/pii/S1877050916304926

2.3 PROBLEMSTATEMENT AND DEFINITION

- The aim is to accurately predictthe Length of Stay for each patienton 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.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHYMAP CANVAS
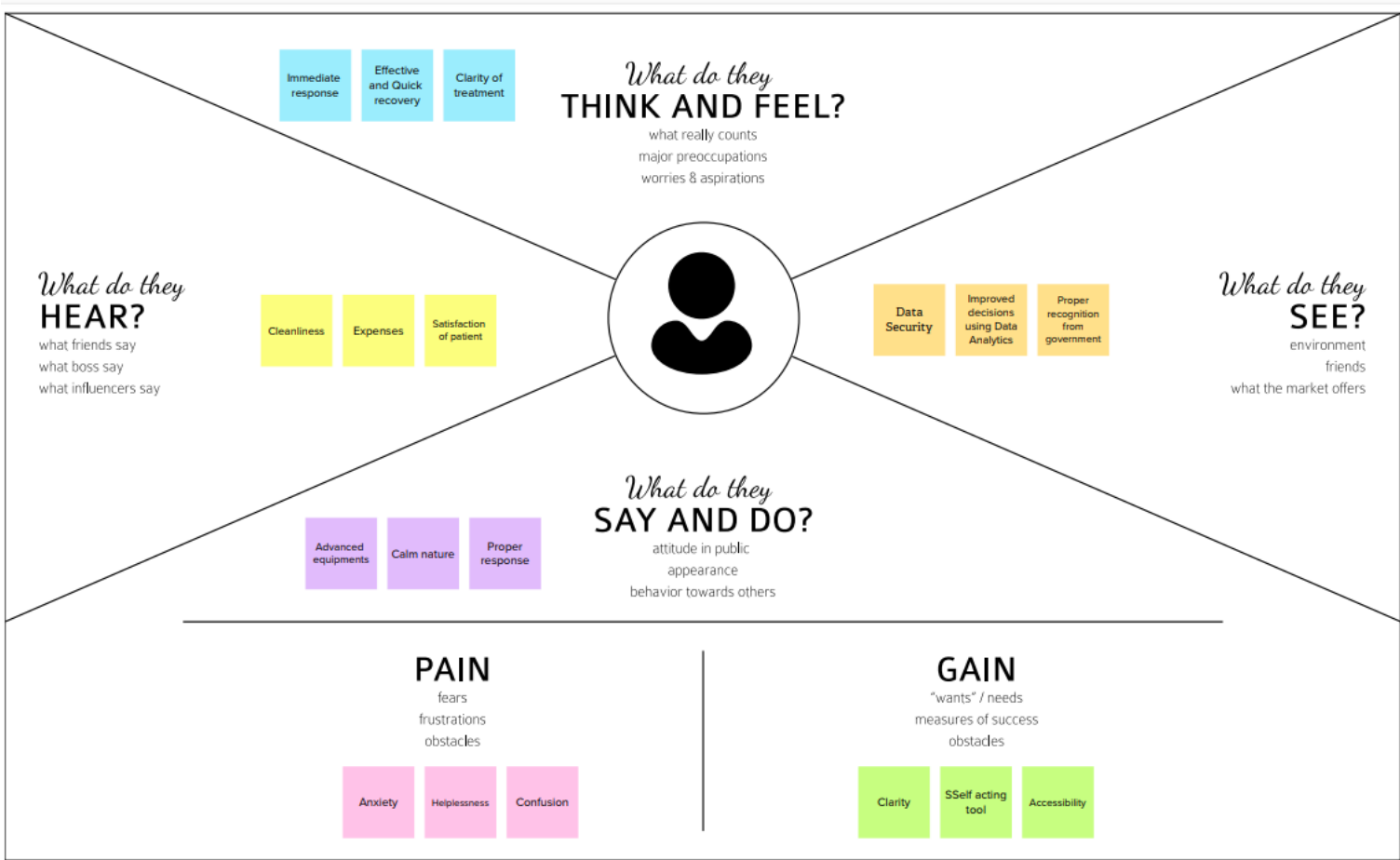
3.2 IDEATION & BRAINSTORMING

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

⏱ 10 minutes

MONISHA A

MATHARANI N

KRITHIKA THARANI A.S

KOUNALYA R.V

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go.
In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

⏱ 20 minutes

Visualization

- Selecting all the attributes for visualization
- Selecting the right kind of Visualization

Data Analysis

- Label all the visualization
- Combine and visualize the data
- Compare the results

Assements of metrics

- Checking whether the visualization are meeting the requirements
- Monitor the performance
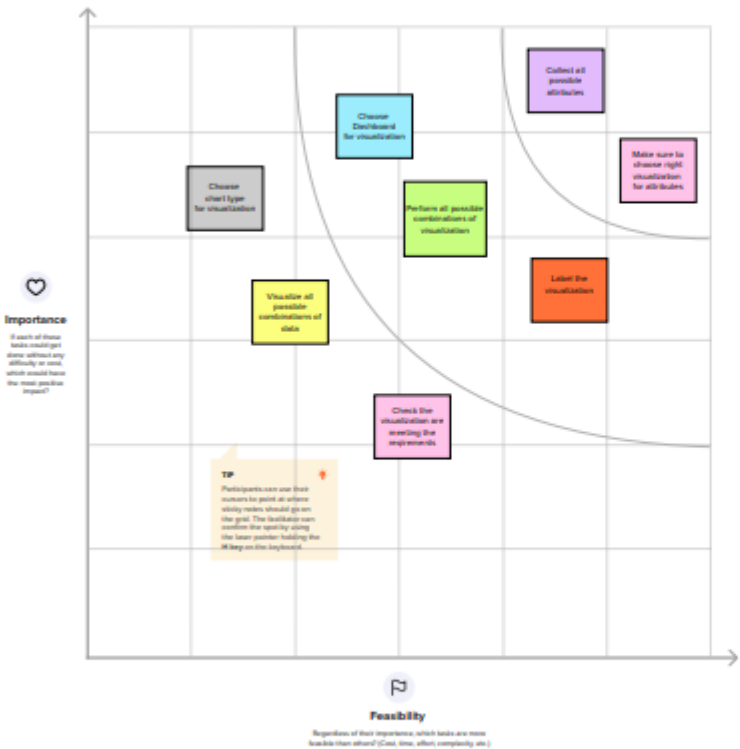
Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕐 20 minutes

Choose Dashboard for visualization

Collect all possible attributes

Make sure to choose right visualization for attributes

Choose chart type for visualization

Perform all possible combinations of visualization

Label the visualization

Visualize all possible combinations of data

Check the visualization are meeting the requirements

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Feasibility

Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

Share the mural
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

🔲 Share template feedback

3.3 PROPOSEDSOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To find the patient length of stay in hospital accurately
2.	Idea / Solution description	Collect the patient information from hospitals Analysis the details of patient's records Create Cognos -Analytics dashboard to visualize the data of patient
3.	Novelty / Uniqueness	The results will be precise and optimized resource allocation can be provided.
4.	Social Impact / Customer Satisfaction	Patient length of stay is important parameter to improve the resource allocation of that hospital's health care management will be enhanced. Patients will be more satisfied with the services.
5.	Business Model (Revenue Model)	Hospitals can charge for the accurate and timely services they provide for the patient from the time of admission.
6.	Scalability of the Solution	More detail-oriented patient information Length of stay of patient can be visualized in the dashboard Integrity of patient details will be maintained

3.4 PROBLEM SOLUTION FIT

CHAPTER -4

REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through official website Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via through call Confirmation via Email Confirmation via OTP
FR-3	Generation of Patient ID	For Each patient ,unique patient ID should be generated While registering
FR-4	Uploading Patient Details	Upload the Patients records
FR-5	Predict LOS	Predict the Length of Stay of each patient on case by case basis
FR-6	Generating Reports	Generates various reports of the patients
FR-7	Resource Allocation	Do Optimal Resource Allocation ,time scheduling and Better Functioning
FR-8	Maintenance	Maintain the Database of Patient Information and Health Data

Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	• User friendly system • Easy training and learning of the desired operation in the system • Easy to use

NFR-2	Security	• Patient data should not visible to all • Only admin can have the right to add or delete new user onto the system, and access other data • Only admins can modify the status of resources • The data should be protected from data hacking and being used for illegal purpose
NFR-3	Reliability	• Ability to change and develop, configure and service the system • Appropriate response time when encountering an error, minimizes the number and severity of system errors
NFR-4	Performance	• By streamlining and integrating multiple processes, system infuses much speed, agility, and efficiency • System boosts the performance and capabilities of a healthcare facility in helping to treat patients, and better functioning of Hospitals
NFR-5	Availability	• The application should be available through out the day • The application should be available in any type of situation(disaster)
NFR-6	Scalability	• Support future increases in throughput • System will be able to handle huge number of user request
NFR-7	Integrity	• The data should be consistent and complete

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAM
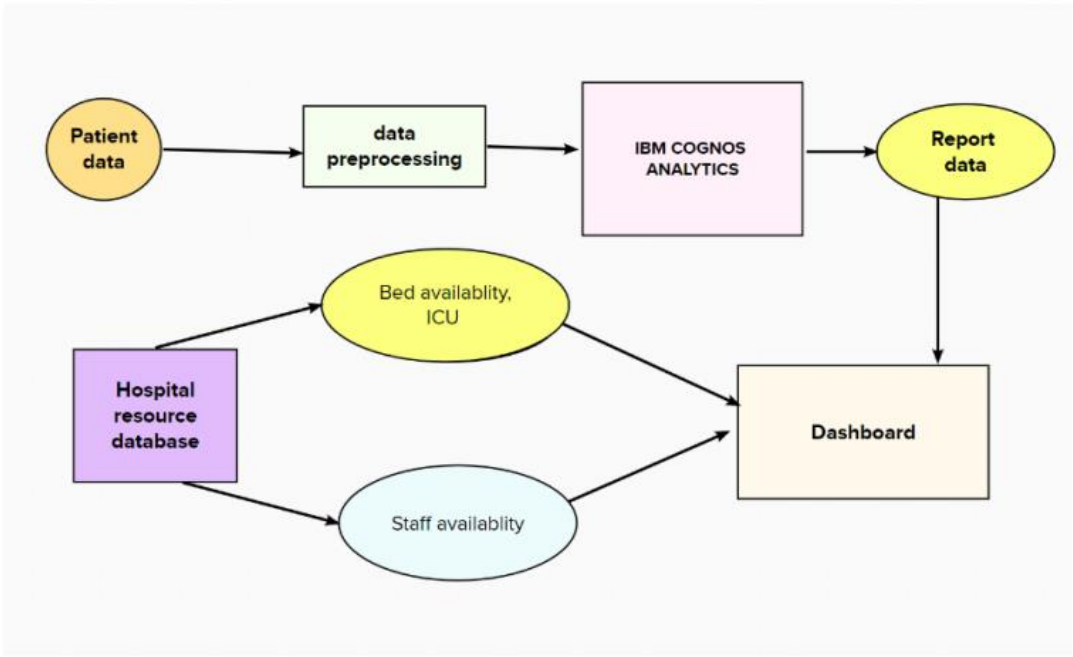
5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

Solution Architecture

```
┌─────────────────────────────┐
│  Download the Dataset for the│
│  given project file type(.csv)│
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Upload the dataset in the Cognos│
│         analytics           │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Use data modules to clean and│
│  connect data from multiple │
│         resources           │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Quickly find the unbiased  │
│  answers by identifying trends in│
│  data with data exploration │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  The output of the project is│
│  analyzing the Length Of Stay│
└─────────────────────────────┘
```
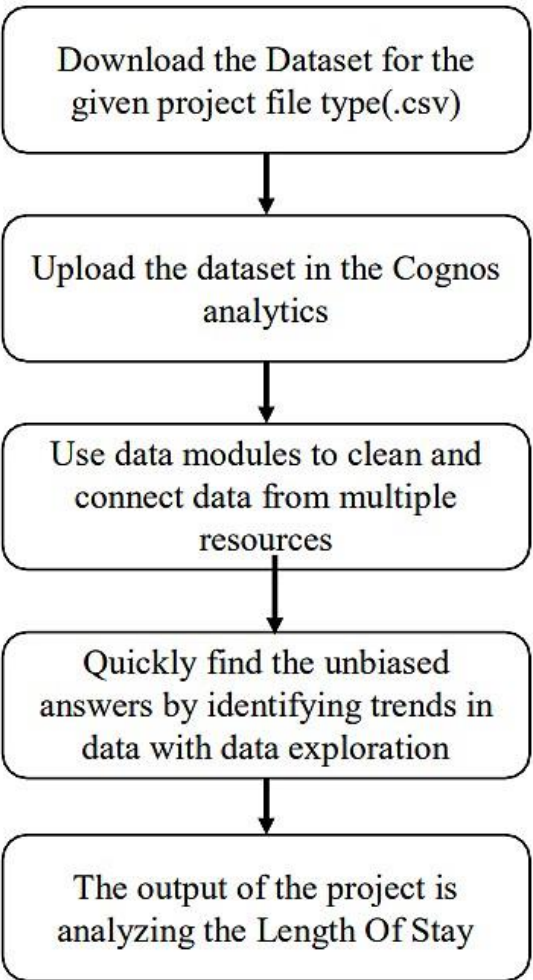
5.3 USER STORIES:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Patient(web user)	Registration	USN-1	User can register by Submitting their details	An account will be created, then they can access it	High	Sprint 1
Hospital staff	Maintaining the patient details in the application	USN-2	The official website enables the technical staffs in the hospital management to access patient data to execute any operation on it.	Only to the authorized person data is available	HIGH	Sprint-1
Patient Care Executive	Dashboard	USN-3	The dashboard provides the information about the severity of the disease, recovery period based on previous data and the current details of the data. This will help to find Length Of Stay	Give quick access for data in need of patient details.	Medium	Sprint-2
Administrator	Maintain database and records	USN-4	Keeps track of the patient details and updating data.	Provides Better Management	LOW	Sprint-3

CHAPTER 6

PROJECT PLANNING& SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement(Epic)	User Story Number	User Story /Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	A user can register for the application through email and password	10	High	Mathiarasi, Monisha, Krithika Tharani, Kousalya
	Data Uploading	USN-2	A user can upload the patient data into the IBM COGNOS analytics	10	High	Mathiarasi, Monisha, Krithikatharani, Kousalya
Sprint-2	Data Visualization	USN-3	A user can visualize the data with various tools	5	High	Mathiarasi, Monisha, Krithikatharani, Kousalya
	Dashboard	USN-4	A user can create a interactive dashboard from the data	10	High	Mathiarasi, Monisha, Krithikatharani, Kousalya
Sprint-3	Data Analysis with ML algorithm	USN-5	A user can apply algorithms on the dataset for predicting	20	High	Mathiarasi, Monisha, Krithikatharani, Kousalya
Sprint-4	Report	USN-6	A user can make a report from the analysis and dashboards	20	High	Mathiarasi, Monisha, Krithikatharani, Kousalya

6.3 REPORTS FROM JIRA:

BURNUP CHART

BURNDOWN CHART

CHAPTER -7
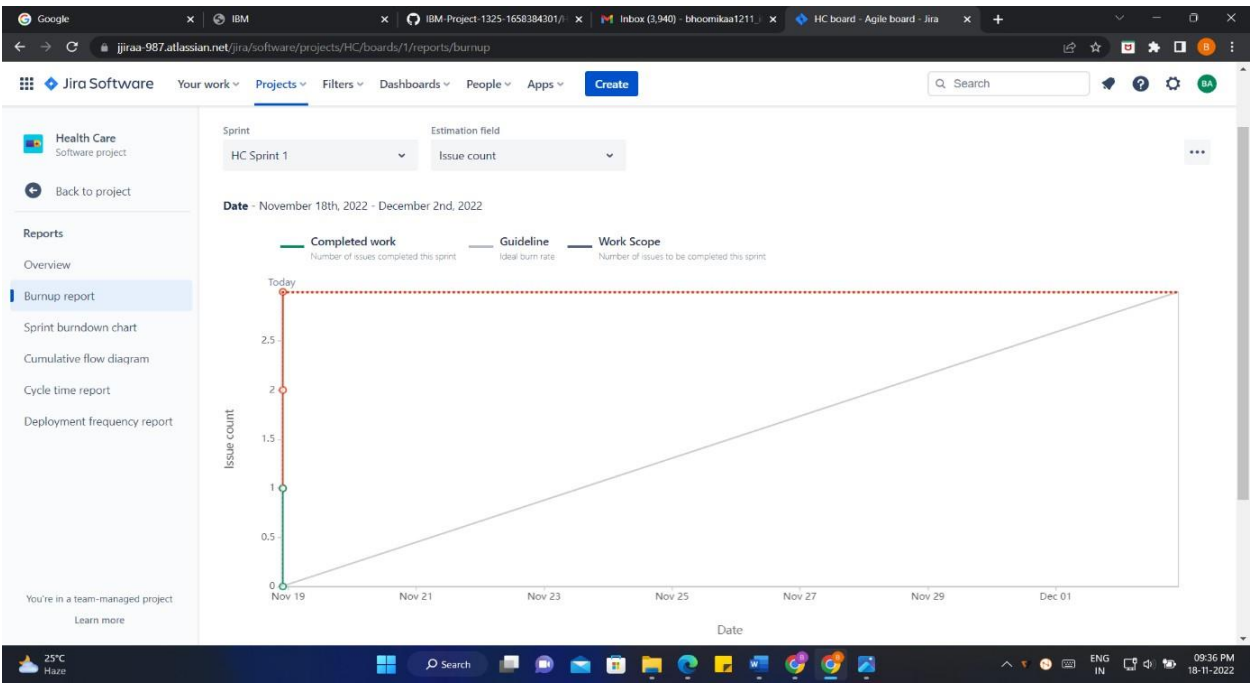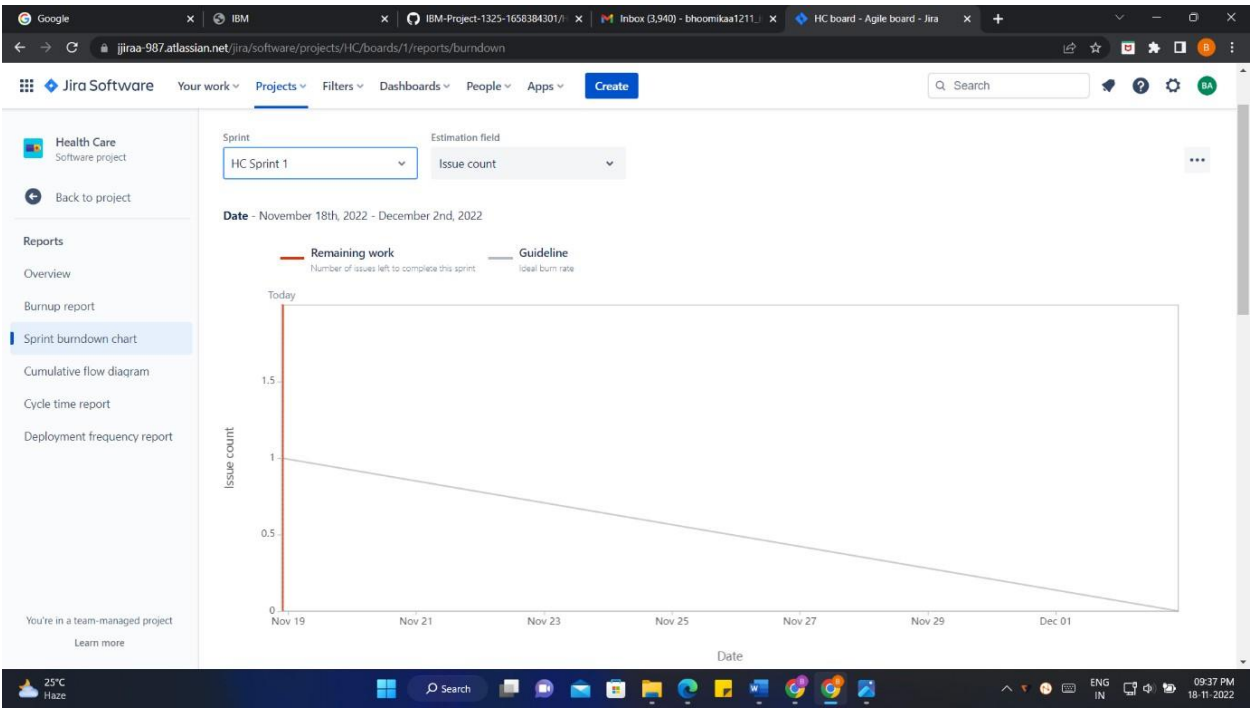
CODING AND SOLUTIONING

7.1 FEATURE 1

STORYBOARD CREATION:
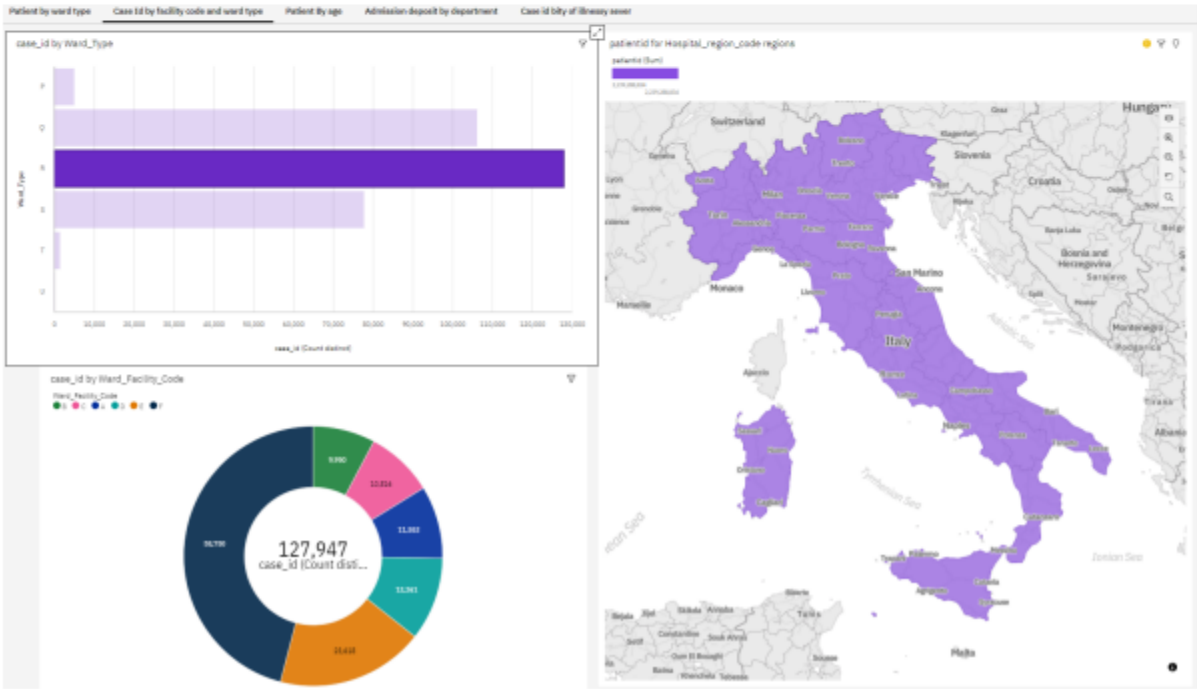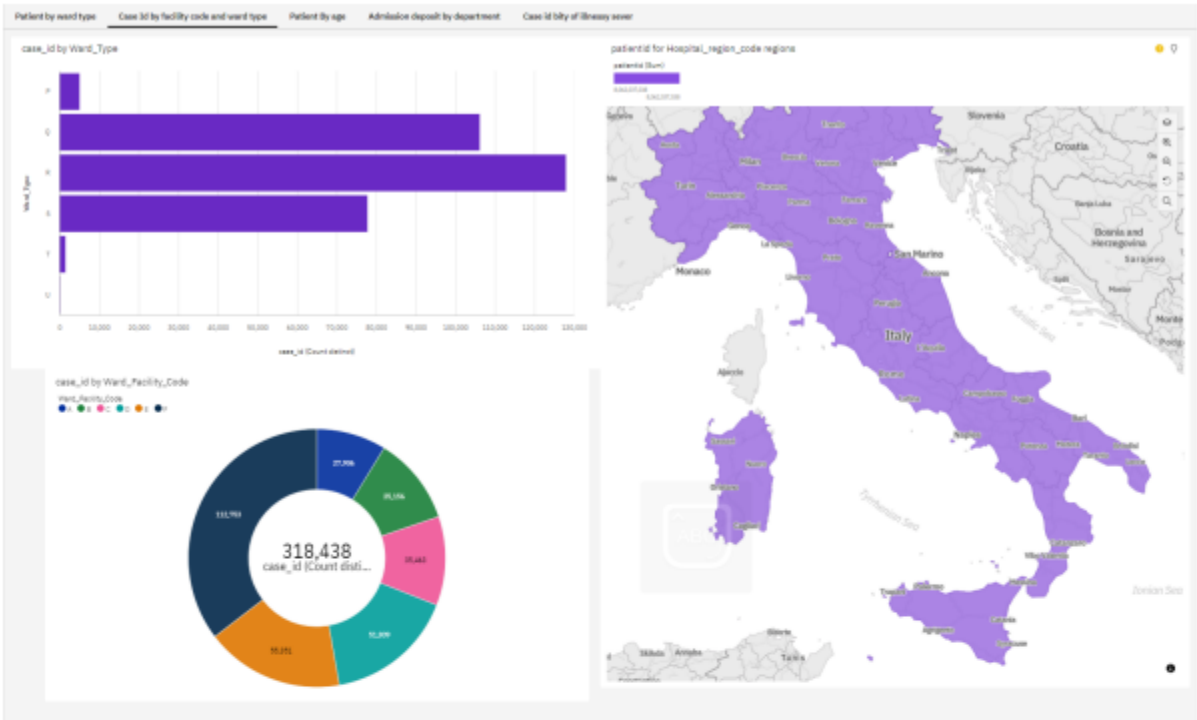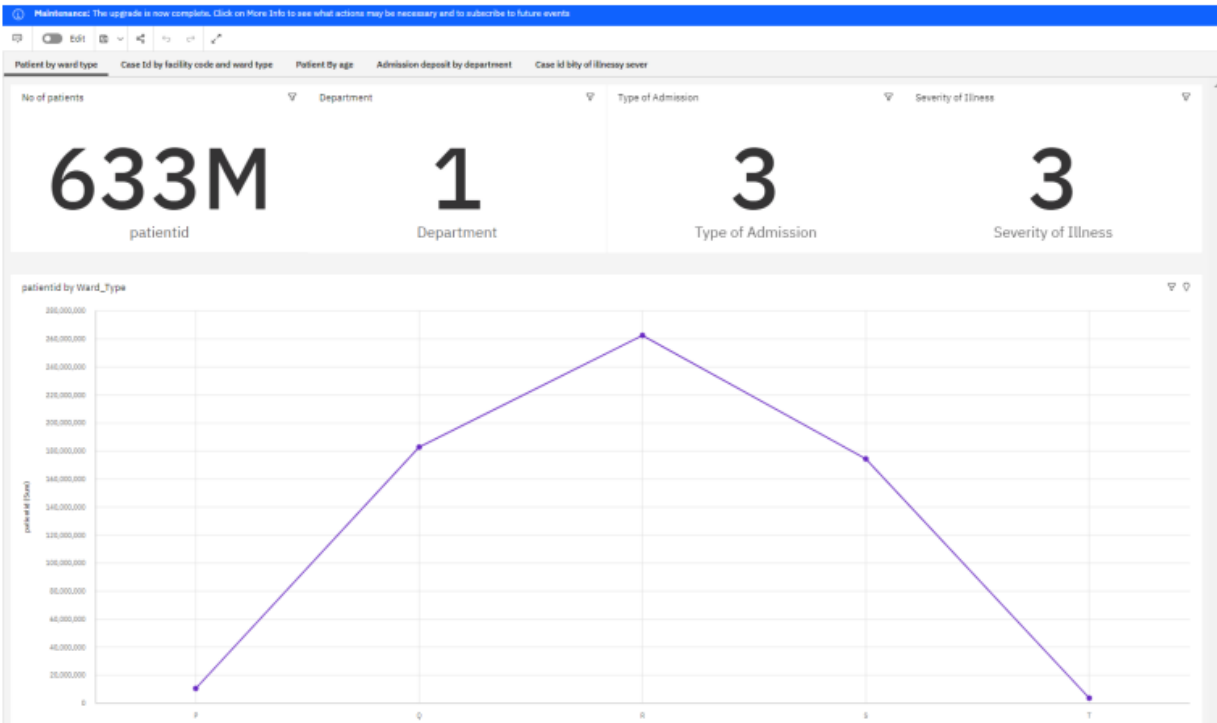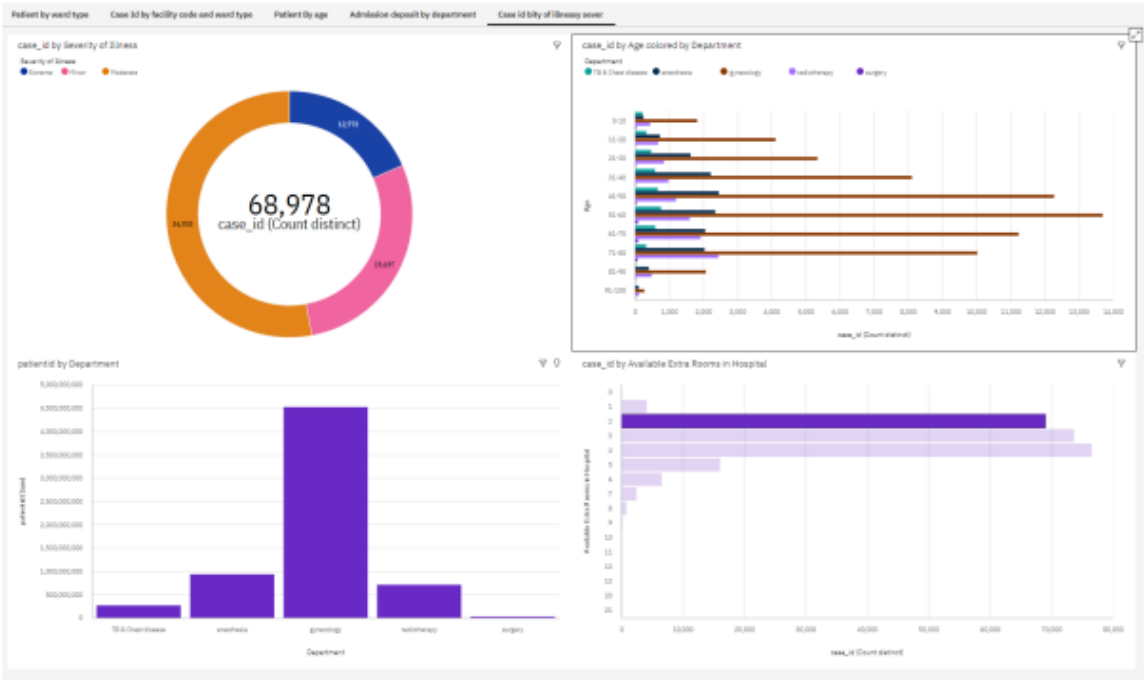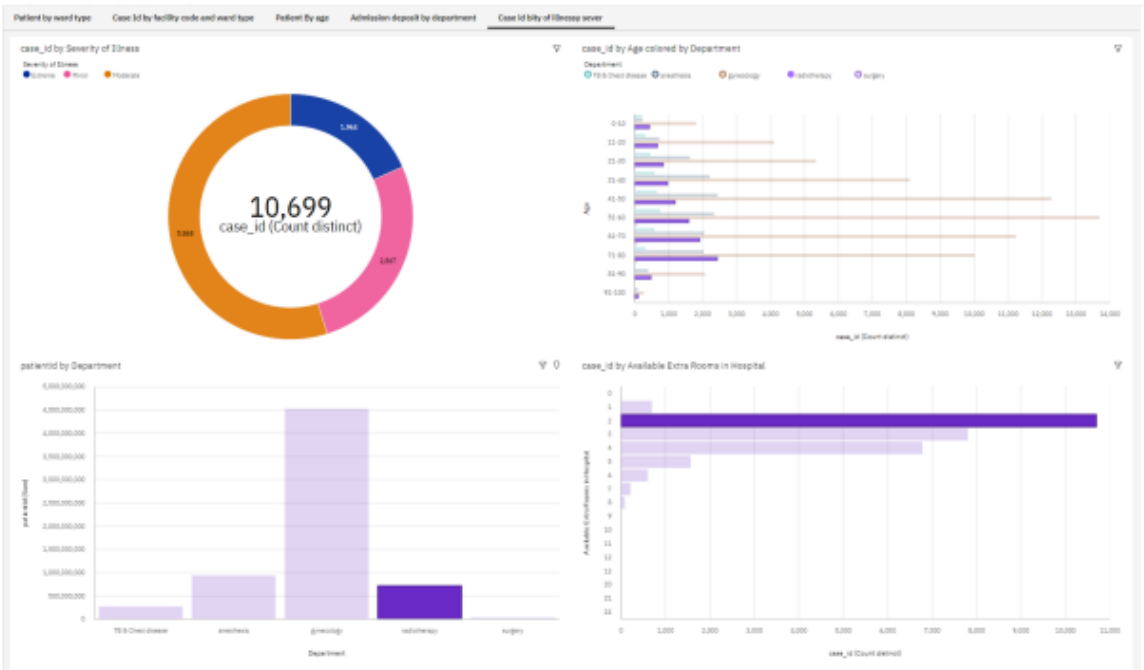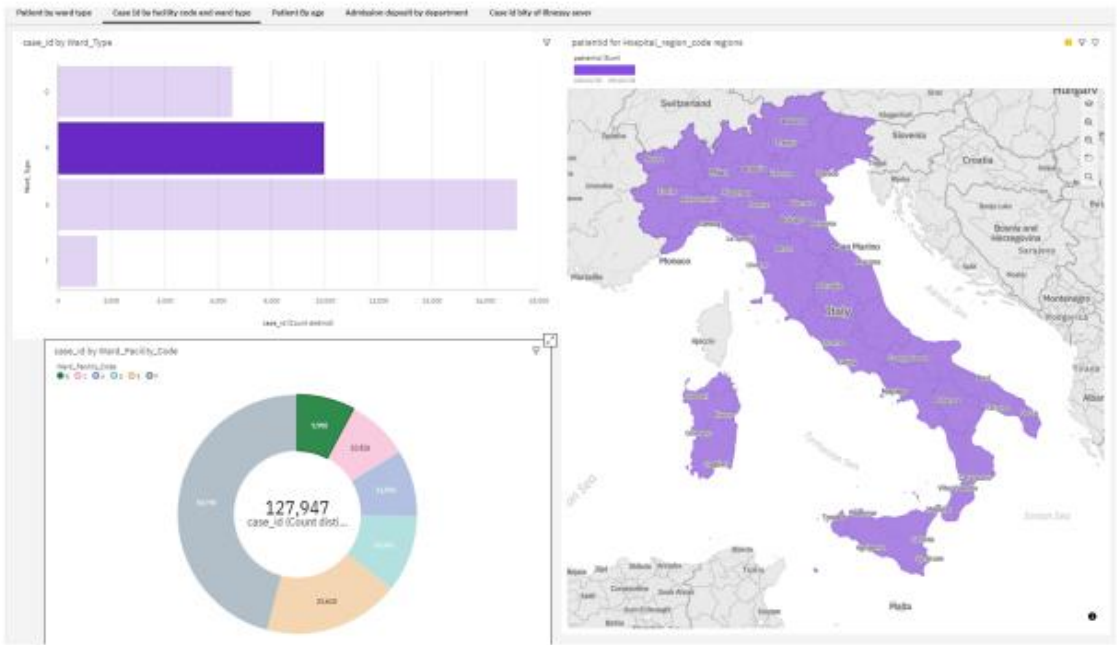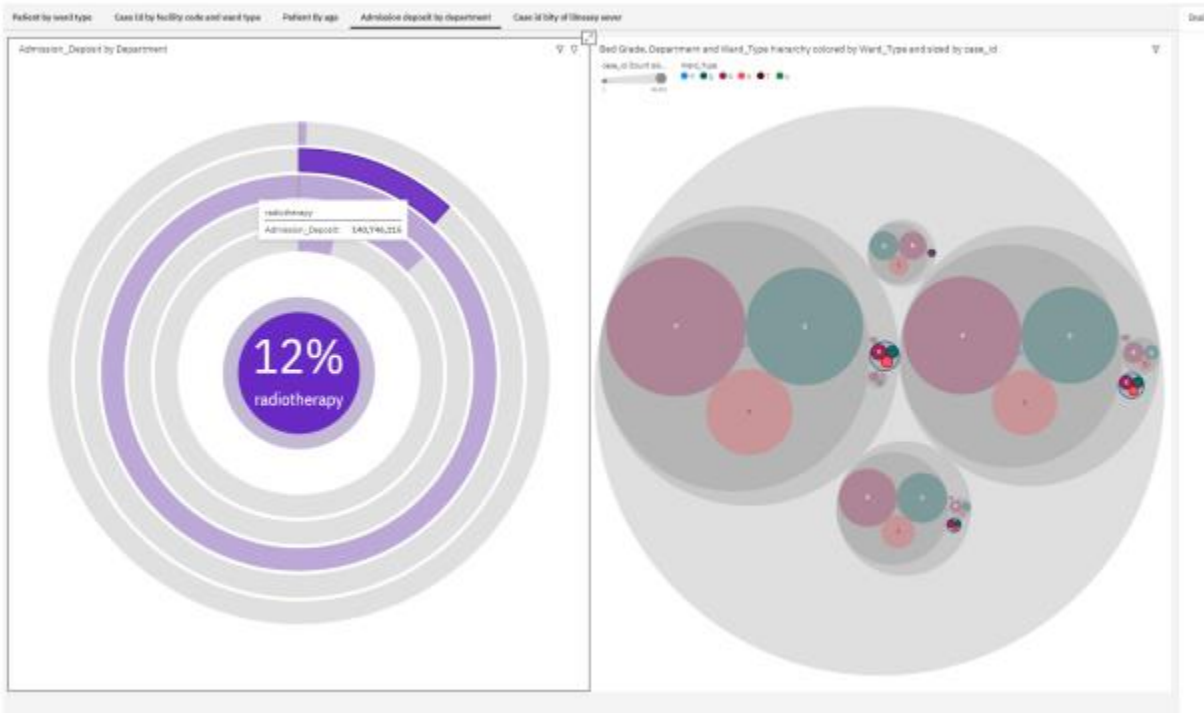
7.2 FEATURE 2-REPORT

❖ Bed Grade by Hospital Region Code
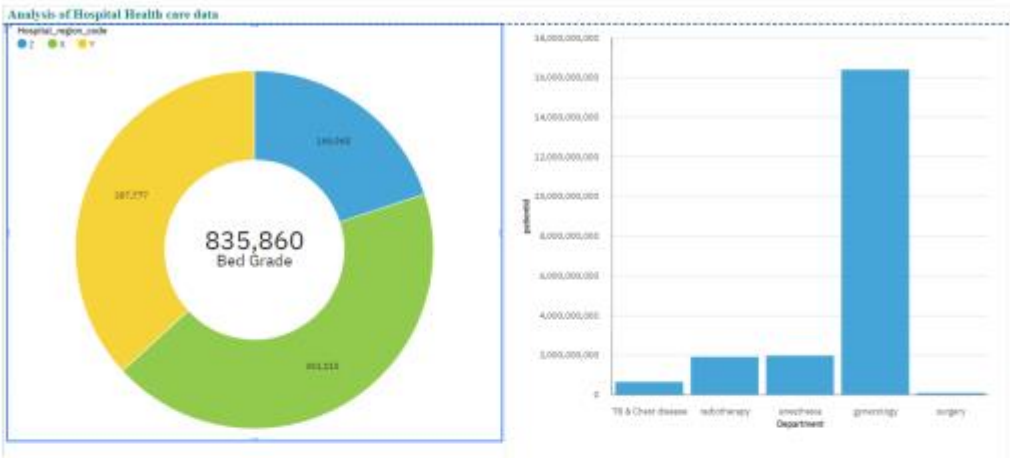
❖ Patient id by Department and Age by Patient ID
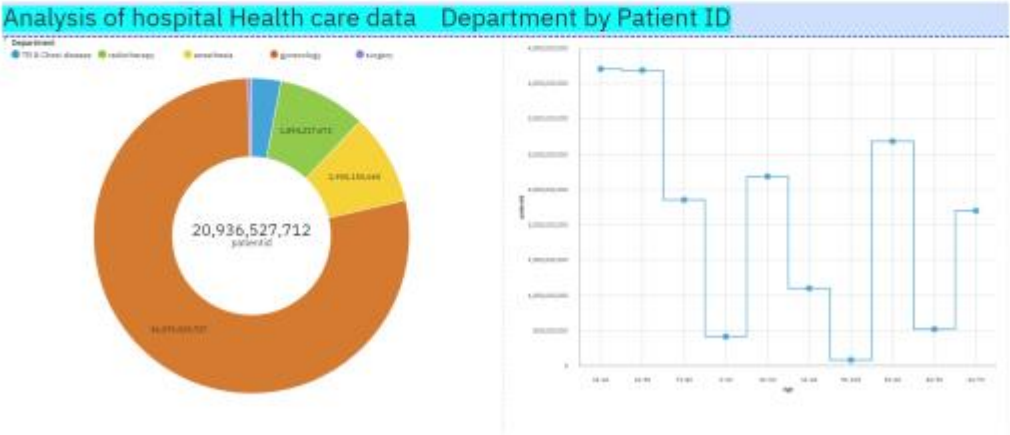
❖ Department wise Bed grade
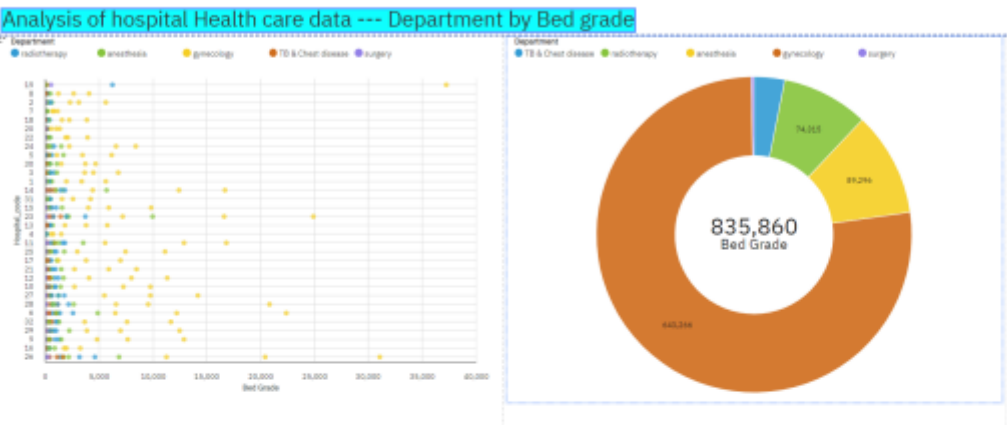
Patient id by ward type

❖ Severity of illness by available rooms in hospital
❖ City code hospital by Ward type

Analytics of hospital health care data
Story

Prev scene |◁ ⏸ ▷| Next scene   Scene 1 of 6   0:03.0 —————————●————— 0:05.0   ⚙

▽ All scenes   No filters have been applied.   ▽ This scene   No filters have been applied.

Bed grade by hospital type code

- showing bed grade by hospital region wise

Bed Grade by Hospital_type_code

Hospital_type_code
● g ● f ● d ● e ● c ● b ● a

53,775
67,073
370,637
121,830
184,215

Prev scene |◁ ⏸ ▷| Next scene   Scene 4 of 6   0:02.4 ——●————————— 0:10.0   ⚙

▽ All scenes   No filters have been applied.   ▽ This scene   No filters have been applied.

hospital code by ward type

City_Code_Hospital

11

City_Code_Hospital

Hospital_code by Ward_Type

Ward_Type
● U ● T ● P ● S ● Q ● R

Prev scene |◁ ⏸ ▷| Next scene   Scene 6 of 6   0:07.8 ——————————●—— 0:10.0   ⚙

03:49 PM

CHAPTER 8

TESTING

1. . 8TESTING.

- verify user is able to see home page

- verify user is able to see dashboard page

- verify user is able to naivigate 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 issuesof the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

2.Defect Analysis
This report showsthe 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	4	0	7
External	0	3	5	1	5
Fixed	13	4	3	18	32
Not Reproduced	0	1	0	1	2
Skipped	1	2	0	0	1
Won't Fix	0	5	2	1	8
Totals	23	14	13	26	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	6	0	0	6
Client Application	51	0	0	51
Security	1	0	0	1
Outsource Shipping	3	0	0	3
Exception Reporting	6	0	0	6
Final Report Output	2	0	0	2
Version Control	1	0	0	1

CHAPTER 9

RESULTS

9.1 PERFORMANCE METRICS

```
[ ] sns.barplot(x= ['K-Nearest Neighbor','Decision tree','Random Forest'],y= [acc_knn, acc_decision_tree,acc_random_forest])
```

<matplotlib.axes._subplots.AxesSubplot at 0x7fd7905332d0>
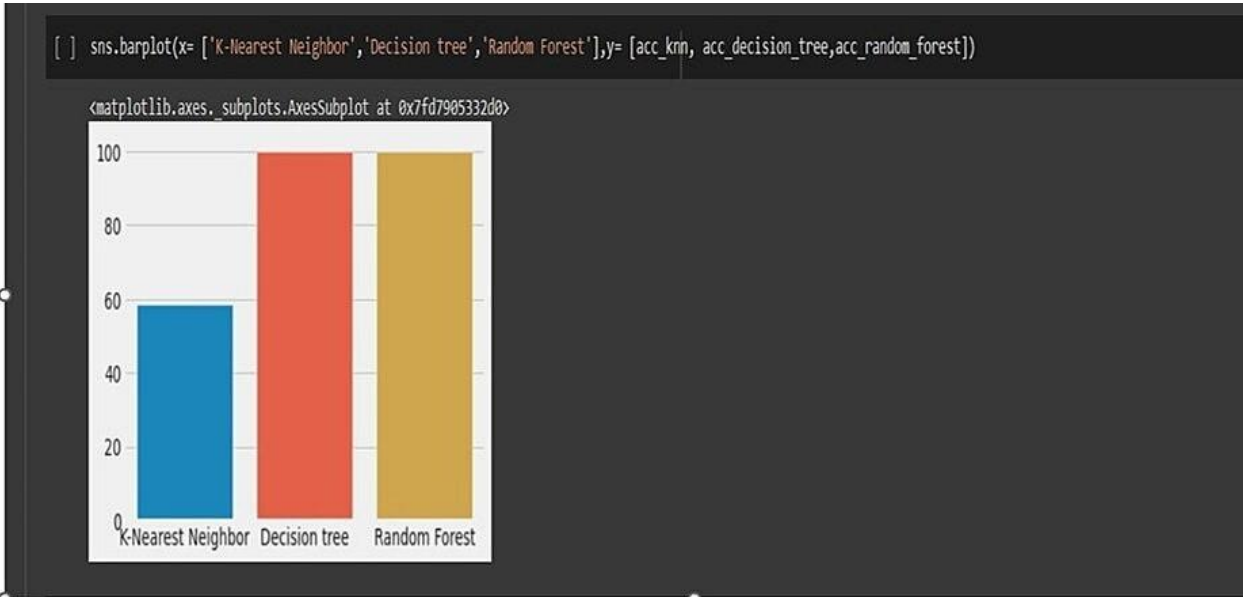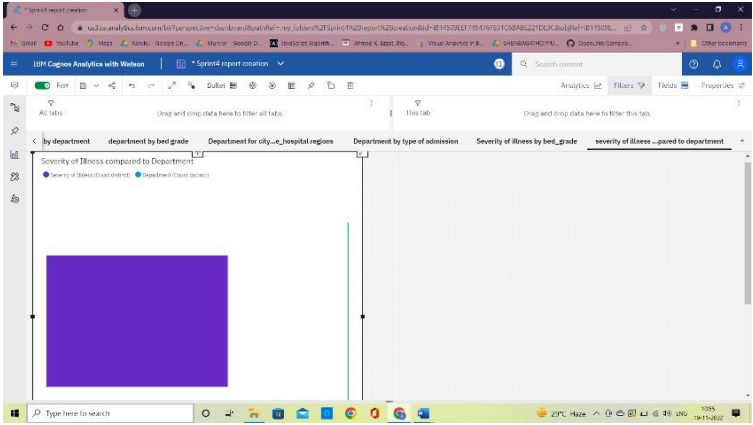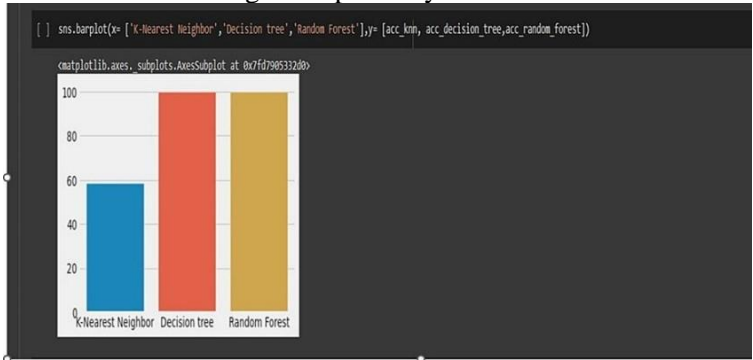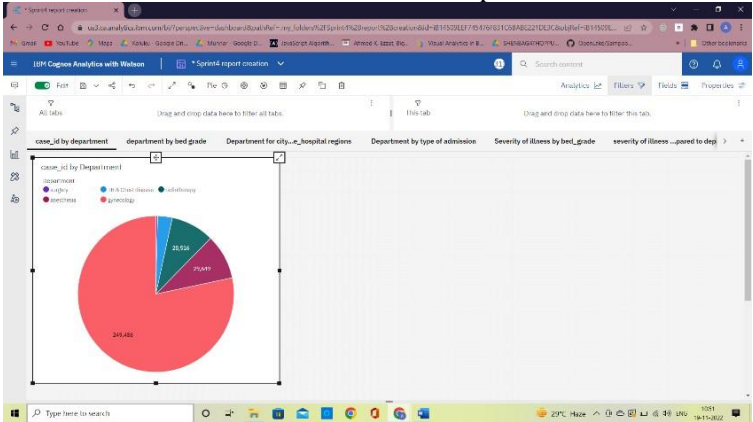
Model Performance Tes ng:

Project team shall fill the following informa on in model performance tes ng template.

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	Number of Visuliza ons / Graphs – 24 No of tabs- 8
2.	Data Responsiveness	Data along with their respec ve graph will dynamically change
3.	Amount Data to Rendered (DB2 Metrics)	Number of rows read-318438 Number of rows loaded-318438 Number of rows rejected-0

4.	U liza on of Data Filters	We created filters for Dashboards
5.	Effec ve User Story	No of Scene Added -6 Anima ons are perfectly displayed Images are perfectly rendered.
6.	Descrip ve Reports	No of Visuliza ons / Graphs – 6

CHAPTER 10

ADVANTAGE AND DISADVANTAGES

ADVANTAGES:

- Cost-effective use of technology

- Improved project management

- Sustaining the improvements in the result

- Boosting hospital capacity

- Enhance the qualityand efficiency of healthcare

- benefit areas like emergency preparation, charting, administration, compliance, and financial management.

- Analysing clinical data to improvemedical research

- Using patient data to improve health outcomes

- Gaining operational insights from healthcareprovider data

- Improved staffing throughhealth business management analytics

- Early detection of disease.

- Prevention of unnecessary doctor's visits.

- Discovery of new drugs.

- More accurate calculation of health insurancerates.

- More effective sharing of patient data

DISADVANTAGES:

REPLACING MEDICAL PERSONNEL:

Application of technology in every sphere of human life is improving the way things are done. These technologies are are also posing some threat to world of works. Robotics are replacing human labour.

DATA SAFETY:

Data security is another challenge in applying big data in healthcare. Big data storage is usually targets of hackers. This endangers the safety of medical data. Healthcare organisations are very much concerned about the safety of patients' sensitivepersonal data. For this, all healthcare applications must meet the requirement for data security and be HIPAA compliant before they can be deployed for healthcare services.

PRIVACY:

One of the major drawbacks in the application of big data in healthcare industry   is the issue of lack of privacy. Application of big data technologies involves monitoring of patient's data, tracking of medical inventoryand assets, organizing collected data, and visualization of data on the dashboard and the reports. So visualization of sensitive medical data especially that of the patients creates negative impression of big data as it violets privacy

MAN POWER:

Applying big data solutions in healthcare requires special skills, and such kills are scarce. Handling of big data requires the combination of medical, technological and statistical knowledge

CHAPTER 11

CONCLUSION

The impact of data analytics in healthcare has already made a substantial difference in the ability of healthcare providers to offer patients high-quality care in an efficient, cost-effective manner. However, the role of data analytics in improving patientoutcomes and healthcare processes continues to grow and expand as more types of data become available and new tools are developed that make the results of the analytics clear and easy for healthcare professionals to access.Realizing the potential of data analytics to transform the healthcare industry begins by understanding how the technology can be applied to address healthcare providers' challenges, including staff recruitment and utilization, operational efficiencies, and enhanced patientexperiences. Patient-centered healthcare depends on knowing what patients want and need. Data analytics holds the key to unlockingthis vital information.

CHAPTER 12

Web pages Code

```html
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="utf-8">
  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>IBM NallaiyaThiran Project</title>
  <meta content="" name="description">
  <meta content="" name="keywords">

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

  <!-- Google Fonts -->
  <link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Raleway:300,
300i,400,400i,600,600i,700,700i"
    rel="stylesheet">

  <!-- Vendor CSS Files -->
  <link href="assets/vendor/aos/aos.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
  <link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
  <link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
  <link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
  <link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">

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

  <!-- =======================================================
  * Template Name: Ninestars - v4.9.1
  * Template URL: https://bootstrapmade.com/ninestars-free-bootstrap-3-theme-for-creative/
  * Author: BootstrapMade.com
  * License: https://bootstrapmade.com/license/
  ======================================================== -->
</head>

<body>

  <!-- ======= Header ======= -->
  <header id="header" class="fixed-top d-flex align-items-center">
    <div class="container d-flex align-items-center justify-content-between">

      <div class="logo">
        <h1 class="text-light"><a href="index.html"><span>IBM Project</span></a></h1>
        <!-- Uncomment below if you prefer to use an image logo -->
        <!-- <a href="index.html"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->
      </div>

      <nav id="navbar" class="navbar">
        <ul>
          <li><a class="nav-link scrollto active" href="#hero">Home</a></li>
          <li><a class="nav-link scrollto" href="#about">About</a></li>
          <li><a class="nav-link scrollto" href="#dashboard">Dashboard</a></li>
          <li><a class="nav-link scrollto" href="#report">Report</a></li>
          <li><a class="nav-link scrollto" href="#story">Story</a></li>
          <li><a class="nav-link scrollto" href="#team">Team</a></li>

          <li><a class="nav-link scrollto" href="#details">Details</a></li>
          <li><a class="getstarted scrollto" href="#about">Get Started</a></li>
        </ul>
        <i class="bi bi-list mobile-nav-toggle"></i>
      </nav><!-- .navbar -->

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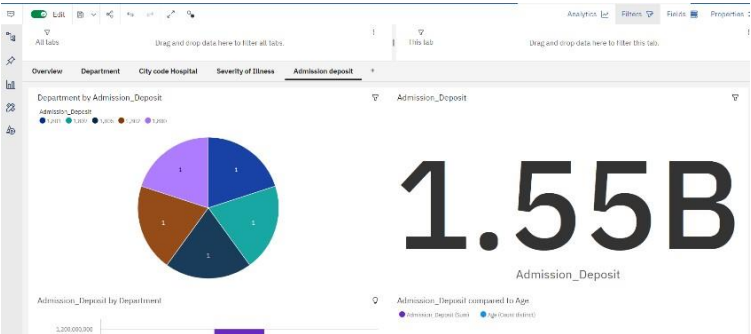
```html
      </header><!-- End Header -->

      <!-- ======= Hero Section ======= -->
      <section id="hero" class="d-flex align-items-center">

        <div class="container">
          <div class="row gy-4">
            <div class="col-lg-6 order-2 order-lg-1 d-flex flex-column justify-content-center">
              <h1>Analytics For Hospitals' Health-Care Data</h1>
              <h2>Finding the Length of Stay of Patient</h2>
              <div>
                <a href="#about" class="btn-get-started scrollto">Get Started</a>
              </div>
            </div>
            <div class="col-lg-6 order-1 order-lg-2 hero-img">
              <img src="assets/img/hero-img.svg" class="img-fluid animated" alt="">
            </div>
          </div>
        </div>

      </section><!-- End Hero -->

      <div id="main">

        <!-- ======= About Section ======= -->
        <section id="about" class="about">
          <div class="container">

            <div class="row justify-content-between">
              <div class="col-lg-5 d-flex align-items-center justify-content-center about-img">
                <img src="assets/img/about-img.svg" class="img-fluid" alt="" data-aos="zoom-in">
              </div>
              <div class="col-lg-6 pt-5 pt-lg-0">
                <h3 data-aos="fade-up">Background of the project</h3>
                <p data-aos="fade-up" data-aos-delay="100">

                </p>
                <div class="row">
                  <div class="col" data-aos="fade-up" data-aos-delay="100">
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.
                  </div>
                </div>
              </div>
            </div>

          </div>
        </section><!-- End About Section -->
        <div class="container" data-aos="fade-up" id="dashboard">
          <div class="dashboard " class="services section-bg">
            <div class="section-title">
              <h2>Dashboard</h2>
              <p>Interactive Dashboard</p>
            </div>
            <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FIBM%2Bproject%
2BData%2BAnalytics%2FHealth%2Bcare%2Bdashborad&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui
_navbar=false&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001848e257f7
4_00000000"
              width="900" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
              allowfullscreen=""></iframe>
          </div>
```

```html
                                        </div>
                    <div class="container" data-aos="fade-up" id="report">
                     <div class="dashboard " class="services section-bg">
                                <div class="section-title">
                                      <h2>Report</h2>
                                  <p>Interactive report</p>
                                        </div>
                                        <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FIBM%2Bproject%2BData%2BAnalytics%2FHealt
hcare%2Breport&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embe
                       dded&amp;action=run&amp;format=HTML&amp;prompt=false"
          width="900" height="1000" frameborder="0" gesture="media" allow="encrypted-media"
                                  allowfullscreen=""></iframe>
                                        </div>
                                        </div>

                    <div class="container" data-aos="fade-up" id="story">
                     <div class="dashboard " class="services section-bg">
                                <div class="section-title">
                                      <h2>Story</h2>
                                  <p>Descriptive story</p>
                                        </div>
                                   <div class="story">
                                        <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2FIBM%2Bproject%2BDa
ta%2BAnalytics%2FData%2Breport&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&am
  p;shareMode=embedded&amp;action=view&amp;sceneId=model00000184942c91e5_00000000&amp;sceneTime=10000"
          width="900" height="700" frameborder="0" gesture="media" allow="encrypted-media"
                                  allowfullscreen=""></iframe>
                                        </div>
                                        </div>
                          <!-- ======= Services Section ======= -->
                    <section id="services" class="services section-bg">
                        <div class="container" data-aos="fade-up">

                                <div class="section-title">
                                      <h2>Services</h2>
                                <p>Tools used to build the project</p>
                                        </div>

                                   <div class="row">
        <div class="col-md-6 col-lg-3 d-flex align-items-stretch" data-aos="zoom-in" data-aos-delay="100">
                                   <div class="icon-box">
                       <div class="icon"><i class="bx bxl-dribbble"></i></div>
                         <h4 class="title"><a href="">IBM Cognos Analytics</a></h4>
  <p class="description">Everyone in your organization can use IBM Cognos BI to view or create business
      reports, analyze data, and monitor events and metrics so that they can make effective business
      decisions. IBM Cognos BI integrates the following business intelligence activities in one Web-based
                                        solution.</p>
                                        </div>
                                        </div>

        <div class="col-md-6 col-lg-3 d-flex align-items-stretch" data-aos="zoom-in" data-aos-delay="200">
                                   <div class="icon-box">
                         <div class="icon"><i class="bx bx-file"></i></div>
                            <h4 class="title"><a href="">IBM Cloud</a></h4>
  <p class="description">IBM Cloud provides solutions that enable higher levels of compliance, security,
                                            and
         management, with proven architecture patterns and methods for rapid delivery for running
                                mission-critical workloads.</p>
                                        </div>
                                        </div>

        <div class="col-md-6 col-lg-3 d-flex align-items-stretch" data-aos="zoom-in" data-aos-delay="300">
                                   <div class="icon-box">
                      <div class="icon"><i class="bx bx-tachometer"></i></div>
                            <h4 class="title"><a href="">Kaggle </a></h4>
  <p class="description">Kaggle is an online community platform for data scientists and machine learning
     enthusiasts. Kaggle allows users to collaborate with other users, find and publish datasets, use GPU
      integrated notebooks, and compete with other data scientists to solve data science challenges.</p>
                                        </div>
                                        </div>

        <div class="col-md-6 col-lg-3 d-flex align-items-stretch" data-aos="zoom-in" data-aos-delay="400">
                                   <div class="icon-box">
```

```html
                          <div class="icon"><i class="bx bx-world"></i></div>
                        <h4 class="title"><a href="">Github</a></h4>
<p class="description">GitHub is a code hosting platform for version control and collaboration. It lets
                  you and others work together on projects from anywhere. </p>
                                            </div>
                                          </div>

                                    </div>

                                  </div>
                      </section><!-- End Services Section -->


                    <!-- ======= Team Section ======= -->
                      <section id="team" class="team">
                          <div class="container">

                      <div class="section-title" data-aos="fade-up">
                                  <h2>Team</h2>
                      <p>Our team is always here to help</p>
                                        </div>

                                  <div class="row">

              <div class="col-xl-3 col-lg-4 col-md-6" data-aos="zoom-in" data-aos-delay="100">
                                    <div class="member">
                  <img src="assets/img/team/team-1.jpg" class="img-fluid" alt="">
                                  <div class="member-info">
                              <div class="member-info-content">
                                    <h4>Walter White</h4>
                              <span>Chief Executive Officer</span>
                                        </div>
                                    <div class="social">
                        <a href=""><i class="bi bi-twitter"></i></a>
                        <a href=""><i class="bi bi-facebook"></i></a>
                        <a href=""><i class="bi bi-instagram"></i></a>
                        <a href=""><i class="bi bi-linkedin"></i></a>
                                        </div>
                                        </div>
                                        </div>
                                        </div>

              <div class="col-xl-3 col-lg-4 col-md-6" data-aos="zoom-in" data-aos-delay="200">
                                    <div class="member">
                  <img src="assets/img/team/team-2.jpg" class="img-fluid" alt="">
                                  <div class="member-info">
                              <div class="member-info-content">
                                    <h4>Sarah Jhonson</h4>
                                <span>Product Manager</span>
                                        </div>
                                    <div class="social">
                        <a href=""><i class="bi bi-twitter"></i></a>
                        <a href=""><i class="bi bi-facebook"></i></a>
                        <a href=""><i class="bi bi-instagram"></i></a>
                        <a href=""><i class="bi bi-linkedin"></i></a>
                                        </div>
                                        </div>
                                        </div>
                                        </div>

              <div class="col-xl-3 col-lg-4 col-md-6" data-aos="zoom-in" data-aos-delay="300">
                                    <div class="member">
                  <img src="assets/img/team/team-3.jpg" class="img-fluid" alt="">
                                  <div class="member-info">
                              <div class="member-info-content">
                                    <h4>William Anderson</h4>
                                      <span>CTO</span>
                                        </div>
                                    <div class="social">
                        <a href=""><i class="bi bi-twitter"></i></a>
                        <a href=""><i class="bi bi-facebook"></i></a>
                        <a href=""><i class="bi bi-instagram"></i></a>
                        <a href=""><i class="bi bi-linkedin"></i></a>
                                        </div>
                                        </div>
```

```html
                                                </div>
                                            </div>

                    <div class="col-xl-3 col-lg-4 col-md-6" data-aos="zoom-in" data-aos-delay="400">
                                        <div class="member">
                            <img src="assets/img/team/team-4.jpg" class="img-fluid" alt="">
                                        <div class="member-info">
                                    <div class="member-info-content">
                                        <h4>Amanda Jepson</h4>
                                        <span>Accountant</span>
                                            </div>
                                        <div class="social">
                            <a href=""><i class="bi bi-twitter"></i></a>
                            <a href=""><i class="bi bi-facebook"></i></a>
                            <a href=""><i class="bi bi-instagram"></i></a>
                            <a href=""><i class="bi bi-linkedin"></i></a>
                                            </div>
                                            </div>
                                            </div>
                                            </div>

                                            </div>

                                            </div>
                            </section><!-- End Team Section -->


                            </main><!-- End #main -->

                        <!-- ======= Footer ======= -->
                            <footer id="footer">


                        <div class="container py-4">
                            <div class="copyright">
    &copy; Copyright <strong><span>IBM TEAM Team ID:PNT2022TMID04371</span></strong>. All Rights Reserved
                                            </div>
                            <div class="credits">
                        <!-- All the links in the footer should remain intact. -->
                    <!-- You can delete the links only if you purchased the pro version. -->
                        <!-- Licensing information: https://bootstrapmade.com/license/ -->
<!-- Purchase the pro version with working PHP/AJAX contact form: https://bootstrapmade.com/ninestars-
                        free-bootstrap-3-theme-for-creative/ -->
                    Designed by <a href="https://bootstrapmade.com/">Mathiarasi</a>
                                            </div>
                                            </div>
                            </footer><!-- End Footer -->

        <a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i
                        class="bi bi-arrow-up-short"></i></a>

                            <!-- Vendor JS Files -->
                    <script src="assets/vendor/aos/aos.js"></script>
            <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
            <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
            <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
            <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
            <script src="assets/vendor/php-email-form/validate.js"></script>

                            <!-- Template Main JS File -->
                    <script src="assets/js/main.js"></script>

                                            </body>

                                            </html>
```

DEMO

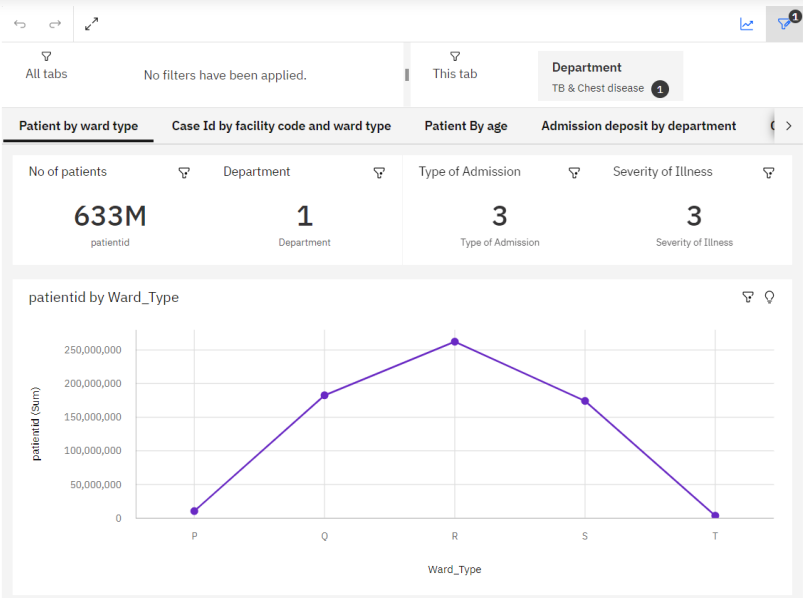# Analytics For Hospitals' Health-Care Data

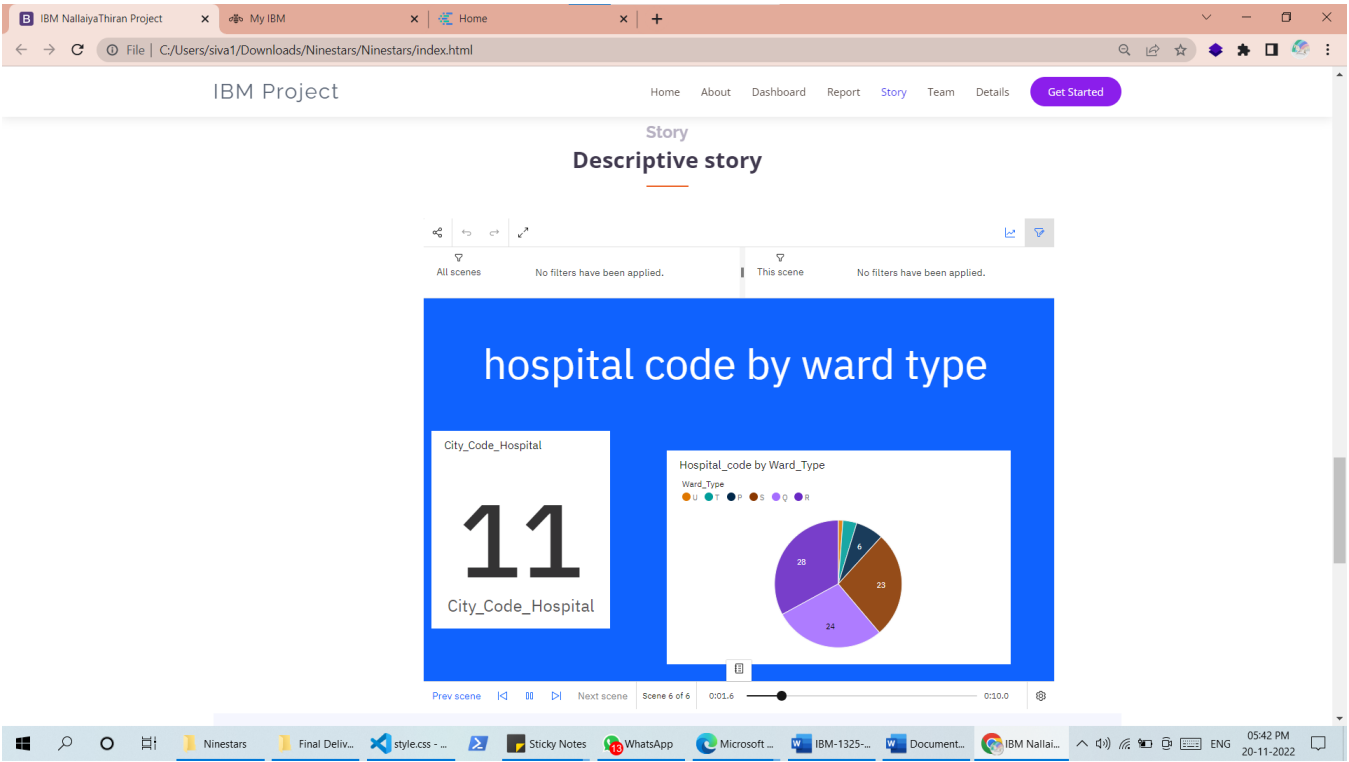Finding the Length of Stay of Patient

Get Started

Background of the project

Recent Covid-19 Pandemic has raised alarms over one of the most overlooked areas
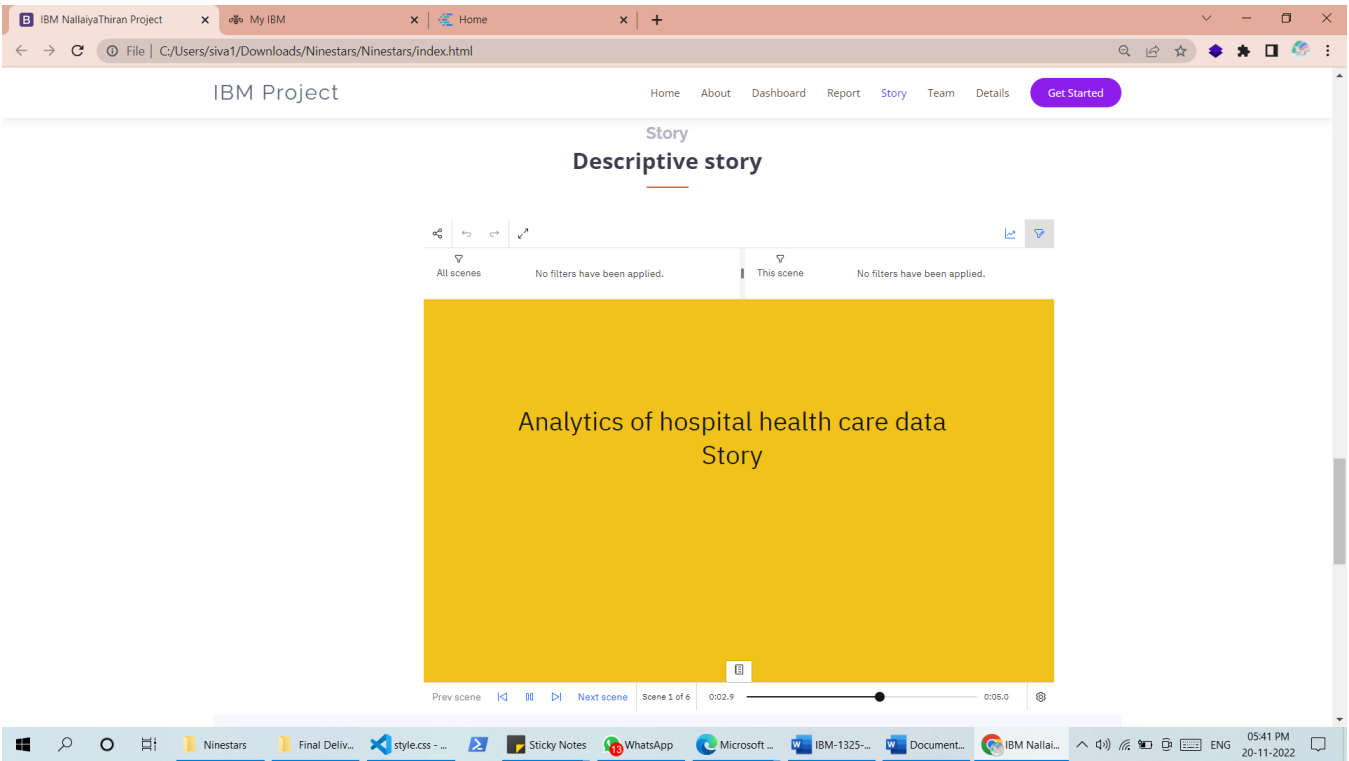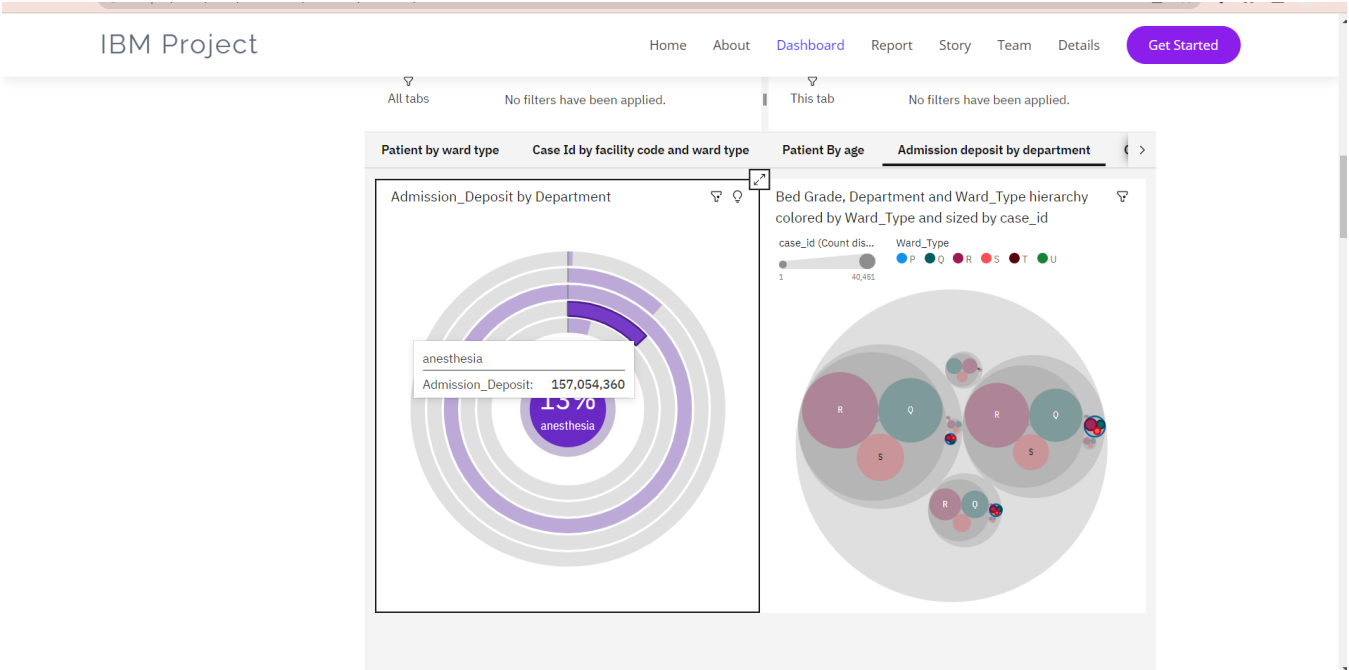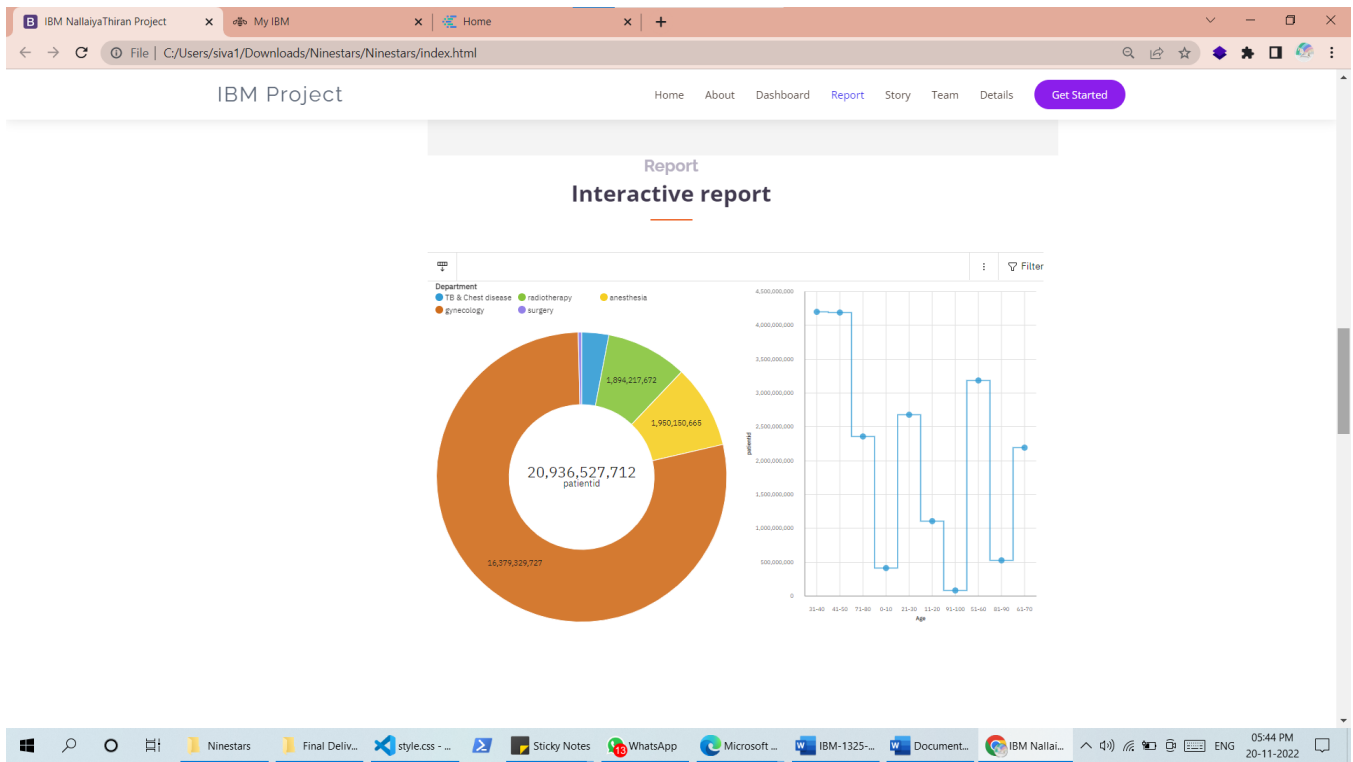
Background of the project

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.

Dashboard

Interactive Dashboard

All tabs   No filters have been applied.   This tab   Department   TB & Chest disease 1

Patient by ward type | Case Id by facility code and ward type | Patient By age | Admission deposit by department

No of patients	Department	Type of Admission	Severity of Illness
633M	1	3	3
patientid	Department	Type of Admission	Severity of Illness

patientid by Ward_Type

Story
Descriptive story

Analytics of hospital health care data
Story

Story
Descriptive story

hospital code by ward type

City_Code_Hospital

11

City_Code_Hospital

Hospital_code by Ward_Type

GitHub Links: