

ANALYTICS FOR HOSPITAL AND HEALTH-CARE DATA

A PROJECT REPORT

Submitted by

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ABSTRACT

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This paper is mainly streamed towards hospitals and their health-care data. Due to recent covid-19 pandemic has raised alarms over one of the most overlooked areas to focus. Healthcare management has various use cases for data science, patients health details and therir past history with data records. Analyizing the data's with a module and exploring the visualization can improve the dataset. In order to discuss health data analytics and the role it plays in the health care sector, we must first understand the data that is being collected and analyzed. There is data being collected on the processes and procedures of the business side of health care, but there is also an enormous amount of health data being gathered, stored and analyzed. Health data is any data relating to the health of an individual patient or collective population. This information is gathered from a series of health information

systems (HIS) and other technological tools utilized by health care professionals, insurance companies and government organizations. Consider the impact this has had on the COVID-19 pandemic. The data being collected is analyzed in real time to understand the effects of the virus better and predict future trends so we may slow the spread and prevent future outbreaks. Health care data management has the potential to lead to better care if used properly. With centralized datasets, there is immediate access to necessary information whenever and wherever it is needed. The addition of big data analytics improves efficiency on all fronts. Better data leads to better care.

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INTRODUCTION

CHAPTER 1

INTRODUCTION

The introduction about the analytics for hospital and health-care data with IBM-Cognos and analytics.

1.1 PROJECT OVERVIEW

Recent Covid-19 Pandemic has raised alarms over one of the most overlooked areas to focus on Healthcare. While Healthcare management has various use cases for using data science, patient length of stay is on 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 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. The goal is to accurately predict the length of stay of each patient on case by case basis so that the Hospitals can use this information for optimal resource allocation and better functioning. The length of stay is divided into 11 different classes ranging from 0-10 days to more than 100 days.

1.2 PURPOSE

- a. This type of analysis is used to investigate why an event happened.
- b. This form of analysis is used to forecast something that will happen in the future. For example, a hospital might predict, based on trends observed over the past decade, that incoming cardiac patients will most likely increase by 20% this year.
- c. This is possibly the most important form of analysis in healthcare and the trend that is growing quickest. This form of analysis takes pre-existing data and implements treatment plans. For example, a healthcare provider might use a smart device to automatically analyze a patient's vital signs, preemptively alert them that they're at risk for developing a medical condition, and instruct them to visit their healthcare provider.
- d. While healthcare data analytics is highly advantageous, it can get pretty complicated, too. Whether the data was collected by assessing important real-time signs or through electronic health records (EHR), it needs to be derived from various sources by following proper government regulations, thus making the process precarious and complex.

- e. Anything from clinical data to patient behaviour, medical expenses, healthcare, or pharmaceuticals data analytics can be employed at the micro and macro level to evidently enhance operations, boost patient care, and even tackle the overall expenses.



Fig 1.1 Analytics for healthcare

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

The introduction about the literature survey gone throughfor the projectare briefly discussedin this chapter.

2.1 EXISTING PROBLEM

As we all know health care organisation will understand of big data analytics. Data mining offers novel information regarding health care helpful for making administrative as well as prediction disease, selection of treatment, health isurance policy. The novel corona virus pandemic outbreak is seriously threatening human health. Security optimization implementaion and testing on real world patients Hospitalization cost and the insured population all show a trend of increasing year by year. The users to help to see understand the valuable information provided by data care visual analytics huge amount of structured and unstructured and semi structured data have been generated by various institutions around the world.

This research demonstrates to address lack, this study examines the historical development, architectural design and component functionalitites of big data analytics. Data sets can gain unwanted attendion from hackers and important information can leaked to competitors. As each and every patient records are important to the hospital organisatoin and the data should be protected with secutiry measures. The health industry sector had been confronted bu the need to manage the big data being produced by various sources, which are well known for producing high volumes of heterogeneous data lack of standardisation methods and electronic tools. In recent years, there has been much research in medical big data, mainly targeting data collecting data, data analysis and visualisation.

2.2 REFERENCES

[1] Big data analytics for healthcare industry.

Authors: R Sunil Kumar, A Daniel

Published in: 2015 IEEE.

The user to help able to information provided by the healthcare data in any need with the help of system the is developed using the AI with chats analysis and visualization. Analysing the dats with the better understand and current practices, capabilities and challenges related to clinical data analytics. Multiview data analytics requires advanced machine learning techniques.

Merits: The data analysis will help to the hospital organisation with the structured data access at anytime through systems.

Demerits: Data should be maintained and protected as leakage of data could lead to unwanted issues to the organisation in privacy concerns.

[2] Intelligent and health care management.

Authors: Yinchuan Wang, .et.al, Zhihan Lv, .et.al,

Published in: 2017 IEEE.

Hospitalization cost and the insured and population all show a trend of increasing year by year. Data analytics become a future escalating tool of all industries including medicine, robotics, etc.,

Merits: As the population increases the productivity also increases so a system can manage this work loads.

Demerits: There is not mandatory to set an employee for data handling as system does it with AI build intelligence.

[3] IoT ENABLED SMART HEALTHCARE SYSTEM.

Authors: Syed Rooh Ullah, Divya Tomer, Imran Ahmed.

Published in: 2021 IEEE.

IoT enabled devices real time, interoperability with prediction of disease real data set focusing on different pandemic symptoms. Unable to predict the data with the right chart and visualization.

Merits: Data prediction will be viewed in the right visualization and chart with different kind of analysis.

Demerits: Accurate data is needed and analysis the pattern.

[4] A FRAMEWORK FOR DATA ANALYTICS BASED ON SYSTEMS.

Author: Alejandro Bal dominos .et.al.,

Published in: 2014 IEEE.

The visual analytics pattern is undertaken and the framework is designed based on the system with the data care information. The user to help the provided by healthcare and information is collected from the hospital organisation. Lack of organisational alignment and strategy for data analyticsad standardized methods and report formation.

Merits: Data accessing is flexible with the designed framework.

Demerits: Maintainance of data fomat should be structured and grouped.

2.3 PROBLEM STATEMENT DEFINITION

There are multiple problems in the hospital health care organisation as some of the them are mentioned and solved though analysis of the various problem statements.

PROBLEM STATEMENT - 1



PROBLEM STATEMENT - 2



PROBLEM STATEMENT - 3



PROBLEM STATEMENT - 4



Fig 2.1 ProblemStatement Definition

IDEATION & PROPOSED SOLUTION

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy –to-digest visual that captures knowledge about a user’s behaviors and attitudes. It is a useful tool to help teams better understand their users..

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user’s perspective along with his or her goals and challenges.

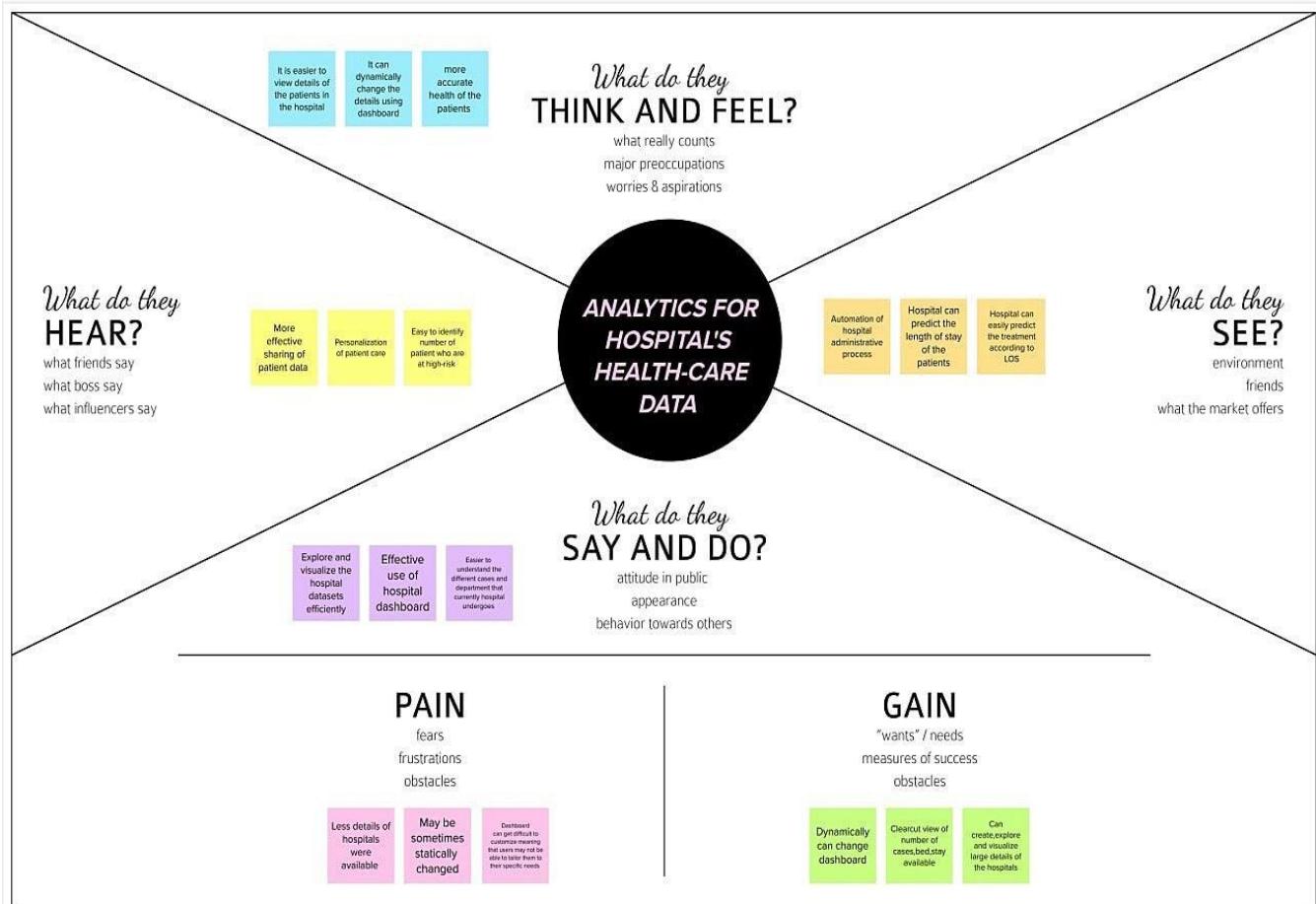


Fig 3.1 Empathy Map Canvas

3.2 IDEATION & BRAINSTORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to

collaborate, helping each other develop a rich amount of creative solutions.



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
💡 1 hour to collaborate
👥 2-8 people recommended

[Share template feedback](#)



Need some inspiration?
See a finished version of this template to kickstart your work.
[Open example](#)



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#)



Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM
How might we [your problem statement]?



Key rules of brainstorming

To run an smooth and productive session

- 🕒 Stay in topic.
- 💡 Encourage wild ideas.
- 🕒 Defer judgment.
- 👂 Listen to others.
- 🕒 Go for volume.
- 👁️ If possible, be visual.

Fig 3.2 Brainstorming 1

2

Brainstorm

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

⌚ 10 minutes

TIP: You can select a sticky note and hit the pencil icon to sketch! (icon to start sketching)

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 break it up into smaller sub-groups.

⌚ 20 minutes

TIP: Add customizable tags to sticky notes to make it easier to find, browse, de-clutter, and categorize important notes as themes worth your note...

Kiran Kumar K

- Analyzing schedule of smoking
- Analyzing smoking habit
- Analyzing smoking habit with respect to age
- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to environment and place

Shriprasad S

- Analyzing effects of smoking
- Analyzing effects of smoking on health
- Analyzing effects of smoking on heart
- Analyzing effects of smoking on lungs
- Analyzing effects of smoking on brain
- Analyzing effects of smoking on eyes
- Analyzing effects of smoking on skin
- Analyzing effects of smoking on teeth
- Analyzing effects of smoking on mouth
- Analyzing effects of smoking on nose

Praveen N

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place and environment
- Analyzing smoking habit with respect to time and environment
- Analyzing smoking habit with respect to place, time and environment

Ram Senjay S

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

Analysis Based on habit

- Analyzing smoking habit
- Analyzing effects of smoking
- Analyzing effects of smoking on health
- Analyzing effects of smoking on heart
- Analyzing effects of smoking on lungs
- Analyzing effects of smoking on brain
- Analyzing effects of smoking on eyes
- Analyzing effects of smoking on skin
- Analyzing effects of smoking on teeth
- Analyzing effects of smoking on mouth
- Analyzing effects of smoking on nose

Analysis Based on physical features

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

Analysis Based on lab results

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

Analysis Based on sensor data

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

Analysis Based on Intakes

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

Analysis of diseases

- Analyzing smoking habit with respect to gender
- Analyzing smoking habit with respect to place
- Analyzing smoking habit with respect to time
- Analyzing smoking habit with respect to environment
- Analyzing smoking habit with respect to place and time
- Analyzing smoking habit with respect to environment and time
- Analyzing smoking habit with respect to place, time and environment

The diagram shows two white boxes side-by-side. The left box contains a grid of 12 yellow sticky notes arranged in a 4x3 pattern. An arrow points from this box to the right box, which contains a grid of 12 yellow sticky notes arranged in a 4x3 pattern. This visualizes the progression from individual brainstorming to group idea clustering.

The diagram shows three white boxes. The first box contains a grid of 12 yellow sticky notes arranged in a 4x3 pattern. An arrow points from this box to the second box, which contains a grid of 12 yellow sticky notes arranged in a 4x3 pattern. A third box follows, containing a grid of 12 yellow sticky notes arranged in a 4x3 pattern, with one note in the top-left position having a curved arrow pointing upwards and to the right, indicating the process of labeling or grouping the ideas.

Fig 3.3 Brainstorming 2

4

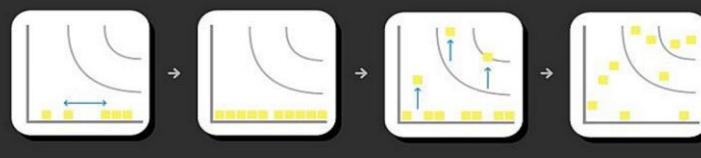
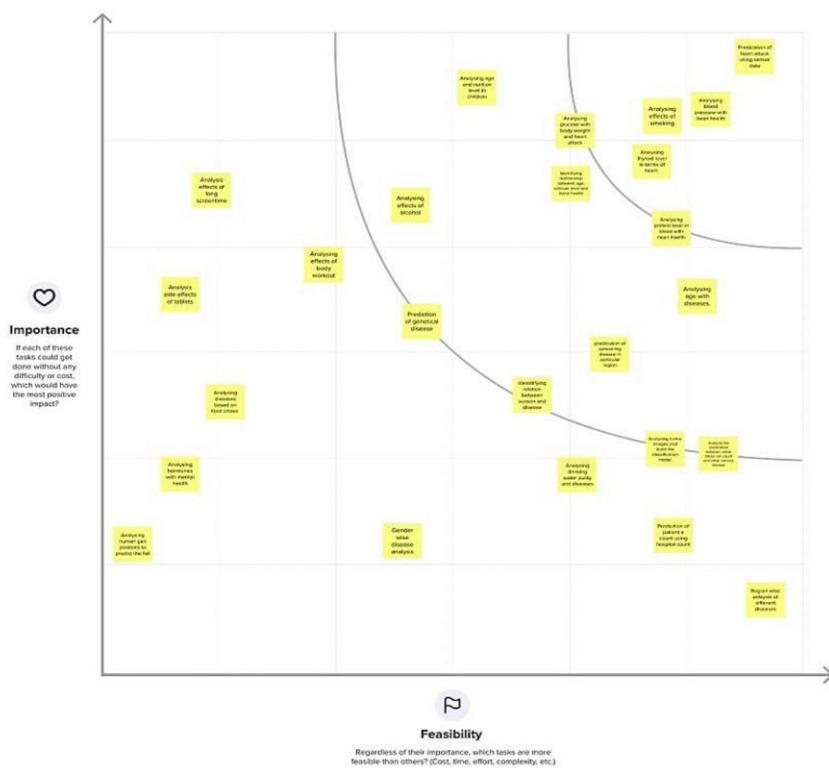
Prioritize

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

TIP

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

**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**A Share the mural**

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

B 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

Fig 3.4 Brainstorming 3

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	EHR data matched patient-reported data in 23.5 percent of records in a study at an ophthalmology practice. Patients' EHR data did not agree in any way when they reported having three or more eye health complaints.
2.	Idea / Solution description	Predictive analytics can create patient journey dashboards and disease trajectories that can lead to effective, and result-driven healthcare. It improves treatment delivery, cuts costs, improves efficiencies, and so on.
3.	Novelty / Uniqueness	Healthcare data frequently resides in several locations from various departments, such as radiology or pharmacy, to various source systems, such as EMRs or HR software. The organization as a whole contributes to the data. This data becomes accessible and usable when it is combined into a single, central system, such as an enterprise data warehouse (EDW).
4.	Social Impact / Customer Satisfaction	<p>Enhanced diagnosis Improved medical treatment Improved health results</p> <p>Improved relationships with patients More positive health indicators</p>
5.	Business Model (Revenue Model)	The two factors that have the biggest negative effects on hospital income are claim denials and patient incapacity to pay their part. 90% more uncollectible claim denials were written off by hospitals and healthcare systems in 2017 compared to the preceding six years.
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 centralized healthcare services.

PROBLEM SOLUTION FIT

<p><u>1. Customer Segments</u></p> <ul style="list-style-type: none">+ Hospital Management+ Patients	<p><u>6. Customer Limitation</u></p> <p>Can't assure the effective utilization and allocation of resources</p>	<p><u>5. Available Solution</u></p> <p>Text mining Information retrieval</p>
<p><u>2. Problems/Pains</u></p> <ol style="list-style-type: none">1. Proper allocation of resources2. Predicting the length of stay of COVID patients3. Proper utilization and treatment to patients	<p><u>9. Problem</u></p> <p>Efficient less calculation and prediction of occurring situations</p>	<p><u>7. Behaviour</u></p> <p>Data tracking with available methodologies such as text mining and information retrieval</p>
<p><u>3. Triggers to Act</u></p> <p>Prevailing emergency situations and Pandemic period</p>	<p><u>10. Your Solution</u></p> <p>Using predictive analysis powered by the Artificial intelligence which is used in analytics technique</p>	<p><u>8. Channels of Behaviour</u></p> <p>1. Online: Usage of data exploration</p>
<p><u>4. Emotions</u></p>		

Tensed and perplexed mind
set to get rectified from the
pandemic period

2. Offline: Preparing the dataset
on the COVID patients.

Fig 3.5 Problem Solution Fit

REQUIREMENT ANALYSIS

CHAPTER 4

REQUIREMENT ANALYSIS

In this chapter, the requirement analysis of the proposed system has been discussed along with the brief explanation about its advantages.

4.1 FUNTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution.

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

4.2 NON-FUNCTIONAL REQUIREMENT

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

FR No.	Non-Functional Requirement	Description

NFR-1	Usability	The project must be easy to use. The user needs to have a good experience while working with the interface.
NFR-2	Security	Every user can access the website only if they possess the password. The database is secured with encryption techniques which provides high levels of security
NFR-3	Reliability	The project must have minimal degree of failure under normal usage and how often does the user get access to this work
NFR-4	Performance	The project must respond quickly to the user's actions or even if the user has to wait the waiting period must be short.
NFR-5	Availability	The project is platform independent. It runs perfectly on almost every platform.
NFR-6	Scalability	The project allows multiple users to handle the data at the same time. It is highly scalable since adding features and making advancements in the website is uncomplicated.

This chapter dealt with the functional and non-functional requirement analysis of proposed system.

PROJECT DESIGN

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

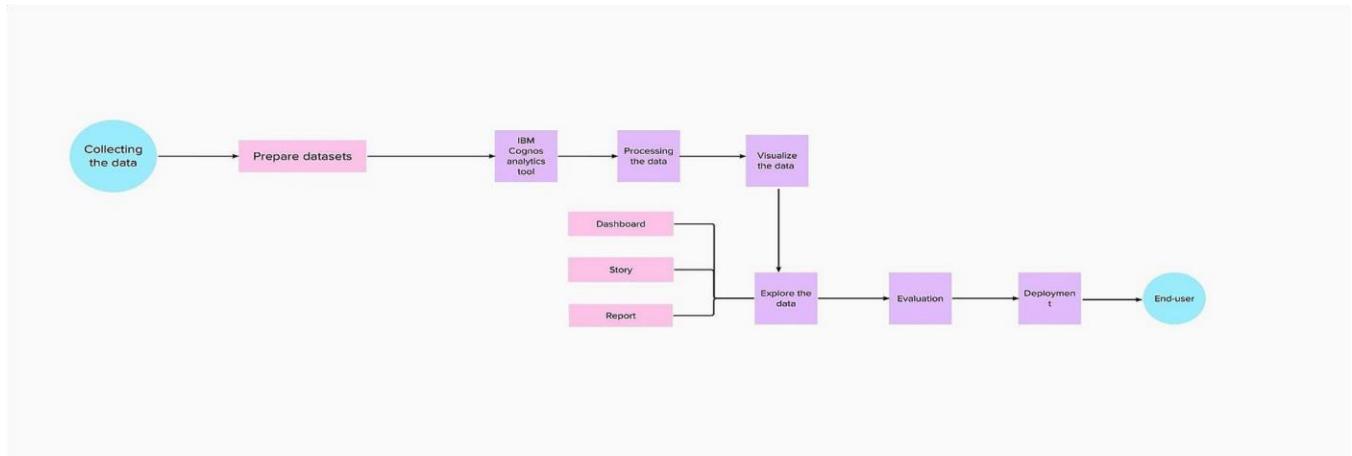


Fig 5.1 Dataflow Diagram

5.2 SOLUTION & TECHNICAL ARCHITECTURE

5.2.1 SOLUTION ARCHITECTURE

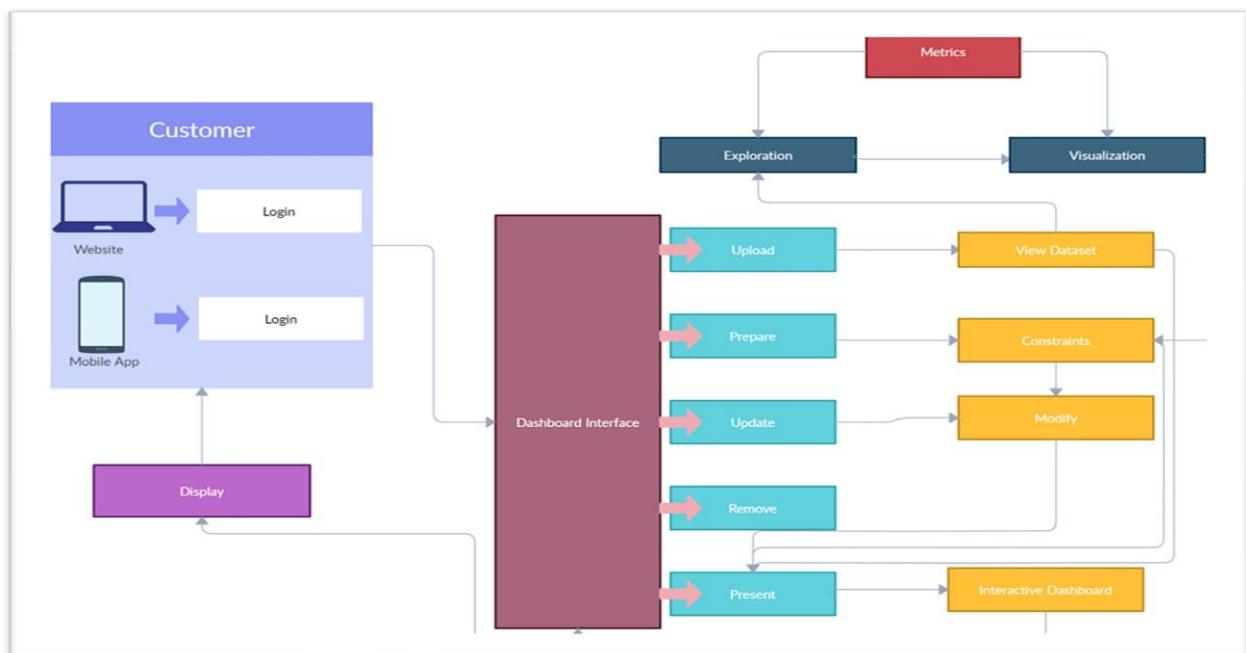


Fig 5.2 Solution Architecture Diagram

5.2.2 TECHNICAL ARCHITECTURE

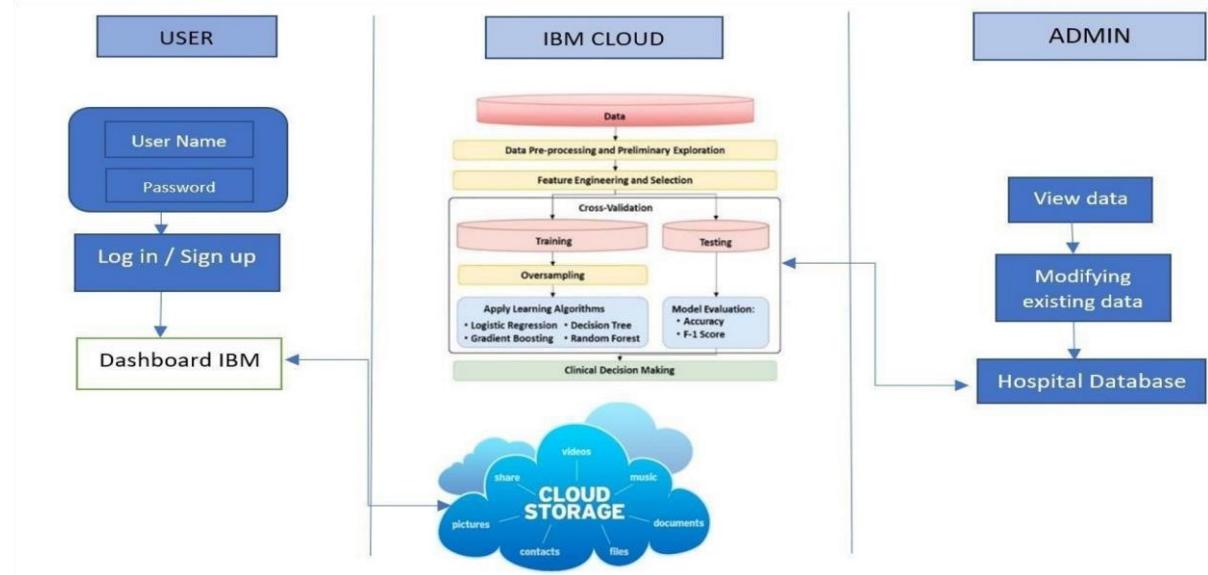


Fig 5.3 Technical Architecture Diagram

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number		User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)		USN-1		As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2		As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3		As a user, I can register for the application through Gmail	I can register & access the dashboard	Medium	Sprint-1

	Login	USN-4		As a user, I can log into the application by entering email & password	I can access the dashboard	High	Sprint-1
	Dashboard	USN-5		As a user, I can upload the datasets to the dashboard	I can access various operations	High	Sprint-1
	View	USN-6		As a user, I can view the patient details	I can view the visual data and the result after the prediction	High	Sprint-2
Admin	Analyse	USN-7		As an admin, I will analyse the given dataset	I can analyse the dataset	High	Sprint-2
	Predict	USN-8		As an admin, I will predict the length of stay	I can predict the length of stay	High	Sprint-2

Table 5.1 User Stories

PROJECT PLANNING &

SCEDULING

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

MILESTONES	ACTIVITY LIST
MILESTONE-1	Collecting the data based on the application
MILESTONE-2	Uploading the collected data on the IBM COGNOS platform
MILESTONE-3	Data exploration in the IBM COGNOS platform
MILESTONE-4	Data visualization in the IBM COGNOS platform
MILESTONE-5	Creating an interactive dashboard
MILESTONE-6	Displaying the prepared dashboard
MILESTONE-7	Preparing a standard dataset and removing the unwanted data using the python programming
MILESTONE-8	By using the various algorithm and exploring the result and getting the accurate result with the help of an algorithm which give more accuracy
MILESTONE-9	Displaying the result according to the required format for example displaying the Length Of Stay of a patient

MILESTONE-10	Deployed in the GitHub
--------------	------------------------

Table 6.1 Sprint Planning and Estimation

6.2 SPRINT DELIVERY SCHEDULE

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

Table 6.2 Sprint Delivery Schedule

6.3 REPORTS FROM JIRA

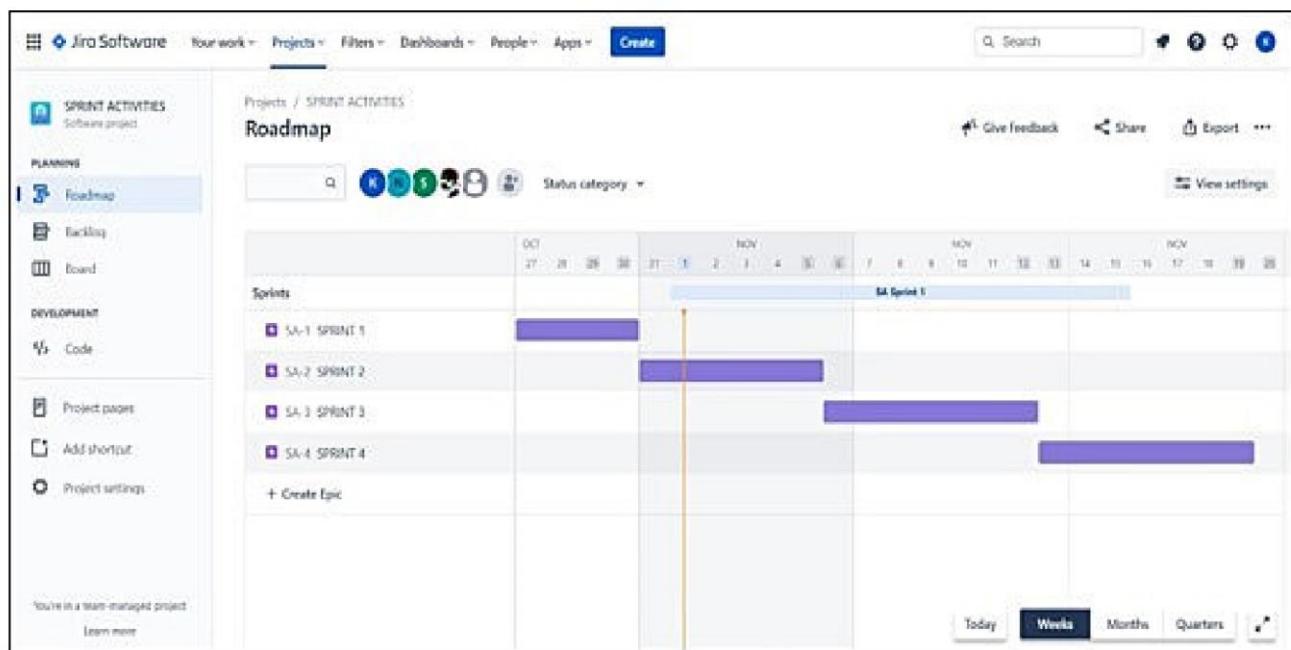
JIRA BOARD

The screenshot shows the Jira Board interface for a project named "SA Sprint 1". The left sidebar includes sections for SPRINT ACTIVITIES, PLANNING (Roadmap, Backlog, selected), DEVELOPMENT (Code, 2), Project pages, Add shortcut, and Project settings. The main area displays a Kanban board with three columns: TO DO (3 issues), IN PROGRESS (1 issue), and DONE (1 issue). The TO DO column contains tasks for SPRINT 2, SPRINT 3, and SPRINT 4. The IN PROGRESS column contains a task for SPRINT 1. The DONE column contains a summary task for SPRINT 1 and its works. A sidebar message indicates the user is in a team-managed project.

BACKLOGS

The screenshot shows the Jira Backlog interface for a project named "Backlog". The left sidebar includes sections for SPRINT ACTIVITIES, PLANNING (Roadmap, selected), DEVELOPMENT (Code, 0), Project pages, Add shortcut, and Project settings. The main area displays a backlog list with items categorized by sprint: SA Sprint 1 (1 Nov - 15 Nov, 5 issues), Backlog (3 issues), and a "+ Create issue" button. Each backlog item has a small icon and a progress bar indicating completion status.

ROADMAP



CODING AND SOLUTIONING

CHAPTER 7

CODING AND SOLUTIONING

7.1 CREATE AND CONFIGURE IBM CLOUD SERVICES

USN 1: As a user, I will create IBM cloud account.

The screenshot shows the 'Account settings' page in the IBM Cloud interface. The left sidebar is titled 'IBM Cloud' and includes sections for Account resources, Resource groups, Cloud Foundry orgs, Licenses and entitlements, Tags, Dashboards, and Account settings (which is currently selected). The main content area has a search bar at the top. It displays account information: 'Kiran Kumar K's Account' (ID: 5ec46bb554b6e4264955bf72d8e94f3e4), Account Type (Trial (Free)), and a message stating '395 days remaining in Trial'. Below this is a section for 'Pay-As-You-Go' which encourages adding a credit card to unlock full power. A 'Subscription' section offers discounted pricing and increased billing predictability, with a 'Upgrade' button. To the right, there's a 'Need help?' section with a 'Contact sales' link. The top right corner shows the user profile 'Kiran Kumar K' with options for Profile, Log in to CLI and API, Privacy, Change theme, and Log out.

USN 2: As a user, I will create IBM cognos account.

The screenshot shows the IBM Cognos Analytics with Watson interface. At the top, there's a blue header bar with the title "IBM Cognos Analytics with Watson", a "2 items open" notification, a search bar labeled "Search content", and user profile icons. Below the header is a dark banner with the text "Hello. Welcome to Cognos Analytics with Watson." and two buttons: "Watch video" and "Take a product tour". To the right of the banner is a 3D graphic of a computer monitor displaying a chart, connected by dashed lines to a cluster of purple cubes representing data. On the far right is a vertical sidebar with the user's name "Kiran Kumar (91bd8c87...)" and email "kiran.kumar.mj1975@gmail.com", followed by links for "Profile and settings", "My schedules and subscriptions", "Log my session", "About", "Manage product subscription", "Privacy", "Cookie Preferences", "IBM Cognos Analytics Mobile", and "Log out". Below the sidebar is a "Quick launch" section with four cards: "Upload data" (icon of an upward arrow), "Prepare data" (icon of a document with a gear), "Exploration" (icon of a magnifying glass over a cube), and "Present data" (icon of a presentation slide). Each card has a brief description.

Hello. Welcome to Cognos Analytics with Watson.

You can get started right away by taking a look at our introduction video, product tour and Getting Started tab.

Watch video Take a product tour

Kiran Kumar (91bd8c87...)
kiran.kumar.mj1975@gmail.com
Profile and settings

My schedules and subscriptions
Log my session

About
Manage product subscription
Privacy
Cookie Preferences
IBM Cognos Analytics Mobile
Log out

Quick launch

Upload data
Upload or drag and drop spreadsheets, csv files, and other data sources.

Prepare data
Use data modules to clean and connect data from multiple resources.

Exploration
Quickly find unbiased answers by identifying trends in your data with data exploration.

Present data
Create sophisticated, multi-page, multi-query dashboards, reports, or stories.

USN 3: Loading the datasets

The screenshot shows the IBM Cognos Analytics with Watson interface. At the top, there's a navigation bar with 'IBM Cognos Analytics with Watson' on the left, followed by 'Content' with a dropdown arrow, a user icon with '30', a search bar containing 'Search content', and several icons for help, notifications, and account settings.

The main title 'Datasets' is displayed prominently. Below it, there are three tabs: 'My content' (which is underlined), 'Team content', and 'Samples'. The 'My content' tab is selected, and the URL 'My content / Datasets' is shown in the address bar.

The main content area displays four dataset cards:

- sample_sub.csv**: Last Accessed 02/11/2022, 11:53 PM. Includes a 'CSV' button and a download icon.
- test_data.csv**: Last Accessed 01/11/2022, 1:55 AM. Includes a 'CSV' button and a download icon.
- train_data_dictionary.csv**: Last Accessed 02/11/2022, 11:53 PM. Includes a 'CSV' button and a download icon.
- train_data.csv**: Last Accessed 01/11/2022, 1:55 AM. Includes a 'CSV' button and a download icon.

At the bottom right of the content area, there are several small icons: a downward arrow, a double arrow, a square, a gear, a refresh symbol, and a list icon.

USN 4: Data analysing with different visualisatioin chart

The dashboard displays four main visualizations:

- case_id by Ward_Type**: A horizontal bar chart showing the count of case IDs for different Ward Types. The data is as follows:

Ward_Type	case_id (Count)
R	55K
Q	45K
W	35K
P	12K
T	4K
U	3K
- case_id by City_Code_Hospital**: A choropleth map of Morocco showing hospital regions. The regions and their colors are: Sidi Bel Abbès (blue), Taza (red), Casablanca (green), Marrakesh (orange), Agadir (yellow), and Bechar (purple).
- case_id by Department**: A bar chart showing the count of case IDs by Department. The data is as follows:

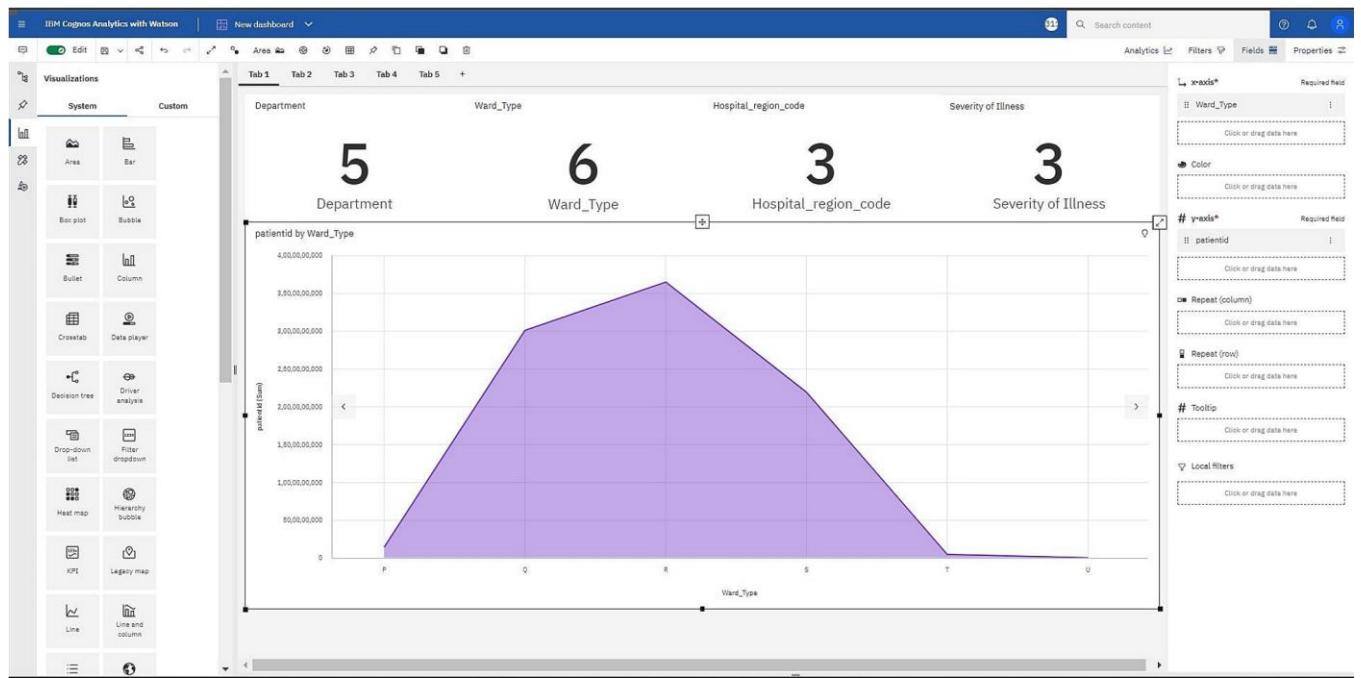
Department	case_id (Count)
surgery	~10,000
TB & Chest disease	~15,000
radiology	~18,000
anesthesia	~18,000
gynecology	100,000

Average: 27,411
- case_id by Ward_Facility_Code**: A donut chart showing the distribution of case IDs by Ward_Facility_Code. The segments represent percentages of 15.8%, 17.1%, 16.4%, 10.9%, 13.3%, and 9.0%.

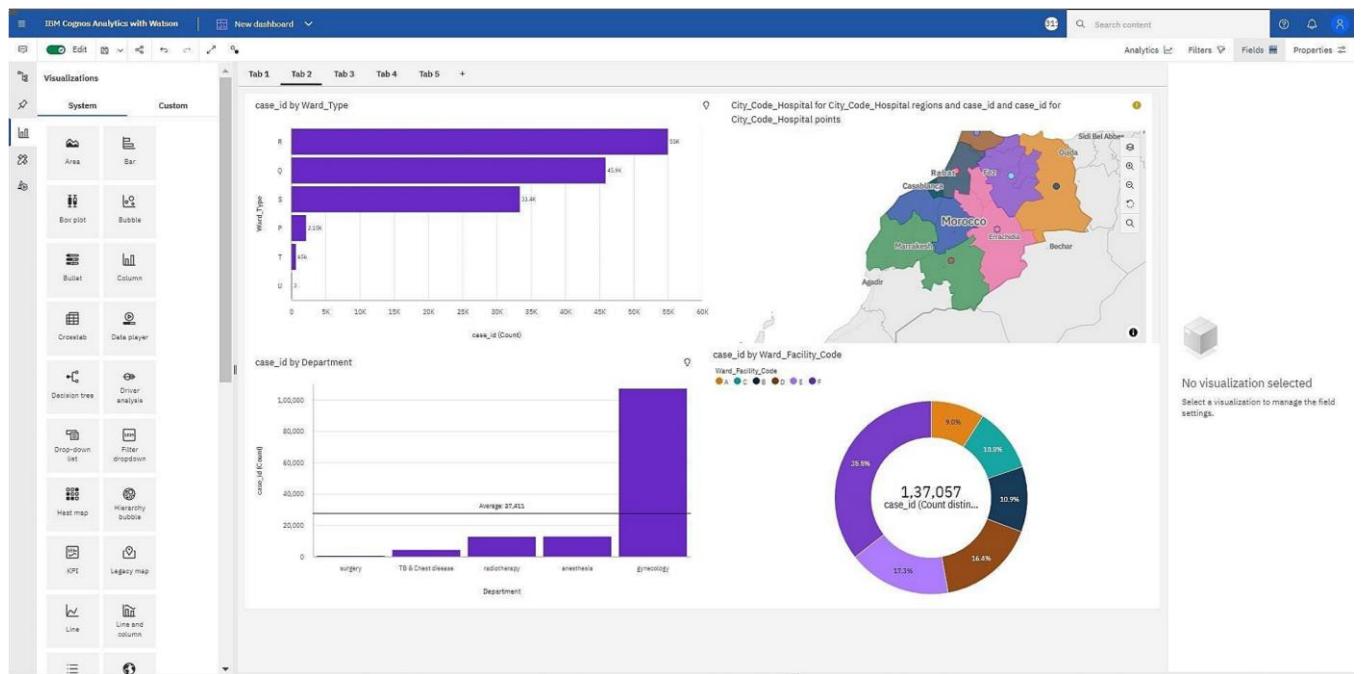
No visualization selected
Select a visualization to manage the field settings.

7.2 Data Visualizations

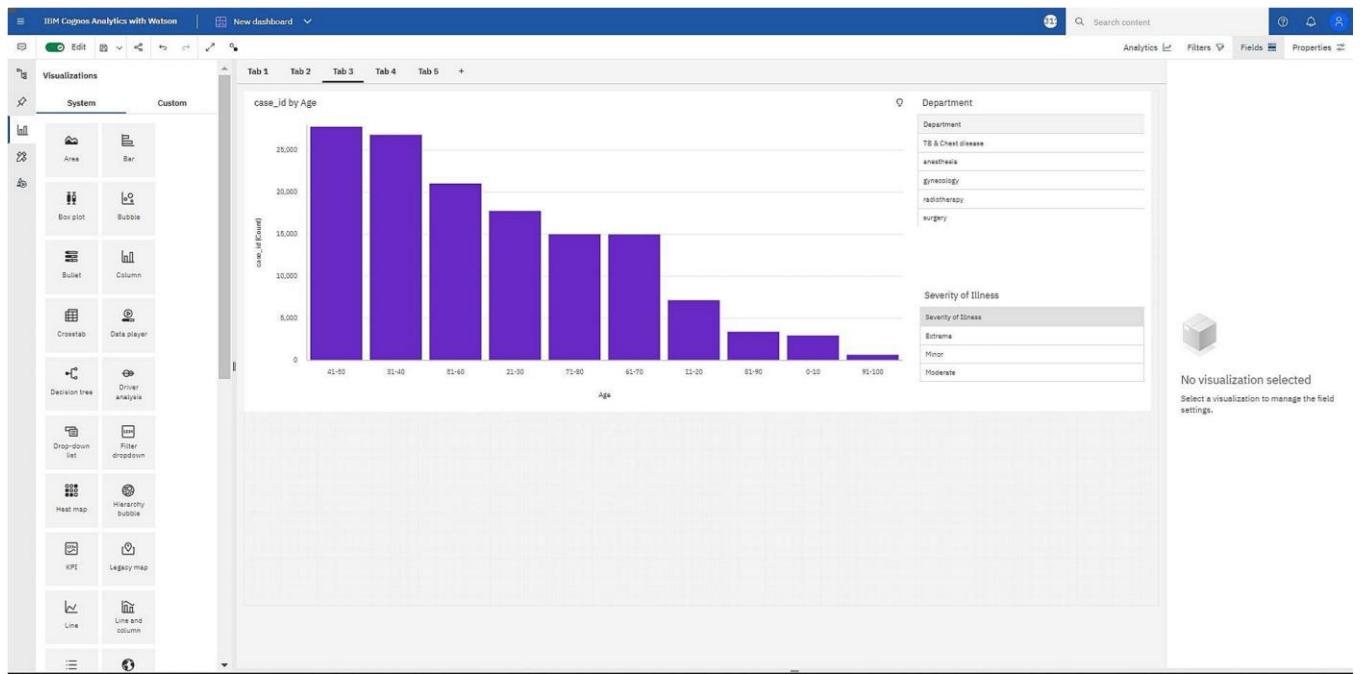
USN 5: Number of Patients By ward types.



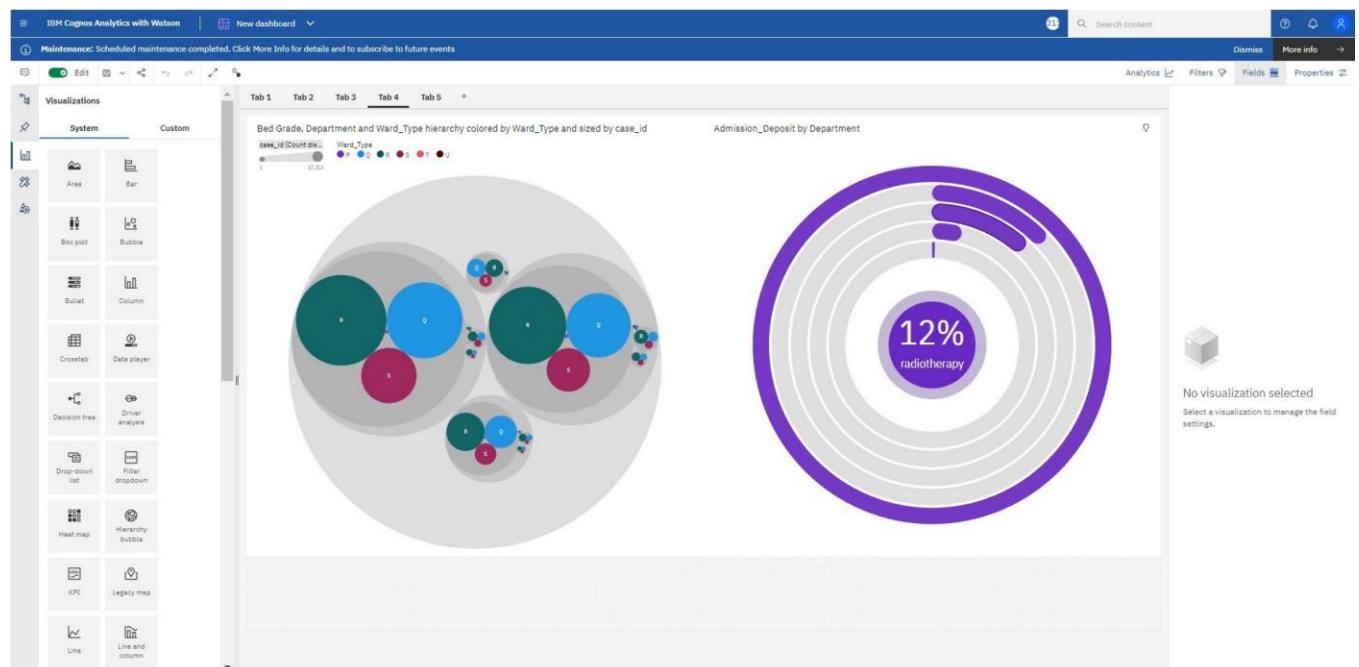
USN 6: Dashboard to show number of patients.



USN 7 : Age wise patients with department and severity filters.



USN 8: Dashboard with Hierarchy bubble and radial visuals.



USN 9: Select the dataset.

The screenshot shows the IBM Cognos Analytics with Watson interface. At the top, there's a navigation bar with tabs like 'Content', 'Samples', and 'New'. Below the navigation bar, a message says 'Maintenance: Scheduled maintenance completed. Click More Info for details.' A progress bar indicates 'Reading 2 files...'.

The main area displays a list of folders under 'Content':

Name	Type	Last Accessed
data_cleaning	Folder	24/09/2022, 8:17 AM
data_dashboard	Folder	31/10/2022, 11:12 AM
data_exploration	Folder	21/09/2022, 9:24 AM
data_module	Folder	31/10/2022, 9:47 AM
data_reports	Folder	21/09/2022, 9:05 AM
data_story	Folder	24/09/2022, 1:48 AM
dataset	Folder	21/09/2022, 7:53 AM

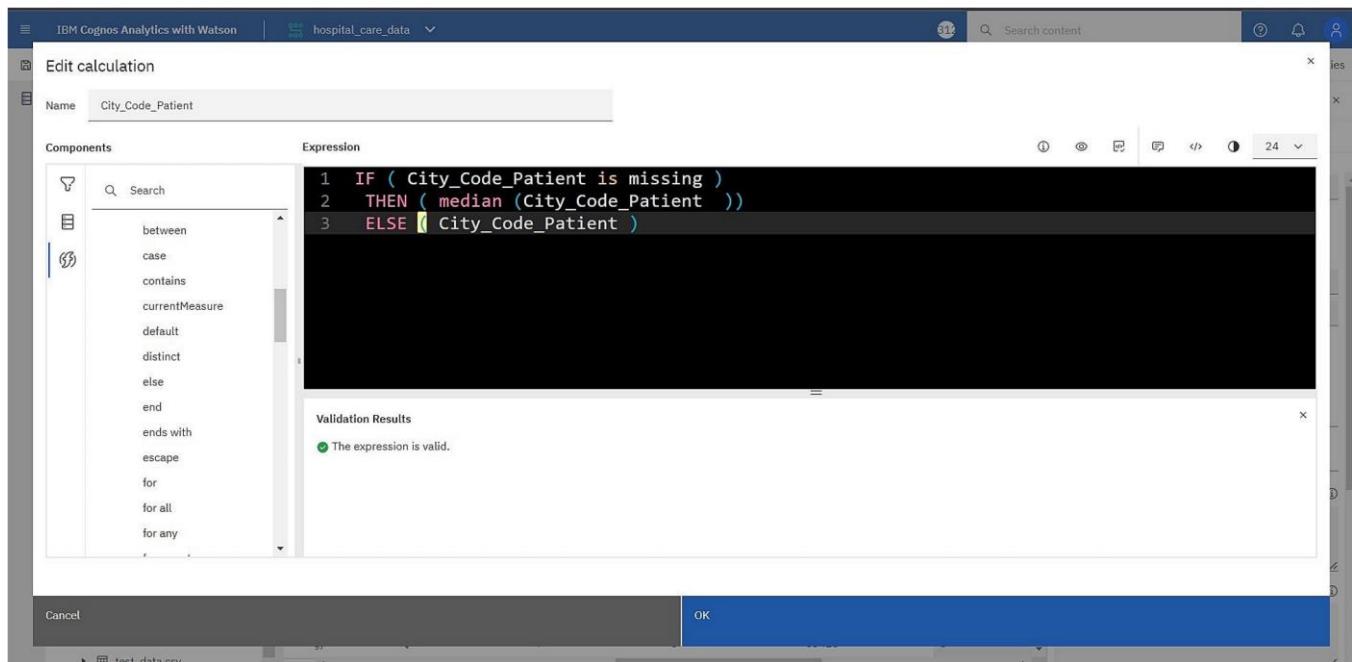
USN 10: Prepare the dataset.

The screenshot shows the IBM Cognos Analytics with Watson interface. The left sidebar shows a 'Data module' section with a tree view of 'hospital_care_data' containing 'train_data.csv' and 'test_data.csv'. The main area is a data grid titled 'Grid' for 'train_data.csv'.

The data grid has the following columns:

Row Id	case_id	Hospital_code	Hospital_type_code	City_Code_Hospital	Hospital_region_code	Available E...in Hospital	Department
1	1	8	c	3	Z	3	radiotherapy
2	2	2	c	5	Z	2	radiotherapy
3	3	10	e	1	X	2	anesthesia
4	4	26	b	2	Y	2	radiotherapy
5	5	26	b	2	Y	2	radiotherapy
6	6	23	a	6	X	2	anesthesia
7	7	32	f	9	Y	1	radiotherapy
8	8	23	a	6	X	4	radiotherapy
9	9	1	d	10	Y	2	gynecology
10	10	10	e	1	X	2	gynecology
11	11	22	g	9	Y	2	radiotherapy
12	12	26	b	2	Y	4	radiotherapy
13	13	16	c	3	Z	2	radiotherapy
14	14	9	d	5	Z	3	radiotherapy
15	15	6	a	6	X	4	gynecology
16	16	6	a	6	X	3	gynecology

USN 11: Null values cleaning process.



Data module								Properties		
	Grid	Relationships	Custom tables	case_id	Hospital_code	Hospital_type_code	City_Code_Hospital	Hospital_region_code	Available E...in Hospital	Department
train_data.csv	1	8	c	3	Z	3	radiotherapy			
# Row Id	2	2	c	5	Z	2	radiotherapy			
# case_id	3	10	e	1	X	2	anesthesia			
# Hospital_code	4	26	b	2	Y	2	radiotherapy			
# Hospital...pe_code	5	26	b	2	Y	2	radiotherapy			
# City_Cod...Hospital	6	23	a	6	X	2	anesthesia			
# Hospital...ion_code	7	32	f	9	Y	1	radiotherapy			
Available...Hospital	8	23	a	6	X	4	radiotherapy			
Department	9	1	d	10	Y	2	gynecology			
Ward_Type	10	10	e	1	X	2	gynecology			
Ward_F...ty_Code	11	22	g	9	Y	2	radiotherapy			
Bed Grade	12	26	b	2	Y	4	radiotherapy			
patientid	13	16	c	3	Z	2	radiotherapy			
City_Code_Patient	14	9	d	5	Z	3	radiotherapy			
Type of Admission	15	6	a	6	X	4	gynecology			
Severity of Illness	16	6	a	6	X	3	gynecology			
Visitors ...h Patient										
Age										
Admissio...Deposit										
Stay										
test_data.csv										

USN 12: Python pandas with numpy.

```
import pandas as pd
```

```
import numpy as np
```

```
import matplotlib.pyplot as plt

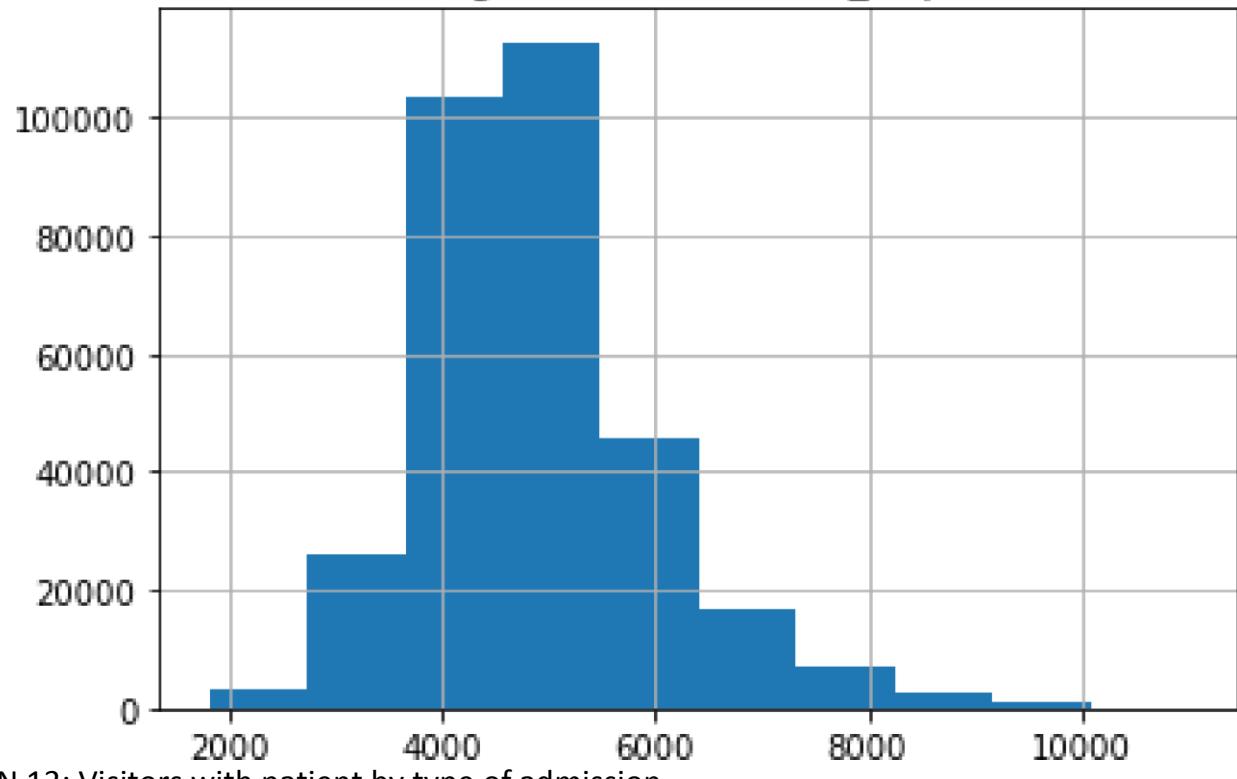
import seaborn as sns

%matplotlib inline

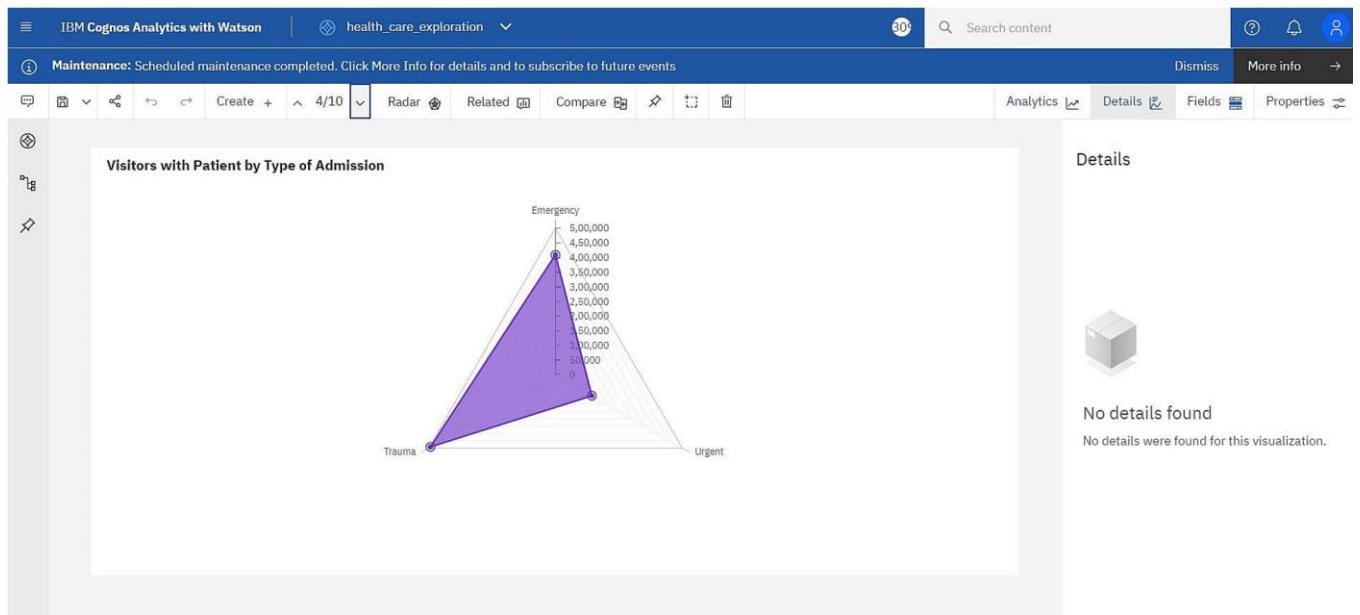
df= pd.read_csv("C:/Users/nprav/OneDrive/Desktop/
Healthcare_Data/train_data.csv")
```

```
df
```

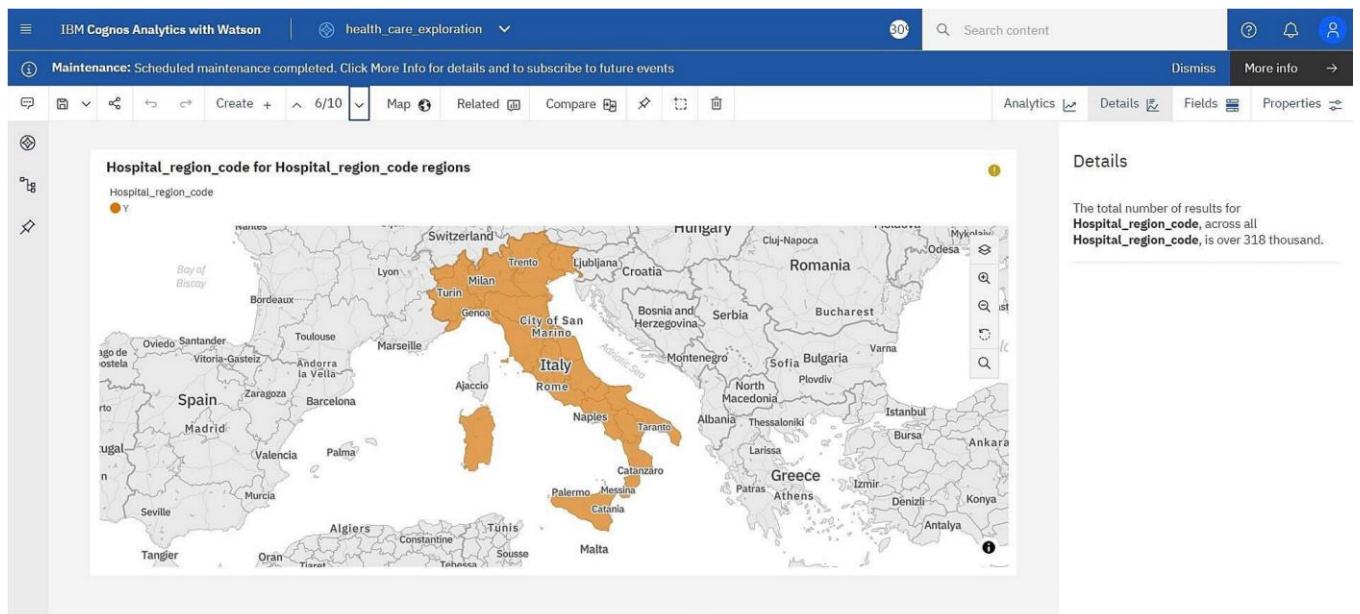
Histogram for Admission_Deposit



USN 13: Visitors with patient by type of admission.

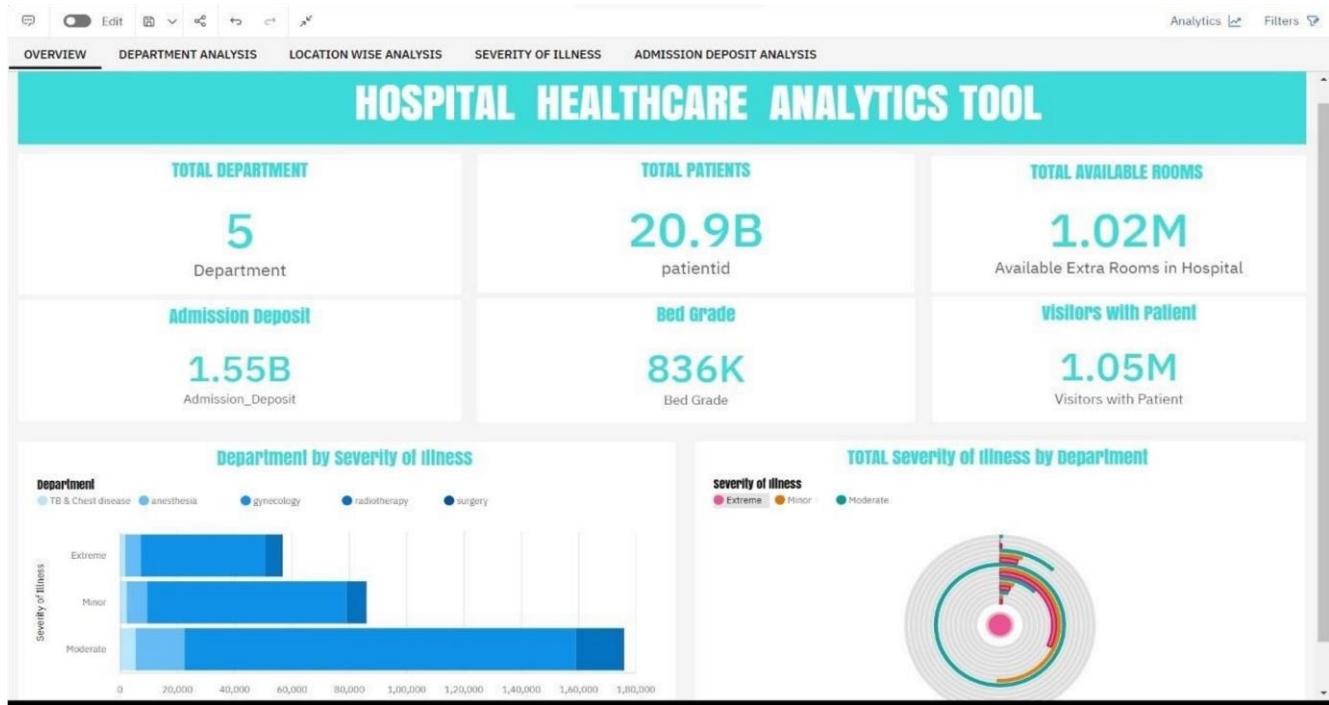


USN 14: Hospital region code for hospital region code regions.

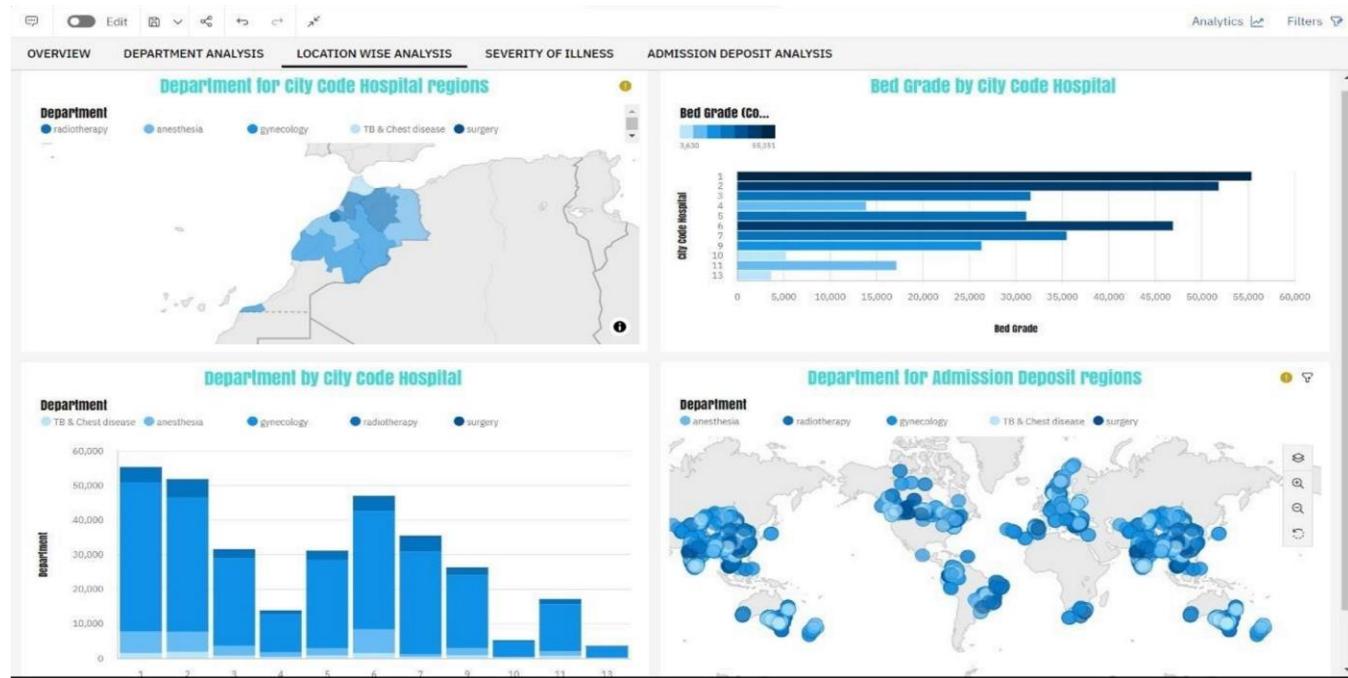


7.3 DASHBOARD CREATION WITH DATASETS.

OVERVIEW



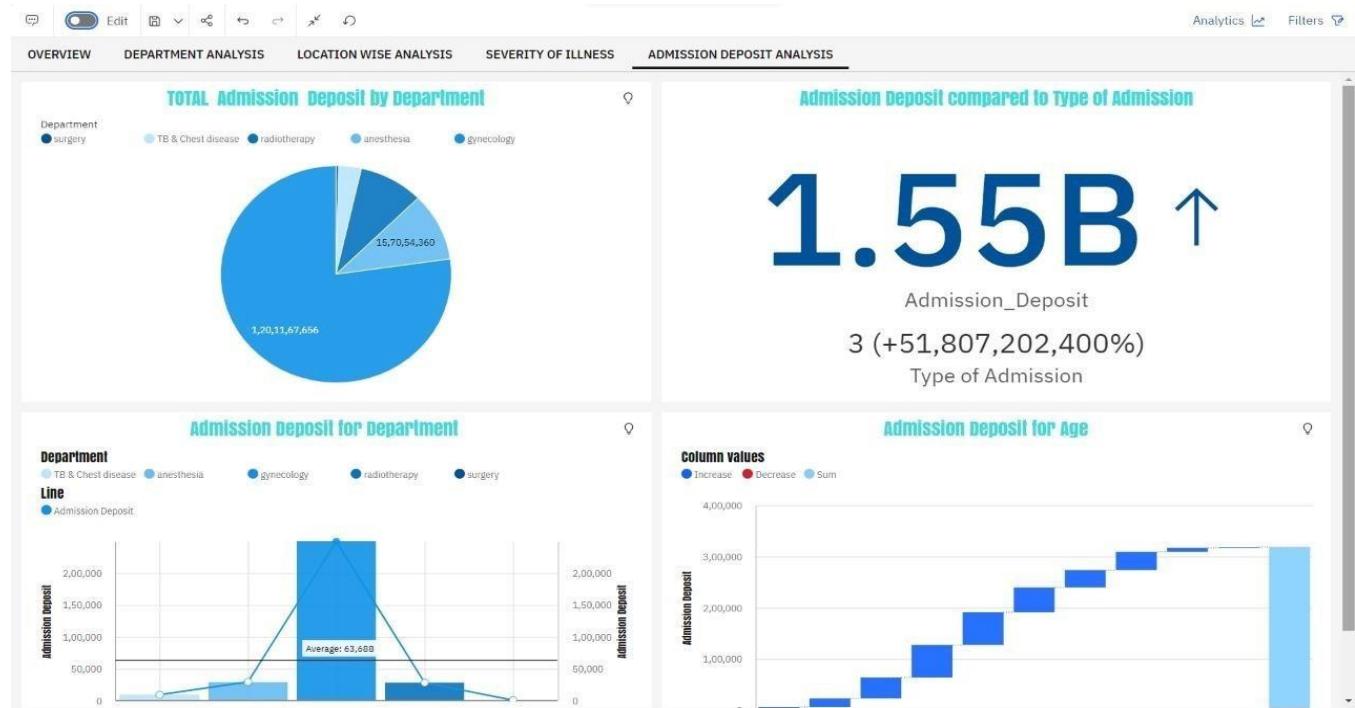
LOCATION WISE ANALYSIS



SEVERITY OF ILLNESS



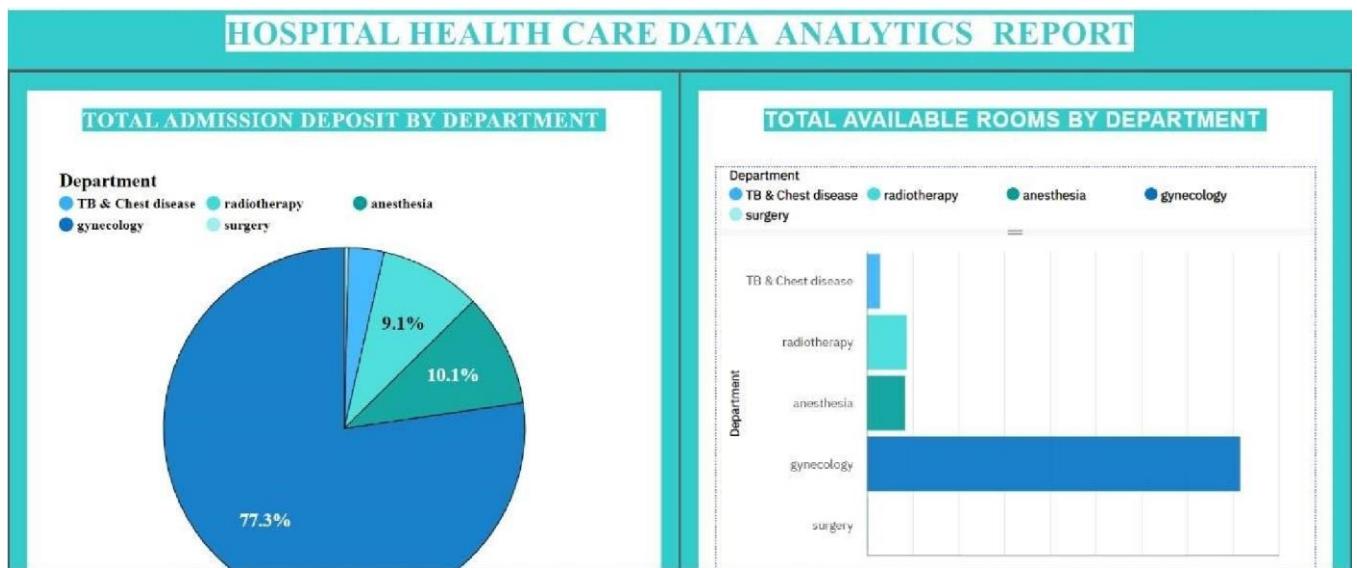
ADMISSION DEPOSIT ANALYSIS



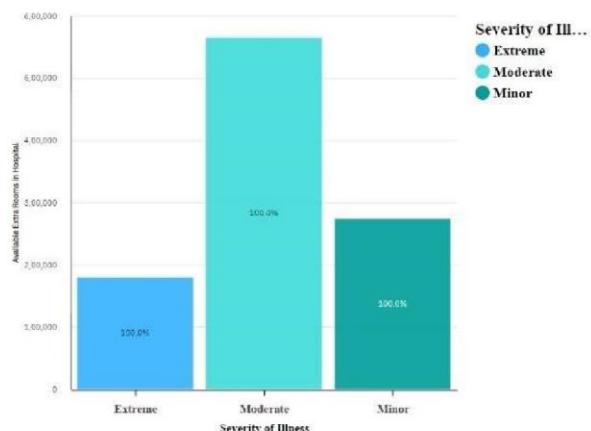
RESULTS

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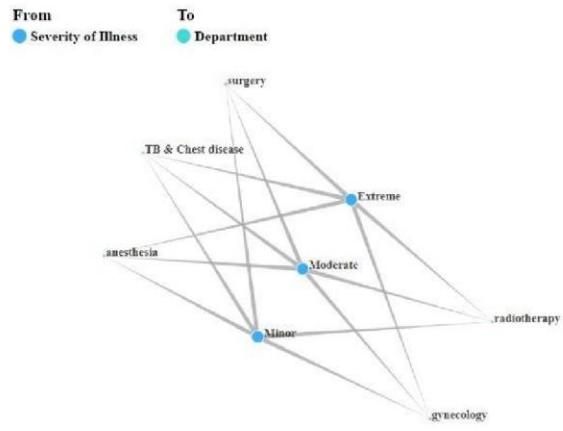
RESULT



AVAILABLE EXTRA ROOMS FOR ILLNESS



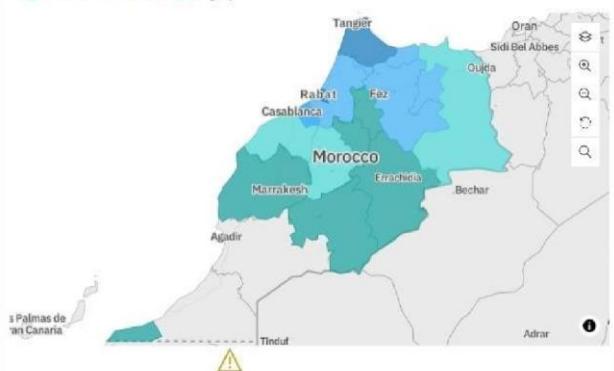
SEVERITY OF ILLNESS TO DEPARTMENT



CITY CODE HOSPITAL BY DEPARTMENT

Department

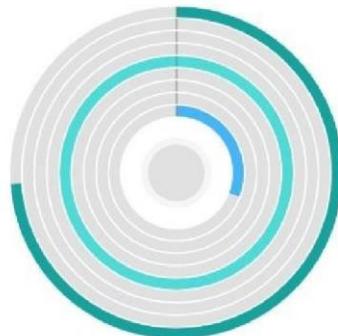
- radiotherapy
- TB & Chest disease
- anesthesia
- surgery
- gynecology



TYPE OF ADMISSION BY ADMISSION DEPOSIT

Type of Admission

- Urgent
- Trauma
- Emergency



ADVANTAGES AND DISADVANTAGES

CHAPTER

9

ADVANTAGES AND DISADVANTAGES

9.1 ADVANTAGES

- As the internet reaches the far ends of our world, so does digital health. With a simple internet connection, anyone can access **patient health records** online without visiting the medical center.
- Gone are those days of securely storing all the handwritten prescriptions and test reports. With **electronic health record** apps, you can store all the relevant health data in one place without worrying about losing one.
- Personal digital health tools like fitness bands let you know your health-related data on a real-time basis.
- Those technological marvels constantly track your vitals and auto-dial emergency numbers in case anything wrong happens to you.

9.2 DISADVANTAGES

- Adapting to new technologies has always been a challenge for senior citizens.
- Adapting to new technologies has always been a challenge for senior citizens. Some of them prefer the old-school treatment methods instead of getting used to digital health facilitators.
- If not done properly, these apps can often crash, resulting in an inconvenience.

CONCLUSION

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CONCLUSION

This research demonstrates Analytics for hospital and health care data with data visualization and anlaytics.This information is gathered from a series of health information systems (HIS) and other technological tools utilized by health care

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professionals, insurance companies and government organizations. Consider the impact this has had on the COVID-19 pandemic. The data being collected is analyzed in real time to understand the effects of the virus better and predict future trends so we may slow the spread and prevent future outbreaks. Health care data management has the potential to lead to better care if used properly.

Healthcare analytics can be understood as the gathering and analysis of healthcare sector data with the purpose of deriving insights and prompting decision-making. Ranging from main areas like medical expenses, clinical data, patient behavior, or pharmaceuticals, healthcare data analytics can be employed at both the macro and micro level to sufficiently boost operations, enhance patient care, and curtail overall expenses.

Nevertheless this data, while being highly advantageous is also pretty complicated. Be it the data from electronic health records (EHR) or the data gained by assessing real-time vital signs, the data is not only derived from a number of varying sources, but it is also required to follow government regulations, making it a complex and precarious process.

FUTURE SCOPE

11

FUTURE SCOPE

The data analytics market in the healthcare space has only increased over the last few years. Considering the rising costs of medical treatments globally, a proper body of knowledge was needed to reduce the costs at the business-level as well as the professional-level. McKinsey, in one of its reports, states that healthcare expenses constitute 17.6 percent of the GDP in the USA, which is approximately US\$600 billion, more than what is the set benchmark for the ideal size of population in the country. This is a serious indicator of bigger trouble. Hence, the usage of healthcare data analytics is being promoted these days.

To some, the domain of healthcare data analytics may look new, but it has a lot of potential, especially if you wish to engage in challenging job roles and build a strong data analytics profile in the upcoming years. In this blog, we have covered some of the major topics such as what is healthcare data analytics, its applications,

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scope, and benefits, etc. We hope it helps you in your decision-making as a healthcare data analytics professional.

