Project Report Format

1. INTRODUCTION

1.1 Project Overview

Big data has unlocked a new opening in healthcare. Thanks to the considerable benefits and opportunities, it has attracted the momentous attention of all the stakeholders in the healthcare industry. This chapter aims to provide an overall but thorough understanding of healthcare big data. The chapter covers the 10 'V's of healthcare big data as well as different healthcare data analytics including predictive and prescriptive analytics. The obvious advantages of implementing big data technologies in healthcare are meticulously described. The application areas and a good number of practical use cases are also discussed. Handling big data always remains a big challenge. The chapter identifies all the possible challenges in realizing the benefits of healthcare big data. The chapter also presents a brief survey of the tools and platforms, architectures, and commercial infrastructures for healthcare big data.

1.2 Purpose

1. Data analytics in health care is vital. It helps health care organizations to evaluate and develop practitioners, detect anomalies in scans and predict outbreaks in illness, per the Harvard Business School.
2. Data analytics can also lower costs for health care organizations and boost business intelligence.
3. Data analytics in the healthcare industry represents the automation of collection, processing, and analysis the complex

4. healthcare data, to gain better insights and enable healthcare practitioners to make well-informed decisions.

2. LITERATURE SURVEY

2.1 Existing problem

Abstract:

The current study performs a systematic literature review (SLR) to synthesis prior research on the applicability of big data analytics (BDA) in healthcare. The SLR examines the outcomes of 41 studies, and presents them in a comprehensive framework. The findings from this study suggest that applications of BDA in healthcare can be observed from five perspectives, namely, health awareness among the general public, interactions among stakeholders in the healthcare ecosystem, hospital management practices, treatment of specific medical conditions, and technology in healthcare service delivery. This SLR recommends actionable future research agendas for scholars and valuable implications for theory and practice

Keywords:

- Data
- Analytics
- Healthcare
- Hospital Management
- Medical Informatics
- Systematic literature review: Big covid-19

Introduction:

Balamurugan 2016; Weng and Kahn 2016 Healthcare enterprises search for suitable technologies to streamline resources for the sake of improving the patient experience and organisational performance (Tang et al. 2019; Wang, Kung, and Byrd 2018; Tandon et al. 2020). Healthcare can be conceptualised as a system comprising three constituent parts: (a) core providers of medical care services, such as physicians, nurses, technicians, and hospital administrations (Boudhir, Ben Ahmed, and Soumaya 2017; Zhang, Simon, and Yu 2017); (b) critical services that are associated with medical care services, such as medical research and health (Austin and Kusumoto 2016; Chandola, Sukumar, and Schryver 2013); and (c) beneficiaries of medical care services, i.e., patients and the public (Salomi).

Big data in healthcare:

Applications of BDA in healthcare are gradually increasing with the growing volume of big data in this context (Galetsi and Katsaliaki 2019, Among the possible sources of big data in healthcare are heterogeneous and multi-spectral observations, such as patient demographics (Malik, Abdallah, and Ala'raj 2018), treatment history (Ozminkowski et al. 2015), and diagnostic reports (Amirian et al. 2017). Mehta and Pandit (2018) suggest that such data may be structured (e.g., genotype, phenotype, or genomics data) or unstructured (e.g., clinical notes, prescriptions, or medical imaging). Implementing data in healthcare often requires the generation and collection of real-time data (Tang et al. 2019) of high quality (Wang, Kung, and Byrd 2018). Decision-makers in healthcare organisations are able to take meaningful action based on valuable insightsderived from big data (Prasser et al. 2019; Wang, Kung, and Byrd 2018). Healthcare organisations deploy technologies to cope with the changing nature of big data (Harerimana et al. 2018; Zhang et al. 2015). Moreover, big data in healthcare can be employed to connect different fields to comprehensively study a disease (Zhang, Simon,

and Yu 2017). In sum, all of the characteristics of big data mentioned above are observable in the context of healthcare.

Methodology:

The protocol for the current SLR, as presented in Figure 1, is comprised of three sequential processes: planning the review, performing the review, and presenting the review (Behera, Bala, and Dhir 2019; Tandon et al. 2020). The present SLR includes preset inclusion and exclusion criteria (see Figure 1), as recommended by prior literature (Behera, Bala, and Dhir 2019; Tandon et al. 2020).

Planning the review:

First, appropriate keywords were identified to search for relevant studies in the databases. This SLR focused on four databases: Scopus, Web of Science, PsycINFO, and PubMed. These databases are reportedly the most important sources for studies related to medical health informatics (Behera, Bala, and Dhir 2019; Tandon et al. 2020). Full texts of the studies that appeared relevant were screened for eligibility. Next, studies meeting the eligibility criteria (namely, the inclusion and exclusion criteria) were assessed for quality and robustness.

Applications of BDA in healthcare:

Health awareness

This theme involves different facets of general awareness of the holistic health and well-being of patients. For instance, prior studies on health awareness discussed health insurance (Chandola, Sukumar, and Schryver 2013), living environment (Jin et al., 2016), and sports behaviour (Tseng et al. 2017), among other topics. Chandola, Sukumar, and Schryver (2013) suggested that insurance claims data reveal important insights about the prevalence of fraudulent activities in healthcare. Jin et al. (2016) proposed that cyber technologies can provide

a safe and secure living environment for the elderly. Tseng et al. (2017) identified that personalised healthcare apps might analyse users' sports patterns and trends of heart rate change during exercise.

Healthcare ecosystem

This theme captures the dynamic relationships among stakeholders in the healthcare ecosystem in managing hardware resources (Koliogeorgi et al. 2017), device networks (Jindal et al. 2018), data warehousing (Sabharwal, Gupta, and Thirunavukkarasu 2016), and other facilities required for reaping the benefits of BDA (Wang, Kung, and Byrd 2018). Koliogeorgi et al. (2017) suggested that parallel execution of accelerated kernels delivers remarkable speed and scalability. Jindal et al. (2018) proposed the possibility of classifying big data generated from device networks in healthcare. Sabharwal, Gupta, and Thirunavukkarasu (2016) highlighted that BDA might revolutionise many aspects of healthcare, such as patient profiling, genomic analysis, and monitoring. However, the capabilities required for implementing big data analytics impact transformation practices in healthcare (Wang, Kung, and Byrd 2018).

2.2 References

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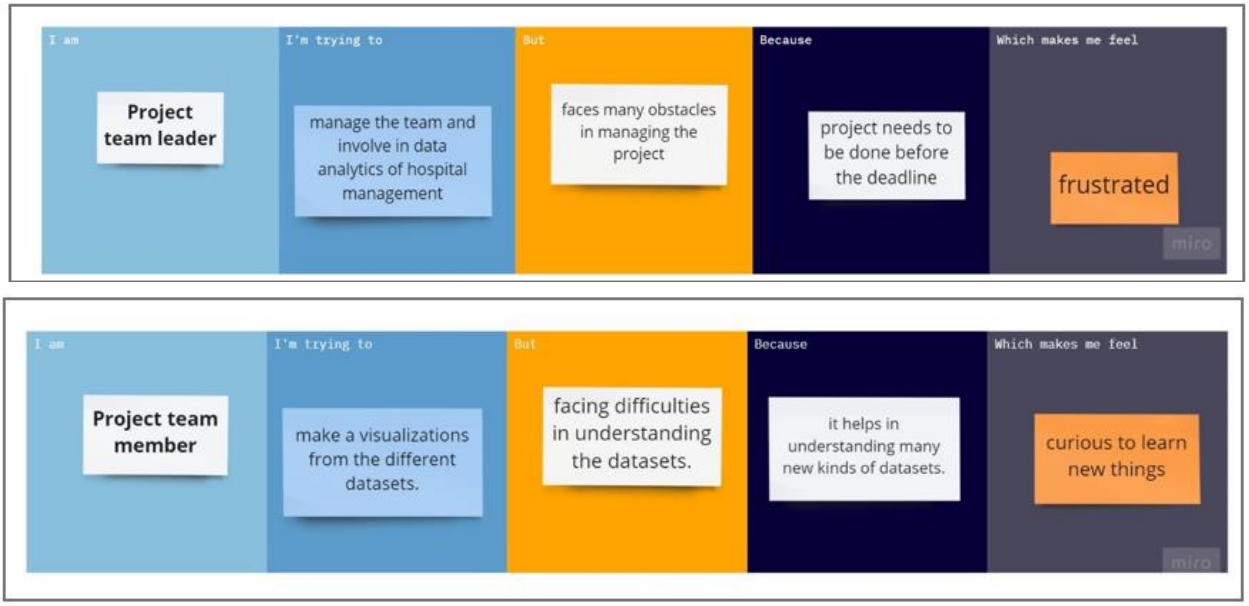
2.3 Problem Statement Definition

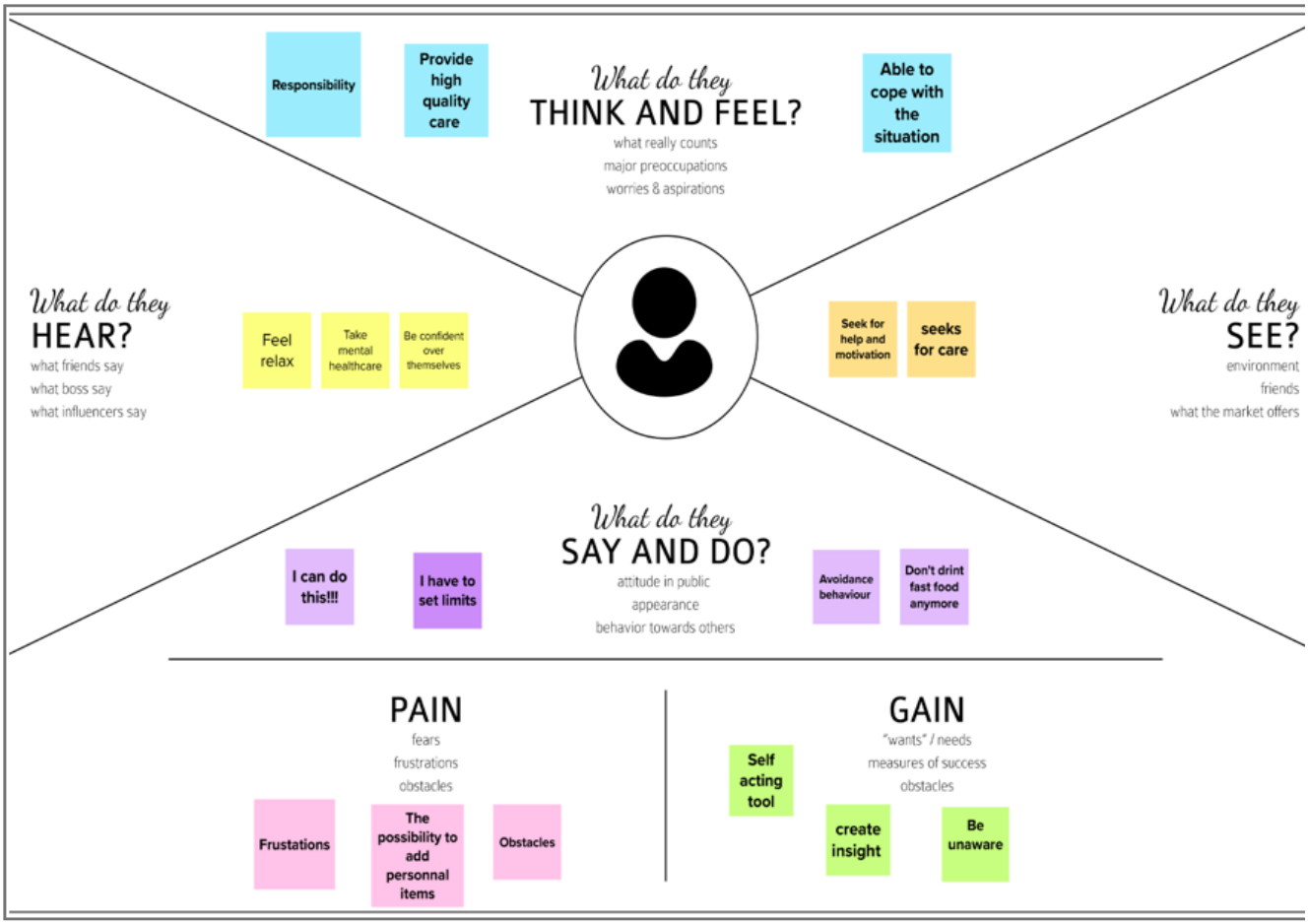


Problem Statement (PS)	I am (Customer)	I’m trying to	But	Because	Which makes me feel

PS-1	Project team leader	Manage the team and involve in data analytics of hospital management.	Faces many obstacles in managing the project.	Project needs to be done before the submission deadline.	Frustrated
PS-2	Project team member	Make a visualizations from the different datasets.	Facing difficulties in understandin g the datasets.	It helps in understanding many new kinds of datasets.	Curious to learn new things.

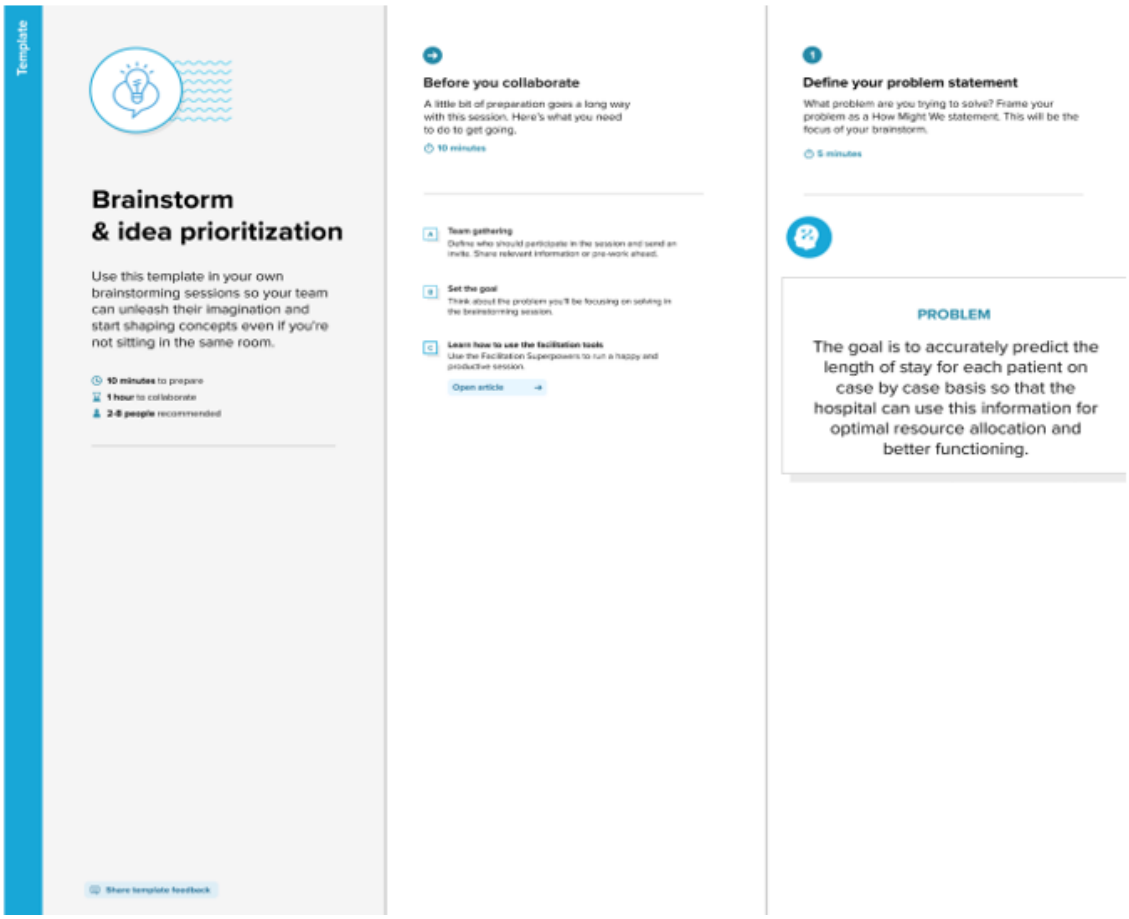
3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

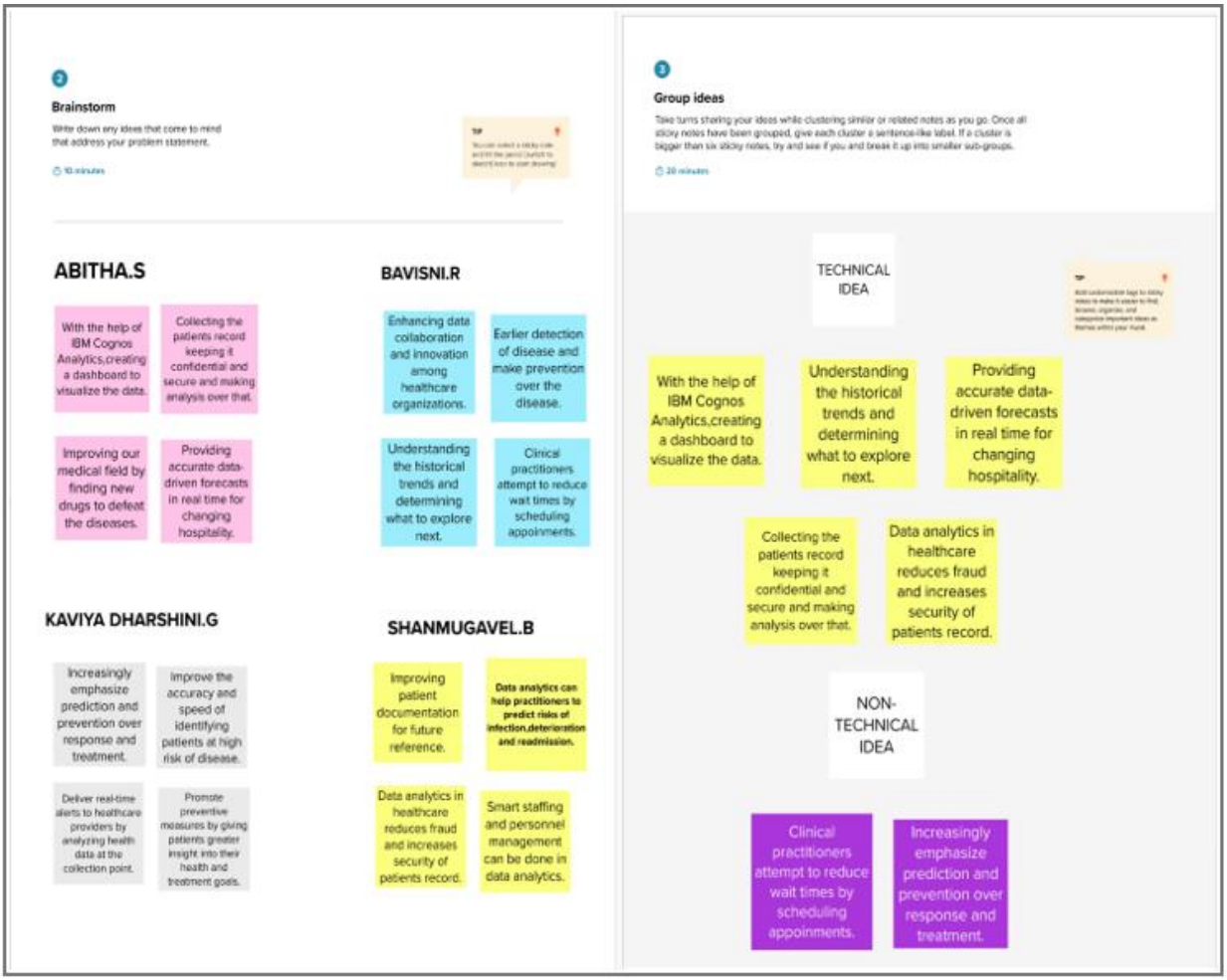


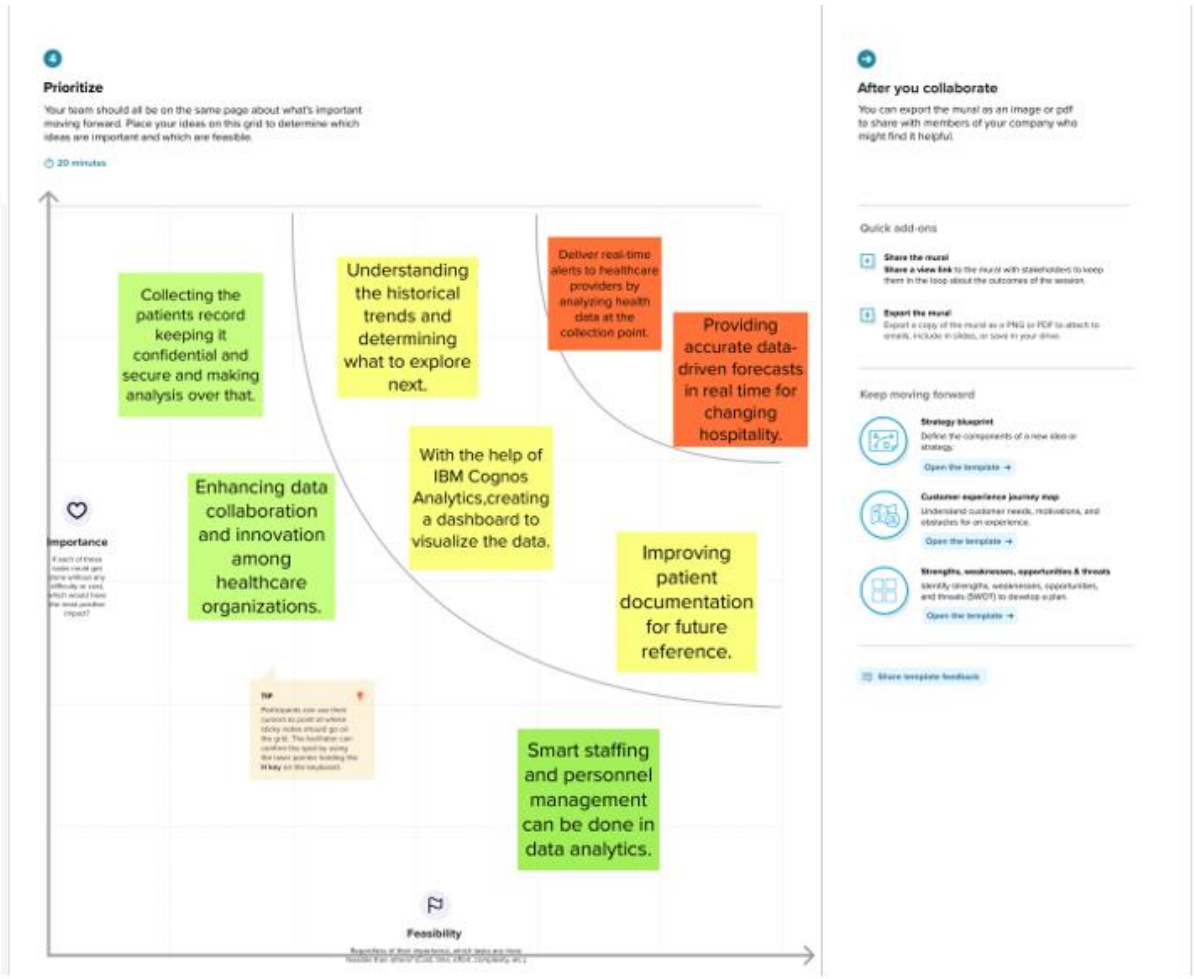
3.2 Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping


2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
ABITHA.S
With the help of IBM Cognos Analytics,creating a dashboard to visualize the data.
Collecting the patients record keeping it confidential and secure and making analysis over that.
Improving our medical field by finding new drugs to defeat the diseases.
Providing accurate data-driven forecasts in real time for changing hospitality.
BAVISNI.R
Enhancing data collaboration and innovation among healthcare organizations.
Earlier detection of disease and make prevention over the disease.
Understanding the historical trends and determining what to explore next.
Clinical practitioners attempt to reduce wait times by scheduling appoinments.
KAVIYA DHARSHINI.G
Increasingly emphasize prediction and prevention over response and treatment.
Improve the accuracy and speed of identifying patients at high risk of disease.
Deliver real-time alerts to healthcare providers by analyzing health data at the collection point.
Promote preventive measures by giving patients greater insight into their health and treatment goals.
SHANMUGAVEL.B
Improving patient documentation for future reference.
Data analytics can help practitioners to predict risks of infection,deterioration and readmission.
Data analytics in healthcare reduces fraud and increases security of patients record.
Smart staffing and personnel management can be done in data analytics.
3
Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, 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
TECHNICAL IDEA
With the help of IBM Cognos Analytics,creating a dashboard to visualize the data.
Understanding the historical trends and determining what to explore next.
Providing accurate data-driven forecasts in real time for changing hospitality.
Collecting the patients record keeping it confidential and secure and making analysis over that.
Data analytics in healthcare reduces fraud and increases security of patients record.
NON-TECHNICAL IDEA
Clinical practitioners attempt to reduce wait times by scheduling appoinments.
Increasingly emphasize prediction and prevention over response and treatment.



3.3 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Now-a-days healthcare management plays a vital role in our day to day life. Taking care of our health means a lot to everyone but during covid-19 situation due to lack of managing of health, the world has lost a millions of people lives. By this technique, we can able to analyse, visualize and predict the disease as much as possible. The medical field could able to find medicines for the disease by predicting the disease as early as.

2.	Idea / Solution description	In healthcare management, analytics can be applied to every aspect of patient care and operations management. The analyses investigate methods of improving the provision of clinical care, enhancing disease prevention, and measuring the effectiveness of various treatment options.
3.	Novelty / Uniqueness	Data analytics stay on top of the latest trends in clinical care, reimbursement models, and population health management could be the difference between closing down a facility and experiencing record growth.
4.	Social Impact / Customer Satisfaction	With the help of this technique, try to predict the disease causing viruses, bacteria, protozoa etc... and avoid loss of lives.
5.	Business Model (Revenue Model)	By this technique, can able to increase in medical field and lives loss.
6.	Scalability of the Solution	It is simple and easy process of predicting diseases. The medical practitioners could make use of this kind of analytics techniques.

3.4 Proposed solution fit

1.CUSTOMER SEGMENT(S) CS	2.JOBS- TO- BE- DONE/ PROBLEMS J&P	3.TRIGGERS TO ACT TA
Patient segmentation is usually based on the following elements: the assessment, definition, and operationalisation of population or patient characteristics that are related to healthcare needs, outcomes aimed at when addressing population or patient needs, and the segmentation logic expressing how subpopulations, or patient groups are formed.	Healthcare data analysts oversee hospital data management and analytics. They are responsible for compiling and organizing healthcare data, analyzing data to assist in delivering optimal healthcare management, and communicating their findings with management.	Penn launched trigger system pallitative connect.The system uses a machine learning algorithm that extracts data from patients' EHRs, analyzing around 30 parameters to prepare predictions. Based on the historical and real-time data, ML algorithms can tell clinicians which patient is in the risk zone within several months by sending alerts. That way doctors can proactively respond to the patient's needs

4.EMOTIONS ***BEFORE/AFTER*** **EM** Recognizing the patient's emotions using deep learning techniques has attracted significant attention recently due to technological advancements. Automatically identifying the emotions can help build smart healthcare centers that can detect depression and stress among the patients in order to start the medication early. Using advanced technology to identify emotions is one of the most exciting topics as it defines the relationships between humans and machines. Machines learned how to predict emotions by adopting various methods. In this survey, we present recent research in the field of using neural networks to recognize emotions. We focus on studying emotions' recognition from speech, facial expressions, and audio-visual input and show the different techniques of deploying these algorithms in the real world.	**5.AVAILABLE SOLUTIONS** **AS** Healthcare providers depend more than ever on digital technologies to ensure accountability of care and efficient management of patient records.*Availability* of critical systems such as electronic health records ,hospital information systems picture archiving and communications systems , and other clinical and administrative applications is paramount. Stratus keeps clinical and administrative applications up and running all the time. We offer a range of flexible that are easy to deploy and manage, and backed by a support structure with a 30-year track record of success. Our solutions can be rapidly deployed in your chosen environment physical, virtualized or cloud without changes to your applications.	**6.CUSTOMER LIMITATIONS** **CL** Hospitals need data readily available to provide personalised experiences as shown above. The CRM solution should be able to seamlessly talk to the hospital HIS and the Electronic health record of the patient. However, as highlighted in a recent piece in providing this kind of personalisation is challenging.In a traditional context, a CRM solution would involve solutions like giving loyalty or reward points to customers. While loyalty programs do have their role in healthcare, delivering a stellar patient experience is equally important for fostering loyalty.

7.BEHAVIOR **BE** Consumer behavior analysis and findings are an important input to the design of health care marketing programs. This paper is an attempt to present a framework for understanding consumer health care behavior, and to present selected findings. The paper concentrates on primary demand aspects and focuses on three types of physician visits: preventive, diagnostic, and therapeutic. A model is presented to predict behavior for preventive and diagnostic situations, and behavior in therapeutic situations is described and analyzed.For a variety of reasons ranging from the purely humanitarian to the purely economic, marketing has become an accepted activity in many health care institutions and settings. The functions that marketing is expected to serve in the health care field are not dissimilar to the functions marketing is expected to fulfill in the commercial sector of the economy. And it is not surprising that the marketing problems faced by many health care institutions are similar to those faced by firms in the commercial sector.	**8.CHANNELS OF BEHAVIOR** **CH** Health organizations and patients interact over different communication channels and are harnessing digital communications for this purpose. Assisting health organizations to improve, adapt, and introduce new patient–health care practitioner communication channels (such as patient portals, mobile apps, and text messaging) enhances health care services access.This retrospective data study aims to assist health care administrators and policy makers to improve and personalize communication between patients and health care professionals by expanding the capabilities of current communication channels and introducing new ones. Our main hypothesis is that patient follow-up and clinical outcomes are influenced by their preferred communication channels with the health care organization.	**9.PROBLEMS ROOT/CAUSE** **RC** Root cause analysis has important implications in helping healthcare organizations study events that resulted in patient harm or undesired clinical outcomes and identify strategies to reduce future error and improve patient care and safety. Most notably, root cause analysis can help identify medication errors such as illegible handwritten prescriptions, similar name packaging or misleading presentations of drug strength or dosage, ineffective control of prescription labels, and lapsed concentration due to interruptions. Clinician participation in root cause analysis is vital as these initiatives recognize and address important patient care aspects. **10.YOUR SOLUTION** **SL** Providing comprehensive, quality training data. Eliminating bias in data and algorithms. Developing quality tools while preserving patient privacy. Ensuring providers trust and support analytics tools.

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)

FR-1	User Registration	Form for registration using gmail or phone number
FR-2	User Confirmation	Confirmation of account using mail or OTP
FR-3	Interoperability	With the help of dashboard it is possible to transmit patient information with hospital
FR-4	Accuracy	Based on LOS (Length of Stay), can predict patient's health risk using dashboard
FR-5	Compliance	The use of a dashboard for compliance by hospitals is quite dynamic and takes place in real time
FR-6	Concise	These dashboards are easy to understand, simple to customize and interactive.

4.2 Non-functional Requirements:

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

FR No.	**Non-Functional Requirement**	**Description**
NFR-1	**Usability**	In order to provide visual representation of the patient's LOS, dashboard makes use of data visualization techniques like charts and graphs
NFR-2	**Security**	The dashboard aids in indicating the level of threat that currently exits for the hospitals, as well as past occurrences and

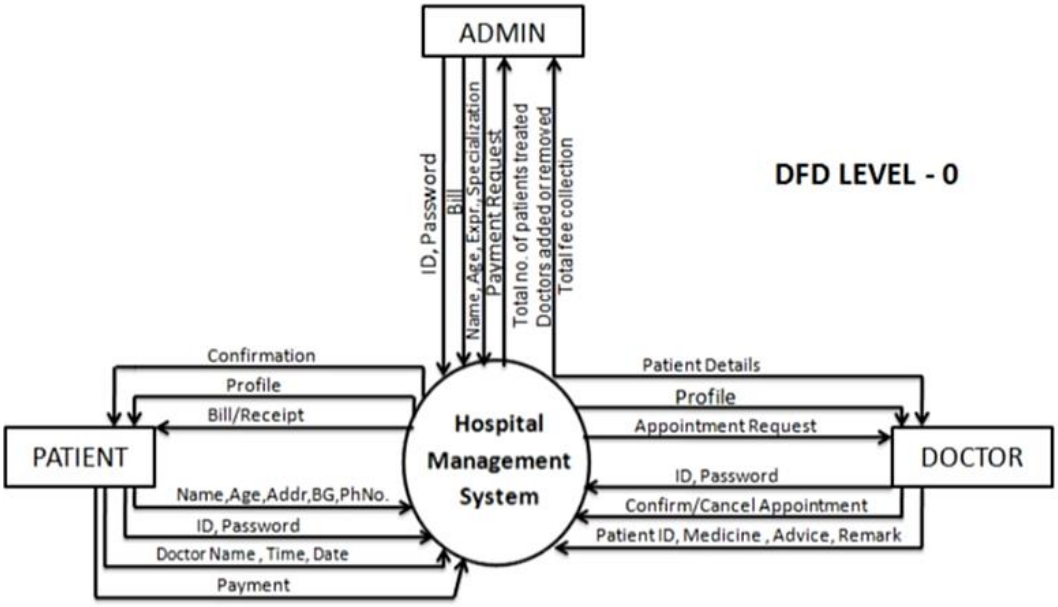
		incidents, authentication mistakes, scams, probes and unwanted access
NFR-3	**Reliability**	Users will find this dashboard to be consistent, dependable and helpful in using in an effective, efficient and dependable manner
NFR-4	**Performance**	This dashboard may scan backend users, examining how frequently they visit the dashboard might reveal relevant information about the jobs the data is beneficial for.
NFR-5	**Availability**	The dashboard is able to promptly satisfy user needs and aids in giving the user's dataset the relevant information
NFR-6	**Scalability**	A hosted feature layer, feature layer view or hosted tile layer are the layers that are used in the dashboard.

5. PROJECT DESIGN

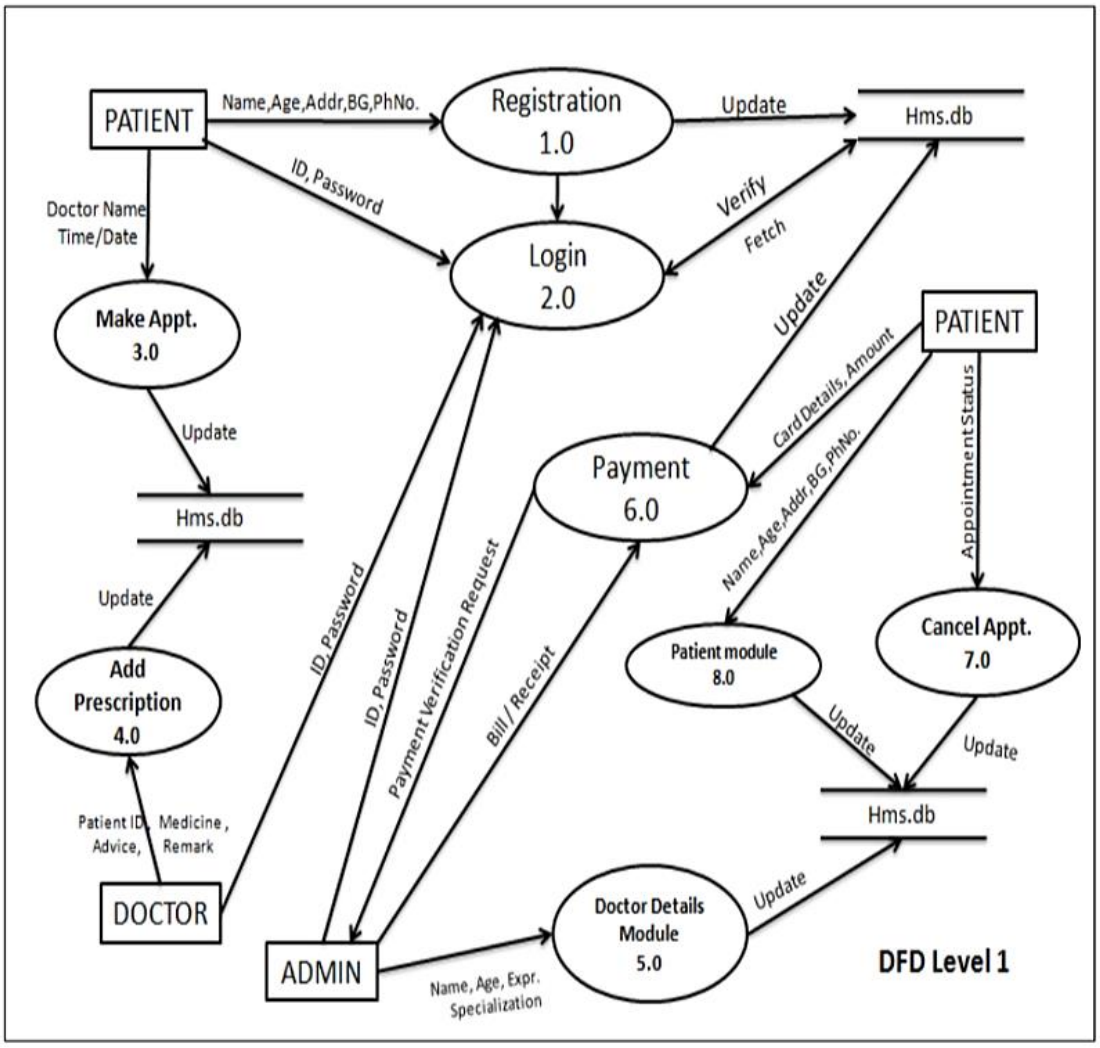
5.1Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

ZERO LEVEL DATA FLOW DIAGRAM



FIRST LEVEL DATA FLOW DIAGRAM



5.2 Solution & Technical Architecture

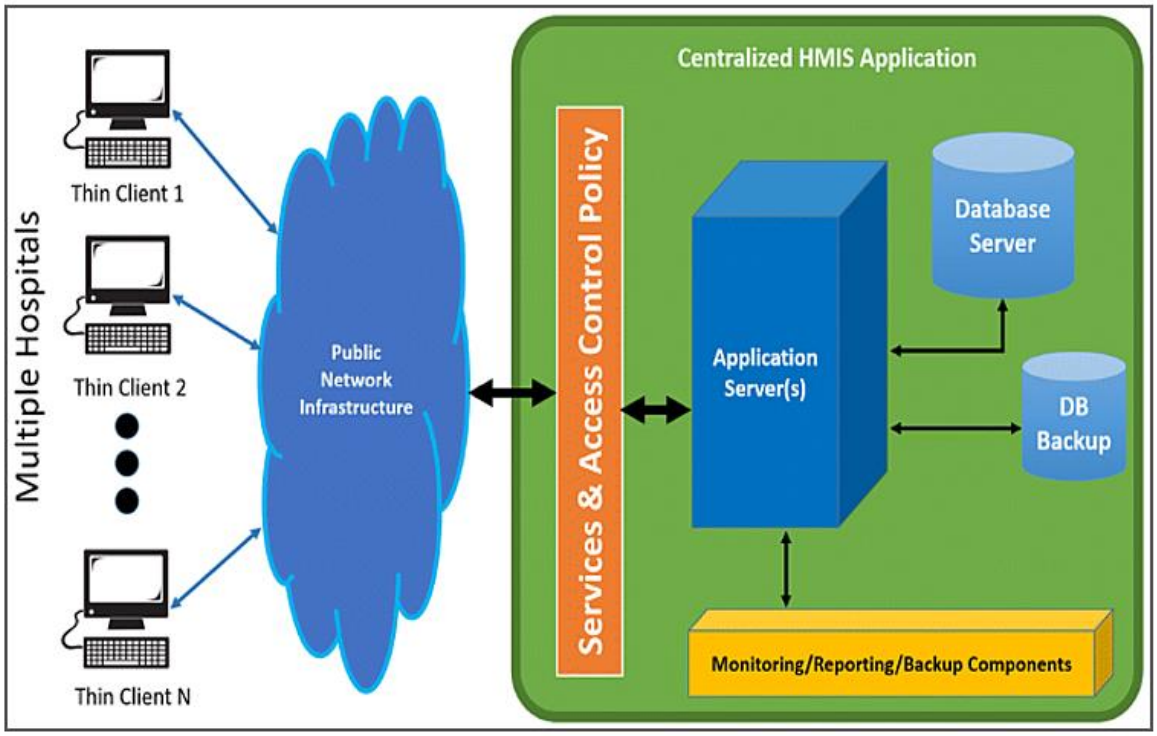


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interacts with application using Web UI	HTML, CSS, JavaScript
2.	Data Processing	The data from the dataset is pre-processed	IBM Cognos Analytics
3.	Cloud Database	The clean dataset is stored on IBM Cloud	IBM Cloud
4.	Data visualization	The data is visualized into different forms	The data is visualized into different forms

5.	Prediction	These Algorithm techniques are used to predict the proper way to make the stock in store.	ML algorithms –Logistic Regression, Linear Regression, Random Forest,ABC Techniques.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frameworks used	IBM Cognos Analytics, Python
2.	Security Implementations	Request authentication using Encryptions	Encryptions
3.	Scalable Architecture	Scalability consists of 3-tiers	Web Server – HTML,CSS,Javascript Application Server – Python Database Server – IBM Cloud
4.	Availability	The application is available for cloud users	IBM Cloud Hosting
5.	Performance	The user can know how to maintain the inventory to increase profits.	ML algorithms.

5.3 User Stories

Use the below template to list all the user stories for the product.

Scenario/step	User action	System action
Basic Path:		
1.a	Clicks Jump to Order Entry hyperlink	Opens up the Order Entry activity for the provider to prescribe Bisphosphonates, silently files an Acknowledge reason of 'Action taken', and locks out the Alert for 168 hours for this provider, this encounter.
Alt Paths:		
2.a	Clicks Jump to Medications hyperlink	Opens up the Medications activity for the provider to review the pt's meds and order Bisphosphonates if desired, silently files an Acknowledge reason of 'Action taken', and locks out the Alert for 168 hours for this provider, this encounter.
3.a	Clicks [Pt declined]	Displays "Not done – patient reason" in the Acknowledge Reason: box. Enables the [Accept] button
3.b	Clicks [Accept]	Files an Acknowledge reason of "Not done – patient reason", and locks out the alert for 6 months, all providers, all encounters
4.a, 4.b. thru 6.a, 6.b	<Clicks other Ack button>	<similar to 3.a. and 3.b. for each, with different Ack reasons and possibly different lockout settings>
7.A	Clicks [Cancel]	Closes Alert window, no lockout set

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the applicationby entering my email, password, and confirming my password.	10	High	Abitha S Bavisni R
Sprint-1	Data uploading	USN-2	As a user, I will be uploading my data intothe Cognos analytics	10	High	Abitha S

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Data Analysis	USN-3	As a user, I will be performing analysis on the data for making predictions	5	High	Abitha S Bavisni R
Sprint-2	Dashboards	USN-4	As a user, I will be making visualizations and interactive dashboards from the data	10	High	Abitha S
Sprint-3	Story	USN-5	As a user, I will be making stories from the data and the dashboards	20	High	Abitha S Bavisni R Kaviya Dharshini G
Sprint-4	Report	USN-6	As a user, I will be making a report from the analysis and dashboards	20	High	Kaviya Dharshini G Shanmugavel B

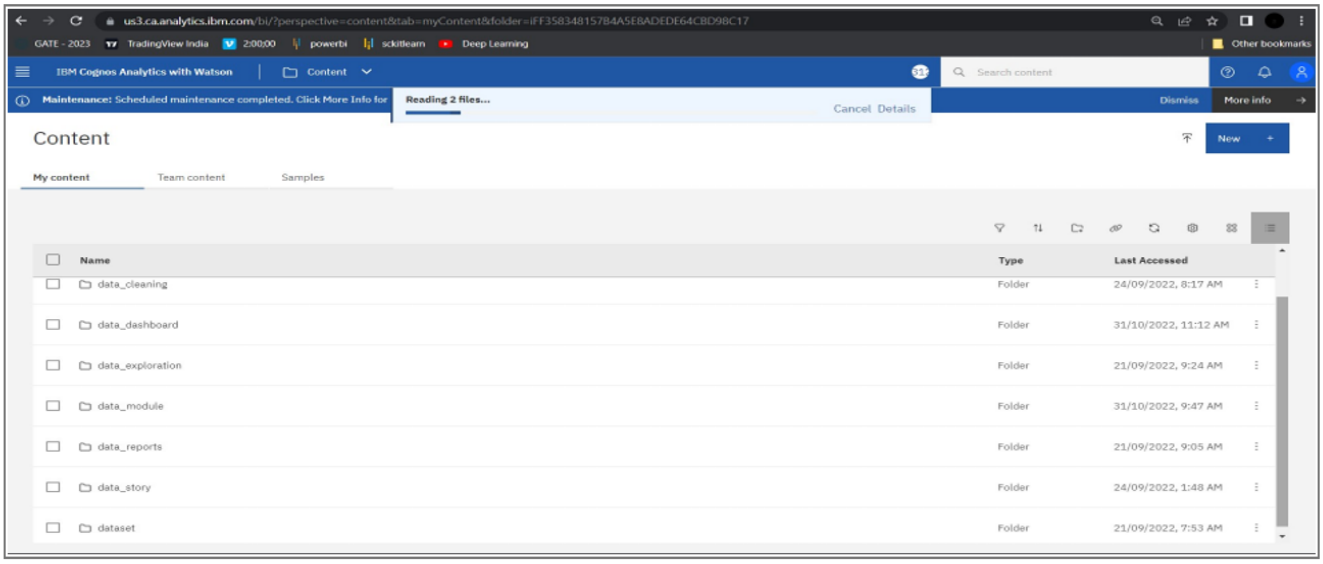
6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

7. CODING & SOLUTIONING

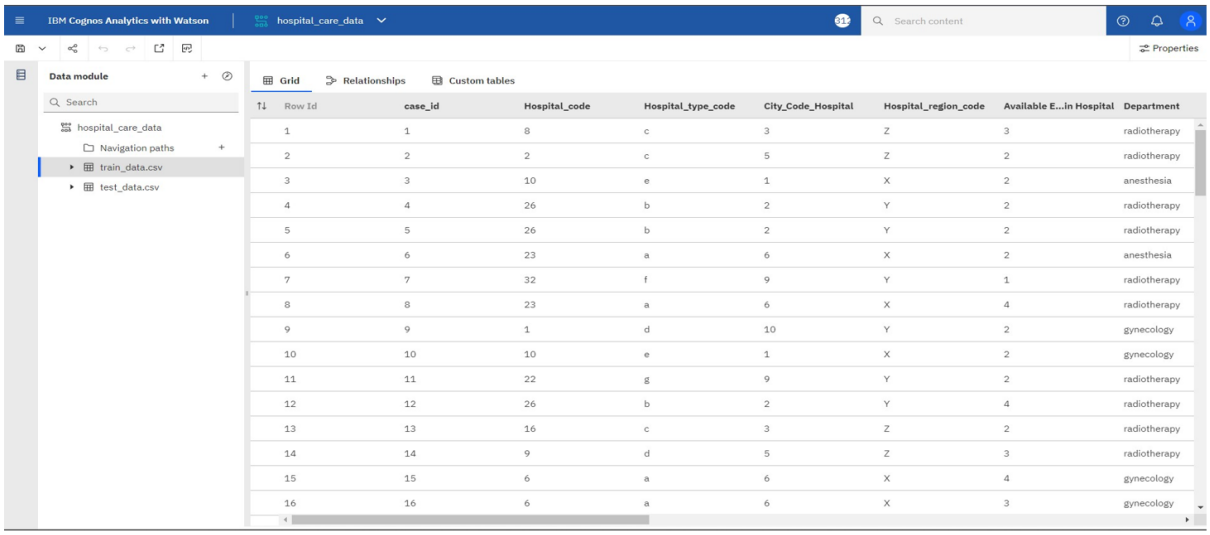
7.1 Feature 1

Data set

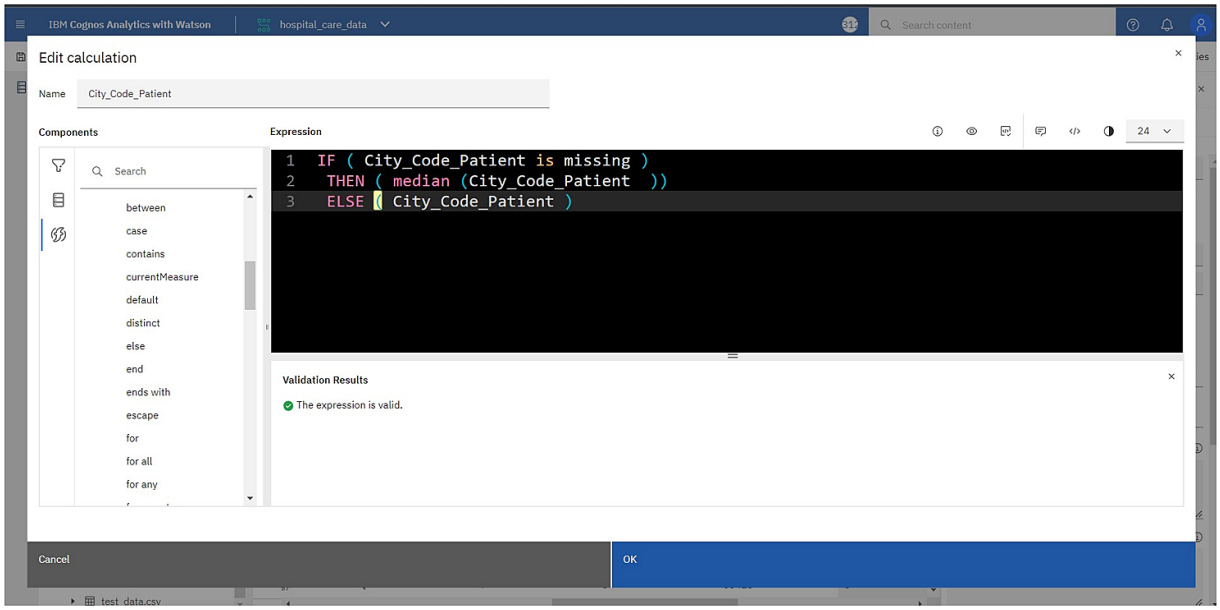


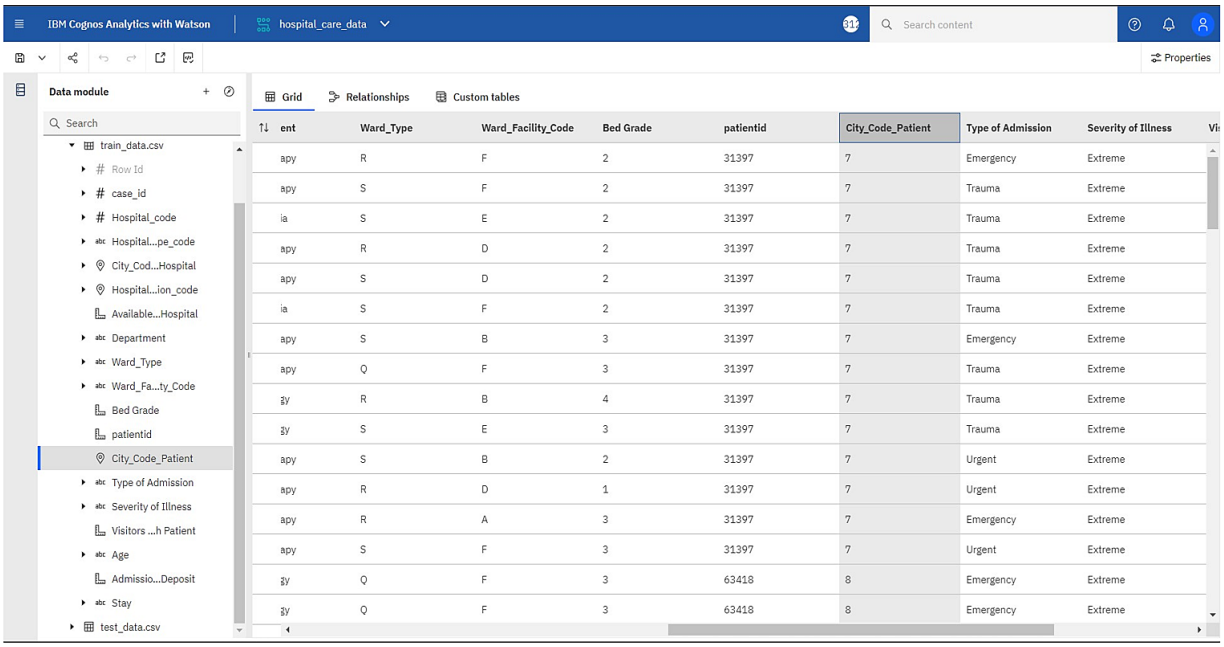
Data Preparation:

Prepare the dataset

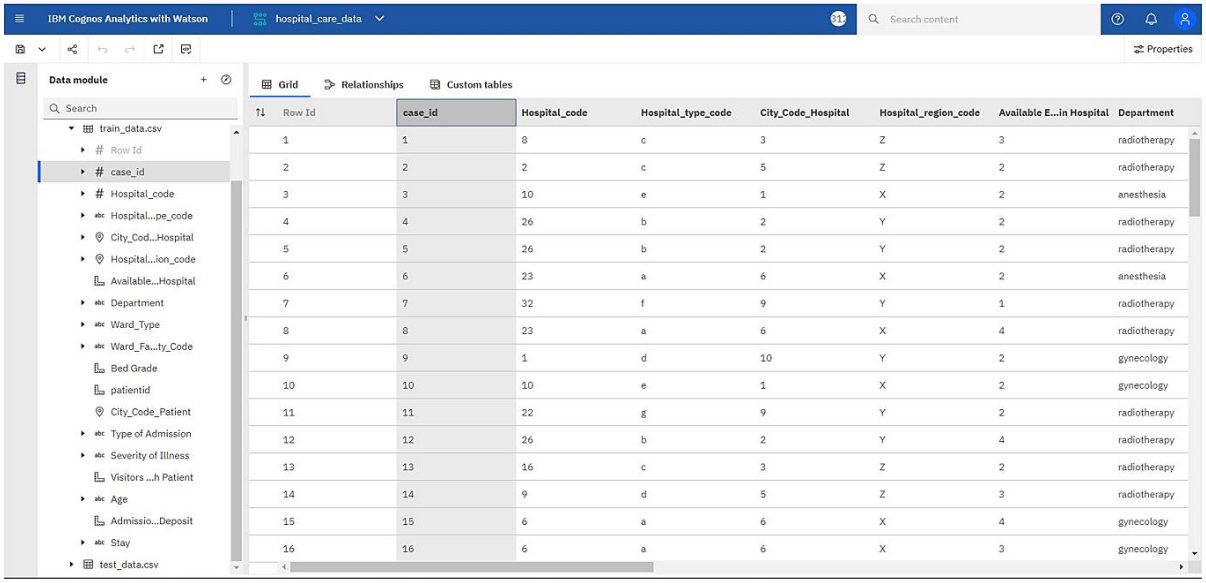


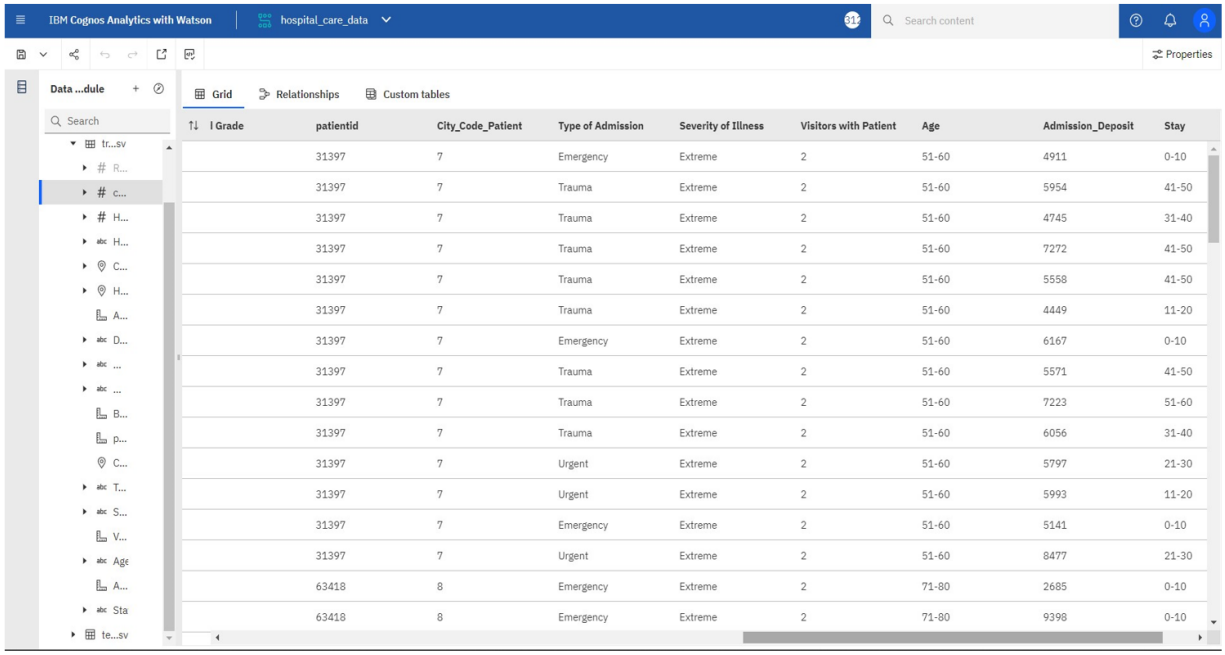
Null values cleaning process





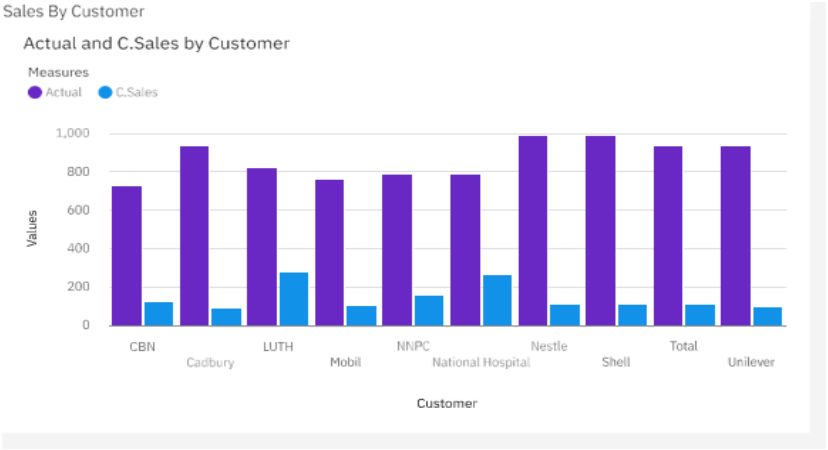
Hospital Data



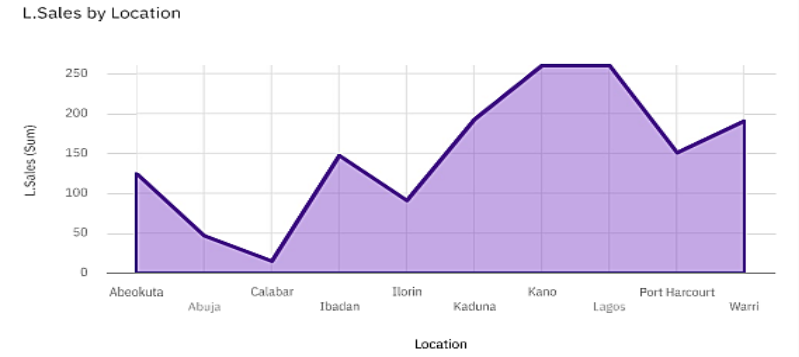


Task 1:Sales By Customer.
Task 2:Sales By Location.
Task 3:Sales By Sales Representative.
Task 4: Received Inventory From Supplier
Task 5: Inventory Stock for Warehouse Locations
Task 6: Sales Trend
Task 7:Monthly Sales
Task 8: Actual and Received Inventory by Month

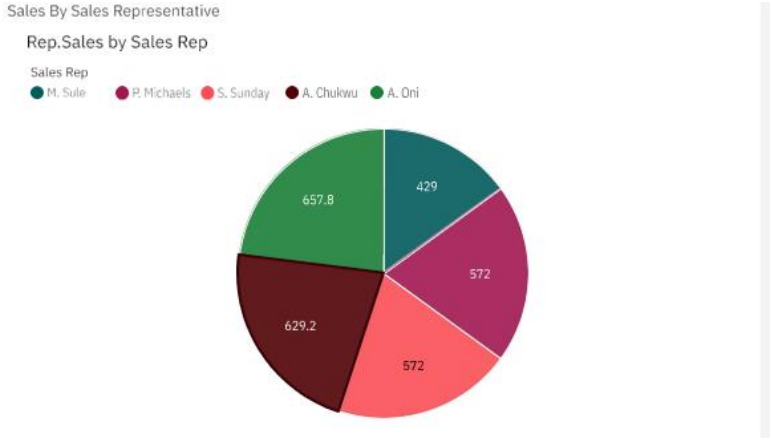
Sales By Customer



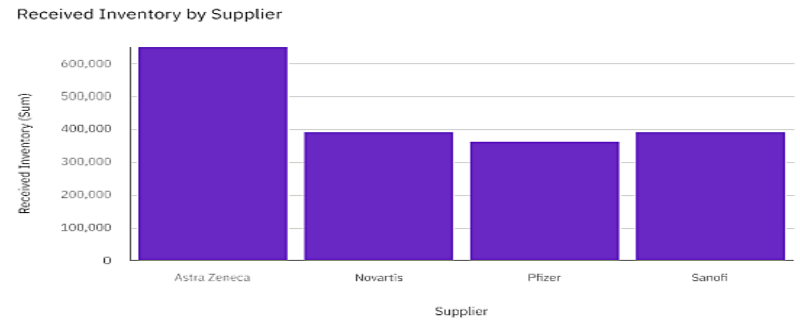
Sales By Location



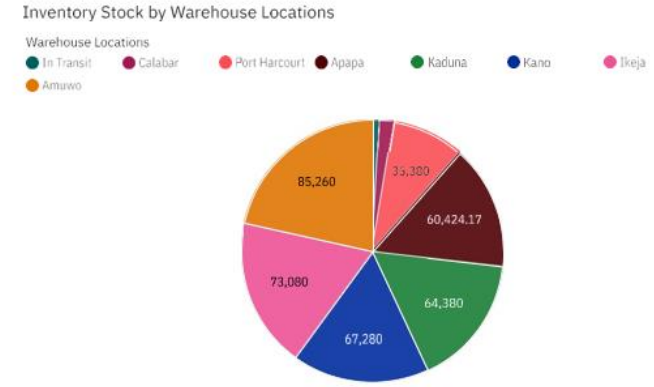
Sales By Sales Representative



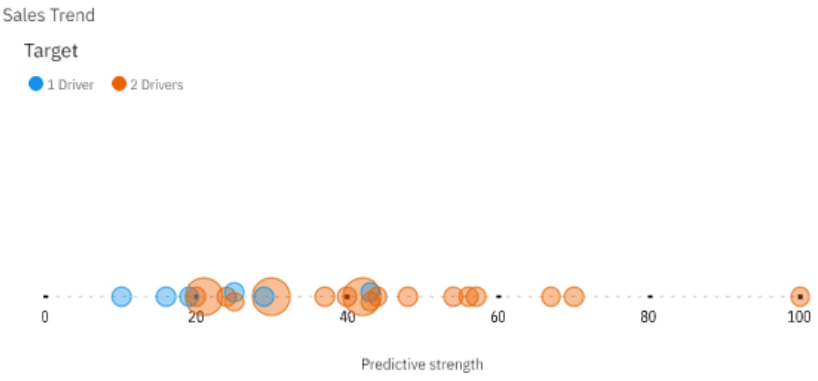
Received Inventory From Supplier



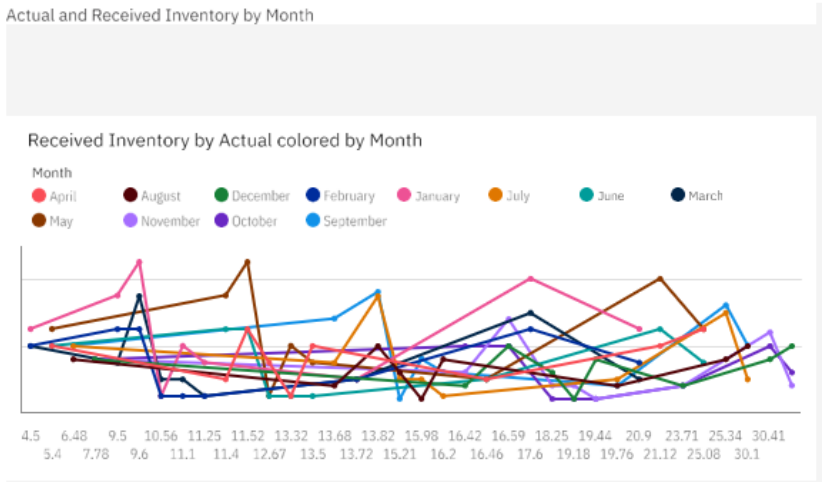
Inventory Stock for Warehouse Locations



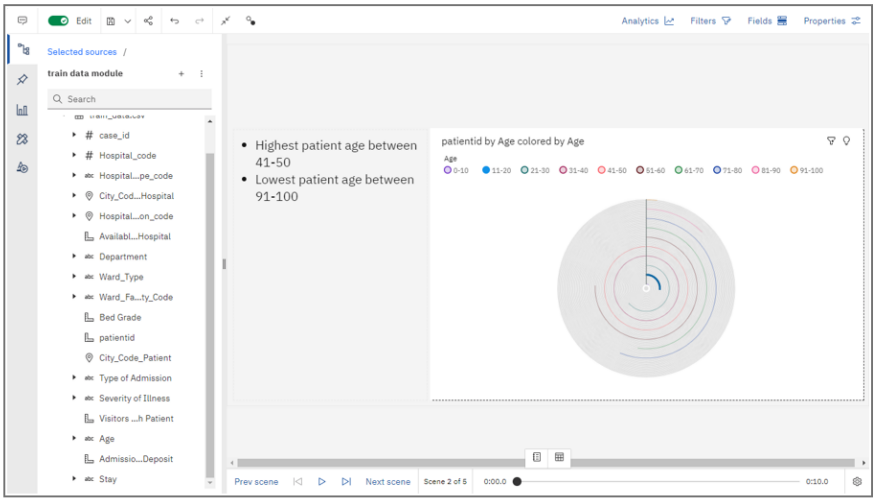
Sales Trend

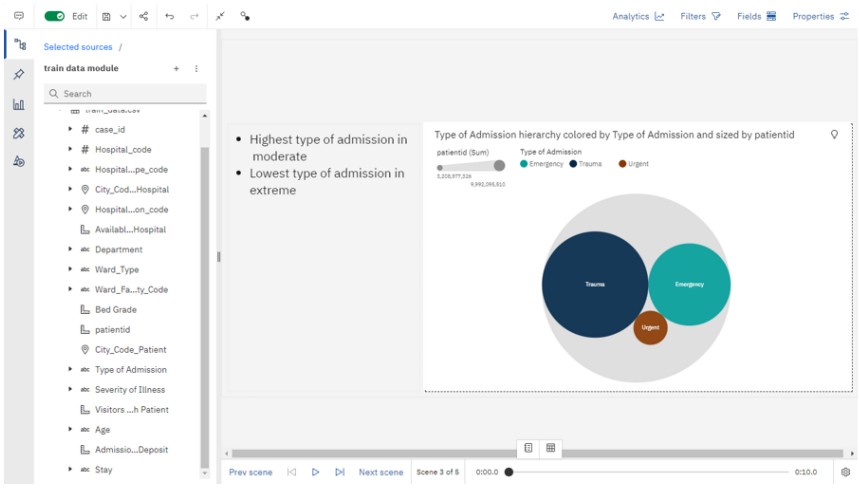


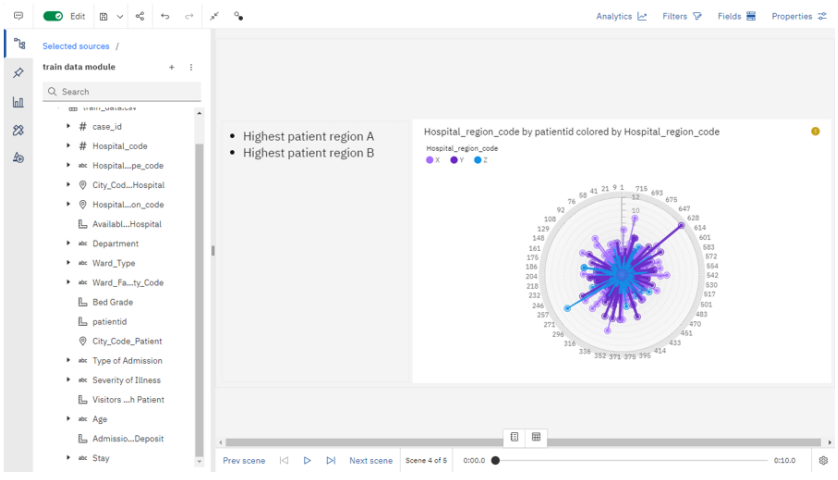

Monthly Sales
M.Sales, Month
2.04K
M.Sales


Actual and Received Inventory by Month
Received Inventory by Actual colored by Month
Month
April
August
December
February
January
July
June
March
May
November
October
September
4.5 6.48 9.5 10.56 11.25 11.52 13.32 13.68 13.82 15.98 16.42 16.59 18.25 19.44 20.9 23.71 25.34 30.41
5.4 7.78 9.6 11.1 11.4 12.67 13.5 13.72 15.21 16.2 16.46 17.6 19.18 19.76 21.12 25.08 30.1

7.2 Feature 2


Edit
Analytics
Filters
Fields
Properties
Selected sources /
train data module
Search
case_id
Hospital_code
Hospital...pe_code
City_Cod...Hospital
Hospital...on_code
Availabl...Hospital
Department
Ward_Type
Ward_Fa...ty_Code
Bed Grade
patientid
City_Code_Patient
Type of Admission
Severity of Illness
Visitors ...h Patient
Age
Admissio...Deposit
Stay
Highest patient age between 41-50
Lowest patient age between 91-100
patientid by Age colored by Age
Age
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
Prev scene
Next scene
Scene 2 of 5
0:00.0
0:10.0


Edit
Analytics
Filters
Fields
Properties
Selected sources /
train data module
Search
case_id
Hospital_code
Hospital...pe_code
City_Cod...Hospital
Hospital...on_code
Availabl...Hospital
Department
Ward_Type
Ward_Fa...ty_Code
Bed Grade
patientid
City_Code_Patient
Type of Admission
Severity of Illness
Visitors ...h Patient
Age
Admissio...Deposit
Stay
Highest type of admission in moderate
Lowest type of admission in extreme
Type of Admission hierarchy colored by Type of Admission and sized by patientid
patientid (Sum)
Type of Admission
Emergency
Trauma
Urgent
Prev scene
Next scene
Scene 3 of 5
0:00.0
0:10.0


Edit
Analytics
Filters
Fields
Properties
Selected sources /
train data module
Search
case_id
Hospital_code
Hospital...pe_code
City_Cod...Hospital
Hospital...on_code
Availabl...Hospital
Department
Ward_Type
Ward_Fa...ty_Code
Bed Grade
patientid
City_Code_Patient
Type of Admission
Severity of Illness
Visitors ...h Patient
Age
Admissio...Deposit
Stay
Highest patient region A
Highest patient region B
Hospital_region_code by patientid colored by Hospital_region_code
Hospital_region_code
X
Y
Z
Prev scene
Next scene
Scene 4 of 5
0:00.0
0:10.0

8.CONCLUSION

The current study performs a systematic literature review (SLR) to synthesis prior research on the applicability of big data analytics (BDA) in healthcare. The SLR examines the outcomes of 41 studies, and presents them in a comprehensive framework. The findings from this study suggest that applications of BDA in healthcare can be observed from five perspectives, namely, health awareness among the general public, interactions among stakeholders in the healthcare ecosystem, hospital management practices, treatment of specific medical conditions, and technology in healthcare service delivery. This SLR recommends actionable future research agendas for scholars and valuable implications for theory and practice.

9.FUTURE SCOPE

The data analytics industry is projected to create over 11 million jobs by 2026 and increase investments in AI and machine learning by 33.49% in 2022 alone.Business analytics innovations create new challenges on their journey to maturity. But they qualify as trends only if enterprises can address them and land a neat profit. The future of business analytics will

see the cloud persisting as a market mover and shaker, thanks to new technology.

10.APPENDIX

Source Code

Main.js

```
(function() {
                    "use strict";

                    /**
                     * Easy selector helper function
                     */
                    const select = (el, all = false) => {
                      el = el.trim()
                      if (all) {
                        return [...document.querySelectorAll(el)]
                      } else {
                        return document.querySelector(el)
                      }
                    }

                    /**
                     * Easy event listener function
                     */
                    const on = (type, el, listener, all = false) => {
                      let selectEl = select(el, all)
                      if (selectEl) {
                        if (all) {
                          selectEl.forEach(e => e.addEventListener(type, listener))
                        } else {
                          selectEl.addEventListener(type, listener)
                        }
                      }
                    }

                    /**
                     * Easy on scroll event listener
```

```
 */
const onscroll = (el, listener) => {
  el.addEventListener('scroll', listener)
}

/**
 * Navbar links active state on scroll
 */
let navbarlinks = select('#navbar .scrollto', true)
const navbarlinksActive = () => {
  let position = window.scrollY + 200
  navbarlinks.forEach(navbarlink => {
    if (!navbarlink.hash) return
    let section = select(navbarlink.hash)
    if (!section) return
    if (position >= section.offsetTop && position <= (section.offsetTop + section.offsetHeight)) {
      navbarlink.classList.add('active')
    } else {
      navbarlink.classList.remove('active')
    }
  })
}
window.addEventListener('load', navbarlinksActive)
onscroll(document, navbarlinksActive)

/**
 * Scrolls to an element with header offset
 */
const scrollto = (el) => {
  let header = select('#header')
  let offset = header.offsetHeight

  let elementPos = select(el).offsetTop
  window.scrollTo({
    top: elementPos - offset,
    behavior: 'smooth'
  })
}

/**
 * Toggle .header-scrolled class to #header when page is scrolled
 */
let selectHeader = select('#header')
```

```
let selectTopbar = select('#topbar')
if (selectHeader) {
  const headerScrolled = () => {
    if (window.scrollY > 100) {
      selectHeader.classList.add('header-scrolled')
      if (selectTopbar) {
        selectTopbar.classList.add('topbar-scrolled')
      }
    } else {
      selectHeader.classList.remove('header-scrolled')
      if (selectTopbar) {
        selectTopbar.classList.remove('topbar-scrolled')
      }
    }
  }
  window.addEventListener('load', headerScrolled)
  onscroll(document, headerScrolled)
}

/**
 * Back to top button
 */
let backtotop = select('.back-to-top')
if (backtotop) {
  const toggleBacktotop = () => {
    if (window.scrollY > 100) {
      backtotop.classList.add('active')
    } else {
      backtotop.classList.remove('active')
    }
  }
  window.addEventListener('load', toggleBacktotop)
  onscroll(document, toggleBacktotop)
}

/**
 * Mobile nav toggle
 */
on('click', '.mobile-nav-toggle', function(e) {
  select('#navbar').classList.toggle('navbar-mobile')
  this.classList.toggle('bi-list')
  this.classList.toggle('bi-x')
})
```

```
/**
 * Mobile nav dropdowns activate
 */
on('click', '.navbar .dropdown > a', function(e) {
  if (select('#navbar').classList.contains('navbar-mobile')) {
    e.preventDefault()
    this.nextElementSibling.classList.toggle('dropdown-active')
  }
}, true)

/**
 * Scrool with ofset on links with a class name .scrollto
 */
on('click', '.scrollto', function(e) {
  if (select(this.hash)) {
    e.preventDefault()

    let navbar = select('#navbar')
    if (navbar.classList.contains('navbar-mobile')) {
      navbar.classList.remove('navbar-mobile')
      let navbarToggle = select('.mobile-nav-toggle')
      navbarToggle.classList.toggle('bi-list')
      navbarToggle.classList.toggle('bi-x')
    }
    scrollto(this.hash)
  }
}, true)

/**
 * Scroll with ofset on page load with hash links in the url
 */
window.addEventListener('load', () => {
  if (window.location.hash) {
    if (select(window.location.hash)) {
      scrollto(window.location.hash)
    }
  }
});

/**
 * Preloader
 */
```

```
let preloader = select('#preloader');
if (preloader) {
  window.addEventListener('load', () => {
    preloader.remove()
  });
}

/**
 * Initiate glightbox
 */
const glightbox = GLightbox({
  selector: '.glightbox'
});

/**
 * Initiate Gallery Lightbox
 */
const galelryLightbox = GLightbox({
  selector: '.galelry-lightbox'
});

/**
 * Testimonials slider
 */
new Swiper('.testimonials-slider', {
  speed: 600,
  loop: true,
  autoplay: {
    delay: 5000,
    disableOnInteraction: false
  },
  slidesPerView: 'auto',
  pagination: {
    el: '.swiper-pagination',
    type: 'bullets',
    clickable: true
  },
  breakpoints: {
    320: {
      slidesPerView: 1,
      spaceBetween: 20
    },
```

```
    1200: {
      slidesPerView: 2,
      spaceBetween: 20
    }
  }
});

/**
 * Initiate Pure Counter
 */
new PureCounter();

})()
```