PROJECTREPORT

Project Title:

Estimation and Prediction of Hospitalizationand Medical Care Costs.

Team ID: LTVIP2023TMID00990

Team Size: 3

Team Leader: Buddha Pravallika

Team Member: Bondi Omeshwar sai

Team Member: Bora Durga bhavani

Facultymentor: Hymavathi

INTRODUCTION

OVERVIEW

Estimation and Prediction of Hospitalization and Medical Care Costs is a data analytics project focused on analyzing and forecasting the expenses associated with hospitalization and medical treatments. The primary goal is to develop models that can accurately estimate the costs incurred by patients and healthcare providers for various medical procedures and hospital stays.

Data Collection and Preprocessing:

A comprehensive dataset was collected from **kaggle**
Which includes age,sex,region,charges,smoker,BMI.

The collected data underwent thorough preprocessing to handle missing values, remove inconsistencies, and ensure data quality.

Exploratory Data Analysis (EDA):

EDA was conducted to gain a deep understanding of the dataset. Visualizations and summary statistics helped in understanding the characteristics of the data and guided further analysis.

Creating a Flask web application:

For Estimation and Prediction of Hospitalization and Medical Care Costs data involves building an interface where We can input relevant information, and the application will use the predictive model to estimate the medical care costs.

PURPOSE

The Estimation and Prediction of Hospitalization and Medical Care Costs project plays a vital role in data-driven decision-making, cost optimization, and improving patient care in the healthcare industry.It empowers various stakeholders with actionable insights to make informed choices and enhance the overall efficiency of the healthcare system.

By undertaking the Estimation and Prediction of Hospitalization and Medical Care Costs project, several significant achievements and benefits can be realized in the healthcare industry and beyond.

KEY OUTCOMES:

Cost Optimization

Improved Financial Planning

Transparency and Informed Decision-making

Enhanced Patient Care

Tailored Insurance Coverage

LITERATURE SURVEY:

The prevalence of obesity, which is defined as a body mass index (BMI) greater than 30, has increased dramatically in the United States since the late 1990s.

So much so that recently obesity has been officially recognized as a disease by the American Medical Association, an action that could put more emphasis on the health condition by doctors and insurance companies to minimize its adverse effects. Currently, rates of obesity exceed 30% in most sex and adult age groups, whereas its prevalence among children and adolescents, defined as a BMI of more than the 95th percentile, has reached 17%.

The alarming rates of the high prevalence of obesity have posed a significant public health concern as well as a substantial financial burden on our society because obesity is known to be a risk factor for many chronic diseases, such as type 2 diabetes,myocardial infarction, cancer,hypertension,asthma,stroke and other conditions.

To understand the economic burden of obesity, several studies have attempted to estimate the attributable costsof obesity, following the burden-of-illness literature on other disease areas. A previous cost-of-illness study estimated that healthcare spending attributable to the rising prevalence of obesity has increased by 27% between1987and2001.

Existing problem:

Solving the Estimation and Prediction of Hospitalization and Medical Care Costs involves a systematic approachthat combines data analysis, model development and evaluation.

Proposed Solution

Proposing a solution for the estimation and prediction of hospitalization and medical care costs involves a combination of data-driven techniques, advanced analytics, and domain expertise.Collect comprehensive and diverse data related to hospitalization and medical care costs from various sources, including electronic health records, insurance claims, and administrative databases.The successoftheproposed solutiondepends

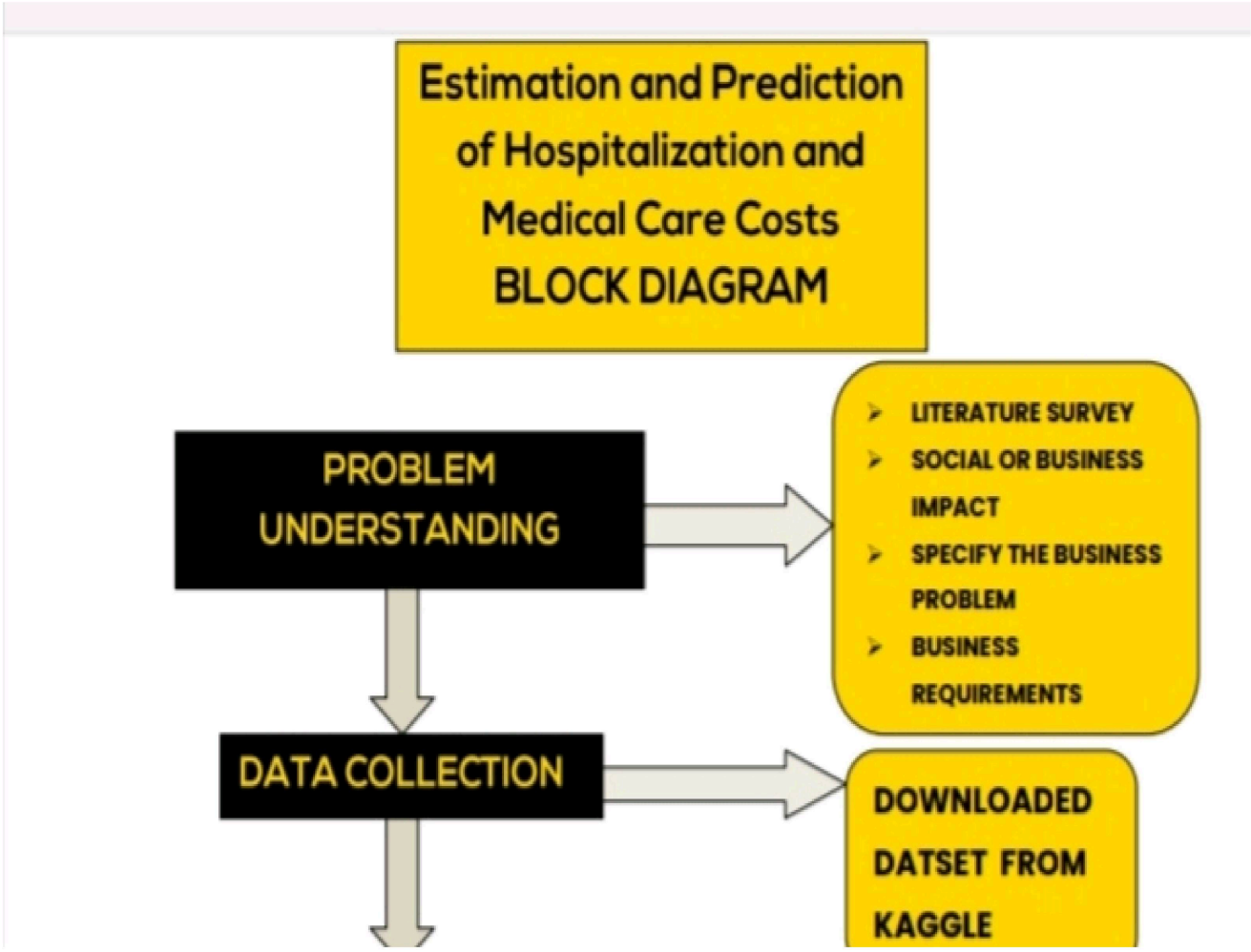
on the availability of quality data, collaboration with healthcare experts, and a commitment to continuous improvement based on real-world feedback. Healthcare cost estimation and prediction are complex tasks, and a multidisciplinary approach is crucial for achieving accurate and reliable results.

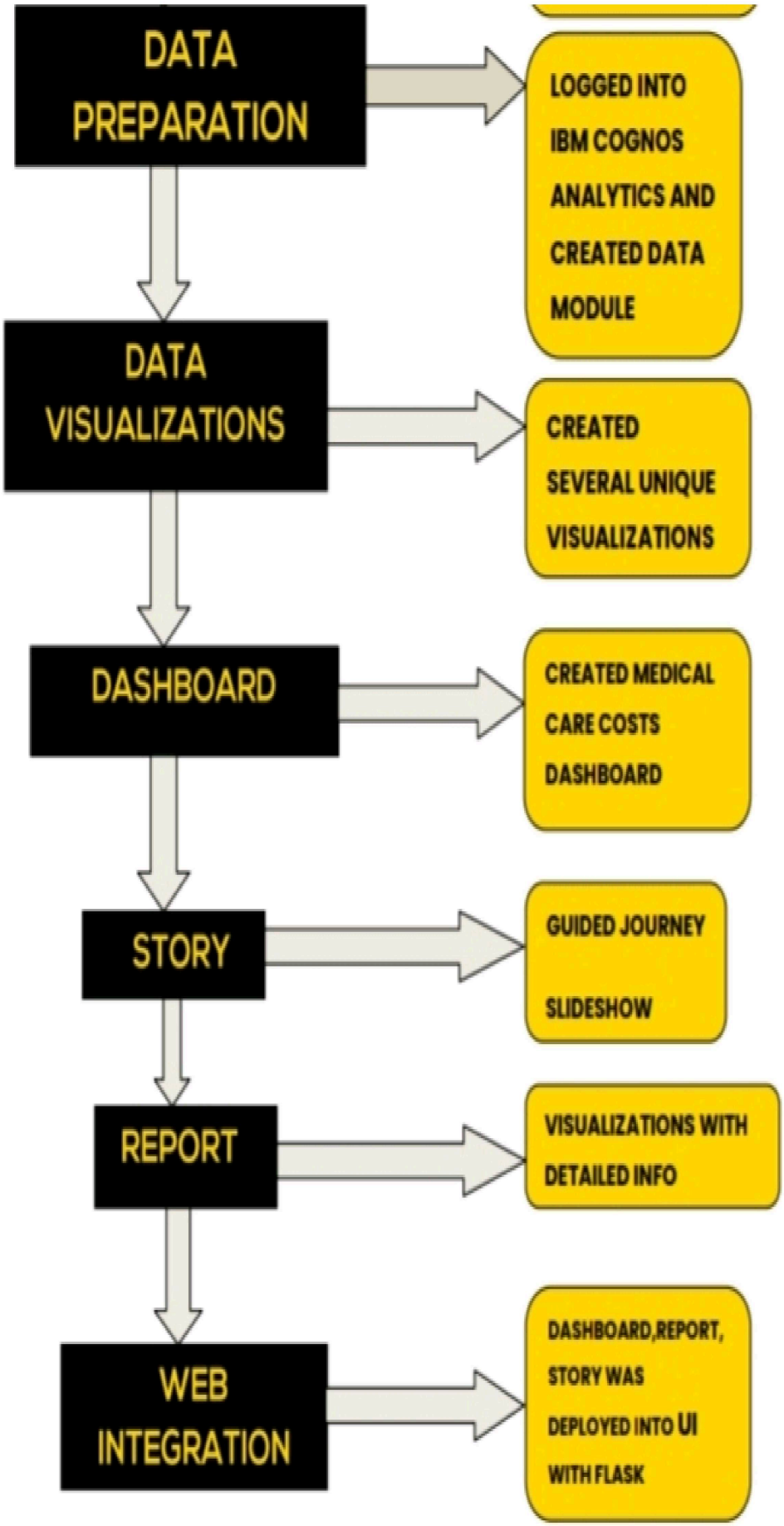
THEORITICAL ANALYSIS

Block Diagram

Creating a detailed block diagram for Estimation and Prediction of Hospitalization and Medical Care Costs involves breaking down the process into key steps and components. Below is a high-level block diagram outlining the main stages and elements involved in estimating and predicting hospitalization and medical care costs.

The block diagram illustrates the end-to-end process of estimating and predicting hospitalization and medical care costs, starting from data collection and preprocessing to deploying the final models for cost estimation and future cost predict




DATA PREPARATION
LOGGED INTO IBM COGNOS ANALYTICS AND CREATED DATA MODULE
DATA VISUALIZATIONS
CREATED SEVERAL UNIQUE VISUALIZATIONS
DASHBOARD
CREATED MEDICAL CARE COSTS DASHBOARD
STORY
GUIDED JOURNEY
SLIDESHOW
REPORT
VISUALIZATIONS WITH DETAILED INFO
WEB INTEGRATION
DASHBOARD,REPORT, STORY WAS DEPLOYED INTO UI WITH FLASK

SOFTWAREORHARDWAREDESIGNINGSoftwareRequirements:

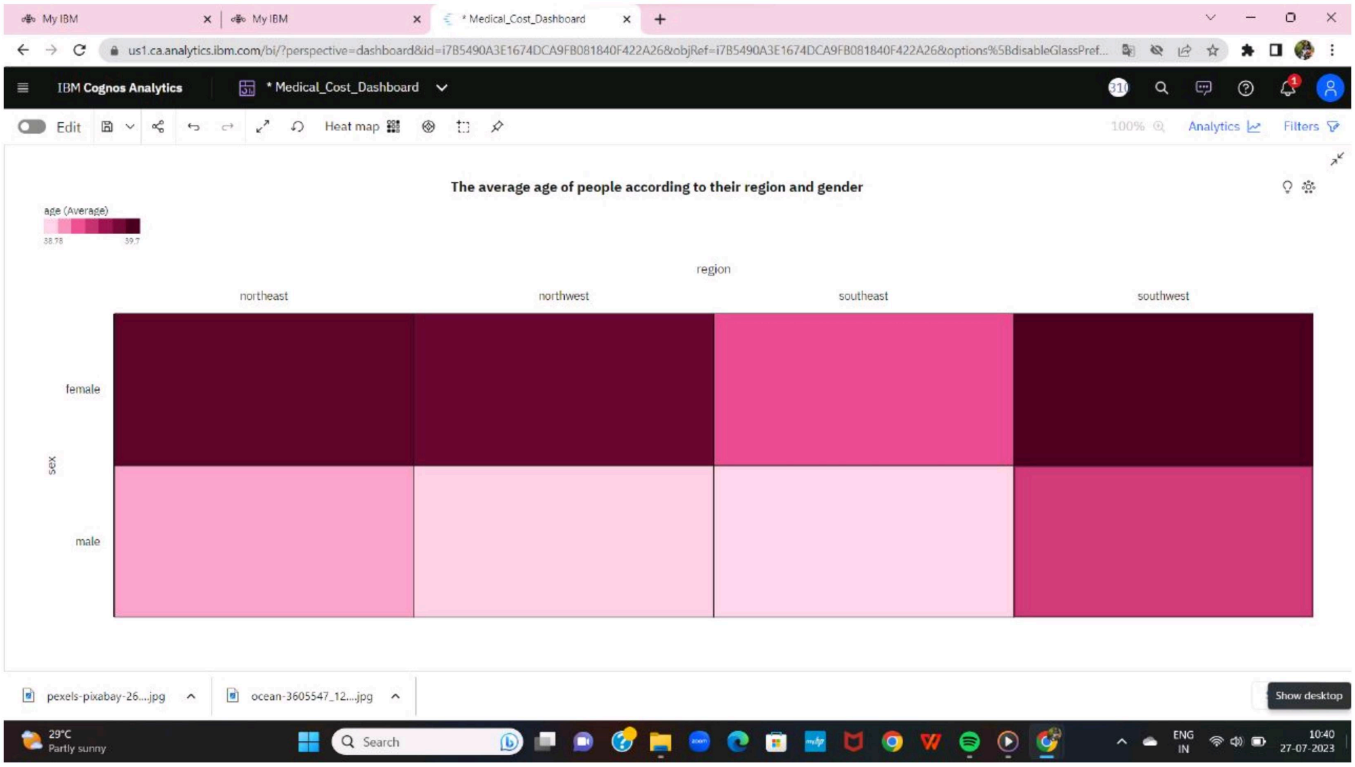
IBM cognos analytics Tool
Flask
Integrated Development Environment (IDE)-Spyder

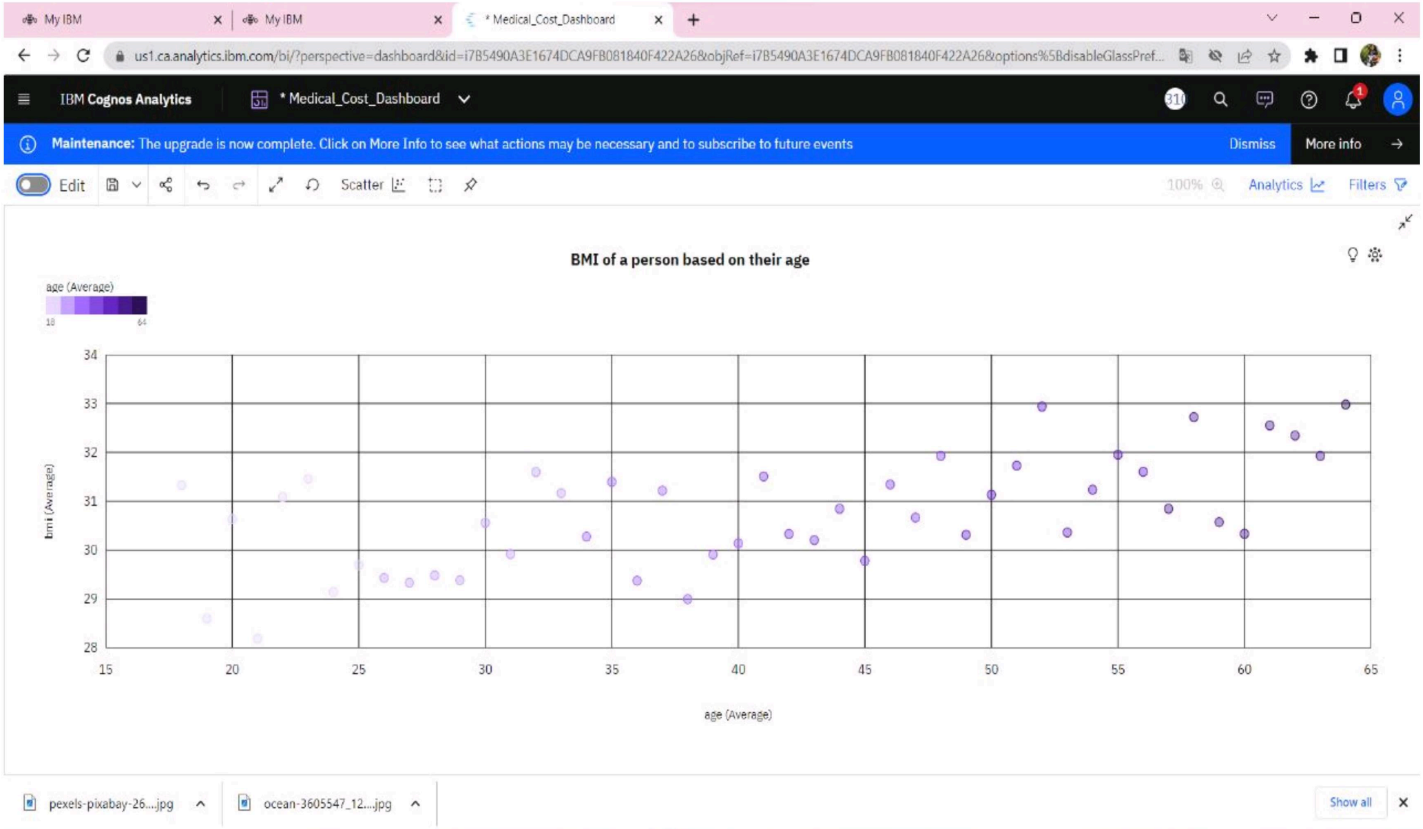
Hardware Requirements:

Minimum System Requirements(RAM-4GB,Quad core Processor Orabove).

RESULT

DATA VISUALIZATIONS:

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My IBM
* Medical_Cost_Dashboard
IBM Cognos Analytics
* Medical_Cost_Dashboard
Maintenance: The upgrade is now complete. Click on More Info to see what actions may be necessary and to subscribe to future events
Dismiss
More info
Edit
Scatter
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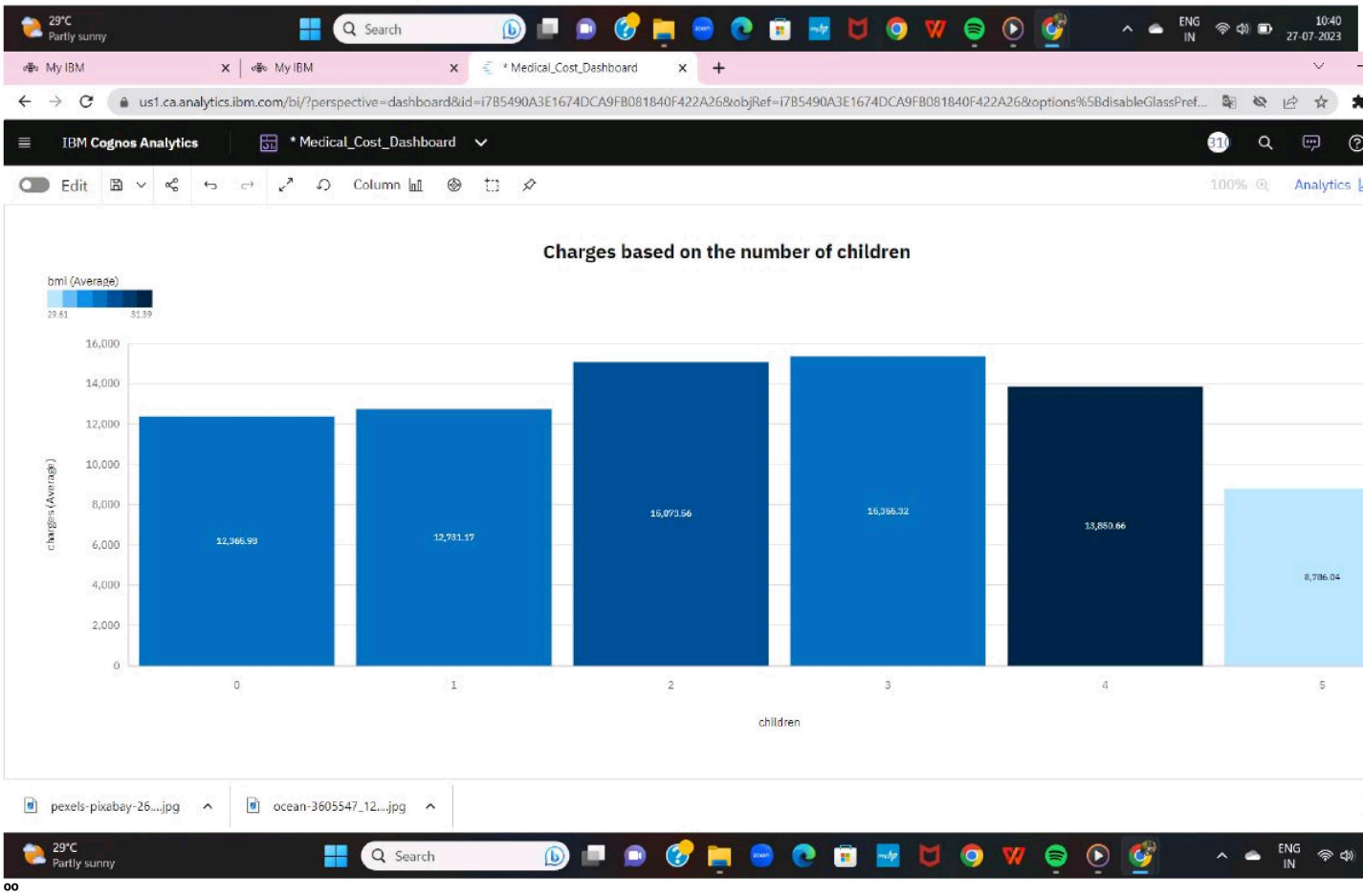
Filters
BMI of a person based on their age
age (Average)
18
64
bmi (Average)
age (Average)
pexels-pixabay-26....jpg
ocean-3605547_12....jpg
Show all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My IBM
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* Medical_Cost_Dashboard
IBM Cognos Analytics
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Edit
Column
Analytics
Filters
Charges based on the number of children
bmi (Average)
29.61
31.39
charges (Average)
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15,073.56
16,356.32
13,880.66
8,786.04
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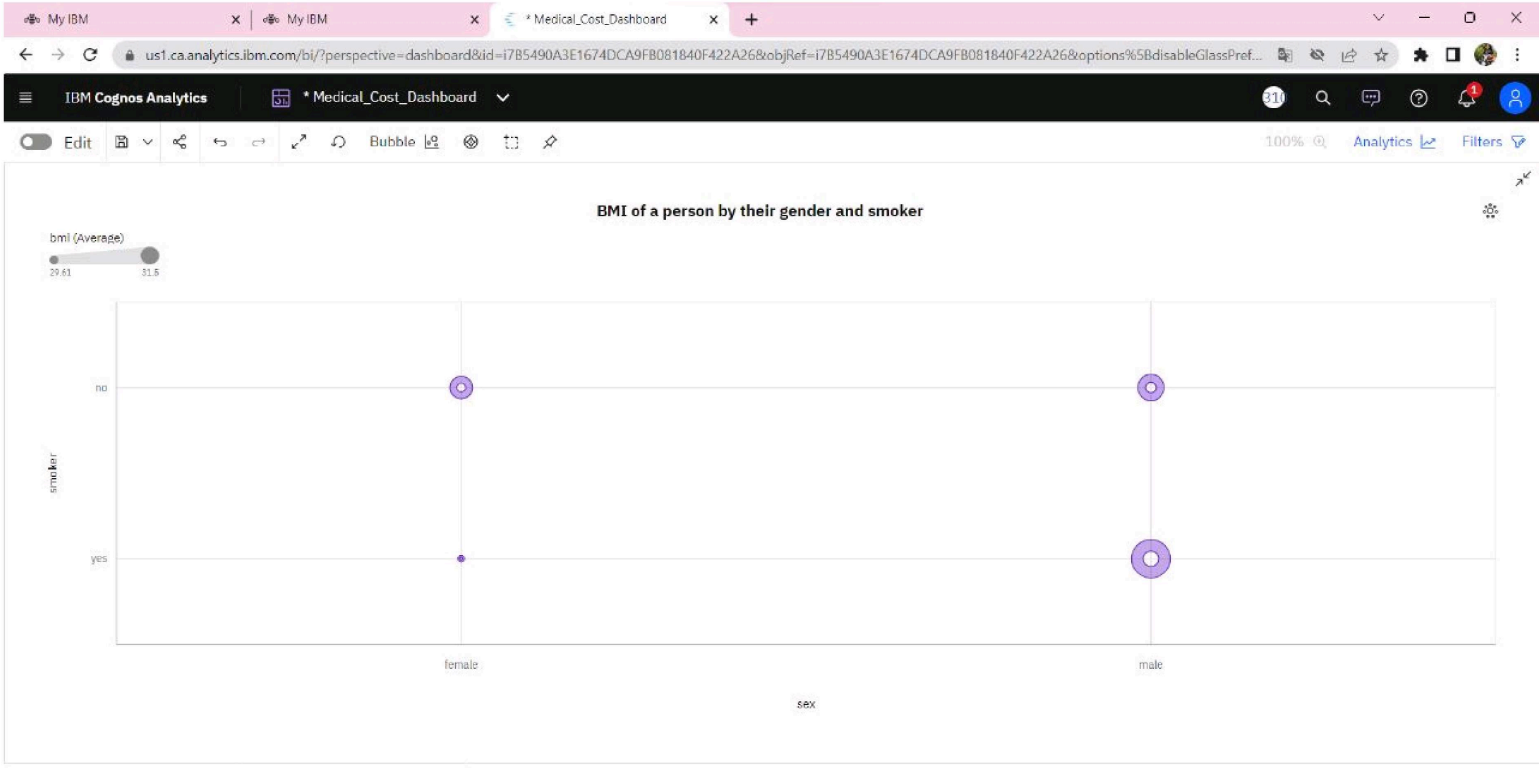
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Edit
Bubble
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Filters
BMI of a person by their gender and smoker
bmi (Average)
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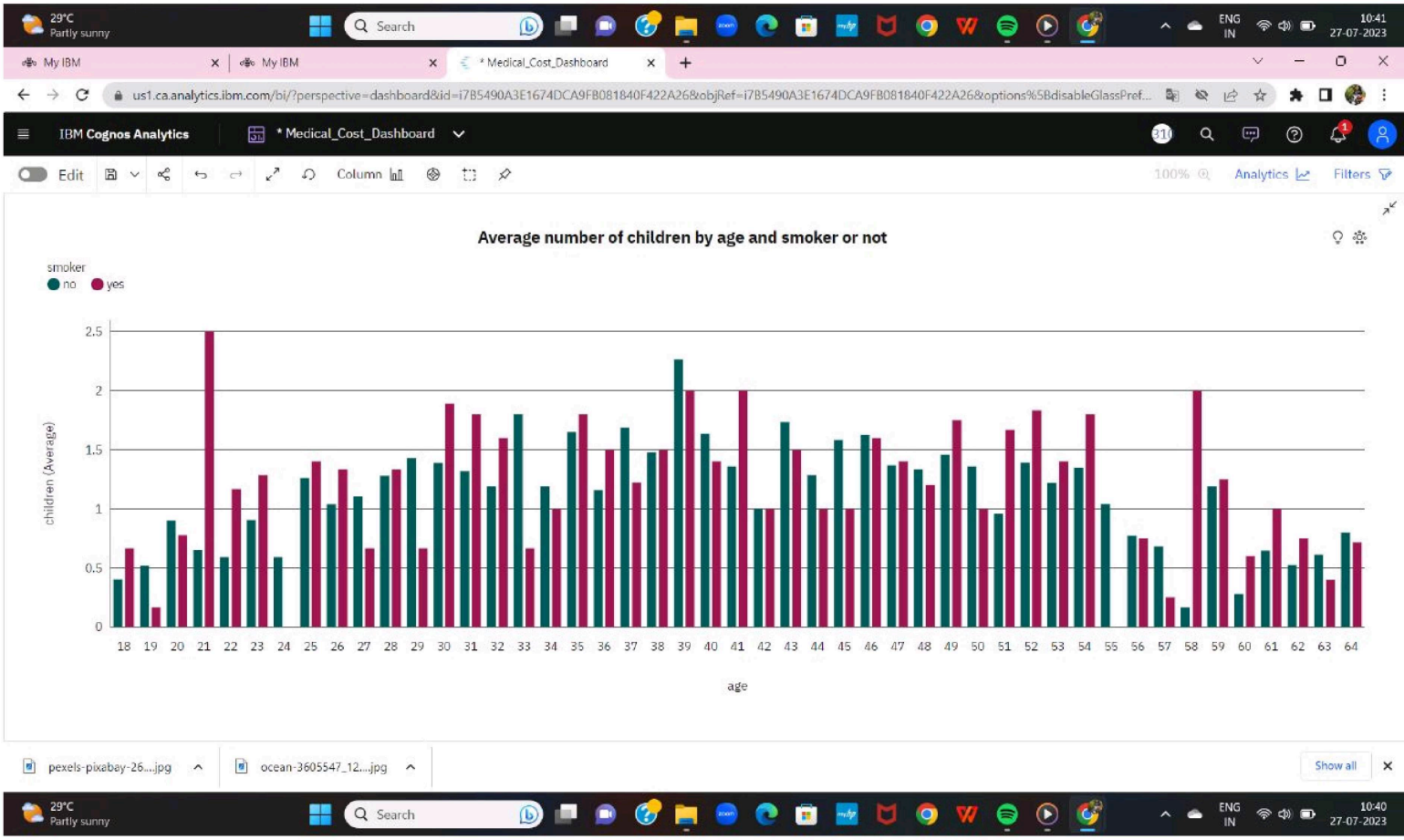
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Column
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Analytics
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Average number of children by age and smoker or not
smoker
no
yes
children (Average)
0
0.5
1
1.5
2
2.5
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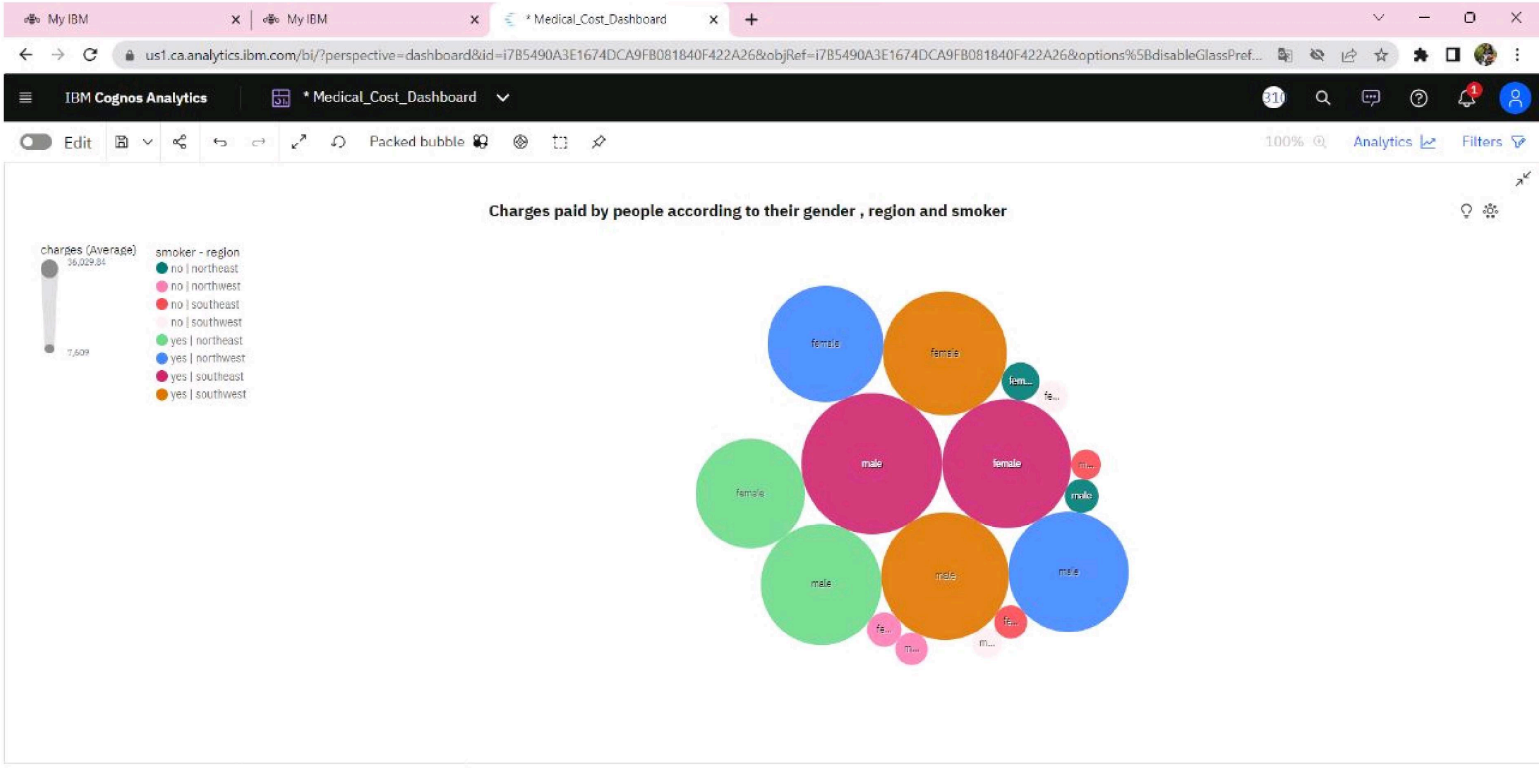
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IBM Cognos Analytics
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Edit
Packed bubble
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Filters
Charges paid by people according to their gender , region and smoker
charges (Average)
smoker - region
no | northeast
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no | southeast
no | southwest
yes | northeast
yes | northwest
yes | southeast
yes | southwest
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male
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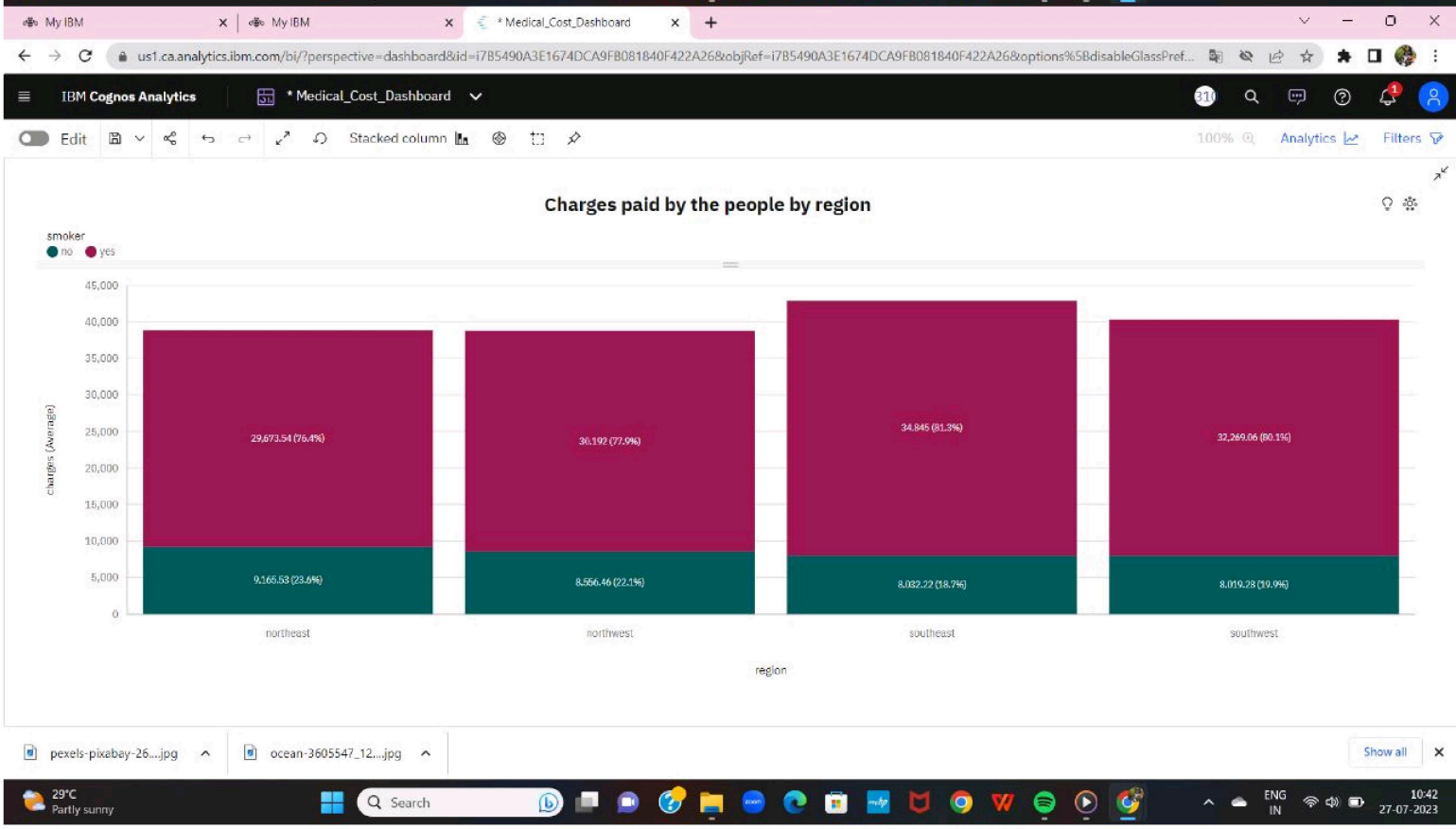
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IBM Cognos Analytics
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Charges paid by the people by region
smoker
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45,000
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20,000
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5,000
0
charges (Average)
29,673.54 (76.4%)
9,165.53 (23.6%)
30,192 (77.9%)
8,556.46 (22.1%)
34,845 (81.3%)
8,032.22 (18.7%)
32,269.06 (80.1%)
8,019.28 (19.9%)
northeast
northwest
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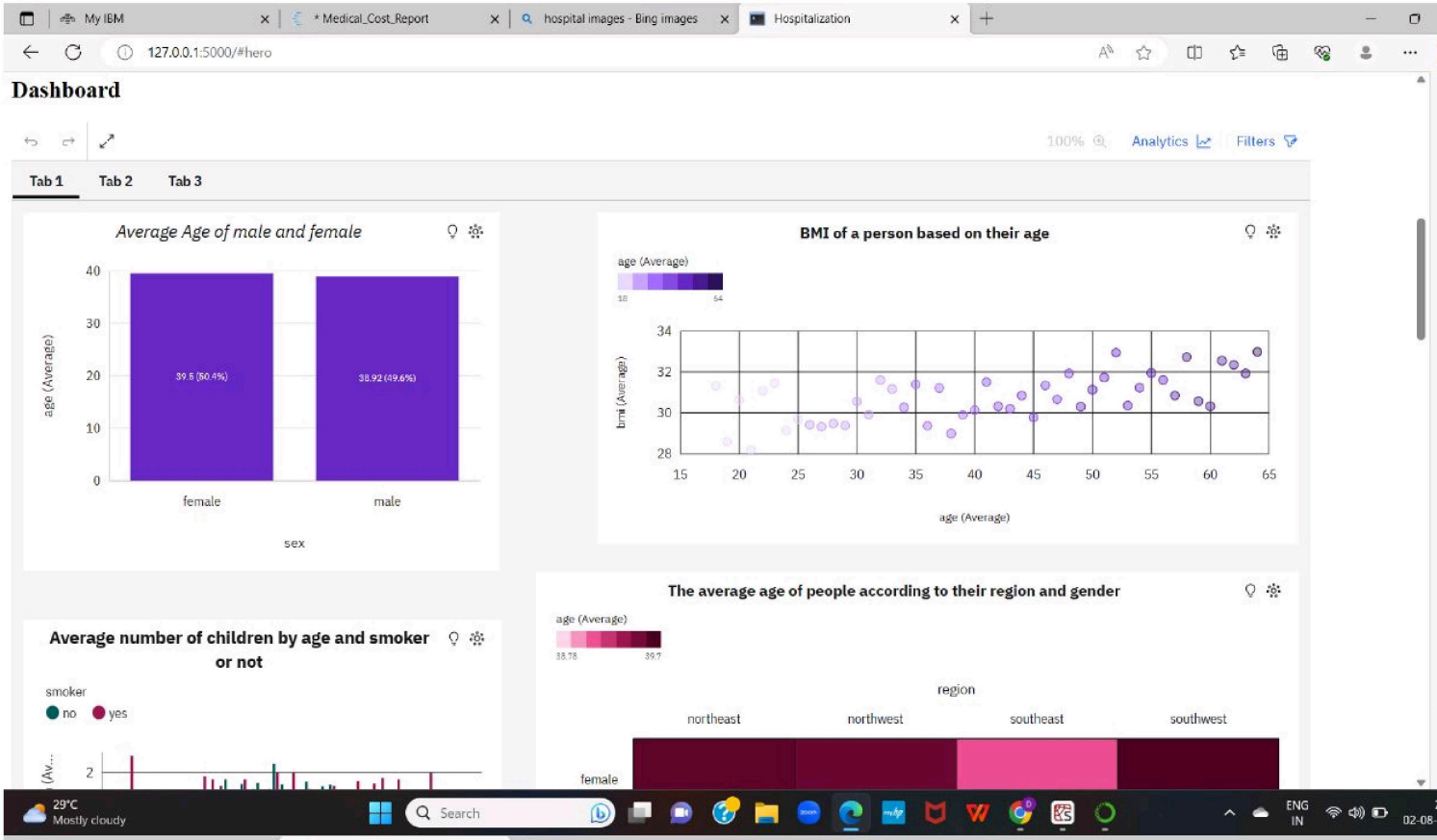
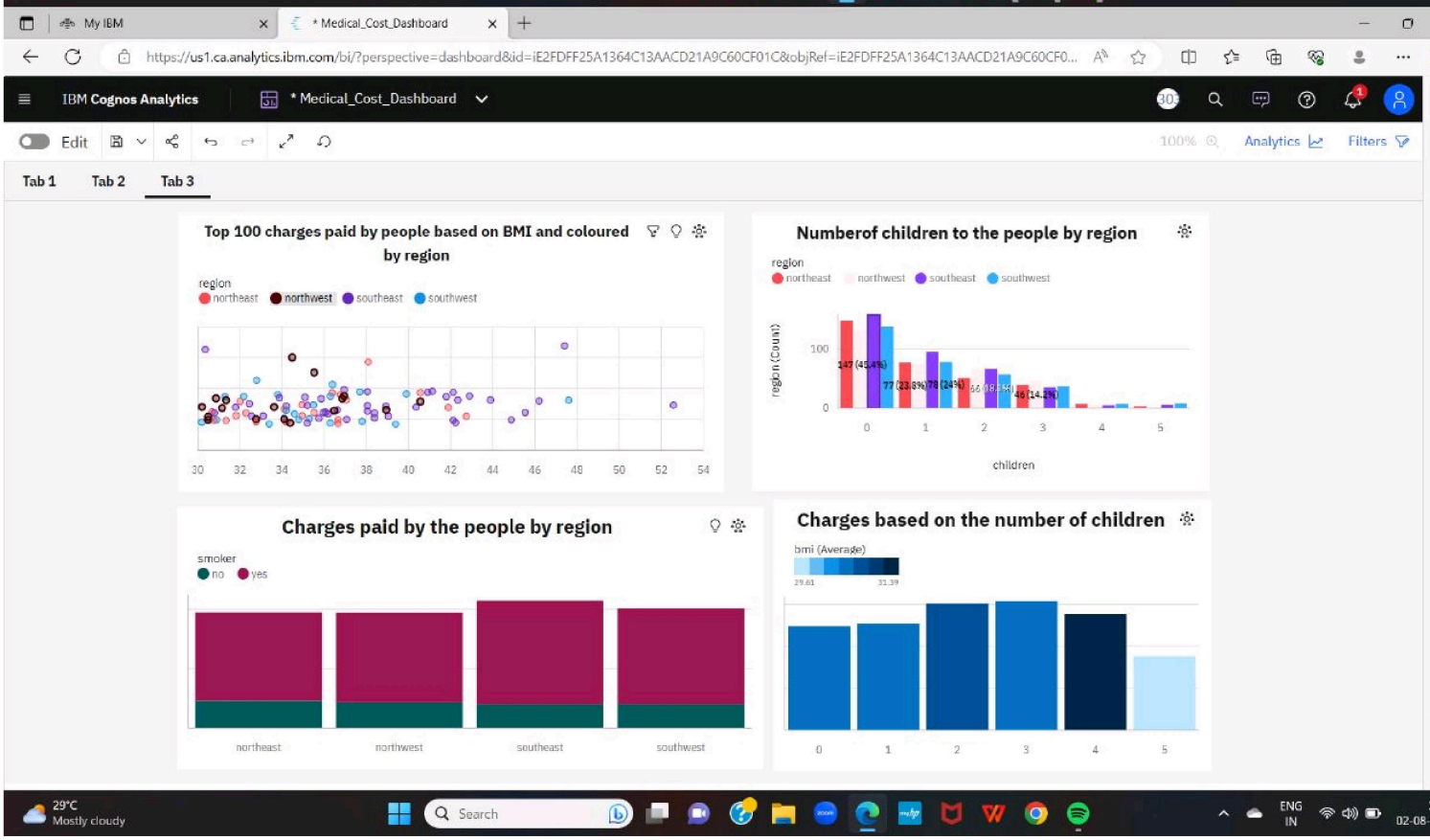
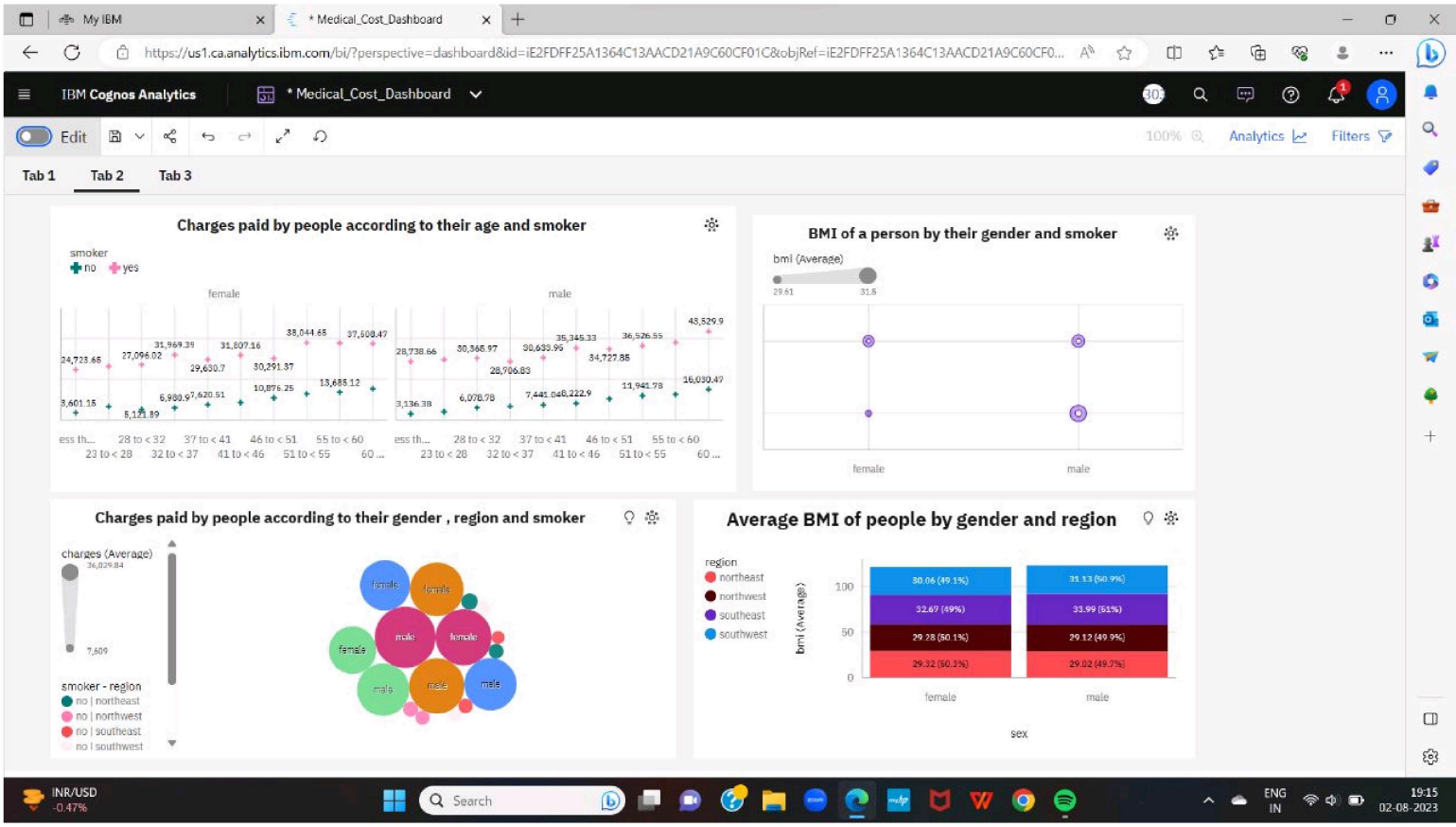
MEDICAL COSTS CARE DASHBOARD







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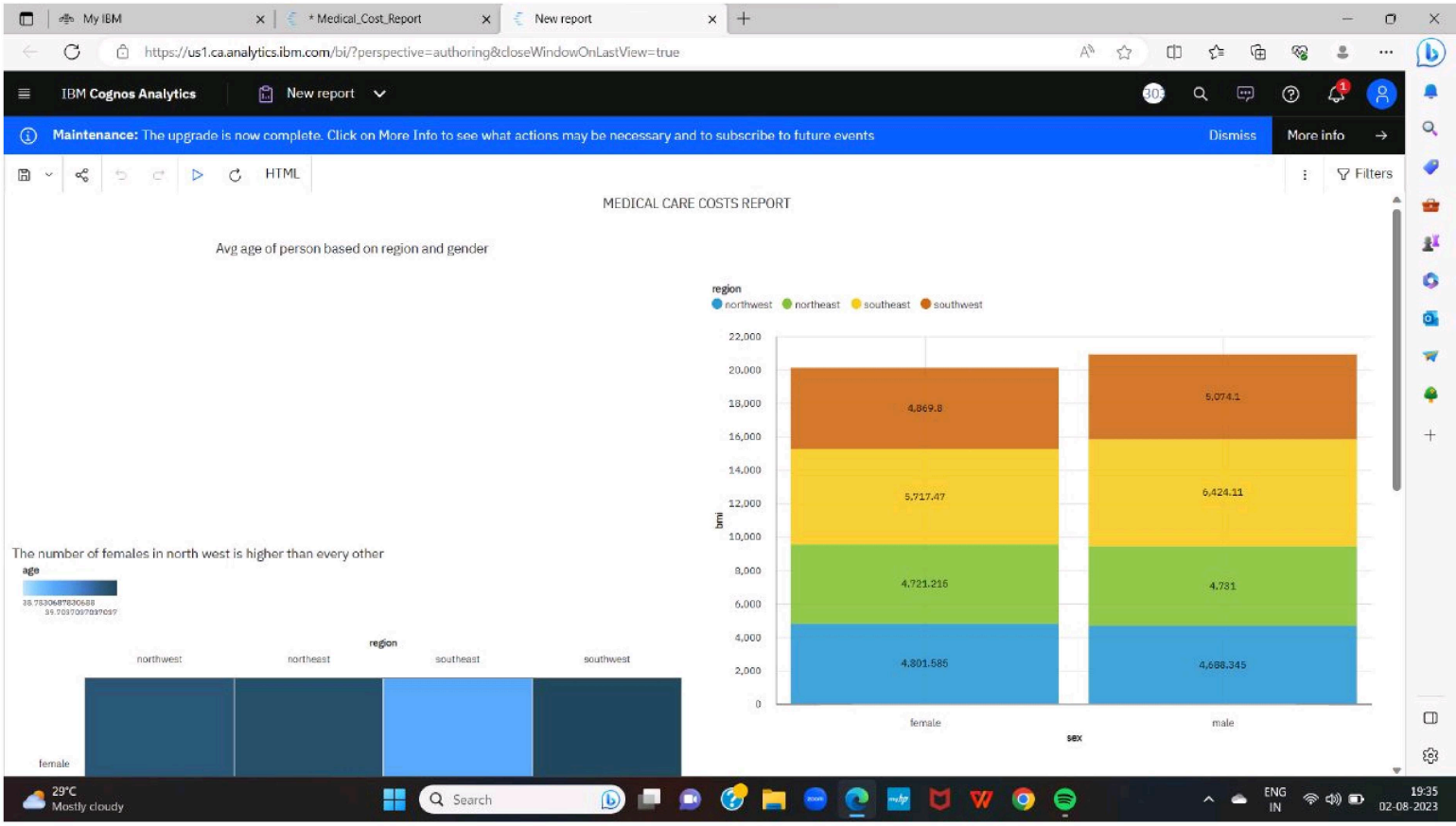

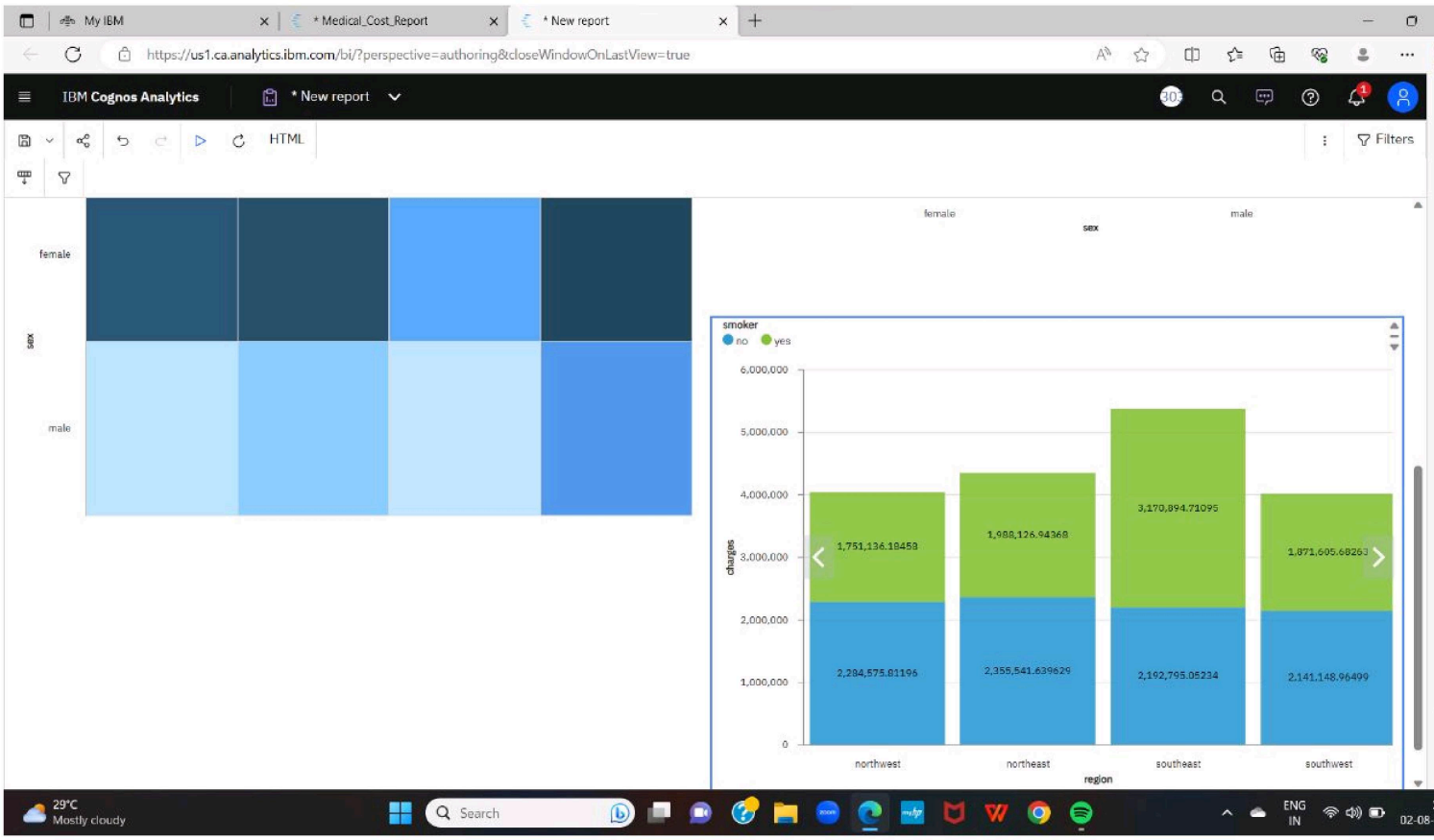
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southwest
region
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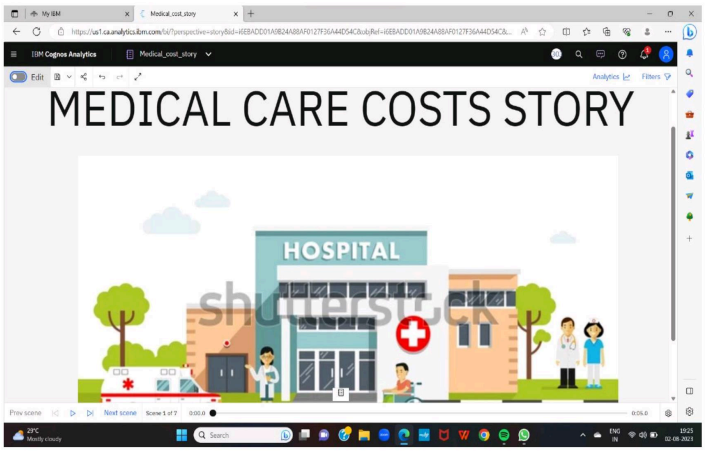
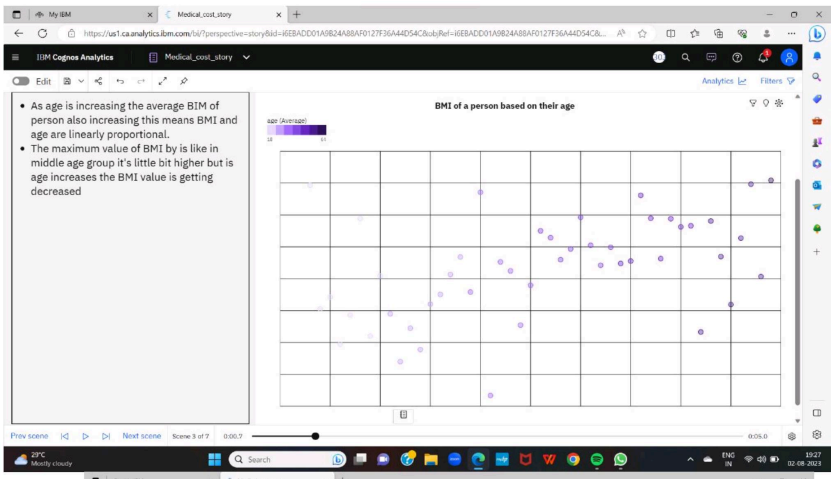
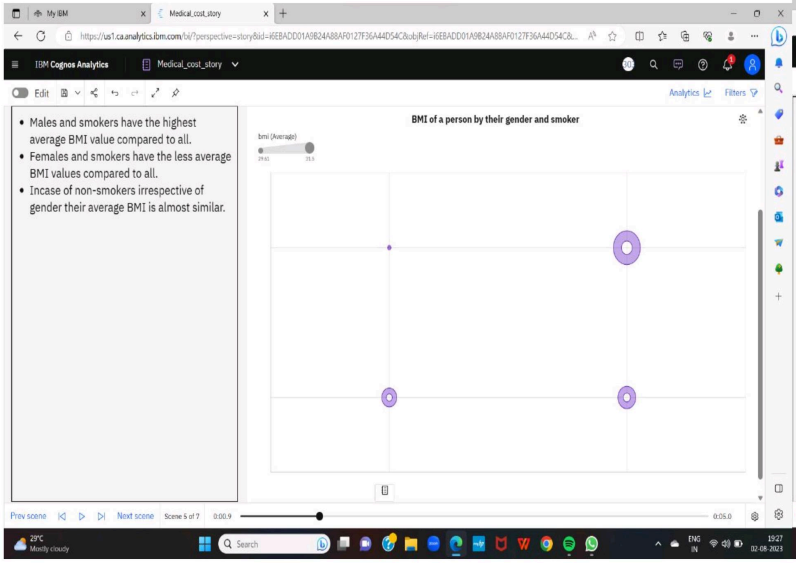
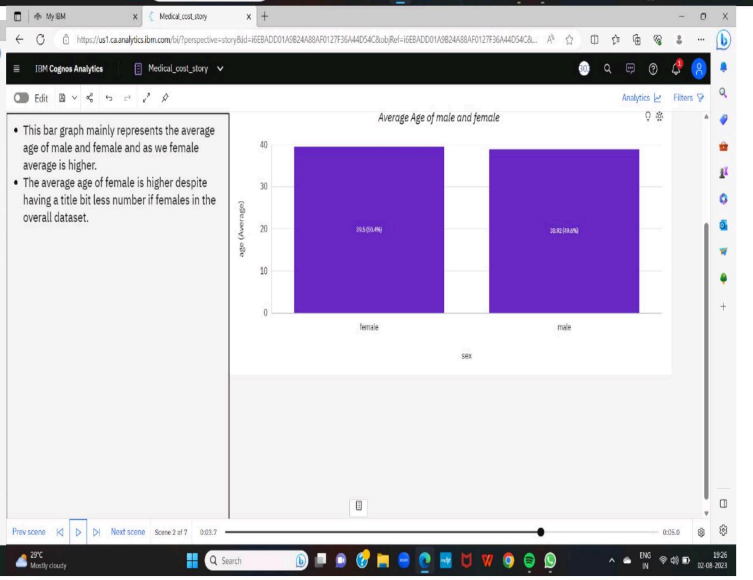
02-08-2023

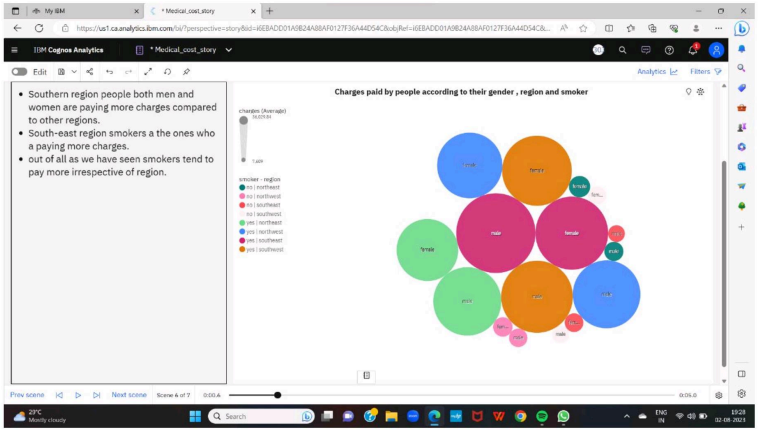
STORY(GUIDED JOURNEY)

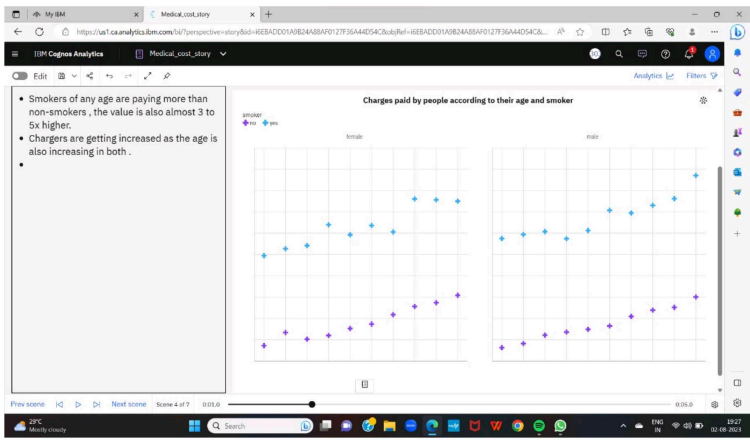












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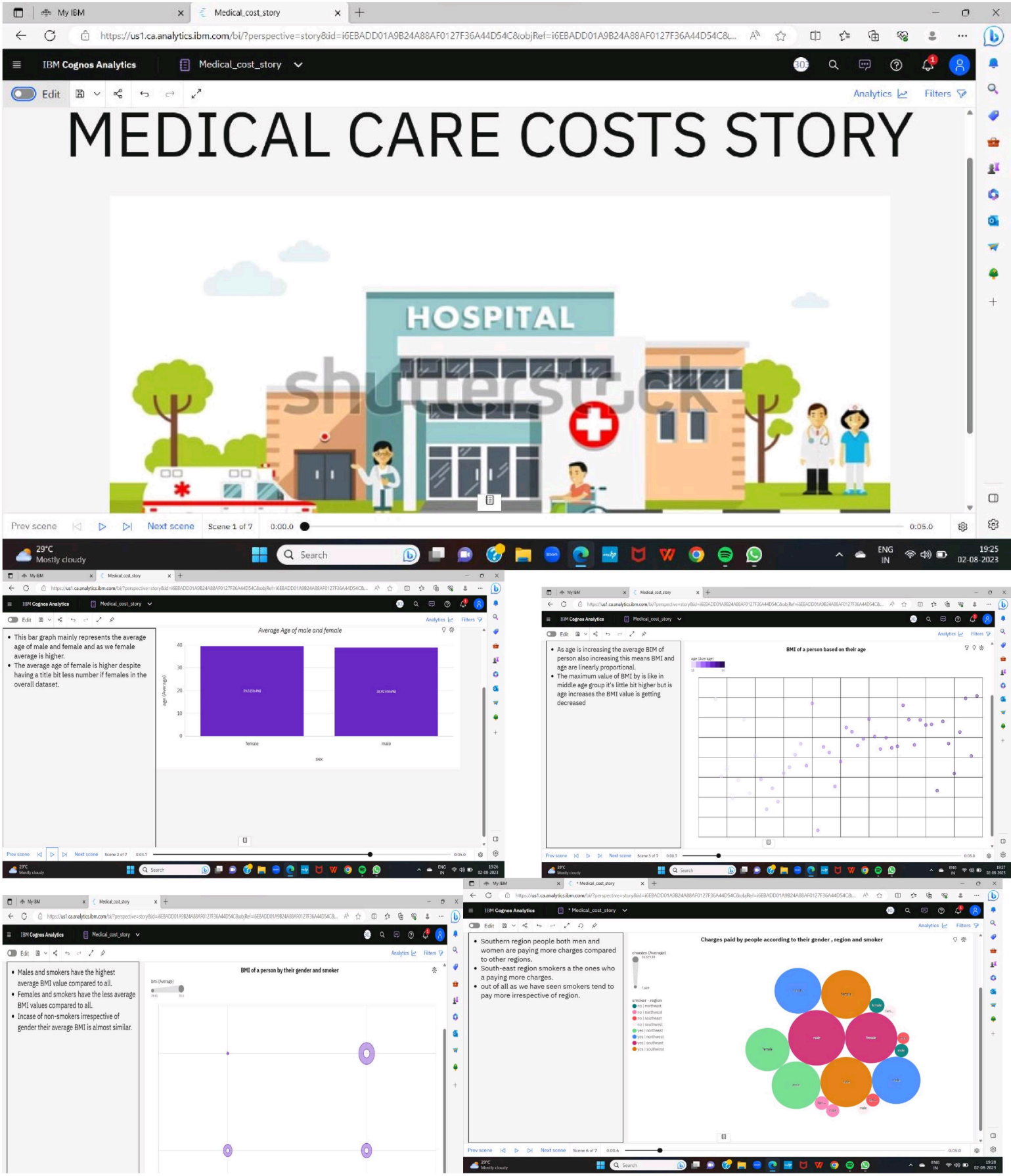

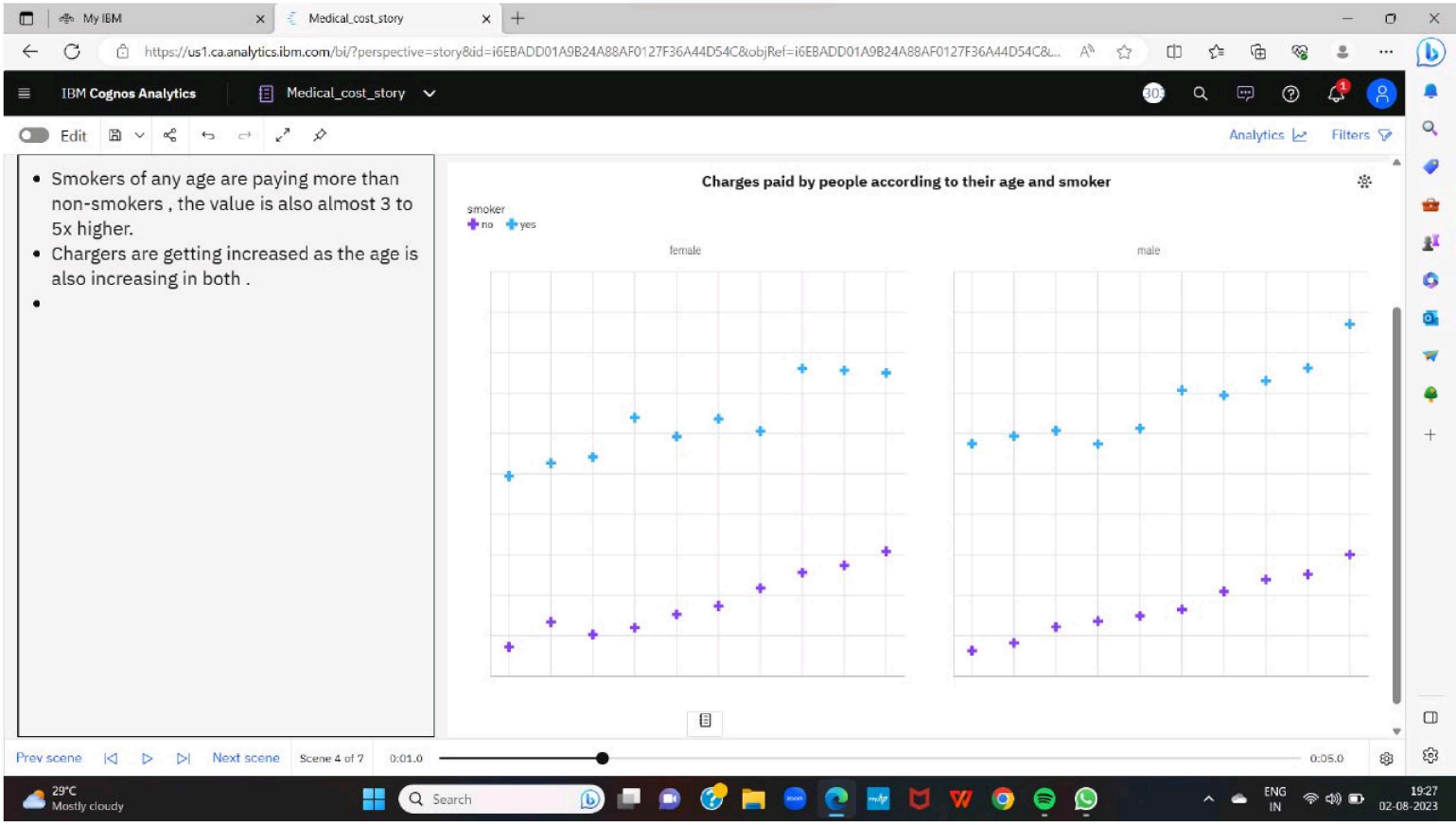
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IBM Cognos Analytics
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Chargers are getting increased as the age is also increasing in both .
Charges paid by people according to their age and smoker
smoker
no
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male
Prev scene
Next scene
Scene 4 of 7
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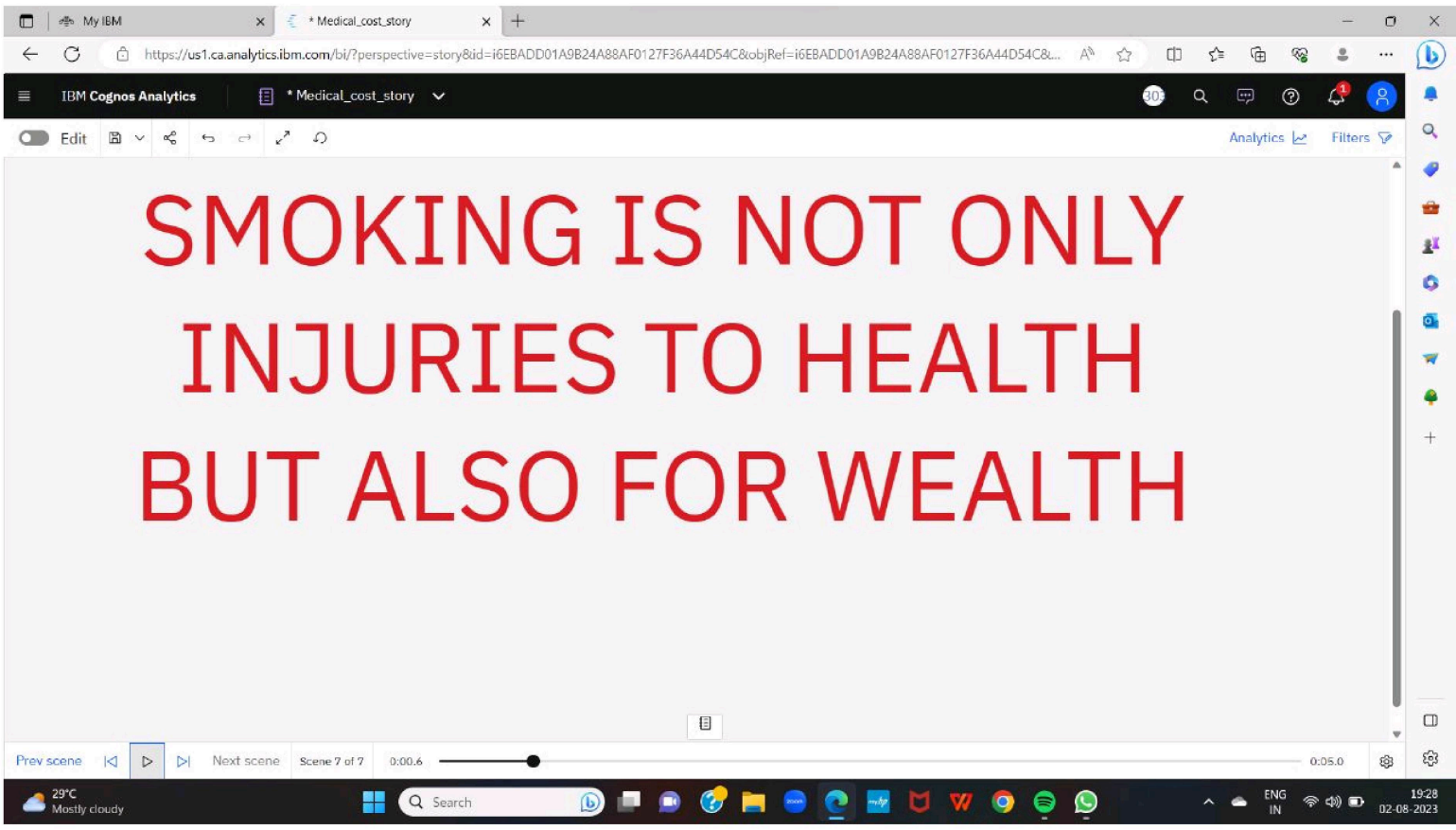
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SMOKING IS NOT ONLY
INJURIES TO HEALTH
BUT ALSO FOR WEALTH
Prev scene
Next scene
Scene 7 of 7
0:00.6
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29°C
Mostly cloudy
Search
ENG
IN
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02-08-2023

WEB INTEGRATION:

Hospitalization

File | C:/Users/HP/Desktop/web%20integration%20index.html#hero

Hospitalization

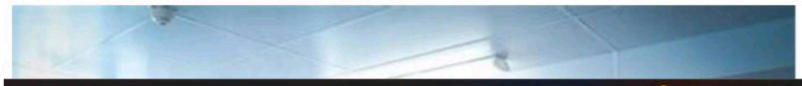
- Home
- Dashboard
- Story
- Report

Medical Costs Care

Like education, healthcare also needs to be given importance.

Welcome to Medical Costs Care

The At Gold Medal Waters we realize that being a doctor can be extremely diffcult.Physical burnout is an epidemic, and the physical and emotinal demands of the job can we overwheming. "Wherever the art of Medicine is loved,there is also a love of Humanity." In nothing do men more nearly approach the gods than in giving health to men.



28°C Haze | Search | ENG IN | 07:26 03-08-2023

Hospitalization

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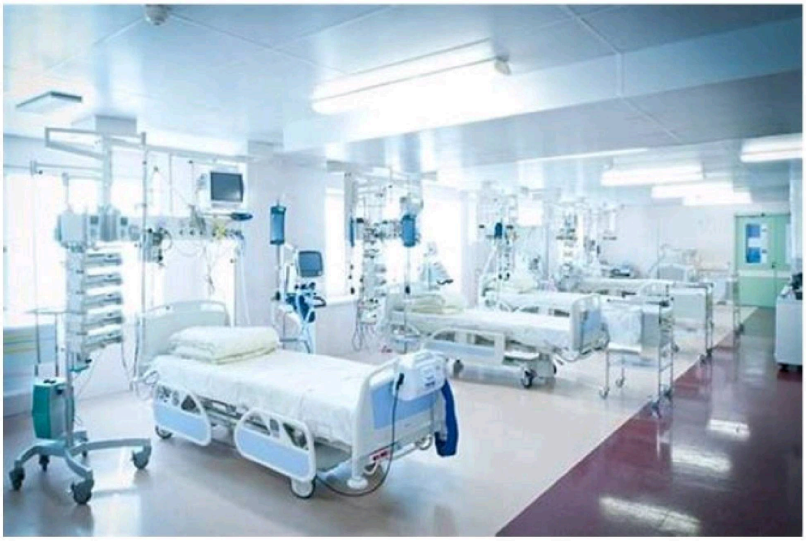
Welcome to Medical Costs Care

The At Gold Medal Waters we realize that being a doctor can be extremely diffcult.Physical burnout is an epidemic, and the physical and emotinal demands of the job can we overwheming. "Wherever the art of Medicine is loved,there is also a love of Humanity." In nothing do men more nearly approach the gods than in giving health to men.



Dashboard

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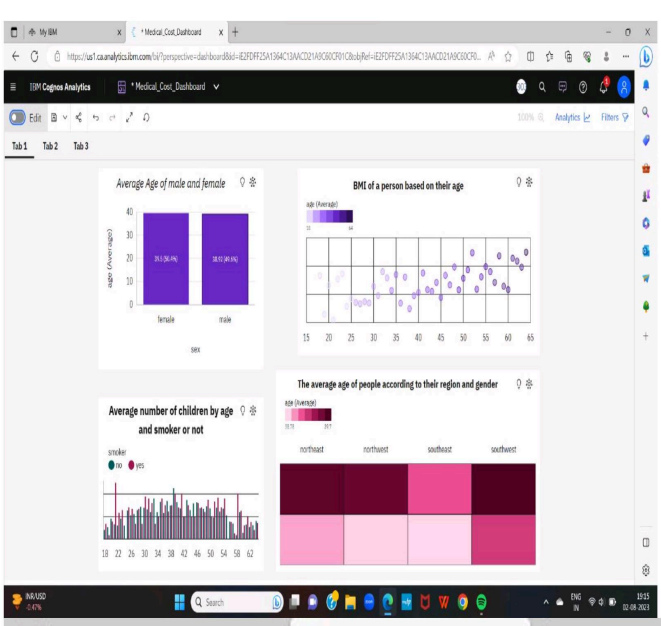

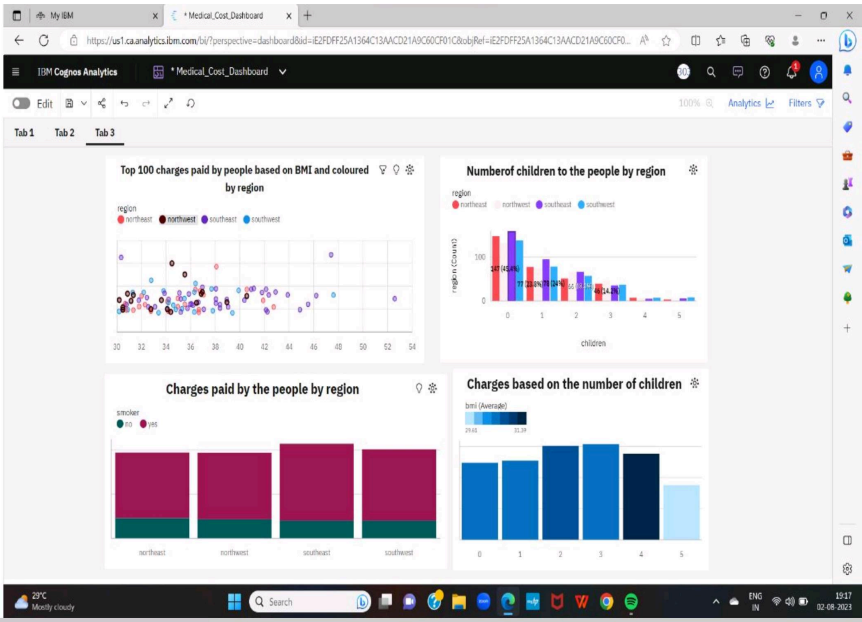

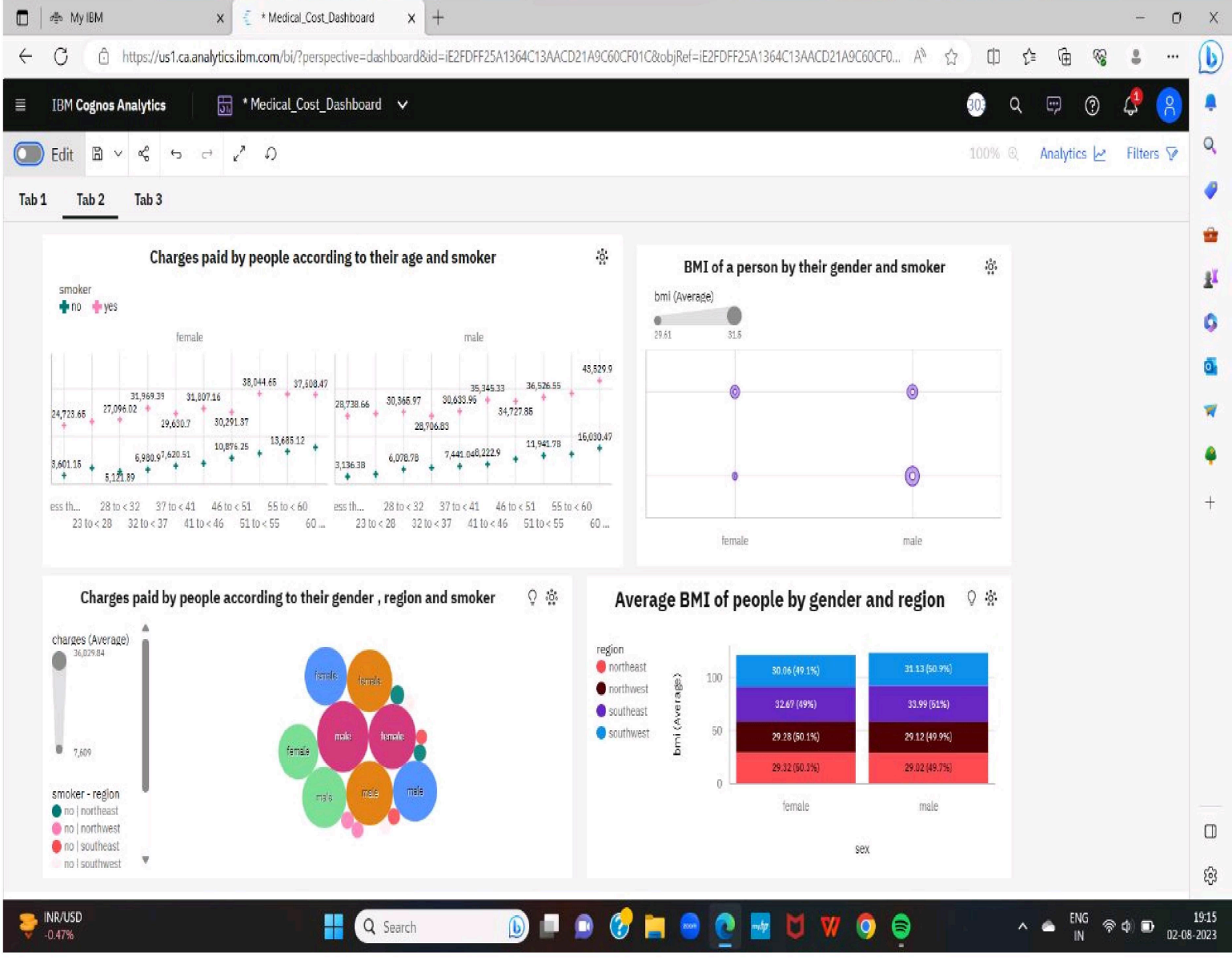

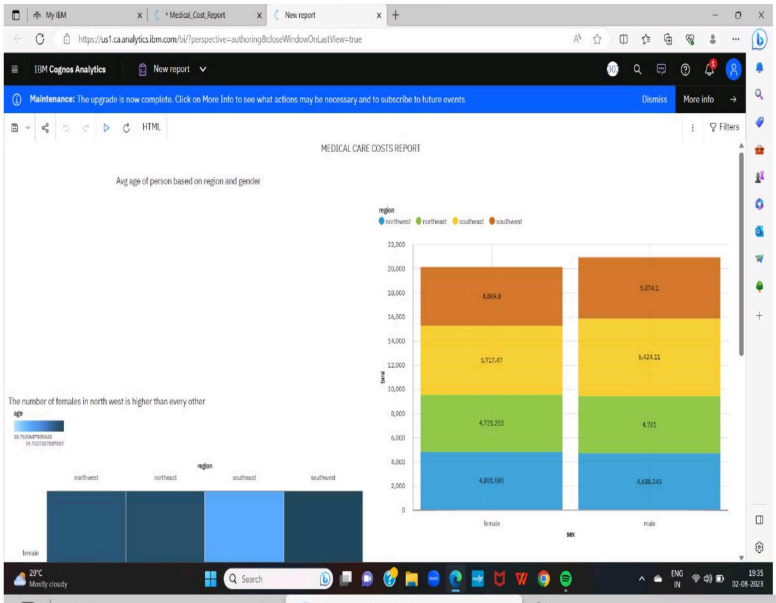
IBM Cognos Analytics
New report
Maintenance: The upgrade is now complete. Click on More Info to see what actions may be necessary and to subscribe to future events
Dismiss
More info
HTML
Filters
MEDICAL CARE COSTS REPORT
Avg age of person based on region and gender
region
northwest
northeast
southeast
southwest
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
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0
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4,701
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The number of females in north west is higher than every other
age
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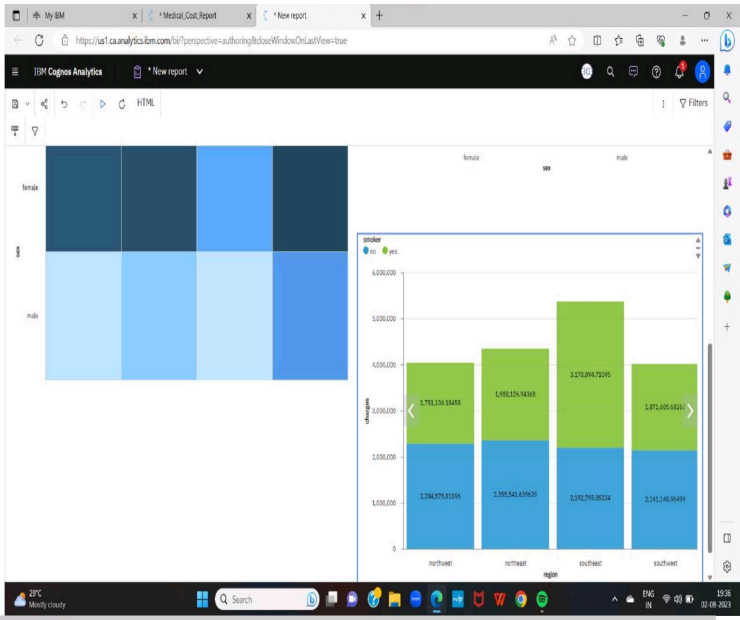
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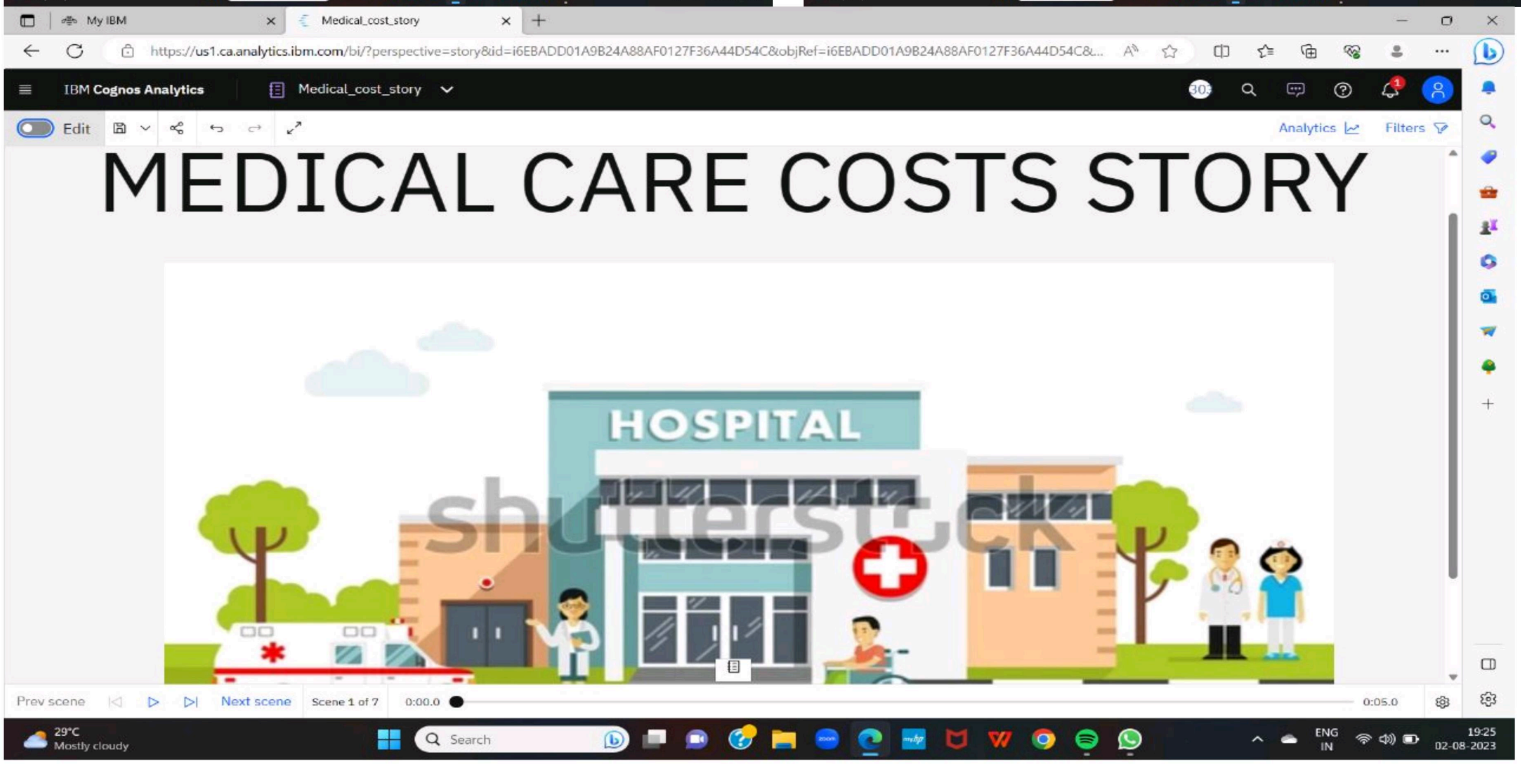
My IBM
Medical_cost_story
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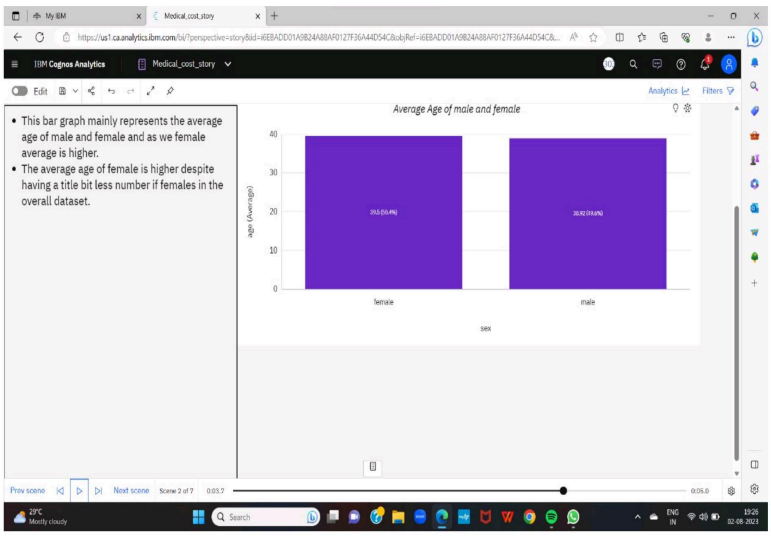
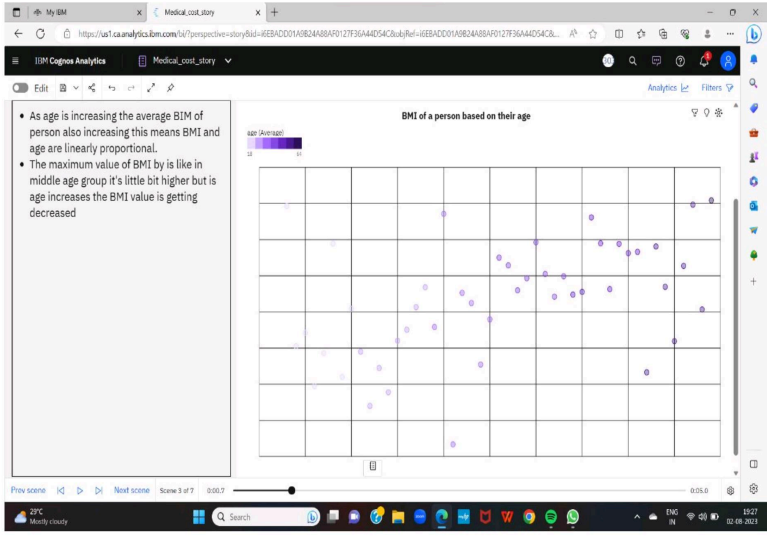
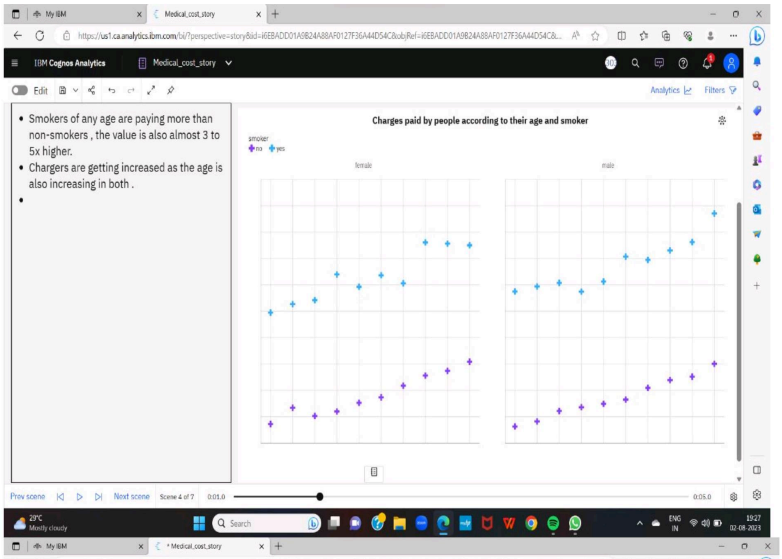
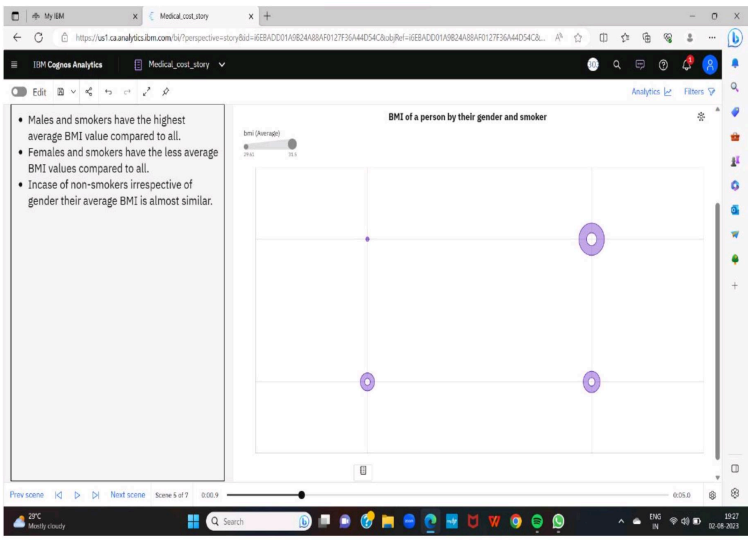
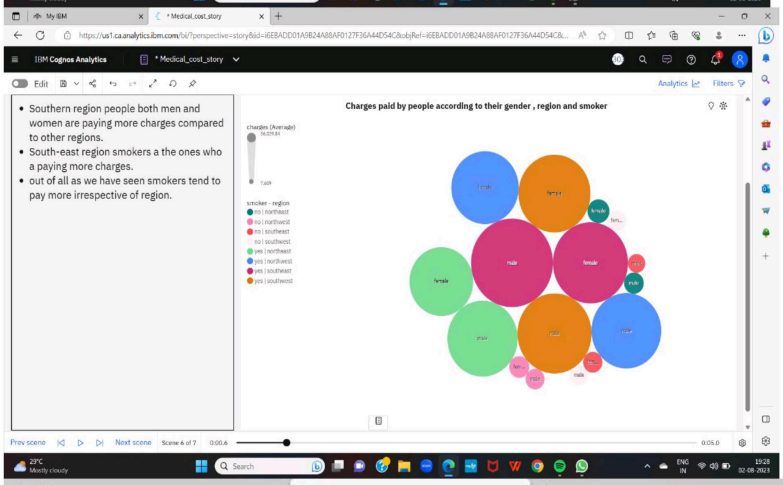
Analytics
Filters
MEDICAL CARE COSTS STORY
HOSPITAL
shutterstock
Prev scene
Next scene
Scene 1 of 7
0:00.0
0:05.0
29°C
Mostly cloudy
Search
ENG
IN
19:25
02-08-2023

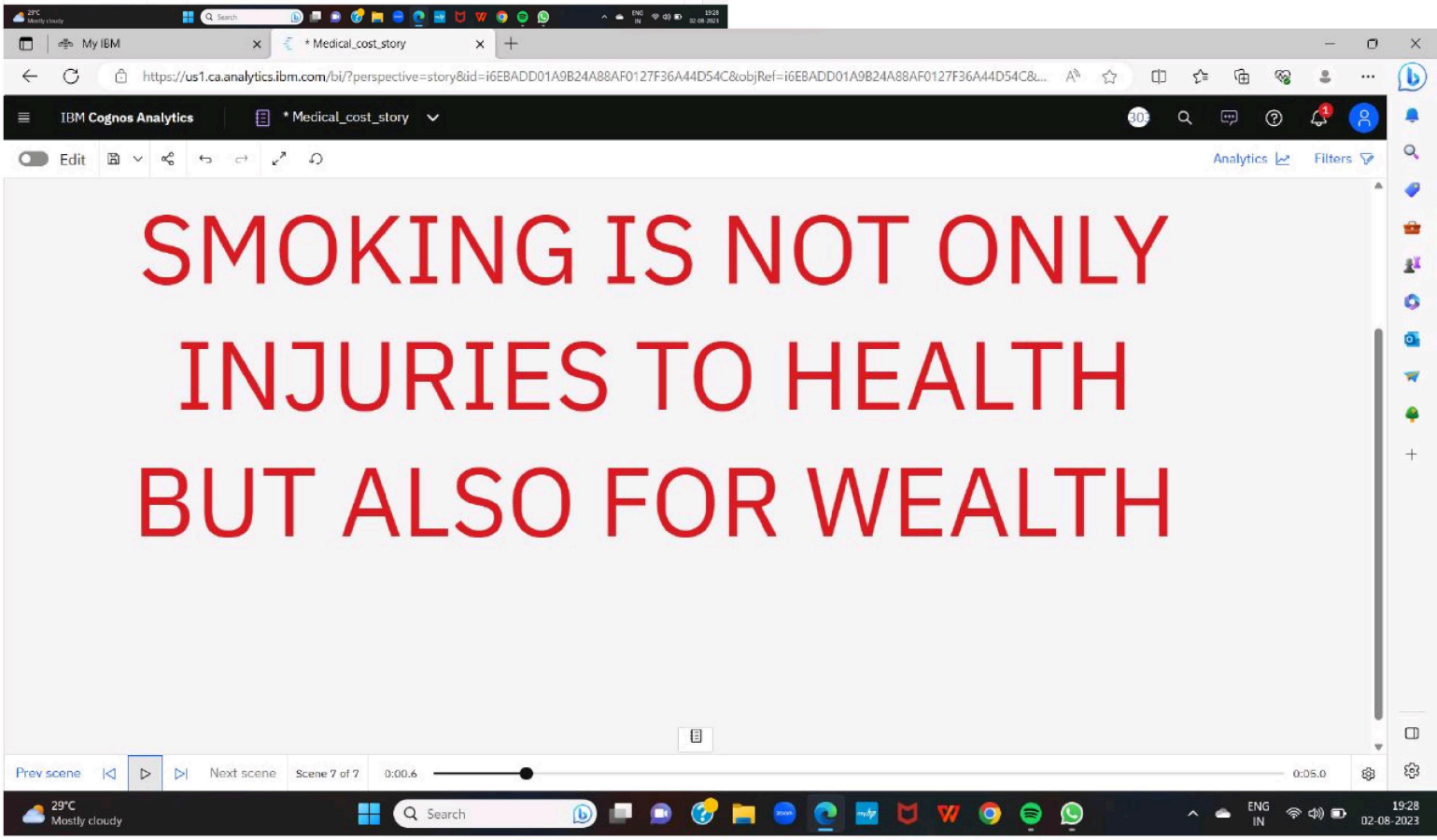

IBM Cognos Analytics
Medical_cost_story
Edit
Analytics
Filters
• This bar graph mainly represents the average age of male and female and as we female average is higher.
• The average age of female is higher despite having a title bit less number if females in the overall dataset.
Average Age of male and female
age (Average)
40
30
20
10
0
female
male
sex
Prev scene
Next scene
Scene 2 of 7


IBM Cognos Analytics
Medical_cost_story
Edit
Analytics
Filters
• As age is increasing the average BIM of person also increasing this means BMI and age are linearly proportional.
• The maximum value of BMI by is like in middle age group it's little bit higher but is age increases the BMI value is getting decreased
BMI of a person based on their age
age (Average)
Prev scene
Next scene
Scene 3 of 7


IBM Cognos Analytics
Medical_cost_story
Charges paid by people according to their age and smoker
• Smokers of any age are paying more than non-smokers , the value is also almost 3 to 5x higher.
• Chargers are getting increased as the age is also increasing in both .


IBM Cognos Analytics
Medical_cost_story
BMI of a person by their gender and smoker
• Males and smokers have the highest average BMI value compared to all.
• Females and smokers have the less average BMI values compared to all.
• Incase of non-smokers irrespective of gender their average BMI is almost similar.


IBM Cognos Analytics
* Medical_cost_story
Charges paid by people according to their gender , region and smoker
• Southern region people both men and women are paying more charges compared to other regions.
• South-east region smokers a the ones who a paying more charges.
• out of all as we have seen smokers tend to pay more irrespective of region.


My IBM
* Medical_cost_story
https://us1.ca.analytics.ibm.com/bi/?perspective=story&id=i6EBADD01A9B24A88AF0127F36A44D54C&objRef=i6EBADD01A9B24A88AF0127F36A44D54C&...
IBM Cognos Analytics
* Medical_cost_story
Edit
Analytics
Filters
SMOKING IS NOT ONLY
INJURIES TO HEALTH
BUT ALSO FOR WEALTH
Prev scene
Next scene
Scene 7 of 7
0:00.6
0:05.0
29°C
Mostly cloudy
Search
ENG
IN
19:28
02-08-2023

ADVANTAGES:

Cost Optimization
Informed Decision-making
Improved Patient Care
Tailored Insurance Coverage
Fraud Detection
Research and Policy Development

DISADVANTAGES:

Data Privacy Concerns
Data Quality
Model Complexity
Limited Predictability
Ethical Considerations
Overemphasis on Costs

APPLICATIONS:

The Estimation and Prediction of Hospitalization and Medical Care Costs project has several valuable applications in the healthcare industry and beyond.

Healthcare Cost Management
Financial Planning
Insurance Pricing and Coverage
Resource Allocation
Treatment Decision Support
Patient Cost Transparency
Policy Development
Fraud Detection
Benchmarking and Performance
Research and Public Health
Cost-Effective Healthcare Programs
Long-Term Cost Control

CONCLUSION:

In conclusion, the Estimation and Prediction of Hospitalization and Medical Care Costs project holds significant value and potential for the healthcare industry. By leveraging data analytics, exploratory data analysis,theproject aims to achieve several important outcomes.

FUTURESCOPE:

The future scope of the Estimation and Prediction of Hospitalization and Medical Care Costs project is vast

And holds great potential in transforming the healthcare industry.

Overall, the future scope of the Estimation and Prediction of Hospitalization and Medical Care Costs project is dynamic and transformative. As technology continues to evolve and data-driven decision-making becomes increasingly prevalent, the project's applications have the potential to revolutionize healthcare cost management, resource allocation, and patient care on a global scale.