

Estimation and Prediction of Hospitalization and Medical Care Costs

1.INTRODUCTION

PROJECT REPORT

Project Title: Estimation and Prediction of Hospitalization and Medical Care Costs.

Team ID: LTVIP2023TMIDOO916

Team Size: 4

Team Leader: PITTA SAMPATH KUMAR

Team Member: GONDESI HARSHINI

Team Member: KARRI LALITHA ANJAN SRI

Team Member: UNDURI LAVANYA

Mentor: **SRINIVASA RAO**

1.1 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:**

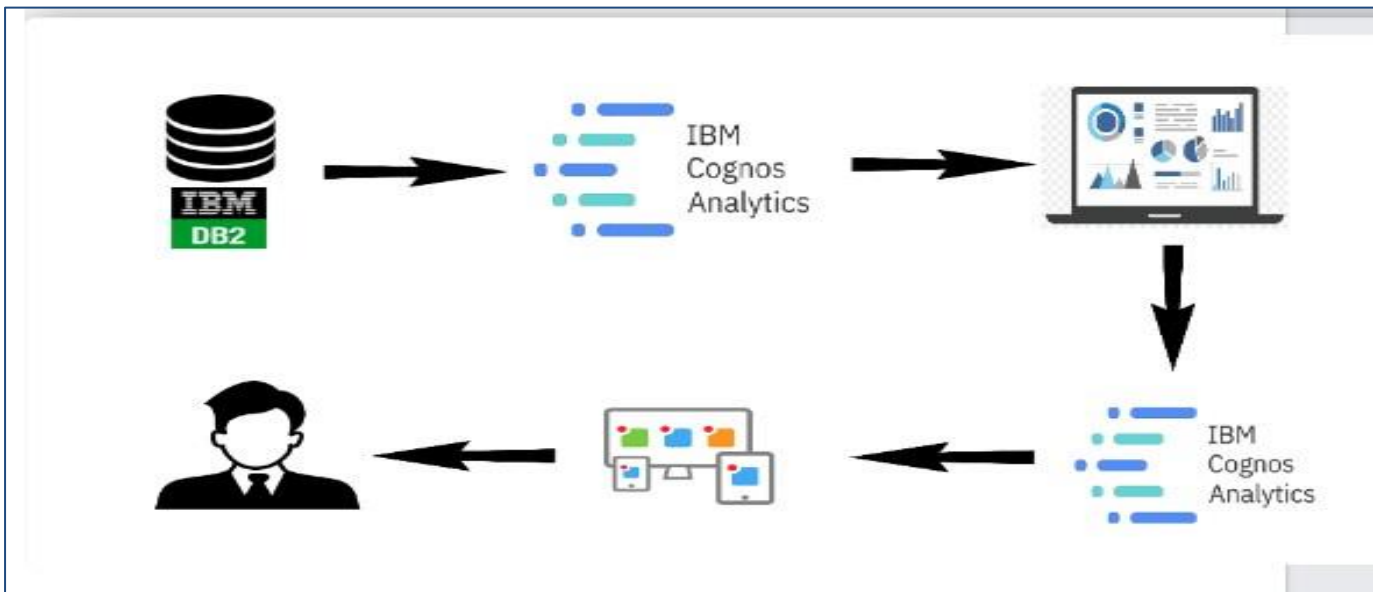
For Estimation and Prediction of Hospitalization and Medical Care Costs data involves building an interface where We can input relevant information, and the application will use the predictive model to estimate the medical care costs.

1.2 Purpose

- The Estimation and Prediction of Hospitalization and Medical Care Costs project plays a vital role in datadriven 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**



2.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 costs of 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% between 1987 and 2001.

2.1 Existing Problems

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

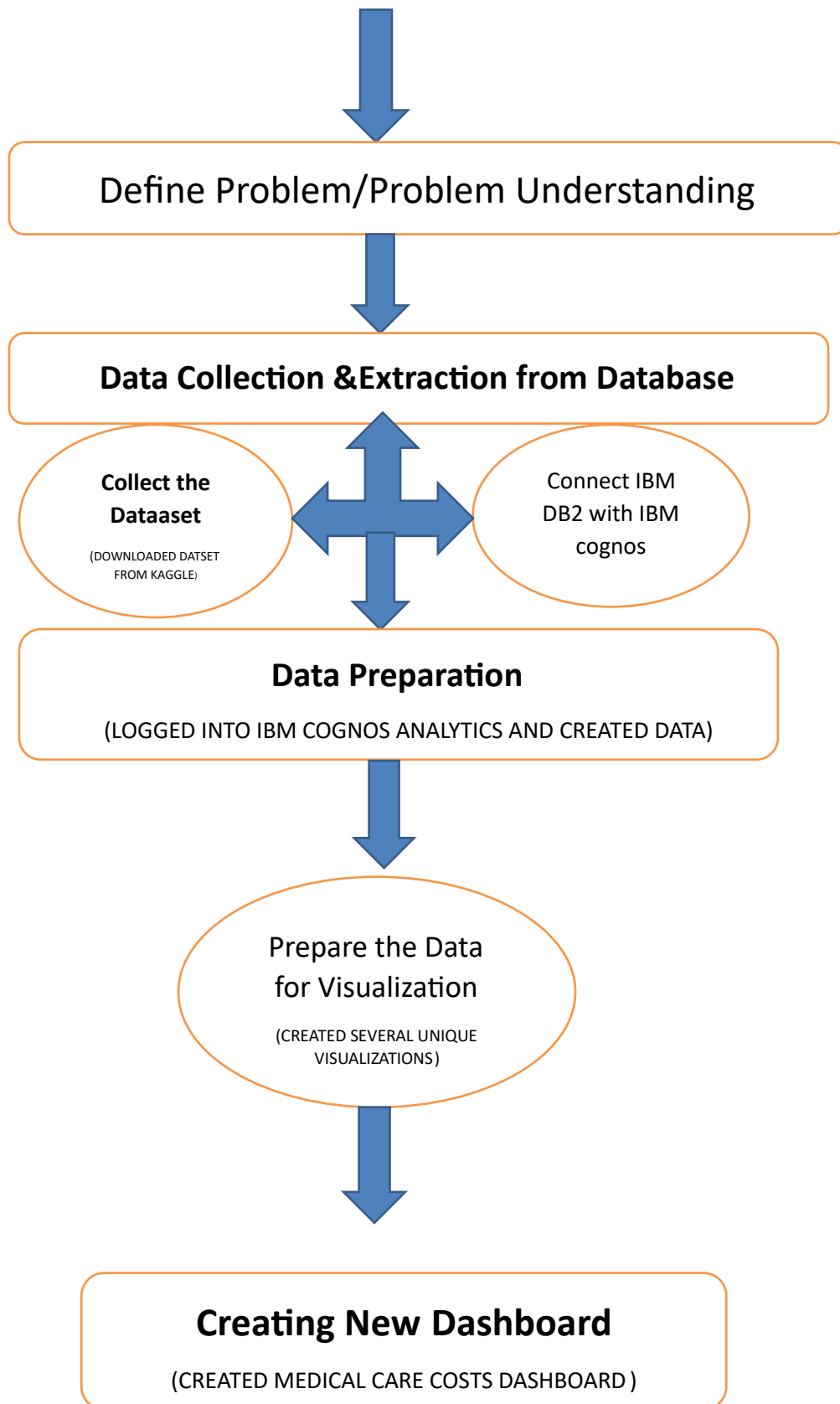
2.2 Proposed Solutions

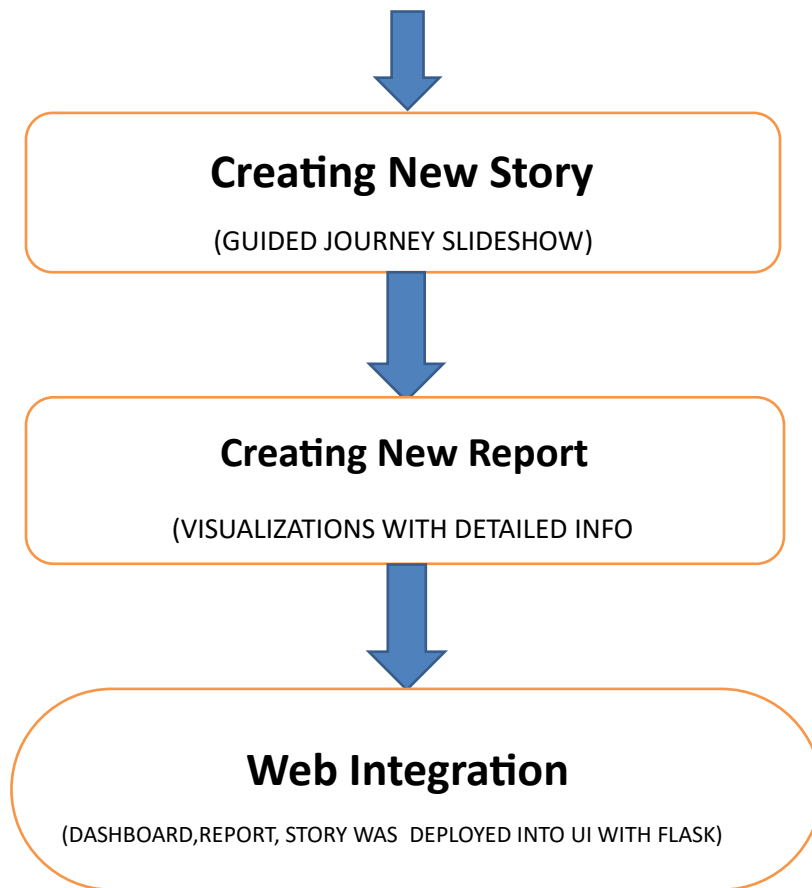
Proposing a solution for the estimation and prediction of hospitalization and medical care costs involves a combination of data-driven techniques, advanced analytics, and domain expertise. Collect comprehensive and diverse data related to hospitalization and medical care costs from various sources, including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

3.THEORITICAL ANALYSIS

3.1 Block diagram:

Estimation and Prediction of Hospitalization and Medical care costs





3.2 SOFTWARE OR HARDWARE DESIGNING

Software Requirements:

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

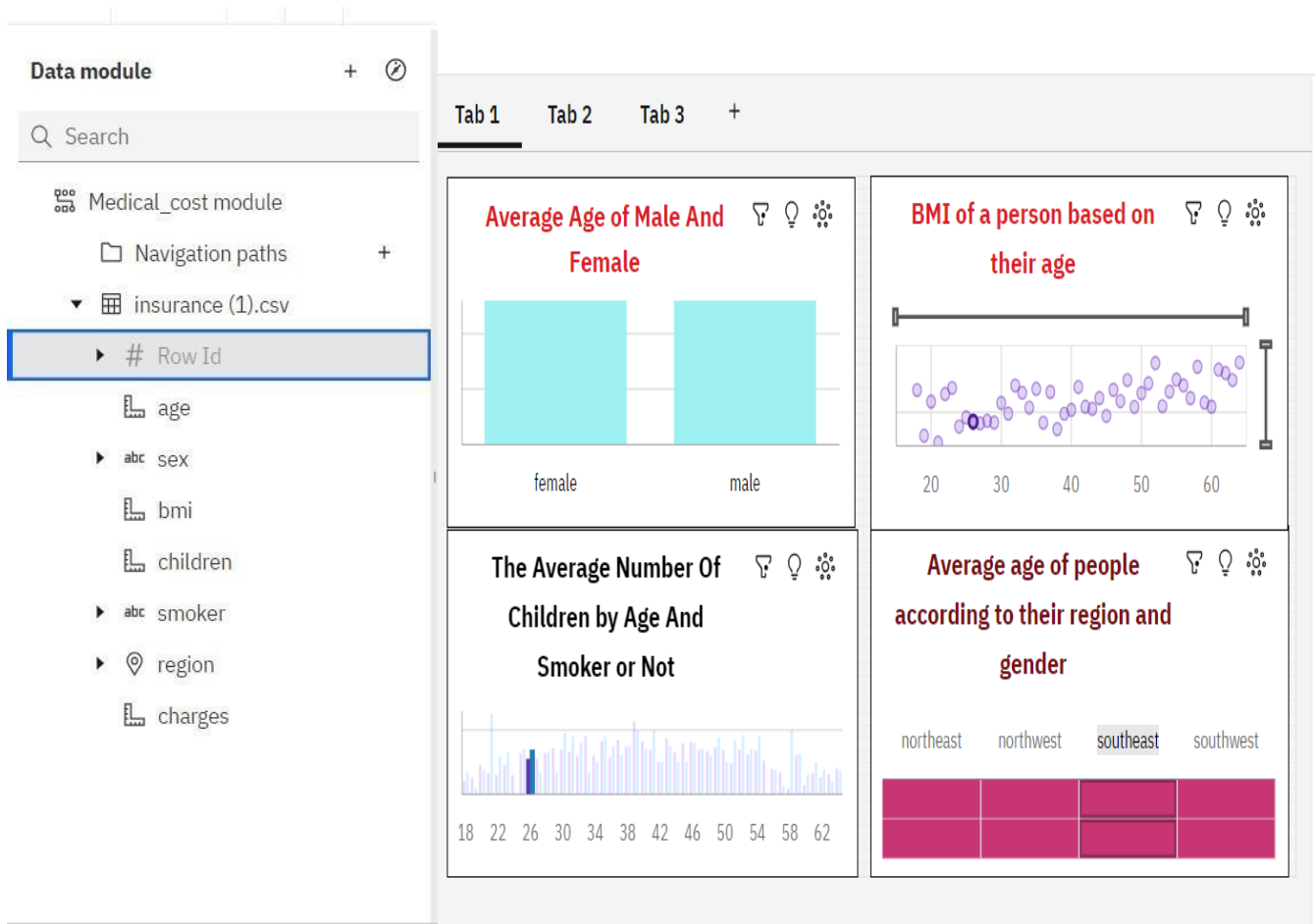
Hardware

Requirements:

- ? Processor
- ? Memory (RAM)
- ? Storage
- ? Graphics Processing Unit (GPU)
- ? Internet Connection



4.RESULT



Charges paid by people according to their gender,region and smoker



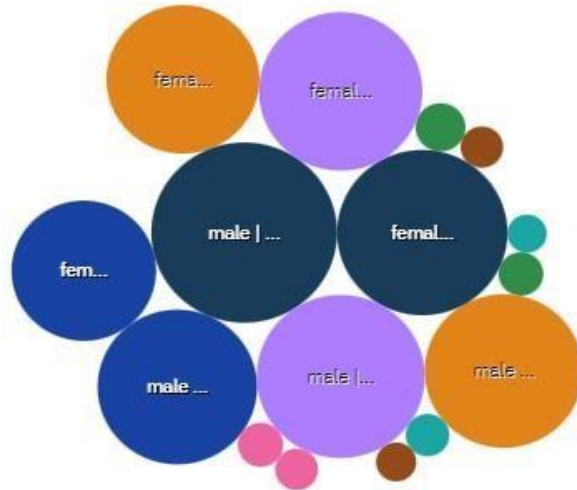
charges (Average)
36,029.84



7,609

region - smoker

- northeast | no
- northeast | yes
- northwest | no
- northwest | yes
- southeast | no
- southeast | yes
- southwest | no
- southwest | yes



DASHBOARD

Tab 1

Tab 2

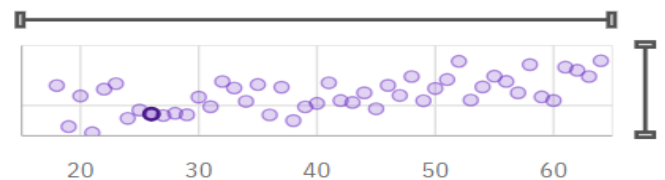
Tab 3

+

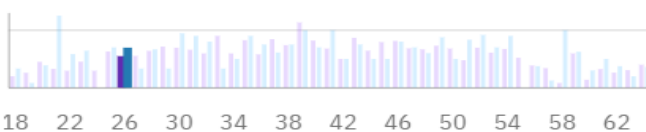
Average Age of Male And Female



BMI of a person based on their age



The Average Number Of Children by Age And Smoker or Not



Average age of people according to their region and gender

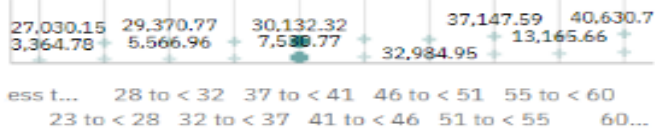


northeast northwest **southeast** southwest



Tab 1 **Tab 2** Tab 3 +

Charges paying by people according to their age and smoker



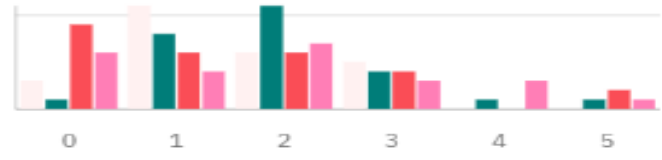
bmi of person by their gender and smoker



Average BMI of people by gender and region



Number of children to the people by region



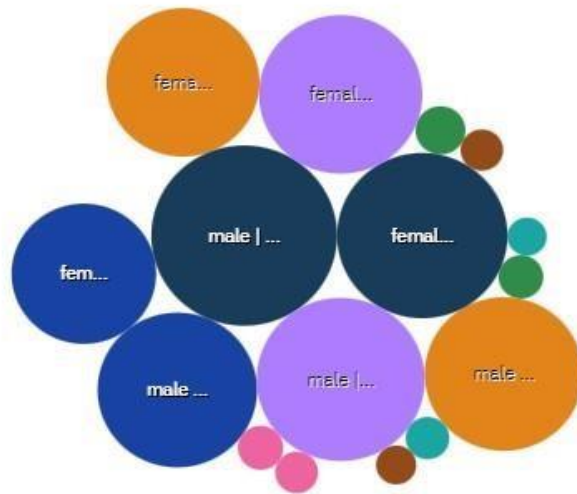
Charges paid by people according to their gender,region and smoker

charges (Average)



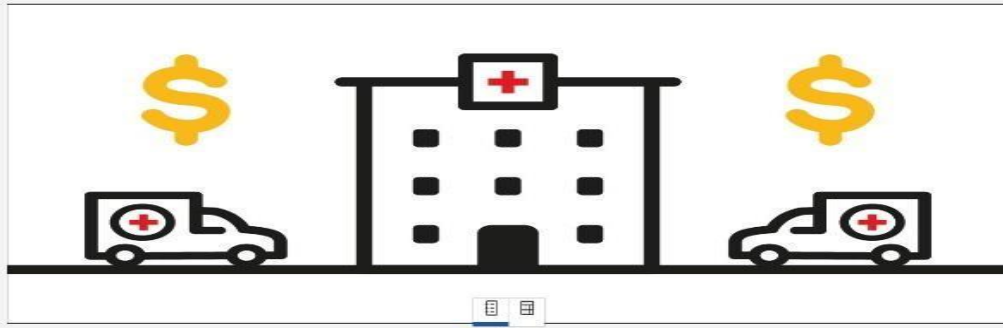
region - smoker

- northeast | no
- northeast | yes
- northwest | no
- northwest | yes
- southeast | no
- southeast | yes
- southwest | no
- southwest | yes

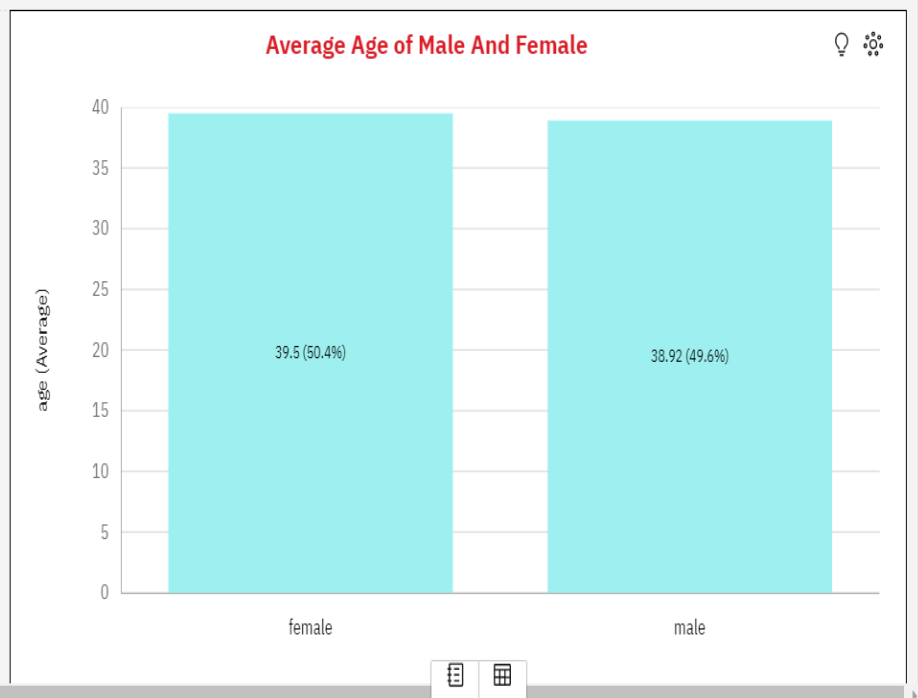


STORY

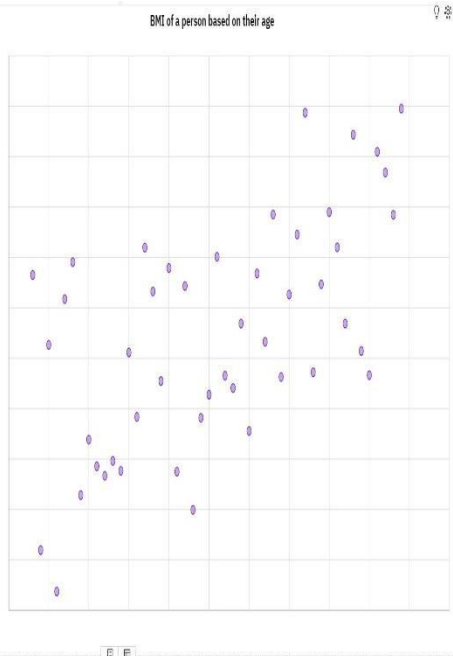
Medical Care Costs story



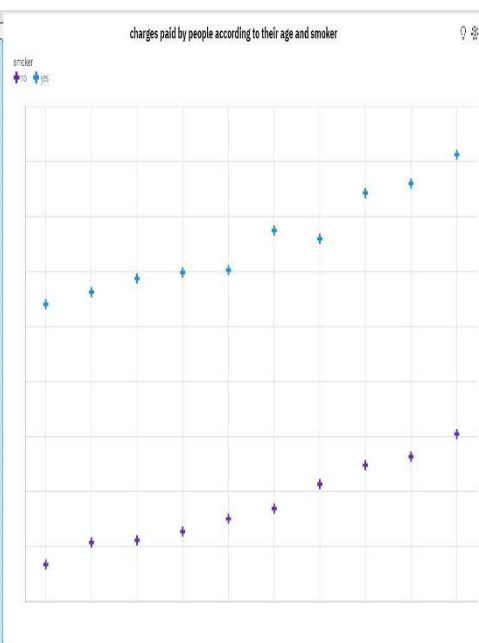
- This graph mainly represents the average age male and female and as we female average is higher.
- The average age of females is higher despite having a little bit less number if females in the overall dataset.



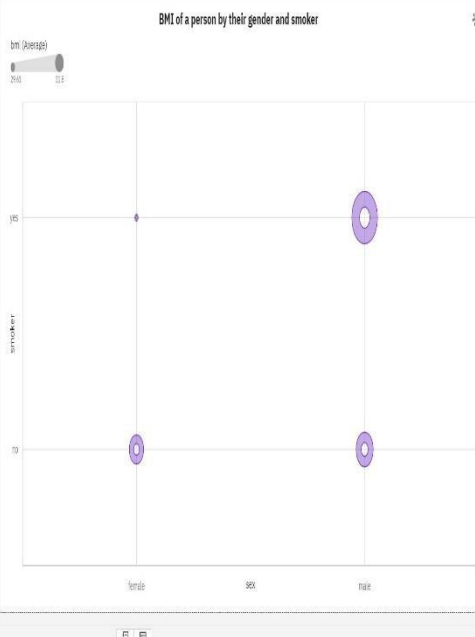
- As the age is increasing the average BMI of persons is also increasing, this means BMI and age are linearly proportional.
- The maximum value of BMI in the middle age group is little bit higher but, when the age is increasing the BMI value is decreasing



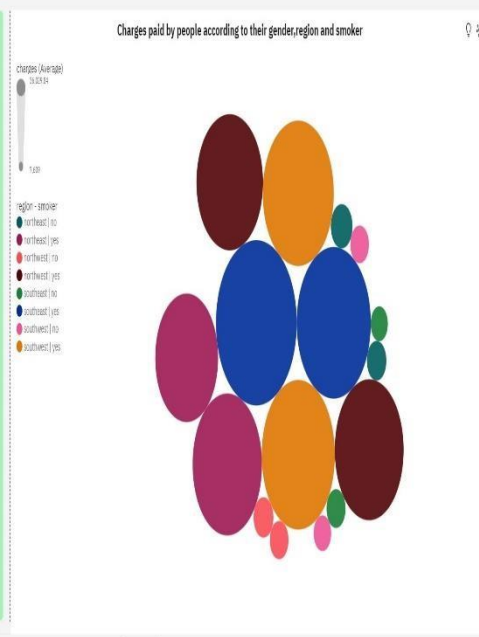
- Smokers of any age are paying more than non-smokers and the value is almost 3x to 5x higher
- Charges are getting increased as the age is also increasing in both scenarios
- Charges are unusually high when the age (Group) is 60 and above



- Males and smokers have the average BMI value compared to all.
- Females and smokers have less average BMI value compared to all.
- Incase of non-smokers, irrespective of gender their average BMI is almost similar

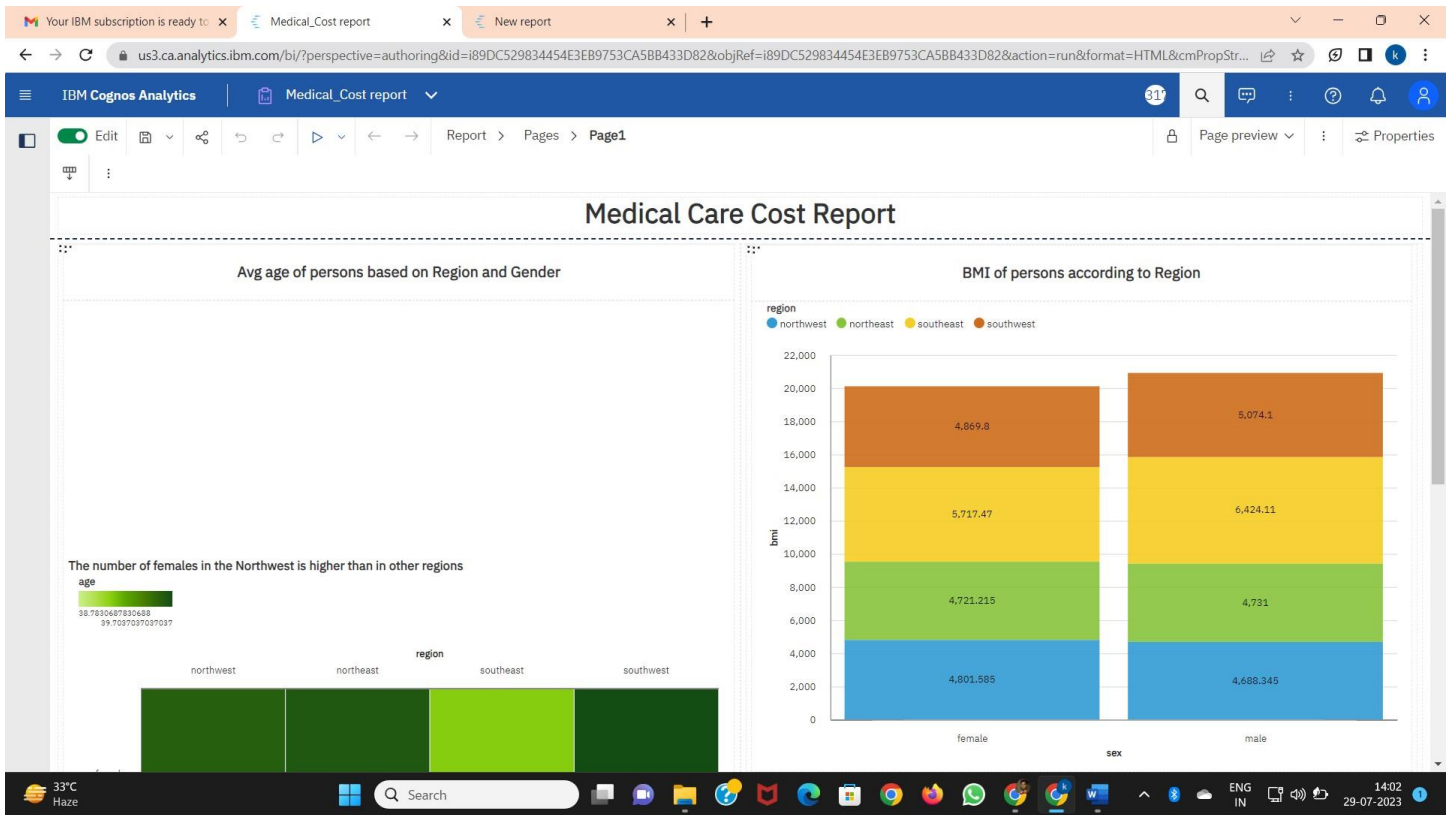


- Southeast region people, both men and women are paying more charges compared to other regions.
- Southeast smokers are the ones who are paying more charges.
- Out of all we have seen, smokers tend to pay more charges irrespective of region.



Smoking is not only injuries to Health but also to Wealth!

REPORT



The number of females in the Northwest is higher than in other regions

age

38.7830687830688
39.7037037037037

region

northwest

northeast

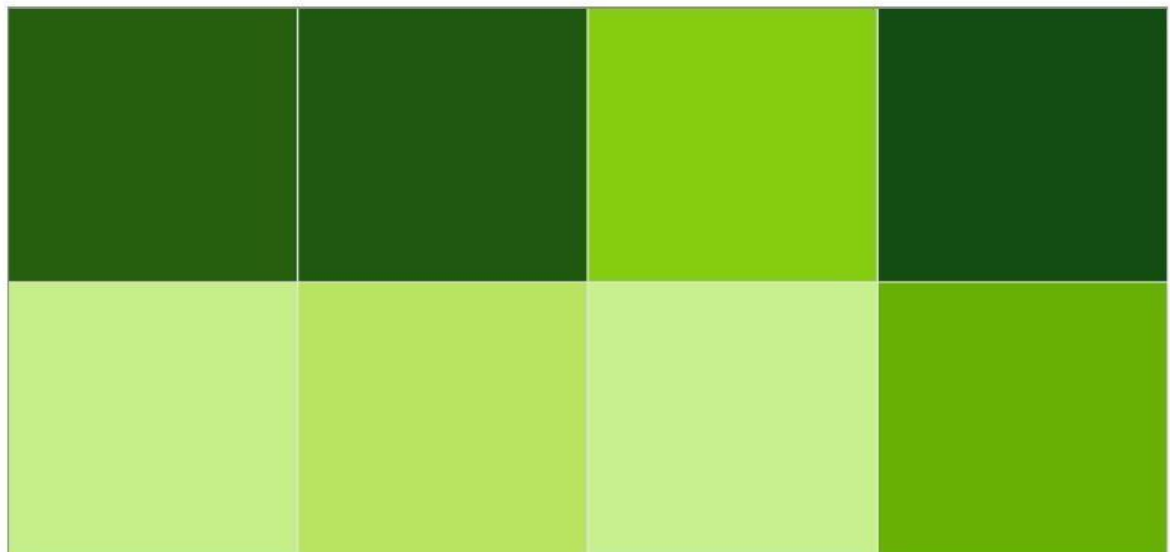
southeast

southwest

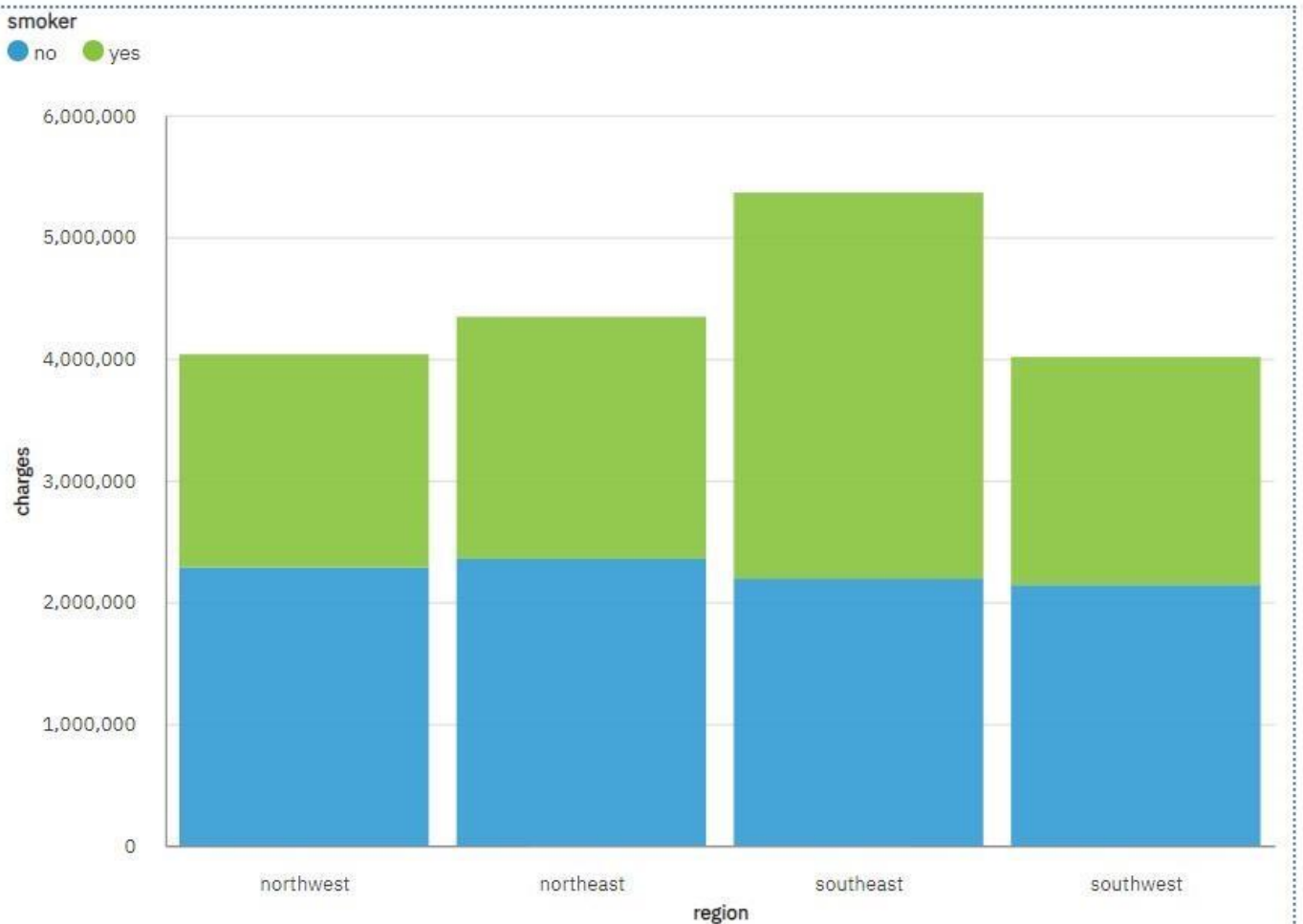
female

sex

male



Charges paid by the smokers and non-smokers according to Region



WEB INTEGRATION

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Analysis of Medical Care Costs in India

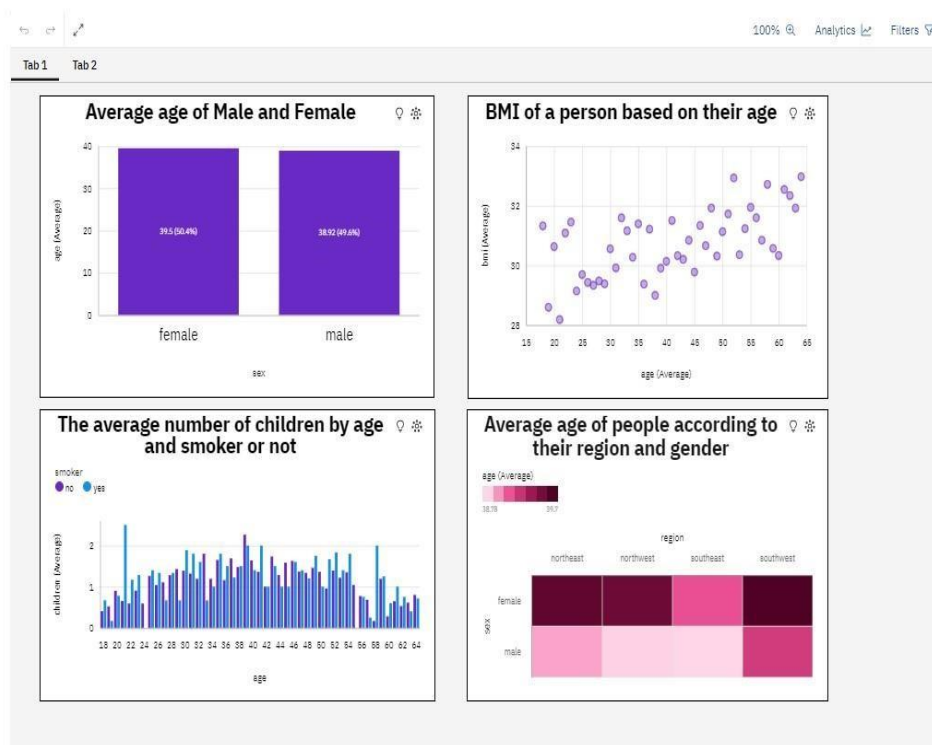
Health is Wealth

Get Started



Activate Windows
Go to Settings to activate Windows.

Dashboard



Activate Windows
Go to Settings to activate Windows

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Search, Share, Star, and other icons

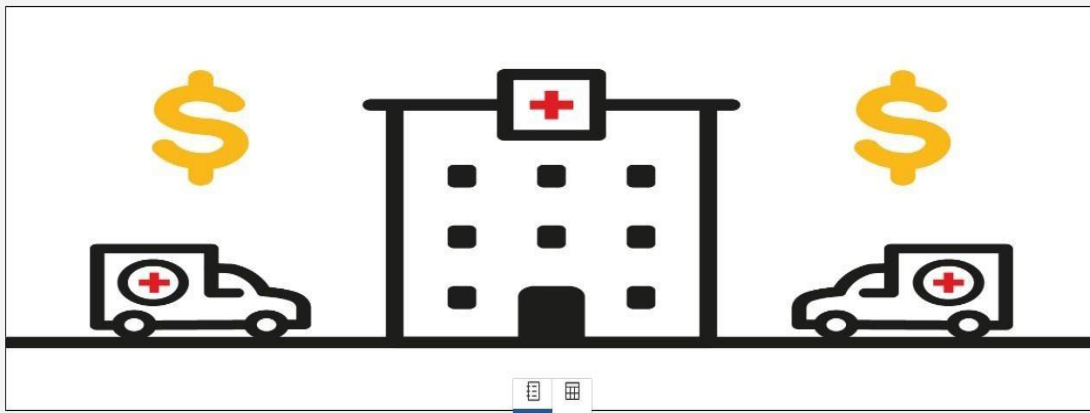
AliExpress, Booking.com, Facebook, YouTube, Gmail

Dashboard

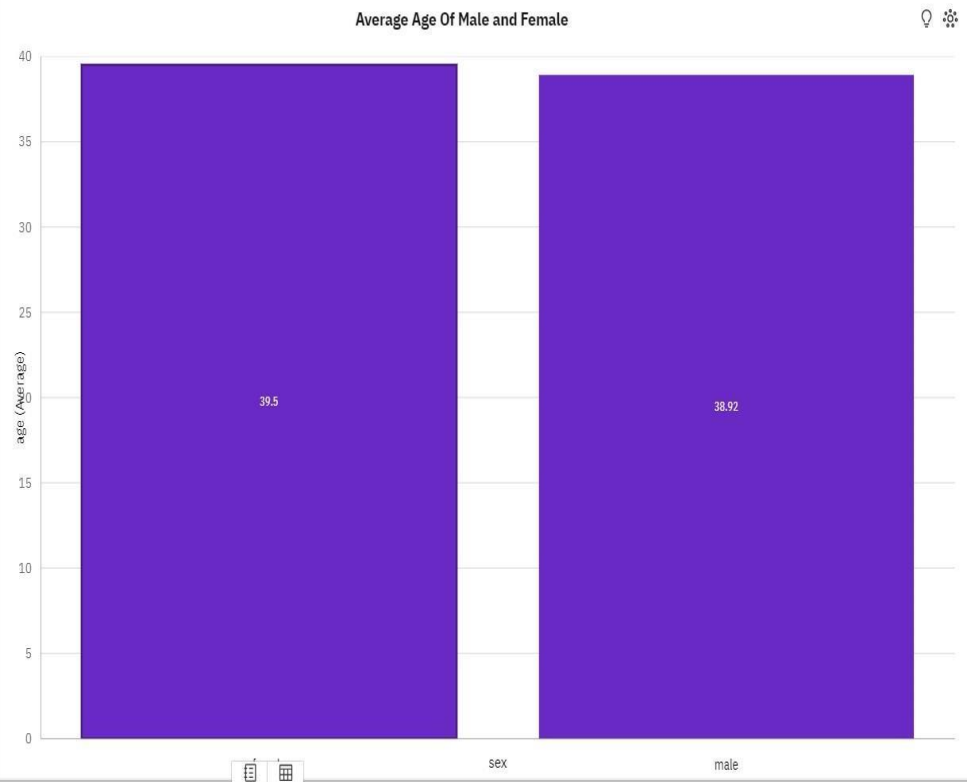


Activate Windows
Go to Settings to activate Windows

Medical Care Costs story

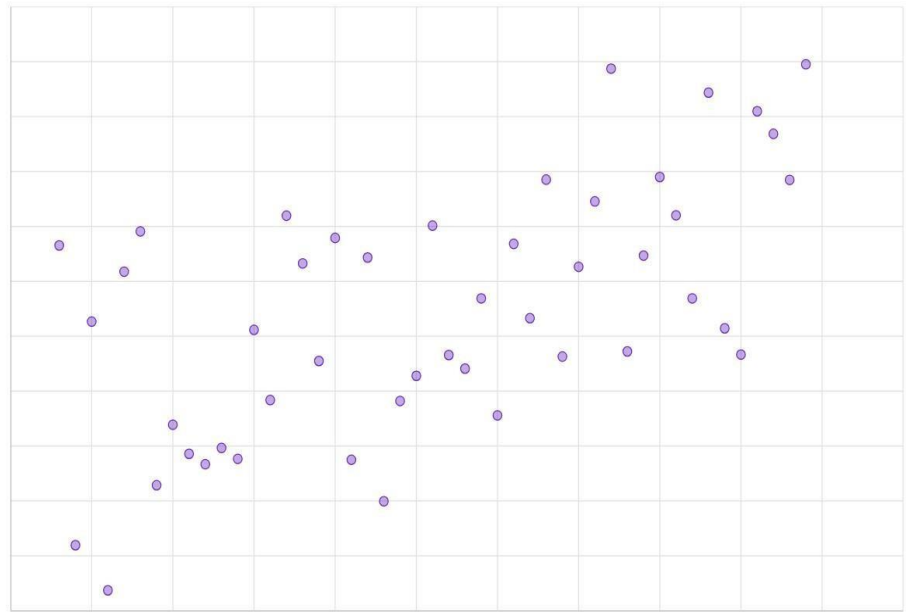


- This graph mainly represents the average age of males and females.
- The average age of females is higher despite having a little bit less number of females in the overall dataset
- The average value of age for males is 38.92 and for females is 39.5



- As the age is increasing the average BMI of persons is also increasing, this means BMI and age are linearly proportional.
- The maximum value of BMI in the middle age group is little bit higher but, when the age is increasing the BMI value is decreasing

BMI of a person based on their age



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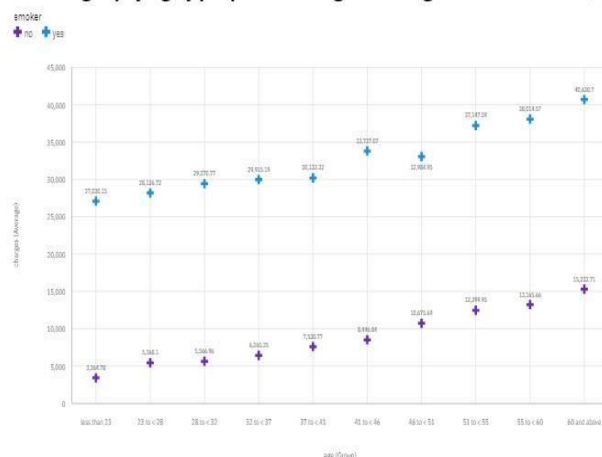
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Story

Medical Care Costs Story

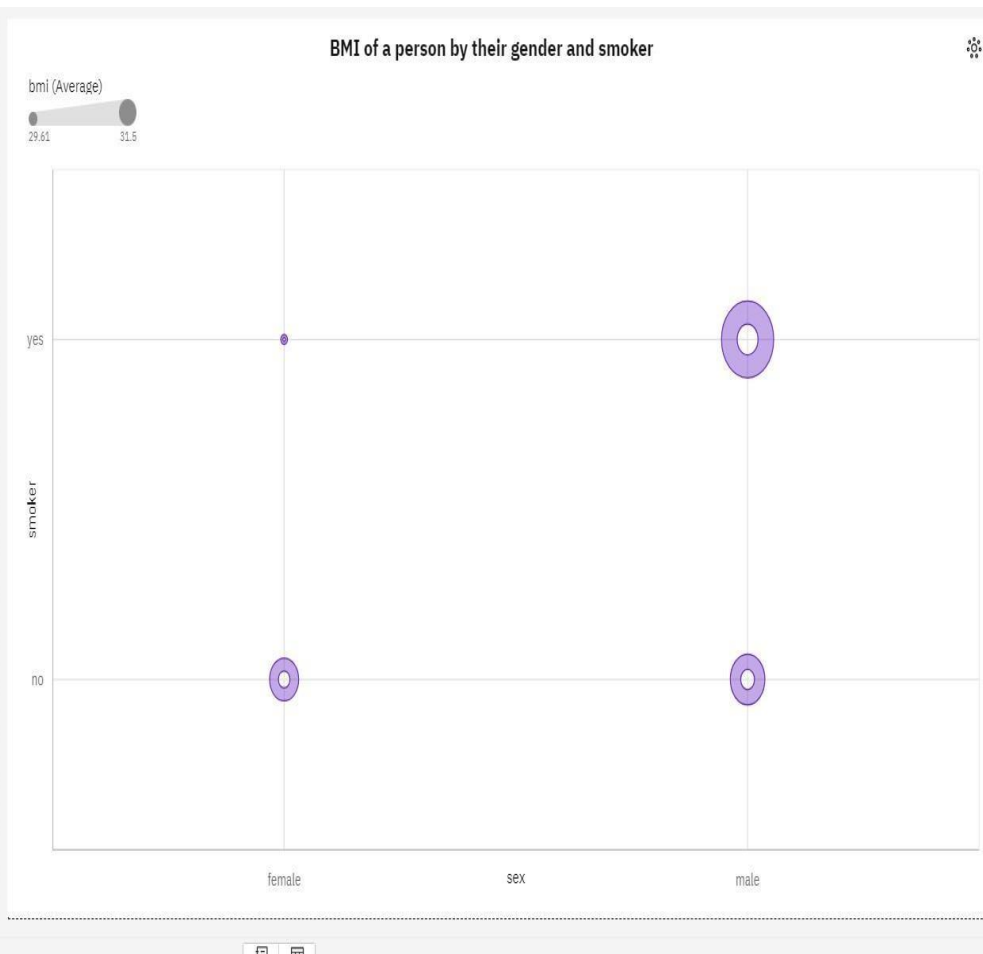
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charges paying by people according to their age and smoker

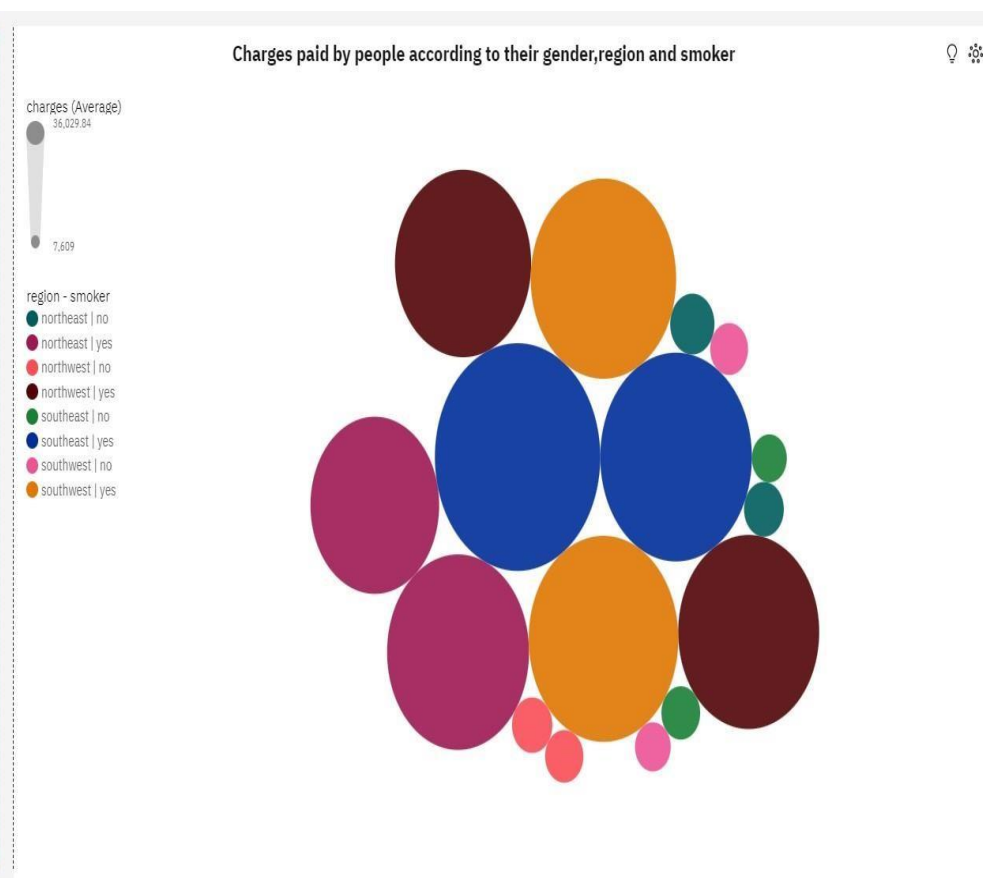


Activate Windows
Go to Settings to activate Windows.

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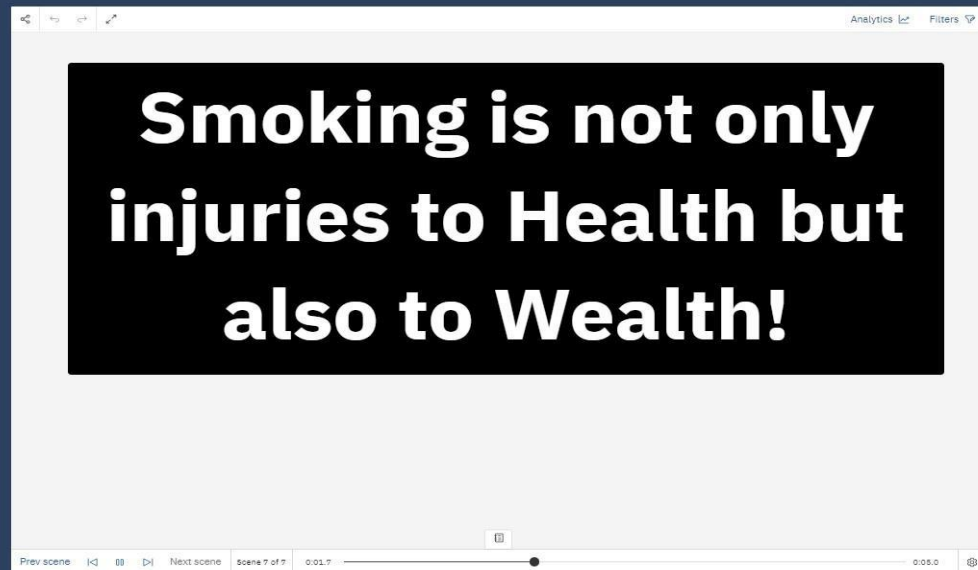
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I Care Costs

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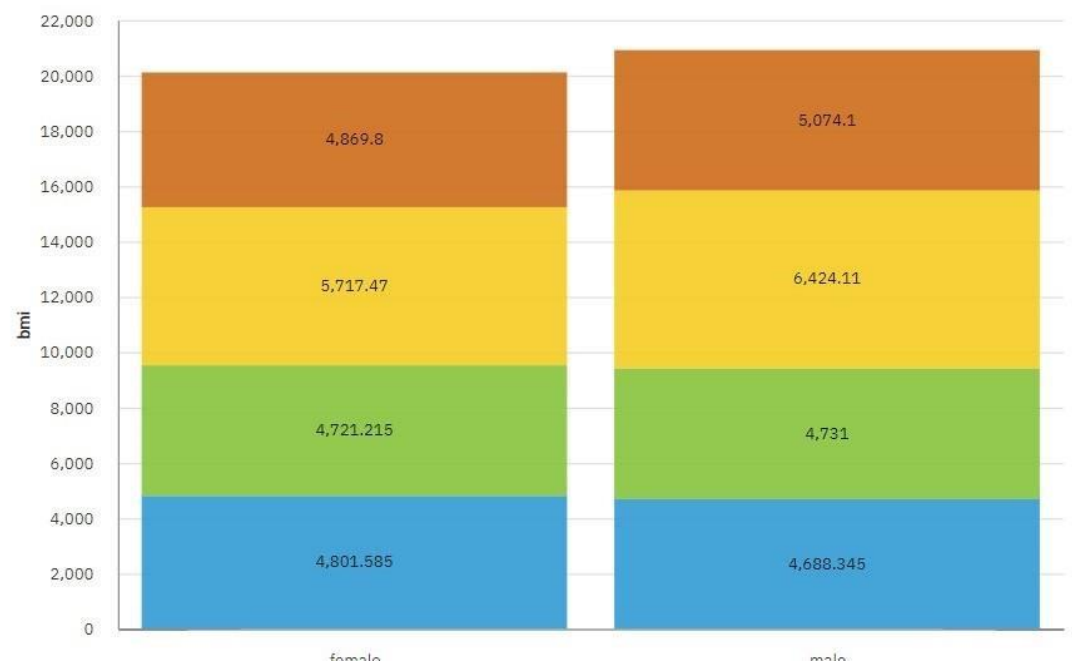
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BMI of persons according to Region

region
● northwest ● northeast ● southeast ● southwest



southwest



The number of females in the Northwest is higher than in other regions

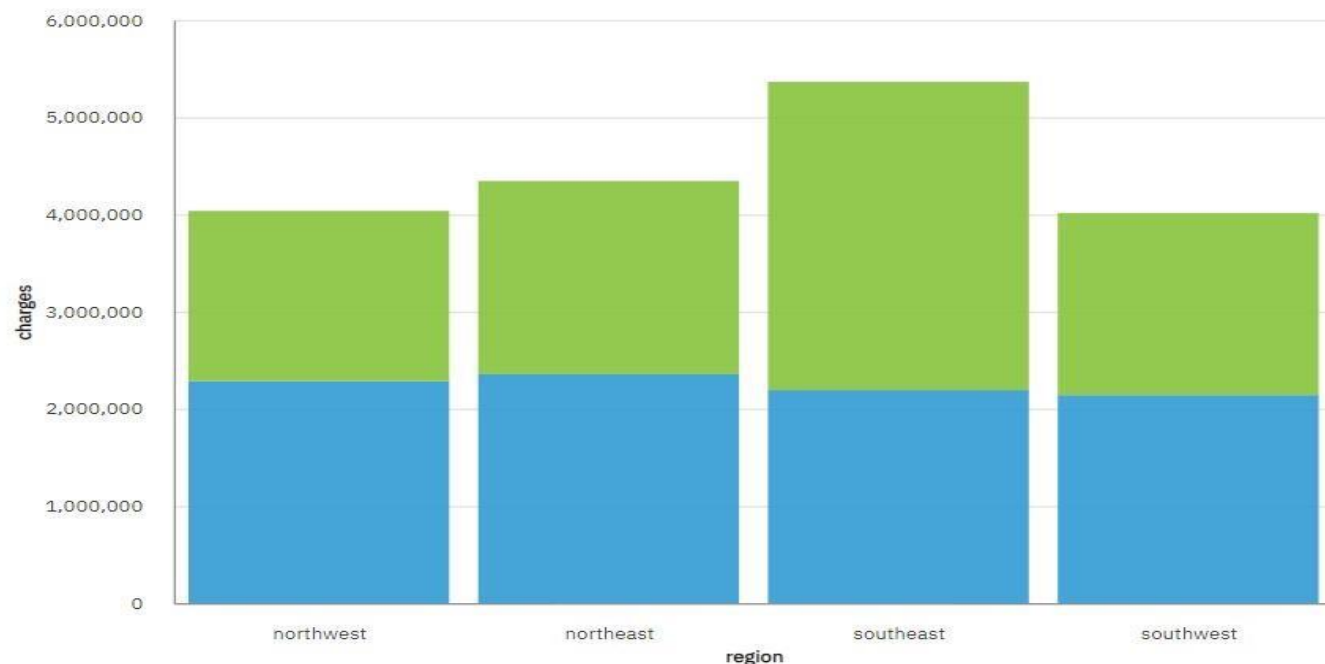
age



Charges paid by the smokers and non-smokers according to Region

smoker

no yes



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contact@example.com

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5.ADVANTAGES & DISADVANTAGES

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

6.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**

7.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 ,the project aims to achieve several important outcomes. Lastly we have to create the web integration in the python folder. Download the bikin file and run the index.html in spyder.

8.FUTURE SCOPE:

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.