PROJECT TITLE:-

Estimation And Prediction Of Hospitalization And Medical Care Costs

TEAM:-

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Team Size : 5

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FACULTY MENTOR K. MUNI SANKAR

1 INTRODUCTION:-

1.1 OVERVIEW :

Es ma on and Predic on of Hospitaliza on and Medical Care Costs is a data analy cs project focused on analyzing and forecas ng the expenses associated with hospitaliza on and medical treatments. The primary goal is to develop models that can accurately es mate the costs incurred by pa ents and healthcare providers for various medical procedures and hospital stays.

Data Collec on and Preprocessing:-

A comprehensive dataset was collected from kaggle Which includes age,sex,region,charges,smoker,BMl. 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. Visualiza ons and summary sta s cs helped in understanding the characteris cs of the data and guided further analysis.

Crea ng a Flask web applica on:-

For Es ma on and Predic on of Hospitaliza on and Medical Care Costs data involves building an interface where We can input relevant informa on, and the applica on will use the predic ve model to es mate the medical care costs.

1.2 PURPOSE:-

The Es ma on and Predic on of Hospitaliza on and Medical Care Costs project plays a vital role in datadriven decision-making, cost op miza on, and improving pa ent care in the healthcare industry.

It empowers various stakeholders with ac onable insights to make informed choices and enhance the overall efficiency of the healthcare system.

By undertaking the Es ma on and Predic on of Hospitaliza on and Medical Care Costs project, several significant achievements and benefits can be realized in the healthcare industry and beyond.

KEY OUTCOMES:

1. Cost Op miza on
2. Improved Financial Planning
3. Transparency and Informed Decision-making 4. Enhanced Pa ent Care 5. Tailored Insurance Coverage

2. LITERATURE SURVEY:

The prevalence of obesity, which is defined as a body mass index (BMI) greater than 30, has increased drama cally 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 Associa on, an ac on that could put more emphasis on the health condi on 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 percen le, has reached 17%. The alarming rates of the high prevalence of obesity have posed a significant public health concern as well as a substan al financial burden on our society because obesity is known to be a risk factor for many chronic diseases, such as type 2 diabetes,myocardial infarc on, cancer,hypertension,asthma,stroke and other condi ons.

To understand the economic burden of obesity, several studies have a empted to es mate the a ributable costs of obesity, following the burdenof-illness literature on other disease areas. A previous cost-of-illness study es mated that healthcare spending a ributable to the rising prevalence of obesity has increased by 27% between 1987 and 2001.

2.1 Existng problem:-

Solving the Es ma on and Predic on of Hospitaliza on and Medical Care Costs involves a systema c approach that combines data analysis. model development and evalua on.

2.2 Proposed Solu on:-

Proposing a solu on for the es ma on and predic on of hospitaliza on and medical care costs involves a combina on of data-driven techniques. advanced analy cs. and domain exper se.Collect comprehensive and diverse data related to hospitaliza on and medical care costs from various sources, including electronic health records, insurance claims and

administra ve databases. The success of the proposed solu on depends on the availability of quality data, collabora on with healthcare experts, and a

commitment to con nuous improvement based on realworld feedback. Healthcare cost es ma on and predic on are com lex tasks and a mul disci lina a roach is crucial for achieving accurate and reliable results

3. THEORITICAL ANALYSIS:-

Crea ng a detailed block diagram for Es ma on and Predic on of Hospitaliza on 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 es ma ng and predic ng hospitaliza on and medical care costs.

The block diagram illustrates the end-to-end process of es ma ng and predic ng hospitaliza on and medical care costs. star ng from data collec on and preprocessing to deploying the final models for cost es ma on and future cost predic on.

3.1 Block Diagram:-

Data Collec on:

- Gather relevant data sources. which may include pa ent demographigs, medical history, diagnosis. treatments. hospitaliza on dura on, medica on costs. and any other factors that impact medical care costs. Data Preprocessing:

- Clean and preprocess the data to handle missinq values. outliers. and inconsistencies. This step is essen al to ensure the data is suitable for analysis.

Feature Engineering:

- Extract relevant features from the data that are likely to impact hospitaliza on and medical care costs. This might include age, gender. diagnosis codes. comorbidi es. and more. Cost Es ma on Model:

- Develop a model to es mate hospitaliza on and medical care costs based on the features iden fied in the previous step. This could involve various techniques such as regression analysis, decision trees. or machine learning algorithms. Cost Predic on Model:

- Build a predic ve model to forecast future hospitaliza on and medical care costs for pa ents. This model could consider me-series data and other temporal factors to make accurate predic ons. Model Evalua on:

- Evaluate the performance of both the cost es ma on and prediction models usinq appropriate metrics. such as mean squared error. root mean squared error. or R-squared.

Cost Analysis and Visualiza on:

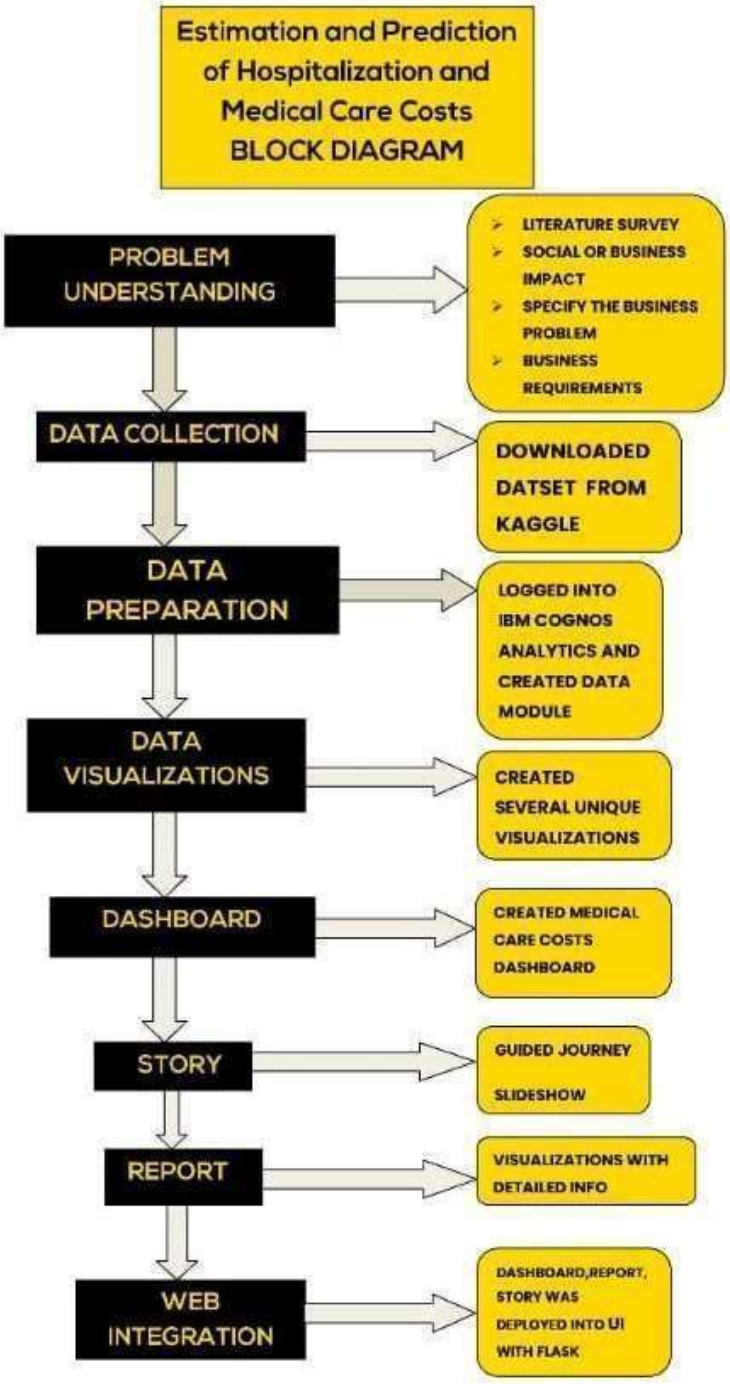
- Analyze the results to qain insiqhts into the factors influencing hospitaliza on and medical care costs. Visualiza on tools can help present the findings in a more understandable format.

Model Deployment:

- Inteqrate the developed models into the healthcare system to provide real-me cost es mates and predic ons for pa ents.

Con nuous Monitoring and Upda ng:

- Regularly monitor the performance of the models and update them as necessary to ensure accuracy and relevance with changing healthcare trends and prac ces.


Estimation and Prediction of Hospitalization and Medical Care Costs BLOCK DIAGRAM
PROBLEM UNDERSTANDING
LITERATURE SURVEY
SOCIAL OR BUSINESS IMPACT
SPECIFY THE BUSINESS PROBLEM
BUSINESS REQUIREMENTS
DATA COLLECTION
DOWNLOADED DATSET FROM KAGGLE
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

3.2 SOFTWARE OR HARDWARE DESIGNING:-

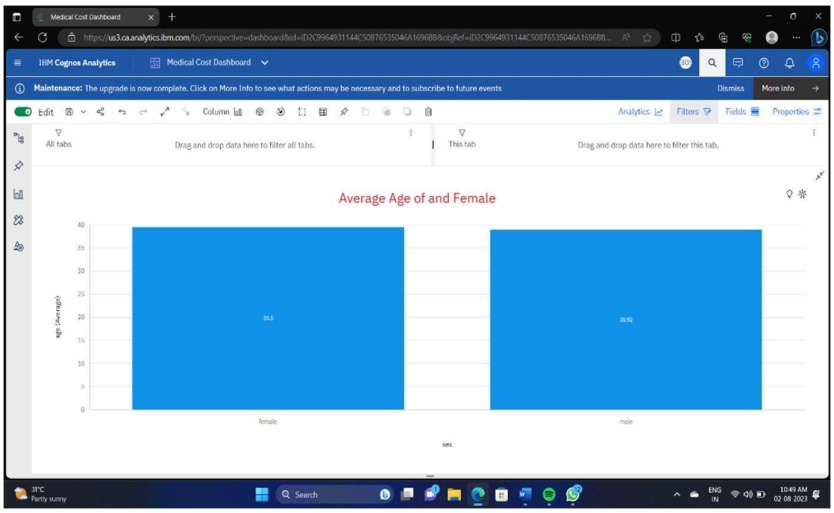
So ware Requirements:

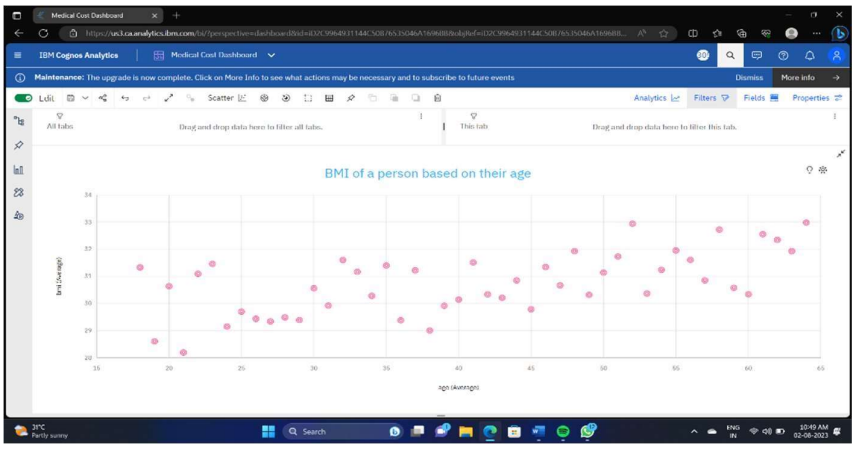
1. IBM cognos analy cs Tool.
2. Flask.
3. Integrated Development Environment (IDE)-Spyder.

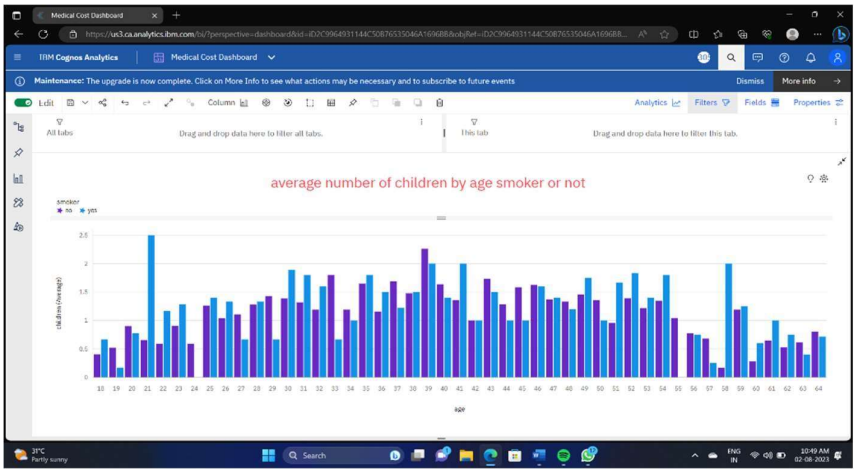
Hardware Requirements:-

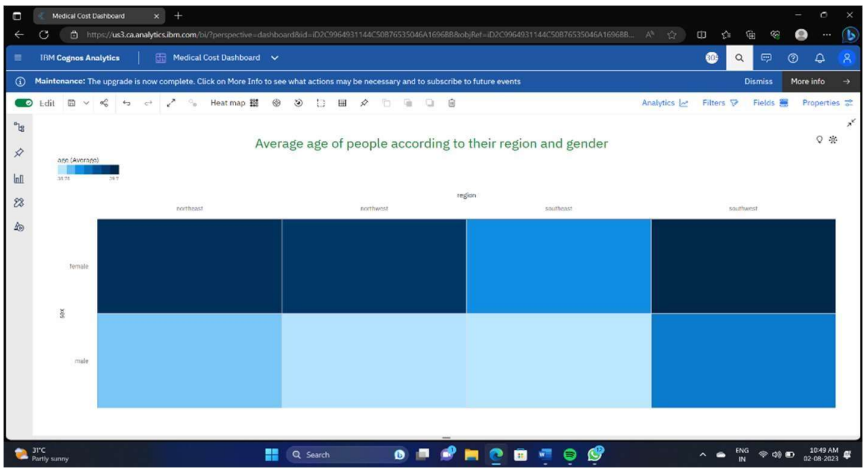
Minimum System Requirements(RAM-4GB,Quad core Processor

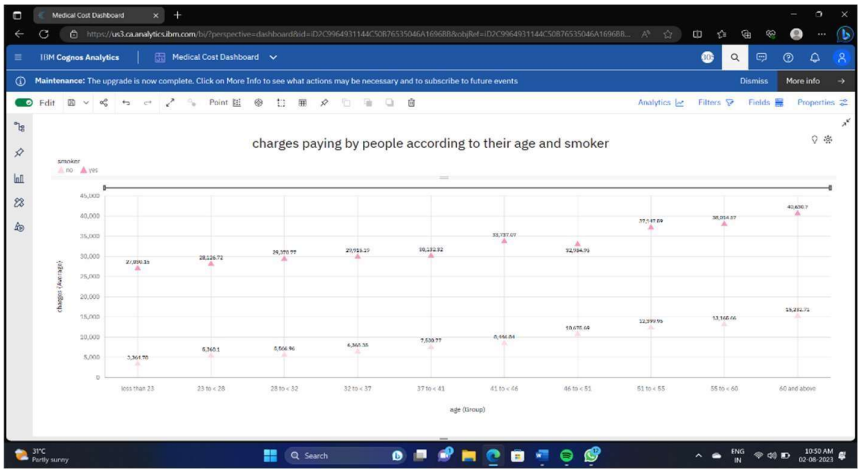
4. RESULT:- DATA VISUALIZATION

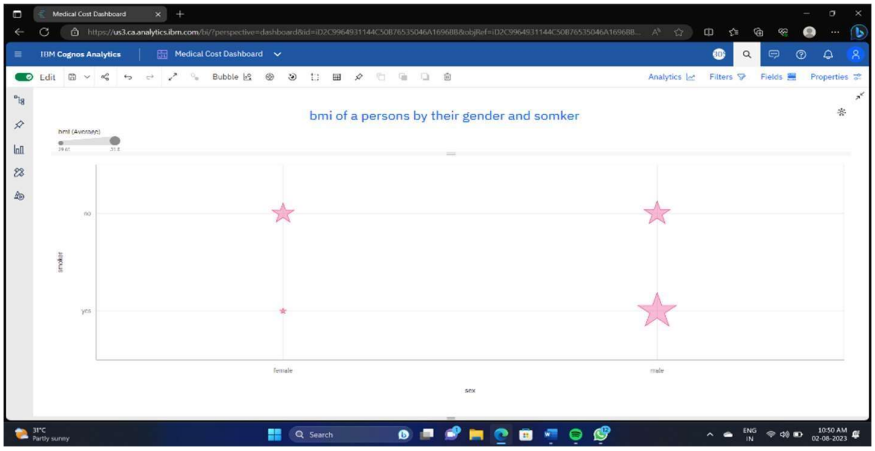







Medical Cost Dashboard
IIIM Cognos Analytics
Medical Cost Dashboard
Maintenance: The upgrade is now complete. Click on More Info to see what actions may be necessary and to subscribe to future events
Dismiss
More info
Edit
Heat map
Analytics
Filters
Fields
Properties
Average age of people according to their region and gender
age (Average)
region
northeast
northwest
southeast
southwest
sex
female
male
31°C
Partly sunny
Search
ENG
IN
10:49 AM
02-08-2023


Medical Cost Dashboard
IIIM 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
Point
Analytics
Filters
Fields
Properties
charges paying by people according to their age and smoker
smoker
no
yes
charges (Average)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
less than 23
23 to < 28
28 to < 32
32 to < 37
37 to < 41
41 to < 46
46 to < 51
51 to < 55
55 to < 60
60 and above
age (Group)
31°C
Partly sunny
Search
ENG
IN
10:52 AM
02-08-2023


Medical Cost Dashboard
IIIM Cognos Analytics
Medical Cost Dashboard
Edit
Bubble
Analytics
Filters
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Properties
bmi of a persons by their gender and somker
bmi (Average)
smoker
no
yes
female
male
sex
31°C
Partly sunny
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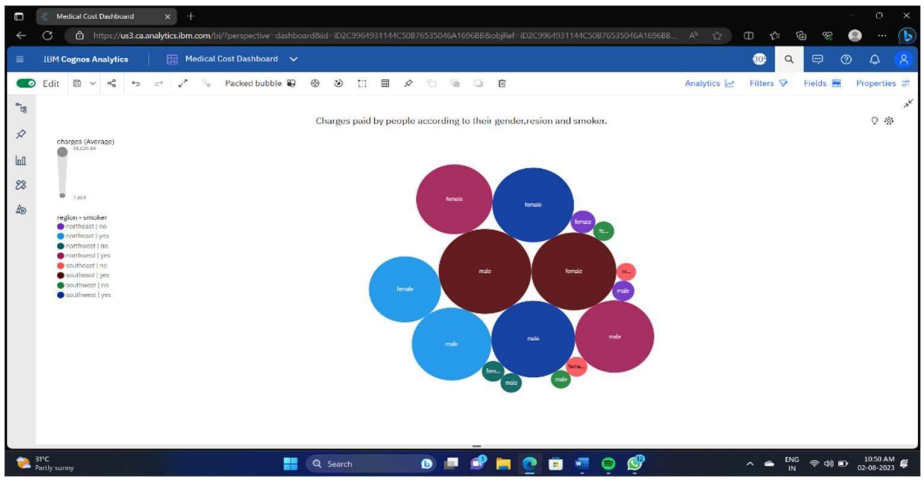
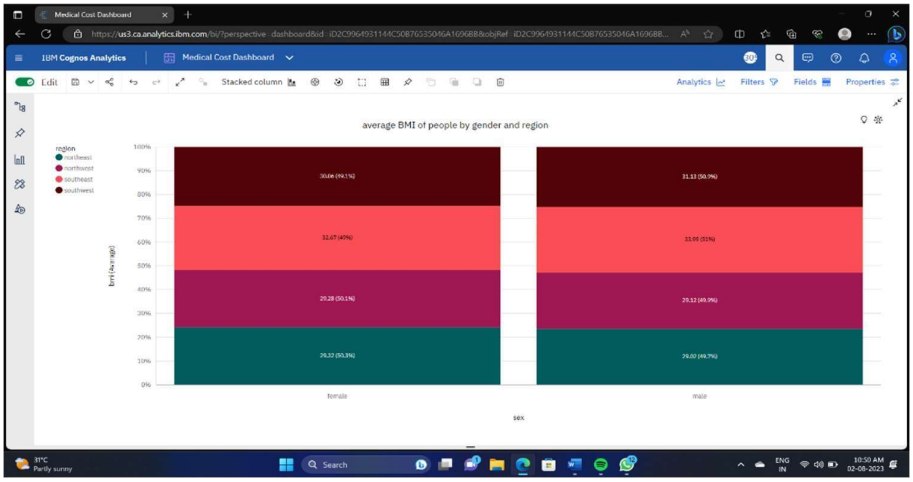

Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Packed bubble
Analytics
Filters
Fields
Properties
Charges paid by people according to their gender,resion and smoker.
charges (Average)
region + smoker
northeast | no
northeast | yes
northwest | no
northwest | yes
southeast | no
southeast | yes
southwest | no
southwest | yes
female
male
31°C
Partly sunny
Search
ENG
IN
10:50 AM
02-08-2023


Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Stacked column
Analytics
Filters
Fields
Properties
average BMI of people by gender and region
region
northeast
northwest
southeast
southwest
bmi (Average)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
30.86 (49.1%)
31.33 (50.9%)
32.07 (40%)
33.00 (51%)
29.28 (50.1%)
29.12 (49.9%)
29.32 (50.3%)
29.07 (49.7%)
female
male
sex
31°C
Partly sunny
Search
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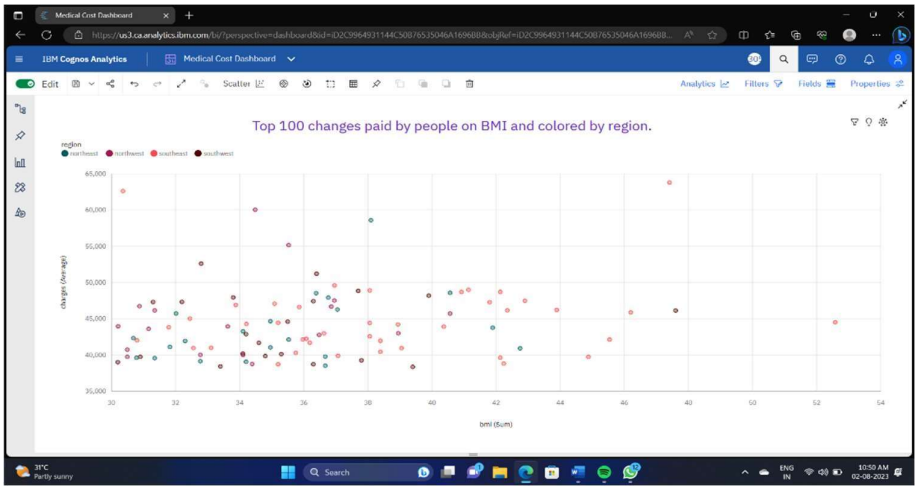
Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Scatter
Analytics
Filters
Fields
Properties
Top 100 changes paid by people on BMI and colored by region.
region
northeast
northwest
southeast
southwest
charges (Average)
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30
32
34
36
38
40
42
44
46
48
50
52
54
bmi (Sum)
31°C
Partly sunny
Search
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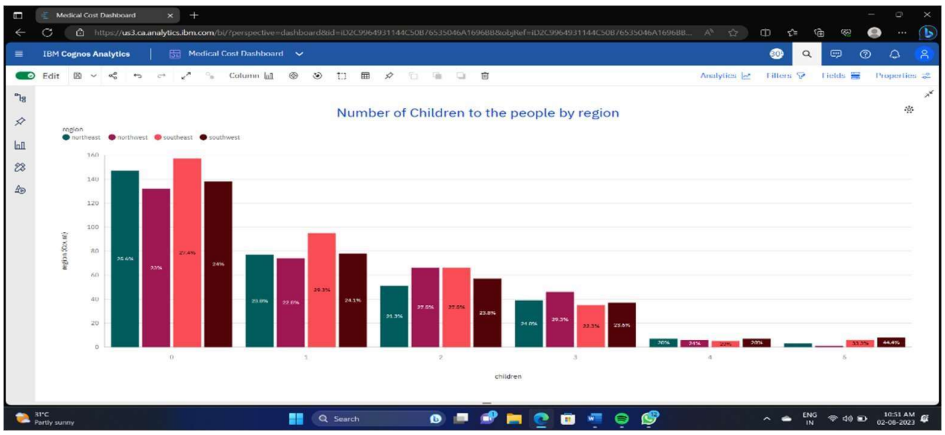
Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Column
Analytics
Filters
Fields
Properties
Number of Children to the people by region
region
northeast
northwest
southeast
southwest
avg(bmi) (Avg)
children
Search
ENG
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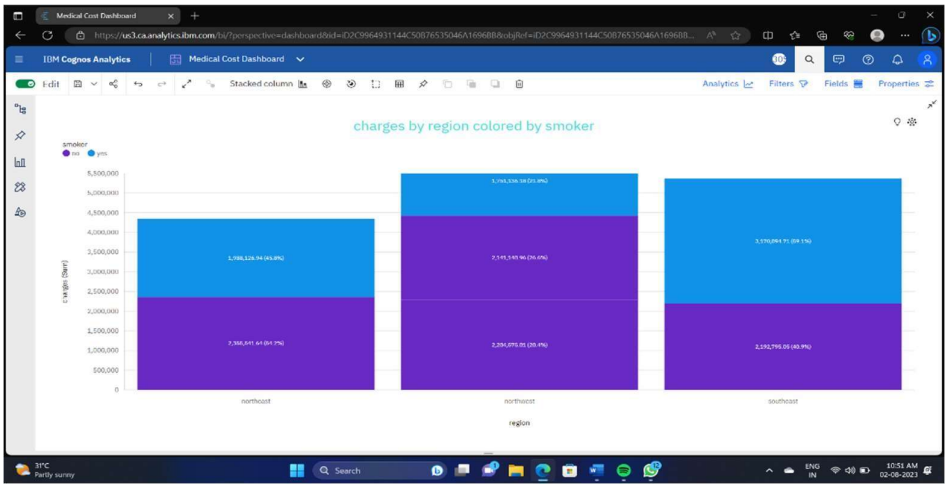
Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Stacked column
Analytics
Filters
Fields
Properties
charges by region colored by smoker
smoker
no
yes
sum(charges) (Sum)
region
northeast
northwest
southeast
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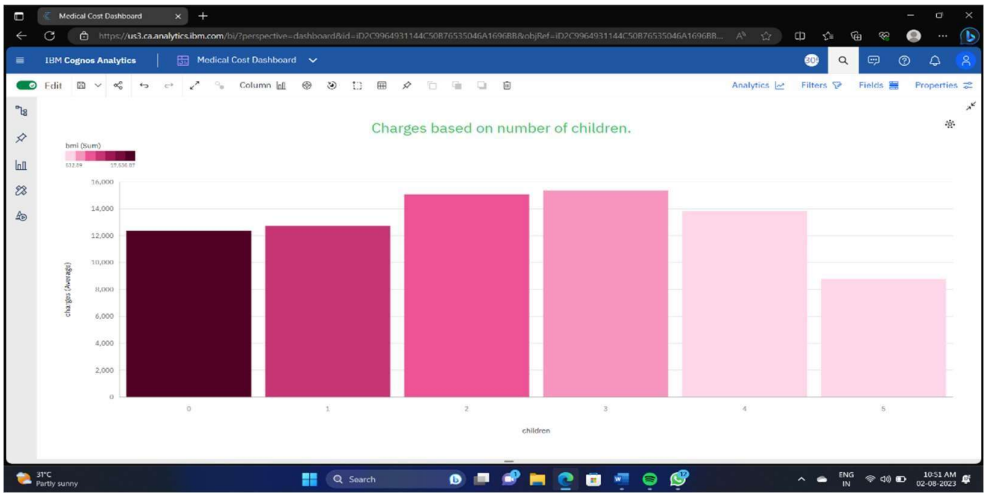
Medical Cost Dashboard
IBM Cognos Analytics
Medical Cost Dashboard
Edit
Column
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Charges based on number of children.
bmi (Sum)
charges (Average)
children
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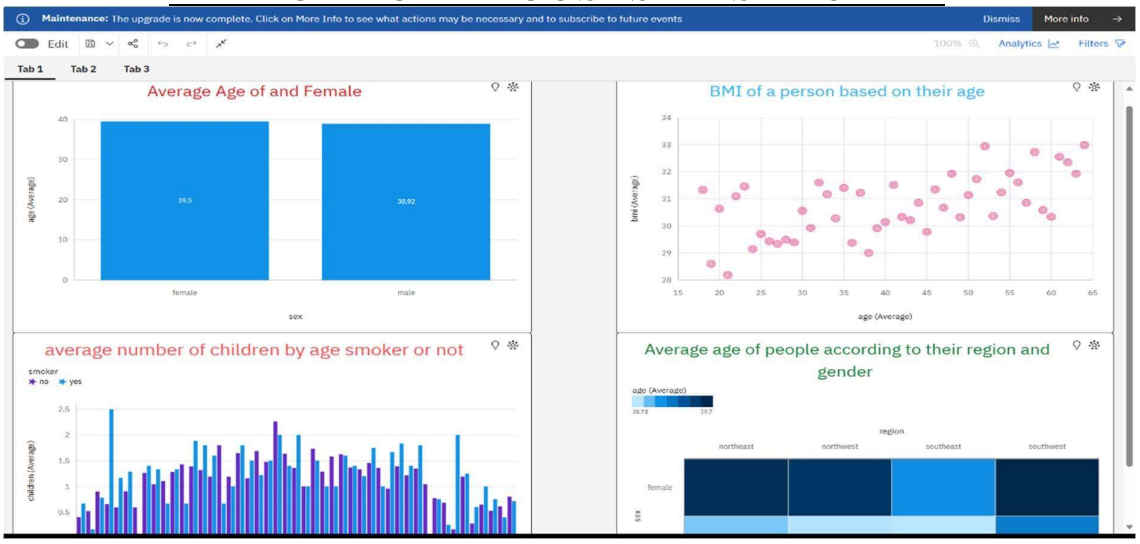
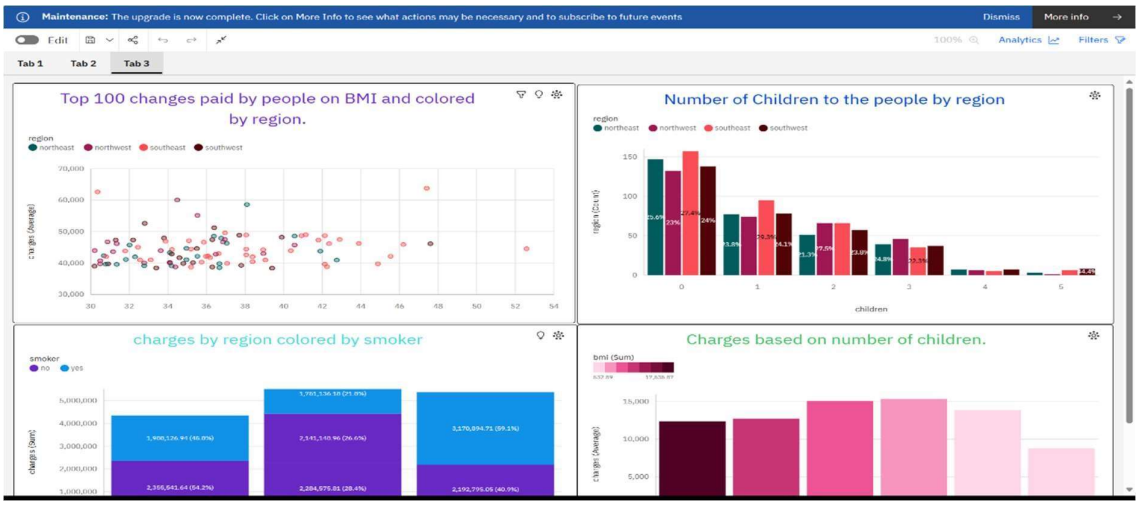
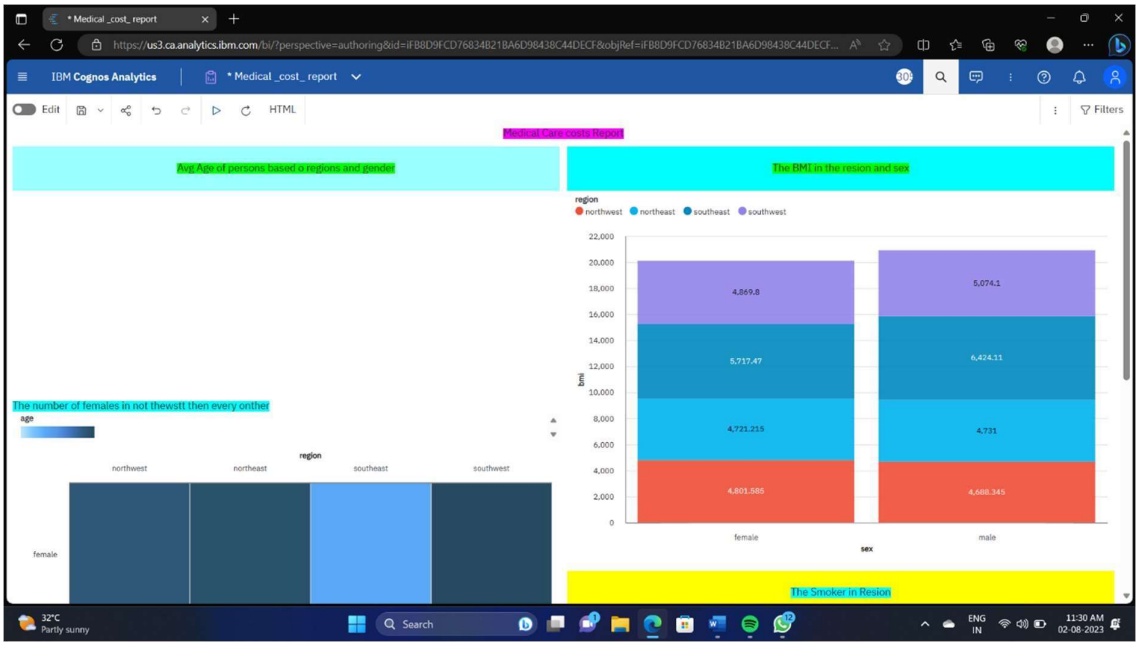
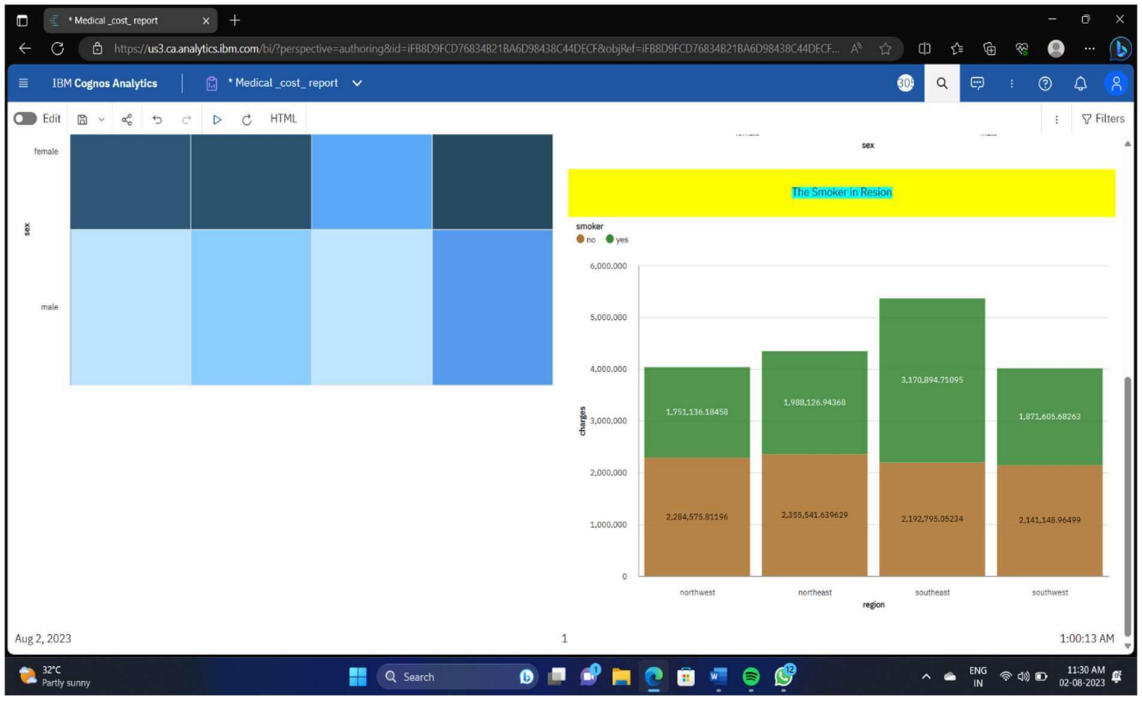
MEDICAL CARE COSTS DASHBOARD:-



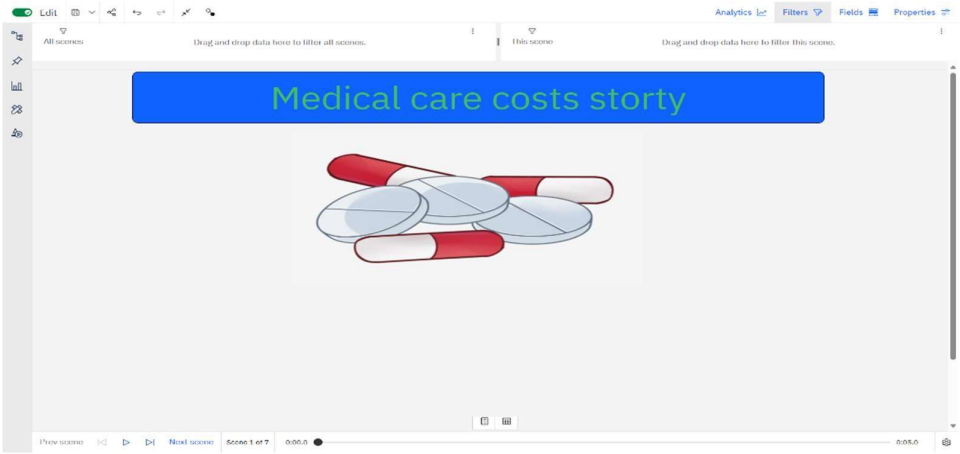


Medical Cost Report





MEDICAL COST STORY


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical care costs storty
Prev scene
Next scene
Scene 1 of 7
0:00.0
0:05.0


Edit
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All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical Care Costs Story
charges are unusually high when age (Group) is 60 and above.
Add insight to favorites.
charges are unusually high when the combination of age (Group) and smoker is 60 and above and yes.
Add insight to favorites.
smoker moderately affects charges (62%).
Add insight to favorites.
less than 23 is the most frequently occurring category of age (Group) with a count of 222 items with charges values (16.6 % of the total).
charges paying by people according to their age and smoker
smoker
no
yes
Prev scene
Next scene
Scene 2 of 7
0:00.0
0:05.0


Edit
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All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical Care Costs Story
The total number of results for bmi, across all sexes, is 324.
The total number of results for smoker, across all sexes, is 324.
bmi of a persons by their gender and somker
bmi (Average)
Prev scene
Next scene
Scene 3 of 7
0:00.0
0:05.0


Edit
Analytics
Filters
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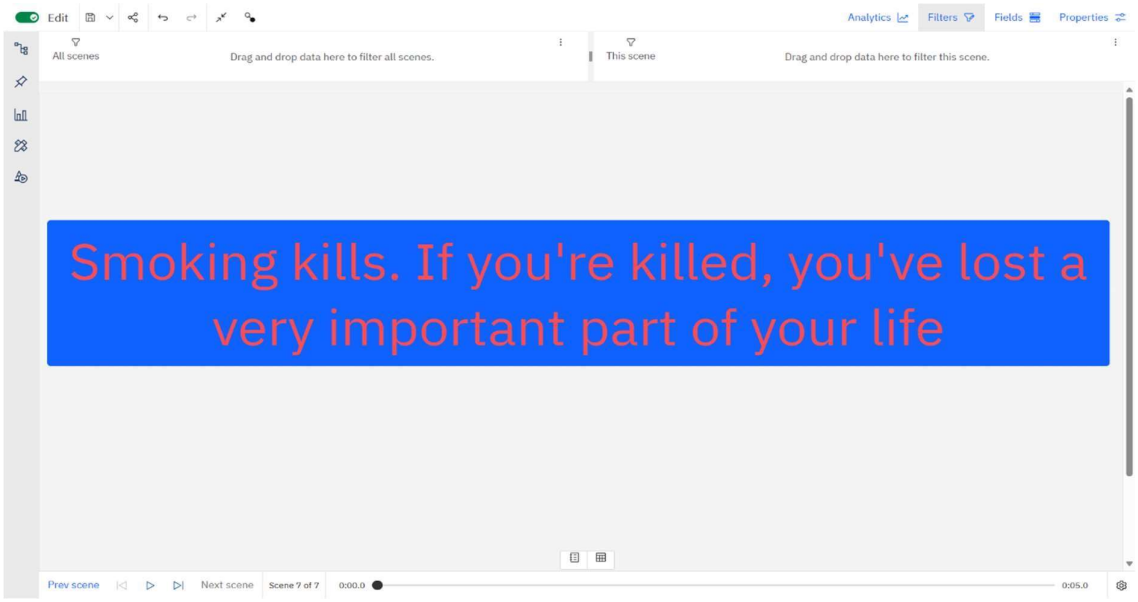
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical Care Costs Story
• children is most unusual when age is 39, 19, 18 and 58.
children is most unusual when the combinations of age and smoker are 18 and no, 39 and no, 58 and no and 19 and no.
• 18 (5.2%) and 19 (5.1%) are the most frequently occurring categories of age with a combined count of 137 items with children values (10.2% of the totall
• no is the most frequently occurring category of smoker with a count of 1064 items with children values (79.5 % of the total).
average number of children by age smoker or not
smoker
no
yes
Prev scene
Next scene
Scene 4 of 7
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical Care Cost Story
• region southeast has the highest total bmi due to charges 44501.3982.
• Add insight to favorites
• charges is unusually high when bmi is 47.41, 30.36 and 34.48.
• Add insight to favorites
• charges 44501.3982 has the highest Total bmi but is ranked #97 in Average age.
• Add insight to favorites
• charges 49577.6624 has the highest Average age but is ranked #36 in Total bmi.
• Add insight to favorites
• region southeast has the highest Total bmi but is ranked #4 in Average age.
BMI of a person based on their age
Prev scene
Next scene
Scene 5 of 7
0:00.0
0:05.0


Edit
Analytics
Filters
Fields
Properties
All scenes
Drag and drop data here to filter all scenes.
This scene
Drag and drop data here to filter this scene.
Medical Care Costs Story
• female exceeds male in age by 0.5859.
• sex male has the highest Total charges but is ranked #2 in Average age.
• sex female has the highest Average age but is ranked #2 in Total charges.
• male is the most frequently occurring category of sex with a count of 676 items with age values (50.5 % of the total).
• Over all sexes, the average of age is 39.21.
Average Age of and Female
Prev scene
Next scene
Scene 6 of 7
0:00.0
0:05.0



WEB INTEGRATION


Home
Estimation Of Hospitalization An
File | D:/Bikin/Bikin/index.html
Medical Care Costs In India
Home
About
Dashboard
Story
Report
AN ABSTRACT INFO OF MEDICAL CARE COSTS
Medical costs are one of the most common recurring expenses in a person's life. Based on different research studies, BMI, ageing, smoking, and other factors are all related to greater personal medical care costs. The estimates of the expenditures of health care related to obesity are needed to help create cost-effective obesity prevention strategies. Obesity prevention at a young age is a top concern in global health, clinical practice, and public health. To avoid these restrictions, genetic variants are employed as instrumental variables in this research. Using statistics from public huge datasets, the impact of body mass index (BMI) on overall healthcare expenses is predicted. A multiview learning architecture can be used to leverage BMI information in records, including diagnostic texts, diagnostic IDs, and patient traits. A hierarchy perception structure was suggested to choose significant words, health checks, and diagnoses for training phase informative data representations, because various words, diagnoses, and previous health care have varying significance for expense calculation. In this system model, linear regression analysis, naive Bayes classifier, and random forest algorithms were compared using a business analytic method that applied statistical and machine-learning approaches. According to the
ESTIMATION OF HOSPITALIZATION IN INDIA
The average expenditure per hospitalization case in urban India was around 26 thousand Indian rupees in the year 2017-18. This is an increase from around nine thousand Indian rupees in 2004. In case of private hospitals, the average expenditure in urban areas was Rs 38,822 while that in rural areas was Rs 27,347. In case of public hospitals, the average expenditure in rural areas was Rs 4,290 while that in urban areas was Rs 4,837
RESULT AND ANALYSIS
According to NCBI, the estimated annual cost of universal healthcare is going to be ₹1,713 per person. This cost can increase by 24% for using branded medical supplies and drugs. This means the Indian government must spend 3.8% of the country's GDP to universalise healthcare services.
DISCUSSION OF MEDICAL CARE COSTS
We provided a novel linear regression technique that can simply demonstrate the purposes for producing a certain forecast regarding potential healthcare expenses, which is a useful capacity in the medical field. We evaluated its outcomes to the
RELATED INFO OF MEDICAL CARES
The Indian public health sector encompasses 18% of total outpatient care and 44% of total inpatient care.[18] Middle and upper class individuals living in India tend to use public healthcare less than those with a lower standard of living.[19] Additionally, women and the elderly are more likely
32°C
Partly sunny
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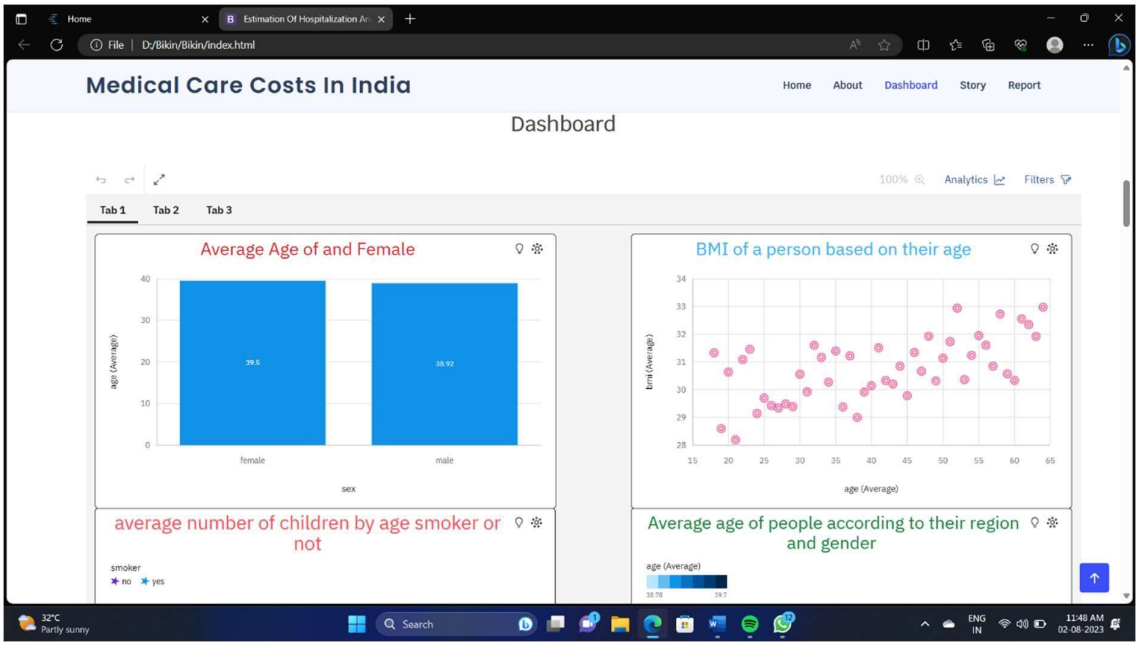
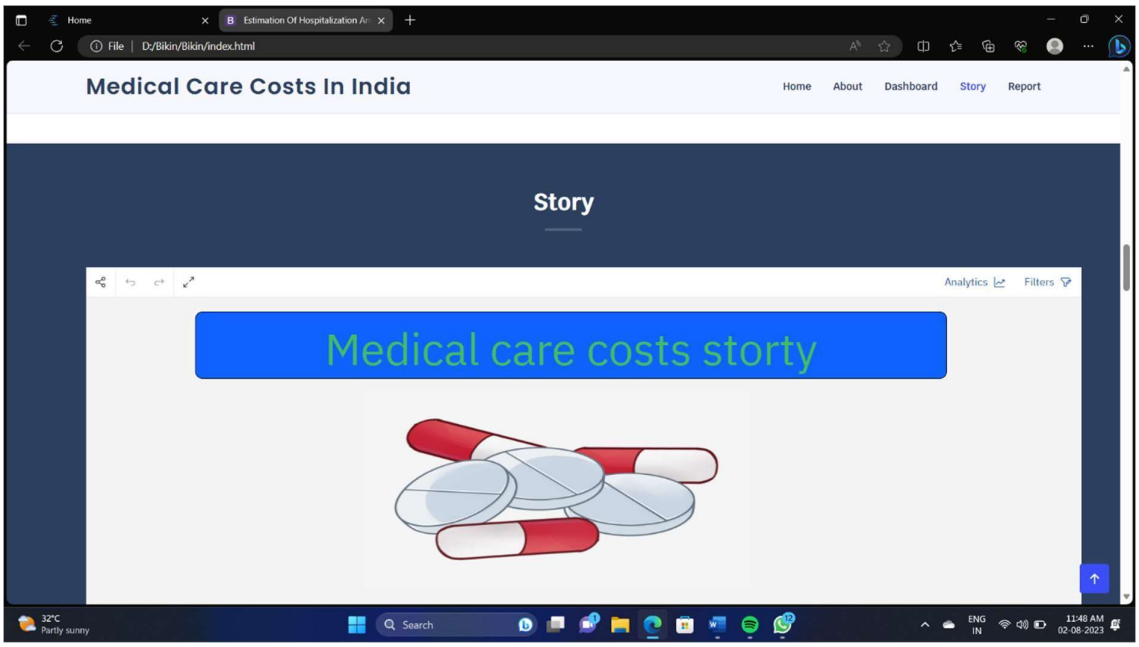
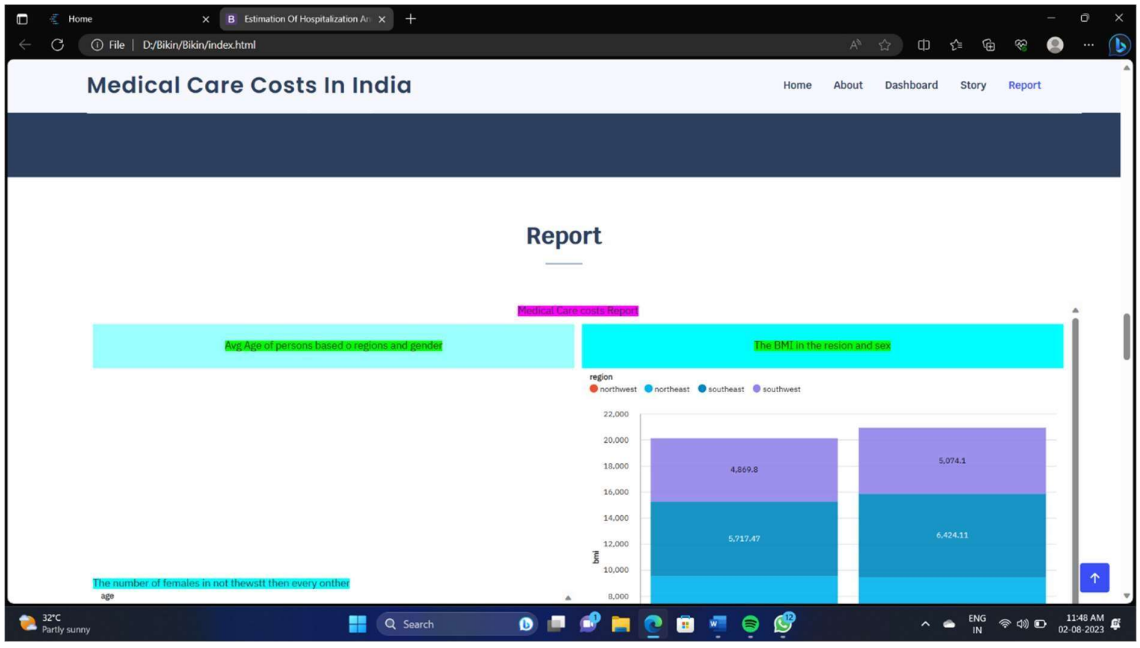
02-08-2023


Home
Estimation Of Hospitalization An
File | D:/Bikin/Bikin/index.html
Medical Care Costs In India
Home
About
Dashboard
Story
Report
Dashboard
100%
Analytics
Filters
Tab 1
Tab 2
Tab 3
Average Age of and Female
age (Average)
sex
female
male
39.5
38.92
BMI of a person based on their age
bmi (Average)
age (Average)
average number of children by age smoker or not
smoker
no
yes
Average age of people according to their region and gender
age (Average)
38.78
39.5
32°C
Partly sunny
Search
ENG
IN
11:48 AM
02-08-2023





5. ADVANTAGES:-

1. Cost Op miza on.

2. Informed Decision-making.
3. Improved Pa ent Care.
4. Tailored Insurance Coverage.
5. Fraud Detec on.
6. Research and Policy Development.

6. DISADVANTAGES:-

Data Privacy Concerns.

1. Data Quality.
2. Model Complexity.
3. Limited Predictability.
4. Ethical Considera ons.
5. Overemphasis on Costs.

6. APPLICATIONS:-

The Es ma on and Predic on of Hospitaliza on and Medical Care Costs project has several valuable applica ons in the healthcare industry and beyond.

1. Healthcare Cost Management.
2. Financial Planning.
3. Insurance Pricing and Coverage.
4. Resource Alloca on.
5. Treatment Decision Support.
6. Pa ent Cost Transparency.

7. Policy Development.
8. Fraud Detec on.
9. Benchmarking and Performance.
10. Research and Public Health.
11. Cost-Effec ve Healthcare Programs.
12. Long-Term Cost Control.

7. CONCLUSION:-

In conclusion, the Es ma on and Predic on of Hospitaliza on and Medical Care Costs project holds significant value and poten al for the healthcare industry.
By leveraging data analy cs, exploratory data analysis,the project aims to achieve several important outcomes.

8. FUTURE SCOPE:-

The future scope of the Es ma on and Predic on of Hospitaliza on and Medical Care Costs project is vast And holds great poten al in transforming the healthcare industry.
Overall, the future scope of the Es ma on and Predic on of Hospitaliza on and Medical Care Costs project is dynamic and transforma ve.

As technology con nues to evolve and data-driven decision-making becomes increasingly prevalent. the project's applica ons have the poten al to revolu onize healthcare cost management, resource alloca on. and pa

ent care on a global scale.

PROJECT REPORT