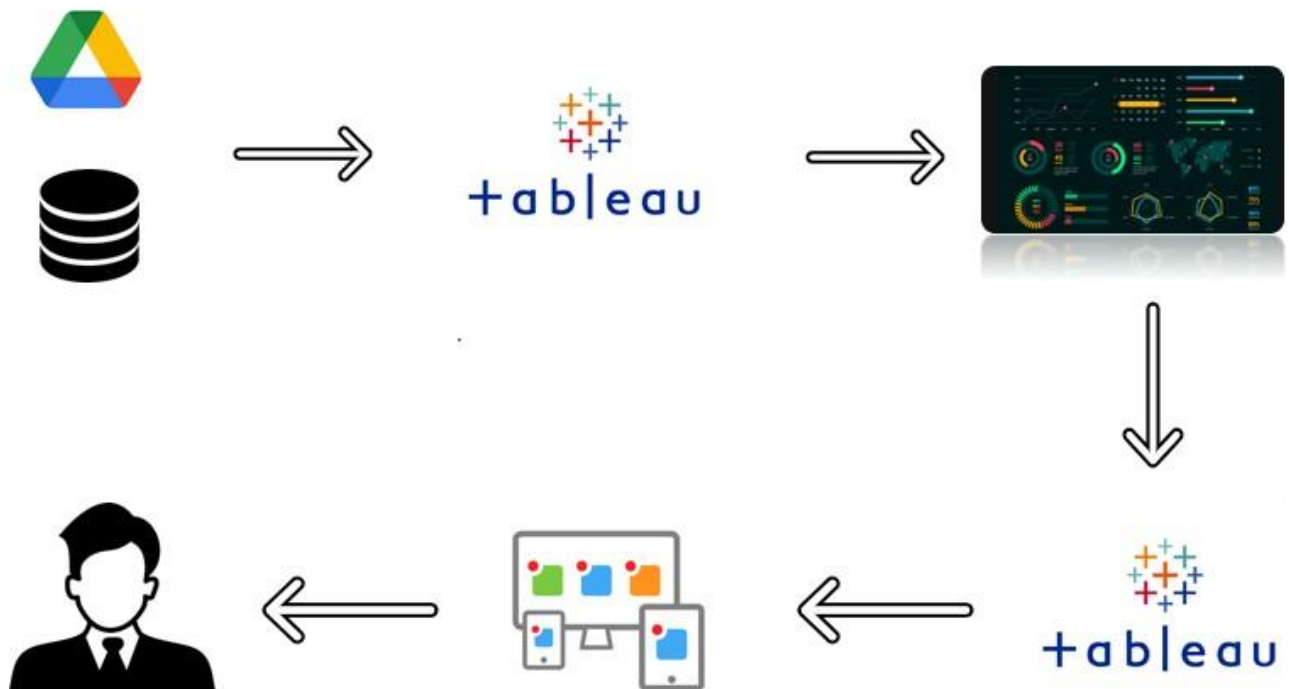


# Unearthing the Environmental Impact of Human Activity: A Global CO2 Emission Analysis

## INTRODUCTION:

Global warming poses one of the most pressing challenges to humanity, with increased atmospheric carbon dioxide from human activities being a likely contributor. This project aims to analyze global CO2 emissions, their effects on the environment, and key factors influencing emissions. By understanding these factors, stakeholders can make data-driven decisions to mitigate climate change and promote environmental sustainability.

## TECHNICAL ARCHITECTURE:



## PROJECT FLOW

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understandingo Specify the business problem
  - o Business requirements
  - o Literature Survey
  - o Social or Business Impact.
- Data Collection & Extraction from Database
  - o Collect the dataset,
  - o Storing Data in DB
  - o Perform SQL Operations
  - o Connect DB with Tableau
- Data Preparation
  - o Prepare the Data for Visualization
- Data Visualizations
  - o No of Unique Visualizations
- Dashboard
  - o Responsive and Design of Dashboard
- Story
  - o No of Scenes of Story
- Performance Testing
  - o Amount of Data Rendered to DB ‘
  - o Utilization of Data Filters
  - o No of Calculation Fields
  - o No of Visualizations/ Graphs
- Web Integration
  - o Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
  - o Record explanation Video for project end to end solution
  - o Project Documentation-Step by step project development procedure

## **Milestone 1: Define Problem / Problem Understanding**

### **Activity 1: Specify the business problem:**

The business problem involves analyzing CO2 emissions globally over time, identifying influencing factors, creating interactive dashboards and reports, making data-driven decisions, comparing countries' averages, and forecasting future emissions to reduce environmental impact.

### **Activity 2: Business requirements:**

Requirements include data analysis, interactive visualization, identifying areas for improvement, and developing forecasting models to reduce CO2 emissions.

### **Activity 3: Literature Survey:**

A literature survey will explore existing studies on CO2 emissions and climate change, identifying factors influencing emissions and best practices for mitigation.

### **Activity 4: Social or Business Impact:**

The project's social impact lies in addressing climate change by reducing CO2 emissions, while the business impact involves identifying opportunities for improvement and transitioning to low-carbon alternatives.

### Milestone 2: Data Collection & Extraction from Database:

### Activity 1: Collect the dataset:

Download the dataset from the provided link, containing CO2 emissions data from 1975 to 2020 for various countries and regions.

## Activity 2: Storing Data in DB & Perform SQL Operations:

Store the data in a database and perform SQL operations for data manipulation and analysis.

### Activity 3: Connect DB with Tableau:

## Connect the database with Tableau for visualization and analysis

The screenshot shows the SQL Server Enterprise Manager interface. The 'Tables' folder under the 'Adventureworks' database is expanded. The 'Tables' list is displayed, showing columns for TABLE\_NAME, COLUMN\_NAME, ORIGINAL\_POSITION, COLUMN\_DEFAULT, IS\_NULLABLE, DATA\_TYPE, CHARACTER\_MAXIMUM\_LENGTH, CHARACTER\_SET\_NAME, NUMERIC\_PRECISION, and NUMERIC\_SCALE. The table 'tbl\_emp' is highlighted.

## **Milestone 3: Data Preparation**

Data preparation involves cleaning and transforming the data into a format suitable for visualization, ensuring accuracy and completeness.

## **Milestone 4: Data Visualization**

Visualize the data using various techniques such as bar charts, line charts, and maps to analyze CO2 emissions globally.

### **Activity 1: No of Unique Visualizations**

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the Co2 Emission include bar charts, line charts, Tree Map, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show Emission, and relationships between variables, breakdown of factors and emission by countries and continents.

**Activity 1.1: To Understand- Total World Emission, Co2 Emission over Time, Total Emission by Continents**

**Activity 1.2: To Understand- Co2 Emission per Capita, Co2 Emission by International Factors, Emission Rate Over Years**

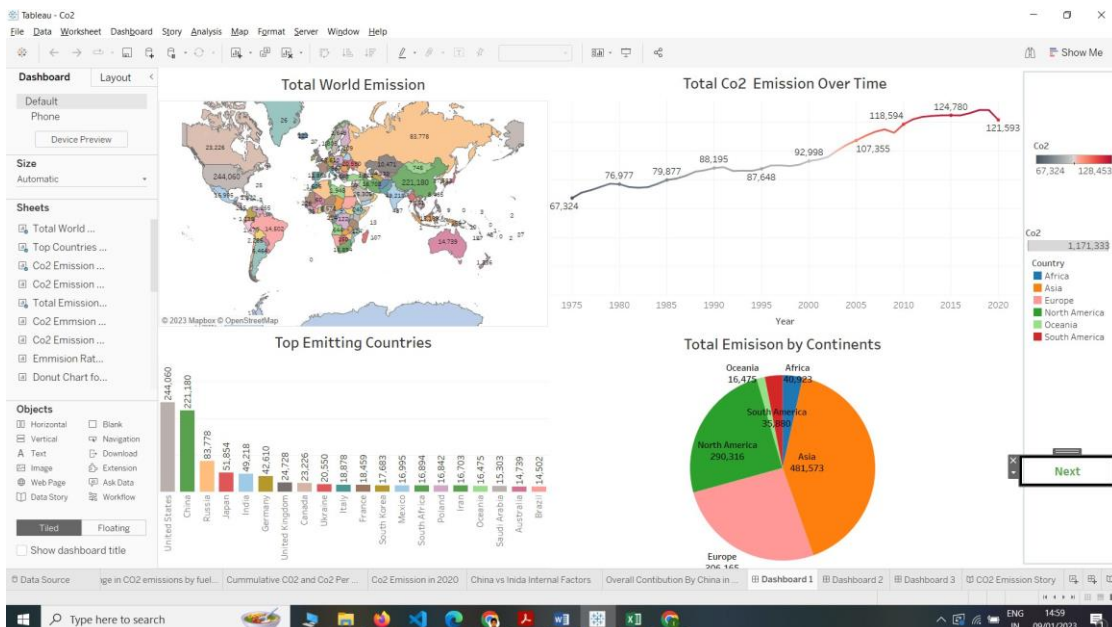
**Activity 1.3: To Understand- Co2 contribution by different fossil fuels, Co2 Emission over past 10 Years, Change in Co2 Emission and Co2 Emission in 2020**

## Milestone 5: Dashboard

Design responsive and user-friendly dashboards for analyzing global CO2 emissions, focusing on clarity, interactivity, and data-driven insights.

### Activity :1- Responsive and Design of Dashboard

The responsiveness and design of a dashboard for analyzing the globally Co2 Emission. It is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centred design, clear and concise information, interactivity, data-driven approach, accessibility, customization. Once you have created views on different sheets in Tableau, you can pull them into a dashboard.

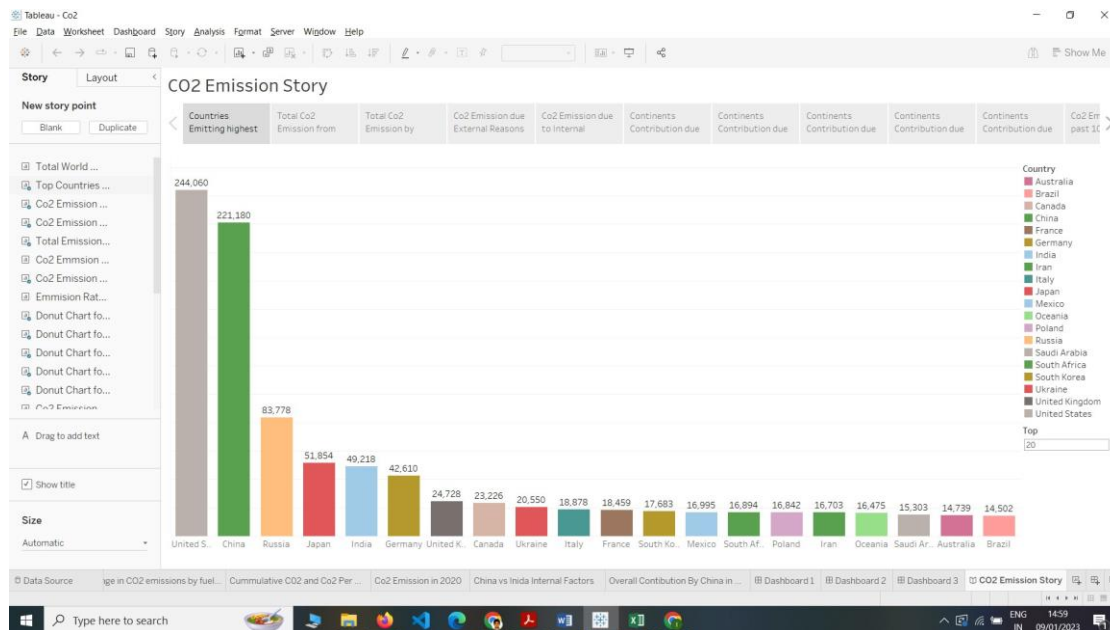


## Milestone 6: Story

Create a narrative-driven data story to present the analysis of CO2 emissions, highlighting key findings and implications.

### Activity: 1- No of Scenes of Story

The number of scenes in a storyboard for a data visualization analysis of the Co2 Emission will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

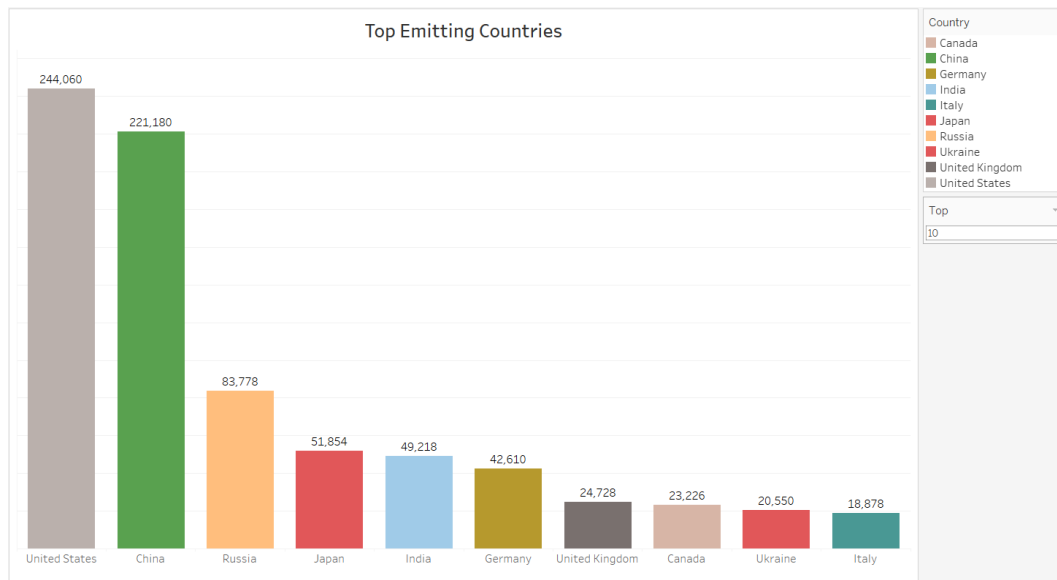


## Milestone 7: Performance Testing

Evaluate the performance of the project, including data rendering, utilization of filters, and the number of visualizations.

### Activity 1: Amount of Data Rendered to DB

- The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.
- Open the SQL Server Management Studio, go to the database then click to expand the tables, select the table and Right click and select Properties



## Activity 2: Utilization of Data Filters

## Activity 3: No of Visualizations/ Graphs

1. Top World Emission
2. Top Emitting Countries
3. Co2 Emission over Time
4. Co2 Emission India vs USA
5. Total Emission by Continents
6. Co2 Emission per Capita
7. Co2 Emission by International Factors
8. Emission Rate over Years
9. Donut Charts-Coal Co2,Cement Co2, Gas Co2, Oil Co2
10. Co2 Emission over past 10 years
11. Continent Contribution in Co2 Emission
12. Cumulative Co2 and Co2 per Capita
13. Co2 Emission in 2020
14. China vs India Co2 emission due to internal factors
15. Overall Contribution by China in Co2 Emission

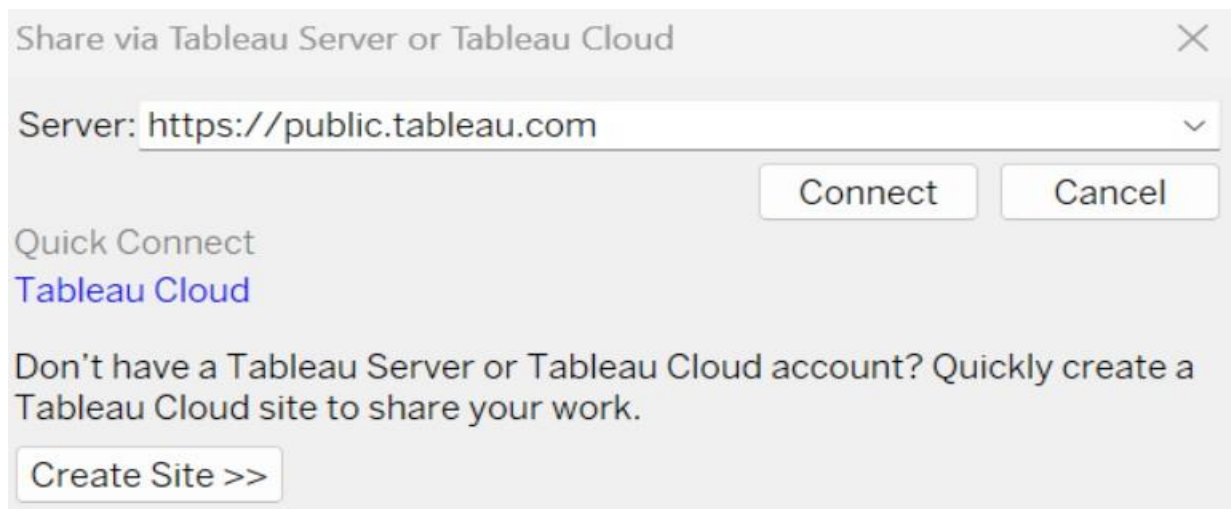


## **Milestone 8: Web integration**

Publish dashboards and reports to Tableau Public for sharing and monitoring performance metrics.

### **Publishing dashboard and reports to tableau public**

**Step 1:** Go to Dashboard/story, click on share button on the top ribbon



The screenshot shows a dialog box titled "Share via Tableau Server or Tableau Cloud" with a close button (X) in the top right corner. Below the title is a "Server:" label followed by a text input field containing "https://public.tableau.com" and a dropdown arrow. To the right of the input field are two buttons: "Connect" and "Cancel". Below these elements, the text "Quick Connect" is followed by a blue link "Tableau Cloud". At the bottom, there is a message: "Don't have a Tableau Server or Tableau Cloud account? Quickly create a Tableau Cloud site to share your work." and a button labeled "Create Site >>".

Give the server address of your tableau public account and click on connect.

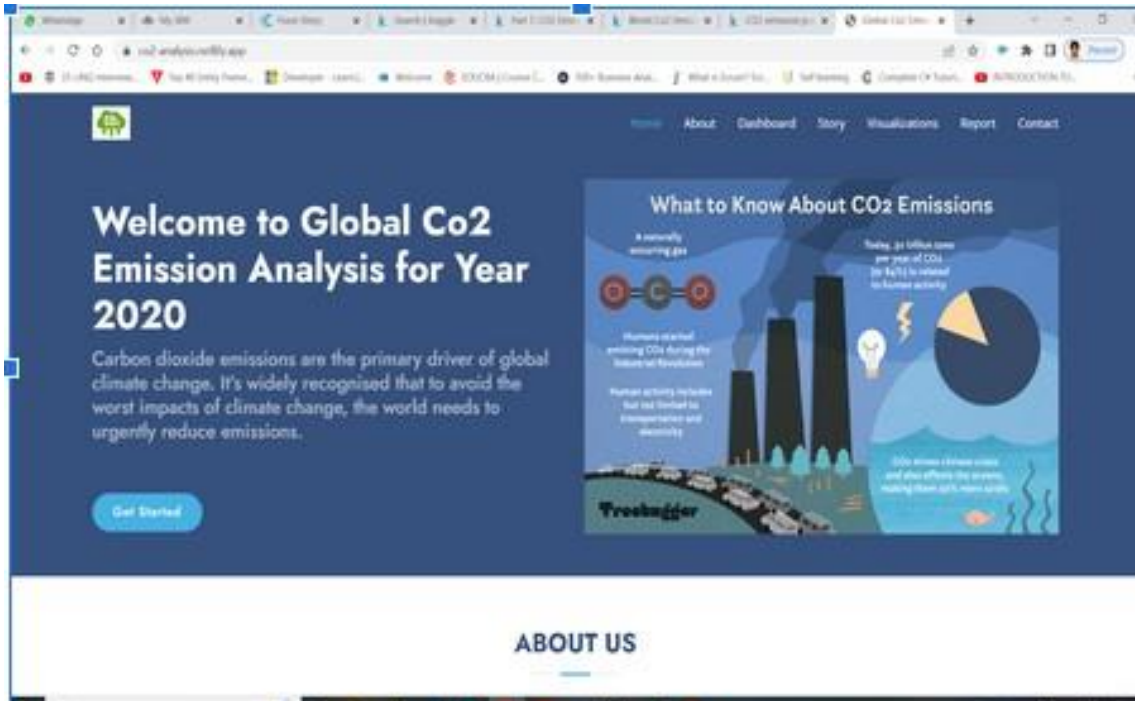
**Step 2:** Once you click on connect it will ask you for tableau public user name and password

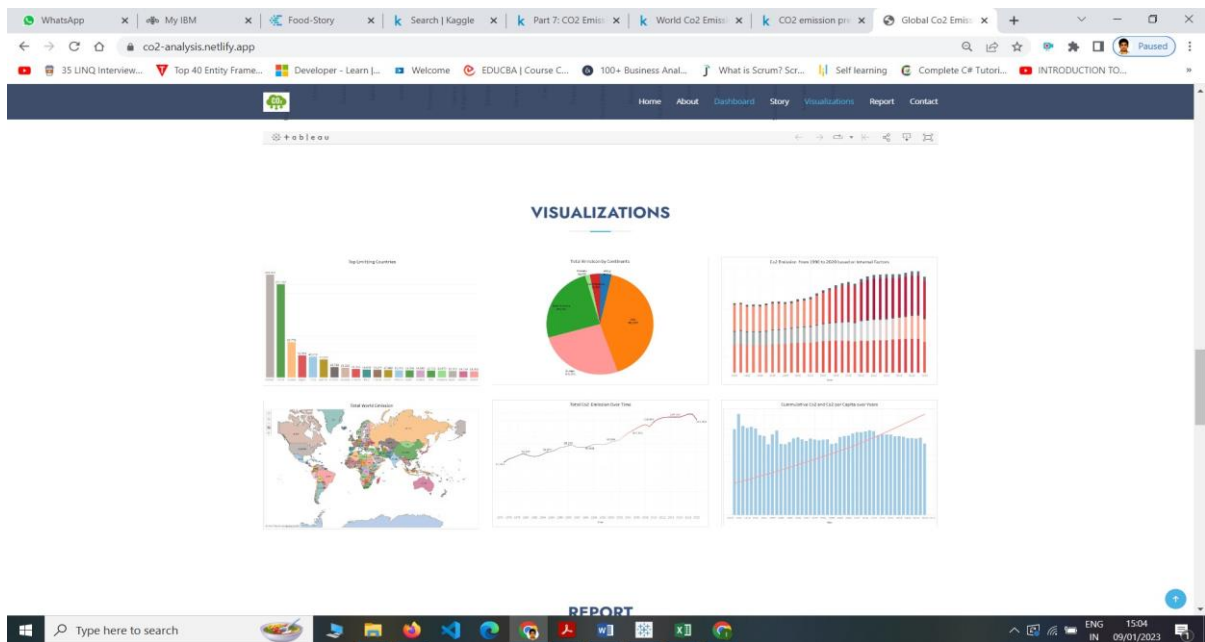
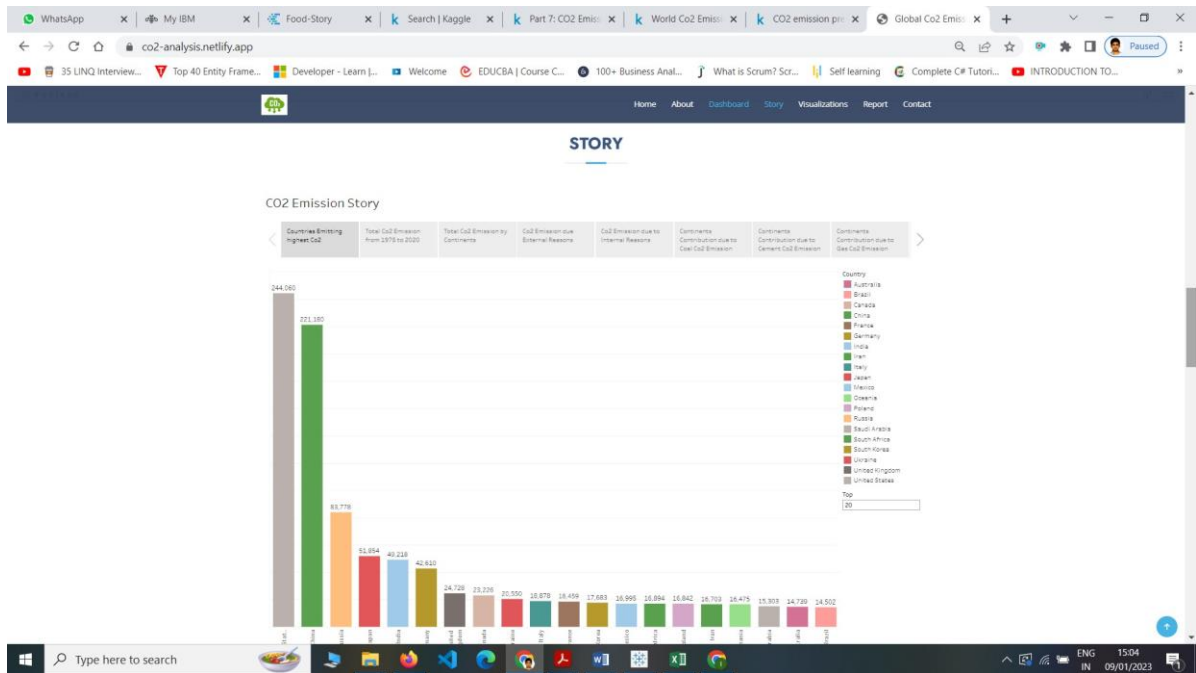


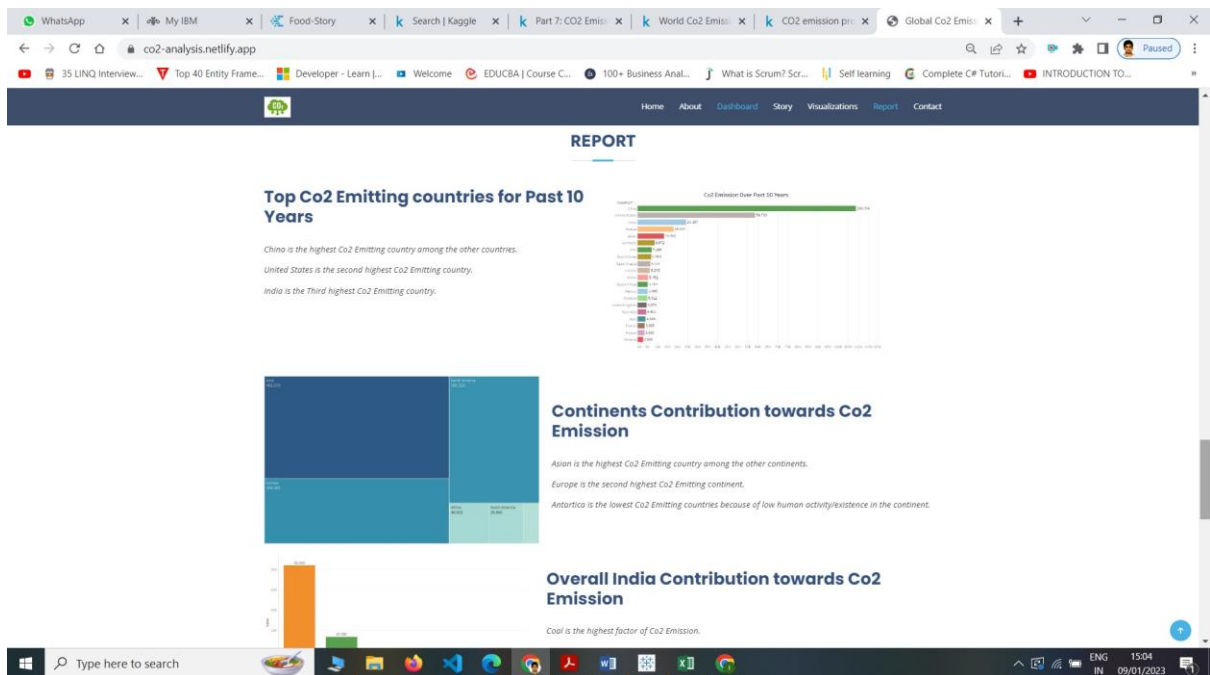
The screenshot shows the Tableau Public sign-in page. At the top is the "tableau++public" logo. Below it are two input fields: "Email" and "Password". A large orange "Sign In" button is centered below the fields. At the bottom left, there is a lock icon and the text "This site is SSL encrypted". At the bottom center, there are two links: "Forgot your password?" and "Don't have a profile yet?". Below these links is a bold text "Create one now for free".

Once you login into your tableau public using the credentials, the particular visualization will be published into tableau public

**Note: While publishing the visualization to the public, the respective sheet will get published when you click on share option**







## **Milestone 9: Project Documentation**

Below mentioned deliverables to be submitted along with other deliverables

