Unleashing The Potential Of Our Youth: A Student Performance Analysis

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Project By
Smart Bridge – Smart Internz
Data Analytics

Project Flow

To accomplish this, we must complete all the activities listed below,

1. Define Problem / Problem Understanding
    1.1. Specify the business problem
    1.2. Business requirements
    1.3. Literature Survey
    1.4. Social or Business Impact.
2. Data Collection & Extraction from Database
3. Data Visualizations
    3.1. No of Unique Visualizations
4. Dashboard
    4.1. Responsive and Design of Dashboard
5. Story
    5.1. No of Scenes of Story
6. Web Integration
    6.1. Dashboard, Report and Story embed with UI With Flask
7. Project Demonstration & Documentation
    7.1. Record explanation Video for project end to end solution
    7.2. Project Documentation-Step by step project development procedure

The Business Problem

The business problem described in the given scenario is the decrease in students' success rate and high dropout rates in higher education. This issue affects the education sector as a whole and is recognized as a challenge that needs to be addressed.

Specifically, the problem is focused on analyzing student performance and identifying the factors that influence their success or failure. The dataset provided contains the marks secured by 1000 students, and the goal is to analyze this data and correlate it with various attributes such as parental level of education and the status of test preparation courses. The analysis aims to understand how these factors impact student performance in exams.

The ultimate objective of this analysis is to gain insights into the important factors influencing student success to inform strategies for improving the quality of education and reducing dropout rates in higher education.

The Business Requirements

Business requirement of student performance analysis refers to the need of educational institutions or organizations to gather, analyze, and use data on students' academic performance to improve teaching and learning outcomes. This process involves collecting, analyzing, and interpreting data on various aspects of student performance such as test scores, attendance, behavioral patterns, and demographic information. The business requirement of student performance analysis is crucial for educational institutions to provide high-quality teaching and learning outcomes and improve student success. The ultimate goal is to gain insights and improve performance through data visualization techniques.

The Literature Survey

Introduction: The growth and development of a country are intricately linked to the quality of its education system. Over the years, the education sector has undergone significant transformations and is now recognized as an industry facing numerous challenges. One of the major challenges in higher education is the decrease in students' success rate and their tendency to leave a course without completion. This literature survey aims to analyze the factors influencing student performance and their correlation with various attributes such as parental level of education and test preparation.

Assessment in Education: Assessing student work is a vital aspect of teaching, as it allows educators to evaluate student learning and enhance their

teaching methods. Ongoing assessment enables continuous quality improvement of courses. Teachers assign, collect, and examine student work to gain insights into their progress and identify areas that need improvement. Various factors can impact a student's performance, including the educational background of their parents, the extent of test preparation, and other related factors.

Factors Influencing Student Performance: Parental Level of Education: Several studies have explored the influence of parental level of education on student performance. It has been found that parents with higher levels of education tend to provide a more supportive learning environment, leading to improved academic outcomes for their children. Additionally, the educational aspirations of parents can significantly impact a student's motivation and dedication towards their studies.

Test Preparation: The status of test preparation courses or activities can play a crucial role in student performance. Students who engage in thorough test preparation tend to have a better understanding of the subject matter and exhibit higher levels of confidence during examinations. This factor has been extensively studied to understand its impact on student success rates.

Socioeconomic Background: Socioeconomic status has long been recognized as a significant predictor of educational achievement. Students from disadvantaged backgrounds may face numerous challenges, such as limited access to resources, financial constraints, and a lack of support systems. These factors can affect their overall academic performance and completion rates.

Learning Environment: The learning environment, both at home and in the educational institution, plays a crucial role in shaping a student's performance. Factors such as classroom size, teacher-student ratio, availability of resources, and the overall school culture can impact student engagement, motivation, and academic success.

Teaching Methods: The pedagogical approaches employed by educators can influence student performance. Research suggests that student-centered and interactive teaching methods, which encourage active participation and critical thinking, can enhance learning outcomes. On the other hand, traditional lecture-based approaches may not effectively cater to the diverse learning needs of students.

Conclusion: This literature survey highlights the importance of analyzing the factors that influence student performance in education. It emphasizes the significance of parental level of education, test preparation, socioeconomic background, learning environment, and teaching methods. Understanding these factors can help policymakers, educators, and stakeholders in the education sector design effective interventions and strategies to improve student outcomes, increase completion rates, and foster overall educational growth. By addressing these challenges, countries can strive towards building a robust and successful education system that contributes to national development and individual empowerment.

Social and Business Impact

Social Impact:
It has a positive social impact by improving student outcomes, promoting equity in education, and increasing transparency and accountability in the education system.

Business Model/Impact:
It has a significant impact on businesses and educational institutions, as it provides valuable insights into student learning and helps improve teaching, increasing efficiency, and promoting competitiveness.

Data collection and Extraction from database

Data contains all the meta information regarding the columns described in the CSV files. The name of file is StudentPerformance.csv
Description for StudentPerformance.csv:
The file StudentPerformance.csv contains 1000 rows. Each row corresponds to an individual student with details and marks in respective subjects. The columns are:

Categorical columns are:

- Gender: Male or Female
- Race/ethnicity: 5 groups, from group A to group E
- Parental level of education: from high school to a master's degree
- lunch: free/reduced or standard.

Numerical Columns are:

- Math score: out of 100
- Reading score: out of 100
- Writing score: out of 100

Data Visualization

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the performance and efficiency of Students Performance include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of hotels.

Activity 1.1: Male Female Pass Ratio
Activity 1.2: Race Specific Distribution
Activity 1.3: Parents Education
Activity 1.4: Test Preparation Effectiveness

Dashboard

Responsive and Design of Dashboard

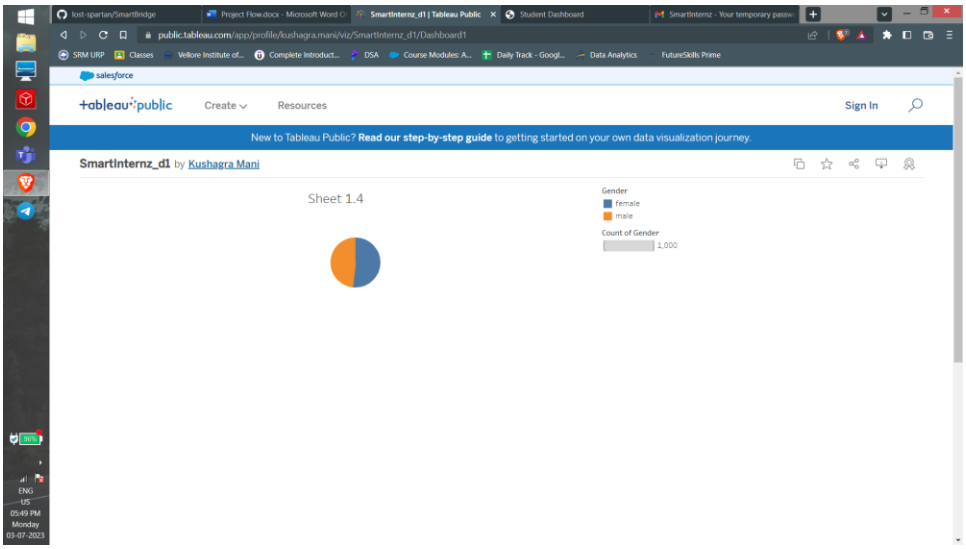
Creating a Tableau dashboard involves several steps. Here's a general guide to help you get started:

- Connect to Data: Launch Tableau and connect to your data source. Tableau supports various data formats, including Excel, CSV, databases, and more. Import or connect to your data using the options available in Tableau.
- Understand Your Data: Take some time to explore and understand your data. Identify the key variables, dimensions, and measures that you want to analyze and visualize in your dashboard. Consider the relationships between different data fields and how they can be represented visually.
- Choose the Dashboard Layout: Determine the layout of your dashboard. Decide how many worksheets or visualizations you want to include and how they will be arranged on the dashboard canvas. Tableau provides a drag-and-drop interface that makes it easy to arrange and resize components.
- Create Worksheets: Start creating individual worksheets that will be part of your dashboard. Select the relevant data fields and apply

appropriate visualizations, such as bar charts, line graphs, maps, or tables. Customize the formatting, colors, labels, and tooltips to enhance the clarity and aesthetics of your visualizations.

- Add Interactivity: Tableau allows you to add interactivity to your dashboard to enhance user engagement and exploration. You can create filters, parameters, and actions that enable users to interact with the data dynamically. For example, users can select a specific region on a map or apply filters to focus on specific data subsets.
- Arrange Worksheets on the Dashboard: Drag and drop the worksheets you created onto the dashboard canvas. Resize and rearrange them as desired to achieve an intuitive and visually appealing layout. Consider the overall composition, alignment, and spacing between components to ensure a cohesive design.
- Add Titles, Text, and Annotations: Include informative titles, text, and annotations to provide context and guide users through the dashboard. Add captions, descriptions, or instructions to help users understand the visualizations and insights they can derive from the data.
- Format and Customize: Customize the appearance of your dashboard by adjusting colors, fonts, backgrounds, borders, and other visual elements. Tableau offers extensive formatting options to ensure your dashboard aligns with your branding or design preferences.
- Test and Refine: Preview your dashboard to ensure that it functions as expected. Interact with the visualizations, apply filters, and test various scenarios to verify the accuracy and responsiveness of your dashboard. Make any necessary refinements or adjustments to optimize the user experience.
- Publish and Share: Once you are satisfied with your dashboard, publish it to Tableau Server, Tableau Public, or Tableau Online. This step allows you to share your dashboard with others, embed it in websites, or collaborate with colleagues.

Remember, creating an effective Tableau dashboard requires a balance between data visualization best practices, user experience, and the specific goals and requirements of your project. Regularly review and iterate on your dashboard as you gather feedback and insights from users to continuously improve its usability and impact.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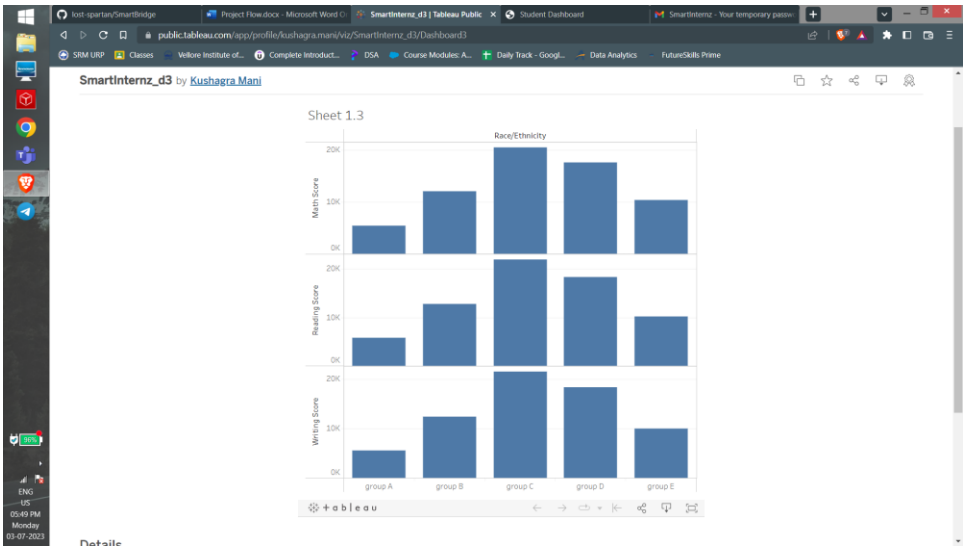
New to Tableau Public? Read our step-by-step guide to getting started on your own data visualization journey.
SmartInternz_d1 by Kushagra Mani
Sheet 1.4
Gender
female
male
Count of Gender
1,000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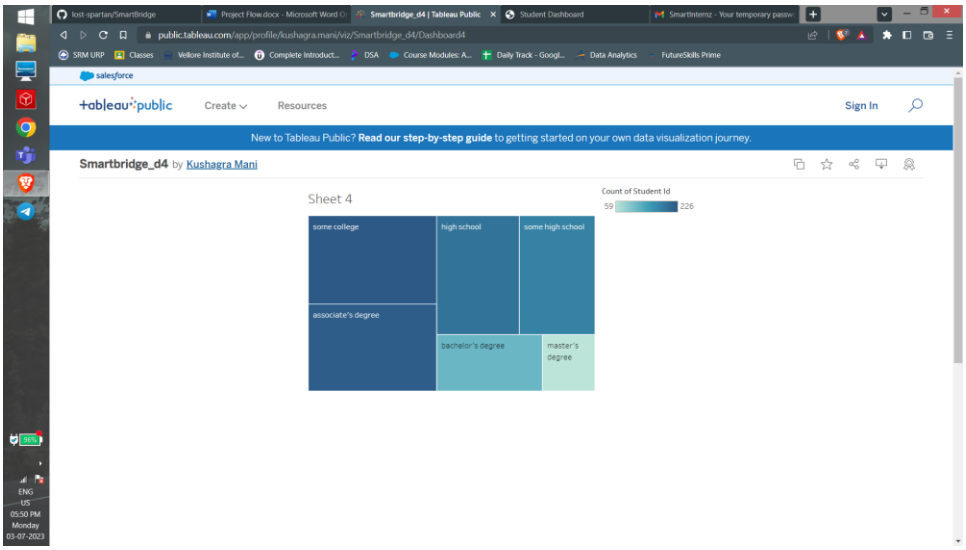
Sheet 1.3
Race/Ethnicity
Math Score
Reading Score
Writing Score
20K
10K
0K
group A
group B
group C
group D
group E
+ableau
Details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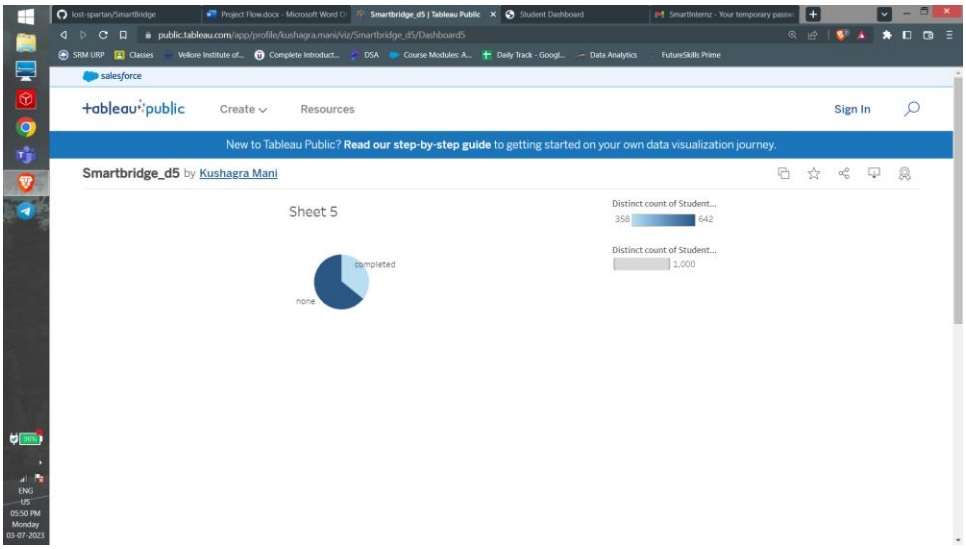
Create
Resources
Sign In
New to Tableau Public? Read our step-by-step guide to getting started on your own data visualization journey.
Smartbridge_d4 by Kushagra Mani
Sheet 4
Count of Student Id
59
226
some college
high school
some high school
associate's degree
bachelor's degree
master's degree



Story

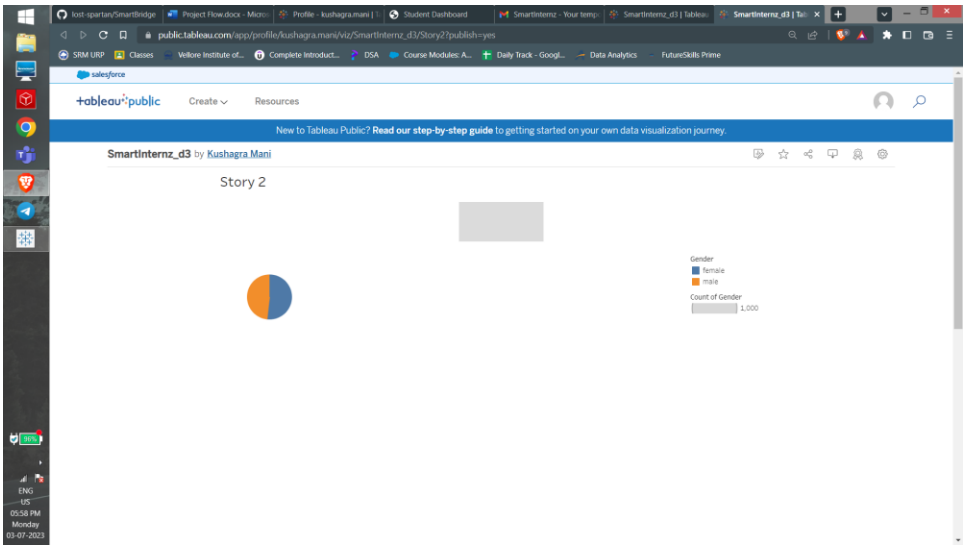
Number of Stories

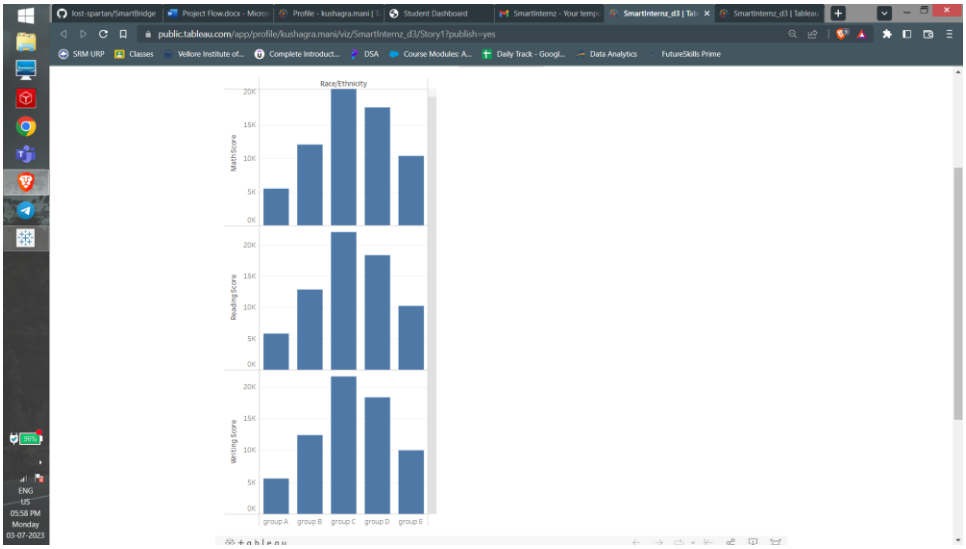
Creating a Tableau story allows you to present a narrative or sequence of visualizations to convey insights and tell a compelling data-driven story. Here's a step-by-step guide on how to create a Tableau story:

- Connect to Data: Launch Tableau and connect to your data source. Import or connect to the relevant data that you want to use for your story.
- Create Worksheets: Build individual worksheets that represent key insights or visualizations you want to include in your story. Use appropriate charts, graphs, maps, or other visual elements to effectively represent the data and support your narrative.
- Arrange Worksheets: Drag and drop the worksheets onto the Tableau canvas to arrange them in the desired order. This order will reflect the sequence of your story.
- Customize Worksheets: Format and customize each worksheet to ensure clarity and visual appeal. Adjust colors, labels, titles, and other elements to create a cohesive and engaging story flow.
- Add Captions and Annotations: Enhance your story by adding captions and annotations to each worksheet. Captions provide brief descriptions or titles for the visualizations, while annotations can provide additional context or explanations.
- Create a Story Point: Once you have arranged and customized your worksheets, you can create story points. A story point is a collection of worksheets that represents a specific point or segment of your story.

- Add Story Points: Click on the "New Story" button or go to the "Story" tab to start adding story points. Add a new story point for each segment of your story. You can include a title or text to describe the key message or insight in each story point.
- Customize Story Layout: Tableau offers various layout options for story points. You can choose to display one or multiple worksheets within a story point, adjust the size and placement of the visuals, and decide whether to show captions or annotations.
- Add Transitions and Narration: Tableau allows you to add transitions and narration to your story points to guide the viewer through the narrative. You can define the order and timing of the transitions, as well as record a narration that will accompany the story.
- Preview and Refine: Preview your Tableau story to ensure the flow and narrative make sense and effectively convey your intended message. Make any necessary adjustments to the layout, formatting, transitions, or narration to refine the story's impact and clarity.
- Publish and Share: Once you are satisfied with your Tableau story, you can publish it to Tableau Server, Tableau Public, or Tableau Online. This allows you to share the story with others, embed it in websites, or collaborate with colleagues.

Remember, when creating a Tableau story, it's important to maintain a clear narrative structure, use visuals that support the story, and keep the viewer engaged throughout the journey. Regularly review and gather feedback to ensure that your story effectively communicates insights and impacts the audience.


public.tableau.com/app/profile/kushagra.mani/viz/SmartInternz_d3/Story2?publish=yes
+tableau public
Create
Resources
New to Tableau Public? Read our step-by-step guide to getting started on your own data visualization journey.
SmartInternz_d3 by Kushagra Mani
Story 2
Gender
female
male
Count of Gender
1,000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Race/Ethnicity
Math Score
Reading Score
Writing Score
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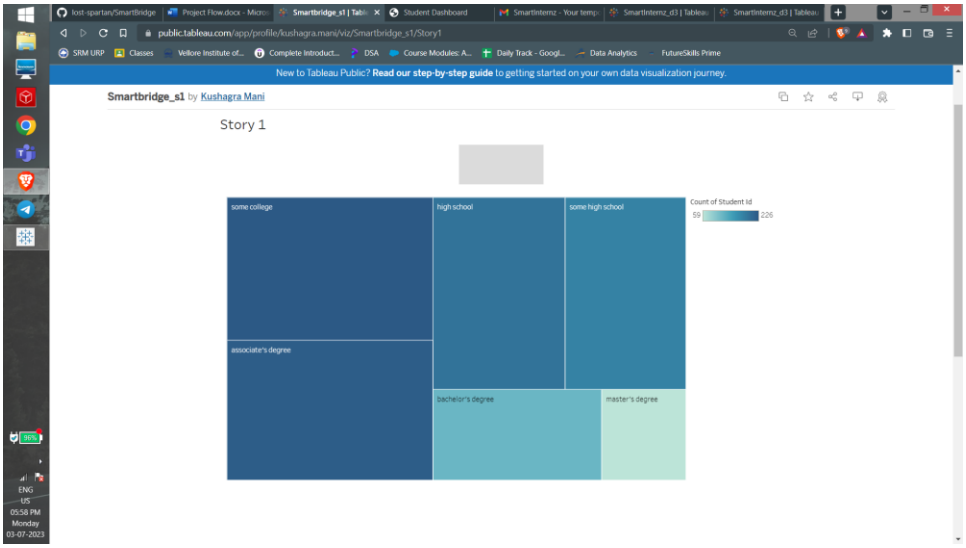
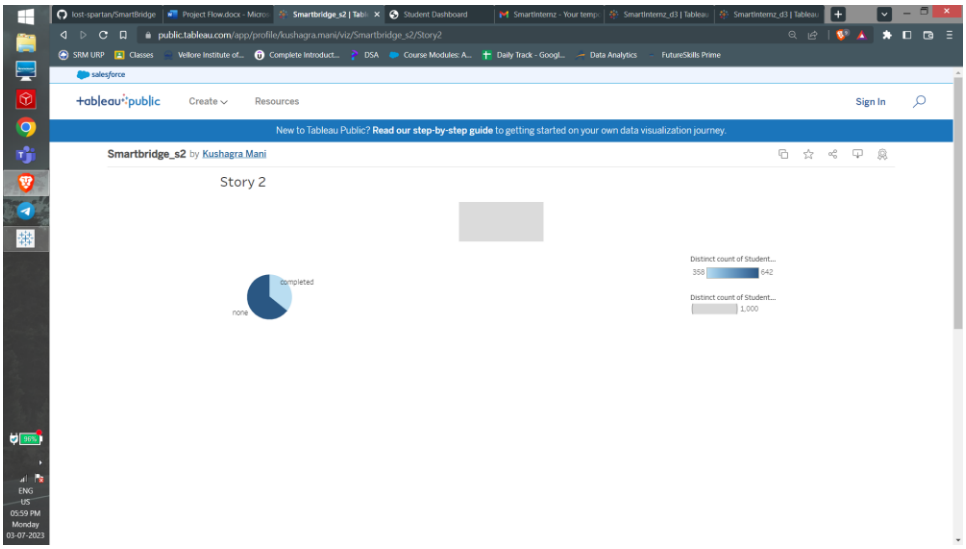
15K
10K
5K
0K
group A
group B
group C
group D
group E


public.tableau.com/app/profile/kushagra.mani/viz/Smartbridge_s1/Story1
New to Tableau Public? Read our step-by-step guide to getting started on your own data visualization journey.
Smartbridge_s1 by Kushagra Mani
Story 1
some college
high school
some high school
associate's degree
bachelor's degree
master's degree
Count of Student Id
59
226



Web Integration

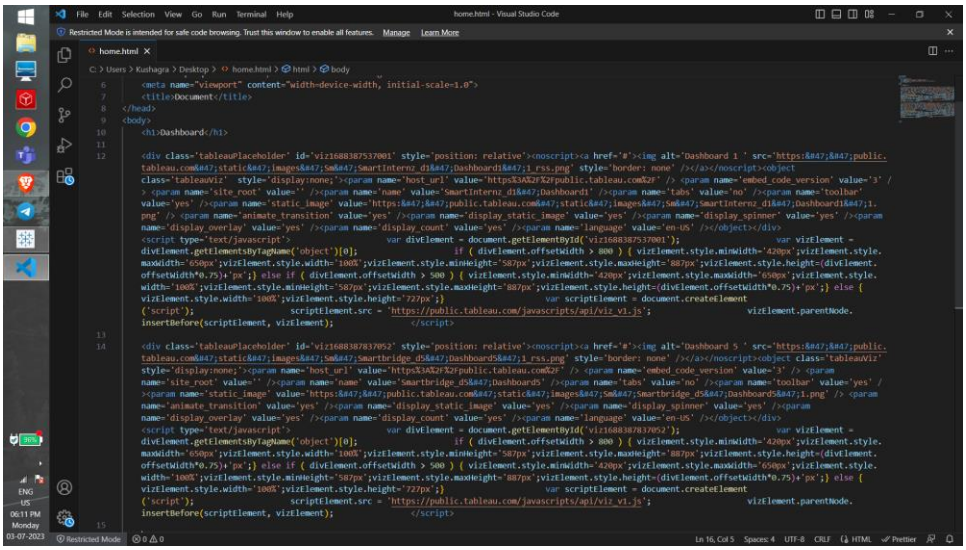
Integrating a Tableau dashboard into a web application involves a few steps. Here's a general overview of the process:

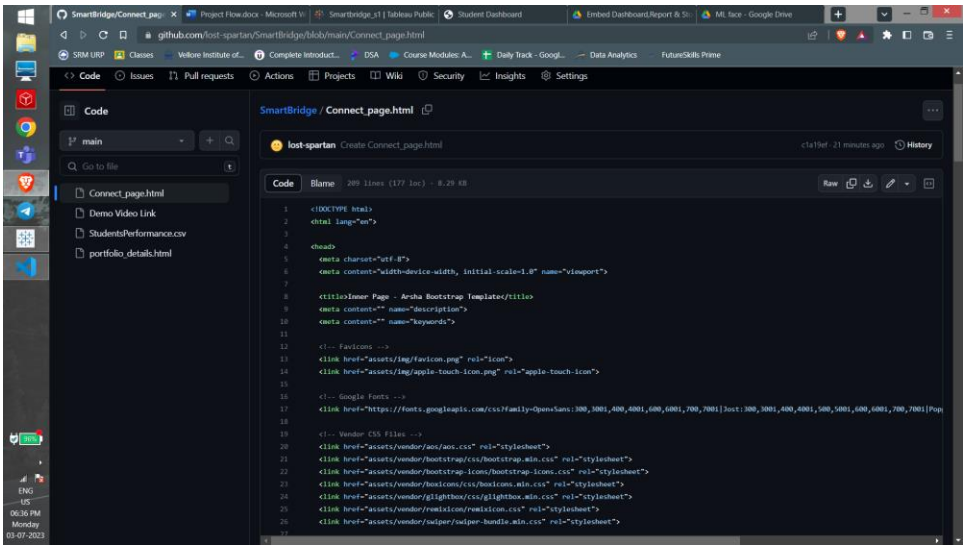
- Publish the Tableau Dashboard: Start by publishing your Tableau dashboard to Tableau Server or Tableau Public. This step is crucial as it makes the dashboard accessible and shareable.
- Embedding Options: Tableau provides different embedding options depending on your requirements. You can choose between Tableau JavaScript API or Tableau Embed Code. The JavaScript API offers more flexibility and customization options, while the Embed Code is simpler to implement.
- Obtain Embed Code or JavaScript API: Once you have published the dashboard, you need to obtain the embed code or the JavaScript API script from Tableau. This code will allow you to embed the dashboard into your web application.
- HTML Markup: In your web application, create an HTML container element (such as a div) where you want to embed the Tableau dashboard. Give it an id attribute for identification.
- Embedding with Embed Code: If you choose to use the Embed Code, paste it directly into the HTML container element within your web application. Customize the code parameters if necessary, such as adjusting the size, toolbar visibility, or applying filters.
- Embedding with JavaScript API: If you decide to use the JavaScript API, include the JavaScript API script within your web application's HTML file. Then, write JavaScript code to initialize the Tableau API,

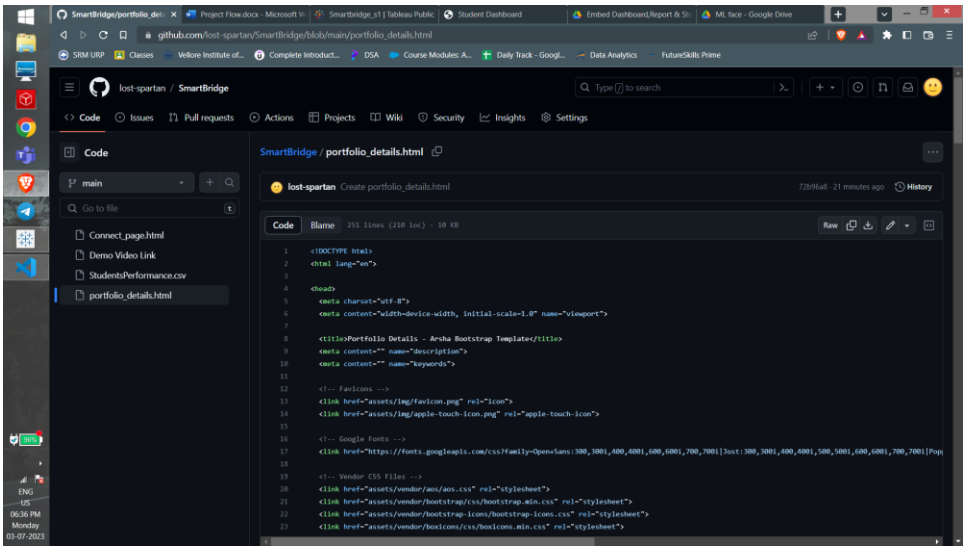
authenticate if necessary, and specify the dashboard to embed. Use the JavaScript code to render the dashboard within the designated HTML container element.

- Configure Interactivity: You can enable interactivity by defining actions and interactions within your web application. For example, you can allow users to interact with filters or parameters in the embedded Tableau dashboard, update visualizations based on user input, or synchronize selections across different components.
- Testing and Deployment: Test the integration thoroughly to ensure that the Tableau dashboard functions as expected within your web application. Make any necessary adjustments or refinements. Finally, deploy your web application to a server or hosting platform to make it accessible to users.

Note: The specific implementation details may vary depending on the web development framework or platform you are using. Tableau provides detailed documentation and examples for embedding dashboards, which can help you understand the specific code snippets and requirements for your integration scenario.







Demonstration Video Link

https://drive.google.com/file/d/1kwxyKDfxCp-n1gqpP2YDF8LweyXjgvRt/view?usp=sharing