Vande Bharat Express

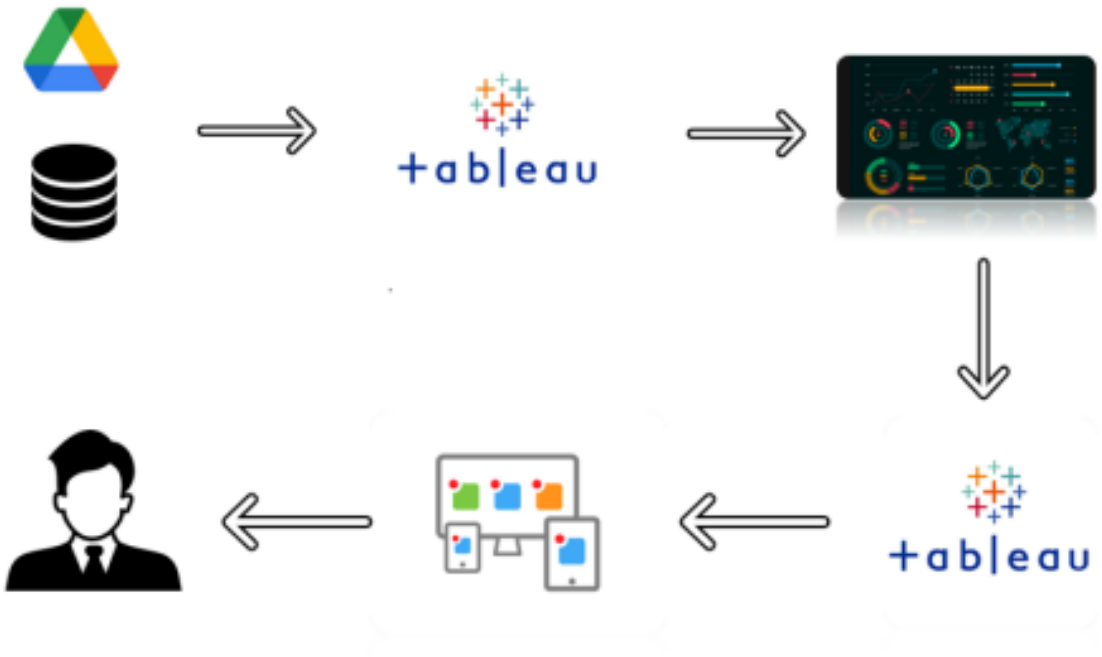
"Vande Bharat Express: Pioneering India's High-Speed Rail Journey"

1. INTRODUCTION

Project Overview

In this project we will outlines the features and significance of the Vande Bharat Express, also known as Train 18, a semi-high-speed intercity electric train developed by the Integral Coach Factory (ICF) in Chennai, India. The train, named after the patriotic phrase "Vande Mataram," operates at a maximum speed of 160 km/h and is recognized for its sleek design, energy efficiency, and indigenous technological contributions to India's railway sector. The key features include modern amenities, safety measures, reduced travel time, and alignment with the "Make in India" initiative. While the text emphasizes the positive aspects of the Vande Bharat Express, it does not explicitly mention potential challenges or issues associated with the train's development and operation.

Technical Architecture



Project Flow

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

Define Problem / Problem Understanding

o 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 Connect dataset 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

● 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

Define Problem

Some potential problems or challenges related to the Vande Bharat Express could include:

1. **Technical Challenges:** The introduction of new technology, especially in the context of a high-speed train, can be accompanied by technical challenges. These may include issues with the train's propulsion system, braking mechanisms, or other critical components.
2. **Infrastructure Readiness:** High-speed trains require specialized infrastructure, including well-maintained tracks and signaling systems. Ensuring that the existing railway infrastructure is compatible with the Vande Bharat Express and adapting it for optimal performance could be a potential challenge.
3. **Operational Efficiency:** Achieving and maintaining the desired operational efficiency, especially in terms of adherence to schedules and minimizing downtime, can be a challenge. This involves coordinating various aspects such as maintenance, crew training, and overall logistics.
4. **Safety Concerns:** While safety features are mentioned in the context of the train, there might be ongoing concerns or challenges related to ensuring the highest level of safety for passengers and crew. This includes addressing potential risks such as accidents or emergencies.
5. **Public Acceptance:** Introducing a new mode of transportation may face challenges in gaining public acceptance and overcoming any skepticism or resistance. Passenger comfort and satisfaction are crucial for the success of the train.

2. Business Problem

The successful operation and long-term viability of the Vande Bharat Express face multifaceted challenges that span technical, operational, financial, regulatory, and competitive aspects. These challenges may potentially hinder the intended transformation of rail travel in India and impact the project's overall success.

Technical Issues:

The risk of technical glitches, mechanical failures, and electronic malfunctions can disrupt the smooth operation of the high-speed train, leading to potential service interruptions and passenger dissatisfaction.
Infrastructure Compatibility:

The existing railway infrastructure may not be optimized for high-speed operations, posing a challenge to the train's performance and speed potential.
Maintenance and Repair:

Inadequate or improper maintenance schedules could result in increased downtime, reducing operational efficiency and potentially affecting the reliability of the service.
Safety Concerns:

Any safety-related incidents, whether minor or major, pose a threat to the project's reputation, leading to negative publicity, passenger apprehension, and a loss of public trust.
Operational Costs:

The higher operational costs associated with specialized technology, maintenance, and energy requirements could challenge the financial viability of the project over the long term.
Public Acceptance and Demand:

Failure to meet passenger expectations or offer competitive fares may impact the desired ridership and undermine the project's goal of enhancing the overall passenger experience.
Infrastructure Expansion:

Delays in expanding the high-speed rail network to new routes could limit the project's potential impact on overall transportation and hinder its transformative objectives.
Regulatory and Political Hurdles:

The need for coordination with regulatory bodies and government agencies introduces the risk of political and bureaucratic hurdles, potentially causing delays in approvals, funding, and project implementation.
Competitive Landscape:

3. Business Requirement

High Speed Capability:

Develop a train with the ability to operate at high speeds, specifically targeting speeds around 160 km/h (99 mph) or higher. This is to significantly reduce travel time between cities and compete effectively with other transportation modes.
Aerodynamic Design:

Design the train's exterior with a focus on aerodynamics to minimize air resistance, thereby enhancing speed and overall efficiency. This design consideration is crucial for energy conservation and maintaining stability at high speeds.
Energy Efficiency:

Emphasize energy efficiency and environmental sustainability by powering the train with electricity, preferably utilizing electric multiple units (EMU). This is aimed at reducing emissions and reliance on traditional fossil fuels.
Passenger Comfort:

Prioritize passenger comfort by designing comfortable seating arrangements, ergonomic interiors, proper ventilation, and a noise-insulated environment. The goal is to ensure a pleasant travel experience for passengers.
Safety Features:

Incorporate advanced safety features, including crash-worthy components, fire detection and suppression systems, and emergency braking systems. The focus is on ensuring the safety of both passengers and crew.
Technological Innovation:

Showcase India's engineering and technological capabilities by incorporating state-of-the-art systems for communication, entertainment, and connectivity within the train.
Reliability and Maintenance:

Design the train for reliability and ease of maintenance, utilizing durable materials, modular components, and systems that are easily inspected, repaired, or replaced.
Accessibility:

Ensure accessibility for passengers of all abilities by incorporating features such as ramps, accessible restrooms, and designated spaces for passengers with disabilities.
Efficient Space Utilization:

Maximize passenger capacity without compromising comfort through efficient space utilization in the interior layouts, balancing seating arrangements, storage, and amenities.
Catering and Amenities:

Accommodate catering services, possibly including onboard dining options, by designing facilities for food preparation and serving.

4. Social Or Business Impact

Increased Ridership and Revenue Generation:

Business Impact: The enhanced speed and comfort provided by the Vande Bharat Express could attract more passengers, contributing to increased ridership on relevant routes. This, in turn, can lead to higher revenue generation for the railway sector.
Economic Stimulus and Local Development:

Social and Business Impact: The introduction of the Vande Bharat Express can stimulate tourism, boost local economies, and generate employment opportunities related to maintenance, operations, and hospitality. This contributes to both economic growth and social development.
Environmental Sustainability:

Social Impact: The use of electric trains like the Vande Bharat Express contributes to reduced greenhouse gas emissions, aligning with India's efforts to promote sustainable transportation. This has a positive impact on the environment and public health.
Technological Showcase and Export Potential:

Business Impact: The successful development and deployment of the Vande Bharat Express showcase India's technological capabilities. This can lead to business opportunities through technology transfer and export potential, further contributing to the national economy.
Infrastructure Development:

Business Impact: The introduction of high-speed trains can drive the development and upgrading of rail infrastructure, including tracks, signaling systems, and stations. This infrastructure development is crucial for the efficient operation of the Vande Bharat Express and benefits the overall transportation network.
Competition with Air Travel:

Business Impact: By offering competitive travel times on certain routes, the Vande Bharat Express poses competition to the airline industry. This impact can influence pricing strategies and service offerings in the air travel sector.
Government's Transportation Initiatives:

Social and Business Impact: The Vande Bharat Express aligns with the government's initiatives to modernize and upgrade the country's transportation infrastructure. This has long-term positive impacts on connectivity, economic growth, and public welfare.
Proud National Achievement:

Social Impact: The Vande Bharat Express is not only a technological achievement but also a source of national pride. It symbolizes India's capability to innovate and contribute to the global rail technology landscape, fostering a sense of pride and identity among the citizens.
Modernization of Rail Travel:

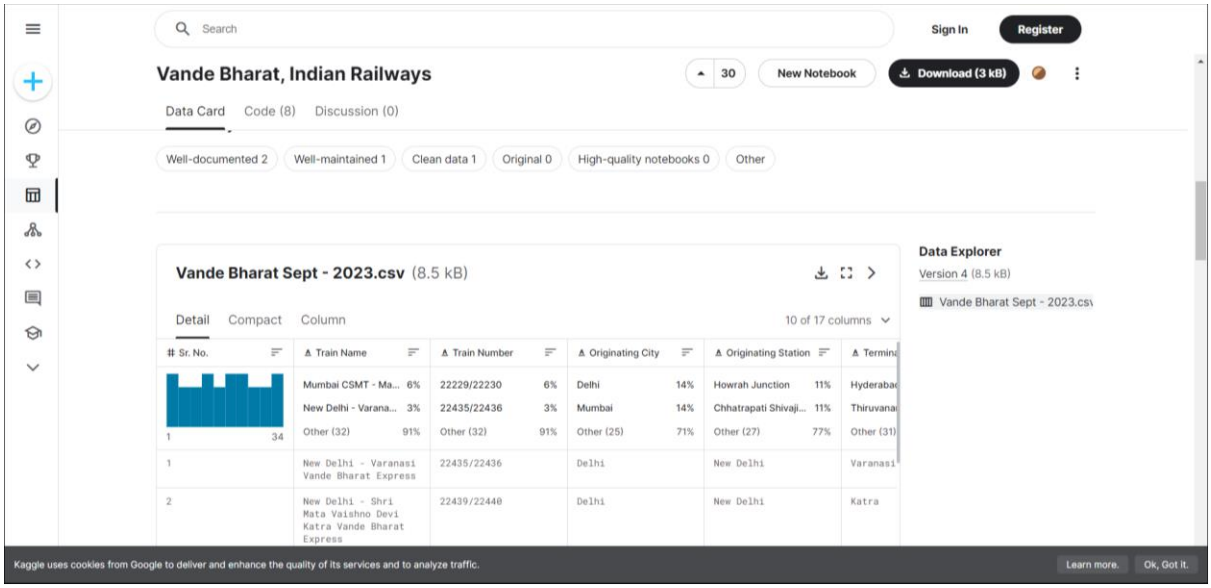
Social Impact: The advanced features of the Vande Bharat Express, including comfortable seating, onboard Wi-Fi, and improved amenities, contribute to modernizing the passenger rail experience in India, enhancing overall passenger satisfaction.

Data Collection & Extraction From Database

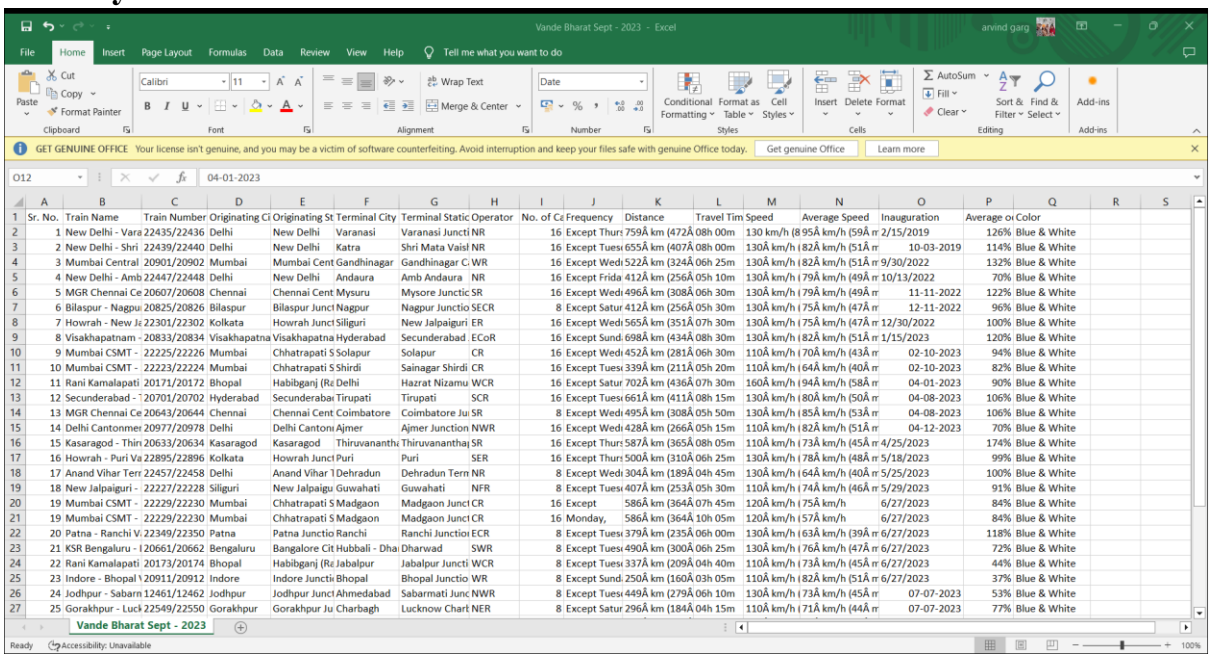
Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Activity 1: Collect the dataset

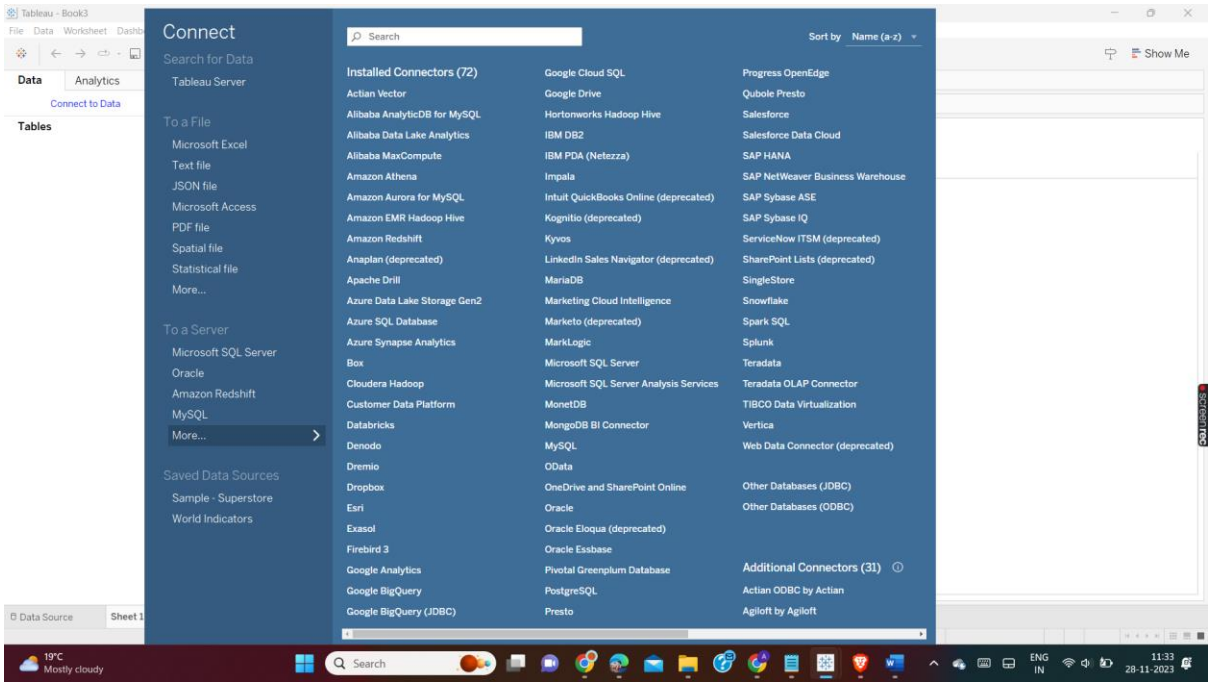
We will download the dataset from Kaggle



Activity 1.1: Understand the data



Activity 2: Connect Dataset to Tableau



Milestone 3: Data Preparation

Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

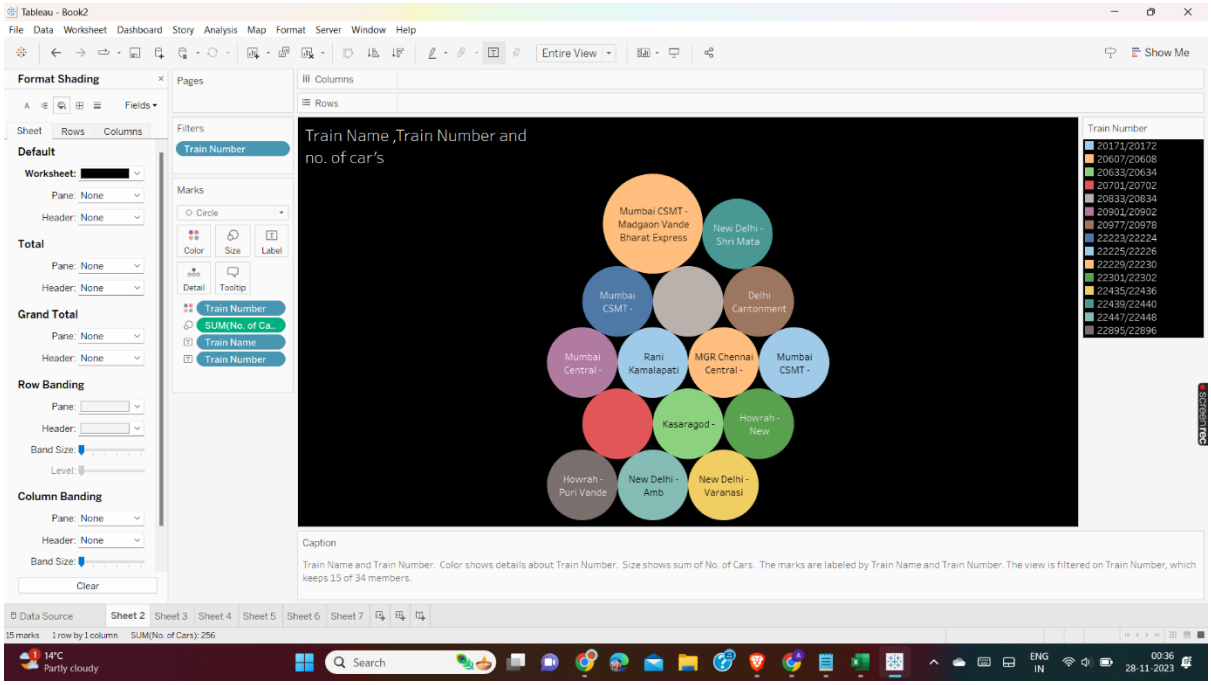
Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

Activity 1: No of Unique Visualizations

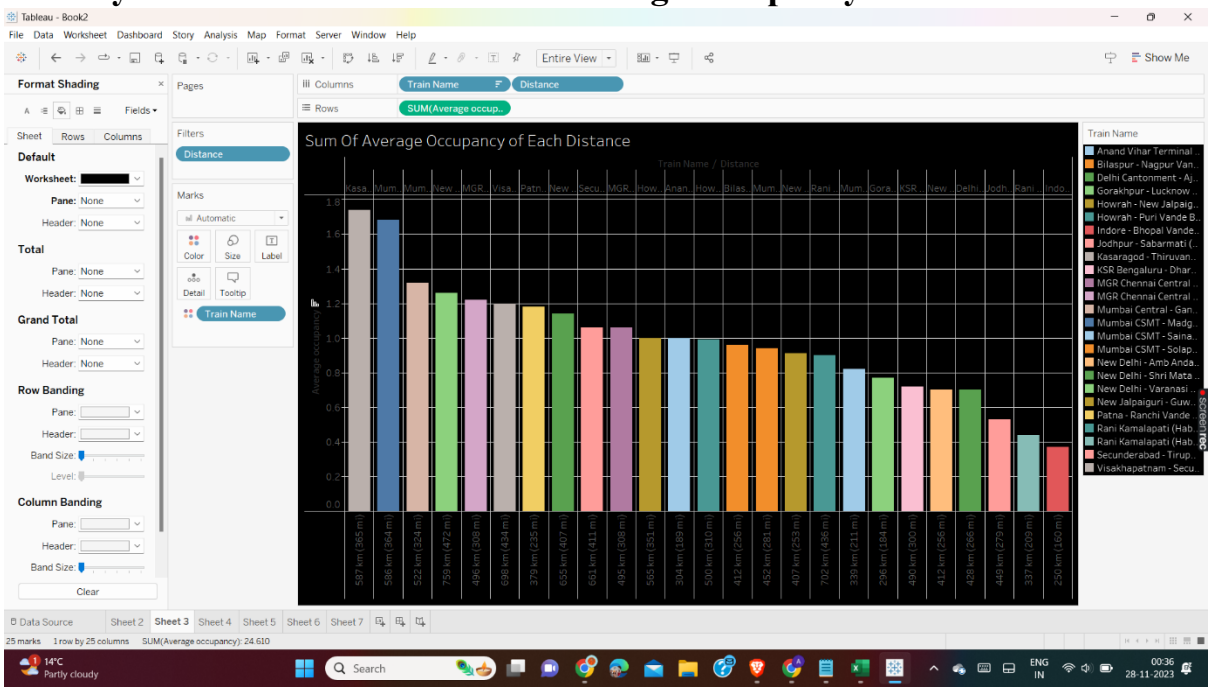
The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the Rice production include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables.

Activity 1.1: Find the Train Name and Train Number and also how many no. of car's are available:



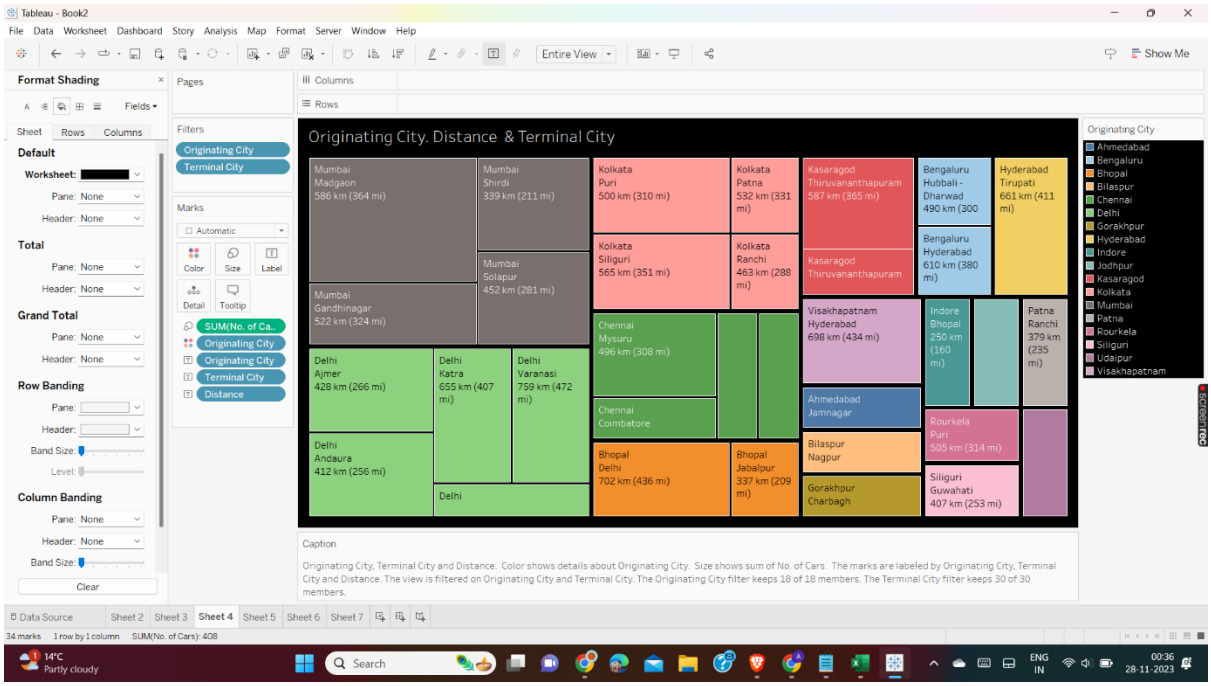
Train Name and Train Number. Color shows details about Train Number. Size shows sum of No. of Cars. The marks are labeled by Train Name and Train Number. The view is filtered on Train Number, which keeps 15 of 34 members.

Activity 1.2: Find the distance and average occupancy of Train:



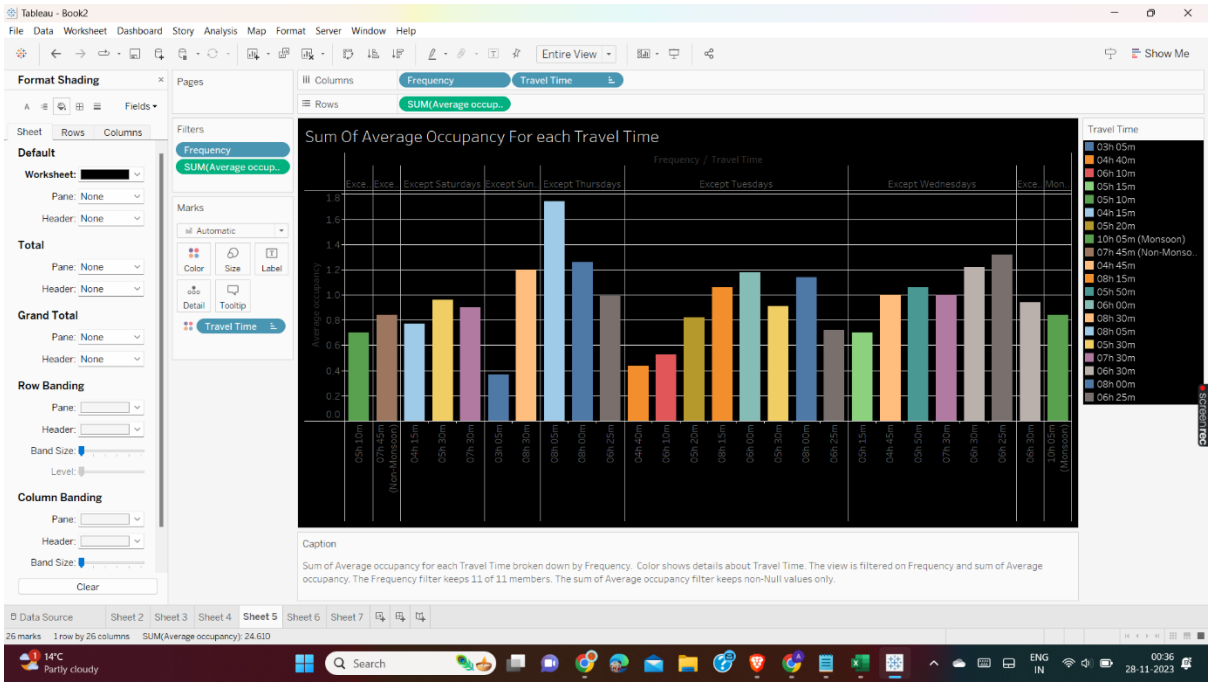
Sum of Average occupancy for each Distance broken down by Train Name. Color shows details about Train Name. The view is filtered on Distance, which keeps 24 of 33 members.

Activity 1.3: Find the distance difference between originating city and Terminal City:



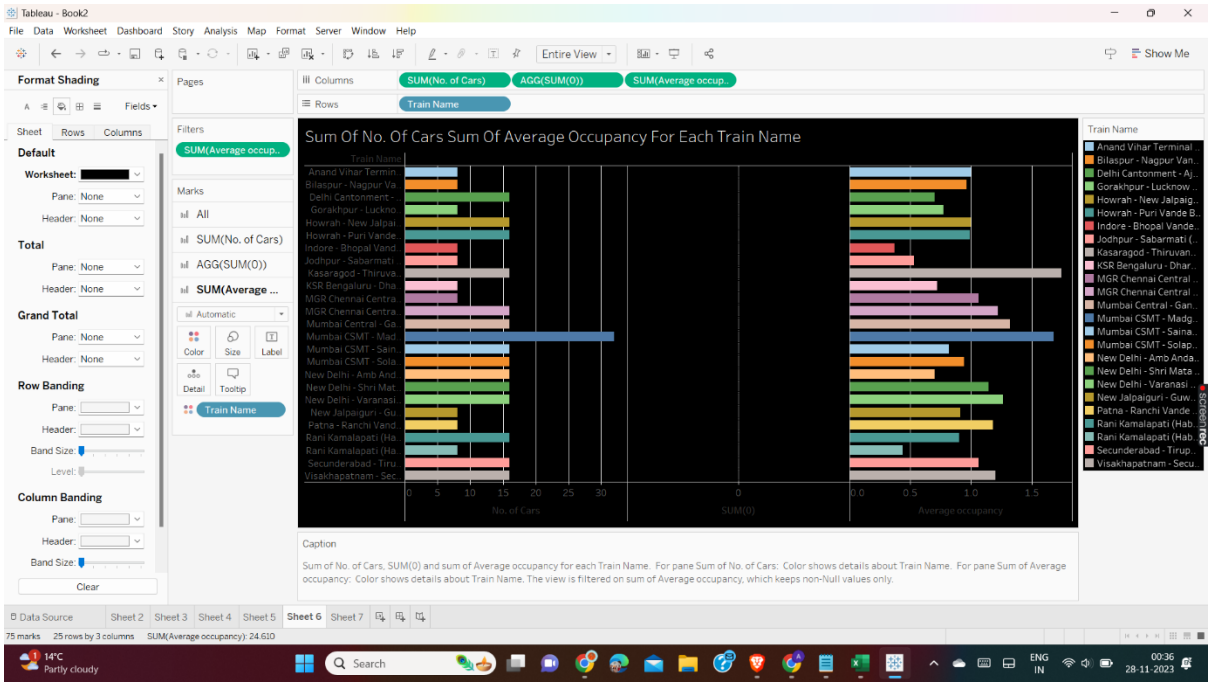
Originating City, Terminal City and Distance. Color shows details about Originating City. Size shows sum of No. of Cars. The marks are labeled by Originating City, Terminal City and Distance. The view is filtered on Originating City and Terminal City. The Originating City filter keeps 18 of 18 members. The Terminal City filter keeps 30 of 30 members.

Activity 1.4: : Find the Travel time of Train's given:



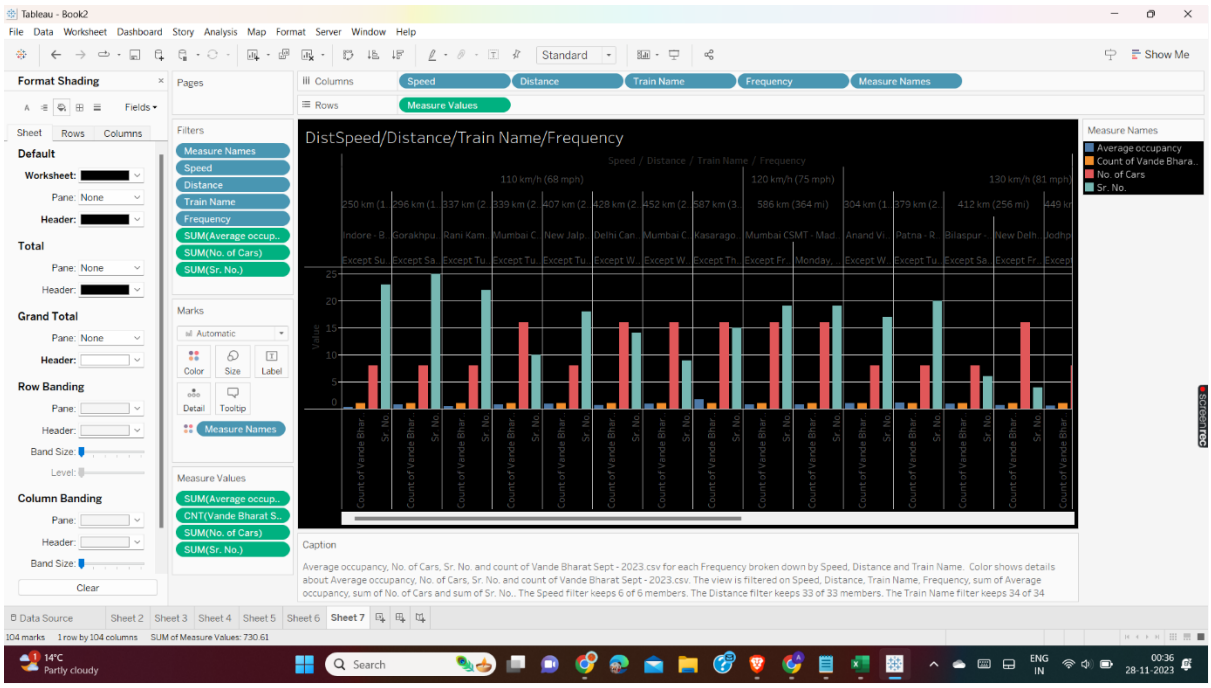
Sum of Average occupancy for each Travel Time broken down by Frequency. Color shows details about Travel Time. The view is filtered on Frequency and sum of Average occupancy. The Frequency filter keeps 11 of 11 members. The sum of Average occupancy filter keeps non-Null values only.

Activity 1.5: Find the Train Name and its average occupancy and no.of cars:



Sum of No. of Cars, SUM(0) and sum of Average occupancy for each Train Name. For pane Sum of No. of Cars: Color shows details about Train Name. For pane Sum of Average occupancy: Color shows details about Train Name. The view is filtered on sum of Average occupancy, which keeps non-Null values only.

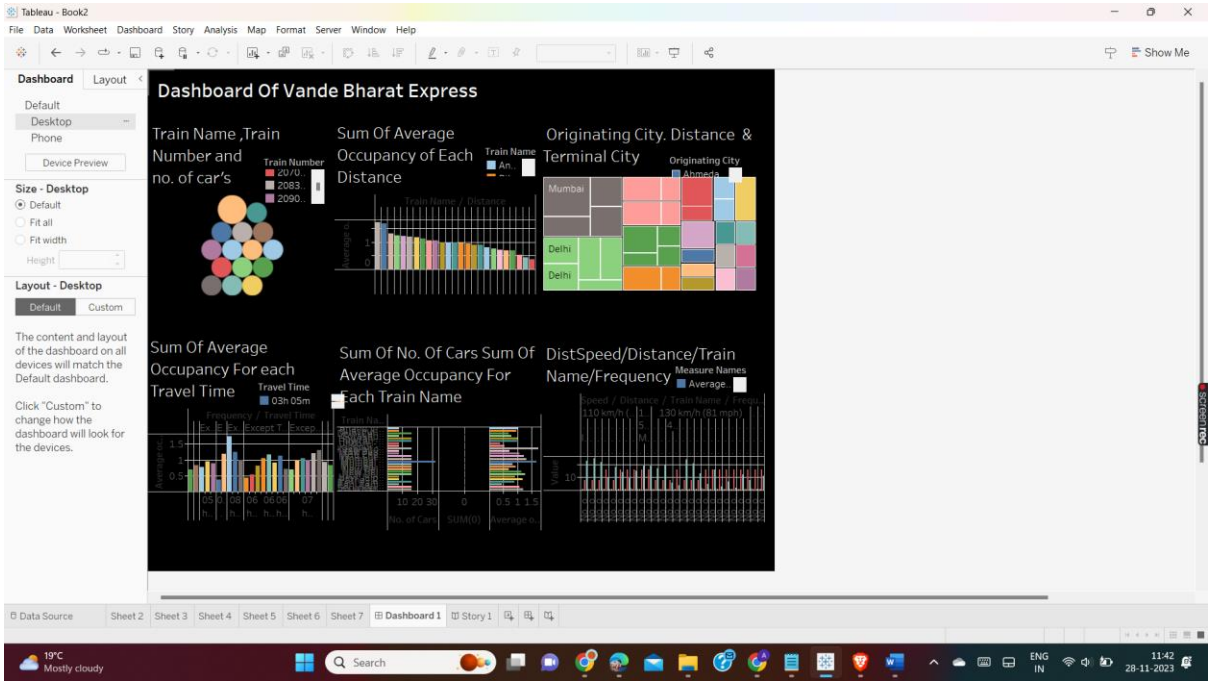
Activity 1.6: Find the Train distance speed and frequency



Average occupancy, No. of Cars, Sr. No. and count of Vande Bharat Sept - 2023.csv for each Frequency broken down by Speed, Distance and Train Name. Color shows details about Average occupancy, No. of Cars, Sr. No. and count of Vande Bharat Sept - 2023.csv. The view is filtered on Speed, Distance, Train Name, Frequency, sum of Average occupancy, sum of No. of Cars and sum of Sr. No.. The Speed filter keeps 6 of 6 members. The Distance filter keeps 33 of 33

members. The Train Name filter keeps 34 of 34 members. The Frequency filter excludes Except Mondays (20632) ,Except Tuesdays (20631) and Except Wednesdays (22926), Except Tuesdays (22925). The sum of Average occupancy filter keeps non-Null values only. The sum of No. of Cars filter keeps non-Null values only. The sum of Sr. No. filter keeps non-Null values only.

Milestone 5: Dashboard



Milestone 6: Story of Vande Bharat Express

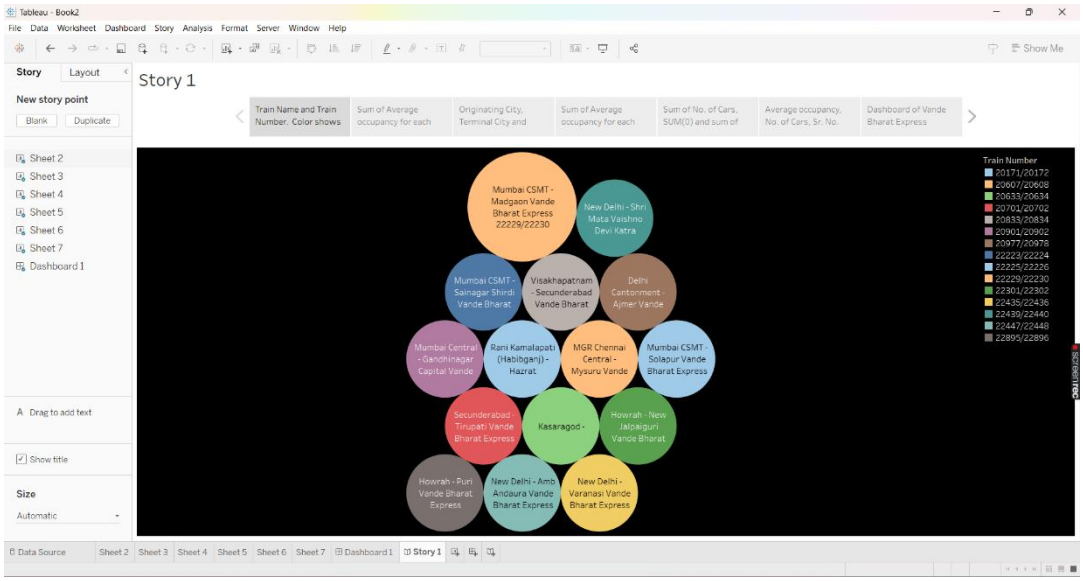
Once upon a time, Olist, a thriving e-commerce platform in Brazil, embarked on a mission to optimize its marketing funnel and drive higher conversions. The team at Olist understood the importance of guiding potential customers through a well-defined journey, from initial awareness to becoming loyal customers.

To kickstart their marketing funnel strategy, Olist decided to revamp their website and create a captivating landing page. The page featured eye-catching visuals, compelling product descriptions, and a clear call-to-action, enticing visitors to explore further. The team also implemented lead capture forms strategically placed throughout the site to capture valuable customer information.

With a steady flow of website traffic, Olist focused on generating leads. They launched an integrated marketing campaign, leveraging various channels such as search engine optimization (SEO), paid advertising, social media, and content marketing. By carefully targeting their audience and providing valuable content, Olist successfully attracted a significant number of leads.

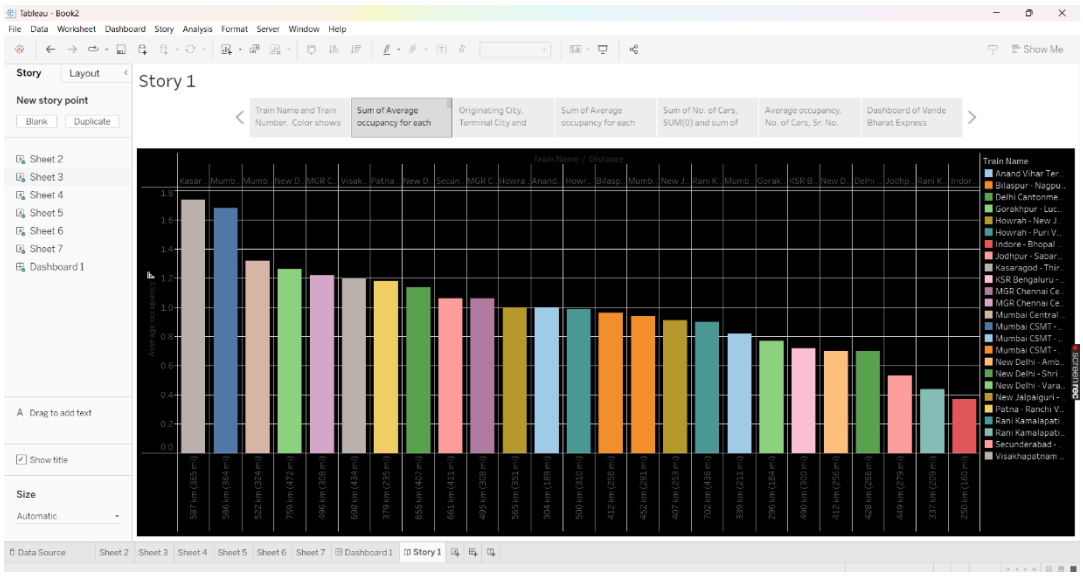
1.Story of Train Name and Train Number and also how many no.of Car's are available:

Train Name, Train Number and sum of No. of Cars. Color shows details about Train Name. Size shows sum of No. of Cars. The marks are labeled by Train Name, Train Number and sum of No. of Cars. The view is filtered on Train Name, which keeps 25 of 25 members..



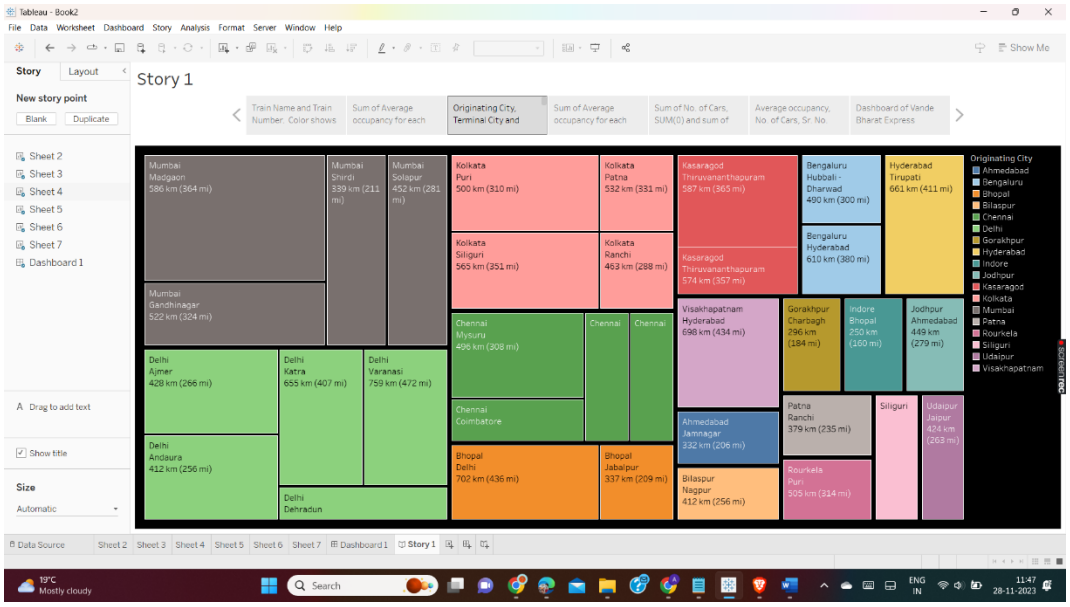
2.Story of Distance and Average Occupancy of Train:

Sum of Average occupancy for each Distance broken down by Train Name. Color shows details about Train Name. The view is filtered on Train Name, which keeps 25 of 25 members.



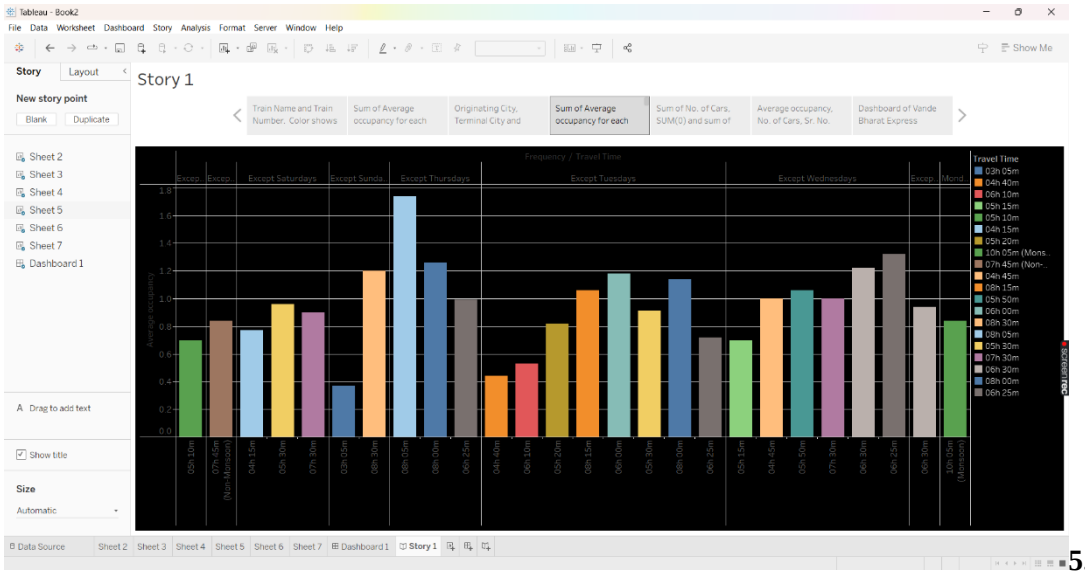
3.Story of Distance Difference Between Originating City and Terminal City:

Originating City, Distance and Terminal City. Color shows details about Distance. Size shows sum of No. of Cars. The marks are labeled by Originating City, Distance and Terminal City. The data is filtered on Train Name, which keeps 25 of 25 members. The view is filtered on Originating City and Terminal City. The Originating City filter excludes Gorakhpur, Indore, Jodhpur, Patna and Siliguri. The Terminal City filter keeps 10 of 25 members.



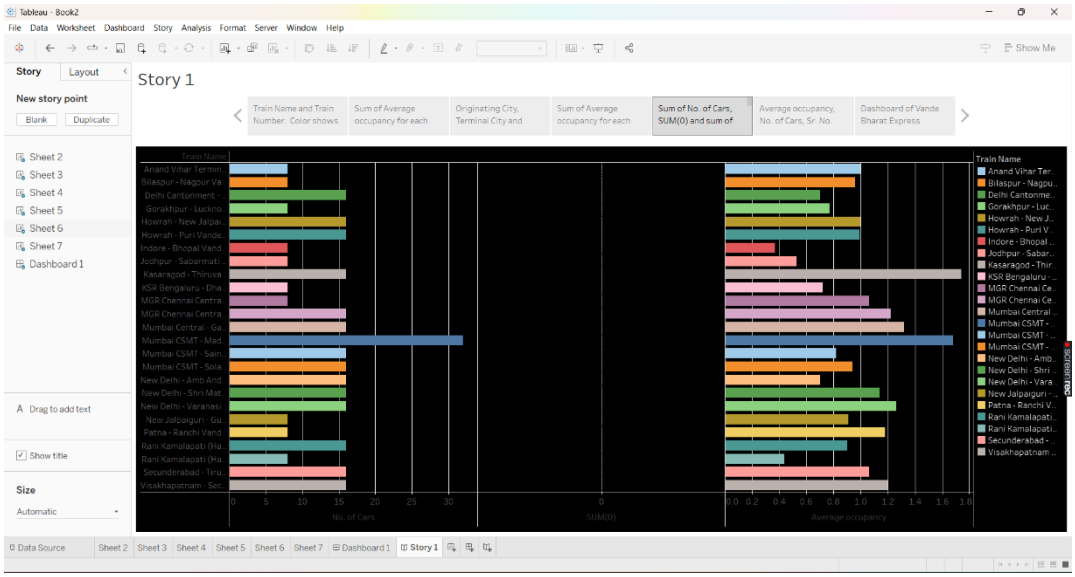
4. Story of Travel Time of Trains Given:

Sum of Average occupancy for each Travel Time broken down by Frequency. Color shows details about Travel Time. The marks are labeled by Frequency. The data is filtered on Train Name, which keeps 25 of 25 members.



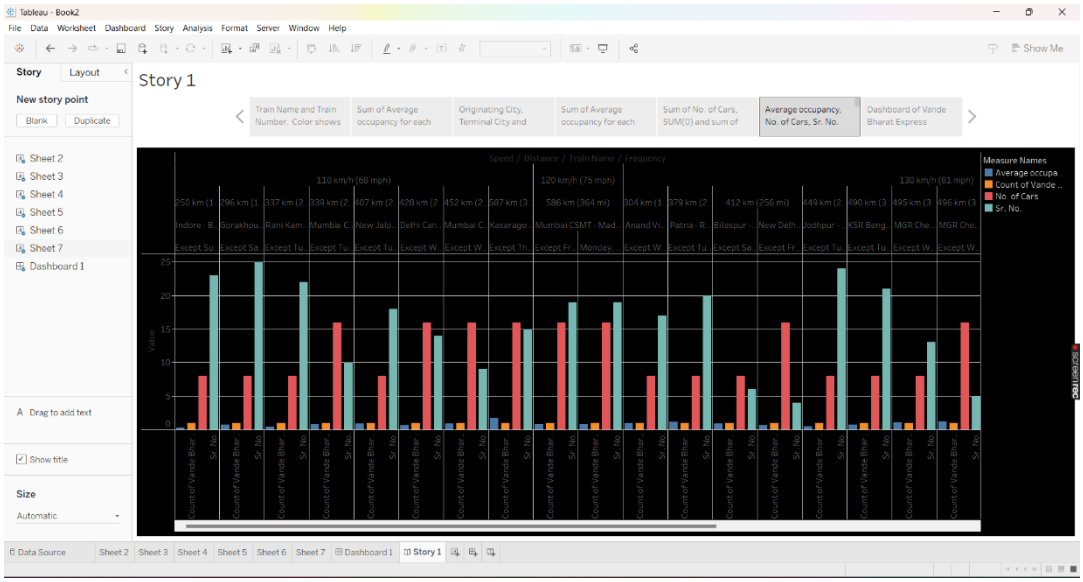
5. Story of Train Name and its Average Occupancy and No. of Car's:

Sum of No. of Cars, SUM (0) and sum of Average occupancy for each Train Name. For pane Sum of No. of Cars: Colour shows sum of Average occupancy. For pane Sum of Average occupancy: Colour shows details about Train Name. The view is filtered on Train Name, which keeps 25 of 25 members.



6.Story of Train Distance Speed and Frequency:

Average occupancy, No. of Cars, Sr. No., and count of Vande Bharat.csv for each Frequency broken down by Speed, Distance and Train Name. Colour shows details about Average occupancy, No. of Cars, Sr.No.,. and count of Vande Bharat.csv. The view is filtered on Train Name, which keeps 25 of 25 members.



Milestone 9: Web integration

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.