Vande Bharat Express

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

The Vande Bharat Express, also known as Train 18, is an Indian semi-high speed intercity electric multiple unit train. It was designed and developed by the Integral Coach Factory (ICF) in Chennai, India. The train is named after the phrase "Vande Mataram," which means "I bow to thee, Mother" in Sanskrit and is a patriotic song often associated with India's struggle for independence.

Key features of the Vande Bharat Express:

High Speed: The train is designed to operate at a maximum speed of around 160 km/h (99 mph) and is one of the fastest trains in India.

Sleek Design: Vande Bharat Express has a modern and aerodynamic design with a smooth exterior. The train's design reduces air resistance and enhances its speed and efficiency.

Energy Efficiency: The train is an electric multiple unit, meaning each coach is powered by electricity. This reduces greenhouse gas emissions and makes it an environmentally friendly mode of transportation.

Amenities: Vande Bharat Express offers a range of passenger amenities, including comfortable seating, onboard Wi-Fi, infotainment screens, bio-vacuum toilets, and catering services.

Safety and Comfort: The train incorporates various safety features such as fire and smoke detection systems, automatic doors with sliding footsteps, and crash-resistant features.

Indigenous Technology: The train is a significant achievement for India's railway sector as it showcases indigenous technological capabilities in terms of design, engineering, and manufacturing.

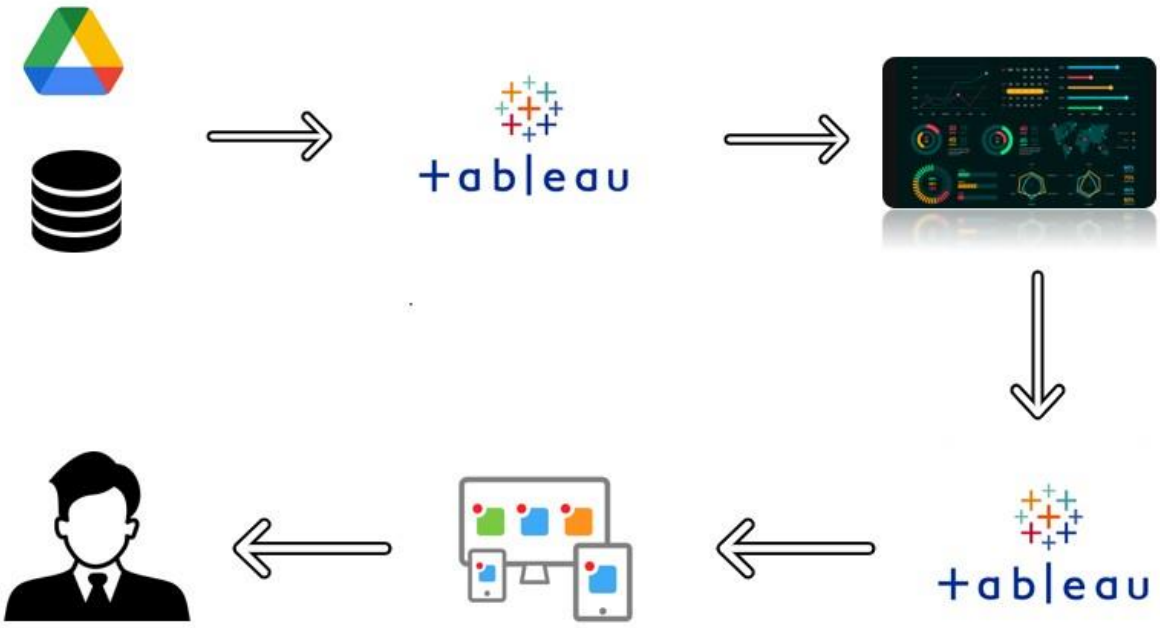
Routes: The Vande Bharat Express initially operated on the New Delhi-Varanasi route. Plans were underway to introduce it on other important routes as well.

Reduced Travel Time: The train's high speed and efficient design contribute to reduced travel times between destinations, making it an attractive option for travelers.

Made in India: The development and manufacturing of the Vande Bharat Express exemplify India's efforts to promote its "Make in India" initiative, encouraging domestic manufacturing and technological innovation.

The Vande Bharat Express represents a leap in India's rail technology and infrastructure, offering passengers a modern and efficient mode of travel. It not only reduces travel times but also symbolizes India's commitment to technological advancement in the transportation sector.

Technical Architecture:



Project Flow

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

- Prepare the Data for Visualization

- Data Visualizations ○ No of Unique Visualizations
- Dashboard ○ Responsive and Design of Dashboard
- Story ○ No of Scenes of Story
- Web Integration
- ○ Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation ○ Record explanation Video for project end to end solution ○ Project Documentation-Step by step project development procedure

Milestone 1: Define Problem / Problem Understanding

Activity 1: Specify the business problem.

The primary business problem faced by Vande Bharat Express is centered around the accessibility and user-friendliness for passengers with disabilities. Despite being a technological marvel and a symbol of progress in India's railway sector, the current infrastructure and service offerings do not adequately address the diverse needs of individuals with disabilities. This lack of accommodation poses a significant challenge to creating an inclusive and equitable travel experience for all passengers.

Passengers with disabilities encounter various obstacles, from navigating through train compartments to accessing essential services during the journey. The existing infrastructure and service design may not be optimized to cater to the unique requirements of this demographic, resulting in a substantial accessibility gap. This challenge not only impacts the travel experience of passengers with disabilities but also goes against the principles of inclusivity and equal access that modern transportation services strive to achieve.

Addressing this business problem requires a comprehensive understanding of the specific challenges faced by passengers with disabilities in using the Vande Bharat Express. It involves identifying areas where the current infrastructure falls short in providing an inclusive environment and developing strategic solutions to overcome these barriers. By prioritizing accessibility improvements, Vande Bharat Express can transform its services to better serve the needs of all passengers, fostering a travel experience that is not only efficient but also welcoming and accommodating for individuals with disabilities.

Activity 2: Business requirements.

The business requirements are essential to guide the redesign and enhancement of services, ensuring that the modifications align with the goal of creating an inclusive and user-friendly travel experience for all passengers. The key business requirements include:

1. User-Friendly Interfaces:
    - Develop and implement user interfaces that are intuitive and compatible with various assistive technologies.
    - Ensure that information and services are easily accessible to passengers with visual, auditory, or motor impairments.

2. Dedicated Spaces within the Train:
    - Allocate specific areas within the train that are designed to cater to the comfort and mobility needs of passengers with disabilities.
    - Ensure these spaces are equipped with features such as ample space for wheelchair users, accessible seating arrangements, and easy entry and exit points.
3. Comprehensive Staff Training:
    - Provide specialized training for train staff to handle the diverse needs of passengers with disabilities.

- Equip staff with the knowledge and skills to offer personalized assistance, ensuring a supportive and comfortable journey for all passengers.

4. Universal Design Principles:
   - Incorporate universal design principles into every aspect of the train service to benefit passengers with disabilities and enhance the overall experience for all travelers.
   - Consider features such as clear signage, audio announcements, and well-designed infrastructure that caters to a diverse range of abilities.

5. Accessible Information and Communication:
   - Ensure that information regarding train schedules, announcements, and emergency procedures is presented in formats accessible to all passengers.
   - Implement communication strategies that consider the varied needs of individuals with different disabilities.

6. Regulatory Compliance:
   - Align modifications with existing accessibility standards and regulations to meet legal requirements.
   - Stay informed about evolving accessibility standards and continuously adapt services to comply with the latest regulations.

7. Feedback Mechanism:
   - Establish a feedback mechanism to collect input from passengers with disabilities regarding the effectiveness of accessibility enhancements.
   - Use this feedback to iteratively improve and refine the services to better meet the evolving needs of the diverse passenger base.

Activity 3: Social or Business Impact.

Social Impact:

1. Inclusivity and Equality:
   - The initiative contributes to building a more inclusive society by ensuring that individuals with disabilities have equal access to modern transportation facilities.
   - It aligns with the broader societal goal of fostering inclusivity, allowing all citizens, regardless of physical abilities, to participate fully in the benefits of public transportation.

2. Enhanced Travel Experience:
    - Passengers with disabilities experience a more welcoming and accommodating travel environment, reducing the challenges and barriers they may face during their journeys.
    - The initiative promotes a positive social environment, where diversity is celebrated, and individuals with disabilities feel valued and respected as part of the broader community.

3. Positive Perception and Public Image:
    - Demonstrating a commitment to accessibility improvements enhances the public image of Vande Bharat Express.
    - The train service is viewed as socially responsible, contributing to the well-being and comfort of all passengers, and fostering positive sentiments among the general public.

Business Impact:

1. Broader Customer Base:
    - Improved accessibility attracts a broader customer base, including individuals with disabilities, their families, and those who prioritize inclusive travel options.
    - Vande Bharat Express becomes a preferred choice for a diverse range of passengers, leading to increased ridership and revenue.

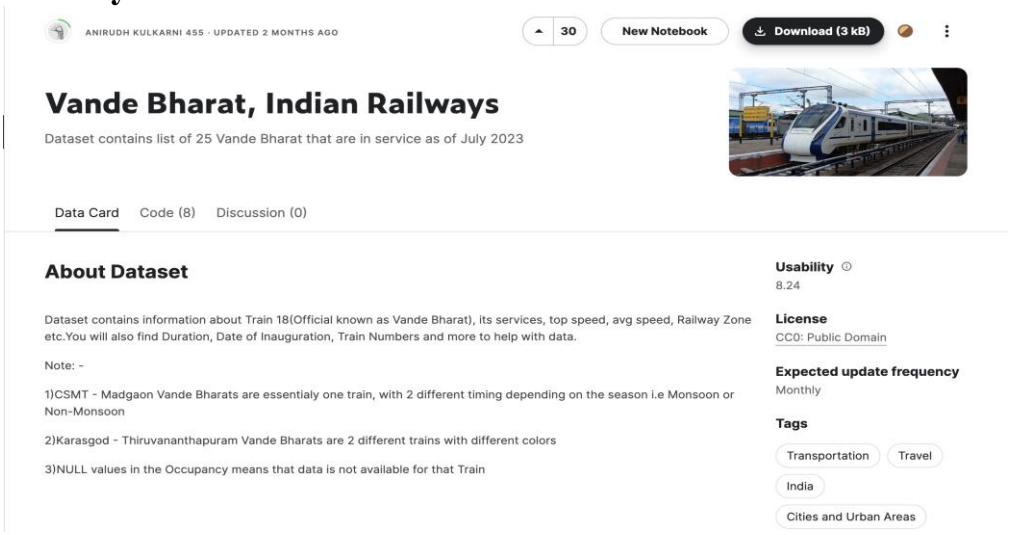
2. Competitive Advantage:
    - By aligning with or exceeding accessibility standards, Vande Bharat Express gains a competitive advantage in the transportation sector.
    - The train service stands out as a leader in providing inclusive and user-friendly travel experiences, distinguishing itself from competitors.

3. Regulatory Compliance:
    - Meeting and exceeding regulatory standards enhances the train service's compliance with accessibility regulations.
    - This not only ensures legal adherence but also positions Vande Bharat Express as a proactive entity that goes beyond the minimum requirements to cater to the diverse needs of its passengers.

4. Customer Loyalty and Repeat Business:
    - Positive experiences stemming from enhanced accessibility contribute to customer loyalty.
    - Passengers who feel well-served and accommodated are more likely to choose Vande Bharat Express for future travel, leading to repeat business and positive word-of-mouth marketing.

Milestone 2: Data Collection & Extraction from Database

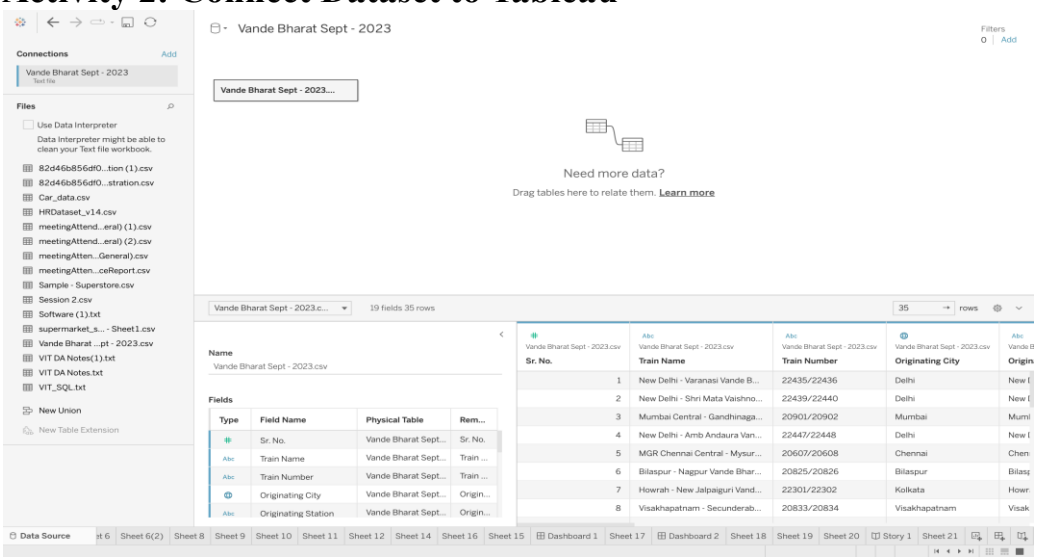
Activity 1: Collect the dataset.



Activity 1.1: Understand the dataset

Sr. No.	Train Name	Train Number	Originating City	Originating Station	Terminal City	Terminal Station
1	New Delhi - Varanasi Vande Bharat Express	22435/22436	Delhi	New Delhi	Varanasi	Varanasi Junction
2	New Delhi - Shri Mata Vaishno Devi Katra Vande Bharat Express	22439/22440	Delhi	New Delhi	Katra	Shri Mata Vaishno Devi Katra
3	Mumbai Central - Gandhinagar Capital Vande Bharat Express	20901/20902	Mumbai	Mumbai Central	Gandhinagar	Gandhinagar Capital
4	New Delhi - Amb Andaura Vande Bharat Express	22447/22448	Delhi	New Delhi	Andaura	Amb Andaura
5	MGR Chennai Central - Mysuru Vande Bharat Express	20607/20608	Chennai	Chennai Central	Mysuru	Mysore Junction
6	Bilaspur - Nagpur Vande Bharat Express	20825/20826	Bilaspur	Bilaspur Junction	Nagpur	Nagpur Junction
7	Howrah - New Jalpaiguri Vande Bharat Express	22301/22302	Kolkata	Howrah Junction	Siliguri	New Jalpaiguri Junction
8	Visakhapatnam - Secunderabad Vande Bharat Express	20833/20834	Visakhapatnam	Visakhapatnam Junction	Hyderabad	Secunderabad Junction
9	Mumbai CSMT - Solapur Vande Bharat Express	22225/22226	Mumbai	Chhatrapati Shivaji Terminus	Solapur	Solapur
10	Mumbai CSMT - Sainagar Shirdi Vande Bharat Express	22223/22224	Mumbai	Chhatrapati Shivaji Terminus	Shirdi	Sainagar Shirdi
11	Rani Kamalapati (Habibganj) - Hazrat Nizamuddin Vande Bharat Express	20171/20172	Bhopal	Habibganj (Rani Kamalapati)	Delhi	Hazrat Nizamuddin
12	Secunderabad - Tirupati Vande Bharat Express	20701/20702	Hyderabad	Secunderabad Junction	Tirupati	Tirupati
13	MGR Chennai Central - Coimbatore Vande Bharat Express	20643/20644	Chennai	Chennai Central	Coimbatore	Coimbatore Junction
14	Delhi Cantonment - Ajmer Vande Bharat Express	20977/20978	Delhi	Delhi Cantonment	Ajmer	Ajmer Junction
15	Kasaragod - Thiruvananthapuram Vande Bharat Express	20633/20634	Kasaragod	Kasaragod	Thiruvananthapuram	Thiruvananthapuram Central
16	Howrah - Puri Vande Bharat Express	22895/22896	Kolkata	Howrah Junction	Puri	Puri
17	Anand Vihar Terminal - Dehradun Vande Bharat Express	22457/22458	Delhi	Anand Vihar Terminal	Dehradun	Dehradun Terminal
18	New Jalpaiguri - Guwahati Vande Bharat Express	22227/22228	Siliguri	New Jalpaiguri Junction	Guwahati	Guwahati
19	Mumbai CSMT - Madgaon Vande Bharat Express	22229/22230	Mumbai	Chhatrapati Shivaji Terminus	Madgaon	Madgaon Junction
19	Mumbai CSMT - Madgaon Vande Bharat Express	22229/22230	Mumbai	Chhatrapati Shivaji Terminus	Madgaon	Madgaon Junction
20	Patna - Ranchi Vande Bharat Express	22349/22350	Patna	Patna Junction	Ranchi	Ranchi Junction
21	KSR Bengaluru - Dharwad Vande Bharat Express	20661/20662	Bengaluru	Bangalore City	Hubbali - Dharwad	Dharwad
22	Rani Kamalapati (Habibganj) - Jabalpur Vande Bharat Express	20173/20174	Bhopal	Habibganj (Rani Kamalapati)	Jabalpur	Jabalpur Junction
23	Indore - Bhopal Vande Bharat Express	20911/20912	Indore	Indore Junction	Bhopal	Bhopal Junction
24	Jodhpur - Sabarmati (Ahmedabad) Vande Bharat Express	12461/12462	Jodhpur	Jodhpur Junction	Ahmedabad	Sabarmati Junction
25	Gorakhpur - Lucknow Charbagh Vande Bharat Express	22549/22550	Gorakhpur	Gorakhpur Junction	Charbagh	Lucknow Charbagh
26	MGR Chennai Central - Vijayawada Vande Bharat Express	20677/20678	Chennai	Chennai Central	Vijayawada	Vijayawada Junction
27	Howrah - Patna Vande Bharat Express	22347/22348	Kolkata	Howrah Junction	Patna	Patna Junction
28	Kacheguda - Yesvantpur Vande Bharat Express	20703/20704	Bengaluru	Yesvantpur Junction	Hyderabad	Kacheguda
29	Chennai Egmore - Tirunelveli Vande Bharat Express	20665/20666	Chennai	Chennai Egmore	Tirunelveli	Tirunelveli Junction
30	Udaipur City - Jaipur Vande Bharat Express	20979/20980	Udaipur	Udaipur City	Jaipur	Jaipur Junction
31	Rourkela - Puri Vande Bharat Express	20835/20836	Rourkela	Rourkela Junction	Puri	Puri
32	Kasaragod - Thiruvananthapuram Vande Bharat Express (via Alappuzha)	20631/20632	Kasaragod	Kasaragod	Thiruvananthapuram	Thiruvananthapuram Central
33	Howrah - Ranchi Vande Bharat Express	20897/20898	Kolkata	Howrah Junction	Ranchi	Ranchi Junction
34	Ahmedabad - Jamnagar Vande Bharat Express	22925/22926	Ahmedabad	Ahmedabad Junction	Jamnagar	Jamnagar

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.

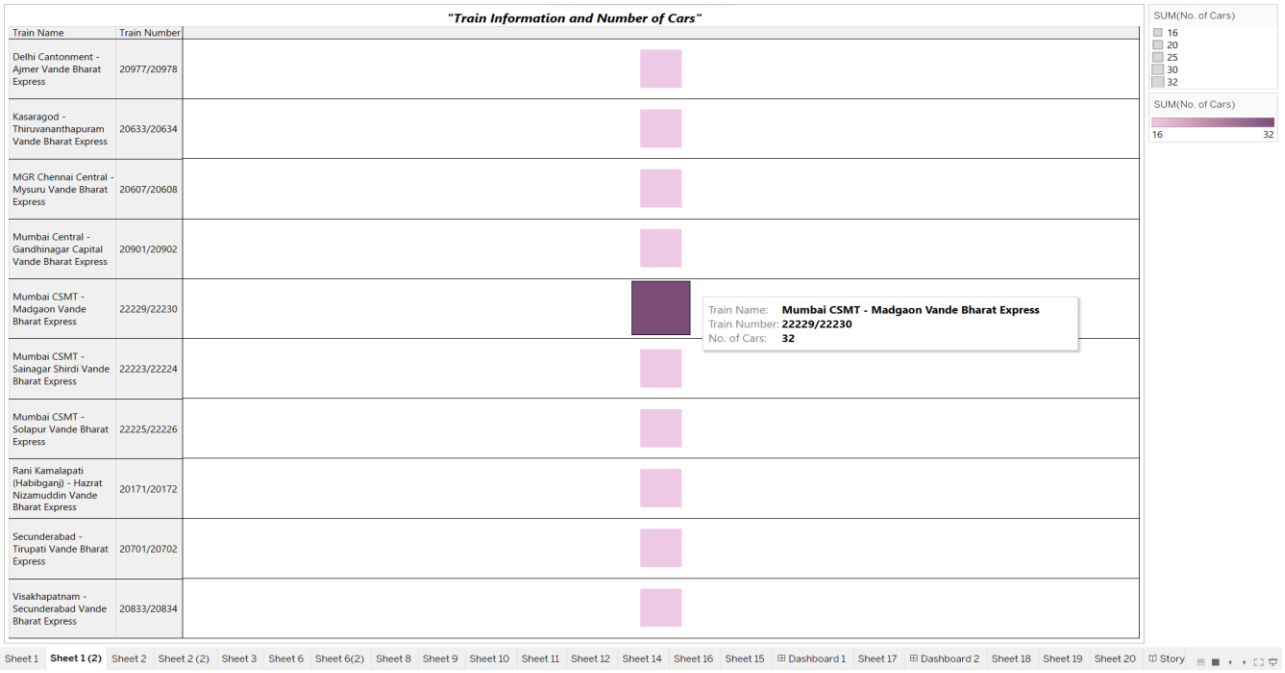
Milestone 4: Data Visualization

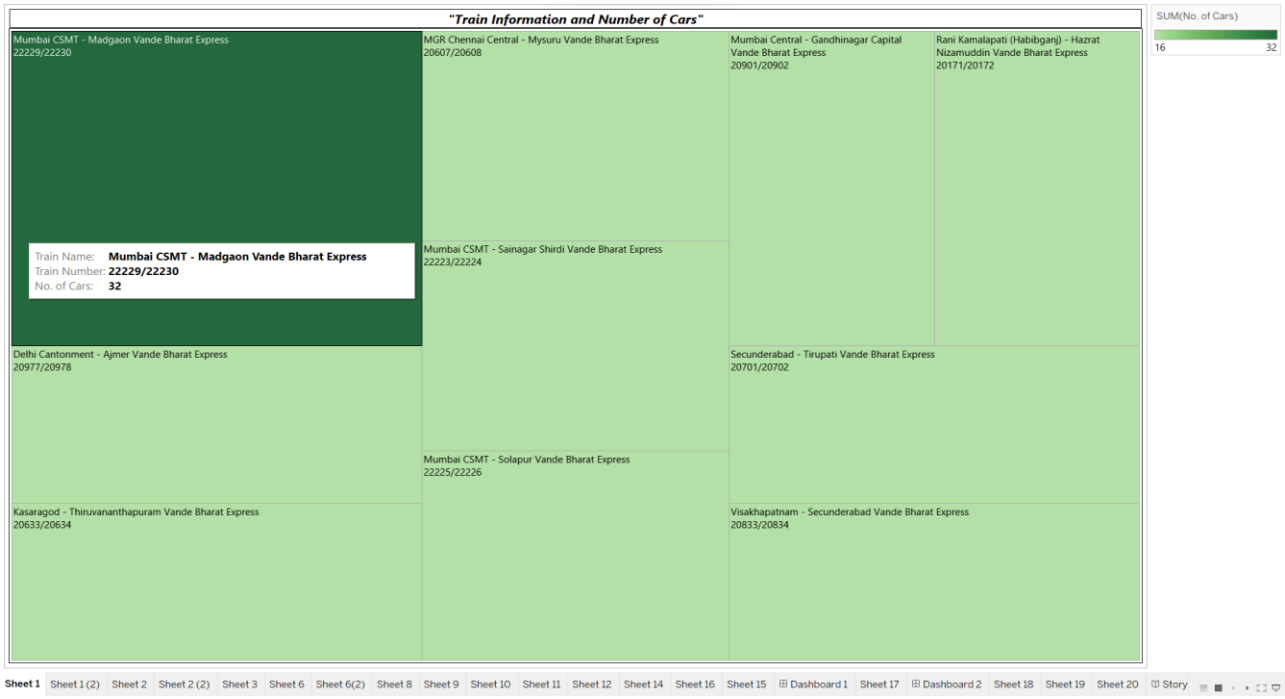
Data visualization involves generating visual depictions of data to aid individuals in comprehending and examining the information. The objective of data visualization is to enhance the accessibility, intuitiveness, and interpretability of intricate data sets. Utilizing visual components like charts, graphs, and maps, data visualizations enable swift recognition of patterns, trends, and anomalies within the data.

Activity 1: No of Unique Visualizations

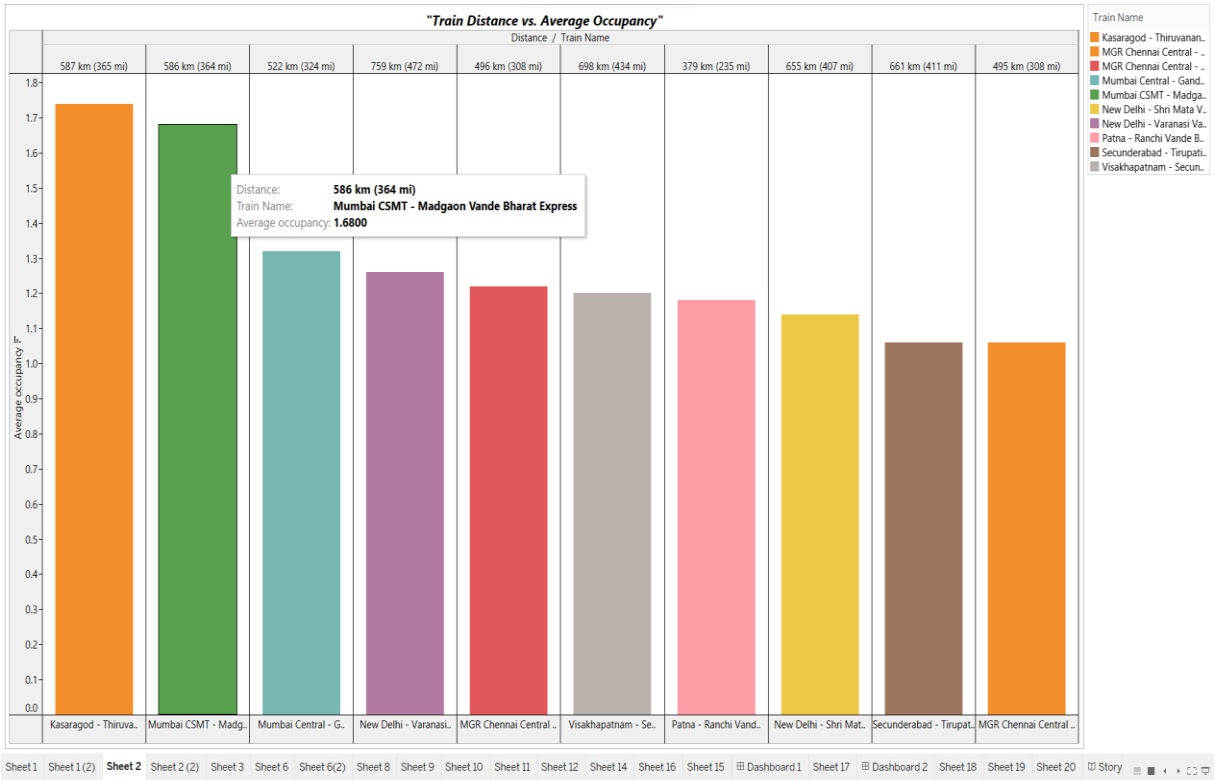
The variety of distinct visual representations possible with a specific dataset. Several typical visualization methods for analyzing rice production encompass bar charts, line charts, heatmaps, scatter plots, pie charts, maps, etc. These visualizations are valuable for comparing performance, monitoring changes over time, illustrating distribution, and highlighting relationships between variables.

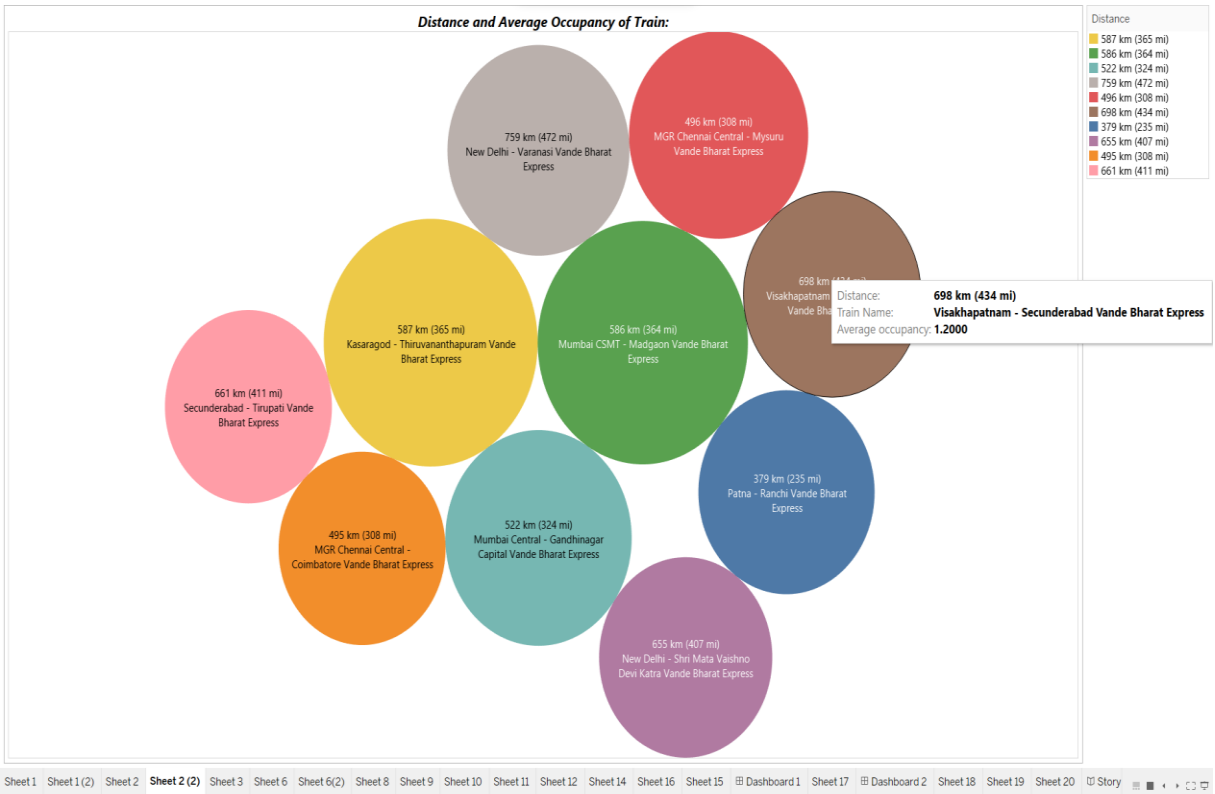
Activity 1.1: Find the Train Name and Train Number and also how many no. of car's are available:



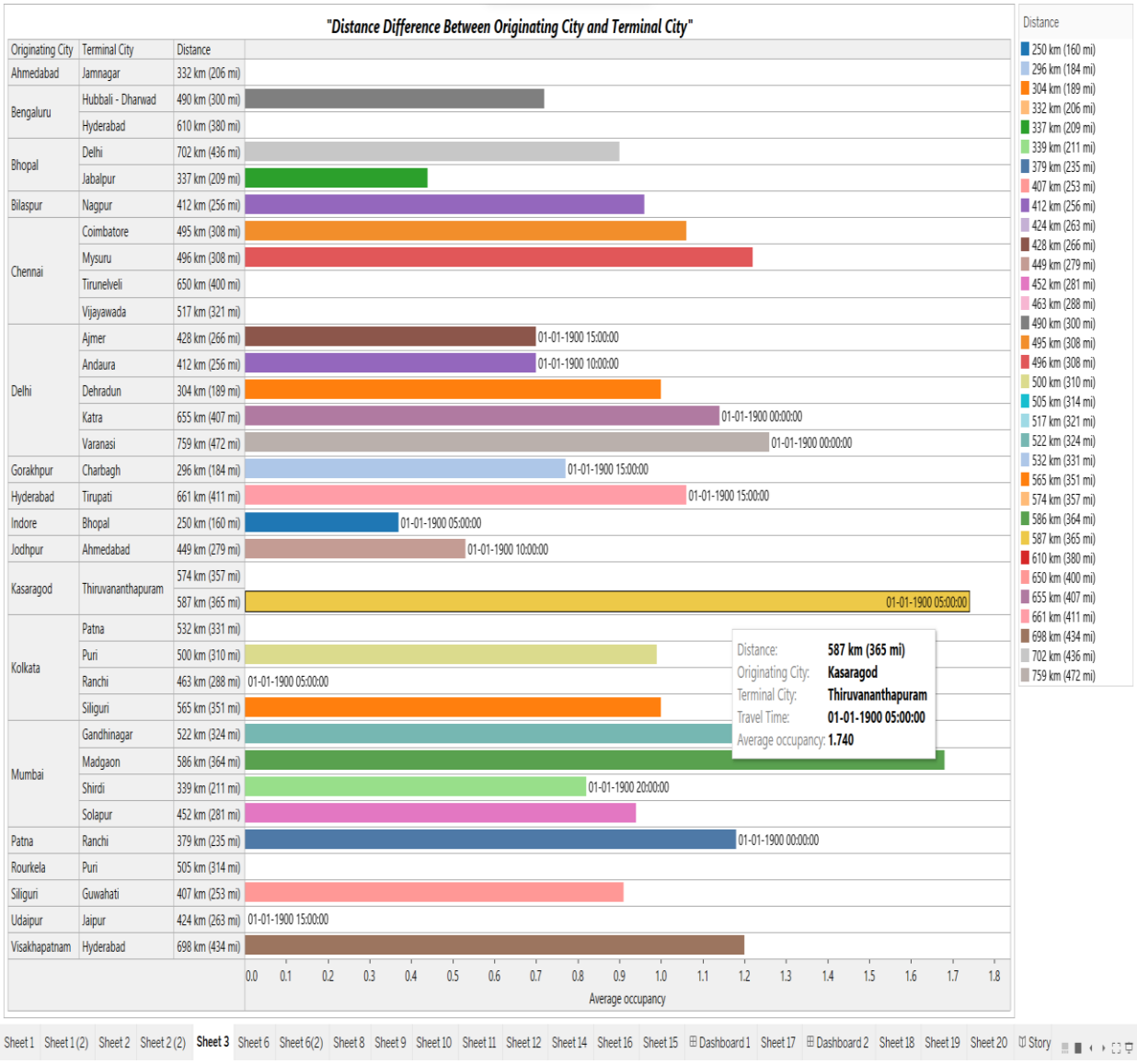


Activity 1.2: Find the distance and average occupancy of Train:

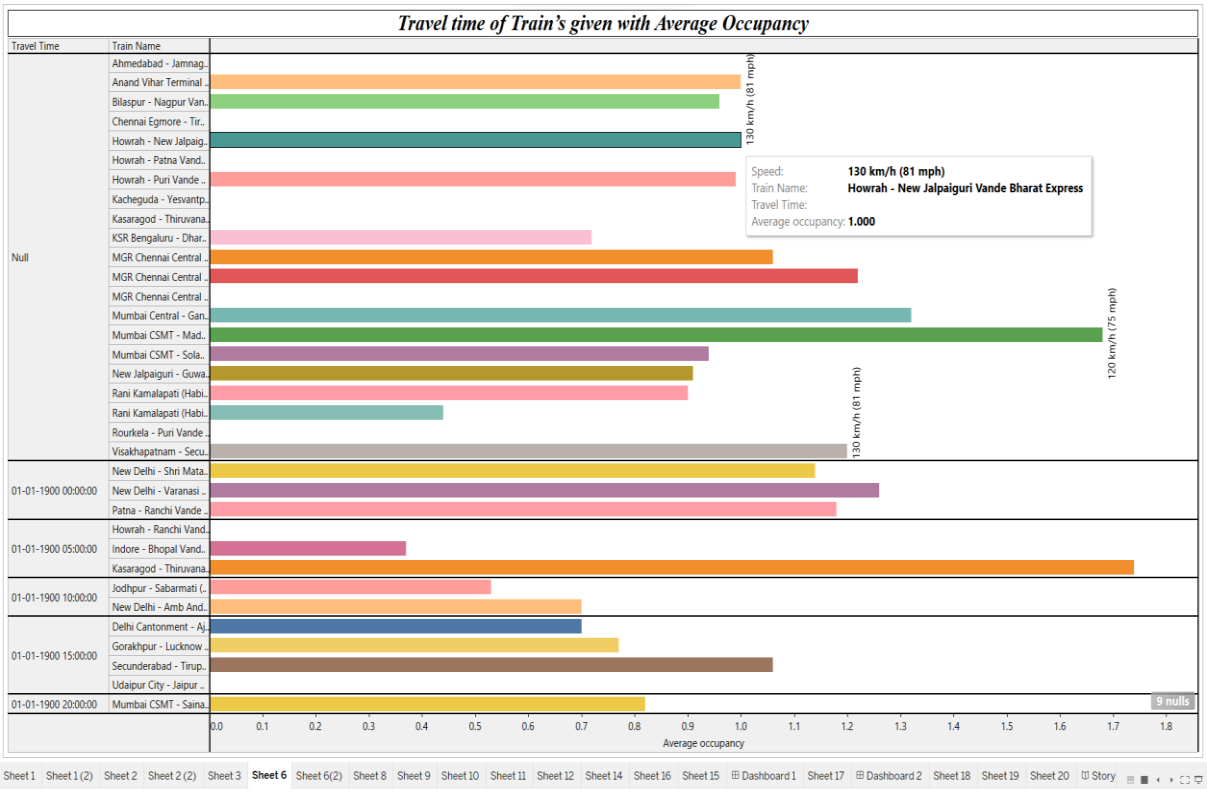


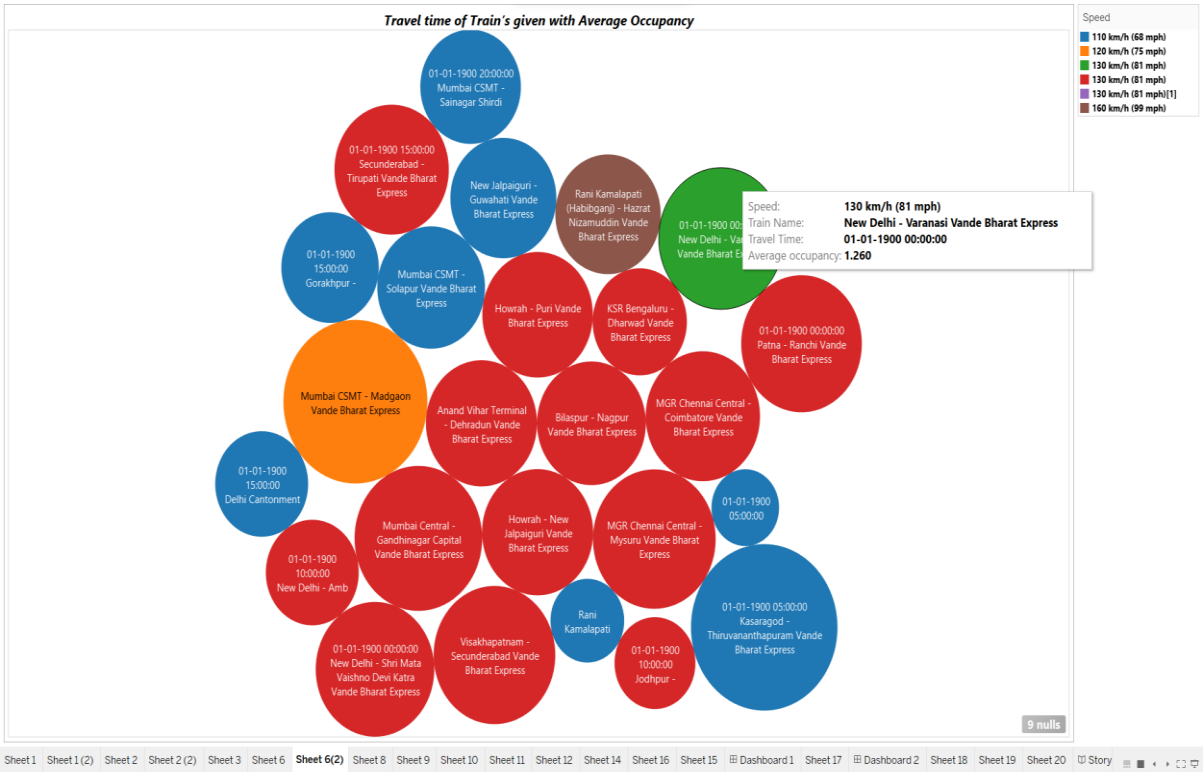


Activity 1.3: Find the distance difference between originating city and Terminal City:

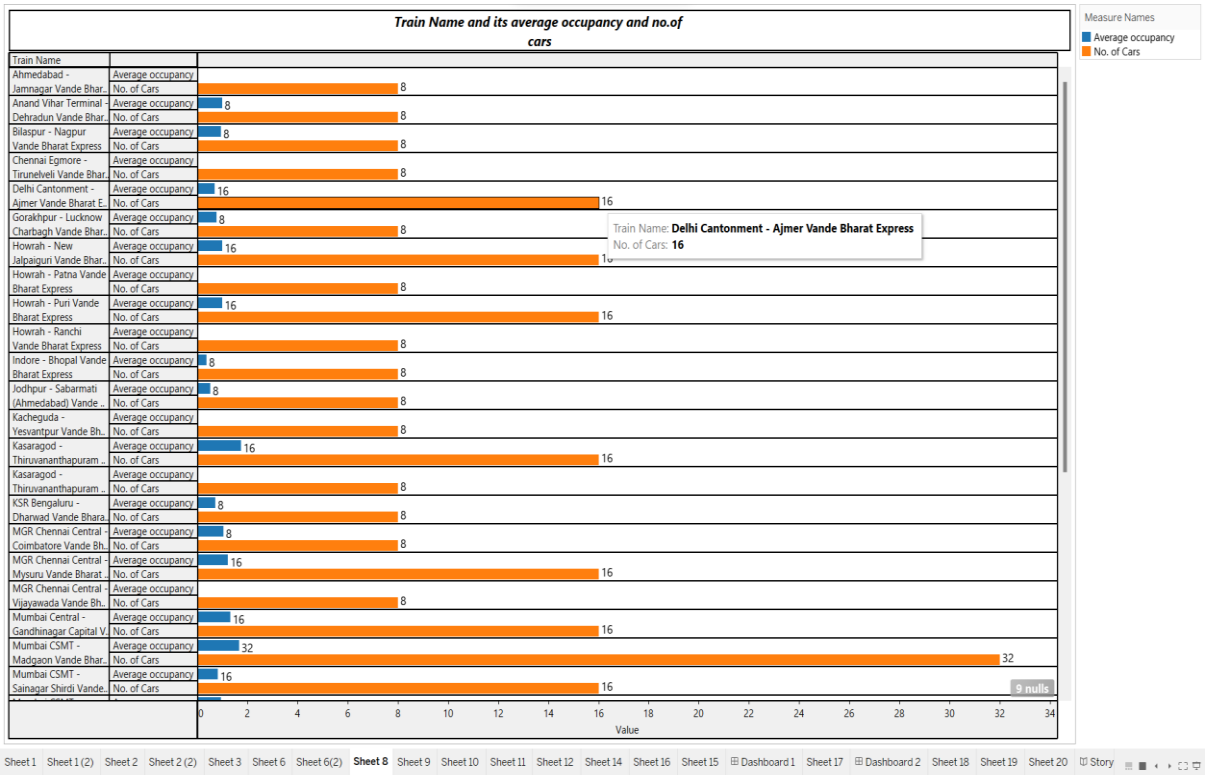


Activity 1.4: Find the Travel time of Train's given:





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



Activity 1.6: Find the (Top-10)Train distance speed and frequency:

Milestone 5: Dashboard

A dashboard is a visual interface that presents information and data in a structured, easily understandable layout. Dashboards are frequently employed for real-time data monitoring and analysis, typically tailored to specific purposes or scenarios. They find application across various sectors, including business, finance, manufacturing, healthcare, and others. Dashboards facilitate the tracking of key performance indicators (KPIs), monitoring performance metrics, and exhibiting data through charts, graphs, and tables.

Activity :1- Responsive and Design of Dashboard

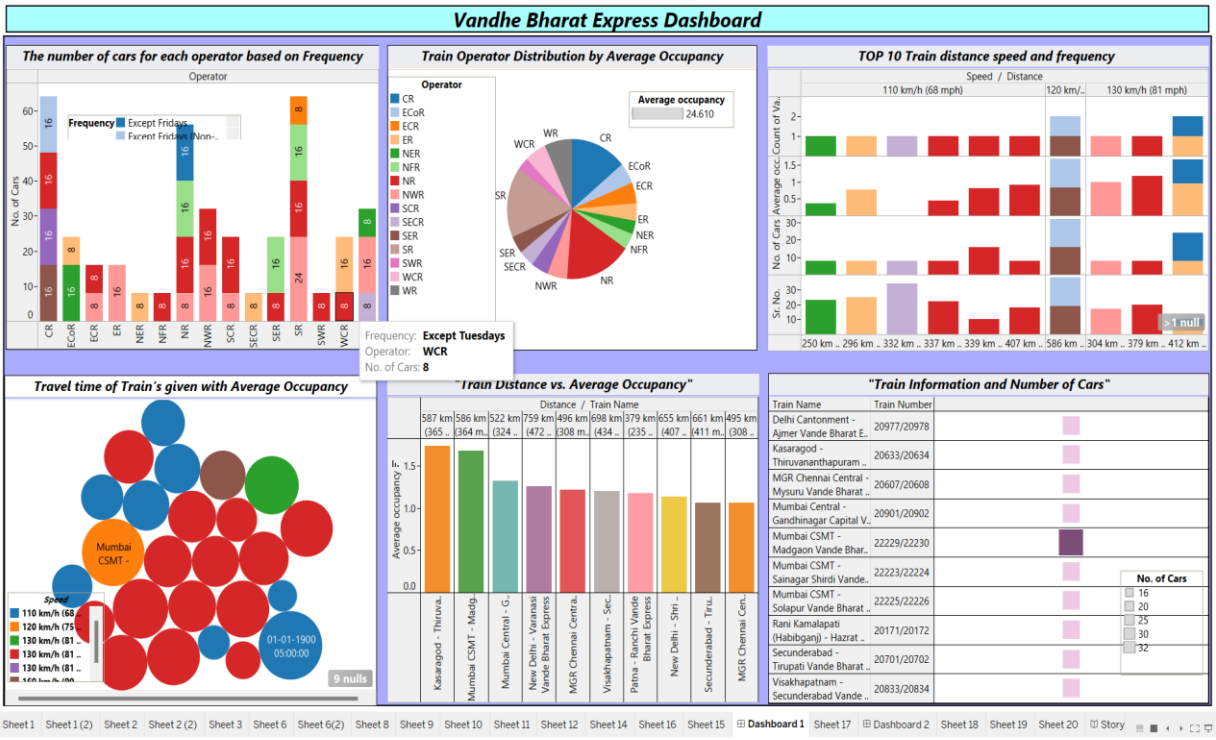
It seems like you're asking about the responsiveness of the Vande Bharat Express. If you're referring to how the train or its components respond to various conditions or inputs, I'll provide some insights based on its design and general expectations for modern high-speed trains.

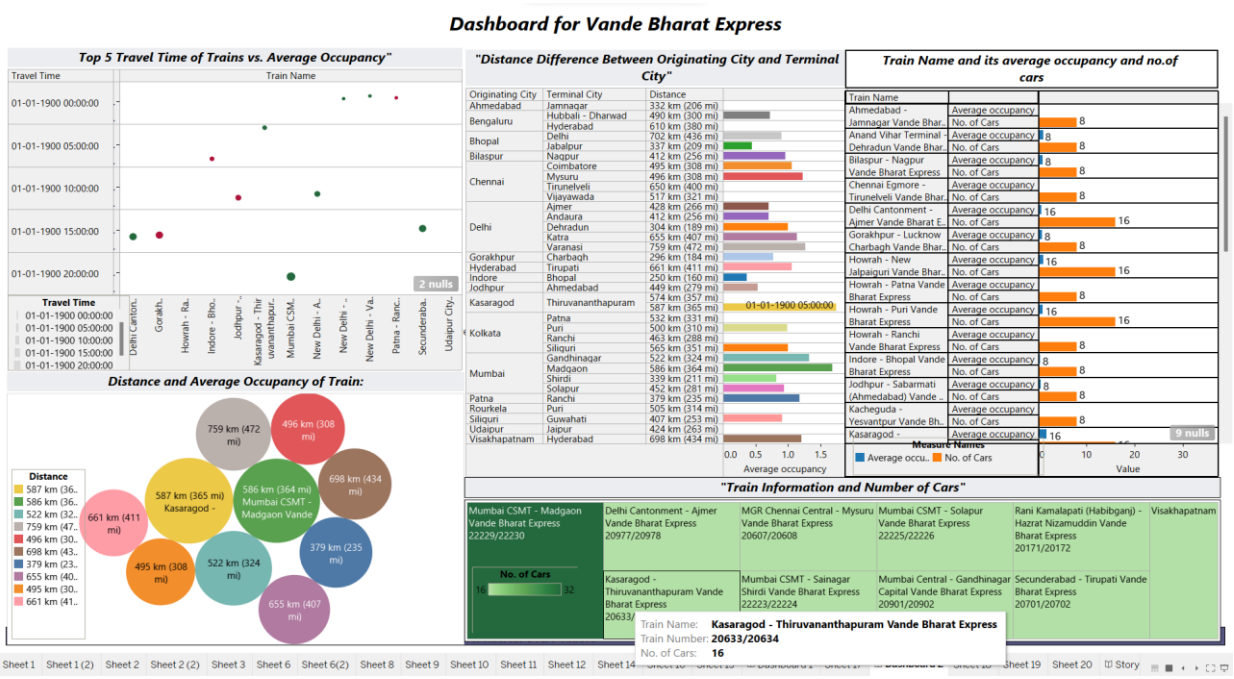
Speed and Acceleration: High-speed trains like the Vande Bharat Express are designed to be responsive in terms of speed and acceleration. Their electric propulsion systems and advanced motors allow them to accelerate quickly and maintain high speeds, providing efficient travel between destinations.

Braking and Deceleration: The train's braking systems are designed to be responsive and efficient. This is essential for maintaining safety, especially when operating at high speeds. The train's braking system should be able to bring the train to a stop within a reasonable distance.

Control Systems: High-speed trains are equipped with advanced control systems that respond to various inputs, ensuring smooth operation. These systems manage speed, acceleration, braking, and other critical functions. Safety Systems: Modern trains are equipped with sophisticated safety systems that respond to emergency situations. These systems can automatically initiate braking or other protective measures to ensure passenger safety.

Safety Systems: Modern trains are equipped with sophisticated safety systems that respond to emergency situations. These systems can automatically initiate braking or other protective measures to ensure passenger safety.

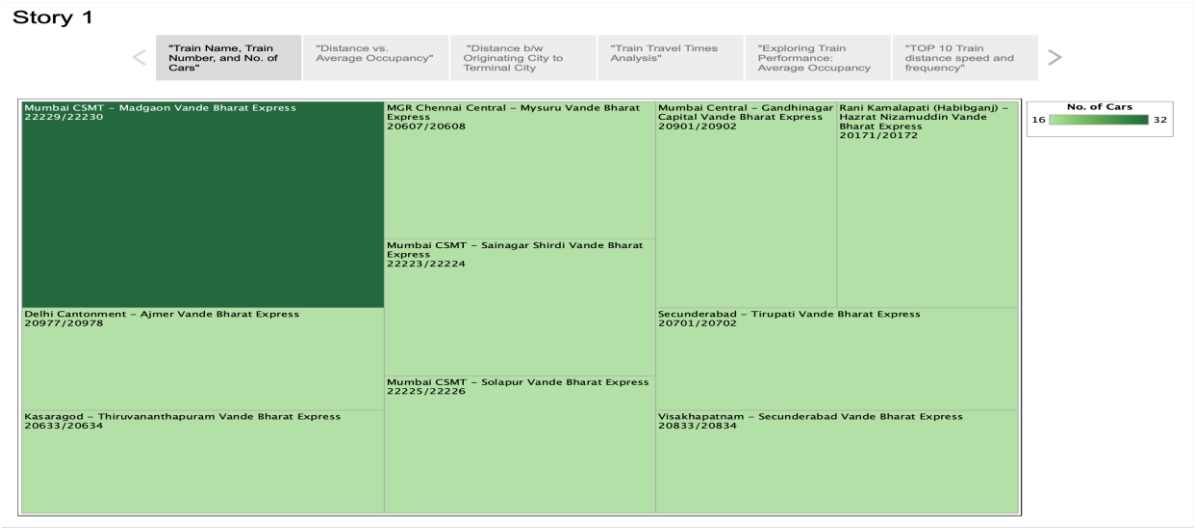




Milestone 6: Story of Vande Bharat Express

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..



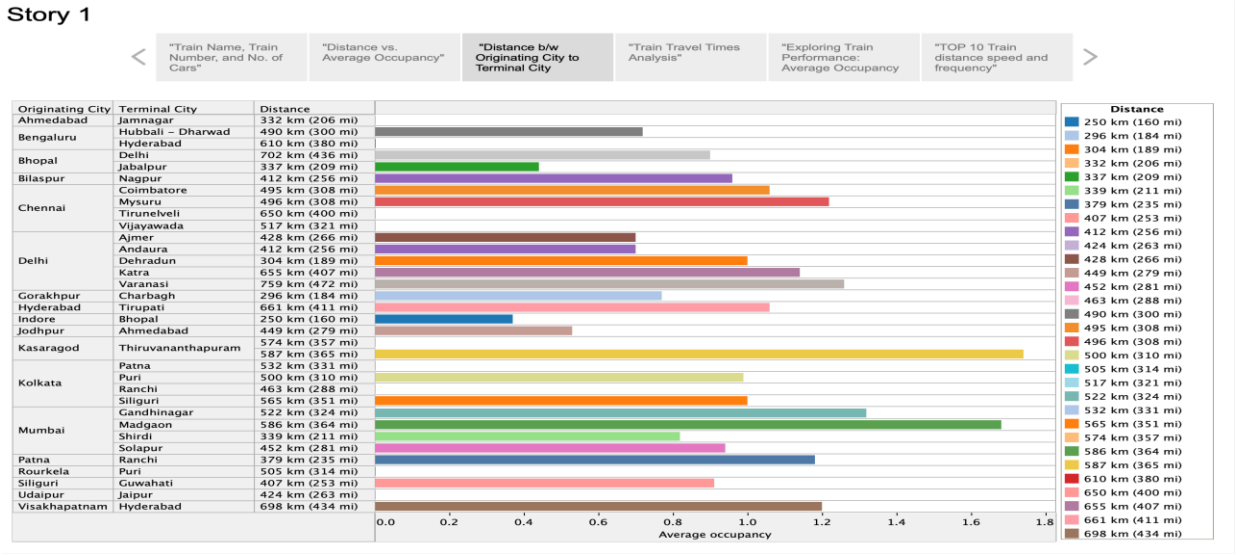
2.Story of Distance and Average Occupancy of Train:

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.

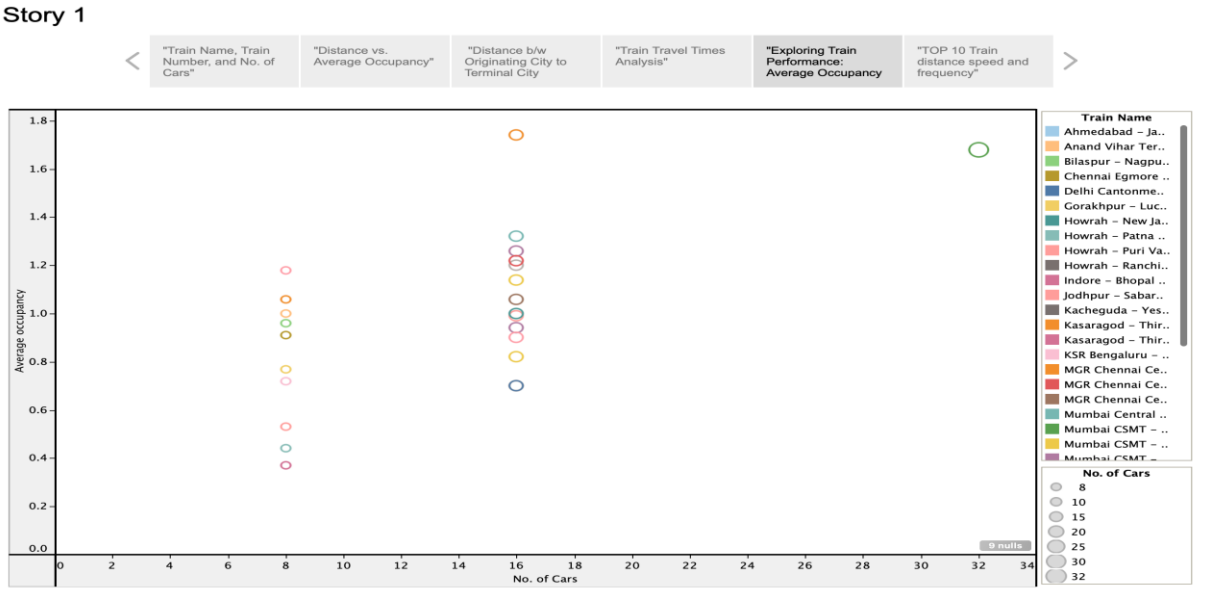


4. Story of Travel Time of Trains Given:

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 8 : completed Visualization names

Activity 1: No of Visualizations/ Graphs

1)Find the Train Name and Train Number and also how many No.of car's are available.

2)Find the Distance and Average Occurancy of Train.
3)Find the Distance Difference between Originating City and Terminal City.
4)Find the Travel Train and Train given.
5)Find the Train Name and its Average Occurancy and No. of Cars.
6)Find the Train Distance Speed and Frequency.