

VISUALIZATION TOOL FOR ELECTRIC VEHICLE CHARGE AND RANGE ANALYSIS-UPDATED

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TEAM GROUP PHOTO



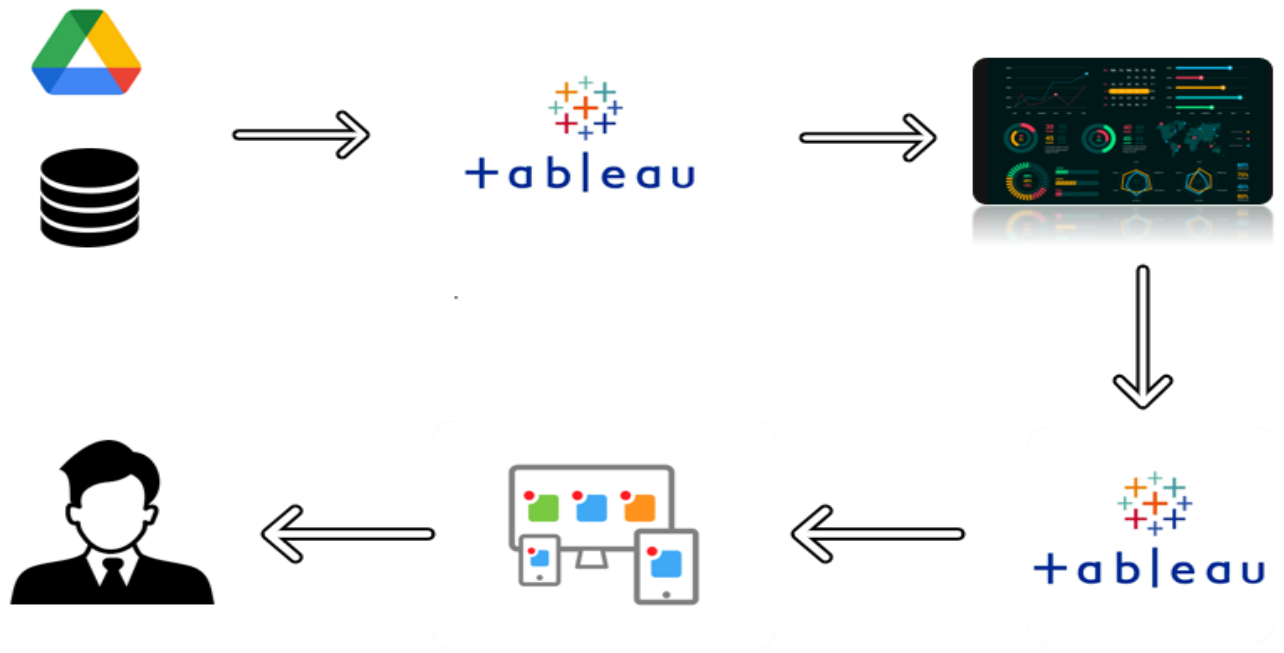
Vehicle Charge and Range Visualization Tool for Electric Analysis

The Electric Vehicle (EV) is not new, but it has been receiving significantly more attention in recent years. Advances in both EV analytics and battery technologies have led to increased automotive market share. However, this growth is not attributed to hardware alone. The modern mechatronic vehicle marries electrical storage and propulsion systems with electronic sensors, controls, and actuators, integrated closely with software, secure data transfer, and data analysis, to form a comprehensive transportation solution. Advances in all these areas have contributed to the overall rise of EV's, but the common thread that runs through all these elements is data analytics.

Problem Statement:

Analysing different data from Multiple sources for Electric cars in India and Globally. We have 4 Different datasets we need to analyse the data and create Dashboard and story that can represent the data and show the Visuals for the data.

Technical Architecture:



Pre requisites

For Completing this project these are some of the prerequisites needed

- A system with a minimum 4GB RAM and 128GB Hard Disk
- Good Internet Connection
- Google Drive / Any of the Database Server with Management Studio
- MySQL:
- <https://youtu.be/2c2fUOgZMmY>
- **SQL Server Management Studio:**
- <https://youtu.be/kGdTg-vGs-E>
- **Tableau Desktop:**
- <https://youtu.be/b3pWYyrHQo8>
- Tableau Public Account: <https://public.tableau.com/app/discover>
- Html, CSS or Bootstrap

Prior Knowledge

To Complete this project, one must understand the below concepts and able to work with the tools

Data Visualization:

- <https://youtu.be/5gpnZvMSTZs>
- **Uni-Variate, Bi- Variate and Multi-Variate Analysis:**
- <https://youtu.be/JG8GRIMjp3c>
- **Chart Types:**
- <https://youtu.be/csXmVBw8cdo>
- **Tableau:**
- <https://youtu.be/aHaOlvR00So>
- **Business Intelligence:**
- <https://youtu.be/Hg8zBJ1DhLQ>

Project Objectives

By the end of this project, you will:

- Able to Connect Tableau with different data sources
- Know fundamental concepts and techniques used for Data Visualization.
- Gain a broad understanding about data and different types of charts.
- Have knowledge on developing Visualizations, Dashboards and Story.
- Able to Integrate the developed dashboard and story with the web application

Project Flow

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

- Data collection
 - Collect the dataset or create the dataset
- Database /Spreadsheet Connection
 - Understand the dataset
 - Import Dataset into the database
 - Connect Tableau Desktop to Database server.
- Visualizing and analysing data
- Understand the Data and the Business Questions
- Based on the Business questions develop the different visualizations
- Dashboard
 - Develop the Dashboard
- Story
 - Develop the Storyboard
- Publishing to the Tableau Public & Web Application Integration
 - Developed Visualizations, Dashboard and story will be published to Tableau Public Account.
 - Once it is published, we will get the shareable links
 - Develop a web application using HTML, CSS or Using Bootstrap
 - Integrate the Visualizations, Dashboard and Story with the Web Application

Data Collection

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.

Downloading the dataset

Please use the link to download the dataset:

<https://drive.google.com/drive/folders/1Rkzdk6Us1Uq2SRB4nxMAb83jN5bpHlI>

Working with Dataset

Here we will start working and understanding the dataset

Understand the data

Data contains all the meta information regarding the columns described in the CSV files. we have provided 4 CSV files:

1. EVIndia
2. Electric_vehicle_charging_station_list
3. ElectricCarData_Clean
4. Cheapestelectriccars-EVDatabase

Column Description for EVIndia:

- Car - Car Brand name and model
- Style Range - Style range of car
- Transmission- Transmission type
- VehicleType – Type of vehicle
- PriceRange(Lakhs) - Price Range in Lakhs
- Capacity - Capacity of car
- BootSpace – Boot space of the car
- BaseModel – Base model name
- TopModel – Top model name

Column Description for Electric_vehicle_charging_station_list:

- region: This column represents the region of the charging station.
- address: This column represents the address of the charging station.
- aux address: This column represents the auxiliary address of the charging station.
- latitude: This column represents the latitude of the charging station.
- longitude: This column represents the longitude of the charging station
- type: This column represents the type of the charging station.

- power: This column represents the power of the charging station.
- service: This column represents the type of service at the charging station.

Column Description for ElectricCarData_Clean:

- Brand
- Model
- AccelSec
- TopSpeed_KmH
- Range_Km
- Efficiency_WhKm
- FastCharge_KmH
- RapidCharge
- PowerTrain
- PlugType
- BodyStyle
- Segment
- Seats
- PriceEuro

Column Description for Cheapestelectriccars-EVDatabase:

- Name
- Subtitle
- Acceleration
- TopSpeed
- Range
- Efficiency
- FastChargeSpeed
- Drive
- NumberofSeats
- PriceinGermany
- PriceinUK

Import Dataset into Database

Explanation video link: [Database creation](#)

Explanation video link: [Basic SQL Operations](#)

Connect Tableau Desktop to Database server

Explanation video link: [Link](#)

Data Preparation

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.

Link: https://drive.google.com/file/d/1IAMzG-Cut2uKqrYv7Z1gHtBJZ7XtM1YT/view?usp=share_link **Data Visualization**

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. Data visualisation aims 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.

Charging Stations by region and type in India

Explanation video

link: https://drive.google.com/file/d/1QuWuNC6S0wd04n8kCH_Z7Bo9PnZZvaEK/view?usp=share_link

EV Charging stations map of India

Explanation video link: https://drive.google.com/file/d/1JgMlZ7pKEIoYvOe5X0v59kmVTFZ-nSQV/view?usp=share_link

Different EV cars in India

Explanation video link: https://drive.google.com/file/d/1PvVm2oqr8j1ERO2luaNUcsROI3QY2ffC/view?usp=share_link

Top speed for different Brands

Explanation video

link: https://drive.google.com/file/d/1VXW8C9b4ycVHaEXnAJoBgB_N_miSI9V/view?usp=share_link

Price for different cars in India

Explanation video

link: https://drive.google.com/file/d/115HwkYlphwVgQGu8LHxBmuJJKH9dyfhp/view?usp=share_link

Top 10 most efficient EV Brands

Explanation video

link: https://drive.google.com/file/d/1EhhapHlPsEqEE21e_2sLHQtr0VDXt8d/view?usp=share_link

Brands according to Bodystyle

Explanation video link: https://drive.google.com/file/d/16KiZpHu-mldDb88ggZ8ZzvrOqpAJw8gg/view?usp=share_link

Brand filtered by PowerTrain type

Explanation video link: https://drive.google.com/file/d/1Gnrj7h6A7il6p26TLTNfRVQTYnREoQwn/view?usp=share_link

No of models by each brand

Explanation video link: https://drive.google.com/file/d/1-FZplgBanEa6HHql9M-lu6YchyQszskC/view?usp=share_link

Summary card for Different brands of EV Cars globally

Explanation video

link: https://drive.google.com/file/d/1CaL3ZLOypWIH77xmabJg4K8fKNlxaVtH/view?usp=share_link

Summary card for Different brands of EV Cars in India

Explanation video

link: https://drive.google.com/file/d/1C61Jxi4jOCdoVbrRNWluDSJse6dguMPS/view?usp=share_link

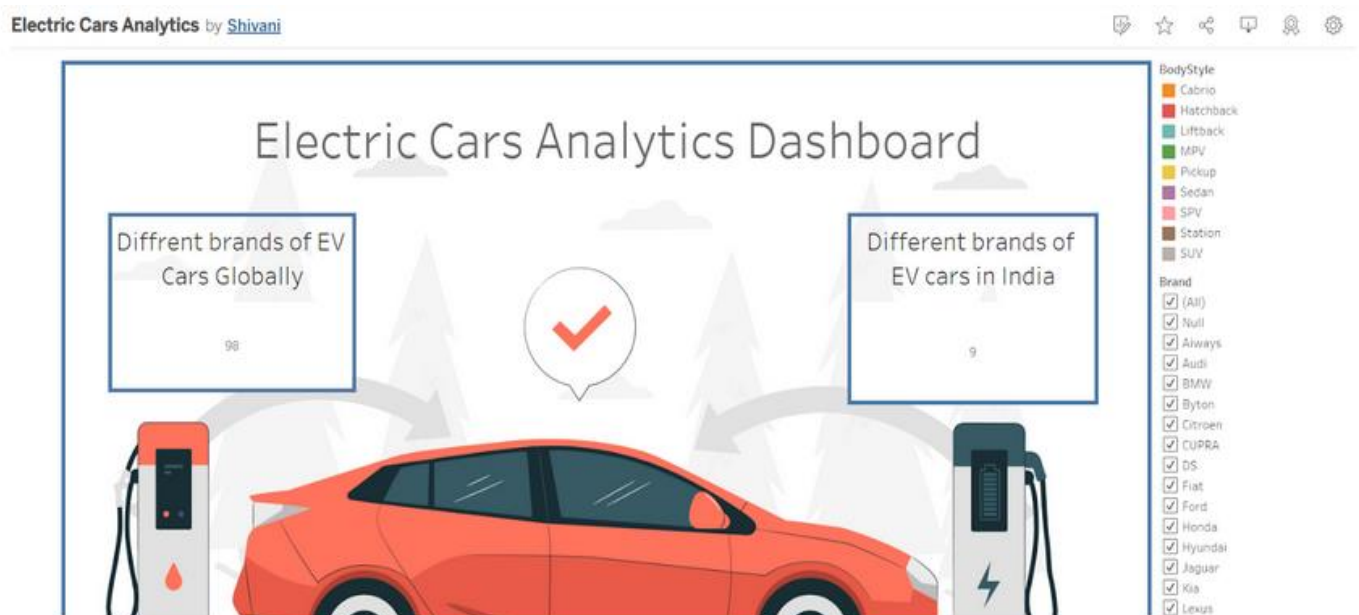
Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Creating the Dashboard

Once you have created views on different sheets in Tableau, you can pull them into a dashboard.

Explanation video link: [Link](#)



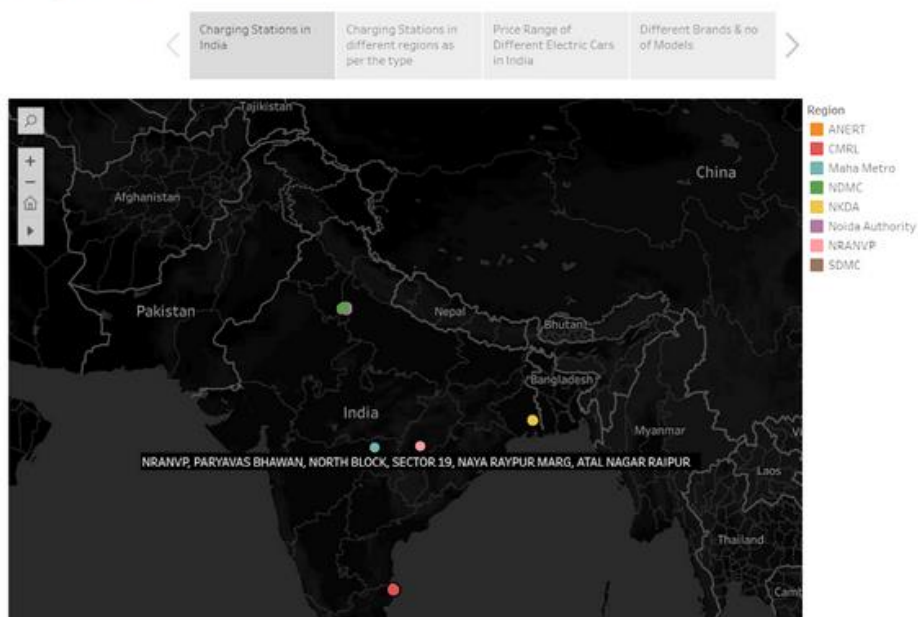
Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

Creating the story board

Explanation video link: [Link](#)

Story of Electric Cars In India

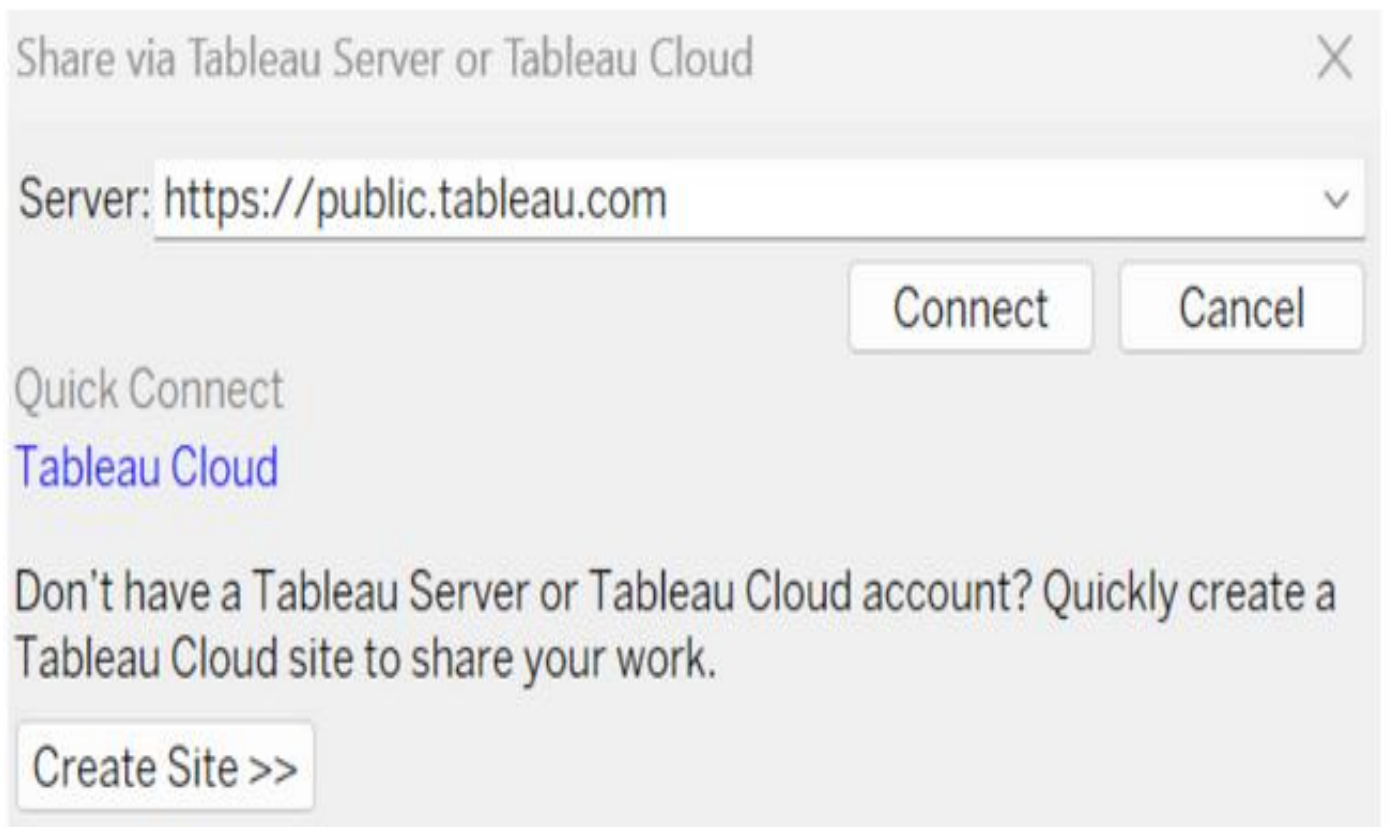


Publishing and Web integration

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

Publishing dashboard and reports to tableau public

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



Share via Tableau Server or Tableau Cloud

Server:

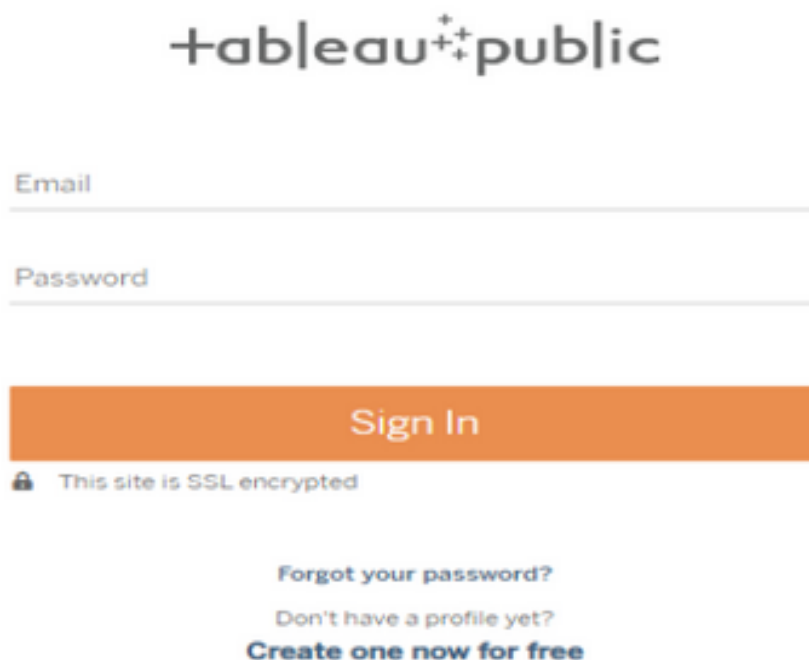
Quick Connect
Tableau Cloud

Don't have a Tableau Server or Tableau Cloud account? Quickly create a Tableau Cloud site to share your work.

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

Explanation Video:- [Link](#)


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



tableau+public

Email

Password

 This site is SSL encrypted

[Forgot your password?](#)
[Don't have a profile yet?](#)
[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 publish the visualization to the public, respective sheet will get published where you click on share option

Embed Dashboard & Story with Web Bootstrap

Explanation video link: [Link](#)