Visualization Tool for Electric Vehicle Charge and Range Analysis

1. INTRODUCTION

Project Description

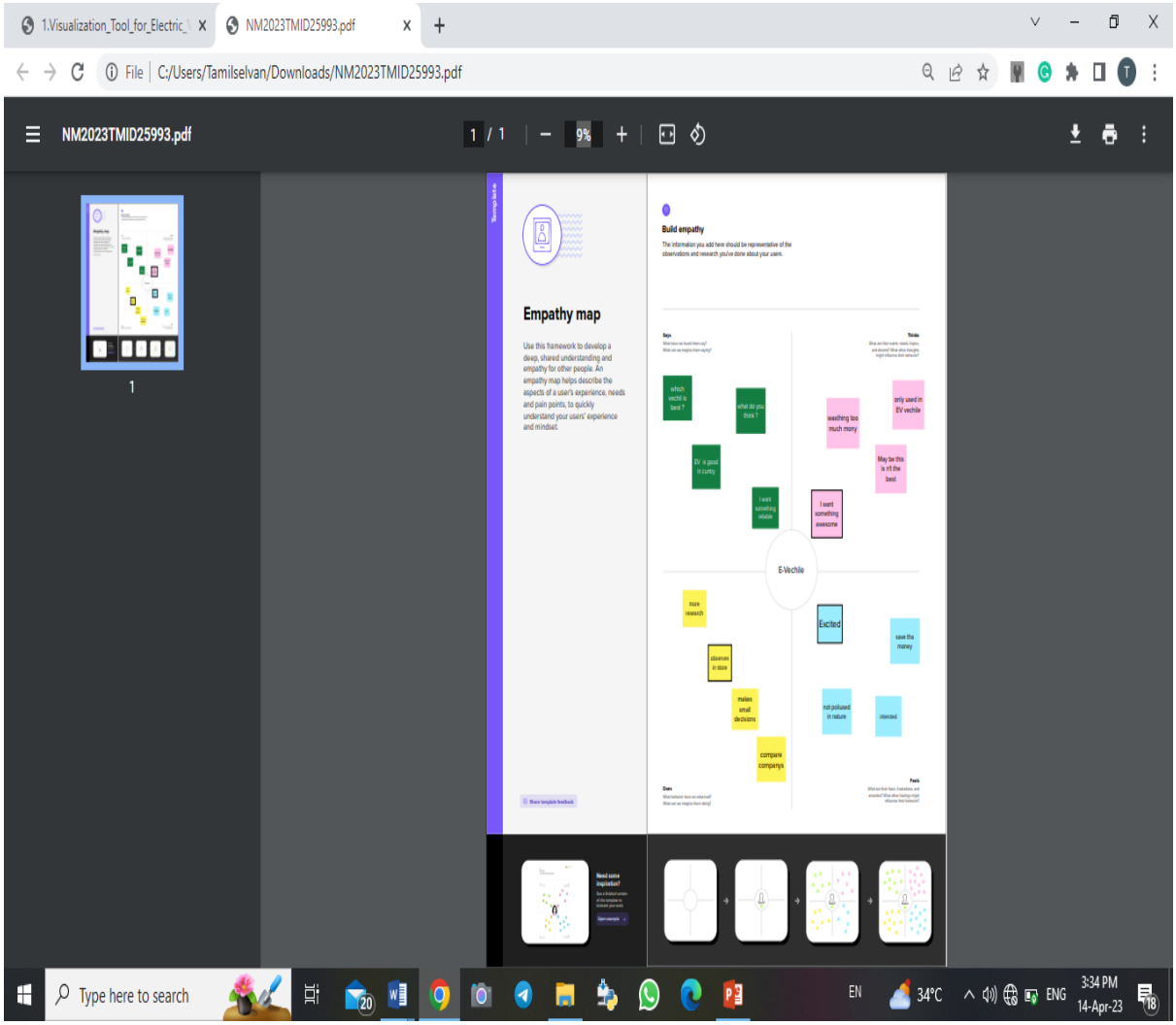
A Vehicle That Can Be Powered By An Electric Motor That Draws Electricity From A Battery And Is Capable Of Being Charged From An External Source And Have An Electric Motor Instead Of An Internal Combustion Engine. The Electric Vehicle (EV) Is Not New, But It Has Been Receiving Significantly More Attention 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. The New EV's Are Combined Electrical Storage And Propulsion Systems With Electronic Sensors, Controls, And Actuators, Integrated Closely With Software, Secure Data Transfer To Form A Comprehensive Transportation Solution.

Purpose

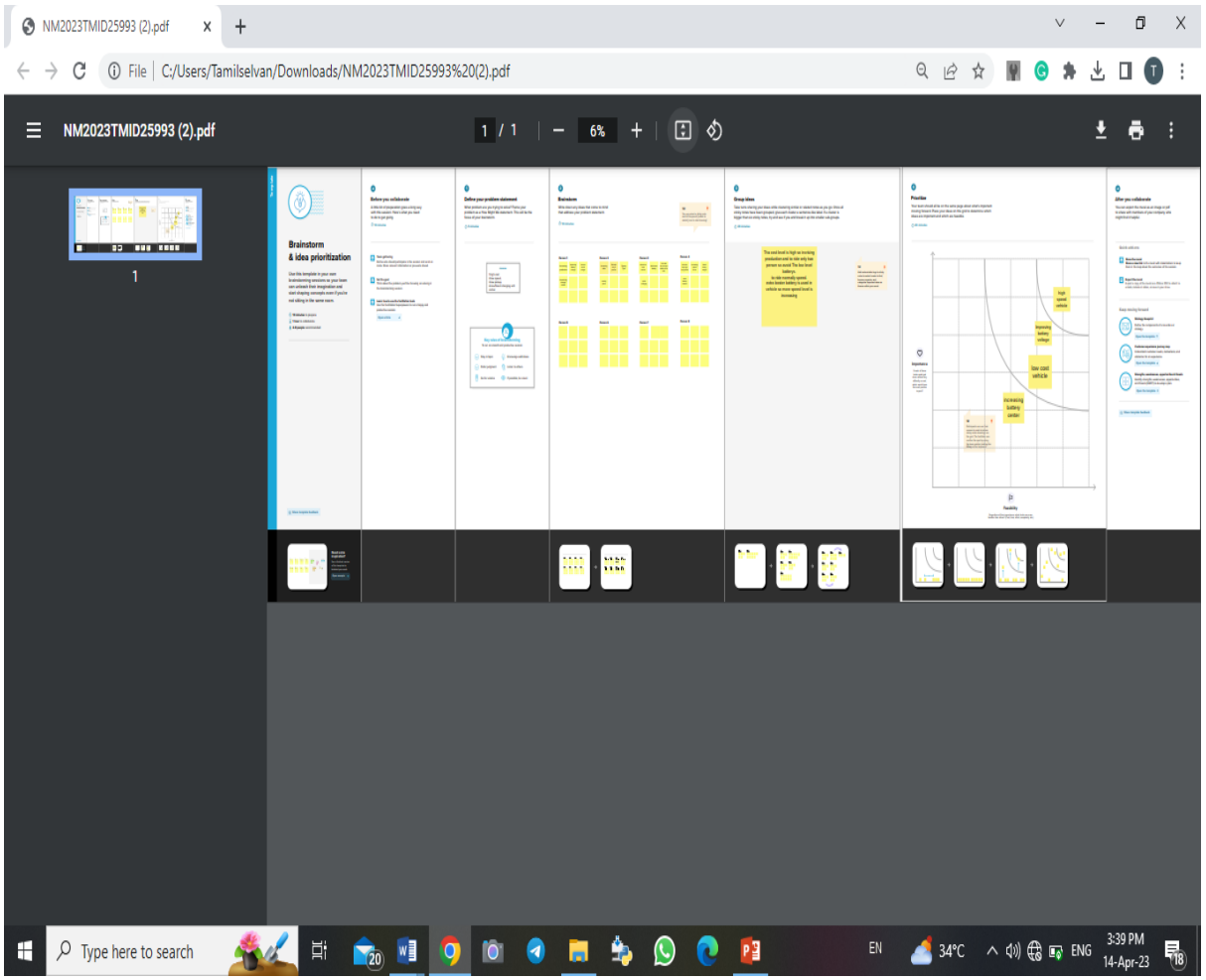
Tha Use Of This Project Learn And Find Tha Datas

2. PROBLEM DEFINITION &DESIGN THINKING

Empathy map

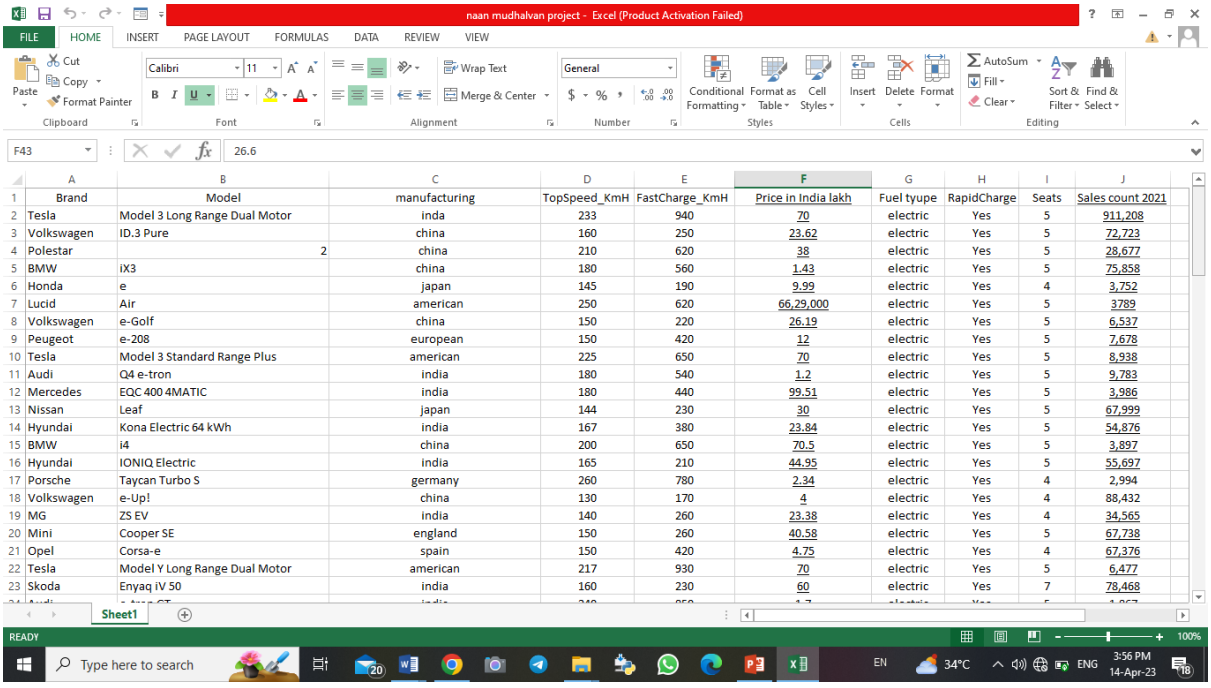


Brainstorming Map



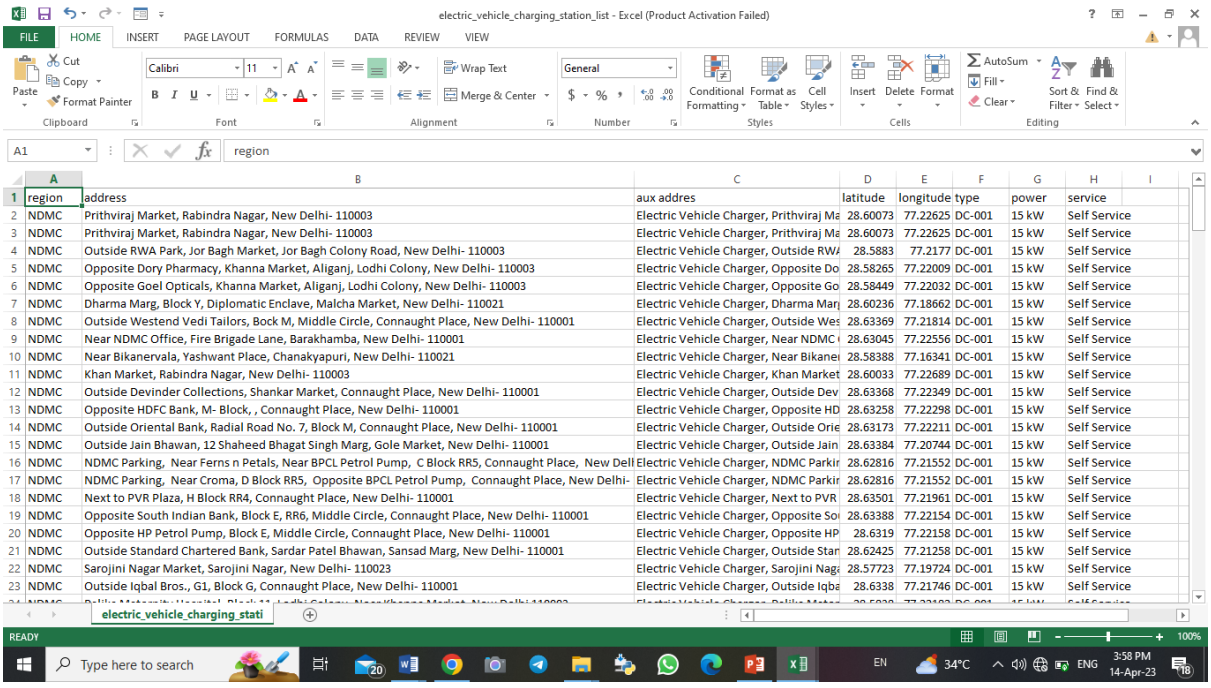
3. RESULT

MY EXCEL FILE



naan mudhalvan project - Excel (Product Activation Failed)

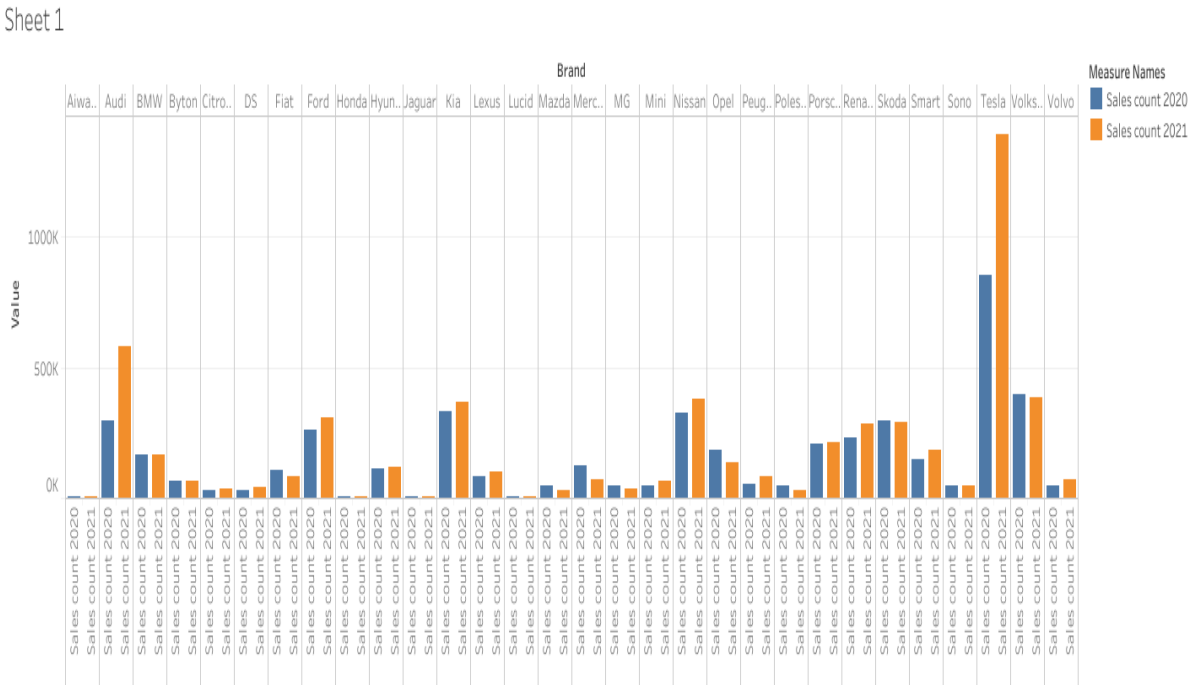
Brand	Model	manufacturing	TopSpeed_KmH	FastCharge_KmH	Price in India lakh	Fuel tuype	RapidCharge	Seats	Sales count 2021
Tesla	Model 3 Long Range Dual Motor	inda	233	940	70	electric	Yes	5	911,208
Volkswagen	ID.3 Pure	china	160	250	23.62	electric	Yes	5	72,723
Polestar	2	china	210	620	38	electric	Yes	5	28,677
BMW	iX3	china	180	560	1.43	electric	Yes	5	75,858
Honda	e	japan	145	190	9.99	electric	Yes	4	3,752
Lucid	Air	american	250	620	66,29,000	electric	Yes	5	3789
Volkswagen	e-Golf	china	150	220	26.19	electric	Yes	5	6,537
Peugeot	e-208	european	150	420	12	electric	Yes	5	7,678
Tesla	Model 3 Standard Range Plus	american	225	650	70	electric	Yes	5	8,938
Audi	Q4 e-tron	india	180	540	1.2	electric	Yes	5	9,783
Mercedes	EQC 400 4MATIC	india	180	440	99.51	electric	Yes	5	3,986
Nissan	Leaf	japan	144	230	30	electric	Yes	5	67,999
Hyundai	Kona Electric 64 kWh	india	167	380	23.84	electric	Yes	5	54,876
BMW	i4	china	200	650	70.5	electric	Yes	5	3,897
Hyundai	IONIQ Electric	india	165	210	44.95	electric	Yes	5	55,697
Porsche	Taycan Turbo S	germany	260	780	2.34	electric	Yes	4	2,994
Volkswagen	e-Up!	china	130	170	4	electric	Yes	4	88,432
MG	ZS EV	india	140	260	23.38	electric	Yes	4	34,565
Mini	Cooper SE	england	150	260	40.58	electric	Yes	5	67,738
Opel	Corsa-e	spain	150	420	4.75	electric	Yes	4	67,376
Tesla	Model Y Long Range Dual Motor	american	217	930	70	electric	Yes	5	6,477
Skoda	Enyaq iV 50	india	160	230	60	electric	Yes	7	78,468



electric_vehicle_charging_station_list - Excel (Product Activation Failed)

region	address	aux addres	latitude	longitude	type	power	service
NDMC	Prithviraj Market, Rabindra Nagar, New Delhi- 110003	Electric Vehicle Charger, Prithviraj Ma	28.60073	77.22625	DC-001	15 kW	Self Service
NDMC	Prithviraj Market, Rabindra Nagar, New Delhi- 110003	Electric Vehicle Charger, Prithviraj Ma	28.60073	77.22625	DC-001	15 kW	Self Service
NDMC	Outside RWA Park, Jor Bagh Market, Jor Bagh Colony Road, New Delhi- 110003	Electric Vehicle Charger, Outside RWA	28.5883	77.2177	DC-001	15 kW	Self Service
NDMC	Opposite Dory Pharmacy, Khanna Market, Aliganj, Lodhi Colony, New Delhi- 110003	Electric Vehicle Charger, Opposite Do	28.58265	77.22009	DC-001	15 kW	Self Service
NDMC	Opposite Goel Opticals, Khanna Market, Aliganj, Lodhi Colony, New Delhi- 110003	Electric Vehicle Charger, Opposite Go	28.58449	77.22032	DC-001	15 kW	Self Service
NDMC	Dharma Marg, Block Y, Diplomatic Enclave, Malcha Market, New Delhi- 110021	Electric Vehicle Charger, Dharma Mar	28.60236	77.18662	DC-001	15 kW	Self Service
NDMC	Outside Westend Vedi Tailors, Bock M, Middle Circle, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Outside Wes	28.63369	77.21814	DC-001	15 kW	Self Service
NDMC	Near NDMC Office, Fire Brigade Lane, Barakhamba, New Delhi- 110001	Electric Vehicle Charger, Near NDMC	28.63045	77.22556	DC-001	15 kW	Self Service
NDMC	Near Bikanervala, Yashwant Place, Chanakyapuri, New Delhi- 110021	Electric Vehicle Charger, Near Bikane	28.58388	77.16341	DC-001	15 kW	Self Service
NDMC	Khan Market, Rabindra Nagar, New Delhi- 110003	Electric Vehicle Charger, Khan Market	28.60033	77.22689	DC-001	15 kW	Self Service
NDMC	Outside Devinder Collections, Shankar Market, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Outside Dev	28.63368	77.22349	DC-001	15 kW	Self Service
NDMC	Opposite HDFC Bank, M- Block, , Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Opposite HD	28.63258	77.22298	DC-001	15 kW	Self Service
NDMC	Outside Oriental Bank, Radial Road No. 7, Block M, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Outside Orie	28.63173	77.22211	DC-001	15 kW	Self Service
NDMC	Outside Jain Bhawan, 12 Shaheed Bhagat Singh Marg, Gole Market, New Delhi- 110001	Electric Vehicle Charger, Outside Jain	28.63384	77.20744	DC-001	15 kW	Self Service
NDMC	NDMC Parking, Near Ferns n Petals, Near BPCL Petrol Pump, C Block RR5, Connaught Place, New Dell	Electric Vehicle Charger, NDMC Parkir	28.62816	77.21552	DC-001	15 kW	Self Service
NDMC	NDMC Parking, Near Croma, D Block RR5, Opposite BPCL Petrol Pump, Connaught Place, New Delhi-	Electric Vehicle Charger, NDMC Parkir	28.62816	77.21552	DC-001	15 kW	Self Service
NDMC	Next to PVR Plaza, H Block RR4, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Next to PVR	28.63501	77.21961	DC-001	15 kW	Self Service
NDMC	Opposite South Indian Bank, Block E, RR6, Middle Circle, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Opposite So	28.63388	77.22154	DC-001	15 kW	Self Service
NDMC	Opposite HP Petrol Pump, Block E, Middle Circle, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Opposite HP	28.6319	77.22158	DC-001	15 kW	Self Service
NDMC	Outside Standard Chartered Bank, Sardar Patel Bhawan, Sansad Marg, New Delhi- 110001	Electric Vehicle Charger, Outside Star	28.62425	77.21258	DC-001	15 kW	Self Service
NDMC	Sarojini Nagar Market, Sarojini Nagar, New Delhi- 110023	Electric Vehicle Charger, Sarojini Nag	28.57723	77.19724	DC-001	15 kW	Self Service
NDMC	Outside Iqbal Bros., G1, Block G, Connaught Place, New Delhi- 110001	Electric Vehicle Charger, Outside Iqba	28.6338	77.21746	DC-001	15 kW	Self Service

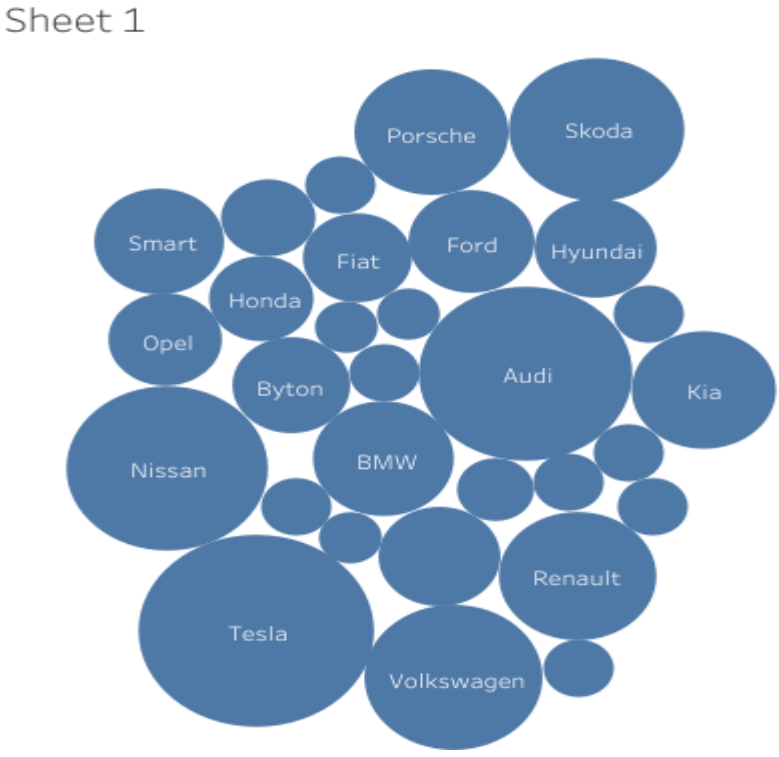
side-by-side bars try



Columns - brand

Rows - Seals count in 2021,2020

Packed bubble try



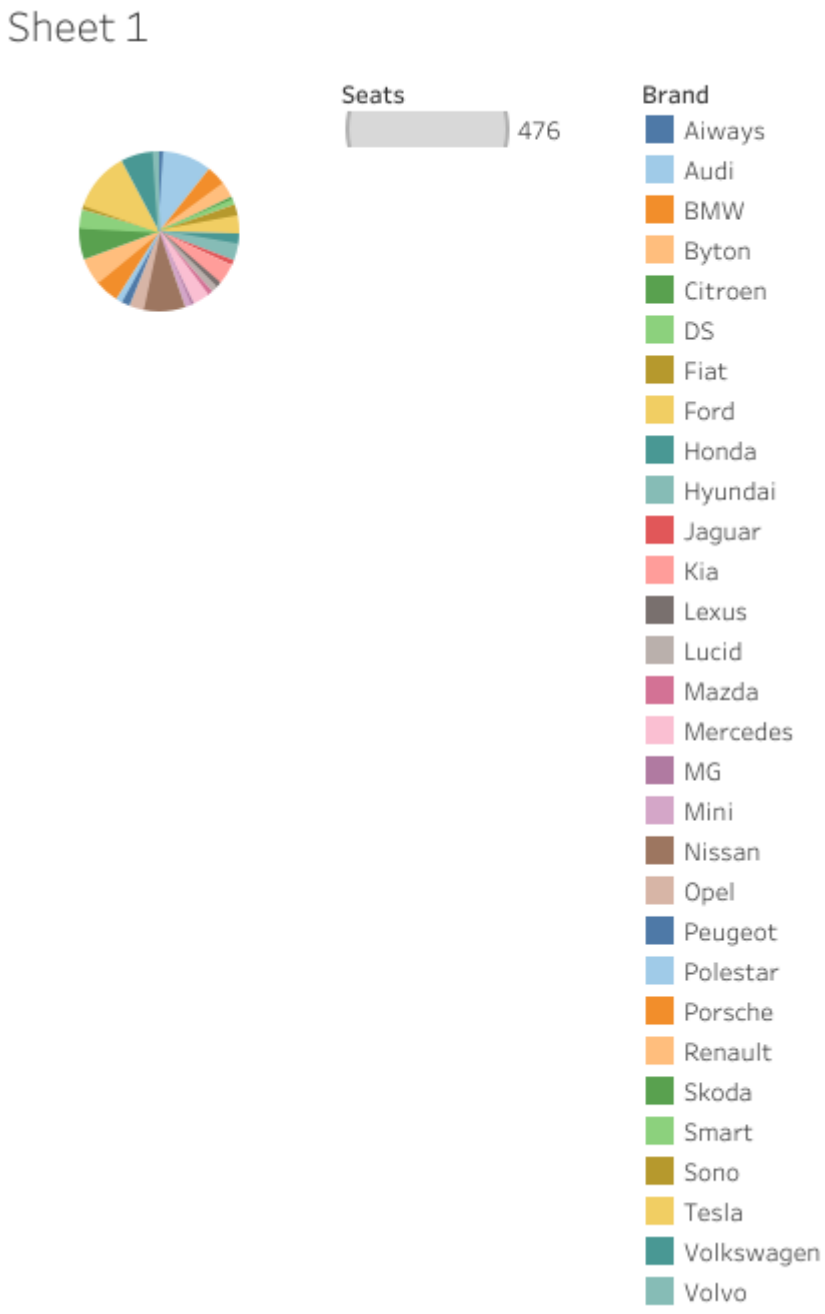
Columns - brand

Rows - Seals count in 2021,2020

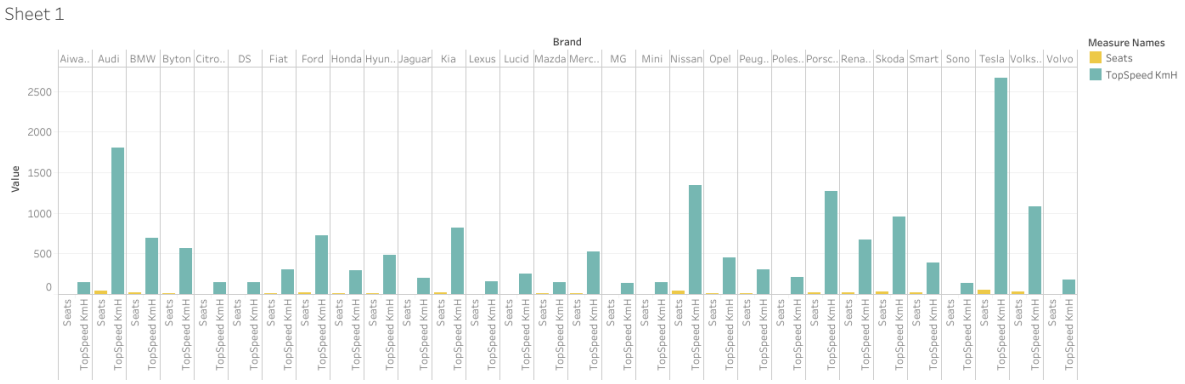
Pie charts try

Columns - brand

Rows - seats



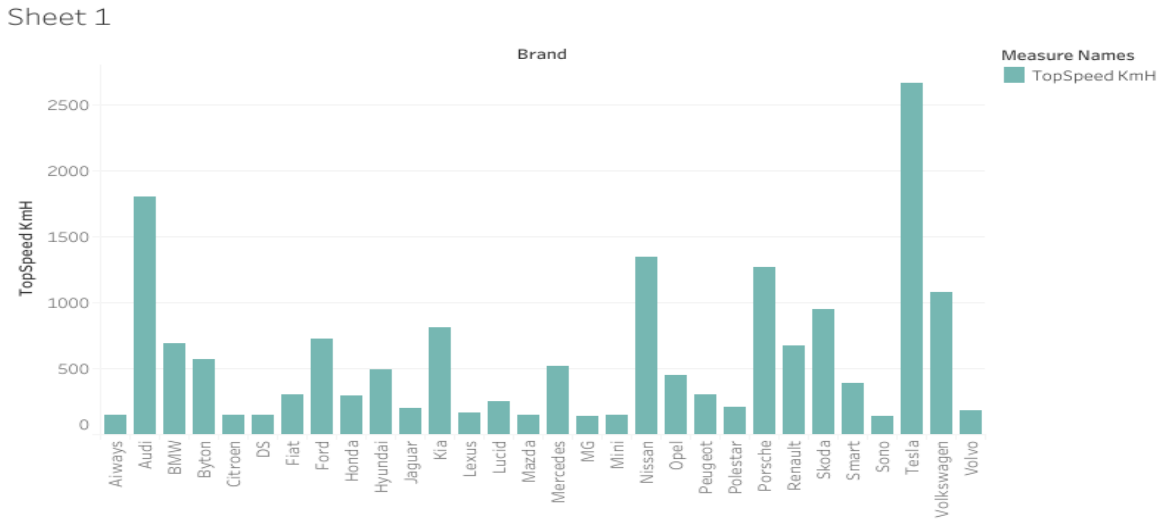
side-by-side bars try



Columns - brand

Rows - seats,Top speed k/m

Stacked bars try



Columns - brand

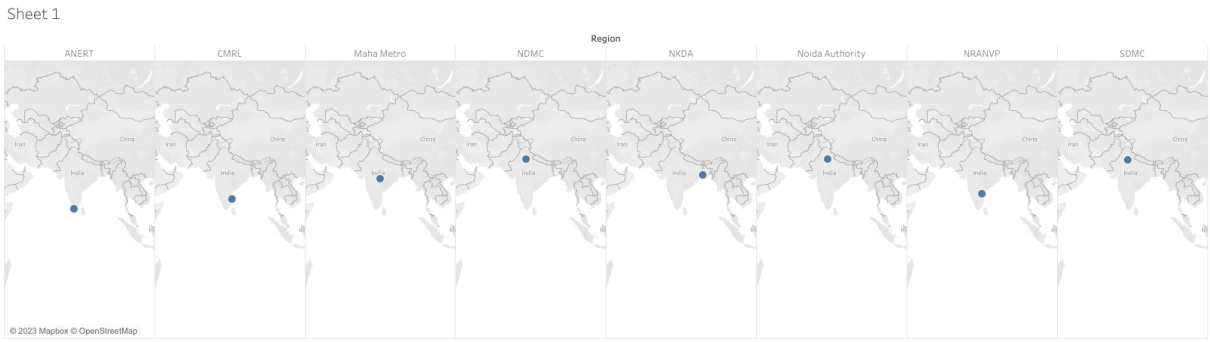
Rows - Top speed k/m

Charging Station

Heat map try

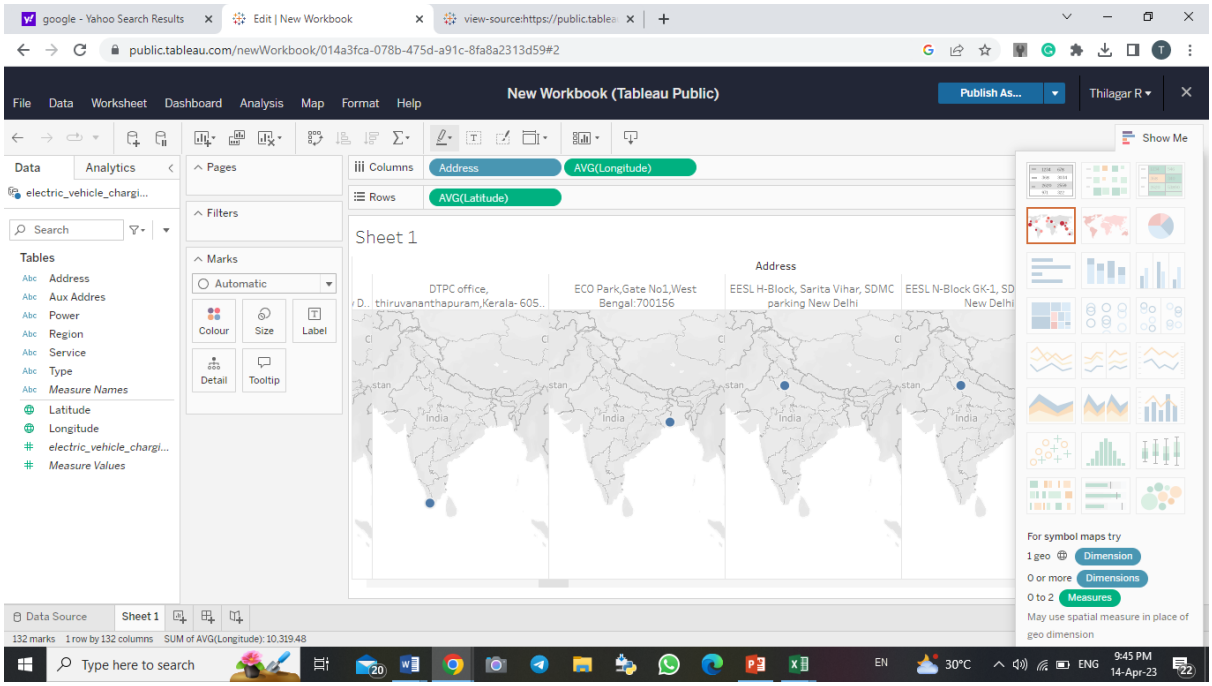
Columns – Region , longitude

Rows - latitude



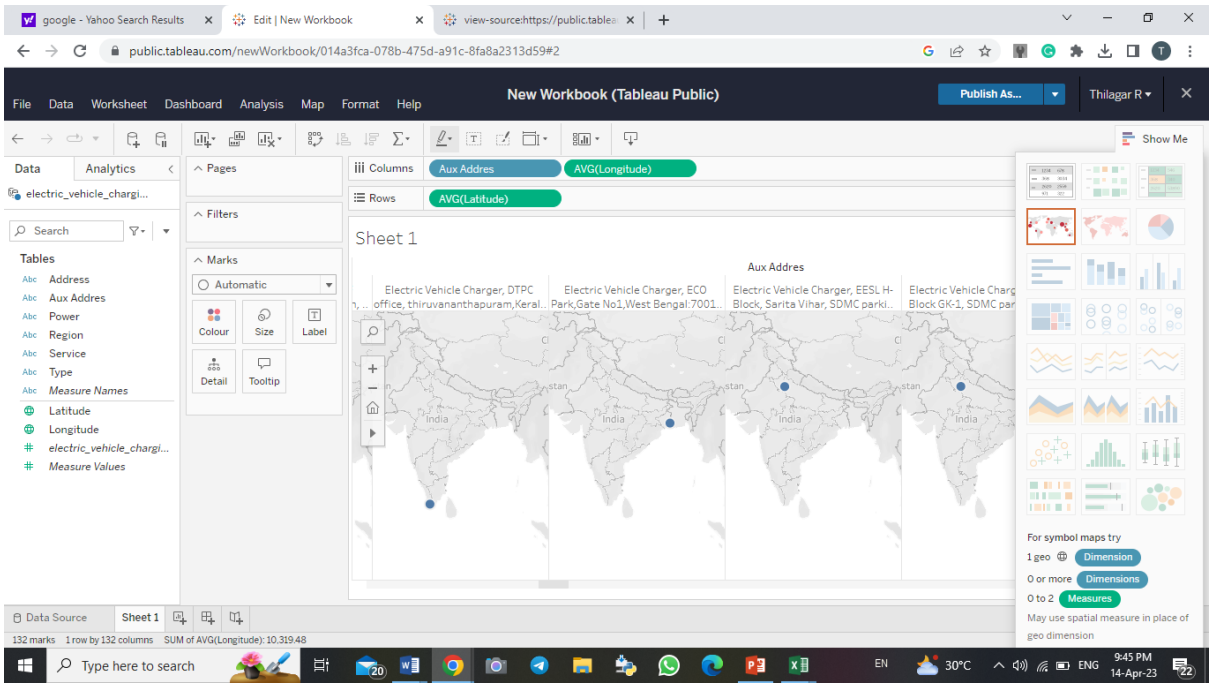
Columns – address, longitude

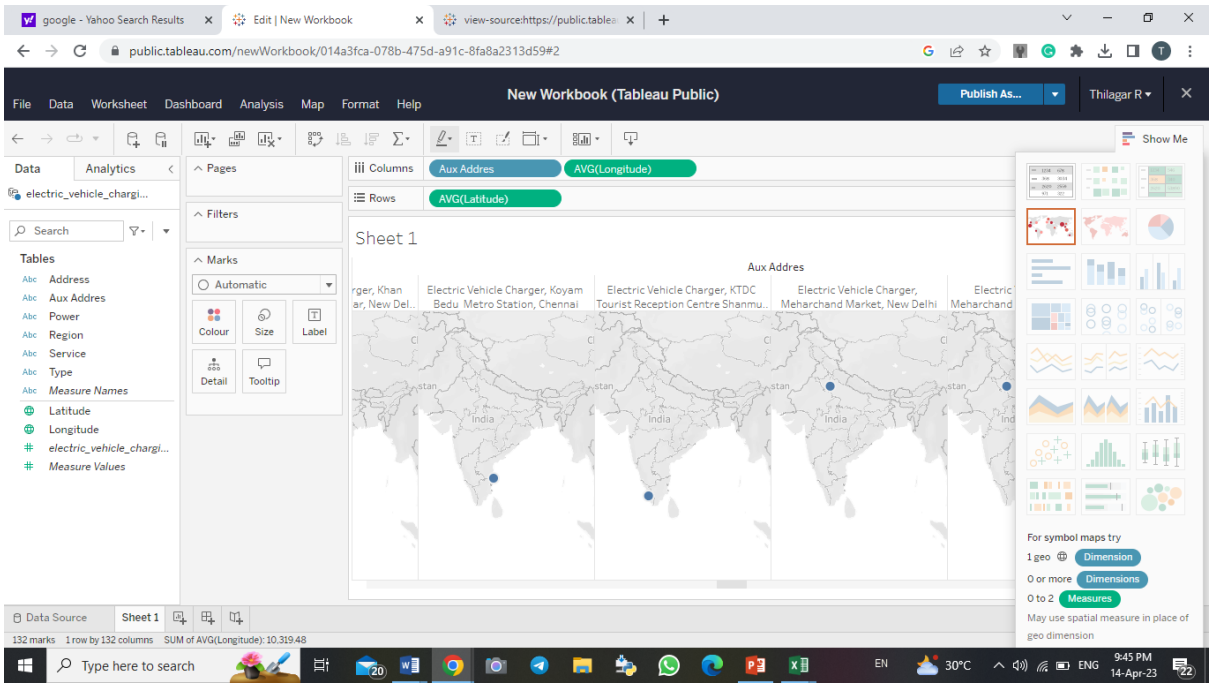
Rows - latitude



Columns – aux address , longitude

Rows - latitude





4. Advantages And Disadvantages

Advantages Of Electric Vehicles

Eco-Friendly: Because Electric Vehicles Do Not Utilize Fuel For Combustion, There Are No Emissions Or Gas Exhaust. Vehicles That Run On Fossil Fuels Contribute Significantly To Hazardous Gas Accumulation In The Environment, Thus Driving An Electric Car Can Help Contribute To A Cleaner Environment.

Renewable Energy Source: Electric Vehicles Run On Renewable Power, Whereas Conventional Automobiles Function On The Combustion Of Fossil Fuels, Which Reduces The World's Fossil-Fuel Stocks.

Less Noise And Smoother Motion: Driving An Electric Car Is Significantly Smoother. Because They Lack Fast-Moving Elements, They Are Quieter And Produce Less Noise.

Cost-Effective: Electricity Is Far Less Expensive Than Fuels Such As Gasoline And Diesel, Which Are Subject To Regular Price Increases. When Solar Electricity Is Utilized At Home, Battery Recharging Is Cost-Effective.

Low Maintenance: Because Electric Cars Have Fewer Moving Components, Wear And Tear Is Reduced When Compared To Traditional Auto Parts. Repairs Are Also Simpler And Less Expensive Than Combustion Engines.

Government Support: Governments Throughout The World Have Granted Tax Breaks To Encourage People To Drive Electric Vehicles As Part Of A Green Program.

Disadvantages Of Electric Vehicles

High Initial Cost: Electric Vehicles Continue To Be Quite Expensive, And Many Buyers Believe They Are Not As Inexpensive As Traditional Automobiles.

Charging Station Limitations: People Who Need To Travel Long Distances Are Concerned About Finding Adequate Charging Stations In The Middle Of Their Journey, Which Are Not Always Accessible.

Recharging Takes Time: Unlike Conventional Automobiles, Which Require Only A Few Minutes To Replenish Their Gas Tanks, Charging An Electric Vehicle Takes Many Hours.

Limited Options: Currently, There Aren't Many Electric Car Models To Pick From In Terms Of Appearance, Style, Or Customized Variations.

Less Driving Range: When Compared To Conventional Automobiles, Electric Vehicles Have A Shorter Driving Range. Electric Cars Can Be Convenient For Short-Distance Travel But Are Inconvenient For Long-Distance Travel.

5. Application

Data

Applications Are Used Every Day In Every Aspect Of Our Lives, Yet We Often Overlook That Most Of Them Are Simply Fancy Guis (Or Graphical User Interfaces) Wrapped Around Data. The Challenge Workbook Is No Different. In Fact, It Connects To A Small Excel Table With Only Five Columns.

Creating The Data To Drive Your Tableau Application Is The First And Most Important Step. It's Important To Have A Clear Understanding Of How Each Component Of Data Should Be Used In The Application. That Way, You Can Build A Data Set That's As Lightweight As Possible And Simple To Modify In The Future.

This Image Shows The Data Set I Used For The Challenge Workbook:

And This Image Shows Where Each Column Appears In The Application:

All Of The Images And Files You Want To Link To Should Be Hosted On A Web Server. If You Are Just Making A Local Application To Run On Your Computer, They Can Be In A Local Folder. You Can Learn More About Other Options For Using Images In Tableau Here. I Host All Images And Documents On Bluehost So That I Can Link To Them From Tableau Public.

Framework

Once The Data Is Ready To Go, Load It Into Tableau And Build The Framework Of The Application. In My Workbook, The Framework Is Comprised Of Six Separate Sheets. Three Of The Sheets Are Lists Of The Challenge Names, Categories, And Questions. Two Of The Sheets Are Buttons For Downloading The Challenge And Solution Workbooks. The Last Sheet Is A Web Page Object Dragged Into The Dashboard (Be Sure To Leave The Url Blank). Drag All Of These Sheets Into A New Dashboard Without Worrying About Formatting At This Point.

Buttons

You Can Make Buttons In Tableau By Putting Number Of Records On Text In A Blank Sheet, Then Editing The Text.

Filter Action

Now That We Have The Framework, We Can Begin Creating The Interactions Between Sheets Using Dashboard Actions. The First Interaction Is Easy: When A User Selects A Challenge, Show The Associated Description And Download Buttons. I Have A Column Labeled "Solution" In My Data That I Use To Hide The Solution Button For Half Of The Challenges.

Create A Filter Action Under The Dashboard Tab. The Filter Is Triggered By A Selection Of A Challenge From The Challenge List And Affects The Three Selected Target Sheets. I Choose To Leave The Filter When Clearing The Selection, But Choosing To Exclude All Values Is Also A Good Option. Showing All Values Is Likely Not A Good Option Here Because It Would End Up Showing A Long List Of All Of The Challenge Descriptions. This Logic Can Also Be Applied To Filter The Challenges From The Category Sheet.

Download Button Action

To Create A Download Based On A Button, We Will Use A Url Action. Fill In This Section With The Url Of The Location Of The Files To Be Downloaded. Use "Www.Yourwebsite/Downloadfolder/" With The File Name Added At The End. In This Case, The File Is Dynamic And Based On A Selection, So We Can Use The Challenge Name Dimension Wrapped In Brackets. The Side Carrot Pointed Out In The Image Below Allows You To Input Dimensions Into The Url Path. Finally, Add The File Type At The End To Complete The Url.

If Publishing Your Workbook To Tableau Public, You May Also Need To Precede The Url Link With An Https Protocol. After Selecting A Challenge, This Url Path Will Update By The Previous Action To Only Include The Challenge Name In The Selection.

Url Image

The Url Image Is Made The Same Way As The Download Buttons. Create A Separate Url Action. Instead Of Using The Url Of The Download File, Put In The Url Path Of The Location Where The Image Is Hosted. Make It Dynamic Like Above And Add The Correct File Type To The End Of The Url (.Png, .Jpeg). This Will Automatically Populate The Web Page Object In The Dashboard Without Making Any Specifications. Because The Starter Page Of My Workbook Is .Html And Not .Png, I Have To Also Make The File Type Dynamic In The Url Path By Writing A Calculated Dimension: If [Challenge Name] = "Start Page" Then '.Html' Else '.Png' End.

Formatting

Once The Framework And Interactions Are Working, Appearances Can Be Addressed. I'll Review How To Accomplish The Two Main Formatting Designs, Creating Lists And Multiple-Column Lists.

Lists

I Have Found The Most Effective Way To Make A List Is To Put The Dimension You Want Listed On Rows And Text. Next Right-Click The Dimension On The Rows Shelf And Uncheck "Show Header."

Multiple-Column Lists

Multiple-Column Lists Are More Commonly Known As Trellis Charts In Tableau. You Can Make These By Applying A Little Bit Of Math. See This Post To Learn How This Can Be Done.

The Rest Of The Formatting Can Be Accomplished From The Formatting Tab For Each Sheet. Remember To Use Tricks Like Copying And Pasting Formatting From Sheet To Sheet.

Check Out The Example Application Below, Then Try Your Hand At Creating Your Own. Good Luck And Do Share Your Awesome Applications With Us!

6. Conclusion

The Progress That The Electric Vehicle Industry Has Seen In Recent Years Is Not Only Extremely Welcomed, But Highly Necessary In Light Of The Increasing Global Greenhouse Gas Levels. As Demonstrated Within The Economic, Social, And Environmental Analysis Sections Of This Webpage, The Benefits Of Electric Vehicles Far Surpass The Costs. The Biggest Obstacle To The Widespread Adoption Of Electric-Powered Transportation Is Cost Related, As Gasoline And The Vehicles That Run On It Are Readily Available, Convenient, And Less Costly. As Is Demonstrated In Our Timeline, We Hope That Over The Course Of The Next Decade Technological Advancements And Policy Changes Will Help Ease The Transition From Traditional Fuel-Powered Vehicles. Additionally, The Realization And Success Of This Industry Relies Heavily On The Global Population, And It Is Our Hope That Through Mass Marketing And Environmental Education Programs People Will Feel Incentivized And Empowered To Drive An Electric-Powered Vehicle. Each Person Can Make A Difference, So Go Electric And Help Make A Difference!

7. Future Scope

Electric Vehicles Future In India

Most Indian Buyers Believe That An Electric Vehicle Will Be Ready By 2023, But The Majority Also Believe That It Would No Longer Be Available Until 2025. Consumers In India Are Looking For A Lower Price For Evs Than Those In Other Countries, With The Global Average Tipping Price For Evs Being $36,000. (Around Rs27 Lakh).

The Cost Of Lithium-Ion Batteries Is Roughly $250/Kwh Globally, Which Translates To Approximately Rs5.7 Lakh In Battery Prices Alone. Currently, Lithium-Ion Batteries Account For Half Of The Cost Of An Electric Vehicle, Making Them More Expensive Than Conventional Vehicles.

The Safety Of The Batteries Against Explosion Serves As A Stumbling Block For Li-Ion Batteries. Charging Is A Significant Barrier For Evs In India, And A Lack Of Charging Stations May Also Be Considered, Rendering Them Impracticable Or Significantly Less Feasible For Long-Distance Rides.

Furthermore, Some Evs Are Slower Than Standard Gas-Powered Engines.

At A Critical Moment, As Many Nations Are Working To Free Mother Earth From The Clutches Of Carbon Emissions And Co2, India Should Take The Lead By Transitioning To Ev Mobility, Making The Country A Greener And Cleaner Ecosystem.