VISUALIZATION TOOL FOR ELECTRIC VEHICLE CHARGE AND RANGE ANALYSIS

TEAM LEADER: G.Pavithra

TEAM MEMBER *1:*S.Saranya

TEAM MEMBER 2:S.Sankavi

TEAM MEMBER 3:M.Sripriya

1.INTRODUCTION

1.1 Overview:

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 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.

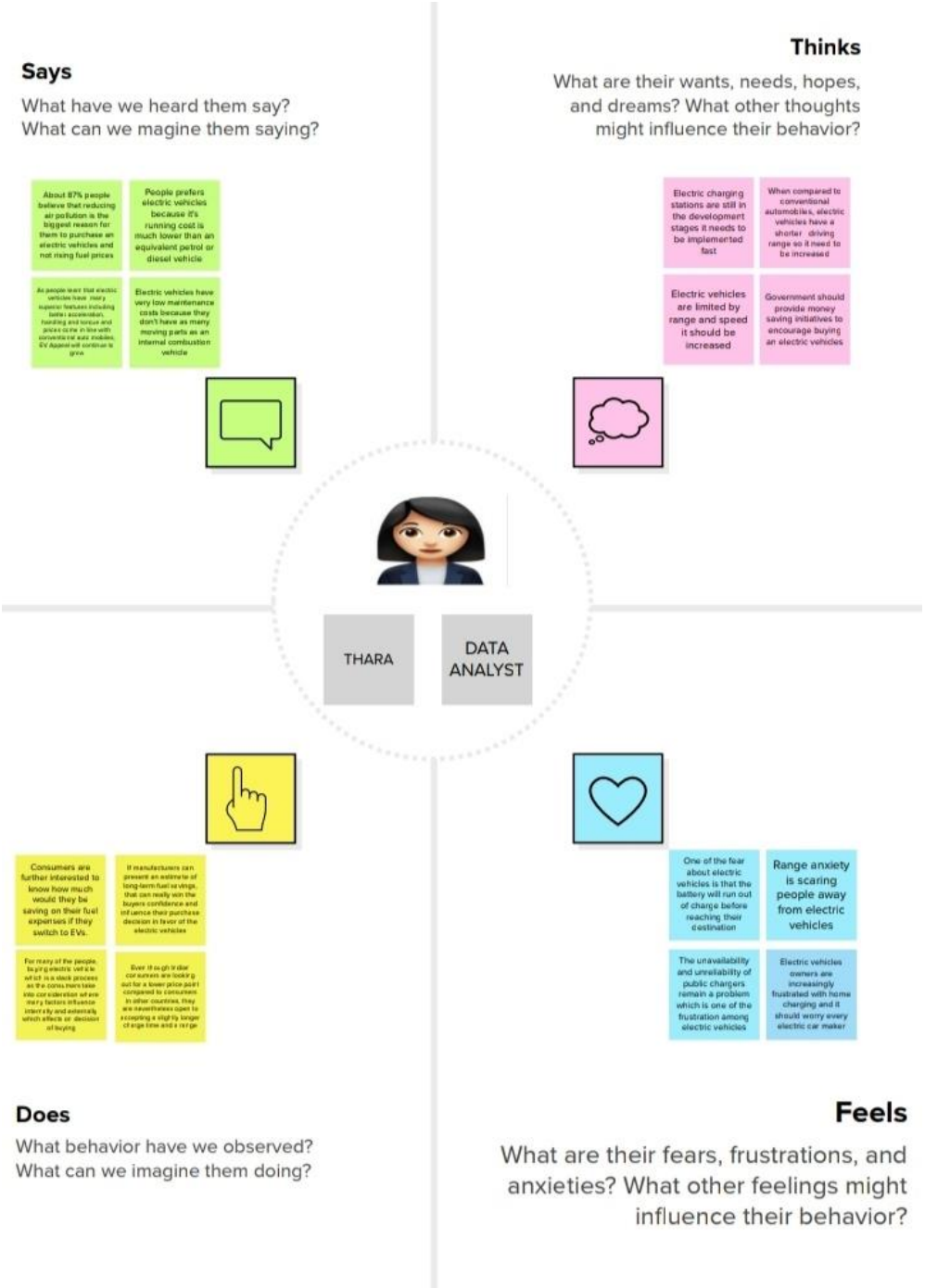
In this project, we will focus specifically on the data analytics considerations in the EV , to examine how these powerful solutions can drive growth and competitive advantage.

1.2 Purpose:

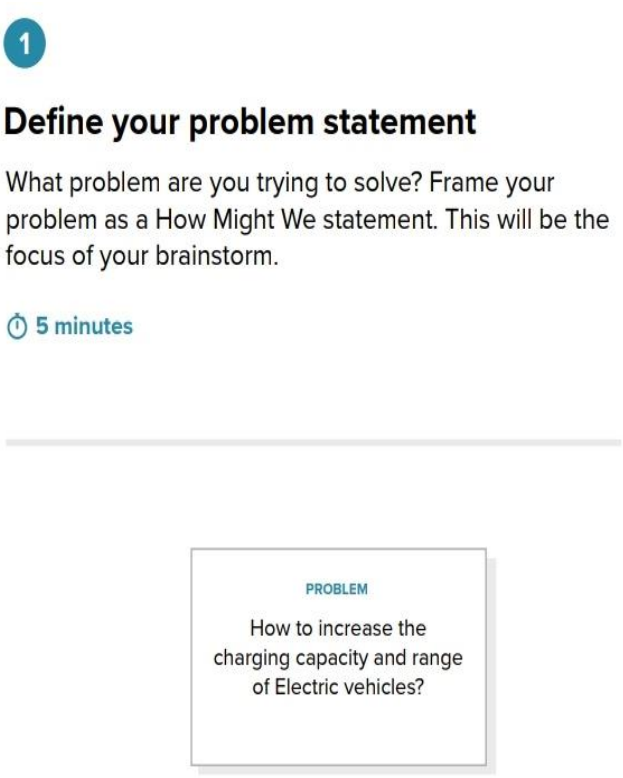
- An EV car can generate terabytes of data in an eight-hour drive. Within that chaotic data are answers to questions that have not yet been asked. Identify the patterns, and you can identify the most valuable questions to ask.
- It retain a customer within their own charger network by anticipating the remaining distance left in a battery until a recharge is required, placing charger information and directions onto the EV's GPS navigation system, automatically reserving chargers before arrival.
- Big data can assess the condition of the vehicle and make recommendations on maintenance intervals and dealer locations, timing maintenance to coincide with a charging interval thus allowing the driver to accomplish two tasks simultaneously.
- It can also access data about the shopping trends and preferences of the humans on board, flashing ads and discounts to the driver and passengers if the charger is close to a complimentary business.

2.PROBLEM DEFINITION AND DESIGN THINKING

2.1 Empathy map:



2.2 Ideation & Brainstorming map:

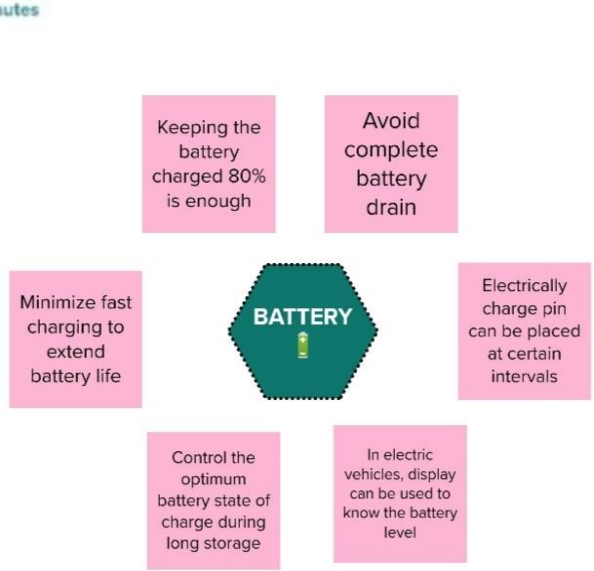


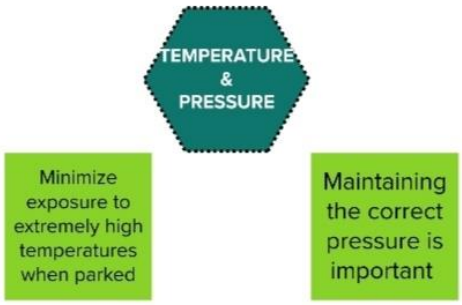
3

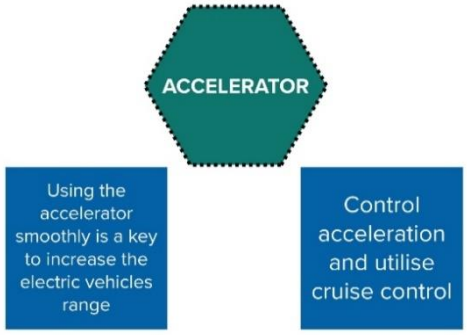
Group ideas

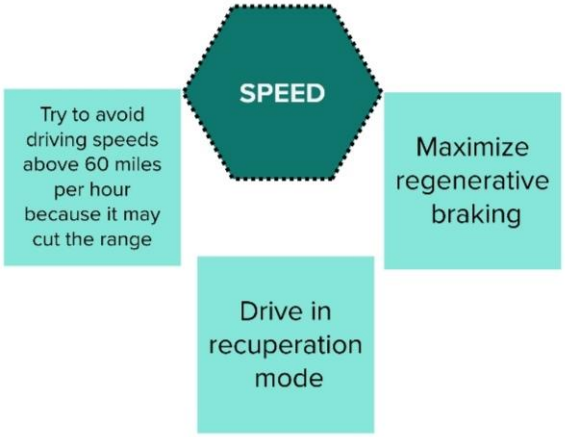
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

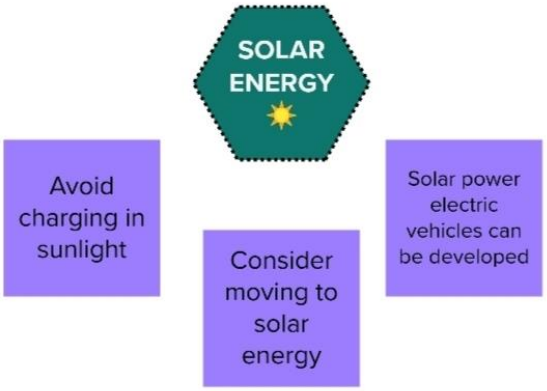
20 minutes









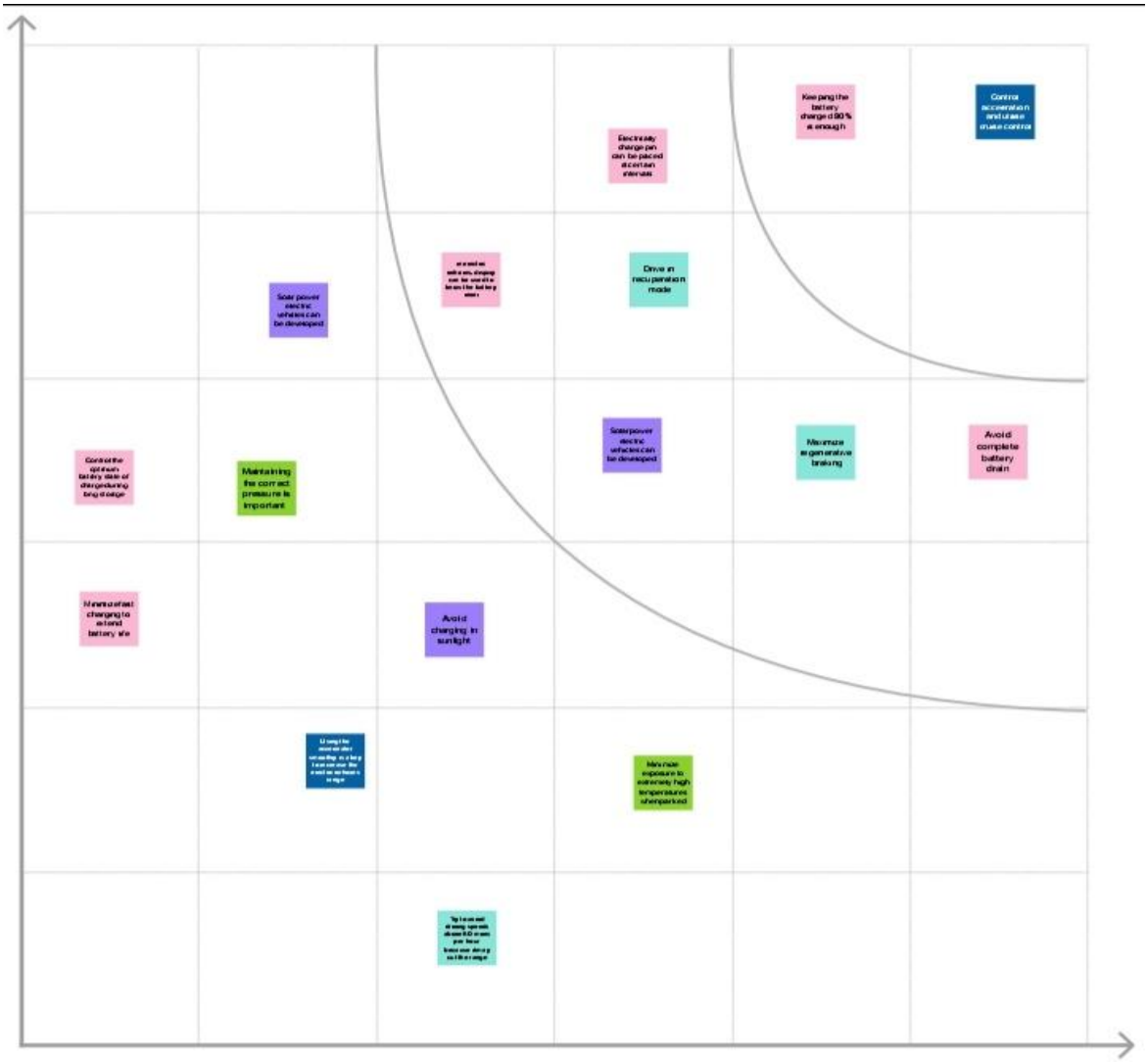


4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Feasibility

Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

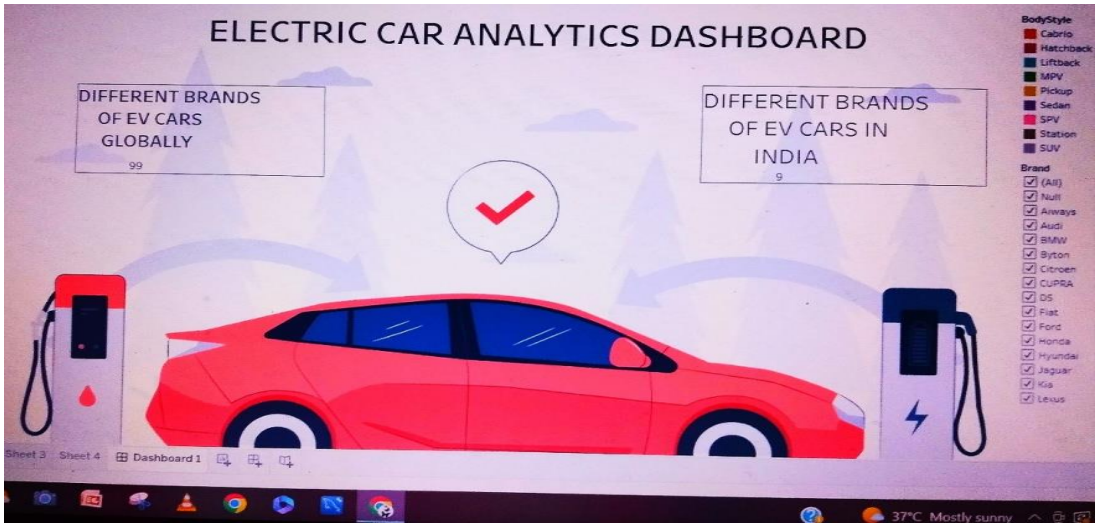
3.RESULT

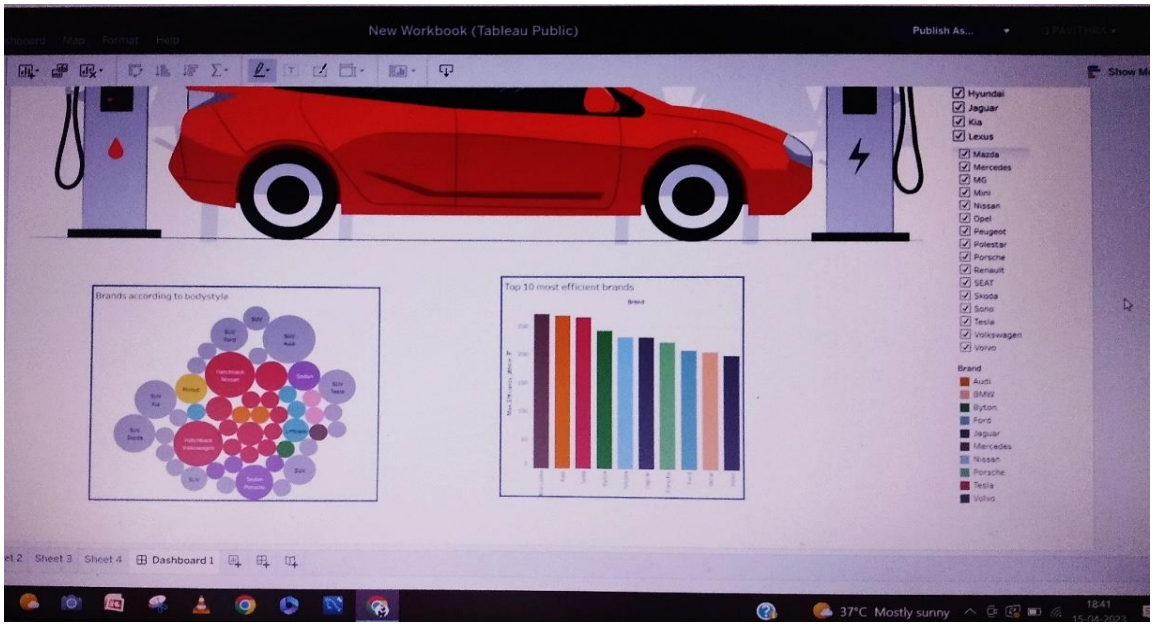
3.1 Data model:

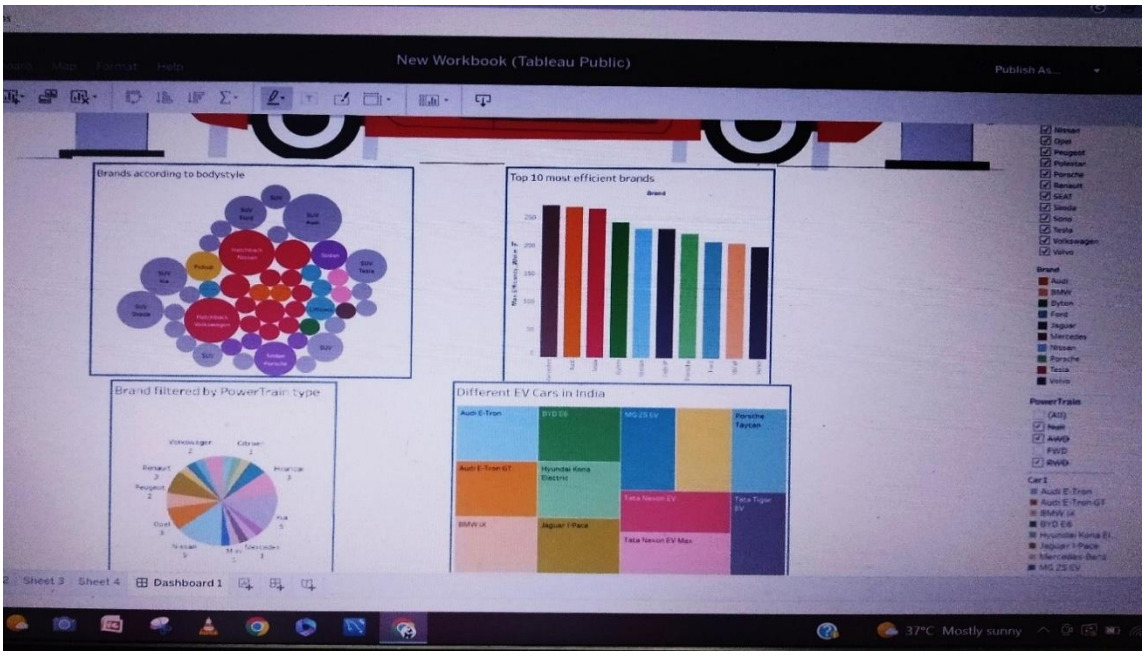
Object name	***Fields in the object***
Object 1: Mural	Empathy map, Ideation and brainstorming template
Object 2: My sql	Database
Object 3: Tableau public	Dashboard, story

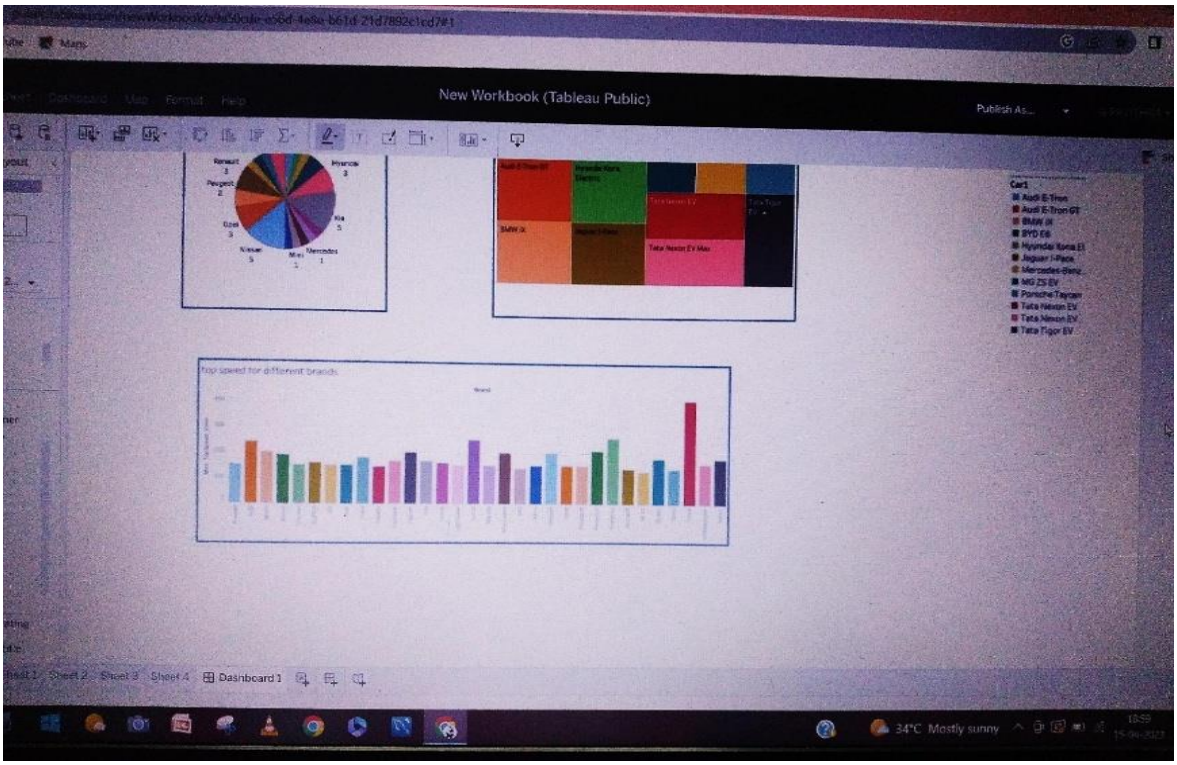
3.2 Activity & Screenshots

Creation of dashboard:

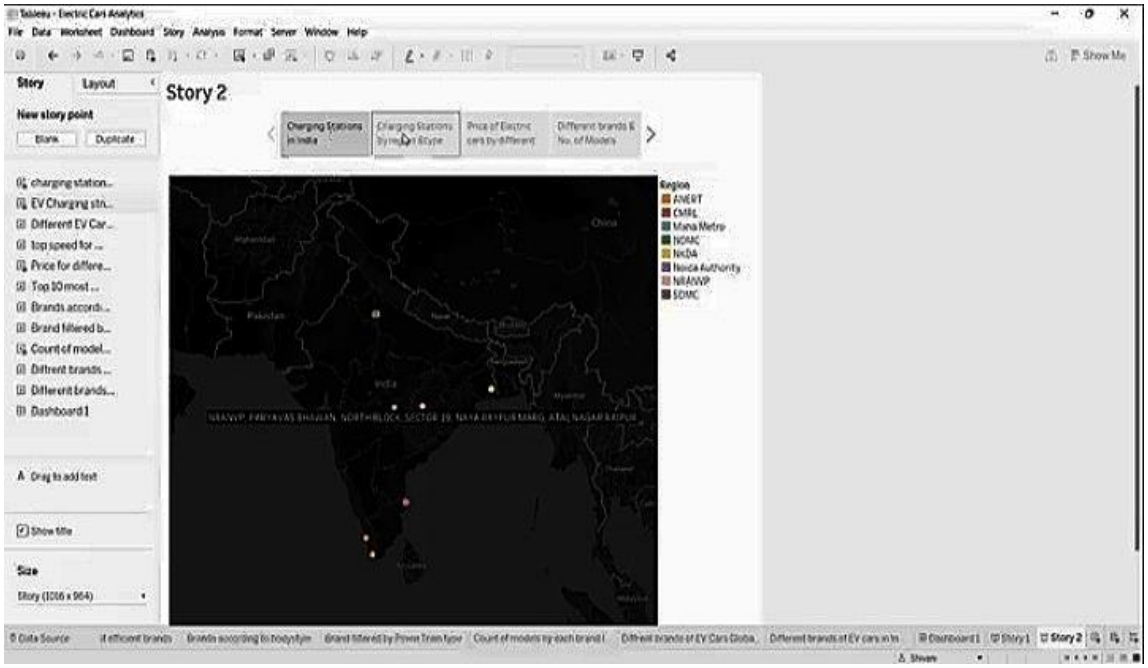


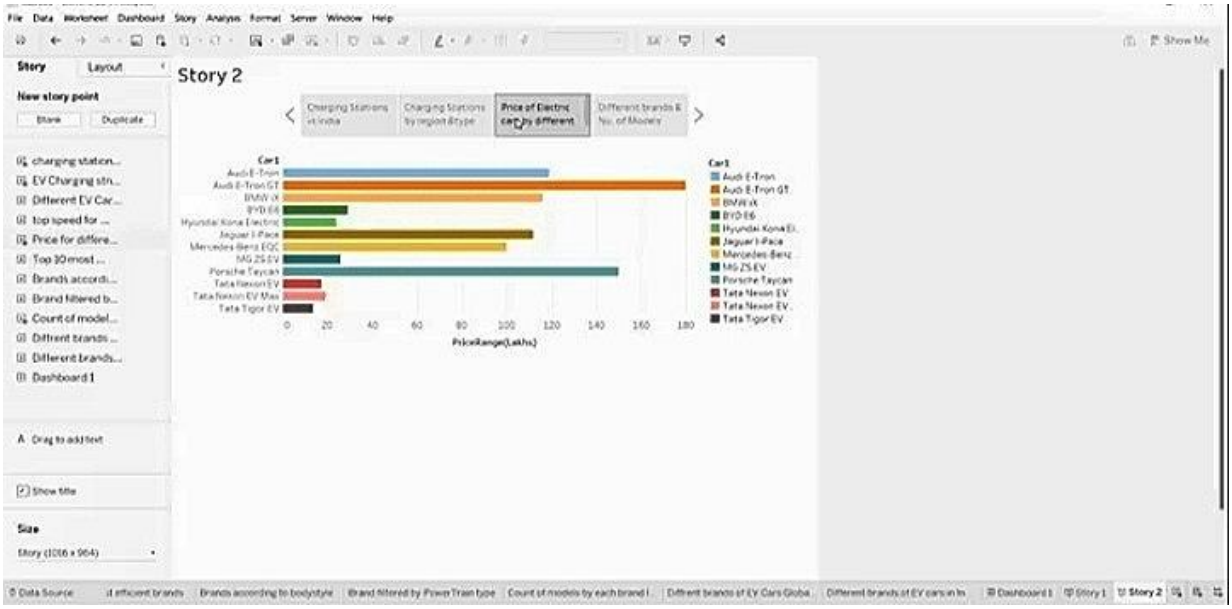


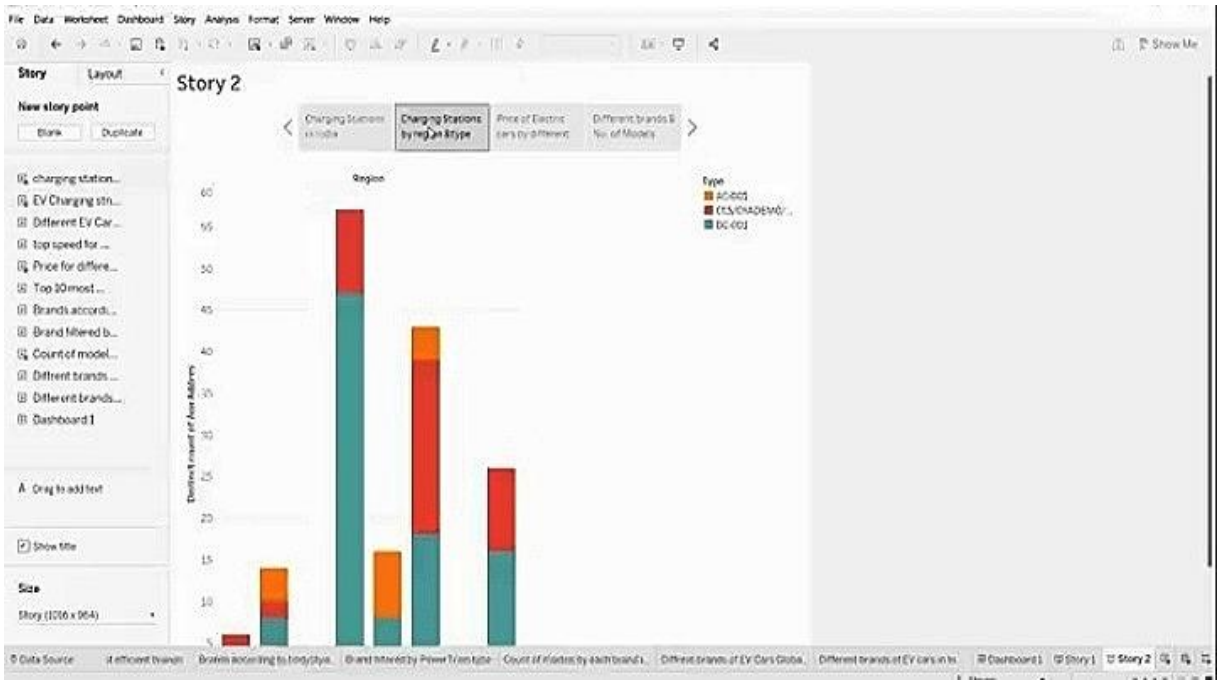

New Workbook (Tableau Public)
Publish As...
Brands according to bodystyle
Top 10 most efficient brands
Brand filtered by PowerTrain type
Different EV Cars in India
Sheet 3
Sheet 4
Dashboard 1
37°C Mostly sunny

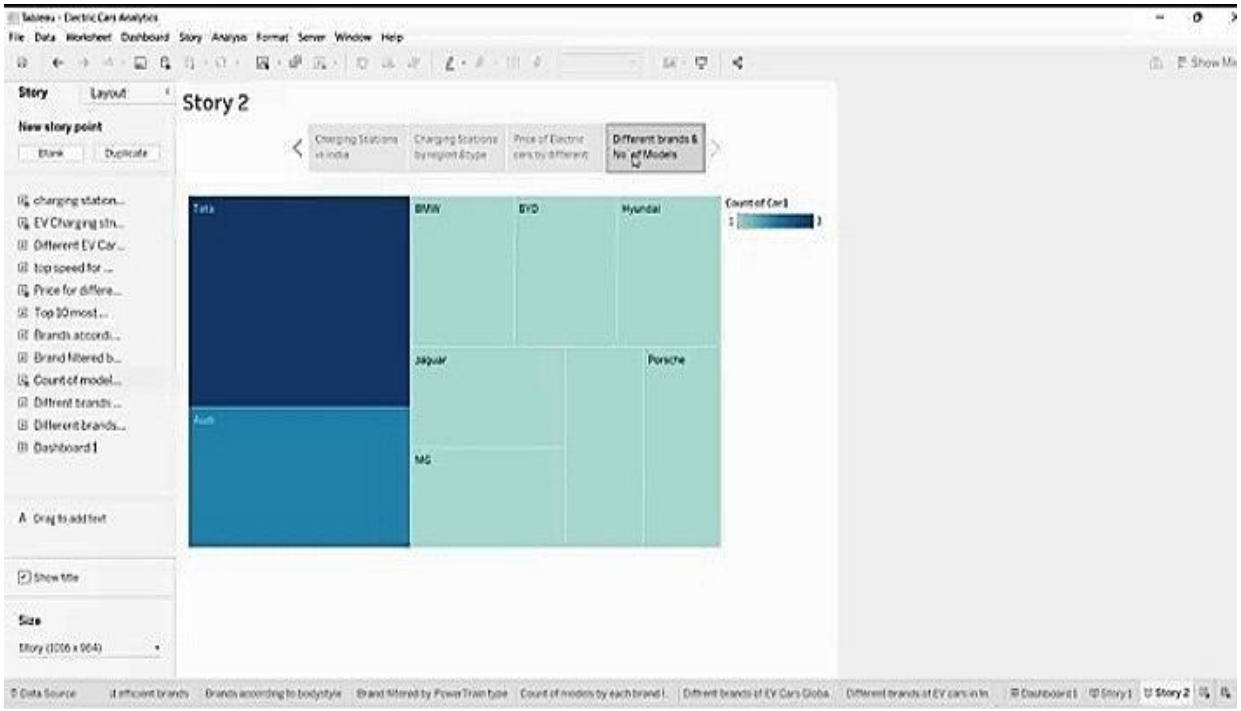

New Workbook (Tableau Public)
Publish As...
Top speed for different brands
Dashboard 1
34°C Mostly sunny

Story creation:

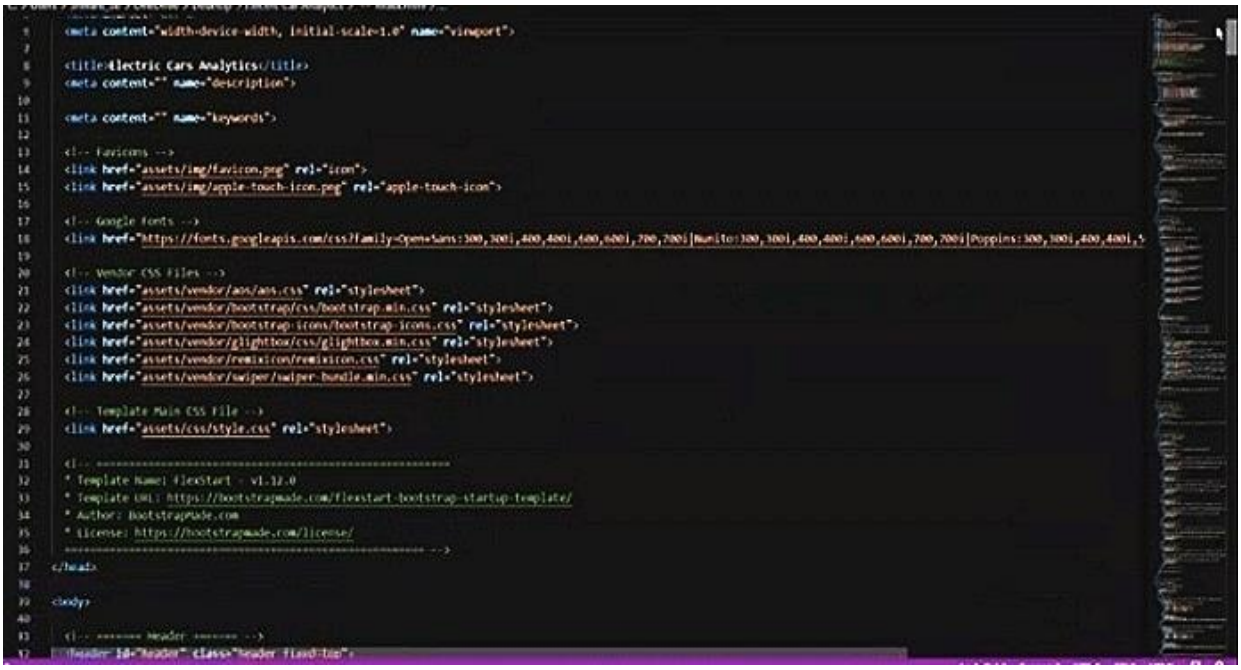


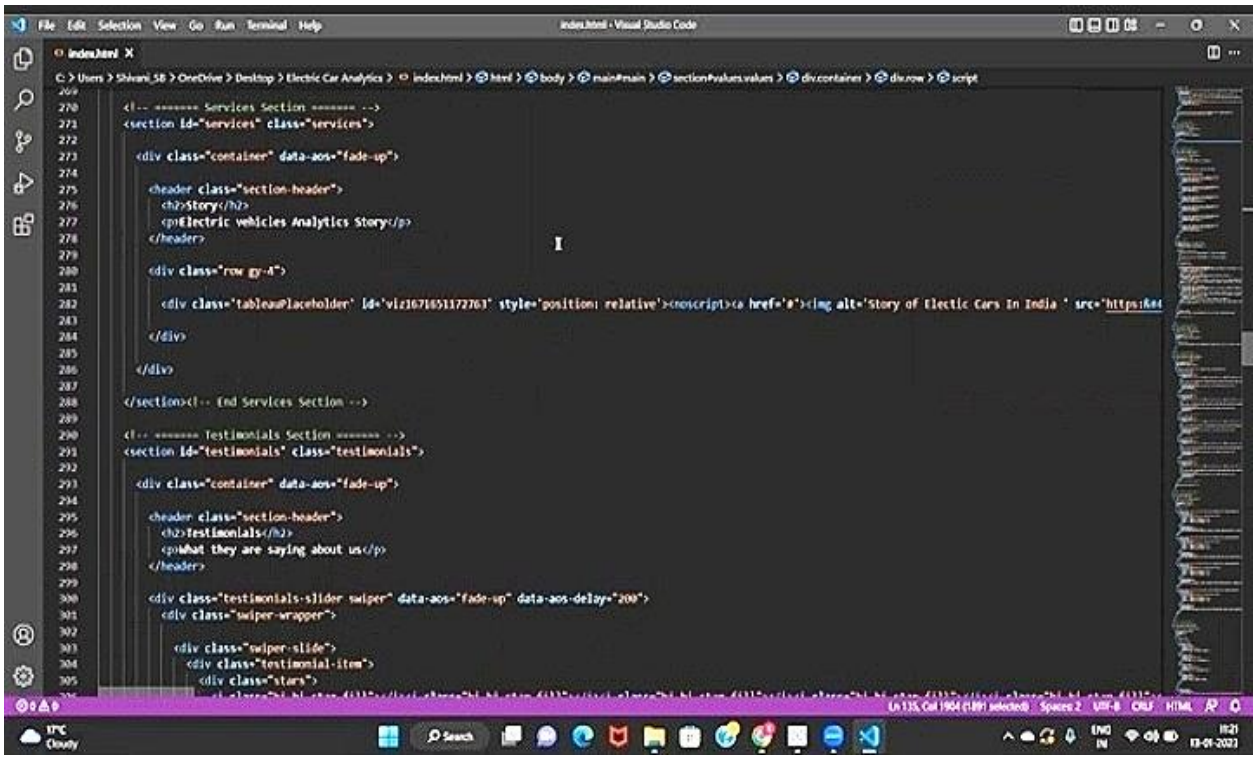



Story 2
Charging Stations by region &type
Region
Type
AC-001
CCS/CHADEMO/...
DC-001
Count of model...
Different brands...
Dashboard 1
Drag to add text
Show title
Size


Story 2
Different brands & No. of Models
Tata
BMW
BYD
Hyundai
Jaguar
Porsche
Audi
MG
Count of Car3
Count of model...
Different brands...
Dashboard 1
Drag to add text
Show title
Size

Web integration:





4.TRAILHEAD PROFILE PUBLIC URL

Team lead - https://trailblazer.me/id/trailblazerpavi2010

Team member 1- https://trailblazer.me/id/trailblazersaranya2709

Team member 2- https://trailblazer.me/id/trailblazersankavi0202

Team member 3- https://trailblazer.me/id/trailblazersripriya2003

5.ADVANTAGE

- Big data for more efficient vehicle maintenance
- Use of data for selecting optimal charging location
- Use of data for optimizing operational and economics
- Big data and analytics for understanding the effects of EV charging on local grid.
- Big data + navigational aids for autonomous driving & parking

DISADVANTAGE

- The huge amount of data generated by devices, vehicles, buildings, the power grid, and many other connected things, coupled with increased rates of data transmission, constitute the big data challenge.
- Among many areas associated with the Internet of Things, smart grid and electric vehicles have their share of this challenge by being both producers and consumers of big data.

6.APPLICATIONS

- In order for the utility to be spared the impact of the large number of EV connections and to utilize already available mass energy storage capacity in EVs, communication design of the EVGI framework and decision making through big data analytics play important roles.
- Mobility needs of drivers can usually be captured with data tracking devices, which in turn helps to understand energy consumption profiles of drivers. Along with modelling the battery-to wheel energy efficiency of different EV vendors, It may be possible to generate custom charging requirements for EVs.
- Data analytics is also important on the utility side requirements when controlling charging. The utility will eventually decide which services are needed by the EVs via analysing its daily demand data stream.
- *Besides the charging aspect, EVs can provide power to the grid through V2G applications. They can support ancillary services such as voltage support, reactive power compensation, active harmonic filtering, and power factor regulation, as well as load balancing, peak shaving, and renewable energy tracking. Additionally, in the case of a power outage, an EV can be used a LPs an emergency backup source for the home, which is often called vehicle-to-home (V2H)*

  As a result, data analytics techniques will need to work on more heterogeneous and unstructured data from multiple sources flowing at higher speeds, while the decision making timeframe will need to be relatively smaller than for today's applications

7.CONCLUSION

In this project, we discuss how these challenges can be addressed by data analytics. Then we provide a comprehensive survey on data analytics tools that are used in this domain. We conclude the project with a summary, a requirement analysis for data analytics tools for EV related applications, and finally, with a discussion of future directions.

8.FUTURE SCOPE

- On one hand, big data has enormous benefits in the economical society, and the environment. On the other hand, there is concern about data security protection and privacy .
- As a result, much valuable information might be lost. Thus, there needs to be a balance between consumers' privacy and the benefit of sharing data.
- The utility-privacy trade-off has been explored in several studies, but there are open issues on how much uncertainty can be handled for EV integration to smart grid and green smart cities.
- However, security and privacy concerns escalate with distributed processing of EV data by other EVs. The nexus of processing capacity, delay, security, and privacy is an open issue that has yet to be addressed in the domain of big data analytics for EVs.