VISUALIZATION TOOL FOR ELECTRIC VEHICLE CHARGE AND RANGE ANALYSIS

By Amaresh S

1. INTRODUCTION:

1.1 Overview:

An electric vehicle (EV) uses one or more electric motors for propulsion instead of an internal combustion engine (ICE) that relies on gasoline or diesel fuel. Electric cars are powered by electricity, typically stored in rechargeable batteries, and they have gained popularity as an environmentally friendly and energy-efficient alternative to traditional gasoline-powered vehicles.

There are several types of electric vehicles, including:

1. **Battery Electric Vehicles (BEVs):** These vehicles are solely powered by electricity stored in high-capacity lithium-ion batteries. BEVs do not have an internal combustion engine and produce zero tailpipe emissions. Examples include the Tesla Model 3 and Nissan Leaf.

2. **Plug-in Hybrid Electric Vehicles (PHEVs):** PHEVs have an electric motor and an internal combustion engine. They can be charged via an electrical outlet and have a limited all-electric range before switching to the internal combustion engine. The Chevrolet Volt is an example of a PHEV.

3. **Hybrid Electric Vehicles (HEVs):** HEVs have an internal combustion engine and an electric motor but cannot be charged externally. The electric motor assists the engine, improving fuel efficiency and reducing emissions. The Toyota Prius is a well-known HEV.

4. **Fuel Cell Electric Vehicles (FCEVs):** FCEVs use a hydrogen fuel cell to generate electricity on board, which powers an electric motor. They emit only water vapour as a by-product and have a more extended range than many battery electric vehicles. The Toyota Mirai is an example of an FCEV.

1.2 Purpose:

The purpose of an electric vehicle is to reduce air pollution and greenhouse gas emissions. Electric vehicles do not produce any tailpipe emissions, significantly contributing to smog and climate change. They are also quieter than gasoline-powered vehicles, which can help to improve air quality in

urban areas.

In addition to the environmental benefits, electric vehicles also offer several other advantages, such as:

Lower operating costs: The electricity used to power an electric vehicle is much cheaper than gasoline, so the operating prices of an electric car are much lower.

Fewer moving parts: Electric vehicles have fewer moving parts than gasoline-powered vehicles, making them less likely to break down and require maintenance.

Improved acceleration: Electric motors produce maximum torque from a standstill, which gives electric vehicles excellent acceleration.

2. DEFINE PROBLEM / PROBLEM UNDERSTANDING :

2.1 The Business Problem :

Electric vehicles (EVs) are becoming increasingly popular, but their range and charging time still need to be improved for many potential buyers to consider them. The goal is "To identify the most suitable electric vehicle (EV) currently available in the market based on a comprehensive analysis of charging infrastructure, range capabilities, cost-efficiency, and environmental impact, and to justify why it excels over other EV options." making them more attractive to a broader range of buyers. The project will use various data sources, including real-world driving, battery, and charging station data.

2.2 Bussiness Requirement:

Identify the key performance indicators (KPIs): This project's KPIs will be used to measure the performance and efficiency of electric vehicles. These KPIs could include range, charging time, price, and features.

Collect data on a variety of EVs: The data for this project will be collected from various sources, such as manufacturer websites, online reviews, and government databases. The data will include information on different electric vehicles' ranges, charging times, prices, and features.

Clean and format the data: The data collected from the previous step will need to be cleaned and formatted to be ready for analysis. This could involve removing duplicate data, correcting errors, and converting the data into a consistent format.

Develop a ranking of EVs: The data will be used to develop a scale of electric vehicles based on the most critical factors to the user.

Present the findings clearly and concisely: The project's results will be presented clearly and concisely so that the user can make an informed decision about which electric vehicle is right for them. This could be done in various formats, such as a report, presentation, or website.

2.3 Literature Survey:

I extensively reviewed relevant literature to understand the various aspects of my project comprehensively. This literature review will provide valuable insights into my project's critical components, encompassing electric vehicles (EVs), consumer buying behaviour in the Indian automotive market, lithium-ion batteries, and industry performance evaluation.

The Electric Vehicle: A Review (Gupta et al., 2020):

Gupta et al.'s comprehensive study offers an in-depth examination of electric vehicles' history, development, and current status (EVs). The paper categorises EVs, delves into their performance and efficiency, and discusses the prevailing challenges and opportunities within the EV market. This work is relevant to my project as it provides an overarching understanding of the EV landscape. It elucidates EV adoption factors, including pricing, charging infrastructure accessibility, and governmental incentives. These insights are pivotal in understanding the EV market and identifying the primary determinants for potential EV buyers.

Consumer Buying Behaviour of Cars in India: A Survey (Sharma et al., 2021):

Sharma et al.'s research dissects the factors influencing automobile purchasing decisions in India. Through a survey of car buyers in India, the paper scrutinises the decision-making processes of prospective car owners. The findings underscore the significance of price, fuel efficiency, and brand reputation as pivotal factors for car buyers in India. This study directly informs my project by delineating the factors of paramount importance to potential EV buyers in the Indian market.

Charge-Discharge Studies of Lithium-Ion Batteries (Wang et al., 2017):

Wang et al.'s investigation concentrates on the charge-discharge performance of lithium-ion batteries, a critical component of electric vehicles. The paper examines the impact of various factors, including charging and discharging rates, temperature, and state of charge, on the performance of lithium-ion batteries. This research is pertinent to my project as it elucidates the factors influencing EVs' range and performance, which rely heavily on lithium-ion battery technology.

Evaluating the Hotel Industry Performance Using Efficiency and Effectiveness Measures (Zhang et al., 2022):

Zhang et al.'s study assesses the hotel industry's performance through efficiency and effectiveness measures, utilising data from hotels in China. The paper reveals that improving the occupancy rate, reducing the cost per available room, and enhancing customer satisfaction scores can augment the efficiency and effectiveness of hotels. Although seemingly unrelated to my project, this research

provides valuable insights into the dynamics of performance evaluation within industries. These insights can potentially be adapted to assess and improve the performance of the EV market.

In conclusion, the insights synthesised from these research papers provide a complex understanding of the electric vehicle market, consumer preferences in the Indian automotive sector, the intricacies of lithium-ion battery performance, and the principles of industry performance assessment. This body of knowledge equips me with the necessary tools to understand the critical determinants of EV adoption and identify potential challenges and opportunities within the EV market.

2.3 Social or Business Impact:

Insights for car/battery manufacturers: The project can provide insights for car and battery manufacturers on the most critical factors to EV buyers. This information can improve electric vehicle design, performance, and marketing. For example, the project could find that the most critical factors for EV buyers are the range, price, and charging infrastructure.

Insights for People using or interested in EVs: The project can provide insights for people using electric vehicles on the challenges and opportunities of owning an EV. This information can help people make informed decisions about whether or not to purchase an electric vehicle. For example, the project could find that the most common challenges for EV owners are the limited range and the availability of charging stations.
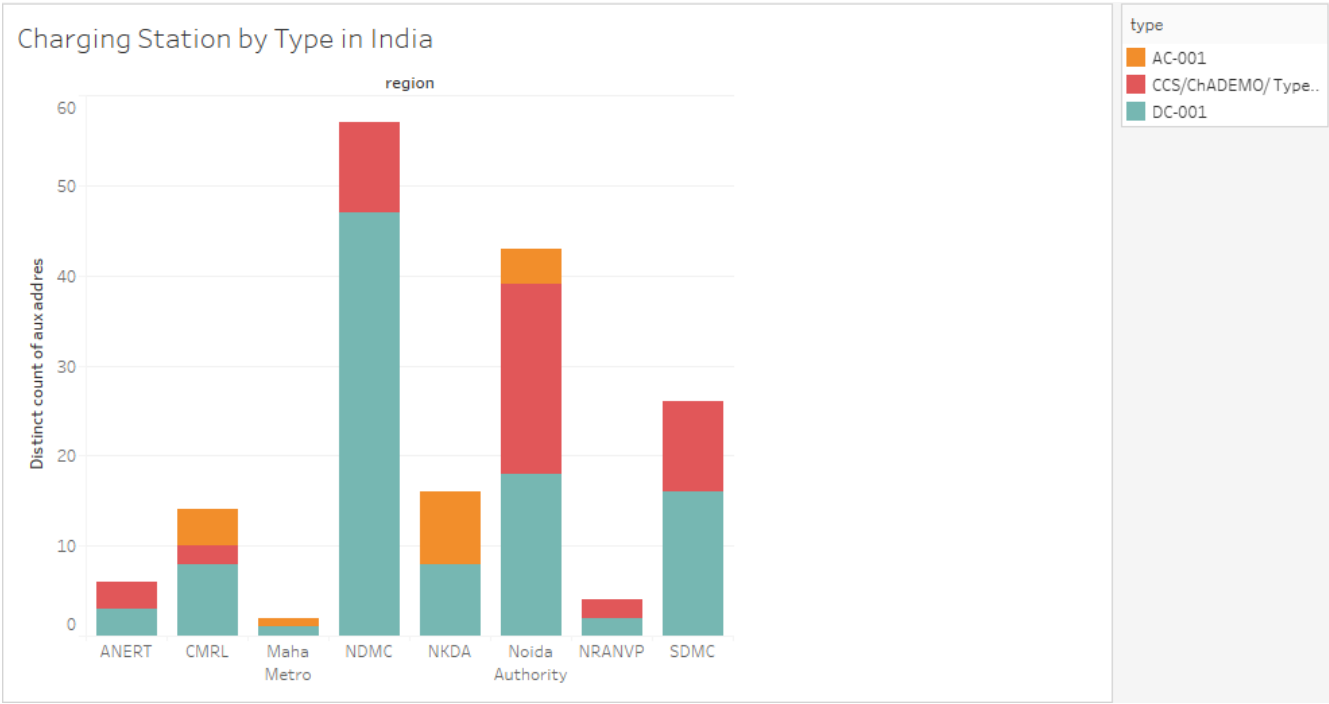
Insights for people thinking to enter the EV market: The project can provide insights for people thinking to enter the EV market on the opportunities and risks of the industry. This information can help people to make informed decisions about whether or not to start an EV business. For example, the project could find that the most promising market for electric vehicles is the commercial vehicle market.
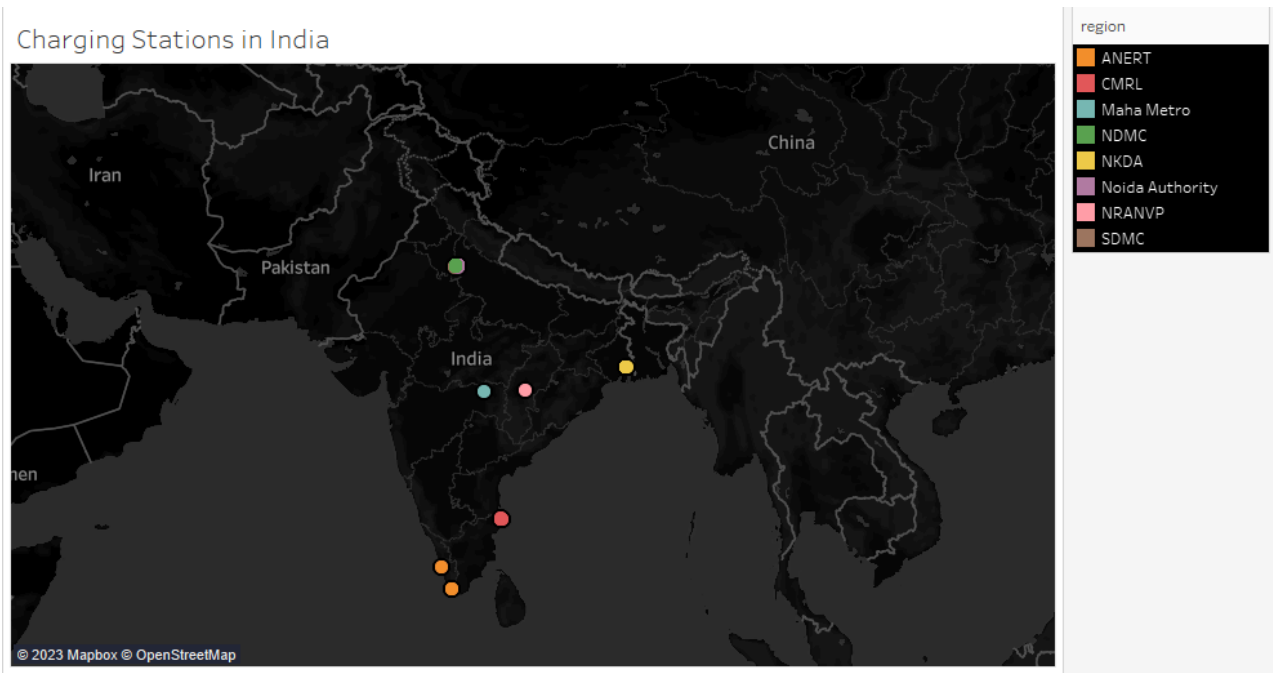
3. Data Preparartion:

Data Preparation is done through SQL8.0. In this step data is downloaded from the given link.Then data is added to the new Schema named electric_vehicle in SQL.Since the data is already clean, There is no cleaning done.

4.Data Vizualization:

1. Charging stations by region & types.

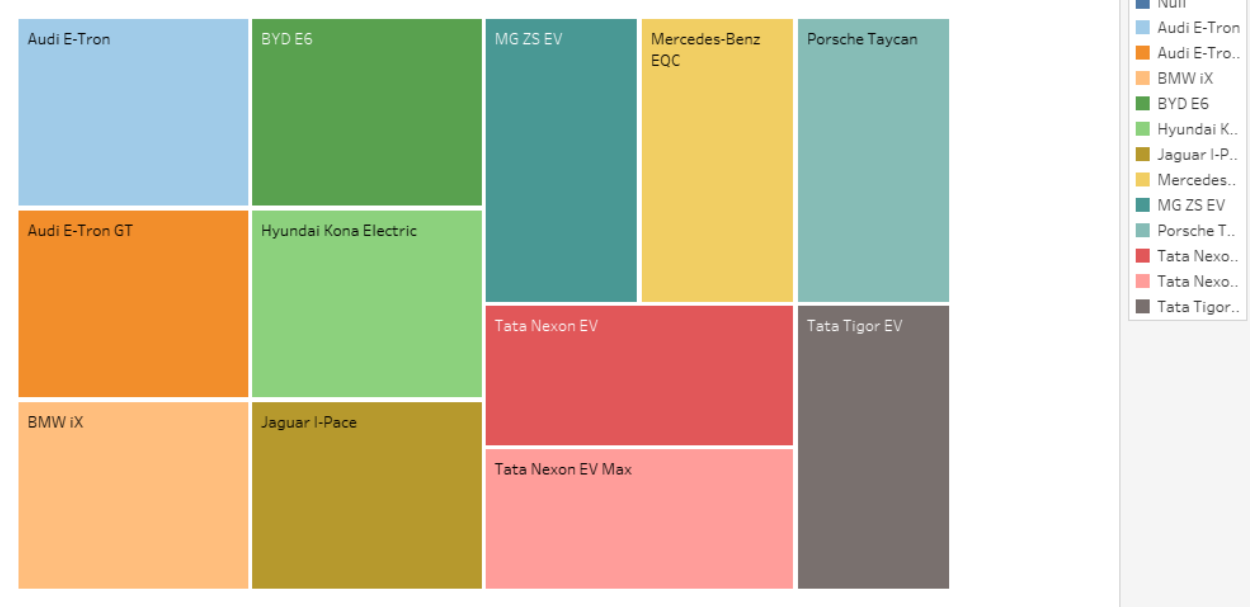Charging Station by Type in India
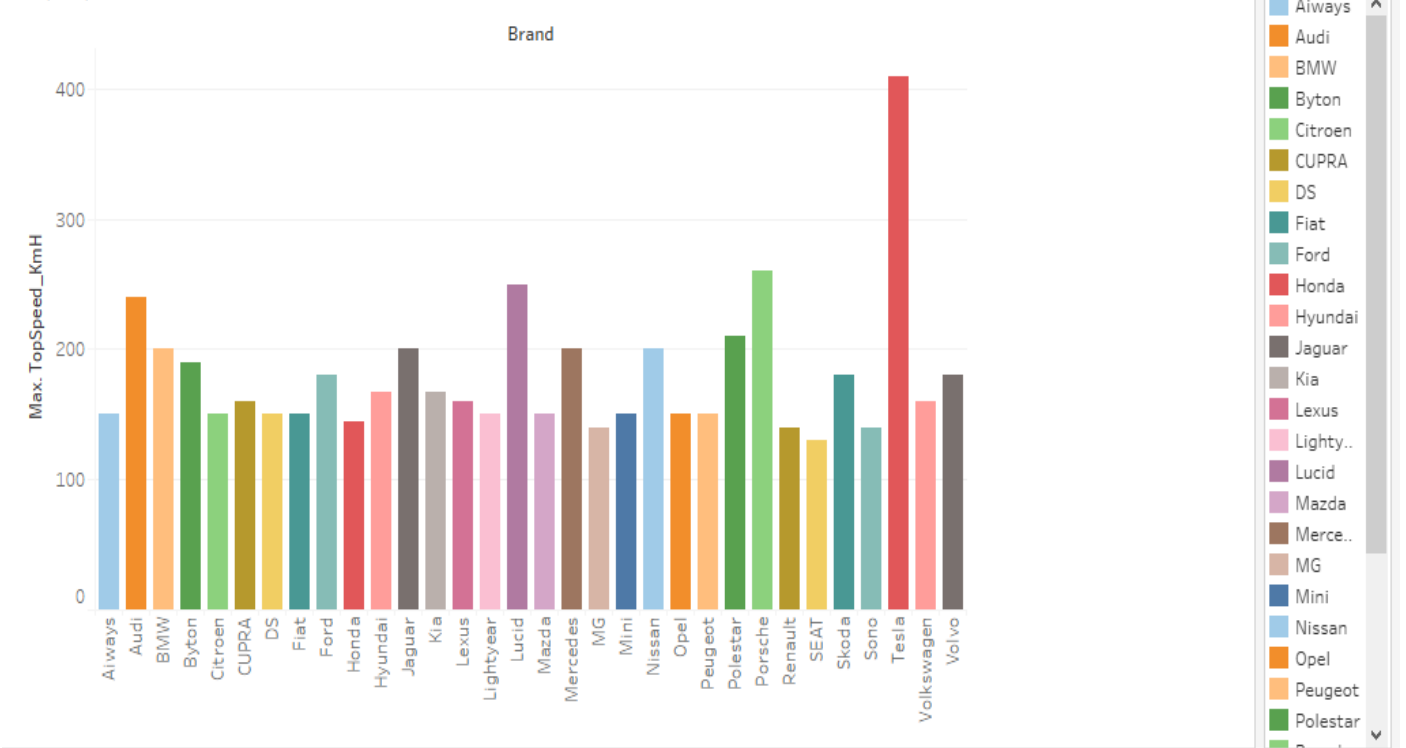
type
- AC-001
- CCS/ChADEMO/ Type..
- DC-001

2. Charging stations in India.

Charging Stations in India

region
- ANERT
- CMRL
- Maha Metro
- NDMC
- NKDA
- Noida Authority
- NRANVP
- SDMC

© 2023 Mapbox © OpenStreetMap

3. Different EV cars in India.

EV Cars in India

Audi E-Tron	BYD E6	MG ZS EV	Mercedes-Benz EQC	Porsche Taycan
Audi E-Tron GT	Hyundai Kona Electric	Tata Nexon EV		Tata Tigor EV
BMW iX	Jaguar I-Pace	Tata Nexon EV Max		

Car legend:
- Null
- Audi E-Tron
- Audi E-Tro..
- BMW iX
- BYD E6
- Hyundai K..
- Jaguar I-P..
- Mercedes..
- MG ZS EV
- Porsche T..
- Tata Nexo..
- Tata Nexo..
- Tata Tigor..

4. Top speeds for different brands.

Top Speed for Different Brands

Brand legend:
- Aiways
- Audi
- BMW
- Byton
- Citroen
- CUPRA
- DS
- Fiat
- Ford
- Honda
- Hyundai
- Jaguar
- Kia
- Lexus
- Lighty..
- Lucid
- Mazda
- Merce..
- MG
- Mini
- Nissan
- Opel
- Peugeot
- Polestar

5. Price of electric cars by different.

Price in India

Car	PriceRange(Lakhs)

Car legend:
- Audi E-Tron
- Audi E-Tron GT
- BMW iX
- BYD E6
- Hyundai Kona Electric
- Jaguar I-Pace
- Mercedes-Benz EQC
- MG ZS EV
- Porsche Taycan
- Tata Nexon EV
- Tata Nexon EV Max
- Tata Tigor EV
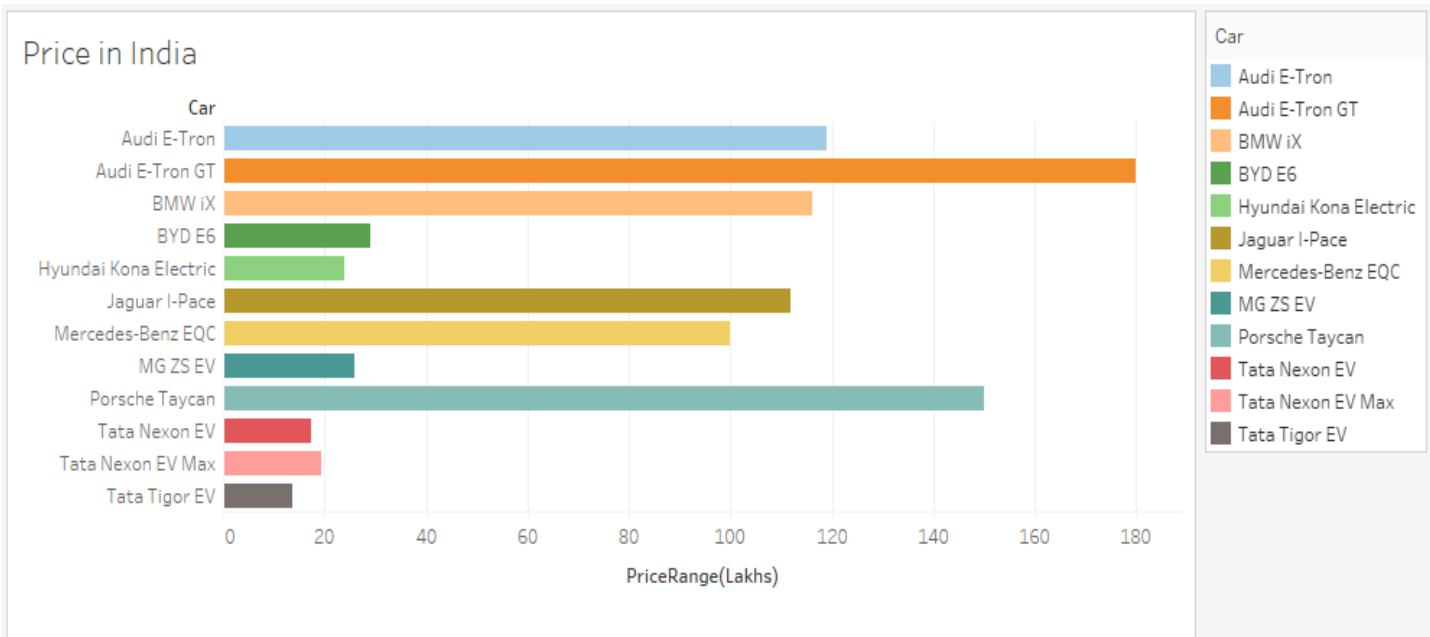
6. Top 10 most efficient brands.

Top 10 Efficienct EV Brands

Brand: Audi
Max. Efficiency_WhKm: 270

Brand filter:
- (All)
- Null
- ✓ Aiways
- ✓ Audi
- ✓ BMW
- ✓ Byton
- ✓ Citroen
- ✓ CUPRA
- ✓ DS
- ✓ Fiat

Limit
Top 10 by
MAX([Efficiency_WhKm])

Brand legend:
- Audi
- BMW
- Byton
- Ford
- Jaguar
- Mercedes
- Nissan
- Porsche
- Tesla
- Volvo
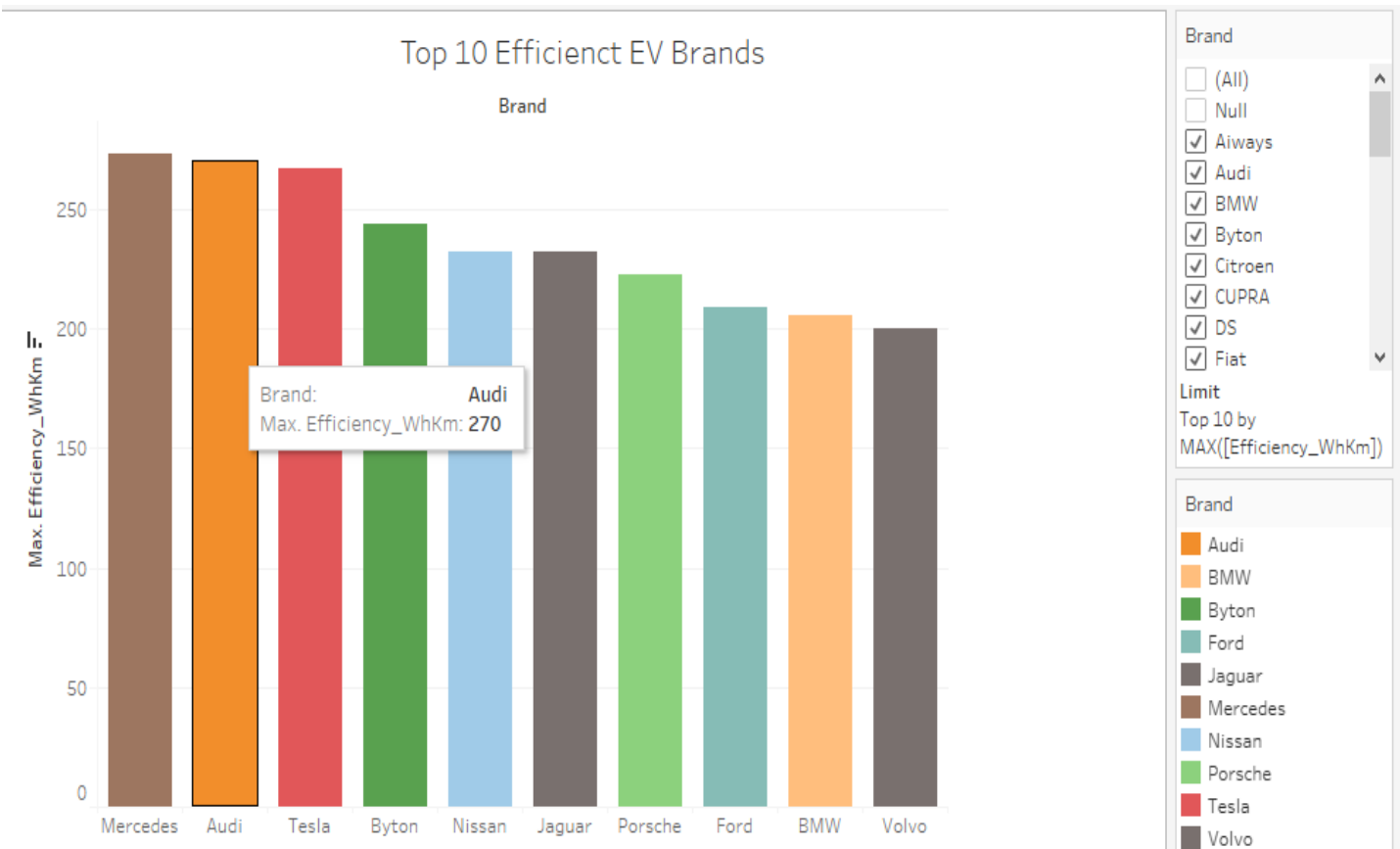
7. Brand according to body style.

Brands According to Body Style

BodyStyle
- Cabrio
- Hatchback
- Liftback
- MPV
- Pickup
- Sedan
- SPV
- Station
- SUV

8. Different brands & No of models.

Count of Model by Brand in India

CNT(Car)

0 — 3
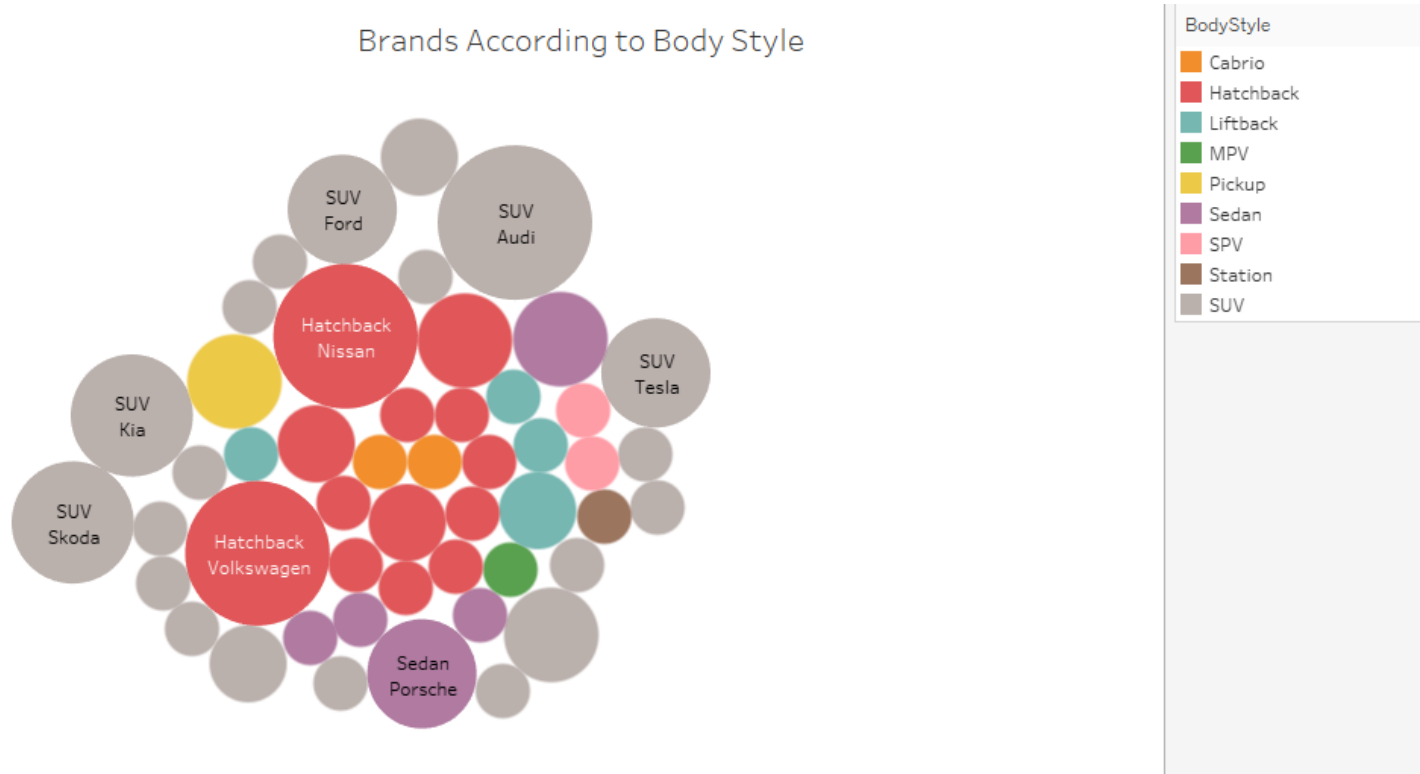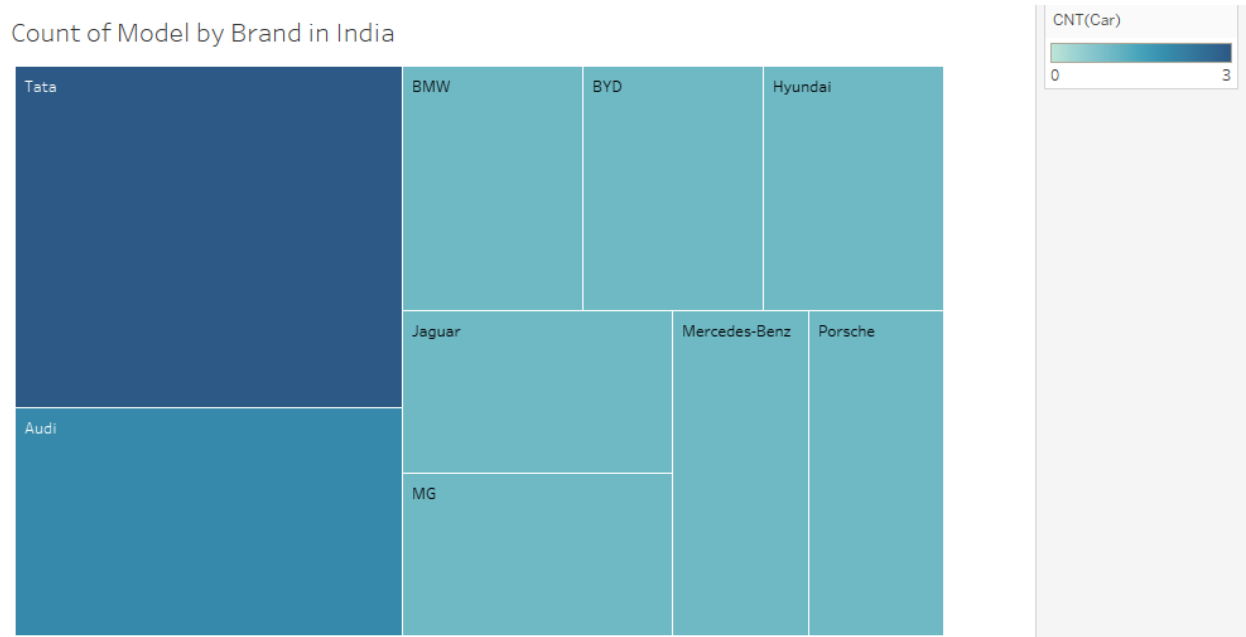
9. Brand filtered by power train types.

Brands by PowerTrain Type

Brand
- Aiways
- Audi
- BMW
- Byton
- Citroen
- CUPRA
- DS
- Fiat
- Ford
- Honda
- Hyundai
- Jaguar
- Kia
- Lexus
- Lightyear
- Lucid
- Mazda
- Mercedes
- MG
- Mini
- Nissan
- Opel
- Peugeot
- Polestar

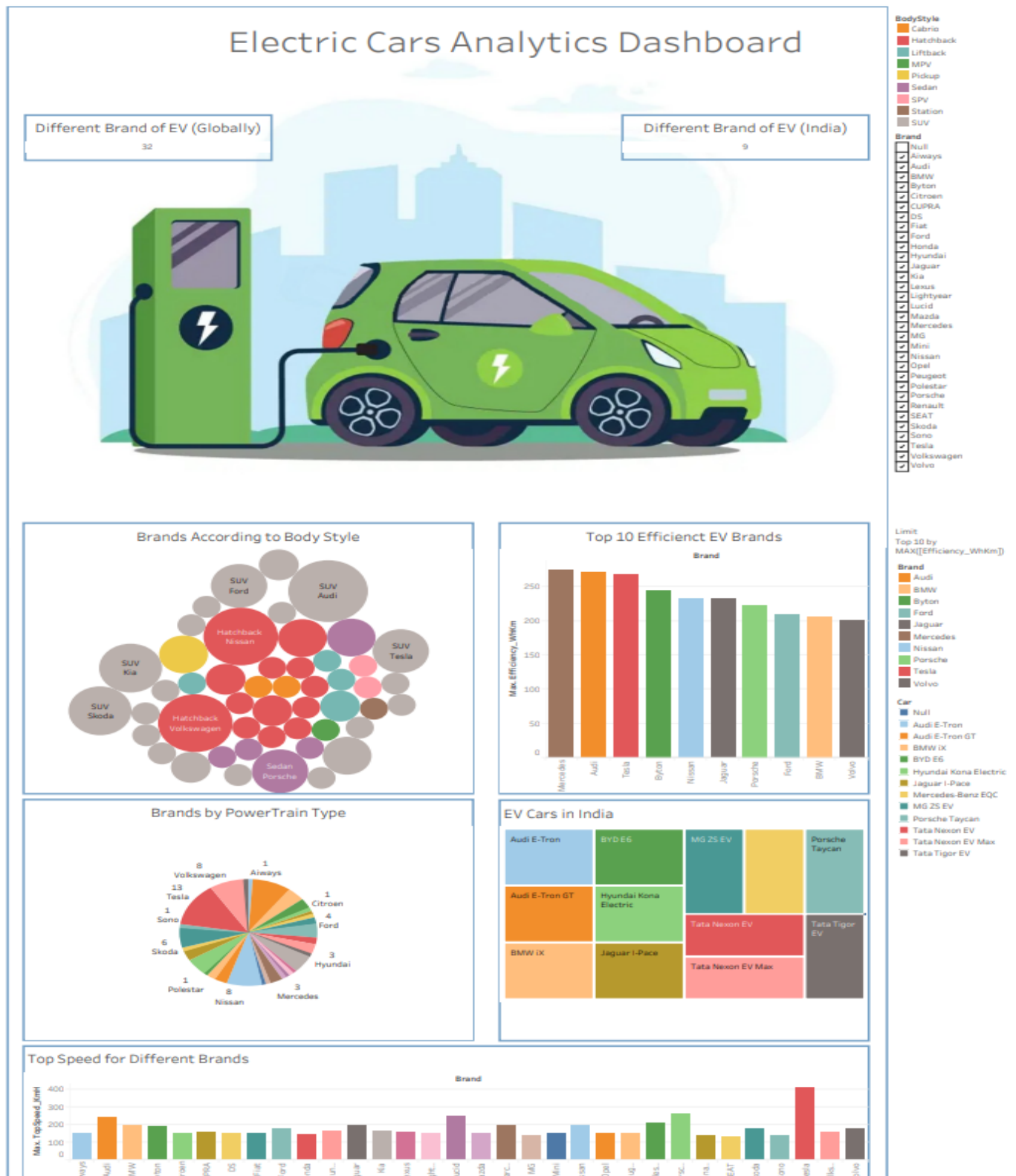10. Different brands of electric cars globally.

Different Brand of EV (Globally)

32

11. Different electric car brands in India.
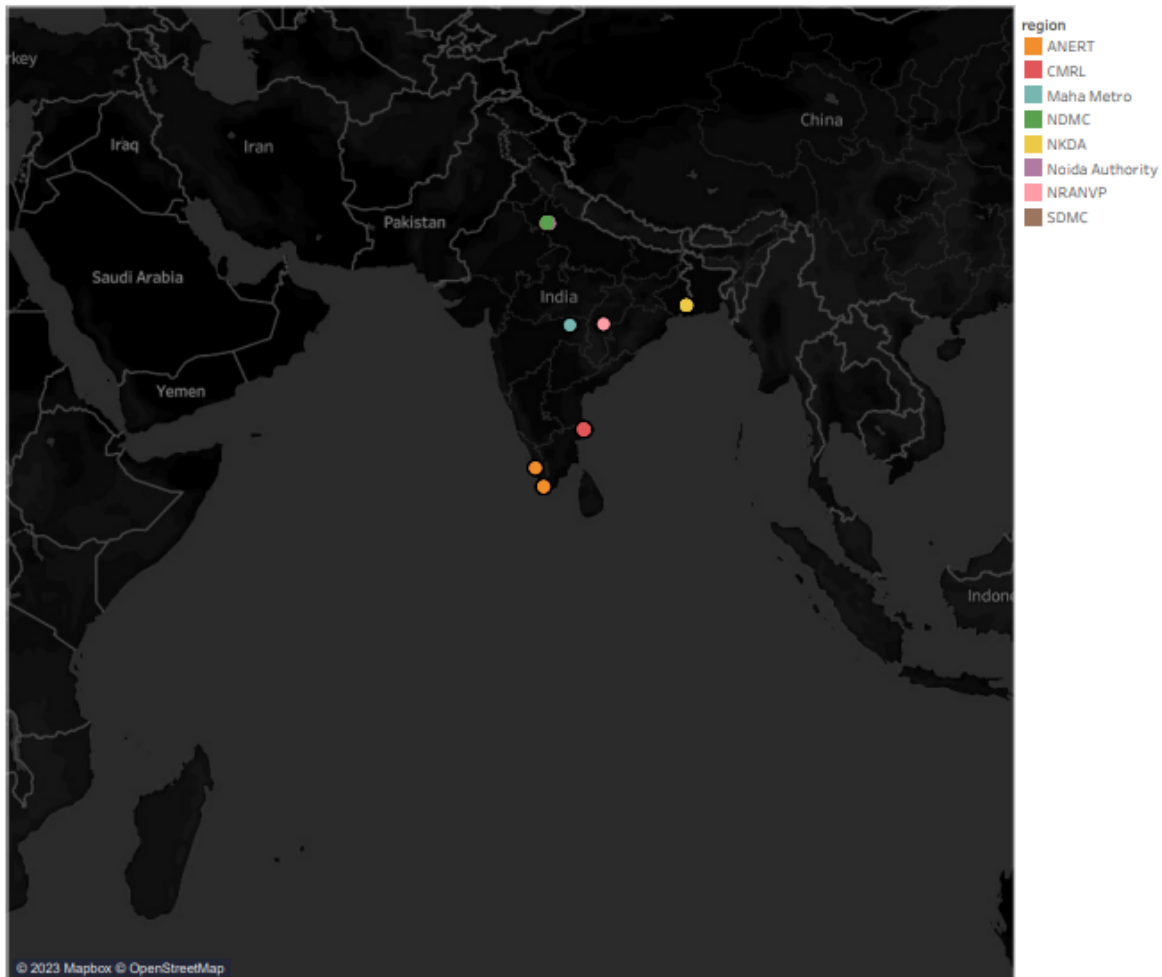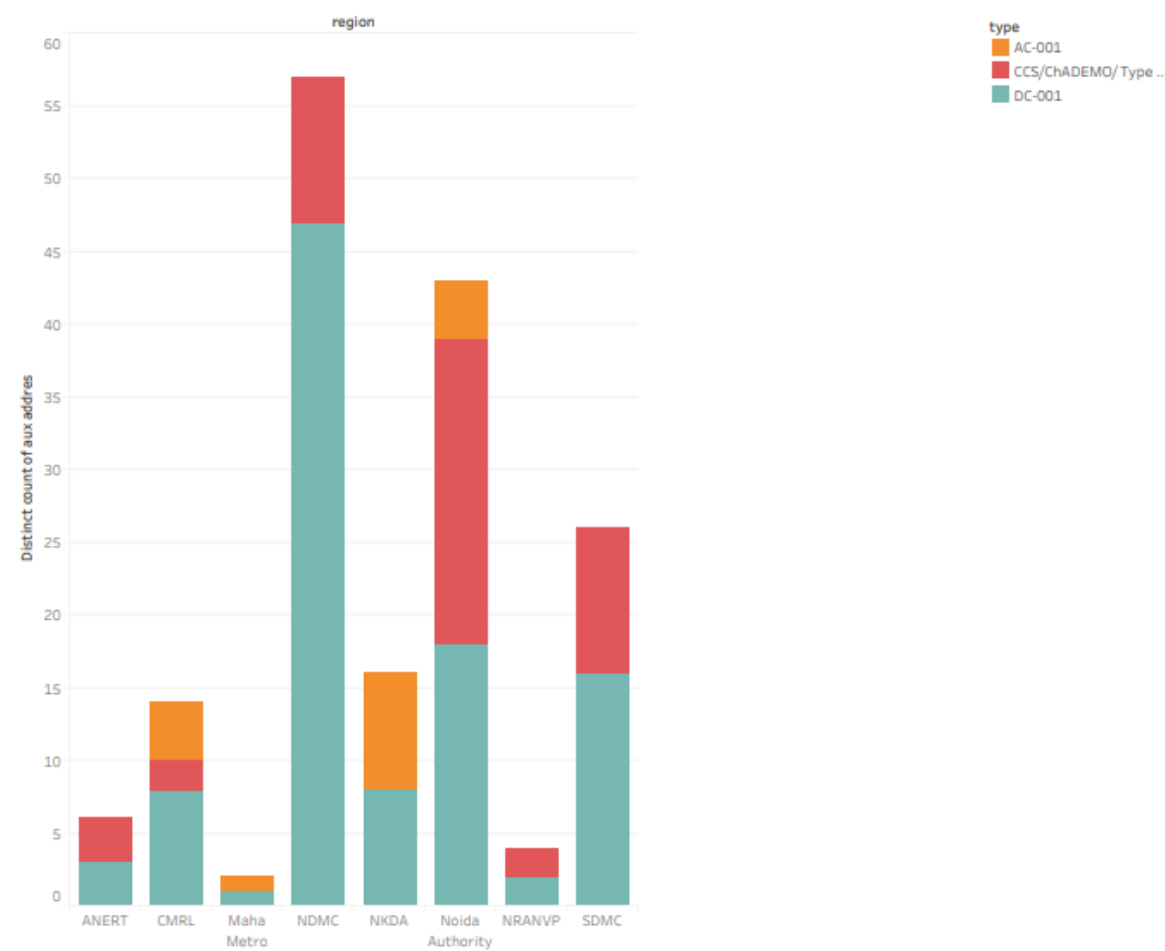
Different Brand of EV (India)

9

5.Dashboard:

Electric Cars Analytics Dashboard

Different Brand of EV (Globally)
32

Different Brand of EV (India)
9

BodyStyle
- Cabrio
- Hatchback
- Liftback
- MPV
- Pickup
- Sedan
- SPV
- Station
- SUV

Brand
- [ ] Null
- [✓] Aiways
- [✓] Audi
- [✓] BMW
- [✓] Byton
- [✓] Citroen
- [✓] CUPRA
- [✓] DS
- [✓] Fiat
- [✓] Ford
- [✓] Honda
- [✓] Hyundai
- [✓] Jaguar
- [✓] Kia
- [✓] Lexus
- [✓] Lightyear
- [✓] Lucid
- [✓] Mazda
- [✓] Mercedes
- [✓] MG
- [✓] Mini
- [✓] Nissan
- [✓] Opel
- [✓] Peugeot
- [✓] Polestar
- [✓] Porsche
- [✓] Renault
- [✓] SEAT
- [✓] Skoda
- [✓] Sono
- [✓] Tesla
- [✓] Volkswagen
- [✓] Volvo

Brands According to Body Style

Top 10 Efficienct EV Brands

Limit
Top 10 by
MAX([Efficiency_WhKm])

Brand
- Audi
- BMW
- Byton
- Ford
- Jaguar
- Mercedes
- Nissan
- Porsche
- Tesla
- Volvo

Car
- Null
- Audi E-Tron
- Audi E-Tron GT
- BMW iX
- BYD E6
- Hyundai Kona Electric
- Jaguar I-Pace
- Mercedes-Benz EQC
- MG ZS EV
- Porsche Taycan
- Tata Nexon EV
- Tata Nexon EV Max
- Tata Tigor EV

Brands by PowerTrain Type

EV Cars in India
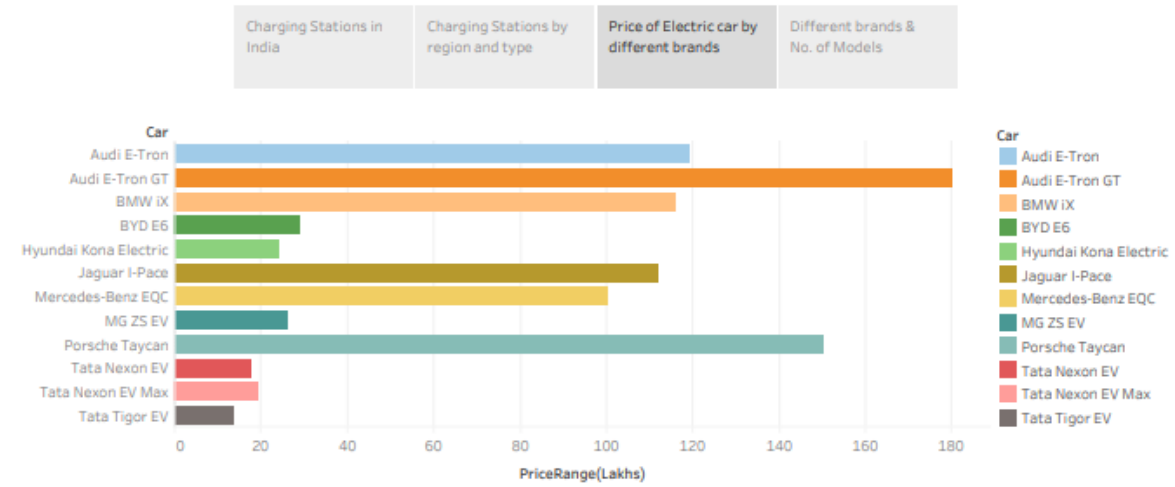
Top Speed for Different Brands
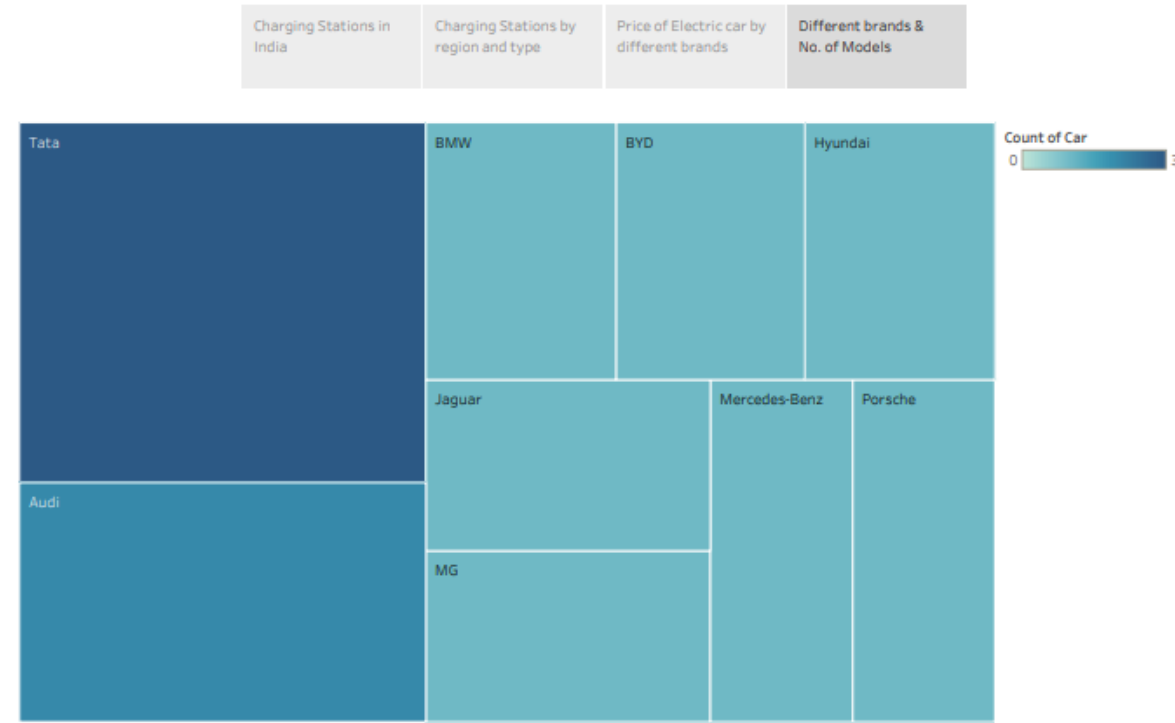
6.Story:

Story of Electric cars in India

| Charging Stations in India | Charging Stations by region and type | Price of Electric car by different brands | Different brands & No. of Models |

Story of Electric cars in India

region

type
- AC-001
- CCS/ChADEMO/ Type ..
- DC-001

Story of Electric cars in India

Car

Car	PriceRange(Lakhs)
Audi E-Tron	~120
Audi E-Tron GT	~180
BMW iX	~115
BYD E6	~28
Hyundai Kona Electric	~24
Jaguar I-Pace	~112
Mercedes-Benz EQC	~100
MG ZS EV	~26
Porsche Taycan	~150
Tata Nexon EV	~18
Tata Nexon EV Max	~20
Tata Tigor EV	~14

PriceRange(Lakhs)

Car legend:
- Audi E-Tron
- Audi E-Tron GT
- BMW iX
- BYD E6
- Hyundai Kona Electric
- Jaguar I-Pace
- Mercedes-Benz EQC
- MG ZS EV
- Porsche Taycan
- Tata Nexon EV
- Tata Nexon EV Max
- Tata Tigor EV

Story of Electric cars in India

Tata

Audi

BMW

BYD

Hyundai

Jaguar

MG

Mercedes-Benz

Porsche

Count of Car
0 — 3

7.Web Integration:

8.Conclusion:

The project "Visualization Tool for Electric Vehicle and Charging Time and Range Analysis" has been sucessfully accomplished by Creating Various Vizualization, Dashboard, Story and Integrating it to a Webpage for sharing it to other stakeholders.

9.Appendix:

1. HTML Code:

```
<!DOCTYPE html>

<html lang="en">


<head>

  <meta charset="utf-8">

  <meta content="width=device-width, initial-scale=1.0" name="viewport">


  <title>Electric Car</title>

  <meta content="" name="description">

  <meta content="" name="keywords">
```
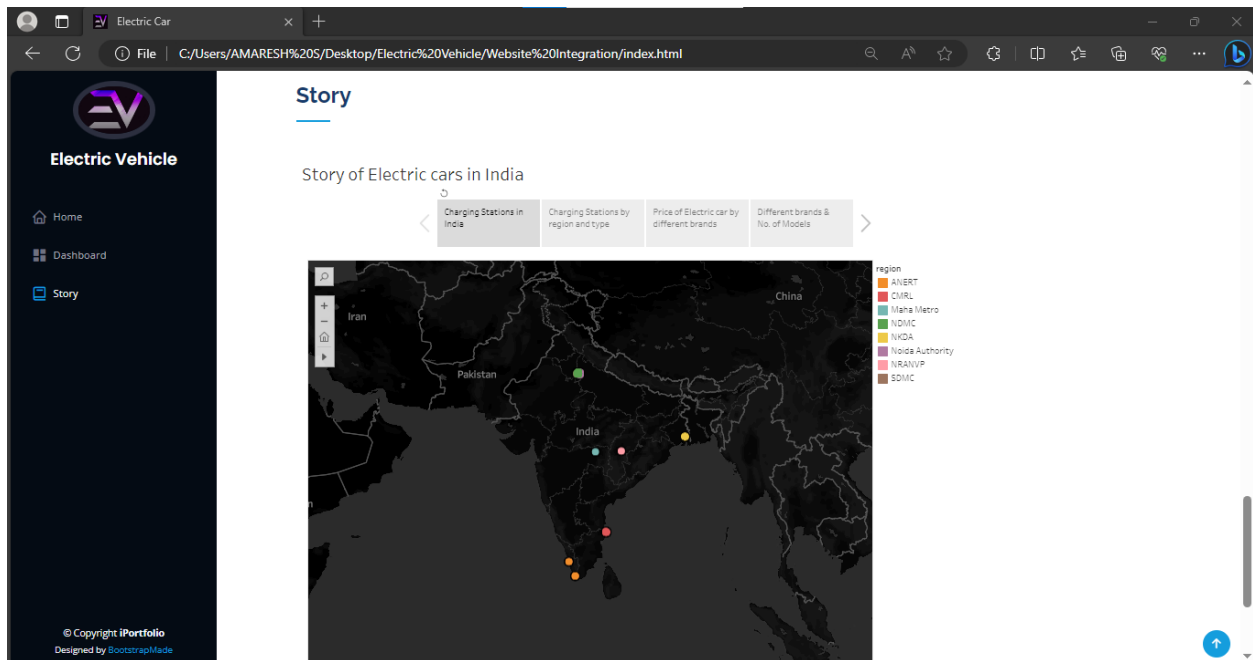
```html
<!-- Favicons -->
<link href="assets/img/EV.png" rel="icon">
<link href="assets/img/EV.png" rel="apple-touch-icon">


<!-- Google Fonts -->
<link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Raleway:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">


<!-- Vendor CSS Files -->
<link href="assets/vendor/aos/aos.css" rel="stylesheet">
<link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
<link href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
<link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
<link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
<link href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">


<!-- Template Main CSS File -->
<link href="assets/css/style.css" rel="stylesheet">


<!-- ======================================================
* Template Name: iPortfolio
* Updated: Jul 27 2023 with Bootstrap v5.3.1
* Template URL: https://bootstrapmade.com/iportfolio-bootstrap-portfolio-websites-template/
* Author: BootstrapMade.com
* License: https://bootstrapmade.com/license/
====================================================== -->
</head>
```

```html
<body>

    <!-- ======= Mobile nav toggle button ======= -->
    <i class="bi bi-list mobile-nav-toggle d-xl-none"></i>

    <!-- ======= Header ======= -->
    <header id="header">
      <div class="d-flex flex-column">

        <div class="profile">
          <img src="assets/img/EV.png" alt="" class="img-fluid rounded-circle">
          <h1 class="text-light"><a href="index.html">Electric Vehicle</a></h1>
          <div class="social-links mt-3 text-center">
          </div>
        </div>

        <nav id="navbar" class="nav-menu navbar">
          <ul>
            <li><a href="#hero" class="nav-link scrollto active"><i class="bx bx-home"></i> <span>Home</span></a></li>
            <li><a href="#dashboard" class="nav-link scrollto"><i class="bx bxs-dashboard"></i> <span>Dashboard</span></a></li>
            <li><a href="#story" class="nav-link scrollto"><i class="bx bx-book"></i> <span>Story</span></a></li>
          </ul>
        </nav><!-- .nav-menu -->
      </div>
    </header><!-- End Header -->
```

```html
<!-- ======= Hero Section ======= -->

<section id="hero" class="d-flex flex-column justify-content-center align-items-center">

  <div class="hero-container" data-aos="fade-in">

    <h1>Electric Vehicle</h1>

      <p>It <span class="typed" data-typed-items="is a vehicle that runs on electricity,uses an electric motor powered by batteries.,is also known as 'E-Vehicle' or 'EV.'"></span></p>

  </div>

</section><!-- End Hero -->


<main id="main">


  <!-- ======= Dashboard Section ======= -->

  <section id="dashboard" class="dashboard">

    <div class="container">


      <div class="section-title">

        <h2>Dashboard</h2>

      </div>

        <div class='tableauPlaceholder' id='viz1695026463982' style='position: relative'><noscript><a href='#'><img alt='Dashboard 1 ' src='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;Pr&#47;Project-Data_Vizualization_Dashboard&#47;Dashboard1&#47;1_rss.png' style='border: none' /></a></noscript><object class='tableauViz' style='display:none;'><param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version' value='3' /> <param name='site_root' value='' /><param name='name' value='Project-Data_Vizualization_Dashboard&#47;Dashboard1' /><param name='tabs' value='no' /><param name='toolbar' value='yes' /><param name='static_image' value='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;Pr&#47;Project-Data_Vizualization_Dashboard&#47;Dashboard1&#47;1.png' /> <param name='animate_transition' value='yes' /><param name='display_static_image' value='yes' /><param name='display_spinner' value='yes' /><param name='display_overlay' value='yes' /><param name ='display_count' value='yes' /><param name='language' value='en-GB' /></object></div>                <script type='text/javascript'>                var divElement = document.getElementById('viz1695026463982');                var vizElement = divElement.getElementsByTagName('object')[0];                vizElement.style.width='1320px';vizElement.style.height='2027px';                var scriptElement =
```

```
document.createElement('script');                                    scriptElement.src   =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);           </script>

  </section><!-- End Dashboard Section -->


 <!-- ======= Story Section ======= -->

  <section id="story" class="story">

   <div class="container">


    <div class="section-title">

     <h2>Story</h2>

    </div>
         <div  class='tableauPlaceholder'  id='viz1695035286963'  style='position: relative'><noscript><a
href='#'><img       alt='Story       of       Electric       cars       in       India       '
src='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;Pr&#47;Project-
Data_Vizualization&#47;StoryofElectriccarsinIndia&#47;1_rss.png'           style='border:          none'
/></a></noscript><object     class='tableauViz'        style='display:none;'><param       name='host_url'
value='https%3A%2F%2Fpublic.tableau.com%2F'  />  <param  name='embed_code_version'  value='3'  />
<param                      name='path'                          value='views&#47;Project-
Data_Vizualization&#47;StoryofElectriccarsinIndia?:language=en-GB&amp;:embed=true'   />   <param
name='toolbar'             value='yes'              />><param                    name='static_image'
value='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;Pr&#47;Project-
Data_Vizualization&#47;StoryofElectriccarsinIndia&#47;1.png'  />  <param  name='animate_transition'
value='yes'  /><param  name='display_static_image'  value='yes'  /><param  name='display_spinner'
value='yes'  /><param  name='display_overlay'  value='ye             s'  /><param  name='display_count'
value='yes'  /><param  name='language'  value='en-GB'  /></object></div>                    <script
type='text/javascript'>               var divElement = document.getElementById('viz1695035286963');
var          vizElement           =           divElement.getElementsByTagName('object')[0];
vizElement.style.width='1016px';vizElement.style.height='991px';               var  scriptElement  =
document.createElement('script');                                    scriptElement.src   =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);          </script>

  </section><!-- End Story Section -->


 </main><!-- End #main -->
```

```html
<!-- ======= Footer ======= -->
<footer id="footer">

  <div class="container">

    <div class="copyright">

      &copy; Copyright <strong><span>iPortfolio</span></strong>

    </div>

    <div class="credits">

      <!-- All the links in the footer should remain intact. -->

      <!-- You can delete the links only if you purchased the pro version. -->

      <!-- Licensing information: https://bootstrapmade.com/license/ -->

      <!-- Purchase the pro version with working PHP/AJAX contact form: https://bootstrapmade.com/iportfolio-bootstrap-portfolio-websites-template/ -->

      Designed by <a href="https://bootstrapmade.com/">BootstrapMade</a>

    </div>

  </div>

</footer><!-- End  Footer -->


  <a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i class="bi bi-arrow-up-short"></i></a>


  <!-- Vendor JS Files -->
  <script src="assets/vendor/purecounter/purecounter_vanilla.js"></script>

  <script src="assets/vendor/aos/aos.js"></script>

  <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>

  <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>

  <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>

  <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>

  <script src="assets/vendor/typed.js/typed.umd.js"></script>

  <script src="assets/vendor/waypoints/noframework.waypoints.js"></script>
```

```html
<script src="assets/vendor/php-email-form/validate.js"></script>


<!-- Template Main JS File -->

<script src="assets/js/main.js"></script>


</body>


</html>
```

2. CSS Code:

```css
/**
* Template Name: iPortfolio
* Updated: Jul 27 2023 with Bootstrap v5.3.1
* Template URL: https://bootstrapmade.com/iportfolio-bootstrap-portfolio-websites-template/
* Author: BootstrapMade.com
* License: https://bootstrapmade.com/license/
*/


/*--------------------------------------------------------------
# General
--------------------------------------------------------------*/
body {
  font-family: "Open Sans", sans-serif;
  color: #272829;
}


a {
  color: #149ddd;
  text-decoration: none;
```

```css
}

a:hover {
  color: #37b3ed;
  text-decoration: none;
}

h1,
h2,
h3,
h4,
h5,
h6 {
  font-family: "Raleway", sans-serif;
}

/*--------------------------------------------------------------
# Back to top button
--------------------------------------------------------------*/
.back-to-top {
  position: fixed;
  visibility: hidden;
  opacity: 0;
  right: 15px;
  bottom: 15px;
  z-index: 996;
  background: #149ddd;
  width: 40px;
  height: 40px;
```

```css
  border-radius: 50px;

  transition: all 0.4s;

}


.back-to-top i {

  font-size: 28px;

  color: #fff;

  line-height: 0;

}


.back-to-top:hover {

  background: #2eafec;

  color: #fff;

}


.back-to-top.active {

  visibility: visible;

  opacity: 1;

}


/*--------------------------------------------------------
# Header
--------------------------------------------------------*/
#header {

  position: fixed;

  top: 0;

  left: 0;

  bottom: 0;

  width: 300px;
```

```css
  transition: all ease-in-out 0.5s;

  z-index: 9997;

  transition: all 0.5s;

  padding: 0 15px;

  background: #040b14;

  overflow-y: auto;

}


#header .profile img {

  margin: 15px auto;

  display: block;

  width: 120px;

  border: 8px solid #2c2f3f;

}


#header .profile h1 {

  font-size: 24px;

  margin: 0;

  padding: 0;

  font-weight: 600;

  -moz-text-align-last: center;

  text-align-last: center;

  font-family: "Poppins", sans-serif;

}


#header .profile h1 a,

#header .profile h1 a:hover {

  color: #fff;

  text-decoration: none;
```

```css
}

#header .profile .social-links a {
  font-size: 18px;
  display: inline-block;
  background: #212431;
  color: #fff;
  line-height: 1;
  padding: 8px 0;
  margin-right: 4px;
  border-radius: 50%;
  text-align: center;
  width: 36px;
  height: 36px;
  transition: 0.3s;
}

#header .profile .social-links a:hover {
  background: #149ddd;
  color: #fff;
  text-decoration: none;
}

#main {
  margin-left: 300px;
}

.container,
.container-fluid {
```

```css
    padding-left: 30px;

    padding-right: 30px;

  }


@media (max-width: 1199px) {

  #header {

    left: -300px;

  }


  #main {

    margin-left: 0;

  }


  .container,

  .container-fluid {

    padding-left: 12px;

    padding-right: 12px;

  }

}


/*--------------------------------------------------------

# Navigation Menu

--------------------------------------------------------*/

/* Desktop Navigation */

.nav-menu {

  padding: 30px 0 0 0;

}


.nav-menu * {
```

```css
  margin: 0;

  padding: 0;

  list-style: none;

}


.nav-menu>ul>li {

  position: relative;

  white-space: nowrap;

}


.nav-menu a,
.nav-menu a:focus {

  display: flex;

  align-items: center;

  color: #a8a9b4;

  padding: 12px 15px;

  margin-bottom: 8px;

  transition: 0.3s;

  font-size: 15px;

}


.nav-menu a i,
.nav-menu a:focus i {

  font-size: 24px;

  padding-right: 8px;

  color: #6f7180;

}


.nav-menu a:hover,
```

```css
.nav-menu .active,
.nav-menu .active:focus,
.nav-menu li:hover>a {
  text-decoration: none;
  color: #fff;
}

.nav-menu a:hover i,
.nav-menu .active i,
.nav-menu .active:focus i,
.nav-menu li:hover>a i {
  color: #149ddd;
}

/* Mobile Navigation */
.mobile-nav-toggle {
  position: fixed;
  right: 15px;
  top: 15px;
  z-index: 9998;
  border: 0;
  font-size: 24px;
  transition: all 0.4s;
  outline: none !important;
  background-color: #149ddd;
  color: #fff;
  width: 40px;
  height: 40px;
  display: inline-flex;
```

```css
  align-items: center;

  justify-content: center;

  line-height: 0;

  border-radius: 50px;

  cursor: pointer;

}


.mobile-nav-active {

  overflow: hidden;

}


.mobile-nav-active #header {

  left: 0;

}


/*--------------------------------------------------------------

# Hero Section

--------------------------------------------------------------*/

#hero {

  width: 100%;

  height: 100vh;

  background: url("../img/Background.png") top center;

  background-size: cover;

}


#hero:before {

  content: "";

  background: rgba(5, 13, 24, 0.3);

  position: absolute;
```

```css
  bottom: 0;

  top: 0;

  left: 0;

  right: 0;

  z-index: 1;

}


#hero .hero-container {

  position: relative;

  z-index: 2;

  min-width: 300px;

}


#hero h1 {

  margin: 0 0 10px 0;

  font-size: 64px;

  font-weight: 700;

  line-height: 56px;

  color: #fff;

}


#hero p {

  color: #fff;

  margin-bottom: 50px;

  font-size: 26px;

  font-family: "Poppins", sans-serif;

}


#hero p span {
```

```css
  color: #fff;

  padding-bottom: 4px;

  letter-spacing: 1px;

  border-bottom: 3px solid #149ddd;

}


@media (min-width: 1024px) {

 #hero {

  background-attachment: fixed;

 }

}


@media (max-width: 768px) {

 #hero h1 {

  font-size: 28px;

  line-height: 36px;

 }


 #hero h2 {

  font-size: 18px;

  line-height: 24px;

  margin-bottom: 30px;

 }

}


/*--------------------------------------------------------
# Sections General
--------------------------------------------------------*/
section {
```

```css
  padding: 60px 0;

  overflow: hidden;

}


.section-bg {

  background: #f5f8fd;

}


.section-title {

  padding-bottom: 30px;

}


.section-title h2 {

  font-size: 32px;

  font-weight: bold;

  margin-bottom: 20px;

  padding-bottom: 20px;

  position: relative;

  color: #173b6c;

}


.section-title h2::after {

  content: "";

  position: absolute;

  display: block;

  width: 50px;

  height: 3px;

  background: #149ddd;

  bottom: 0;
```

```css
  left: 0;

}


.section-title p {

  margin-bottom: 0;

}


/*---------------------------------------------------------

# Dashboard

----------------------------------------------------------*/

.dashbord .content h3 {

  font-weight: 700;

  font-size: 26px;

  color: #173b6c;

}


.dashboard .content ul {

  list-style: none;

  padding: 0;

}


.dashboard .content ul li {

  margin-bottom: 20px;

  display: flex;

  align-items: center;

}


.dashboard .content ul strong {

  margin-right: 10px;
```

```css
}

.dashboard .content ul i {
  font-size: 16px;
  margin-right: 5px;
  color: #149ddd;
  line-height: 0;
}


.dashboard .content p:last-child {
  margin-bottom: 0;
}



/*--------------------------------------------------------------
# Story
--------------------------------------------------------------*/
.story .content h3 {
  font-weight: 700;
  font-size: 26px;
  color: #173b6c;
}

.story .content ul {
  list-style: none;
  padding: 0;
}

.story .content ul li {
```

```css
  margin-bottom: 20px;

  display: flex;

  align-items: center;

}


.story .content ul strong {

  margin-right: 10px;

}


.story .content ul i {

  font-size: 16px;

  margin-right: 5px;

  color: #149ddd;

  line-height: 0;

}


.story .content p:last-child {

  margin-bottom: 0;

}


/*--------------------------------------------------------------

# Breadcrumbs

--------------------------------------------------------------*/
.breadcrumbs {

  padding: 20px 0;

  background: #f9f9f9;

}


.breadcrumbs h2 {
```

```css
  font-size: 26px;

  font-weight: 300;

}


.breadcrumbs ol {

  display: flex;

  flex-wrap: wrap;

  list-style: none;

  padding: 0;

  margin: 0;

  font-size: 15px;

}


.breadcrumbs ol li+li {

  padding-left: 10px;

}


.breadcrumbs ol li+li::before {

  display: inline-block;

  padding-right: 10px;

  color: #0e2442;

  content: "/";

}


@media (max-width: 768px) {

  .breadcrumbs .d-flex {

    display: block !important;

  }
```

```css
  .breadcrumbs ol {

    display: block;

  }


  .breadcrumbs ol li {

    display: inline-block;

  }

}


/*-----------------------------------------------------------

# Footer

-----------------------------------------------------------*/

#footer {

  padding: 15px;

  color: #f4f6fd;

  font-size: 14px;

  position: fixed;

  left: 0;

  bottom: 0;

  width: 300px;

  z-index: 9999;

  background: #040b14;

}


#footer .copyright {

  text-align: center;

}


#footer .credits {
```

```
   padding-top: 5px;

   text-align: center;

   font-size: 13px;

   color: #eaebf0;

 }


@media (max-width: 1199px) {

 #footer {

   position: static;

   width: auto;

   padding-right: 20px 15px;

  }

}
```

3. JavaScript Code:

```
/**

* Template Name: iPortfolio

* Updated: Jul 27 2023 with Bootstrap v5.3.1

* Template URL: https://bootstrapmade.com/iportfolio-bootstrap-portfolio-websites-template/

* Author: BootstrapMade.com

* License: https://bootstrapmade.com/license/

*/

(function() {

  "use strict";


  /**

   * Easy selector helper function
```

```javascript
 */
const select = (el, all = false) => {
  el = el.trim()
  if (all) {
    return [...document.querySelectorAll(el)]
  } else {
    return document.querySelector(el)
  }
}


/**
 * Easy event listener function
 */
const on = (type, el, listener, all = false) => {
  let selectEl = select(el, all)
  if (selectEl) {
    if (all) {
      selectEl.forEach(e => e.addEventListener(type, listener))
    } else {
      selectEl.addEventListener(type, listener)
    }
  }
}


/**
 * Easy on scroll event listener
 */
const onscroll = (el, listener) => {
  el.addEventListener('scroll', listener)
```

```
  }

/**
 * Navbar links active state on scroll
 */
let navbarlinks = select('#navbar .scrollto', true)
const navbarlinksActive = () => {
  let position = window.scrollY + 200
  navbarlinks.forEach(navbarlink => {
    if (!navbarlink.hash) return
    let section = select(navbarlink.hash)
    if (!section) return
    if (position >= section.offsetTop && position <= (section.offsetTop + section.offsetHeight)) {
      navbarlink.classList.add('active')
    } else {
      navbarlink.classList.remove('active')
    }
  })
}
window.addEventListener('load', navbarlinksActive)
onscroll(document, navbarlinksActive)

/**
 * Scrolls to an element with header offset
 */
const scrollto = (el) => {
  let elementPos = select(el).offsetTop
  window.scrollTo({
    top: elementPos,
```

```javascript
      behavior: 'smooth'
    })
  }

  /**
   * Back to top button
   */
  let backtotop = select('.back-to-top')
  if (backtotop) {
    const toggleBacktotop = () => {
      if (window.scrollY > 100) {
        backtotop.classList.add('active')
      } else {
        backtotop.classList.remove('active')
      }
    }
    window.addEventListener('load', toggleBacktotop)
    onscroll(document, toggleBacktotop)
  }

  /**
   * Mobile nav toggle
   */
  on('click', '.mobile-nav-toggle', function(e) {
    select('body').classList.toggle('mobile-nav-active')
    this.classList.toggle('bi-list')
    this.classList.toggle('bi-x')
  })
```

```
/**
 * Scrool with ofset on links with a class name .scrollto
 */
on('click', '.scrollto', function(e) {
  if (select(this.hash)) {
    e.preventDefault()

    let body = select('body')
    if (body.classList.contains('mobile-nav-active')) {
      body.classList.remove('mobile-nav-active')
      let navbarToggle = select('.mobile-nav-toggle')
      navbarToggle.classList.toggle('bi-list')
      navbarToggle.classList.toggle('bi-x')
    }
    scrollto(this.hash)
  }
}, true)

/**
 * Scroll with ofset on page load with hash links in the url
 */
window.addEventListener('load', () => {
  if (window.location.hash) {
    if (select(window.location.hash)) {
      scrollto(window.location.hash)
    }
  }
});
```

```
/**
 * Hero type effect
 */
const typed = select('.typed')
if (typed) {
  let typed_strings = typed.getAttribute('data-typed-items')
  typed_strings = typed_strings.split(',')
  new Typed('.typed', {
    strings: typed_strings,
    loop: true,
    typeSpeed: 100,
    backSpeed: 50,
    backDelay: 2000
  });
}

/**
 * Skills animation
 */
let skilsContent = select('.skills-content');
if (skilsContent) {
  new Waypoint({
    element: skilsContent,
    offset: '80%',
    handler: function(direction) {
      let progress = select('.progress .progress-bar', true);
      progress.forEach((el) => {
        el.style.width = el.getAttribute('aria-valuenow') + '%'
      });
```

```
    }
  })
}


/**
 * Porfolio isotope and filter
 */
window.addEventListener('load', () => {
  let portfolioContainer = select('.portfolio-container');
  if (portfolioContainer) {
    let portfolioIsotope = new Isotope(portfolioContainer, {
      itemSelector: '.portfolio-item'
    });


    let portfolioFilters = select('#portfolio-flters li', true);


    on('click', '#portfolio-flters li', function(e) {
      e.preventDefault();
      portfolioFilters.forEach(function(el) {
        el.classList.remove('filter-active');
      });
      this.classList.add('filter-active');


      portfolioIsotope.arrange({
        filter: this.getAttribute('data-filter')
      });
      portfolioIsotope.on('arrangeComplete', function() {
        AOS.refresh()
      });
```

```javascript
    }, true);

  }

});

/**
 * Initiate portfolio lightbox
 */
const portfolioLightbox = GLightbox({
  selector: '.portfolio-lightbox'
});

/**
 * Portfolio details slider
 */
new Swiper('.portfolio-details-slider', {
  speed: 400,
  loop: true,
  autoplay: {
    delay: 5000,
    disableOnInteraction: false
  },
  pagination: {
    el: '.swiper-pagination',
    type: 'bullets',
    clickable: true
  }
});
```

```javascript
/**
 * Testimonials slider
 */
new Swiper('.testimonials-slider', {
  speed: 600,
  loop: true,
  autoplay: {
    delay: 5000,
    disableOnInteraction: false
  },
  slidesPerView: 'auto',
  pagination: {
    el: '.swiper-pagination',
    type: 'bullets',
    clickable: true
  },
  breakpoints: {
    320: {
      slidesPerView: 1,
      spaceBetween: 20
    },

    1200: {
      slidesPerView: 3,
      spaceBetween: 20
    }
  }
});
```

```
  /**
   * Animation on scroll
   */
  window.addEventListener('load', () => {
    AOS.init({
      duration: 1000,
      easing: 'ease-in-out',
      once: true,
      mirror: false
    })
  });


  /**
   * Initiate Pure Counter
   */
  new PureCounter();


})()
```