

# **PROCESS BOOK**

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# CARS AND THEIR SIGNIFICANCE

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## Basic Info :

Done by :

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Link for project repository:

<https://github.com/KrishnaTejaCh7/cars-their-significance>

## **Background and motivation**

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As we know that cars are the leading automobiles which are being sold every year. There are multiple companies which manufacture the cars. Most of the companies are in Americas, China, Europe and India. So, we would like to demonstrate the hierarchy of the companies. The main motivation to choose this topic is because the sales of the cars never decreases and car can be viewed as one of the significant factor in the increasing population.

## **Project Objectives**

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By doing this visualization one can understand the hierarchy in the evolution of cars. Apart from this we can also learn the sales of the cars in the recent years.

In addition to that we can also know which cars are being sold the most in US.

We have considered the US sales data, so we can visualize the sales of cars considering a span of years.

## **Data**

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For this project there are two sources of data which is collected from:

- <https://www.johnhughes.com.au/blog/car-brands-and-their-parent-companies>
- <https://www.factorywarrantylist.com/sales-report.html>

As of now we are building data from other sources as well.

## **Data processing**

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We are planning to take only the required attributes which are enough to provide the significant analysis of cars. So, from the above links we would like to consider the data of car manufacturer and their sales per quartile. Apart from these the other data can be excluded.

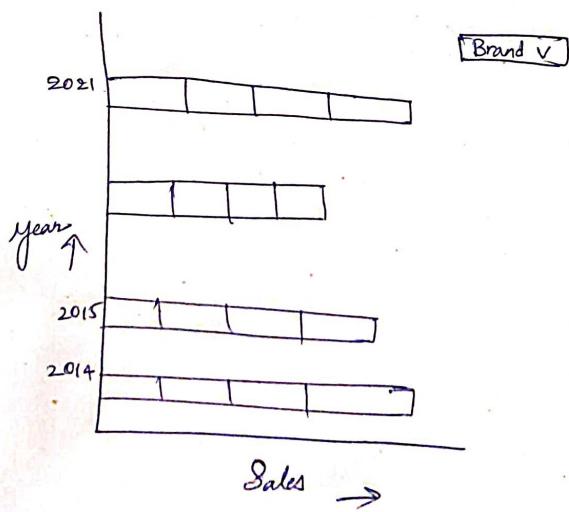
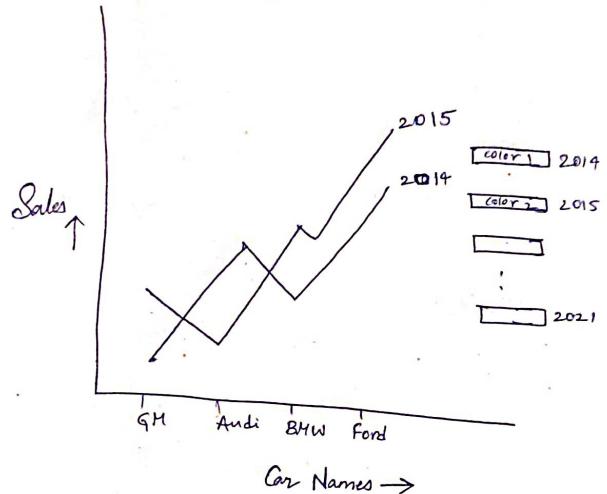
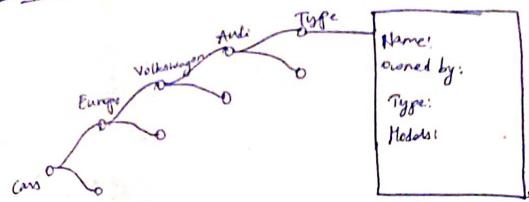
## **Data visualization**

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Prototype 1:

In this prototype we are willing to implement the hierarchy of the car companies using the dendrogram which could be an interactive visualization technique. In the first step when we click the node then we will get the major 3 manufacturing children which are Americas, European and Asia. From then the children will be the respective brands for that region and is followed. Later, to show the stats we would like to implement two different visualizations such as line chart and the stacked bar graph. In the line chart we are willing to visualize the sales vs car manufactures for the respective years. Initially we will be having graphs for all the years then after when we click on year which is a button which is placed in the right side of the visualization we will start by the selected line and if we select another year the lines in the graphs will be added. Later in the stacked bar graph we would like to visualize the quartile sales per company by selecting it in the drop down box.

Prototype-1:

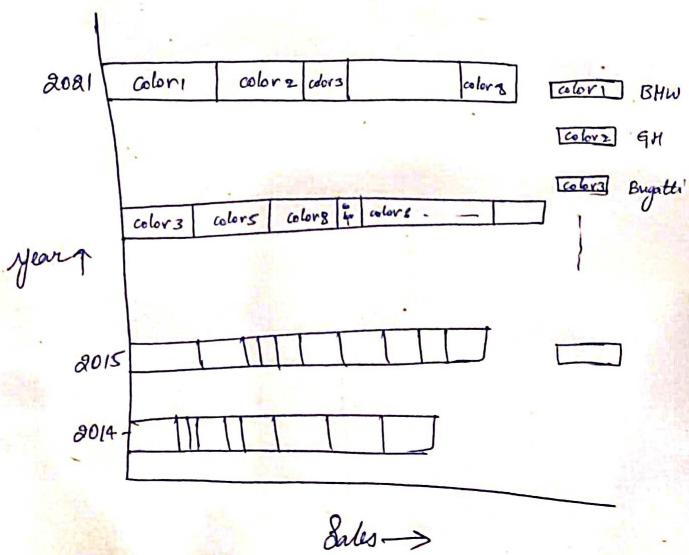
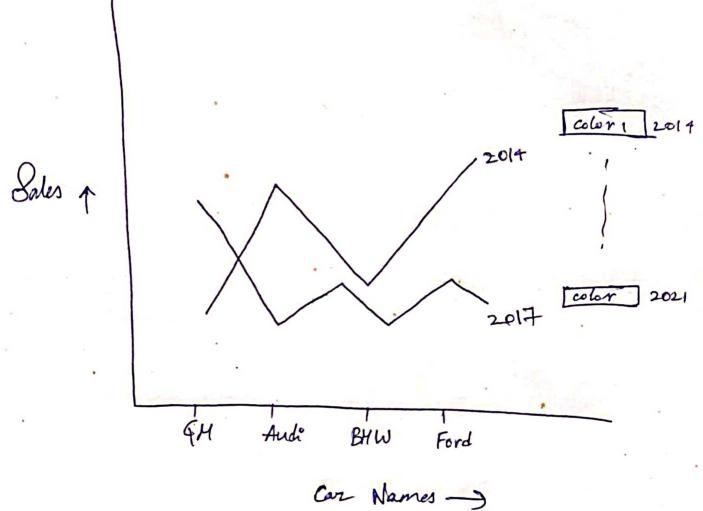
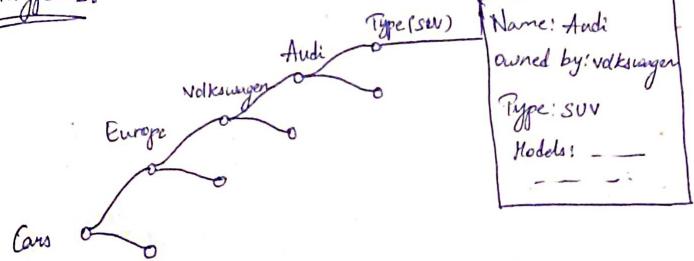


## Prototype 2:

Here in this prototype, we changed the third part which was representing the quartile. We turned it into the stacked bar chart which represents all sales vs years. Here each manufacturer will be represented with a unique color.

When the cursor is hovered on the stacked data then that color will be highlighted in every year. For instance, if the BMW is pink and if the cursor is on pink in any of the year then the BMW pink color will be highlighted in every year of the graph.

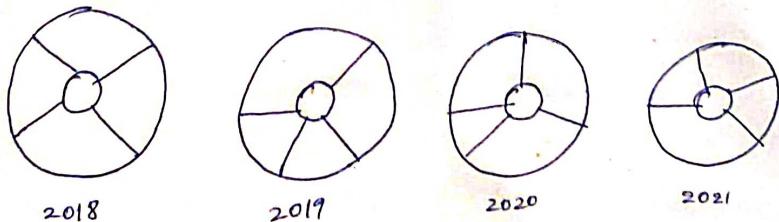
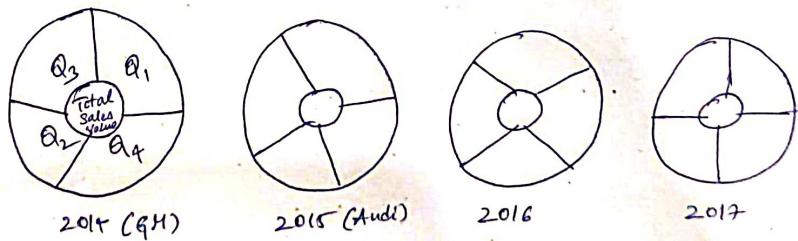
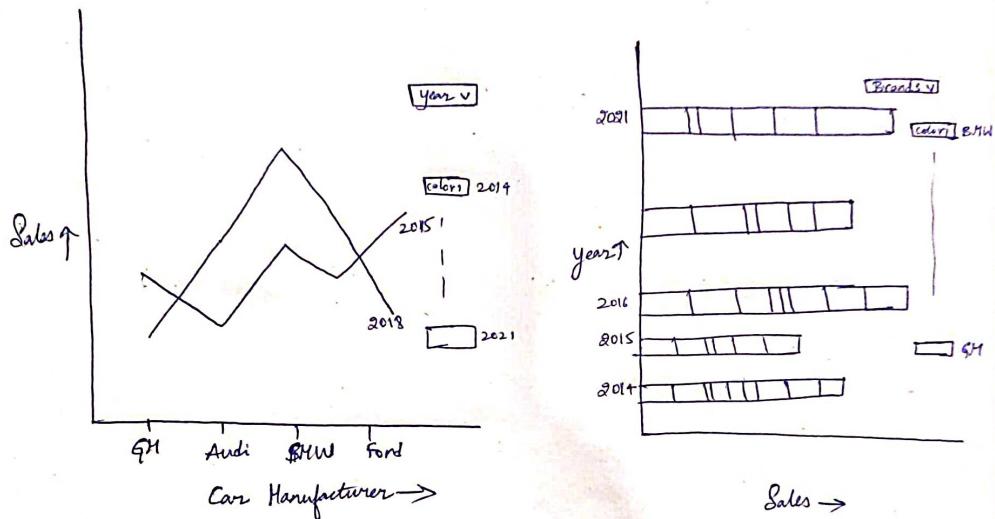
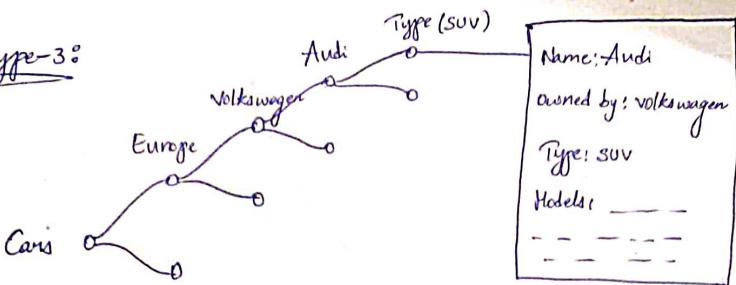
Prototype-2:



### Prototype 3:

Here in this prototype, we got an idea to implement the visualization user friendly. Such that if user wants to get the comparison between the sales vs manufacturer or sales vs years. Here it is done using a dropdown menu. So, if the user selects year then it will show the graph on the left side or if the user selects brands then the right side stacked graph will appear. Later we got an idea that it would become clumsy and difficult to understand if there is no clarity in the stacked bar chart. So, we included the pie charts which represents 4 quarters and total sales in that year. We statically created 8 charts for 8 years. In middle we will be having value of total cars sold and at the quartiles we will be having sales at that particular quartile. Here in the stacked bar chart when we hover the pointer at a particular bar then the manufacturing company's sales in all the years will be highlighted. And only when we click on them the pie chart will get the data to show the quartile.

Prototype-3:



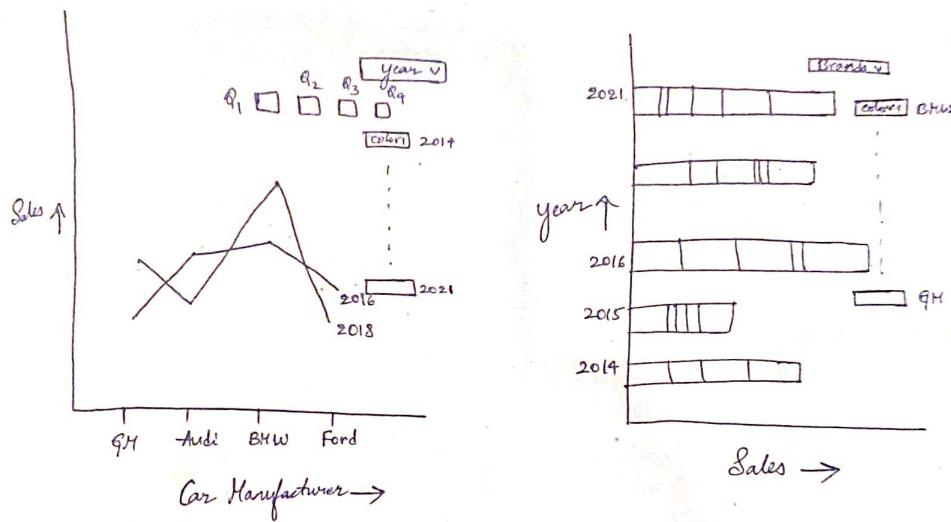
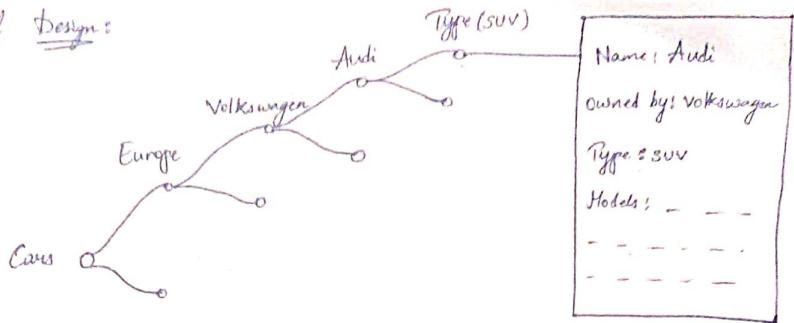
#### Prototype 4:

In the final design we added a sorting feature for the line chart so that we can get the graphs for each quartile sorted for every brand which can determine the maximum number of sales at each quartile of the year. And also, we would like to add the pie chart dynamically so that we can have as many comparisons as we need.

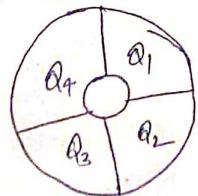
For instance, the prototype-3 doesn't cover the comparison between Audi and ford in year 2014, but dynamically we can add as many pie charts as we want for comparison.

We also included a clear button so that we can clear the canvas whenever it is full and restart selecting the comparisons. By doing all these upgrades we thought it would be a good design for this project.

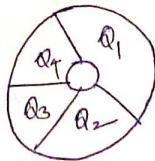
Final Design:



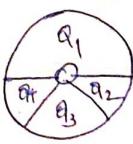
clear ✓



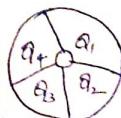
2014 (QH)



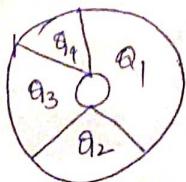
2014 (Audi)



2015 (Fiat)



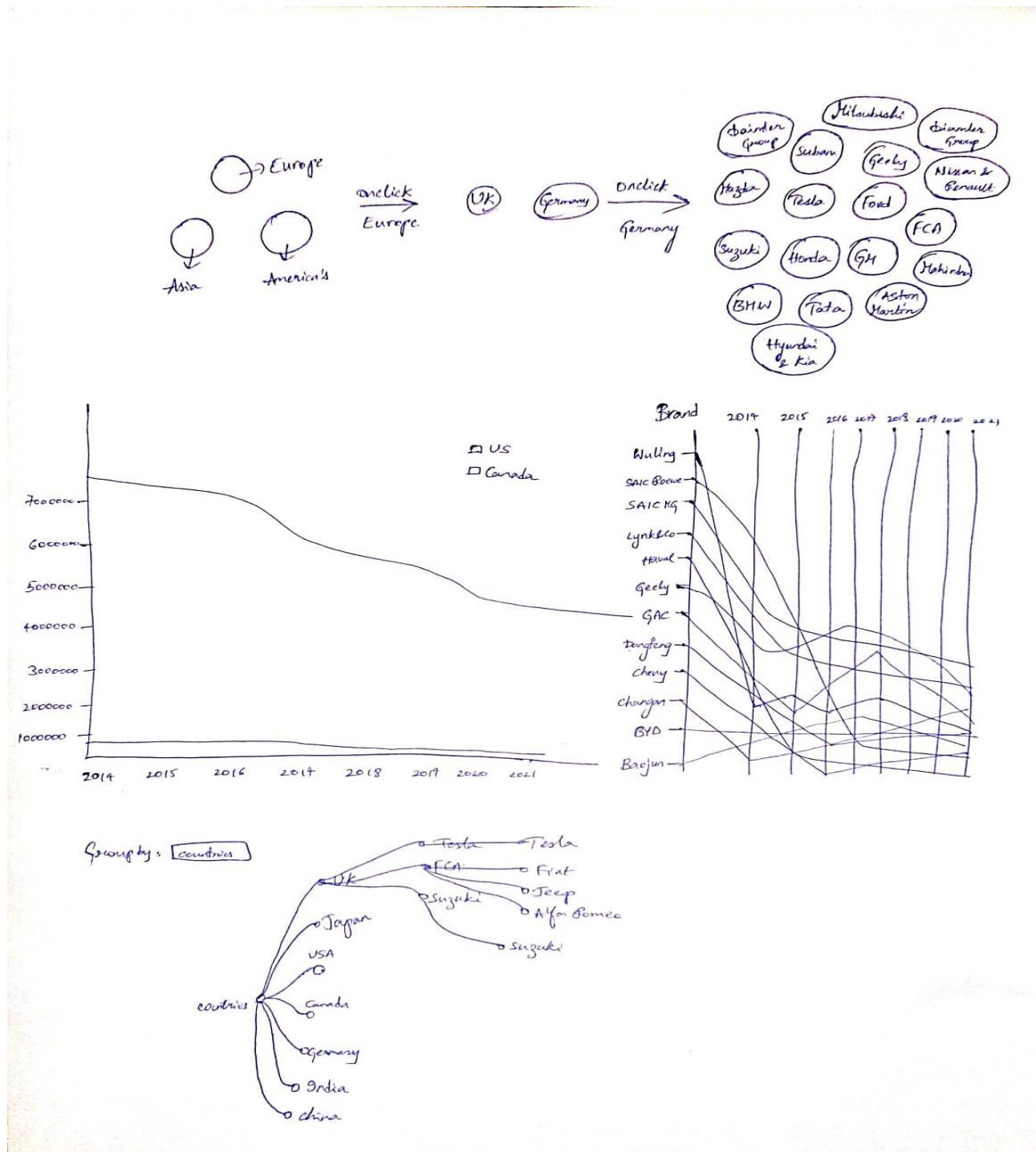
2021 (Ford)



2016 (Honda)

## Design :

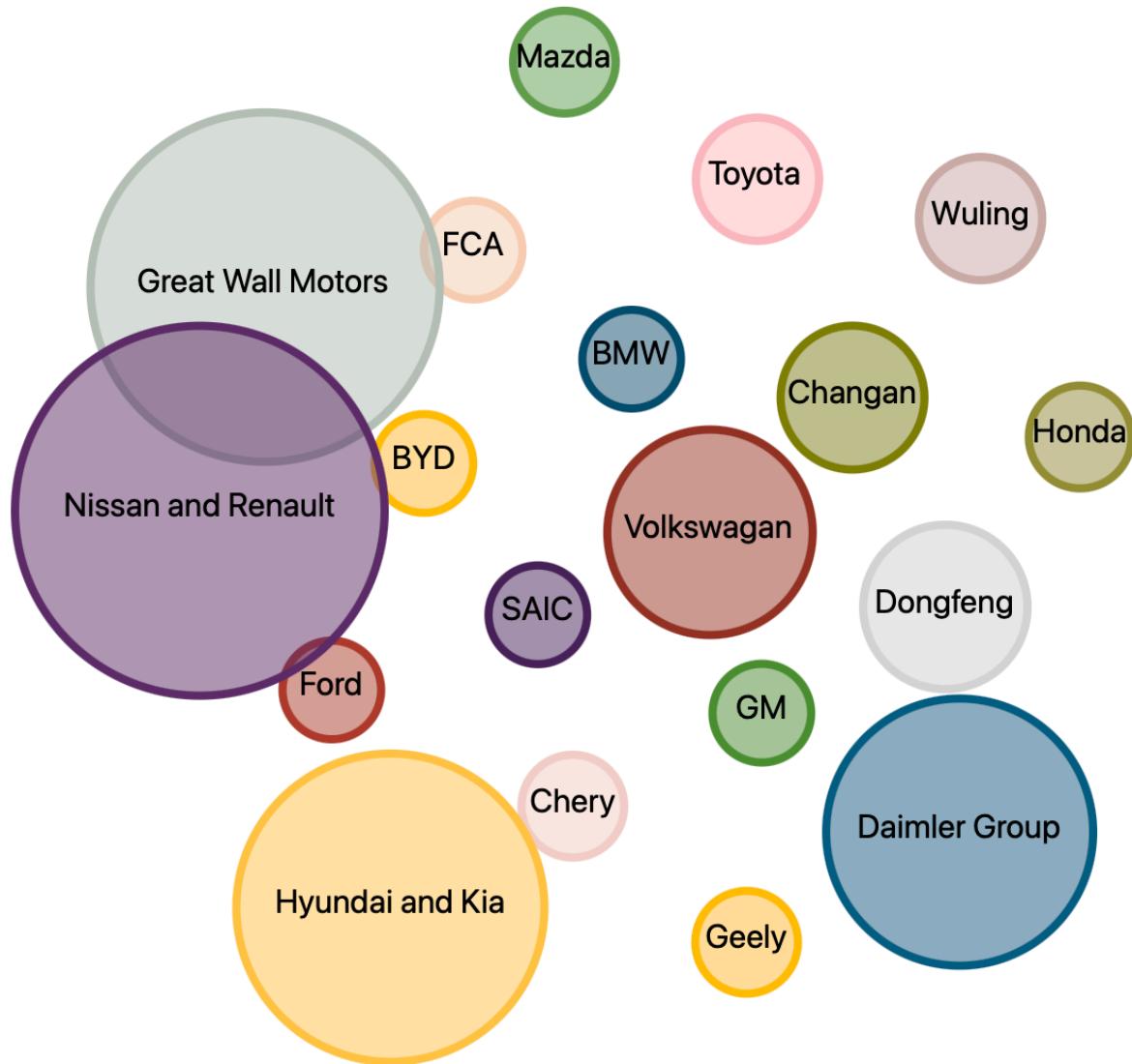
As per the feedback opinions we have redesigned it by including the bubble chart and the parallel coordinates. But here dendrogram is optional.



## Implementation:

Bubble chart :

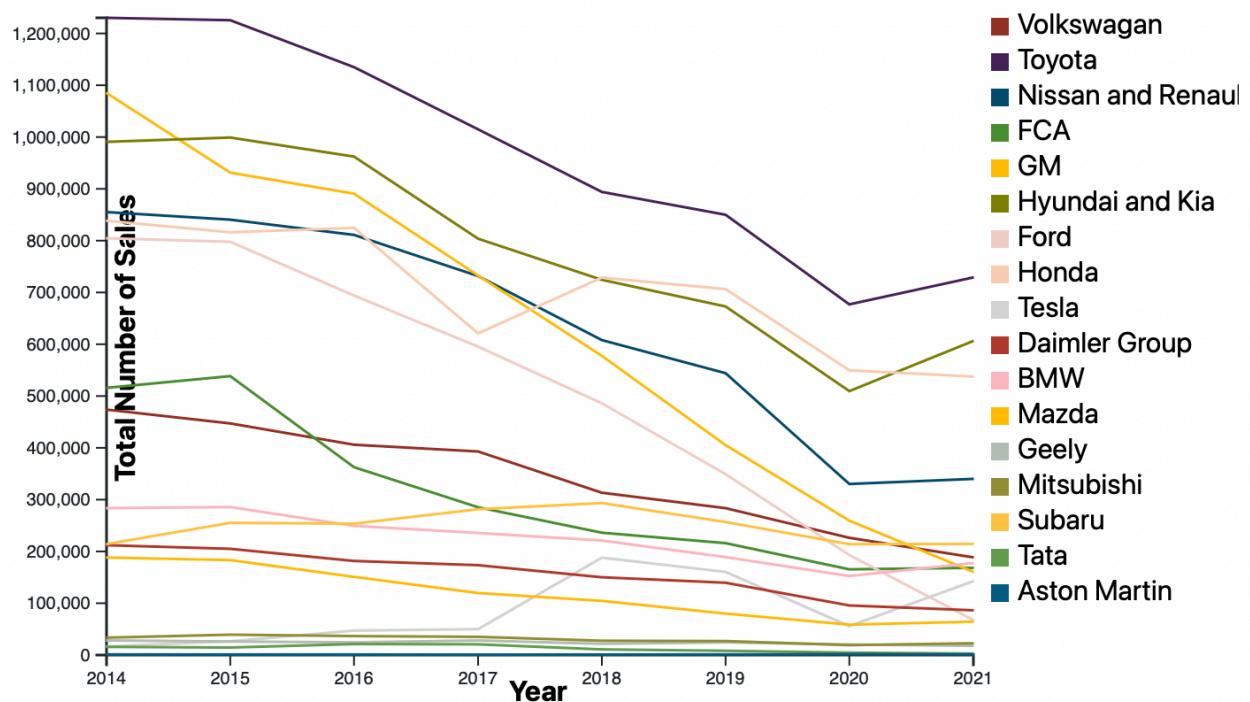
First, we started to implement bubble chart. Here in the bubble chart initially we did start with the continents and then we implemented the onclick events for the further attributes such as countries, ownerships and the cars.



Here if we want to return to the default state we included a clear button so that it will come back into the default state i.e continents.

Line chart:

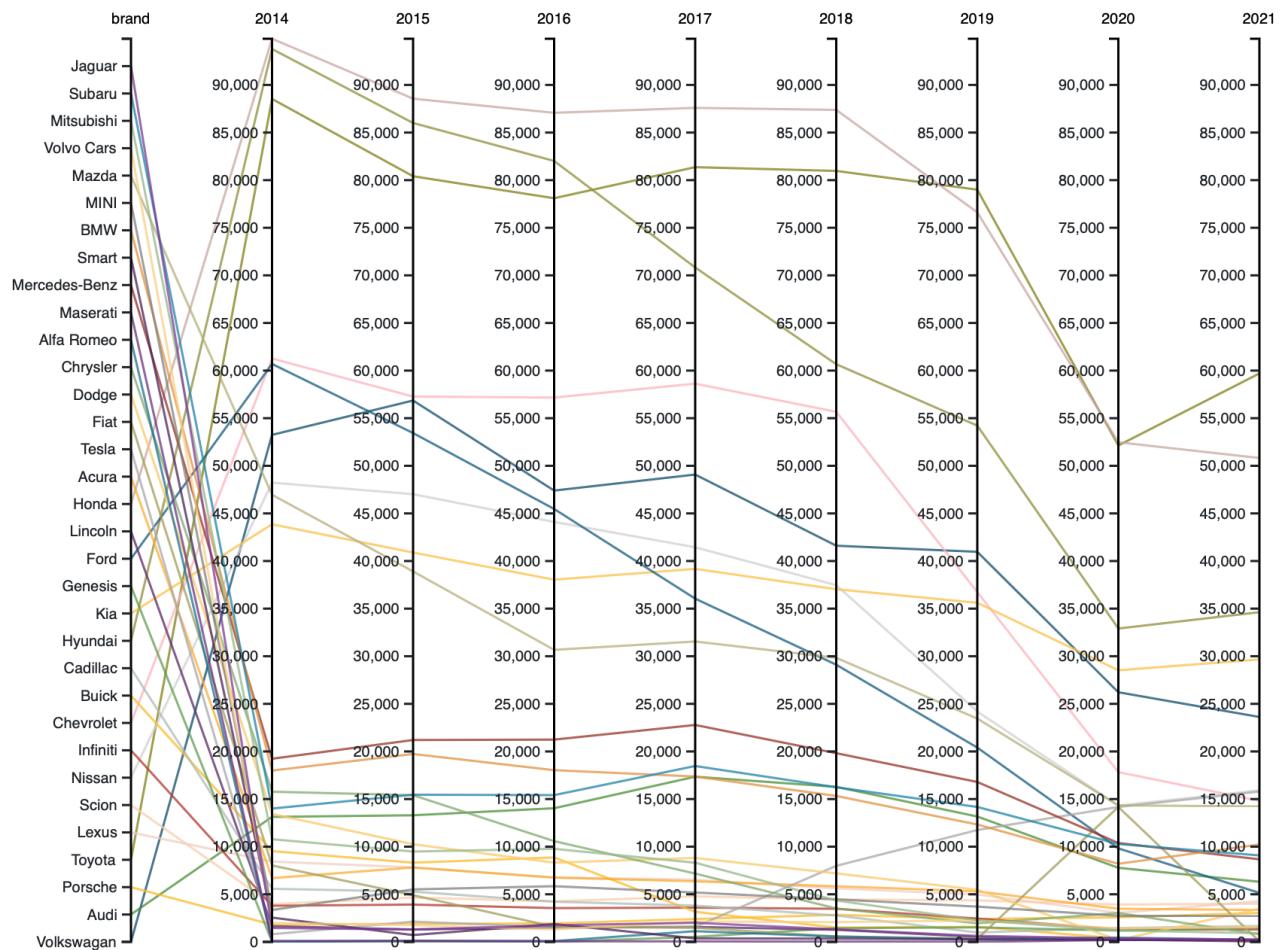
Later we started implementing the line chart which has the graphs that shows the comparisons between years and sales respectively with the selected countries. Here we are yet to do the interactive parts. So we just placed randomly one of the continents which has 2 countries in it. It is as follows.



Here on the x axis we are considering the years and on the y axis we are considering the sales as per our plan we need to make it dynamically as soon as we select a bubble on the bubble chart and the parameters in the graph will be changed respectively.

## Parallel Coordinates

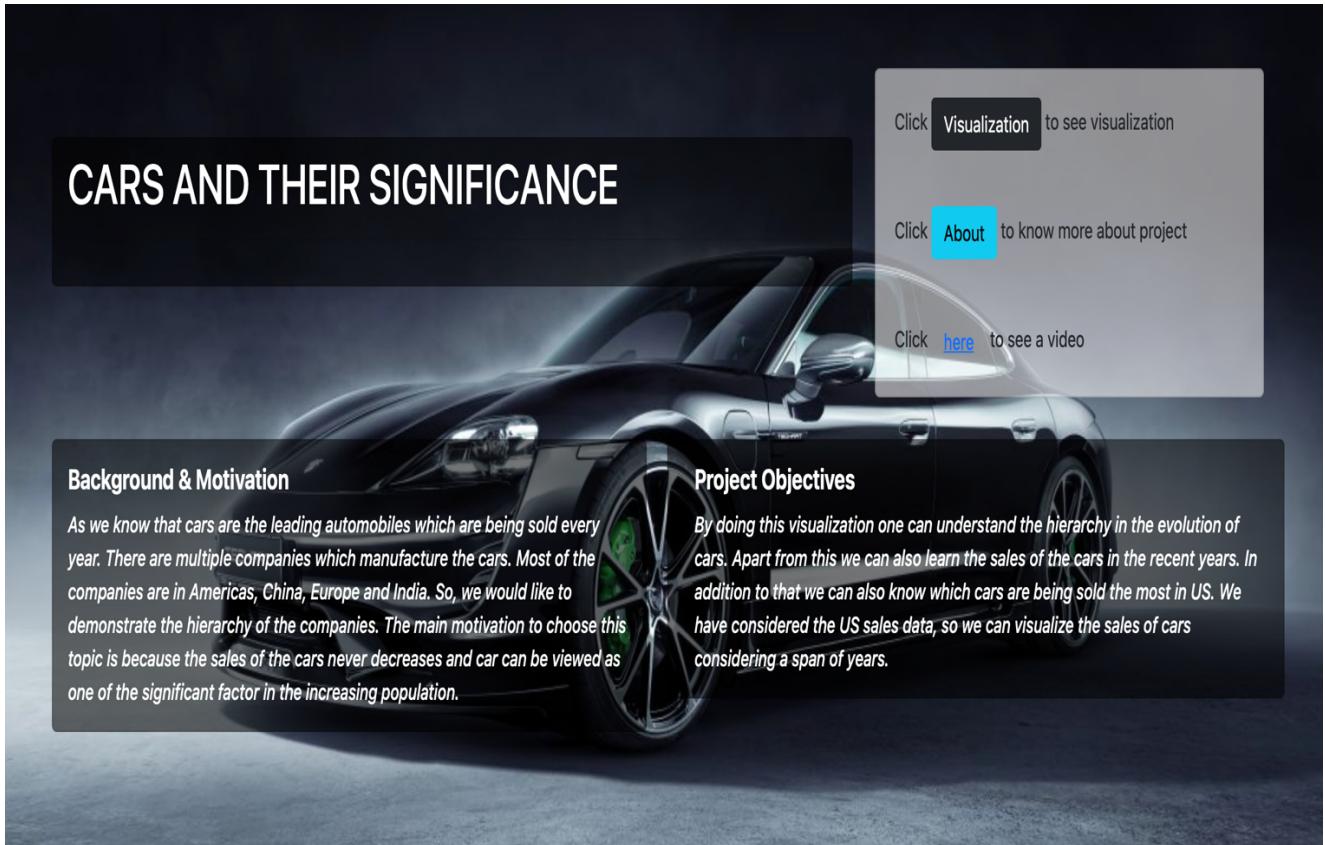
Now we looked into the deeper comparisons such as comparisons between brands so we are choosing the parallel coordinates as the visualization. Here in the parallel coordinates the first coordinate indicates all the brands and all the other lines represent the years. Each brand will be represented with different colors in the parallel coordinates.



As shown in the above diagram we constructed this parallel coordinate graph so that we can provide the comparisons.

Opening webpage:

We have designed an opening page so that we have brief information regarding the project over there and it has the options to get directed into process book, visualization and demo video.



## **Feedbacks**

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### **Project peer feedback:**

- According to peer group the overall design of the project is fine but some part of the project is being done static. They advised us to make it dynamic.
- Coming to the comparisons they advised out that we were showing different visualizations for the similar attributes later they encouraged us to consider attributes for the different visualizations.
- They even advised us to use heatmaps for some part of the visualizations so that we could present the best out of it.

### **TA's feedback:**

- As per TA's feedback the idea of the project was okay.
- But in the visualization part we got some advises from our TA to change some parts of the visualization.
- For an instance if we consider the initial part of the visualization we wanted to have to place a dendrogram but we got a good suggestion to change it into bubble chart visualization.