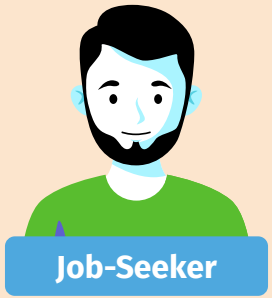
The Adoption Of Electric Vehicles And Their Future Outlook

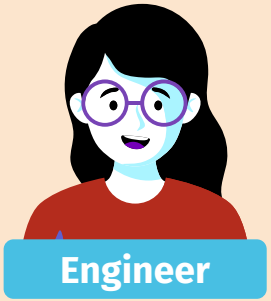
By Shailly Patel & Nagulan Nathan

You may wonder... what are we doing again?

Current reports are too technical and focus on a small aspect of EVs

We will bring a broad, well-rounded perspective of EVs and analyze the market with different statistical and visual methods so that the insights gathered will cater to a broad audience, from job seekers in the EV industry to investors.





Our Motivation to take on this problem

Growing pressure to take the greener route

EV Sales in North America, Europe and China have experienced compounding annual growth rates

Curiosity to Learn about the EV market and factors affecting its success

The topics we looked into

Emission

EV Infrastructure & Adoption

Stock Market Prices

What Industry needs are being addressed?

- Statistical analysis of emissions of conventional vehicles vs EV
- Unbiased perspective of the EV market
- Analysis into factors affecting EV market and building a predictive model

What approaches did we use?

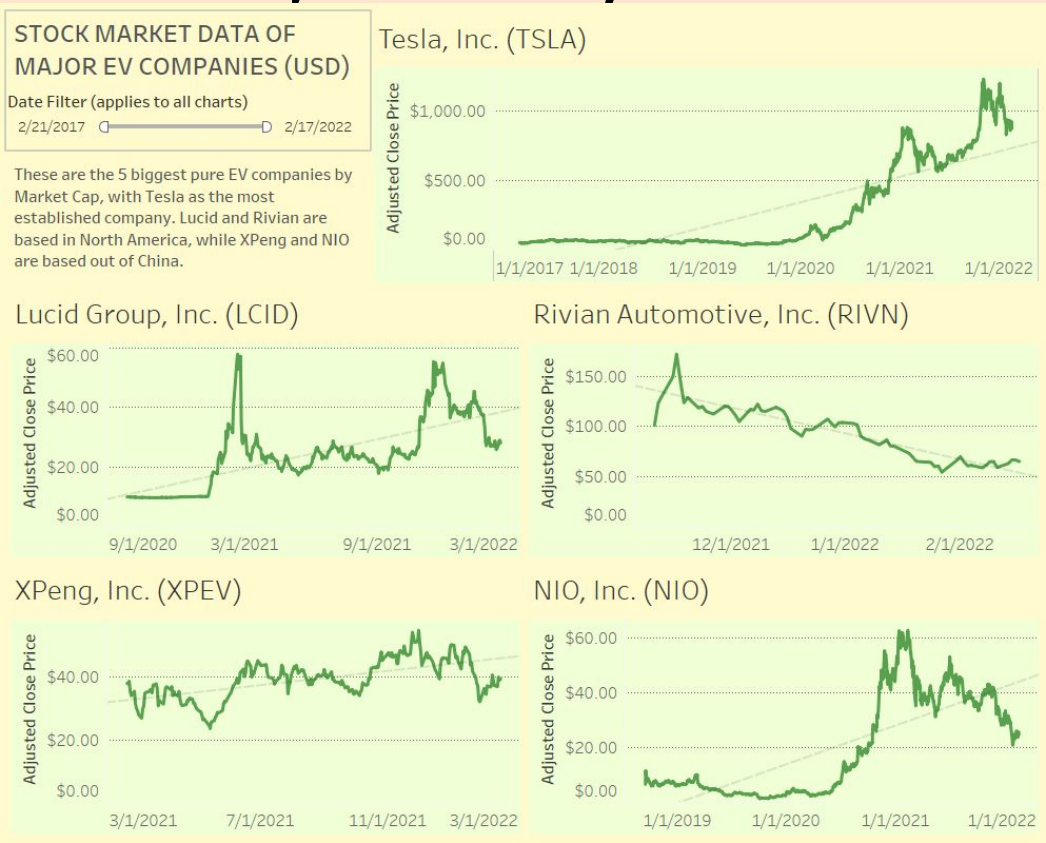
01 Visual Analytics with Tableau

02 Statistical Analysis using R

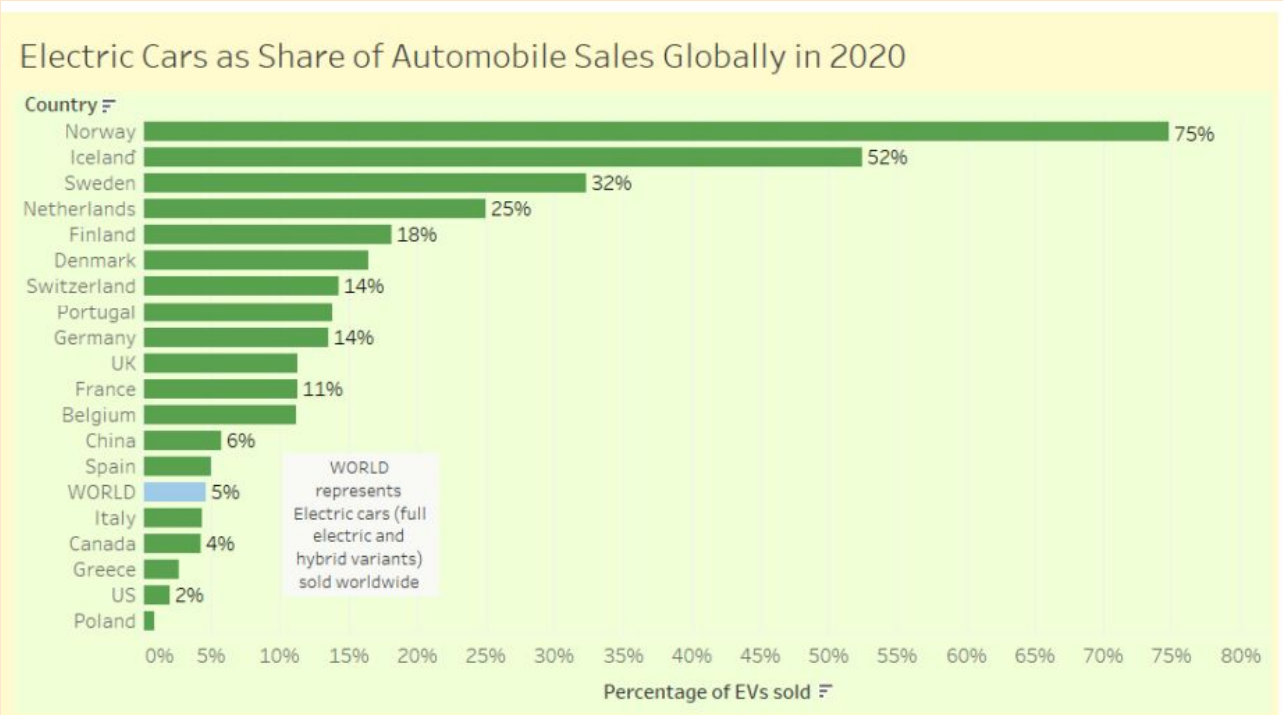
03 Predictive Modelling using RapidMiner

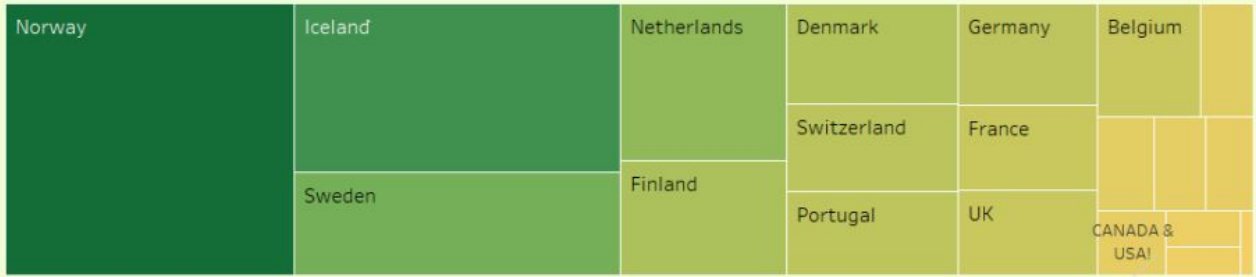
04 Exploratory Analysis with R

1. What has the growth been like for the major EV companies in the past five years?

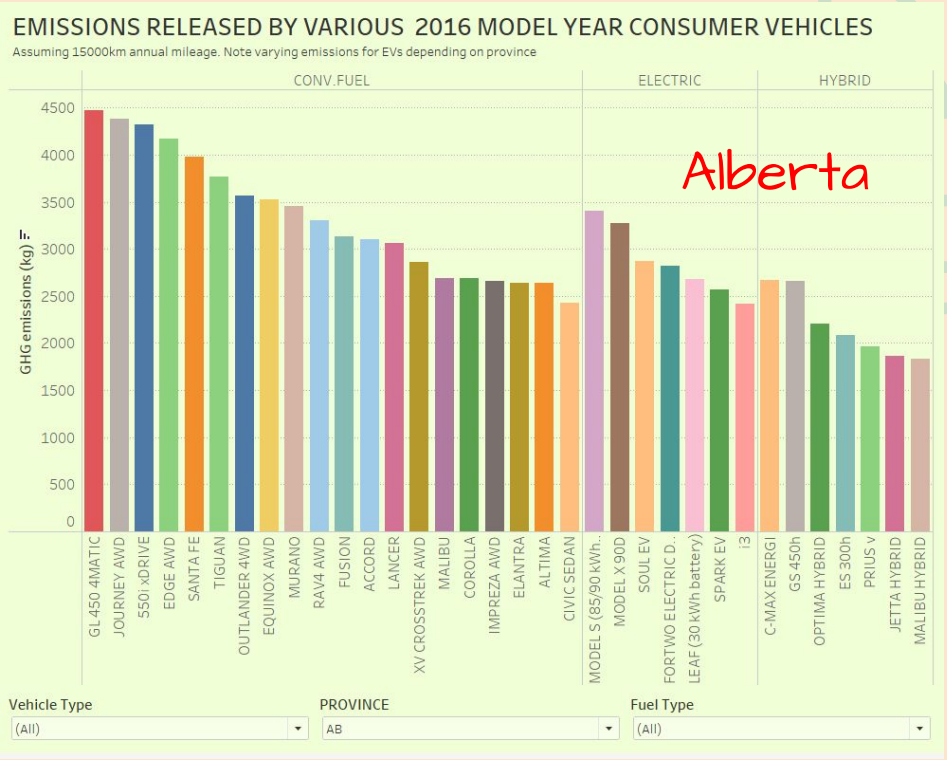


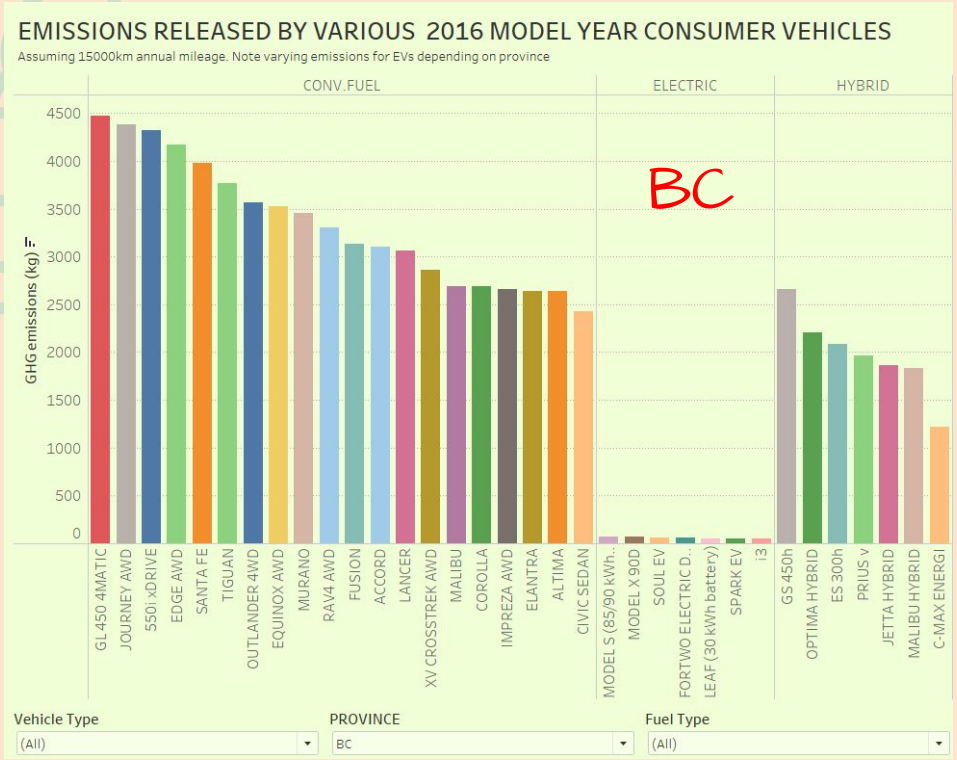
2. What has the adoption of EVs looked like in major regions?



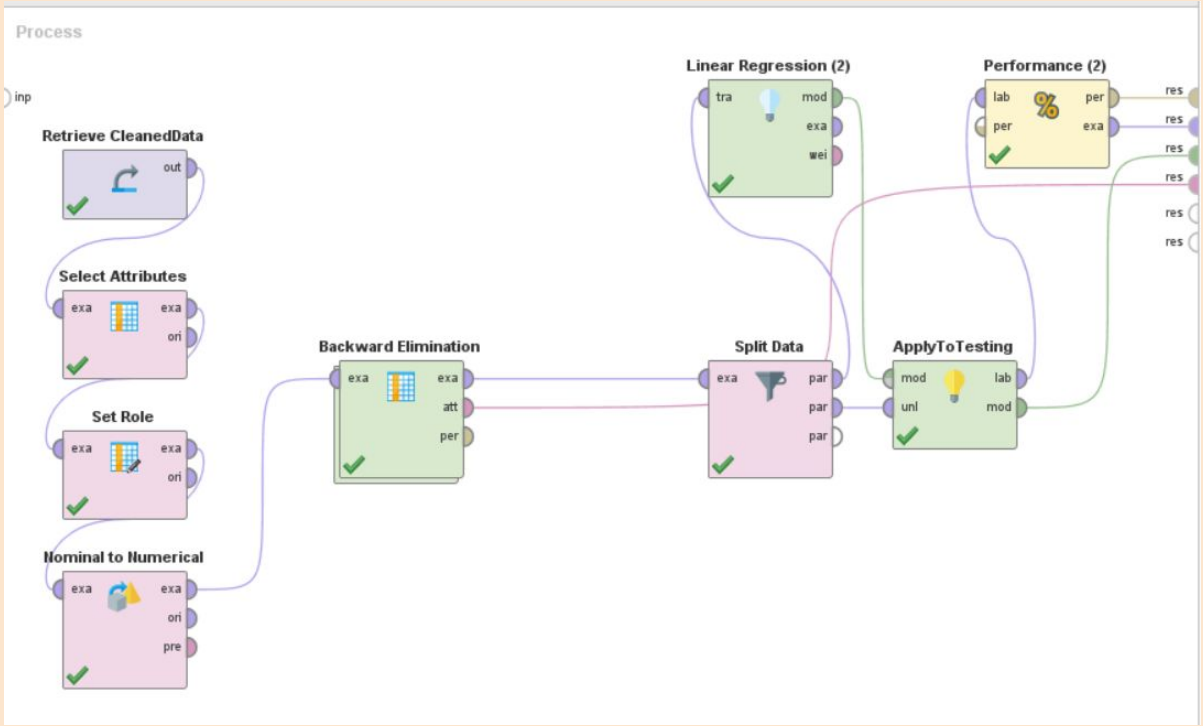


3. Is there a significant difference in emissions between EV and gasoline vehicles?





4. Create a regression model for predicting Tesla Stock Prices using commodities and evaluate its performance.



RMSE: 66.238

```
#checking multicollinearity - our VIFs are way too high
vif(reg_model)
```

```
    PalladiumPrice         CobaltPrice         NickelPrice           ZincPrice
          9.451137            3.804493            6.420662           19.001880
    GC.F.Adjusted       SI.F.Adjusted       CL.F.Adjusted       HG.F.Adjusted
         37.375429           19.243816            7.316477           56.558527
    ChargingStation    LithiumSpotUSD    USPolParty.1.Dem.
         55.245912            9.709112           23.722966
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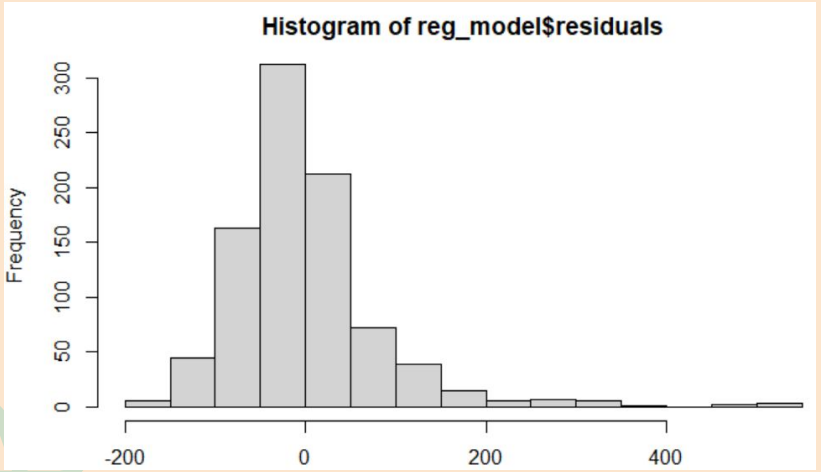
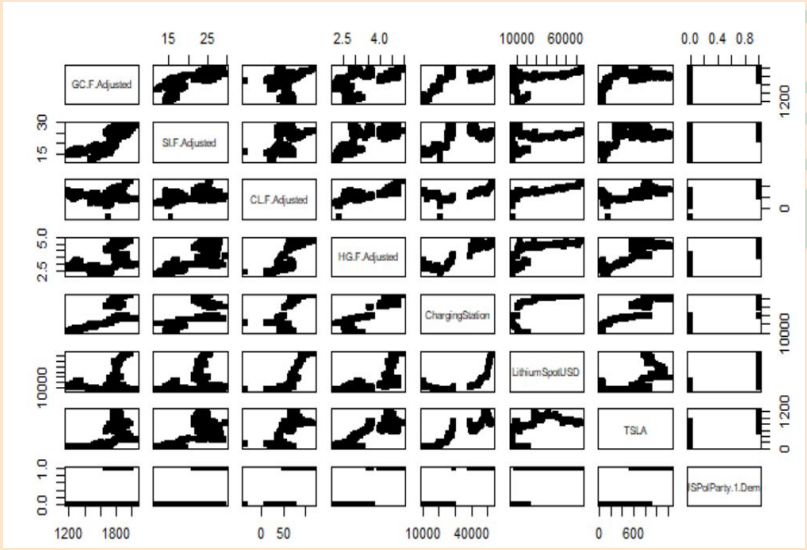
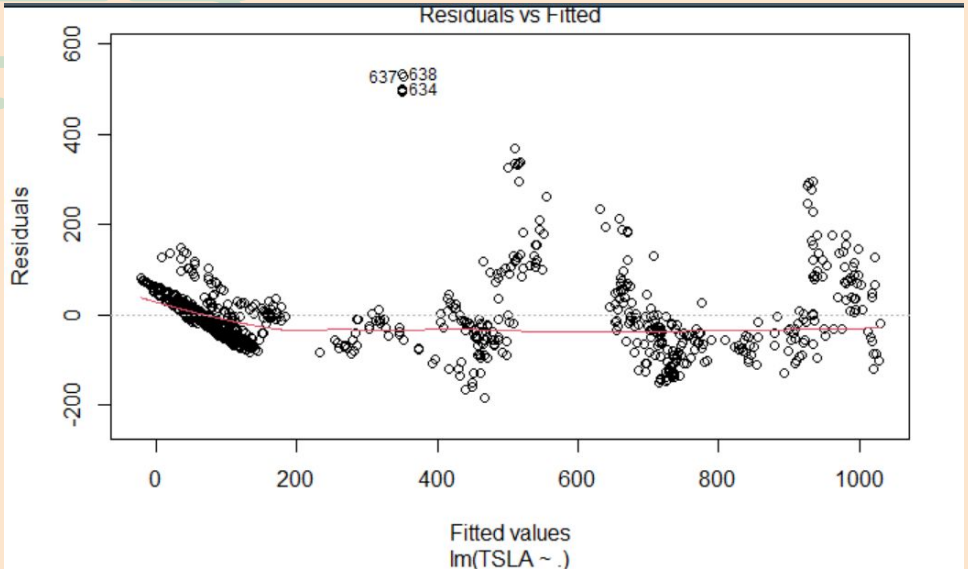
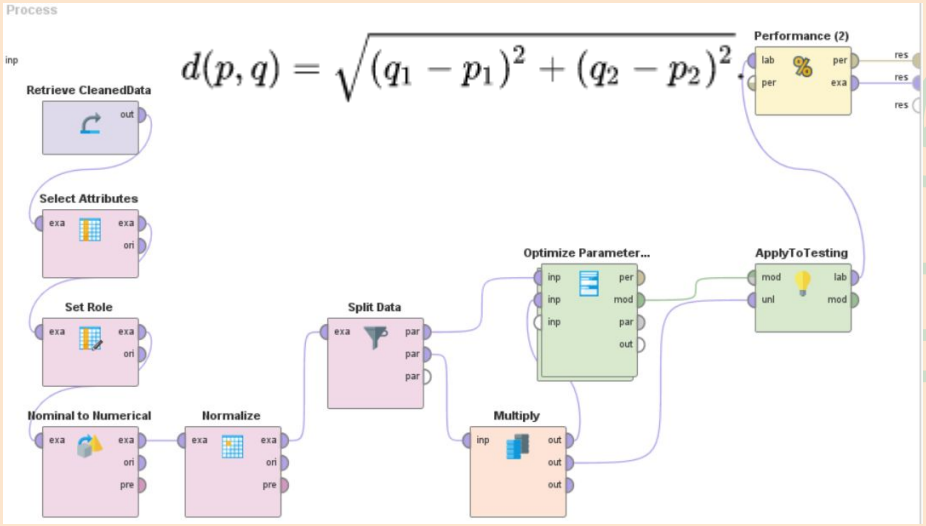


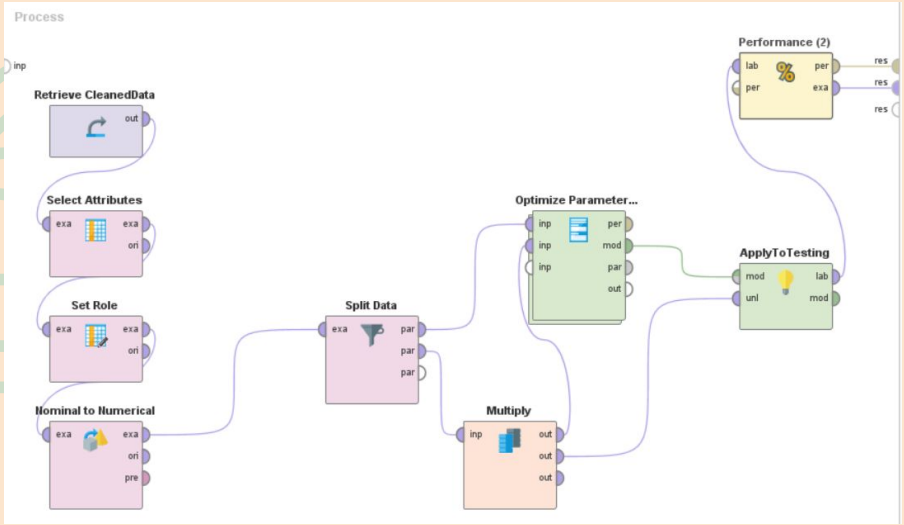




5. Compare different predictive models using different algorithms to find the one with the best predictive power.



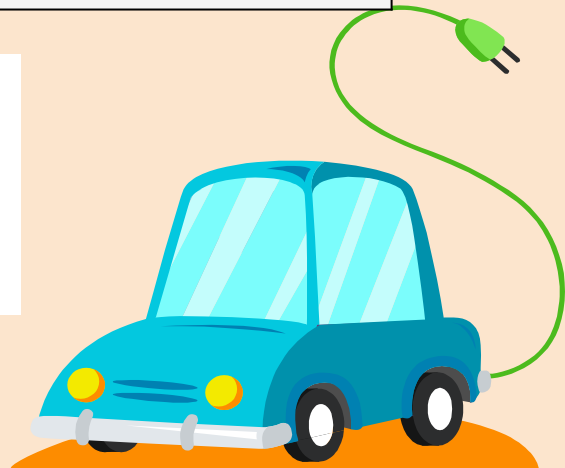
Process for k-NN



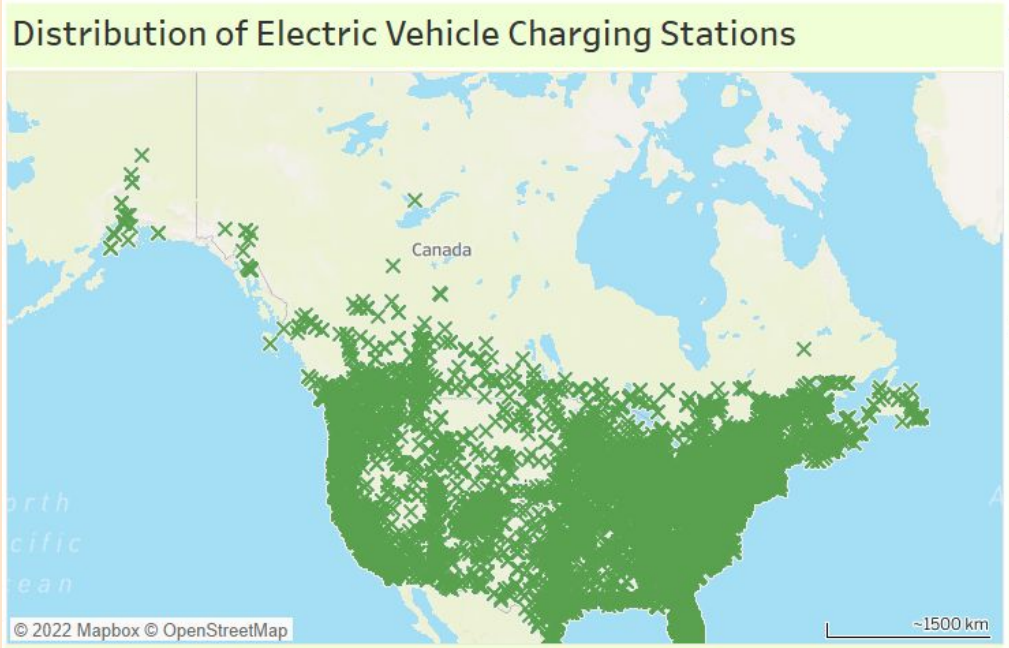
Somewhat Similar Process for Decision Tree & Random Forest

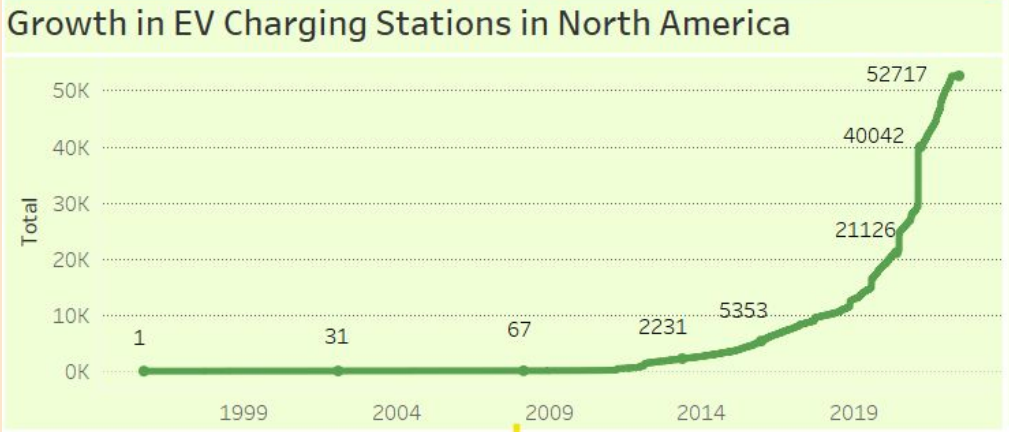
Technique	RMSE (Descending Order)
Linear Regression	66.238
Decision Tree	30.516
k-NN	25.294
Random Forest	19.838

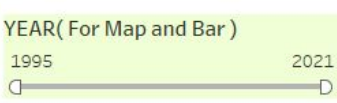
$$RMSE = \sqrt{\frac{\sum_{i=1}^{N} (Predicted_i - Actual_i)^2}{N}}$$

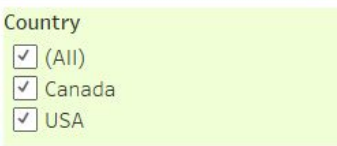


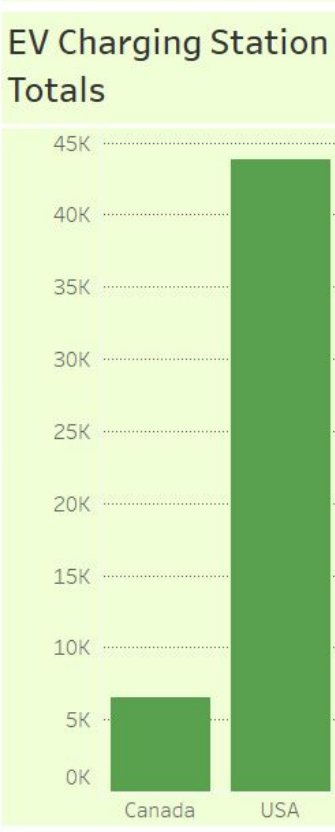
6. Explore Charging Station Growth in North America



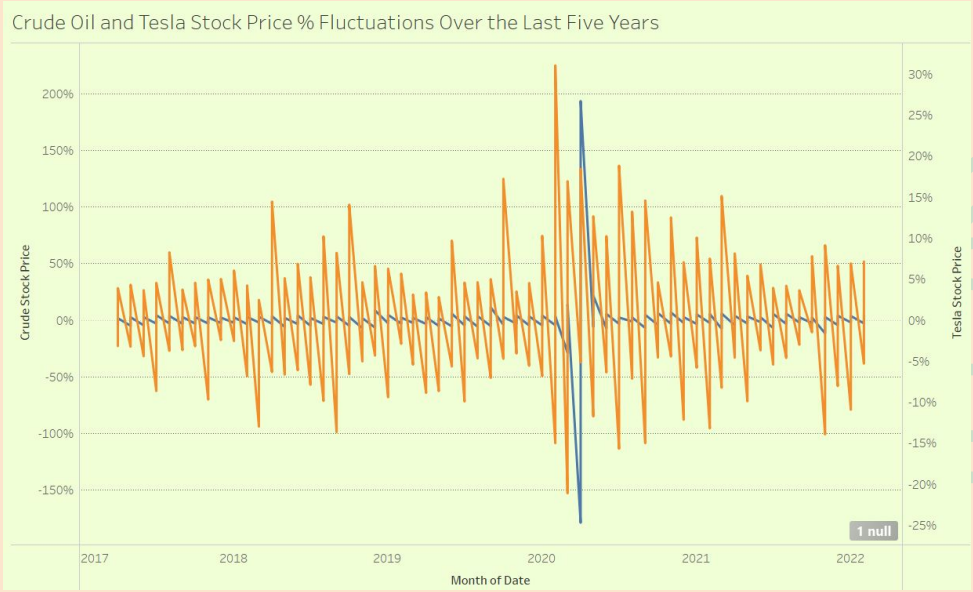


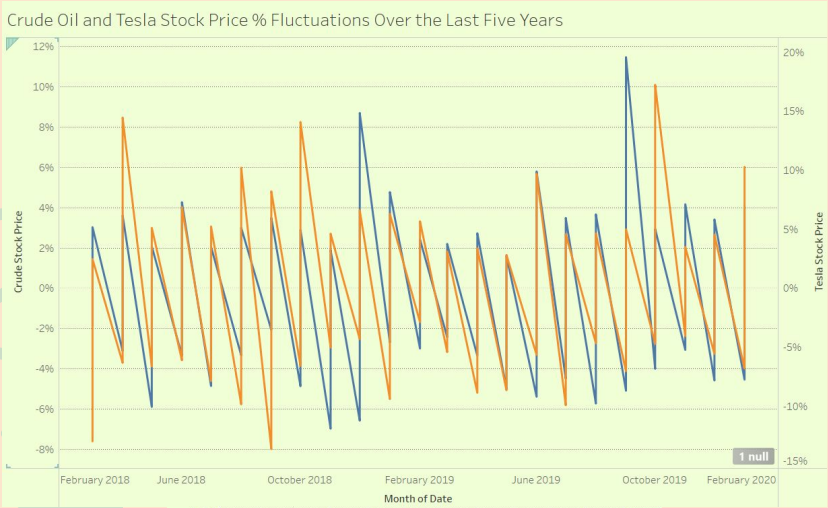


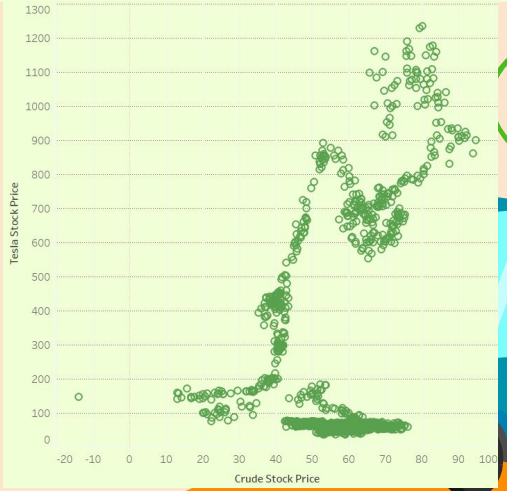


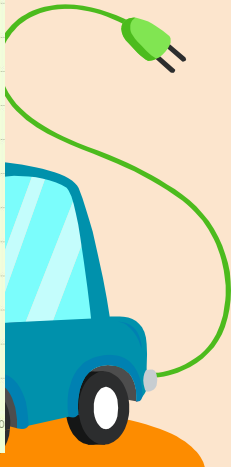


7. What does the relationship between Tesla stock prices and oil price/barrel look like?







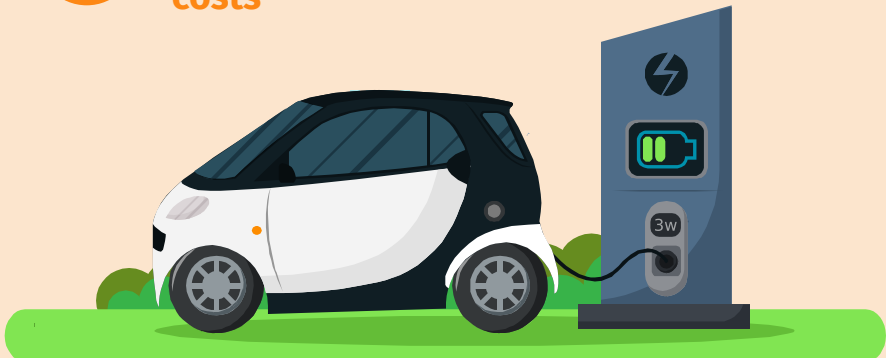


Follow-up work aka "what we wish we could've done"

01 Investigate distribution of charging stations

02 Work on the Regression Model to be able to explain predictors

03 Find data on maintenance and fuel costs



We've come to the end of our presentation

Thank You For Listening!