# Fuel Economy Data Analysis

## Model Year 2019

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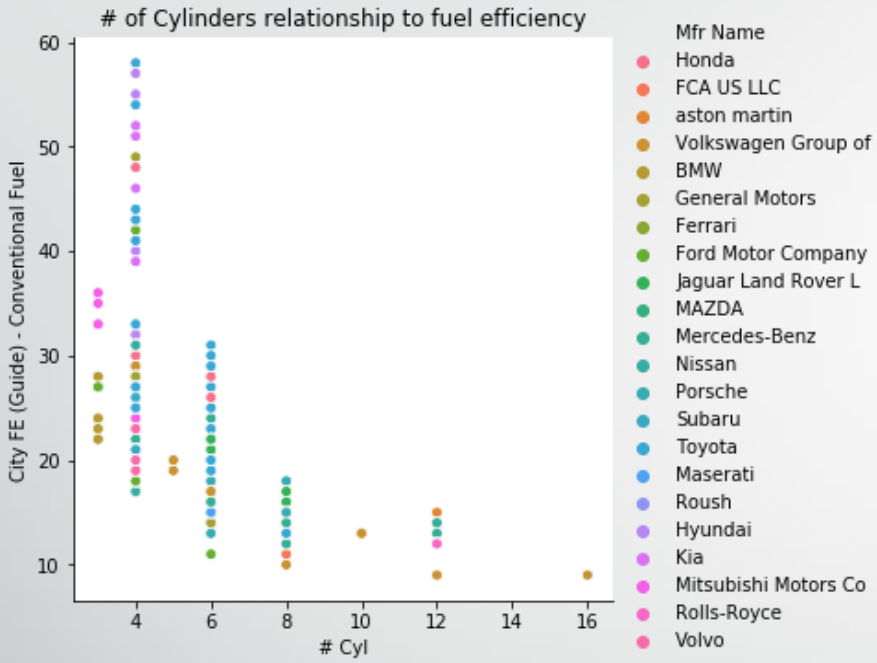
# The U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) produce the Fuel Economy Guide

| | Model Year | Mfr Name | Division | Carline | # Cyl | Transmission | City FE (Guide) - Conventional Fuel | Hwy FE (Guide) - Conventional Fuel | Comb FE (Guide) - Conventional Fuel | Drive Desc | Annual Fuel Cost - Conventional Fuel | FE Rating (1-10 rating on Label) | City CO2 Rounded Adjusted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 2019 | Honda | Acura | NSX | 6 | Auto(AM-S9) | 21 | 22 | 21 | All Wheel Drive | 2150 | 4 | 419 |
| 1 | 2019 | FCA US LLC | ALFA ROMEO | 4C | 4 | Auto(AM6) | 24 | 34 | 28 | 2-Wheel Drive, Rear | 1600 | 6 | 365 |
| 2 | 2019 | aston martin | Aston Martin Lagonda Ltd | Vantage V8 | 8 | Auto(S8) | 18 | 25 | 21 | 2-Wheel Drive, Rear | 2150 | 4 | 494 |
| 3 | 2019 | Volkswagen Group of | Audi | TT Roadster quattro | 4 | Auto(AM-S7) | 23 | 31 | 26 | All Wheel Drive | 1450 | 5 | 384 |
| 4 | 2019 | BMW | BMW | Z4 sDrive30i | 4 | Auto(S8) | 25 | 32 | 28 | 2-Wheel Drive, Rear | 1600 | 6 | 355 |
| 5 | 2019 | Volkswagen Group of | Bugatti | Chiron | 16 | Auto(AM-S7) | 9 | 14 | 11 | All Wheel Drive | 4100 | 1 | 1010 |
| 6 | 2019 | General Motors | Chevrolet | CORVETTE | 8 | Auto(S8) | 12 | 20 | 15 | 2-Wheel Drive, Rear | 3000 | 2 | 742 |
| 7 | 2019 | General Motors | Chevrolet | CORVETTE | 8 | Auto(S8) | 15 | 25 | 18 | 2-Wheel Drive, Rear | 2500 | 3 | 599 |
| 8 | 2019 | General Motors | Chevrolet | CORVETTE | 8 | Auto(S8) | 14 | 23 | 17 | 2-Wheel Drive, Rear | 2650 | 3 | 654 |
| 9 | 2019 | General Motors | Chevrolet | CORVETTE | 8 | Manual(M7) | 13 | 19 | 15 | 2-Wheel Drive, Rear | 3000 | 2 | 691 |

- The purpose of EPA's fuel economy estimates is to provide a reliable basis for comparing vehicles
- To help car buyers choose the most fuel-efficient vehicle that meets their needs
- The average household spends about one-fifth of its total family expenditures on transportation, making it the second most expensive category after housing

# Interesting findings?

## RELATIONSHIIPS




As the number of cylinder increases fuel efficiency decreases

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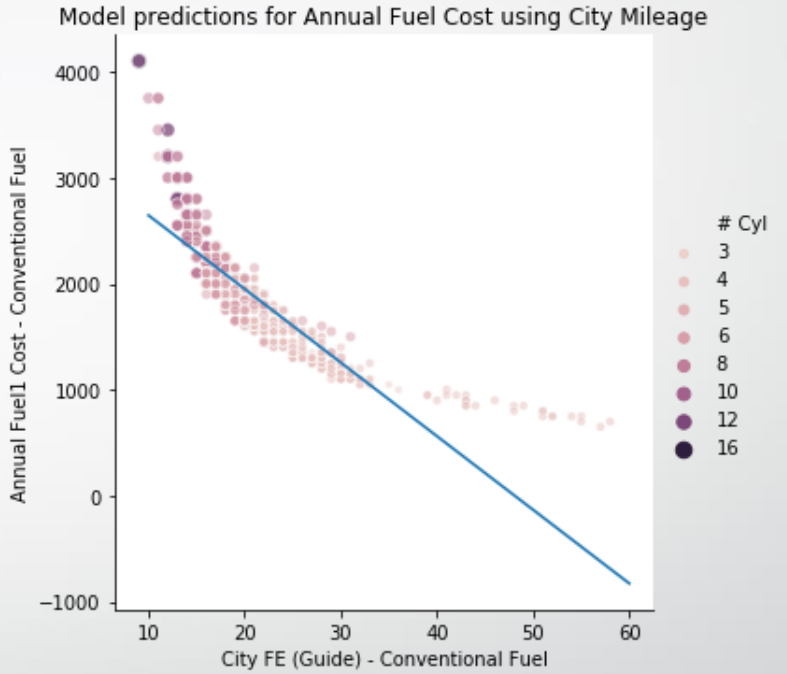
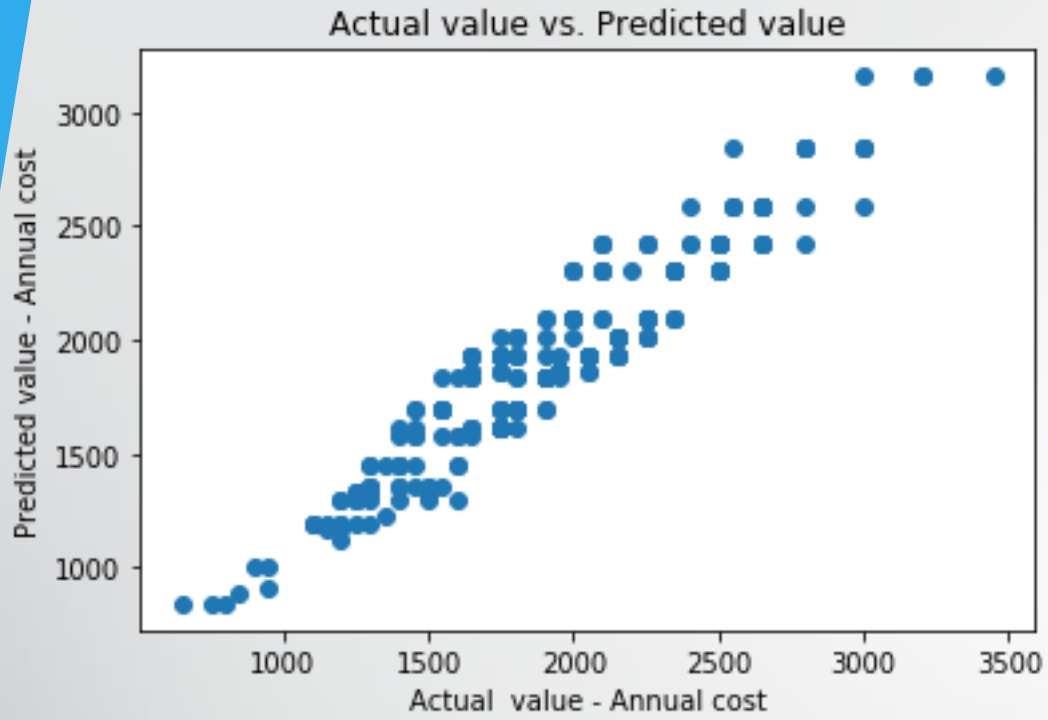
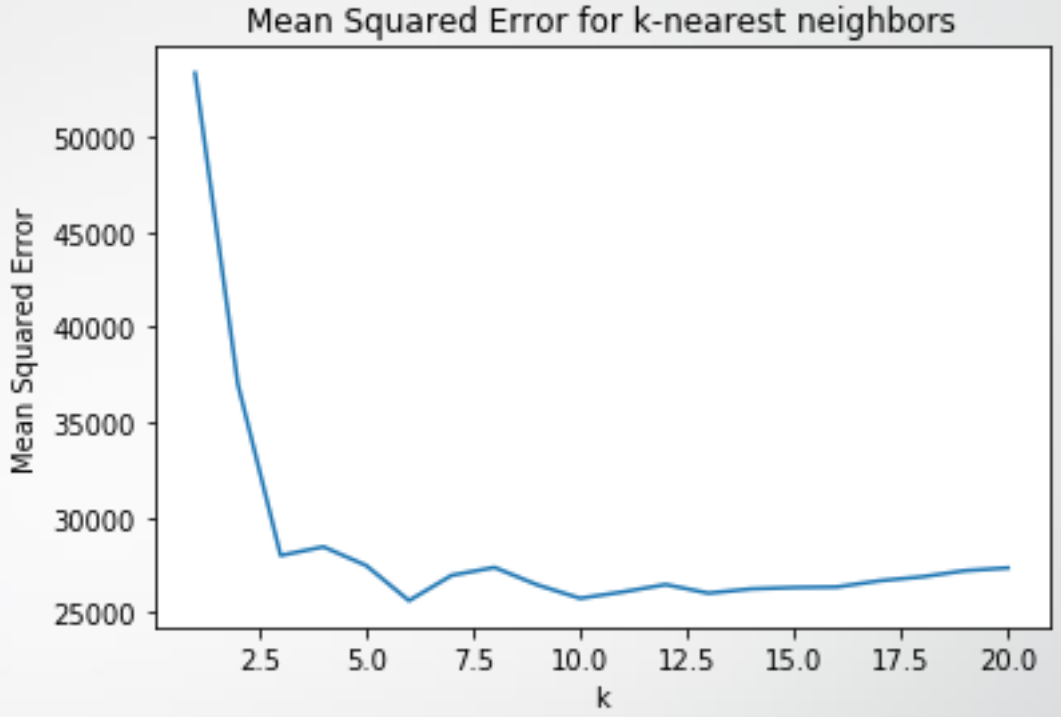
|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | Volkswagen Group of | Bugatti | Chiron | 16 | Auto(AM-S7) | 9 | 14 | 11 | All Wheel Drive | 4100 |

## LINEAR REGRESION




Unsurprisingly, as fuel efficiency increases, the annual fuel cost for the car decreases.




Using k-nearest neighbors with k = 3, the mean square error is: 27993.827160493805;

Which is lower than using a decision tree with depth 3.
Mse: 31123.84041091141

k = 6, will give me the lowest mean square error

https://sites.google.com/view/jhony-maurad-data-science-fuel/home