

Homework 1

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Introduction

This document provides a plot based on a dataset from an R package.

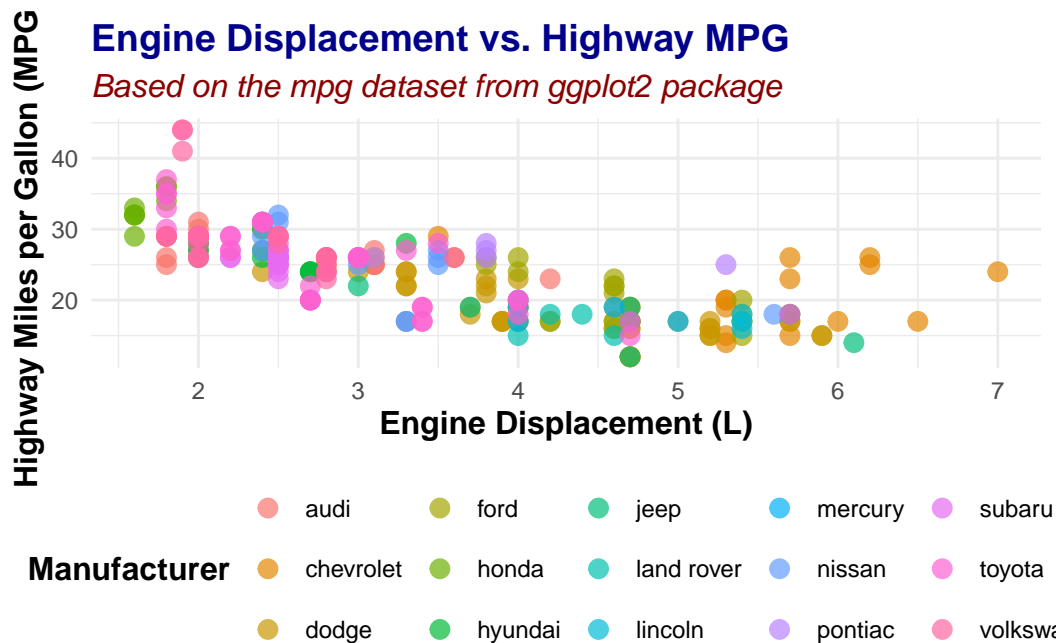
Dataset

The dataset used in this plot is the `ggplot2` package's `mpg` dataset. The `mpg` dataset contains observations collected by the *US Environmental Protection Agency* on 38 models of cars.

It includes variables such as *manufacturer*, *model*, *engine displacement*, *year*, *number of cylinders*, *transmission*, *drive type*, and *fuel economy (in city and highway driving)*.

Plot

Below is a scatter plot showing the relationship between engine displacement (in liters) and highway miles per gallon. We've added colors for each manufacturer and labels to make it visually appealing.



Description of the Plot

Overall Trend

- **Negative correlation:** Overall, highway MPG shows a decreasing trend with increasing engine displacement. This indicates that larger engines are generally less efficient and require more fuel.

Anylasis of Manufactures

- **Manufacturer differences:** Different manufacturers have different MPG on the highway for the same engine displacement. For example, Toyota and Honda models exhibit higher MPG for smaller displacements (2-3 liters).
- **Group Distribution:**
 - *Toyota and Honda:* Mainly concentrated in the 2 to 3 liter displacement range, with higher MPG.
 - *Ford and Chevrolet:* Covers a wide range of displacements, from less than 2 liters to close to 7 liters, with a wide MPG range.
 - *Volkswagen:* Mainly concentrated in the displacement range of less than 3 liters, MPG performance is also relatively high.

Conclusion

- According to the data, if consumers are concerned about fuel economy, they should consider choosing a model with a smaller displacement (2-3 liters) from Toyota or Honda.