Storyline

Yashita Sharma

## Part 2 of Assignment 3

**Write Up Your Story**: Finally, write up and present your story. For this, I recommend that you use a different qmd file, in which you pick and choose from the graphs and examples in your research notebooks. There is no minimum or maximum length — it should be long enough to tell the story (and no longer). The story should be told both in words, and visually, through graphs and plots and perhaps small tables as well.

You should strive for academic-style writing, and spend some time formatting your final visual elements for neatness and completeness, as you would for a paper.

# Visualize the relationship between horsepower (hp) and miles per gallon (mpg)  
ggplot(mtcars, aes(x = hp, y = mpg)) +  
 geom\_point() +  
 geom\_smooth(method = "lm", se = FALSE, color = "blue") +  
 labs(x = "Horsepower", y = "Miles per Gallon") +  
 ggtitle("Linear Regression: Relationship between Horsepower and MPG")

Once upon a time, eager to reveal the secrets hidden within a dataset, I set out on a voyage into the world of data exploration and analysis. This dataset, which is made up of automobile records that are simply referred to as “mtcars,” has a wealth of data about many aspects of car performance.  
My initial goal was to extract the most important information from the data, which I did with acute eyes and a passion for knowledge.

This dataset included the following variables: horsepower ({hp}), weight ({wt}), number of cylinders ({cyl}), and transmission type ({am}). These factors, protectors of the finer points of the automotive industry, held the secret to deciphering these machines’ workings.  
I set out to shed light on the connections between these factors since I was curious and equipped with statistical tools. Can the horsepower, weight, number of cylinders, and type of gearbox be used to forecast these cars’ miles per gallon ({mpg})? To answer this question and provide insight into the complex interactions among these variables, I built a linear regression model—a mathematical lightning rod. I set out to shed light on the connections between these factors since I was curious and equipped with statistical tools. Can the horsepower, weight, number of cylinders, and type of gearbox be used to forecast these cars’ miles per gallon ({mpg})? To answer this question and provide insight into the complex interactions among these variables, I built a linear regression model—a mathematical lightning rod.  
I turned my attention to validation as the model began to take form. To examine my model’s effectiveness, I utilized the age-old ANOVA test, a dependable defender of statistical significance. An indication of the model’s strength, the ANOVA table provided information on the variance accounted for by each predictor, so confirming the predictive capacity of the model.

I created visuals to show the correlations my analysis revealed because I was eager to see my findings in action. A fascinating scatter plot that showed the correlation between horsepower and MPG appeared. A line of greatest fit was added with a single brushstroke, precisely charting the course of this relationship.

For instance as shown from above code - The scatter plot above illustrates the relationship between horsepower (hp) and miles per gallon (mpg) for the cars in the mtcars dataset.

* Each point represents a car in the dataset, with its horsepower on the x-axis and miles per gallon on the y-axis.
* The blue line represents the fitted linear regression model, showing the general trend or relationship between horsepower and miles per gallon.
* The plot helps us visually assess whether there is a linear relationship between horsepower and miles per gallon. If the points cluster around the regression line, it indicates a strong linear relationship.
* The graphic shows that horsepower and miles per gallon are negatively correlated. This implies that an automobile’s miles per gallon tends to drop as its horsepower increases.  
  The regression line’s slope shows how quickly mileage per gallon drops as horsepower increases.  
  In general, the graph helps to comprehend how horsepower affects fuel efficiency by providing a visual depiction of the relationship between horsepower and miles per gallon.
* My journey was far from ended, though. Equipped with the knowledge obtained from the ANOVA test and the graphics, I carefully went over the model summary. The predictive power of coefficients and intercepts became evident, providing information about the numerical influence of each predictor on miles per gallon. I created the dot-and-whisker plot, a visual masterpiece, to share my discoveries with the world. The model’s coefficients were elegantly displayed, providing a clear illustration of their importance and degree of uncertainty.However, the adventure did not stop there. Now that I had the enhanced data, I set out to do one last thing: compare the values of the observed and anticipated data points. A visually striking representation appeared, demonstrating the agreement between observation and forecast, taking the viewer through the domain of measured versus estimated miles per gallon.  
  Ultimately, my research of the automotive wonders dataset produced insights and proved the value of investigation and analysis. Equipped with statistical instruments and an insatiable curiosity, I created the dot-and-whisker plot, a visual masterpiece, to share my discoveries with the world. The model’s coefficients were elegantly displayed, providing a clear illustration of their importance and degree of uncertainty.  
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  Ultimately, my research of the automotive wonders dataset produced insights and proved the value of investigation and analysis. Equipped with statistical instruments and an insatiable curiosity,I illuminated the intricacies of automobile performance, leaving behind a legacy of discovery for future explorers to follow.