ECO 395M: Exercises 1

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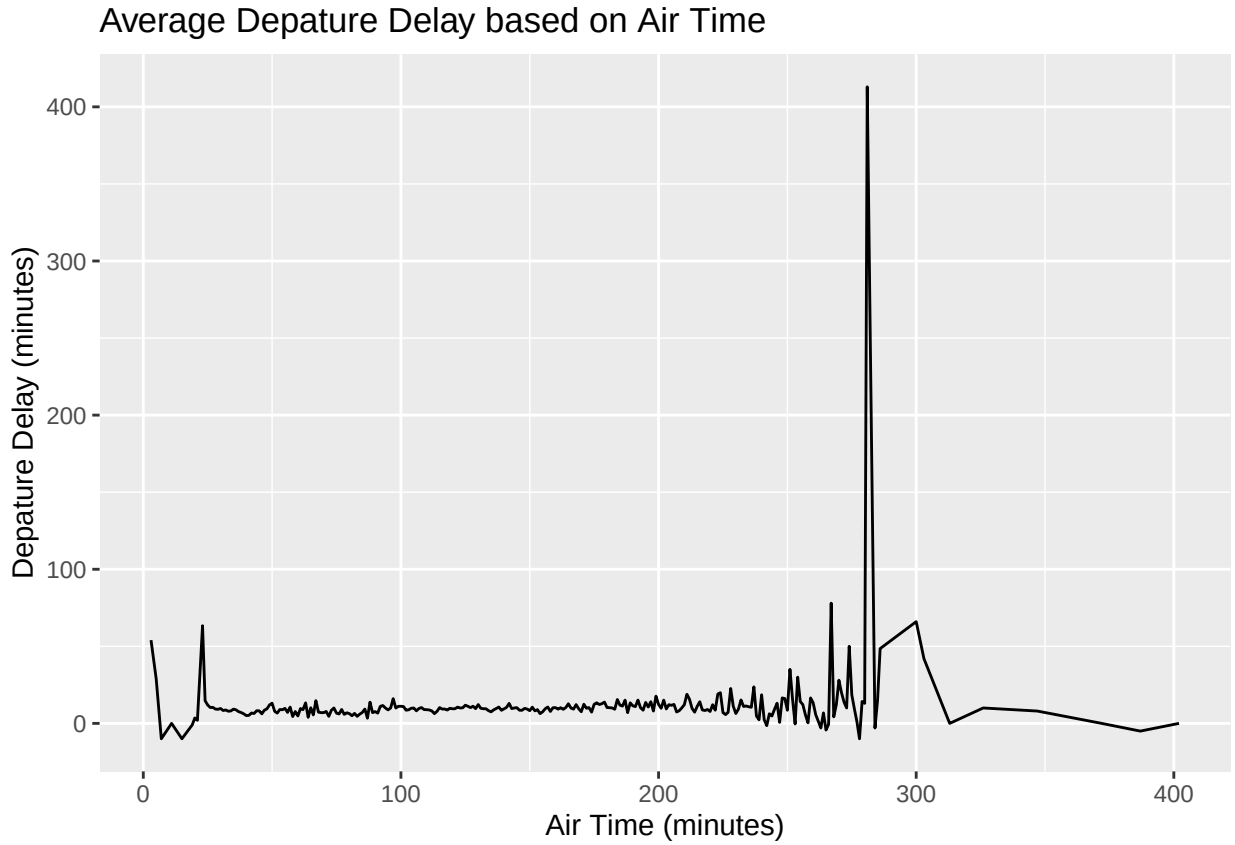
1) Data visualization: flights at ABIA

Your task is to create a figure, or set of related figures, that tell an interesting story about flights into and out of Austin.



The graph shows that average time of departure delays are similar to each other and slightly above 0 when the time of flight is between 50 to 200 minutes. When it exceeds 200 minutes, the average length of delay became larger and more volatile. When the air time is 281 minutes, the average departure delay is 413 minutes.

2) Wrangling the Olympics

A) What is the 95th percentile of heights for female competitors across all Athletics events (i.e., track and field)? Note that `sport` is the broad sport (e.g. Athletics) whereas `event` is the specific event (e.g. 100 meter sprint).

Table 1: 95% heights for female competitors

	quantile	height
95%	95%	197

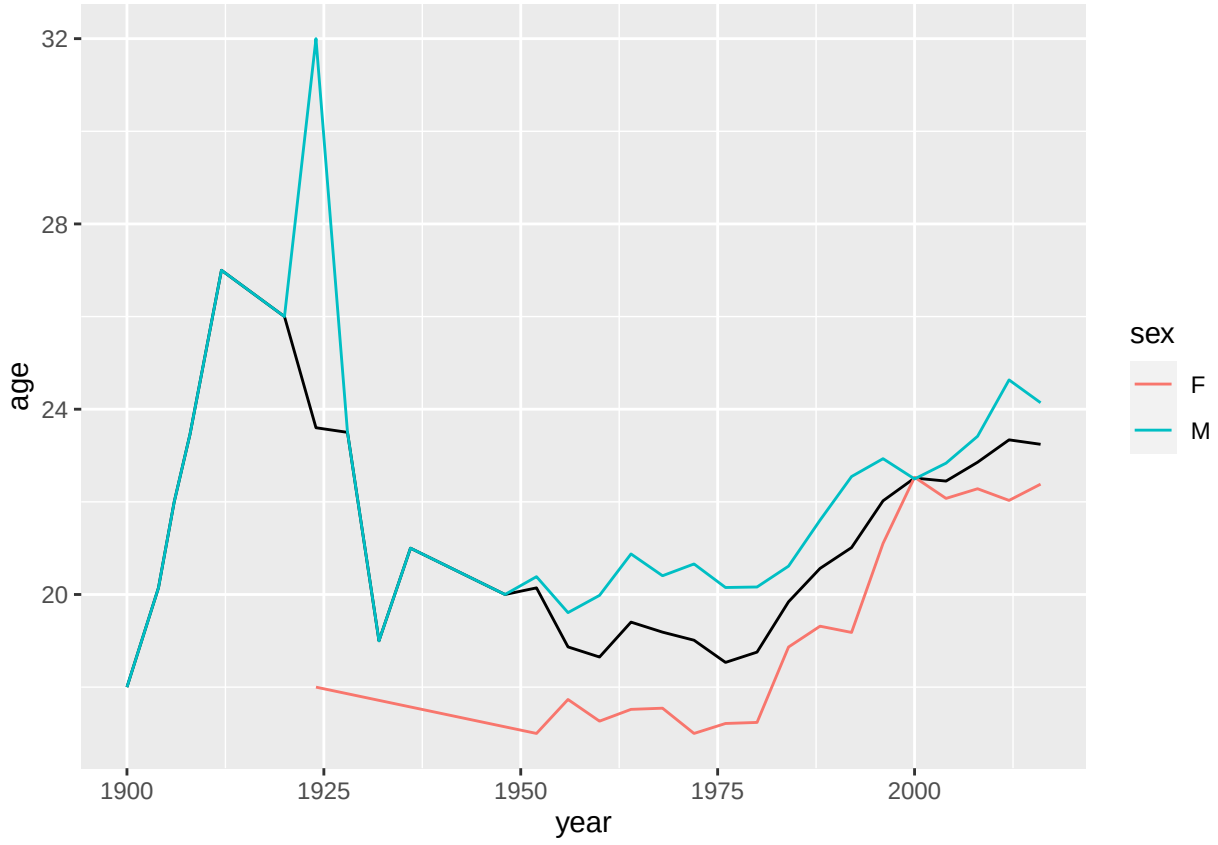
B) Which single women's `event` had the greatest variability in competitor's heights across the entire history of the Olympics, as measured by the standard deviation?

Table 2: Top 5 Female Events that Have the Greatest Variability in Height

	event	height_std_dev
Rowing Women's Coxed Fours	Rowing Women's Coxed Fours	10.865490
Basketball Women's Basketball	Basketball Women's Basketball	9.700255
Rowing Women's Coxed Quadruple Sculls	Rowing Women's Coxed Quadruple Sculls	9.246396
Rowing Women's Coxed Eights	Rowing Women's Coxed Eights	8.741931
Swimming Women's 100 metres Butterfly	Swimming Women's 100 metres Butterfly	8.134398
Volleyball Women's Volleyball	Volleyball Women's Volleyball	8.101521

The Rowing Women's Coxed Fours had the greatest variability in competitor's heights across the entire history of the Olympics, as measured by the standard deviation.

C) How has the average age of Olympic swimmers changed over time? Does the trend look different for male swimmers relative to female swimmers? Create a data frame that can allow you to visualize these trends over time, then plot the data with a line graph with separate lines for male and female competitors. Give the plot an informative caption answering the two questions just posed.



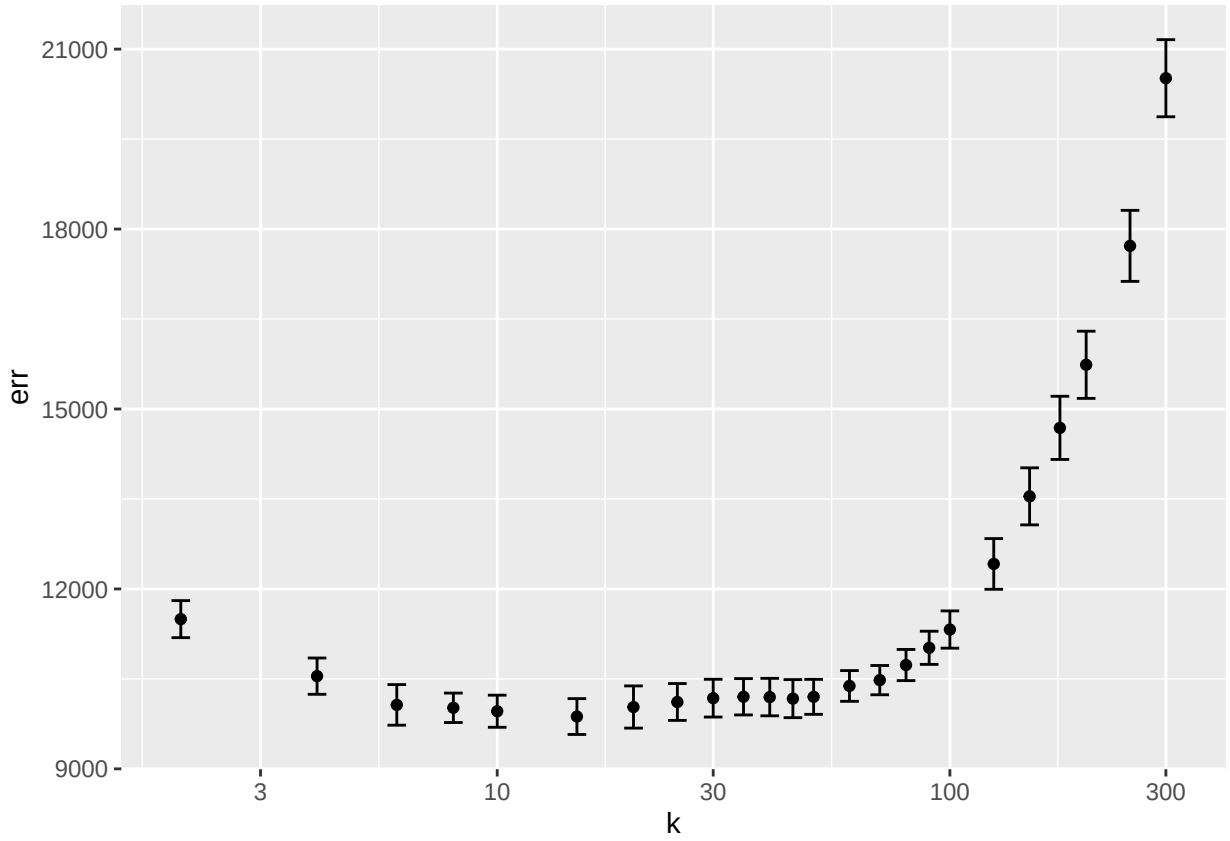
3) K-nearest neighbors: cars

The data in sclass.csv contains data on over 29,000 Mercedes S Class vehicles—essentially every such car in this class that was advertised on the secondary automobile market during 2014. For websites like Cars.com or Truecar that aim to provide market-based pricing information to consumers, the Mercedes S class is a notoriously difficult case. There is a huge range of sub-models that are all labeled "S Class,"" from large luxury sedans to high-performance sports cars; one sub-category of S class has even served as the safety car in Formula 1 Races. Moreover, individual submodels involve cars with many different features. This extreme diversity—unusual for a single model of car—makes it difficult to provide accurate pricing predictions to consumers.

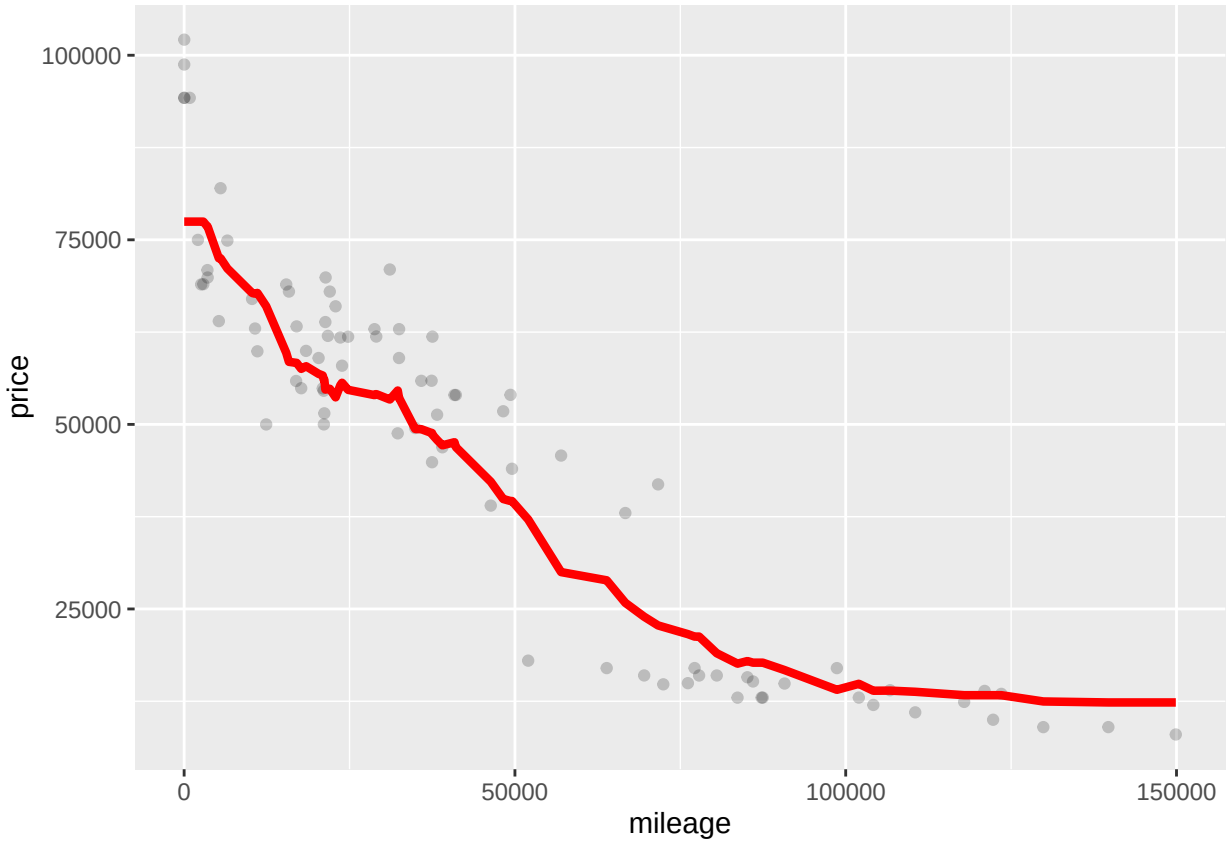
Use K-nearest neighbors to build a predictive model for price, given mileage, separately for each of two trim levels: 350 and 65 AMG. That is, Treating the 350's and the 65 AMG's as two separate data sets.

Trim 350

KNN Test Plot

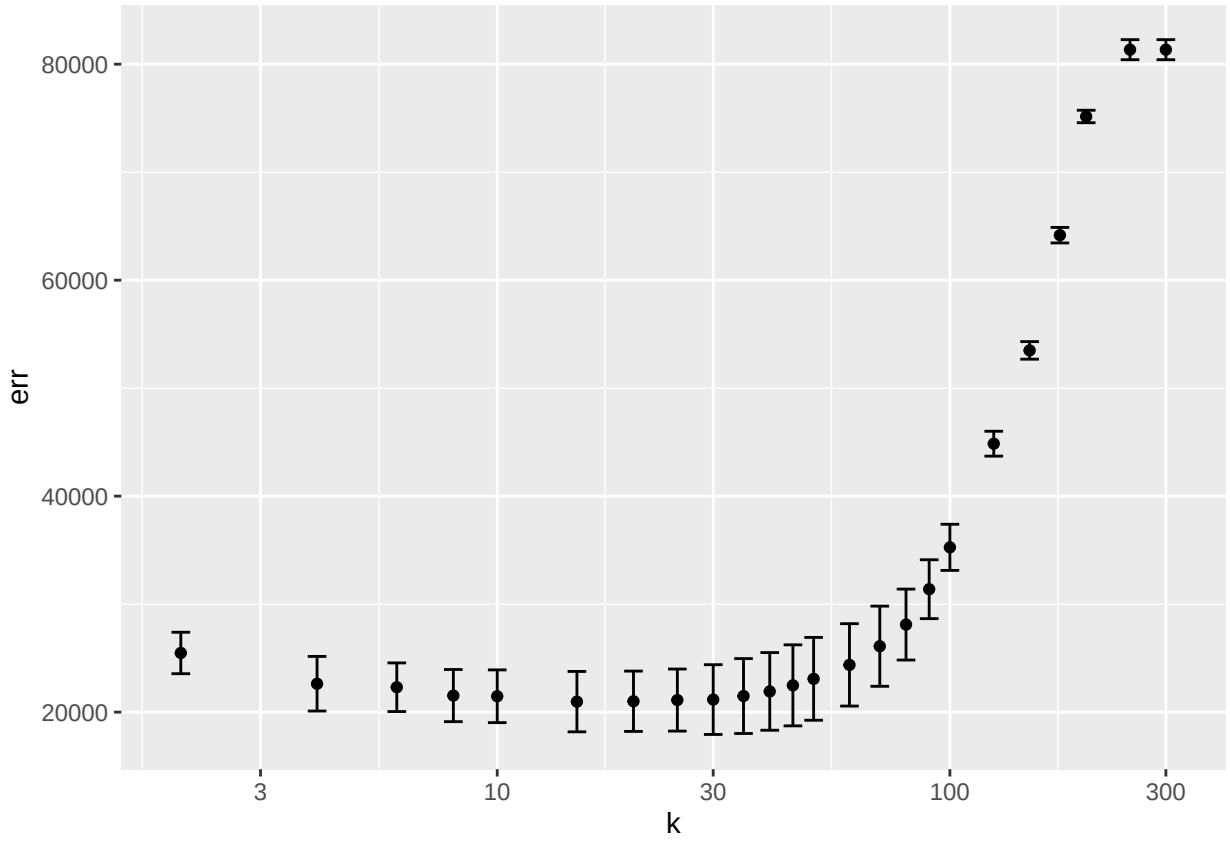


Trim 350 Prediction Plot



Trim 65 AMG

Trim 65 AMG KNN Test Plot



Trim 65 AMG Prediction Plot