Gas Price Micro Markets

Kai Lukowiak

February 28, 2019

1 Abstract

Gas station prices are highly dependent on competition. Due to the nature of gasoline markets this competition is very local. Industry does not segment markets beyond the city level, potentially leaving profits on the table.

Stations are also able to set their own prices to some extent (without the input from corporate), introducing variability into pricing. I use this variation to try and identify submarkts.

I used python to scrap gasbuddy.com and pandas to clean the time-series data. I then imported the data into R and used the package tsclust to create a hierarchical cluster of the data based on euclidean distance and correlation.

Other methods of clustering were investigated, most interestingly, dynamic time warping and Frechett Distance. These methods were abandoned because of their computationally expensive nature. I did not have the time or budget to set up my analysis on a large AWS cluster.

I then set arbitrary cutoffs for the hierarchical clusters and used this classification as my labels.

With these labels, created a KNN model to cluster the gas stations based on latitude and longitude. I then used a test set to validate the accuracy of my clustering algorithm.

I had very promising results for gas stations that were very close to each other, however, I was unable to identify greater submarkets in a specific city (e.g., the north west of Calgary).

I believe these poor results are due to the transient nature of markets and the poor quality of information gained from scrapping gasbuddy.

Further analysis is needed to investigate how different clustering algorithms would work, along with different hierarchical cutoff methods.

2 Bio

Kai is a passionate cross-country ski racer and runs two learn to ski websites with his mother and a national level coach. He graduated from the University of Calgary with a BA-H in Economics and from City University of New York with a MS in Data Science. He currently works in the retail gasoline sector. Kai loves solving interesting and challenging problems and dreams of one day entering the healthcare sector.