Parking Costs Survey

Interim report

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Topic

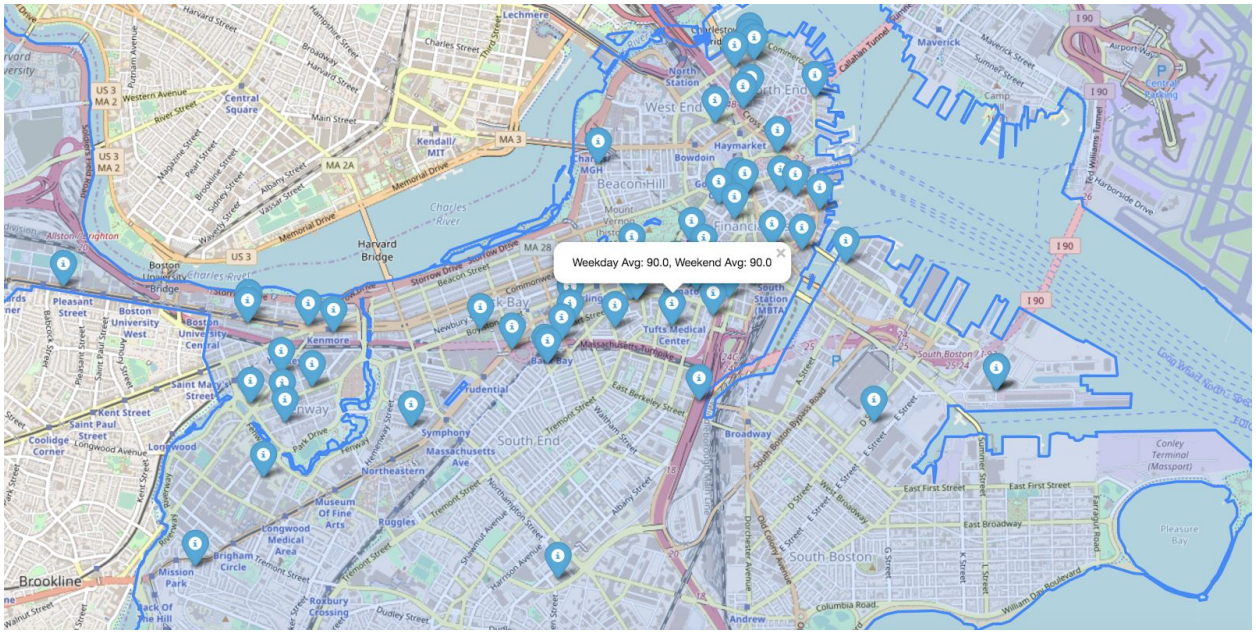
The purpose of this research is to understand the cost of driving and parking in Boston by providing updated information on current parking costs in various Boston districts with the ultimate goal of understanding what conditions might be responsible for driving up the cost of parking and ultimately reducing the volume of individuals commuting by car to Boston.

Questions

1. How does the parking cost change Boston region change over time and address?
2. How does the parking cost change from weekdays to weekend on different parking address?
3. What elements are influencing the degree of change from weekdays to weekend on different address?

Data sets

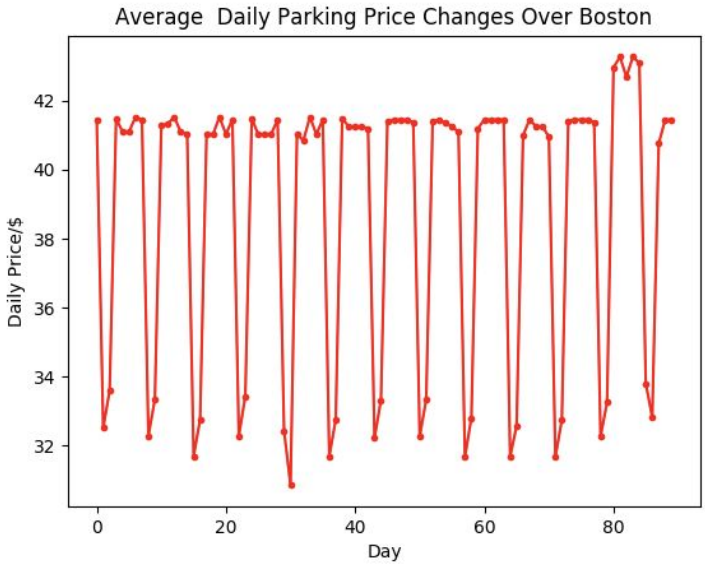
The raw data is collected from ParkWhiz via its API in Json format containing parking address, coordinates and prices of weekdays and weekend from 1st Mar 2017 to 1st Mar 2018. After retrieving one-year data with ‘Boston’ as the city label, we’ve found 80 parking lots in Boston in total and store the related data into csv table. The map with all parking lots locations is shown below.



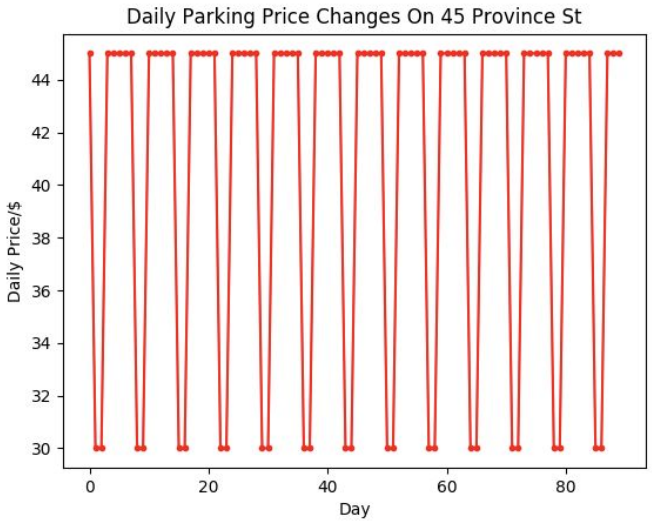
The blue line depicts the boundary of city Boston whose parking lots are marked in the map. Both of the average parking prices on weekdays and weekend can be found on the map. Some ‘nan’ value of the parking prices mean the corresponding parking sites may be closed or unavailable for visitors.

Exploratory analysis

We want to analysis how the parking prices change across Boston and what’s the relationship between the change and other elements. However, the collected data shows the parking prices over Boston region change periodically within a week and seldom change from week to week, which is shown on the figure below.



The data of the plot is collected from Dec 1st, 2017 to Mar 1st, 2018. The value of daily price is an average daily rate of all parking lots in Boston region. The occasional absent parking prices from some sites make the periodical function look imperfect.



The figure above shows a perfect periodical function on “45 Province St”, an address without absent parking price.

Our original goal mainly focuses on what elements will drive up the parking prices across Boston region, including uber prices, weather and big events and the two figures above explain why we make some modifications on the original questions.

Methodology

Clustering: utilize K-Means to label clusters of parking lots to show the price distribution across downtown Boston.

Prediction: utilize Linear Regression to predict the future parking price across downtown Boston.

Partial conclusion

We intended to research what elements will drive up the parking costs. But the parking prices almost do not change dynamically and they only change from weekdays to weekend. The negative data result changes our plan. Our current goal is to solve the following problems:

1. How does the parking cost change from weekdays to weekend on different parking address?
2. What elements are influencing the degree of change from weekdays to weekend on different address?

Future plan

We plan to figure out what elements are influencing the degree of change from weekdays to weekend on different address and visualize the work.

We have a github repository as our workspace containing all we have done including code and collected data. Please feel free to visit https://github.com/haigouhhhh/Parking_Price.