CS591 Data Mechanics

Do You Live Too Far From A Hospital?

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Introduction

We wanted to see whether specific characteristics of Boston affected the health of its residents to determine if such facilities/characteristics should be invested in further by the city.

The main correlation we calculated was between the distance from a hospital and the rate in which people go for their yearly check up. We hypothesized that the further one is from a hospital the less likely they would go for their check up.

Datasets

The main datasets we used were the CDC's 500 Cities and Hospital Locations (Boston) to find our main correlations. We also looked at Year-Round Swimming Pools (Boston), Healthy Corner Stores (Boston) and the Higher Education (colleges in the US) datasets throughout the course.

Transformations

We mapped every person in Boston in the CDC500 dataset to the nearest hospital to them. This allowed us to calculate the correlation between the rate at which people visited the doctor and the distance from that hospital.

$$\varrho(x, y) = \frac{cov(x, y)}{\sigma(x) \cdot \sigma(y)}$$

Results

We were able to find the following from the previous transformation:

· Correlation coefficient: –0.16493

· P-value: 0.03012

We found a weak negative correlation between the distance people are from their nearest hospital and the rate in which they go for their yearly checkup. In other words, the further you are from a hospital, the less likely you are to visit for your yearly check up. We also found that the p-value is less than 0.05, meaning we can infer that the correlation coefficient is statistically significant. However, since this is a weak correlation, there are other factors in play as well (e.g. age, insurance, prior medical conditions, etc). Another factor to consider is that the hospitals data set does not include private clinics. To further our analysis, we limited the distance from the hospital and recalculated the correlation for every quarter-mile (i.e. between 0 and 0.25 miles, 0 and 0.5 miles, 0 and 0.75 miles and so forth). The results of this can be seen in figure 1. Figure 2 illustrates visually that there are higher rates of doctor visits the closer people are to a hospital, albeit there are outliers and exceptions.

Implications and Conclusions

From our research, we were able to determine that there is a relationship between how far one is from a hospital and the rate of doctor visits. While there are other external factors to consider, it may be necessary to look into how to make these hospitals more accessible to people who live too far away.

Further Work

If we were to continue this project, we would focus on gathering more data so that we're not looking at just hospital locations. This is because there are private clinics where primary care doctors do practice, but this is not included in the data set. We would also look at other data sets, especially income and health insurance rates, to see how this factor plays in with regards to the rate of people going in for their yearly checkup.

Figure 1: Distance (miles) from hospital and the correlation coefficient between the given distance and doctor visits rate
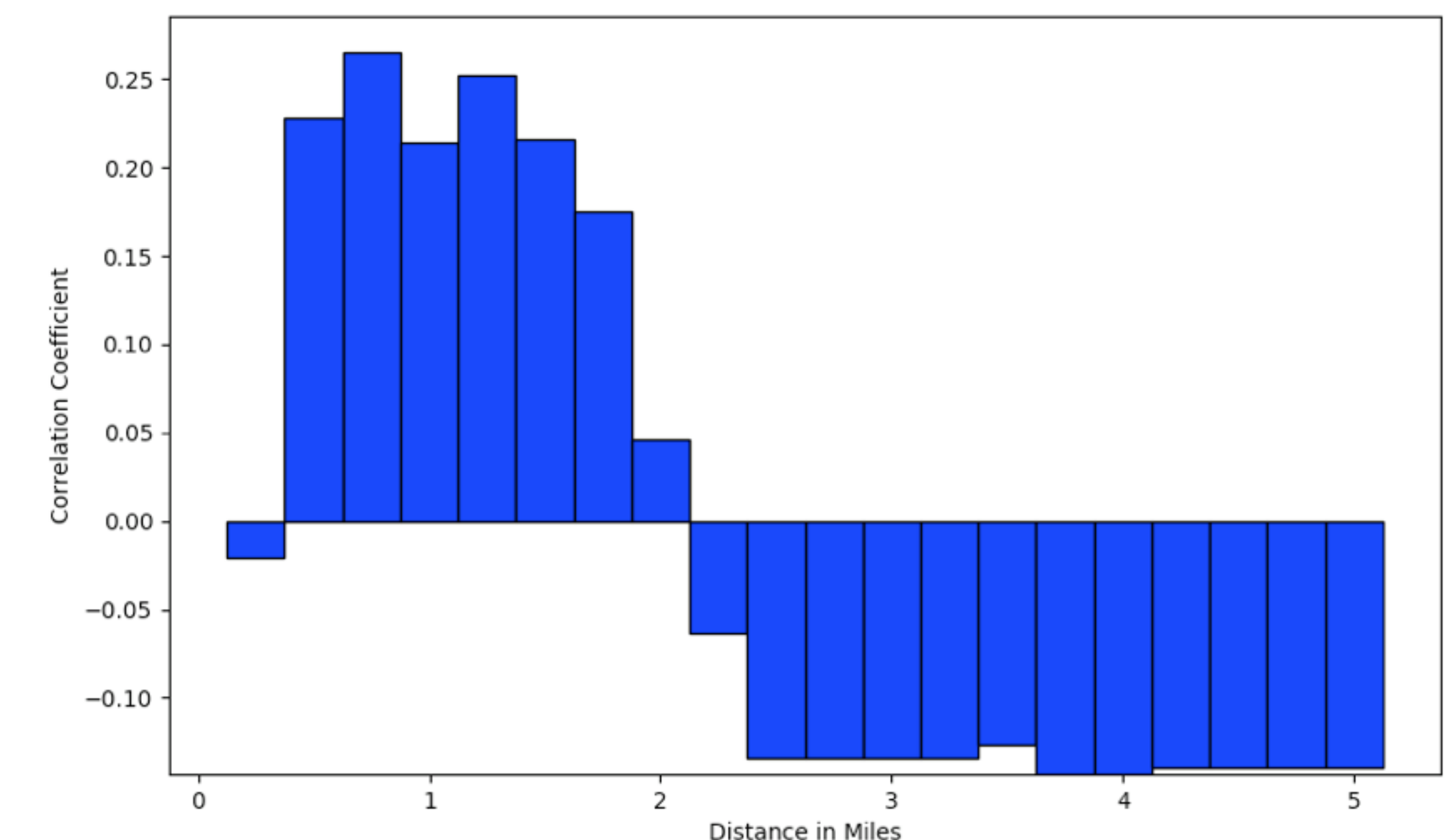

Figure 2: Heat Map pinpointing the hospital locations in Boston and the rate of doctor visits; "hotter" = higher rate of visits