Have you ever wondered what factors can affect retail sales? Using a collection of three datasets from kaggle we aimed to analyze what factors contributed or affected weekly retail sales.Kaggle collected data from 45 different department stores in the year 2010 and contained information on weekly sales, temperature, fuel price and more. The final dataset was created by merging all three Kaggle datasets into one, giving us the ability to analyze chosen factors on retail sales. The goal is to analyze the data, find a correlation between these factors and weekly sales, and give recommendations to retail companies to increase revenue.

In this analysis, we focused on four factors and their effects on retail sales: time of year, holidays, temperature, and store size.

Our data only came with a binary 'IsHoliday' column. To further investigate the effect of holidays on sales, we chose six major US holidays: Christmas, Thanksgiving, Halloween, Black Friday, New Years, and Memorial Day. To determine which dates fell into each holiday, we chose the two weeks prior, including the day of the holiday for Christmas, Thanksgiving, and Halloween. Black Friday was a singular day and Memorial Day, along with New Year's Eve, was one week prior, including the day.

TIME OF YEAR

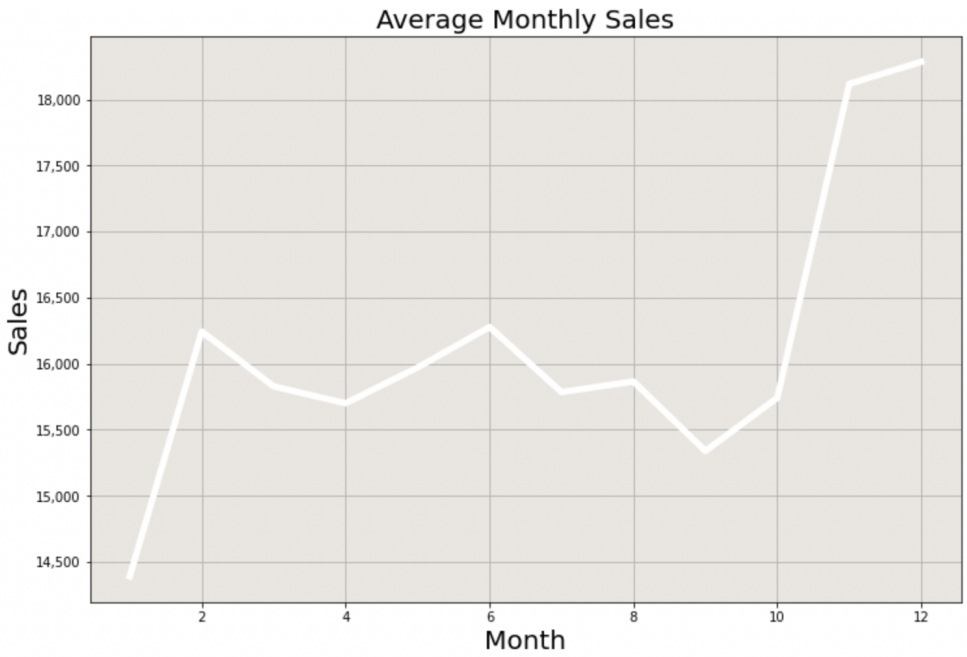

Figure 1

We looked at the average monthly sale change over time throughout the year. The year starts very low in January with a high peak in December. If we were to take out the values of January, November, and December, which are extreme cases compared to the other months, we would see a steady decrease overall in average sales from February to October. Moreover, we see an uptick in October, more than likely due to Halloween. November and December contain 4 out of the 6 holidays. High average sales in these months could be due to holiday sales. This tells that during a non-holiday month, weekly sales don't increase but stay at a steady decrease slope.

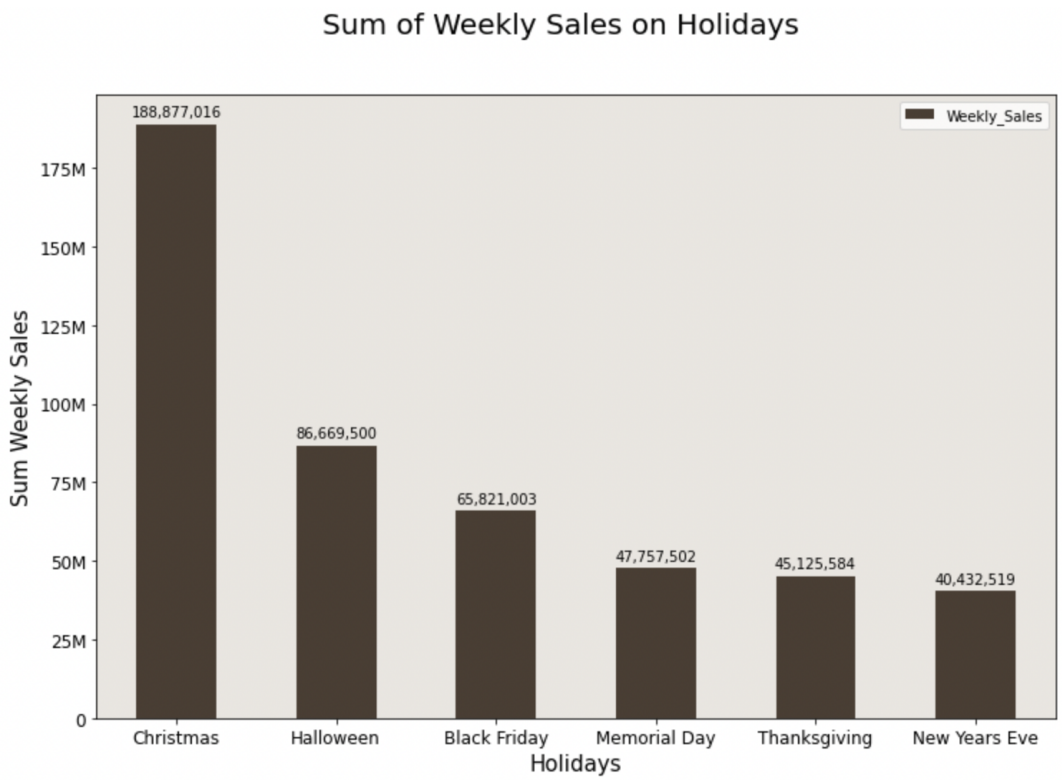

Figure 2

A bar graph was created to see which holiday had the highest total weekly sales (See Figure 2) based on the sum of weekly sales for each holiday. Christmas had the highest sales at $188,877,016, while New Year's Eve had the lowest total sales at $40,432,519. New Year's Eve is not known for discount sales or gift-giving, which could probably explain the lack of sales for the holiday. Black Friday was third in total weekly sales even though, unlike some of the other major holidays, the sales were only counted for that particular day and not the weeks preceding.

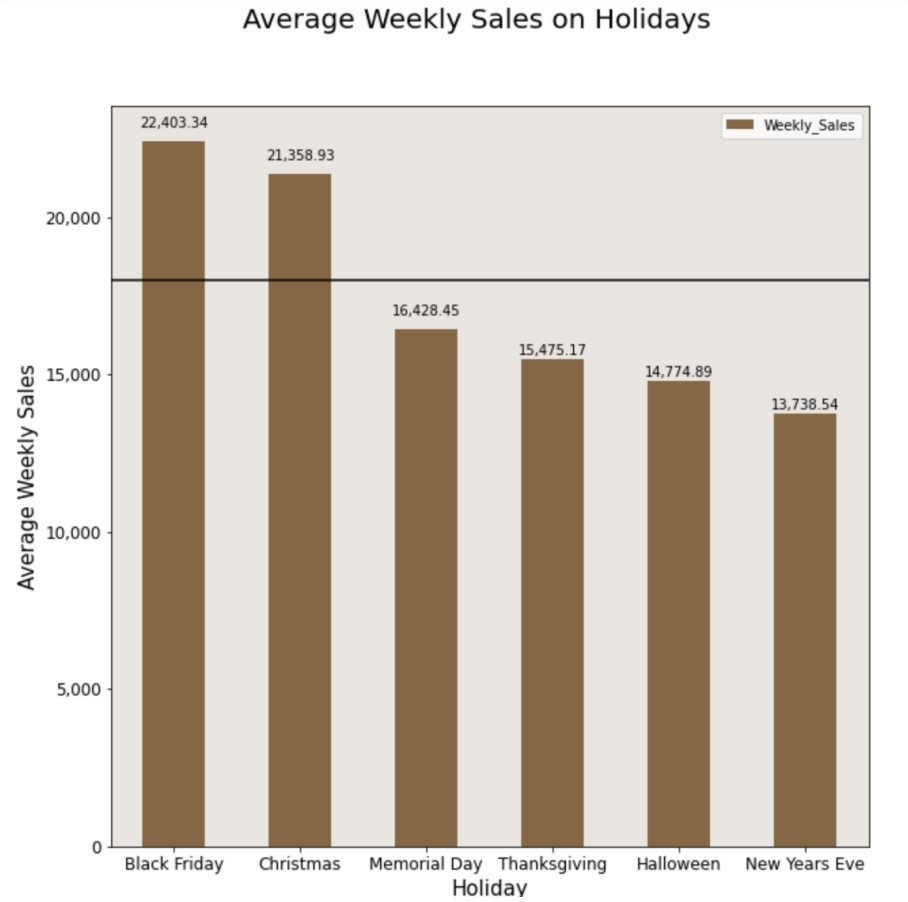

Figure 3

Further, we looked at the weekly sales based on the average sales for each holiday, where we see a stark change with Black Friday having the highest average sales. Although Black Friday is only one day, our analysis shows that more significant purchases are being made in just that one day compared to the other holidays. However, we see that New Year's Eve stays at the tail end with the lowest average sales.

TEMPERATURE

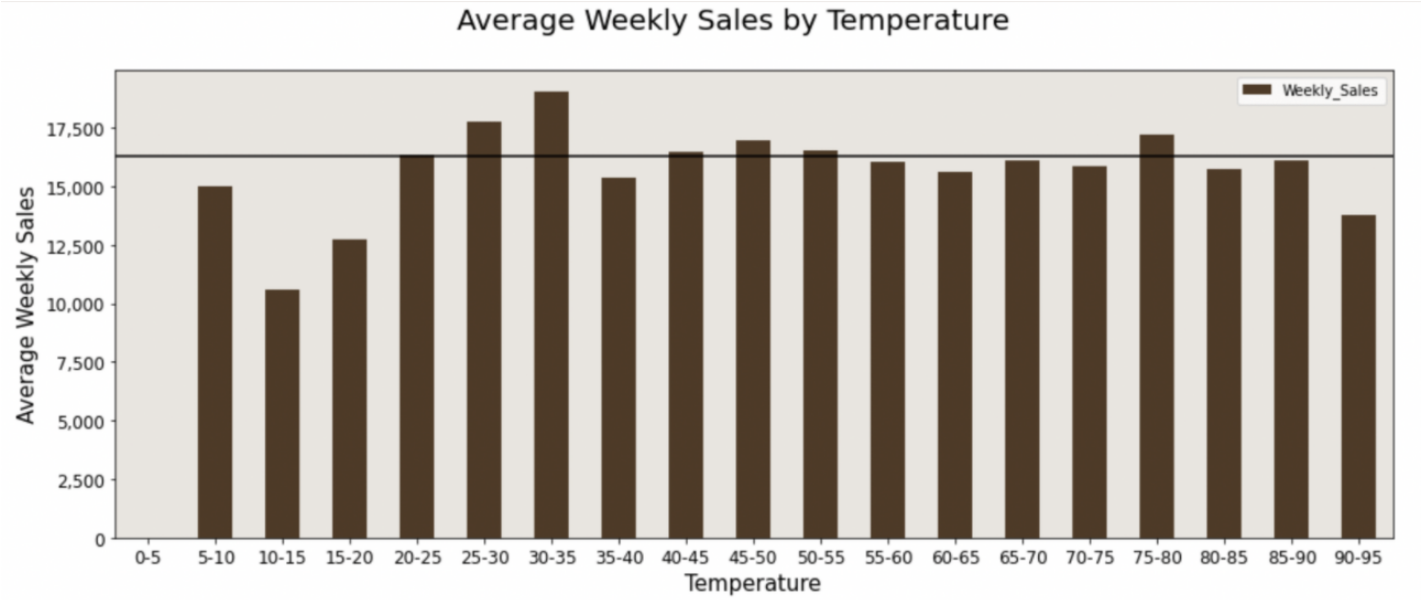

Figure 4

Moreover, we looked to see if temperature affected sales. For this analysis, the temperature was binned by 5°F and ranged from 5°F to 95°F. In Figure 4, we see that the more extreme temperatures (bins from 5°F-20°F and bins 80°F-95°F) are below average. The highest frequencies were from bins 35°F-80°F with the majority of the bins being above or slightly lower than the average weekly sales. This tells us that sales are higher during a non-extreme temperature.

SIZE

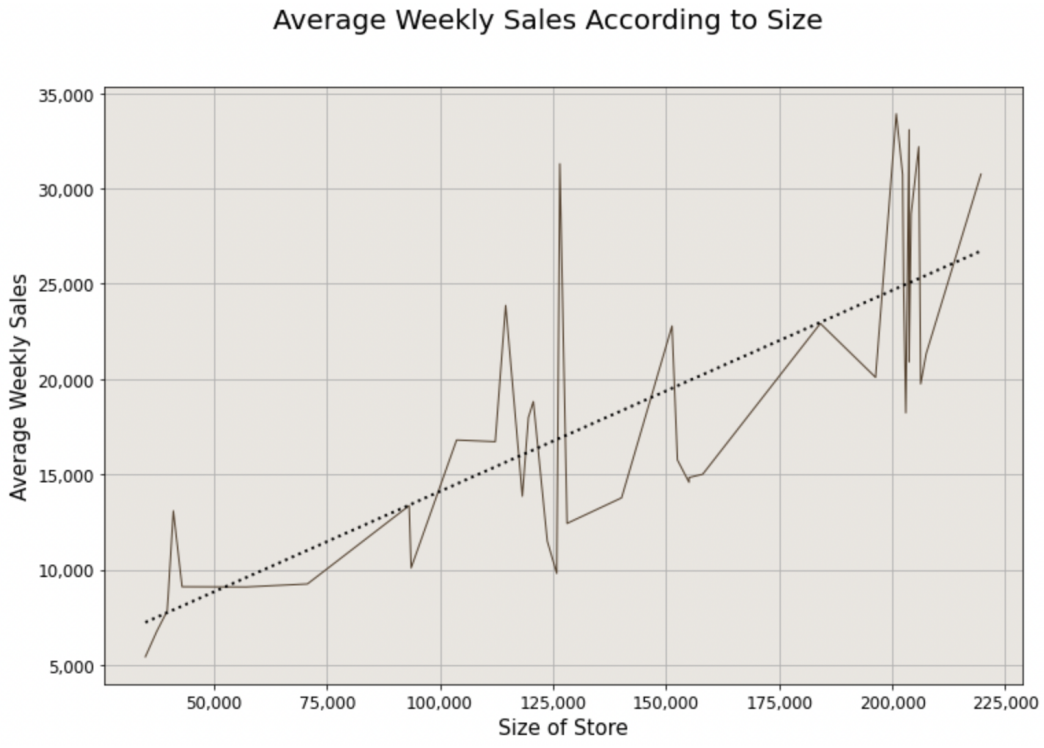

Figure 5

Lastly, we looked into the effects of weekly sales on department store size. Figure 5 shows a positive trend with the size of the store and average weekly sales. Using a linear regression line, we see that with bigger stores the average weekly sales will increase steadily.

The main takeaways from this analysis are that Christmas has the highest ***sum*** of weekly sales out of all holidays, Black Friday has the highest ***average*** weekly sales out of all holidays, and New Year's Eve needs to become a priority to boost sales. Our recommendation for these
retail stores is to prioritize New Year's goods and collectibles to increase sales. Moreover, due to extreme temperatures, offer warming or cooling stations at stores to encourage customers to come out and shop. Lastly, a good focus can be on building higher square footage stores to promote higher sales for future stores.

Death Penalty– advocating from the hilltop
February 17th
5:30-7:00
bit.ly/deathpenaltyevent