

WAYS TO OBTAIN AIRLINE MARKET SHARE IN HOLIDAY SEASONS

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Web Analytics



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Executive Summary

As society rapidly develops, air travel is becoming one of the most important and common means of transportation. According to Yahoo Finance, on average, there are roughly 7,782 to 8,755 commercial airplanes in the air per day in 2022. And that is 10% to 20% less than normal due to the pandemic, which means the numbers were only higher in the previous years (Waldek). Especially during the holiday seasons, airports are the most crowded, the amount of air travelers grows exponentially, and airfares also tend to skyrocket at the same time. The Point Guy states that in 2022, “Christmas travel average \$430 per ticket - a 53% increase from 2021 levels and a 17% increase from 2019” (Cudahy). Therefore, we decide to look into the ticket prices during the holiday season to compare and contrast between different airlines. From the companies’ point of view, examine ways that allow them to obtain more market share and to better take advantage of the season.

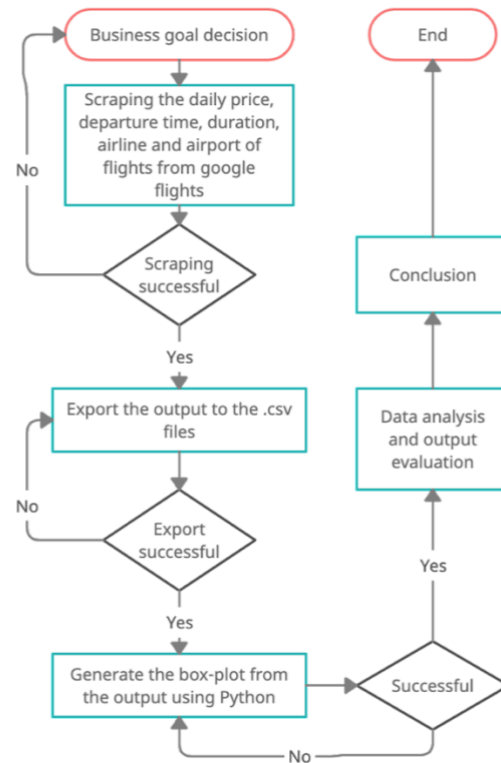
Business Goal Analysis

We will choose flights departing from all New York airports that travel to five major cities (Boston, Los Angeles, Las Vegas, Seattle, and Houston) across the United States as destinations on a given date range, specifically from December 23rd, 2022, to January 2nd, 2023. Then we are going to ‘pretend’ as a customer who’s going to travel on the above dates and is looking to buy tickets. We designated a 20-day time period in which the customer is going to buy the ticket, from November 25th, 2022, to December 14th, 2022. We will utilize tools learned from Web Analytics to perform a series of data scraping and data analysis, produce graphs and charts accordingly and use the results achieved to provide recommendations.

Database Description

In order to achieve our objectives, we decided to crawl the following information from the website Google flights, our scrapped data include Flight Dates, Airlines, Ticket Prices, Departure Airport, Destination Airport, Departure Time, and Flight Duration. All flights are one-way and non-stop, as well as restricted to economy class only, no carry-ons allowed, and non-refundable.

System Design



System Implementation

Throughout the project, the following tools were used: Jupyter Notebook Python (packages include BeautifulSoup, Selenium, ChromeDriver, Pandas, and Matplotlib), and Microsoft Excel. We first browsed the designated websites' HTML code and then used packages like Selenium and BeautifulSoup in Python to perform the scrapping. The code was written to allow automated scrapping when we run it each day, restoring the results in a text file on the local computer. We then used Pandas and Matplotlib to produce pie charts and box plots based on our needs, as well as using Excel to clean data and draw box plots. Then the flow chart was generated by Creately.

Evaluation

Step 1: Using Pie Chart to show the ratio of Airlines flying to each airport on a given day. We chose Dec 23rd, Dec 27th, and Dec 30th as examples, because both December 23rd and 27th are the top two most crowded traveling dates of Christmas in the past three years, and December 30th is the beginning of New Year.

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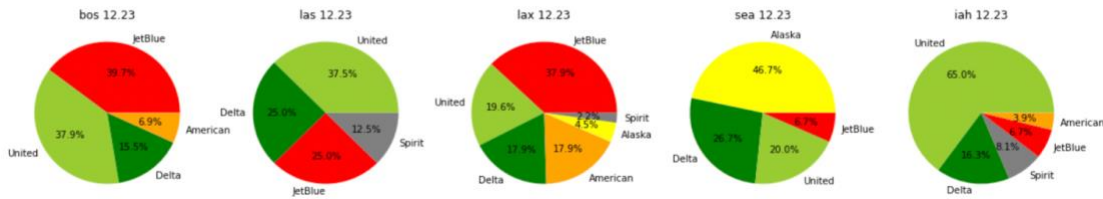


Figure 1 Flights Ratio to All Airports on 12/23

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Figure 2 Flights Ratio to All Airports on 12/27

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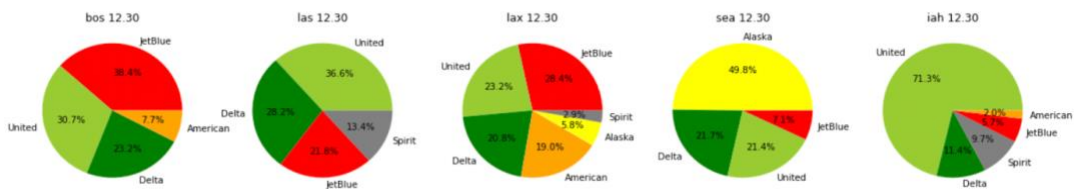


Figure 3 Flights Ratio to All Airports on 12/30

From the pie chart, we can see that some Airlines don't offer routes to every city, for instance New York to Boston (BOS) is not offered by Spirit, JetBlue and Alaska Airlines, and New York to Las Vegas (LAS) is not offered by American Airlines and Alaska Airlines. Thus, we suggest each airline company to consider increasing routes from New York to all five destinations in order to gain more customers. For example, Alaska Airlines should add more flights to Boston, American Airlines should add more routes to Las Vegas and so on. To further analyze, we chose the Airlines with the most and least ratio of each route to make the comparisons.

Step 2: Generate box plots using both Python and Excel. In addition to picking out three most crowded dates, we also picked three most representative routes (Las Vegas, Houston, and Boston) to further perform the analyses. Each route consists of three graphs: the first graph shows the boxplots of the overall price distribution of all airlines departing from New York to that city on the given dates; the second graph shows price distribution boxplots of the Airline company that

offers the most flights on the given dates; and finally, vice versa, the third graph shows price distribution boxplots of the Airline company that offers the most least on the given dates.

For instance, the first graph below shows the price distribution of all airlines flying from New York to Las Vegas separately on December 23rd, December 27th, and December 30th. Because United Airlines offers the most flights to Las Vegas, the second graph shows the price distribution of United Airlines separately on December 23rd, December 27th, and December 30th. Similarly for the last graph, we can see that Spirit Airlines offers the least flights from New York to Las Vegas.

We notice that the price of flights offered by United Airlines are generally above the average, and the price of Spirit Airlines is slightly lower than that of United Airlines. The prices of Spirit Airlines are more scatter than United Airlines when there are more than one flights offered on the same day.

The price trend can also be told from the overall boxplot. For instance, the ticket prices on December 23rd are significantly high between December 1st to December 6th and lower between November 25th to November 30th.

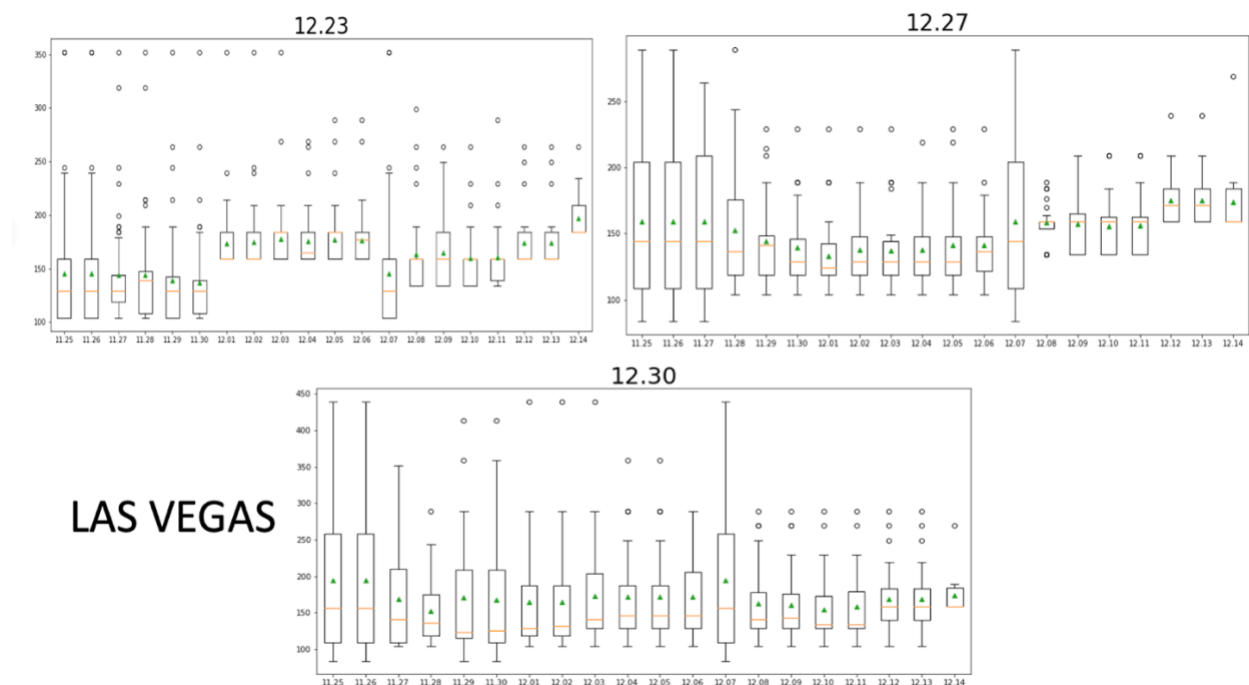


Figure 4 Price Distribution of All Flights to Las Vegas on 12/23, 12/27, 12/30

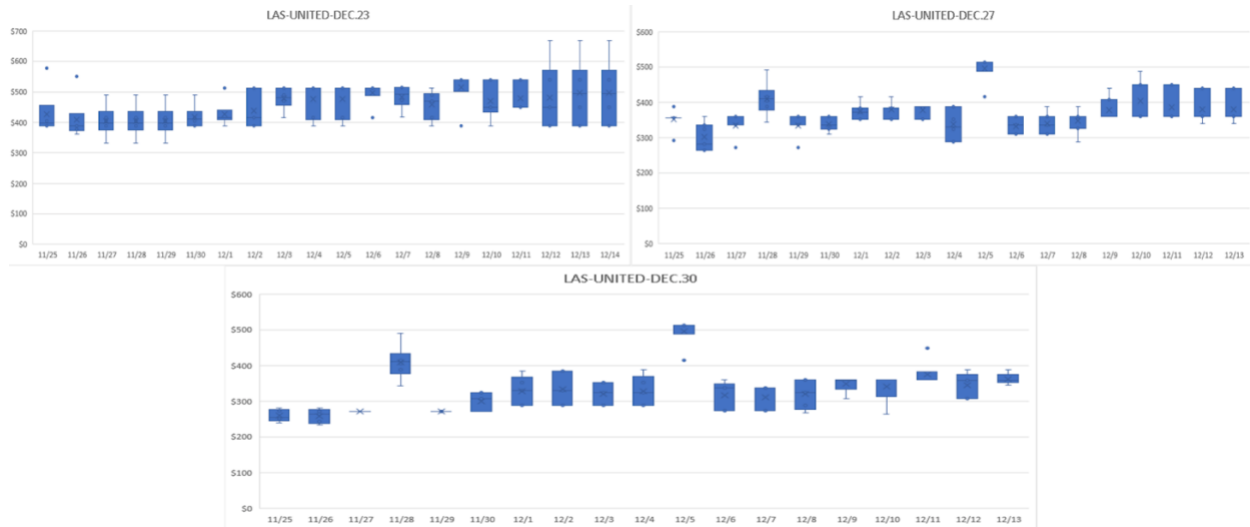


Figure 5 Price Distribution of United Airlines to Las Vegas on 12/23, 12/27, 12/30

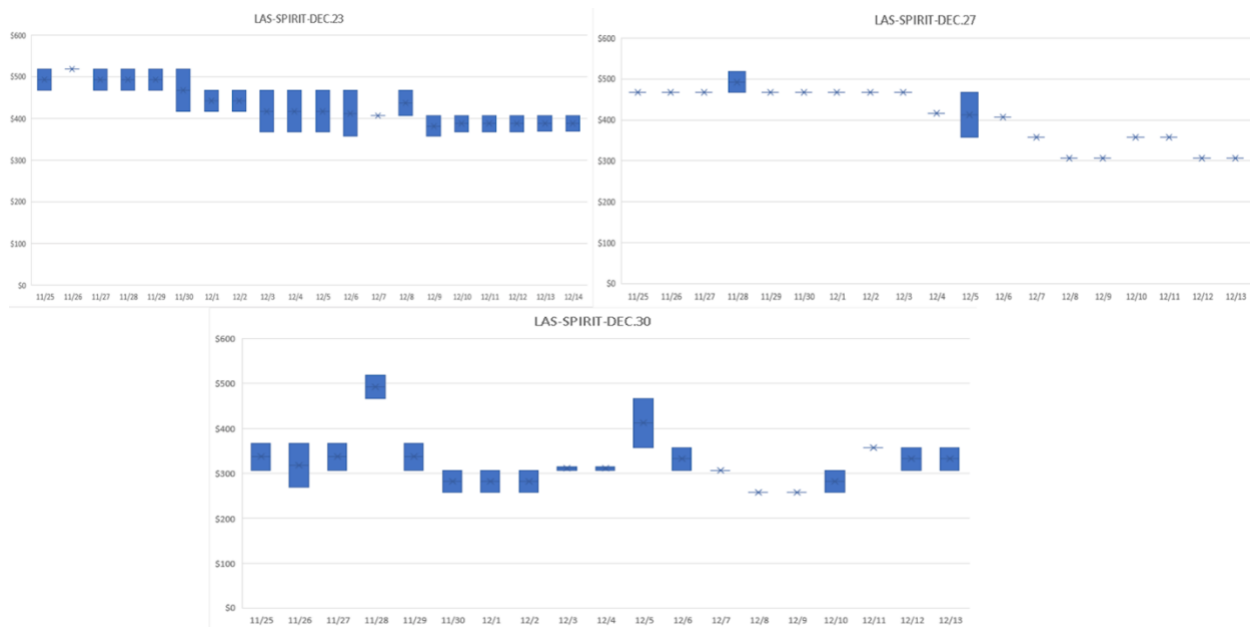


Figure 6 Price Distribution of Spirit Airline to Las Vegas on 12/23, 12/27, 12/30

Looking at the boxplots below, the United Airlines flights prices are significantly above the average, and the prices of American Airlines are higher than the average, but lower than United Airlines. The prices of American Airlines also have a wider range than United Airlines as long as there are more than one flights on the same day. Interestingly, we see that American Airlines only offers very few flights on December 30th, which is a rare situation compared to other airlines.

Same as the flight to Las Vegas, the ticket prices on December 23rd are significantly high if the customer buys between December 1st to December 6th, and lower between November 25th to November 30th. The ticket price on December 30th is smoother before December 7th since the

time range is too long.

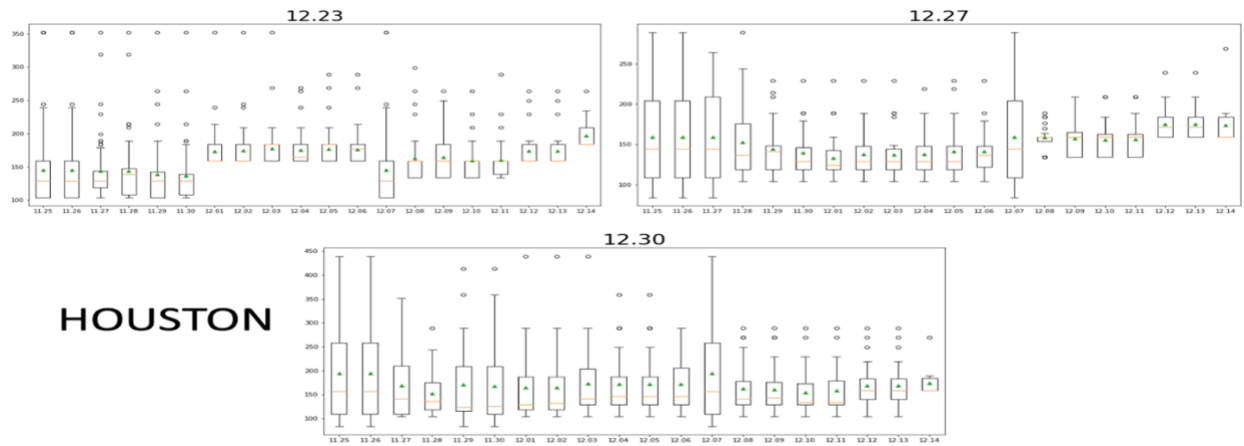


Figure 7 Price Distribution of All Flights to Houston on 12/23, 12/27, 12/30

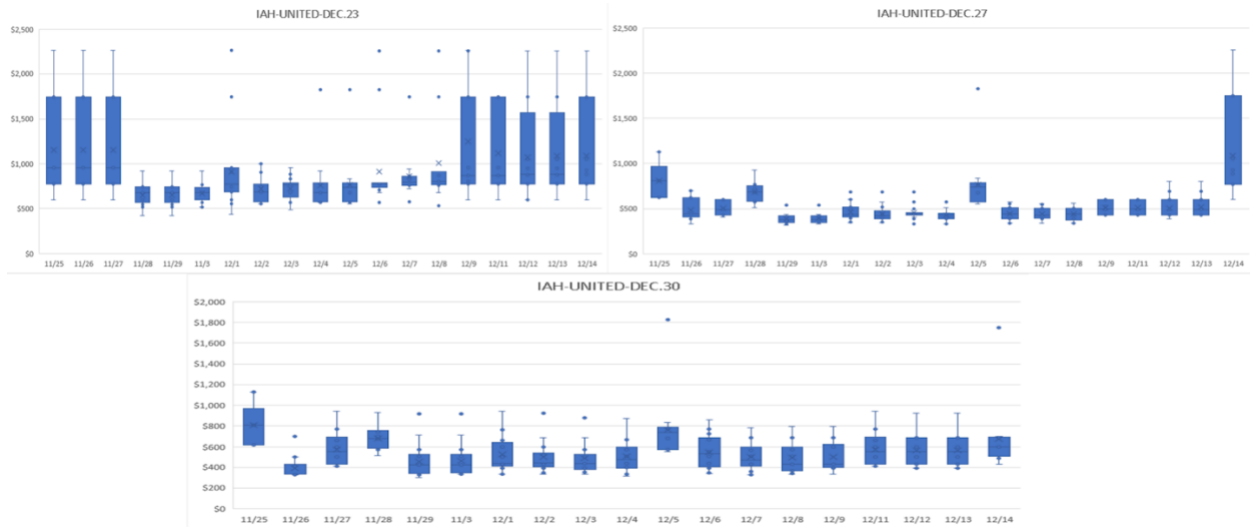


Figure 8 Price Distribution of United Airlines to Houston on 12/23, 12/27, 12/30

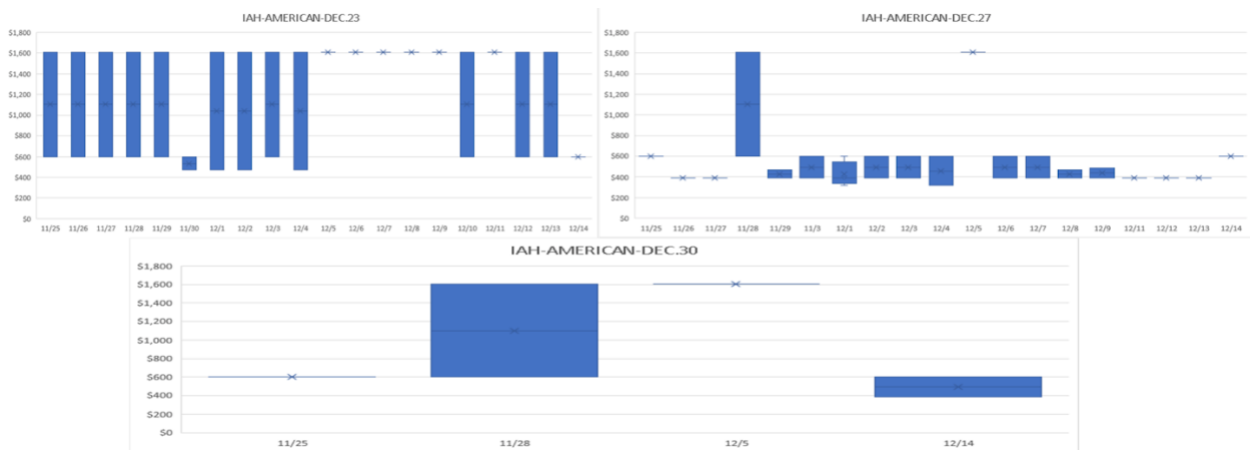


Figure 9 Price Distribution of American Airlines to Houston on 12/23, 12/27, 12/30

The prices of American Airlines are more scattered and higher than JetBlue, which shows the pricing strategy of American Airlines is that it's aiming to customers who hold the different consumption idea. The overall boxplot is generally the same as the other two, which means that the price of flight ticket holds similar trends before and after Christmas and New Year.

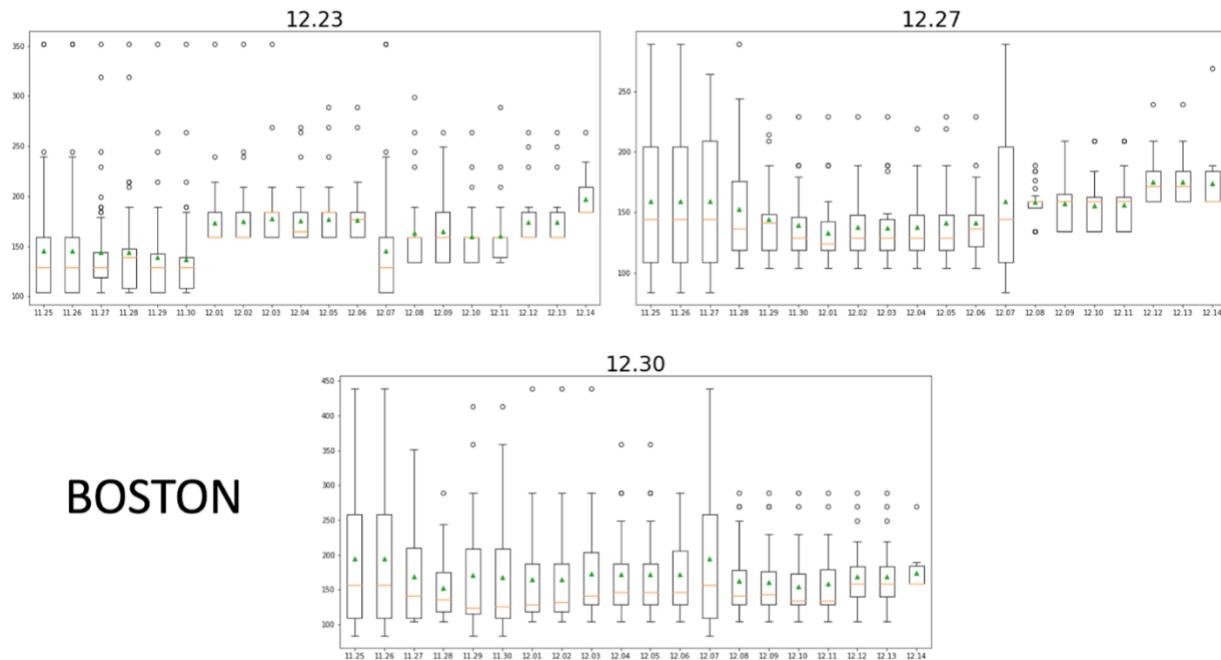


Figure 10 Price Distribution of All Flights to Boston on 12/23, 12/27, 12/30

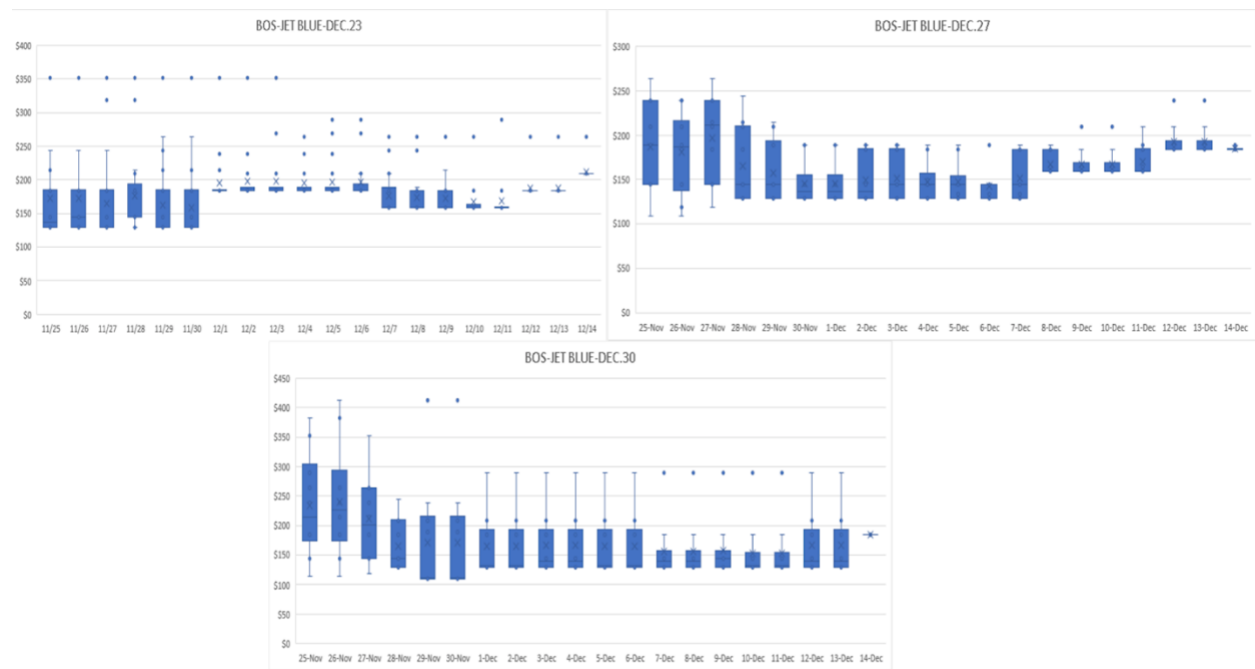


Figure 11 Price Distribution of JetBlue to Boston on 12/23, 12/27, 12/30

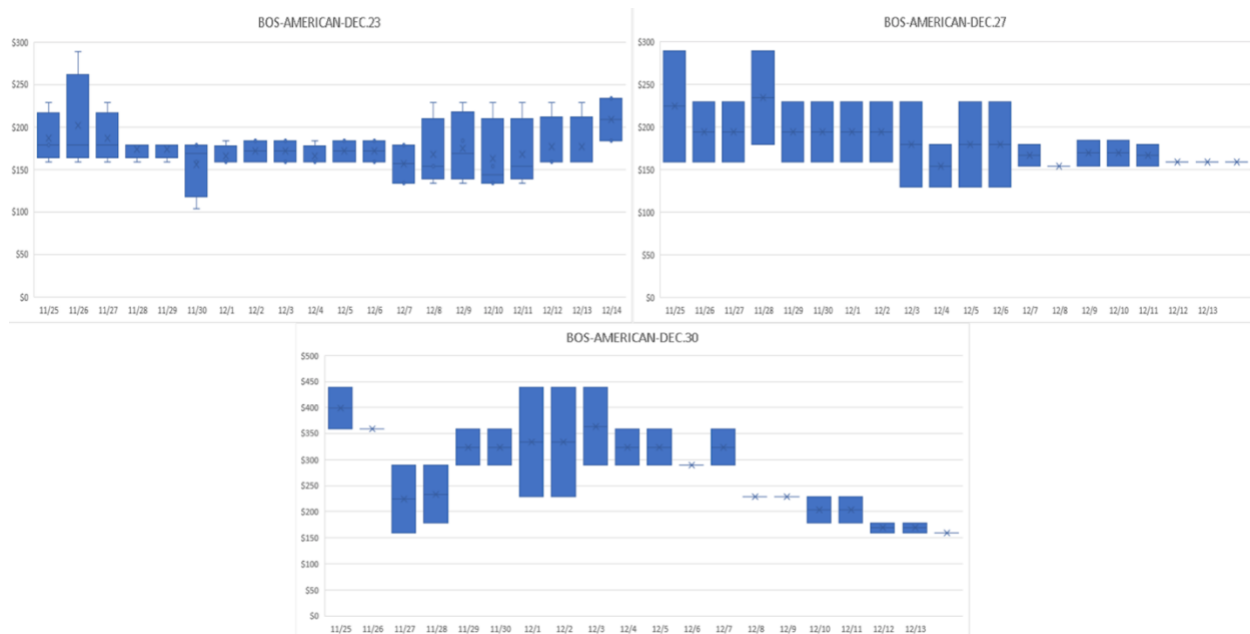


Figure 12 Price Distribution of American Airlines to Boston on 12/23, 12/27, 12/30

Conclusion

Throughout the whole project, we utilized Python packages learned from Web Analytics and Excel form Data Mining to perform a series of data scraping of flight data, produced graphs and charts with Python and used the results achieved to conduct pricing analyzation and provide strategic recommendations for small airline companies to improve market shares.

Based on our analyses, we found that small airline companies tend to have a wider range in pricing compared to large airline companies. All the airline companies are following a similar price strategy regardless of their flights' proportion in a certain route. Usually, passengers tend to choose larger airline companies to ensure better services and lower the risk of unwanted situations. Therefore, we suggest smaller airline companies to implement different pricing strategies like opposite price strategy to seize the market share. They may consider lowering the ticket prices when larger airline companies have high prices to sell more tickets, and vice versa, increase the ticket prices when other opponents sell at a lower price to make more profits.

We also discovered that small airline companies offer less flights compared to large airline companies and will set a lower price for more profits. Thus, they will need more passenger to maintain the profit. From this prospective, we suggest smaller companies to increase their service quality to maintain a stronger customer relationship. Such as complimentary free baggage allowances or complimentary in-flight WIFI that can be redeemed by customers with air mileages,

and also, companies can set a higher flight delay insurance or baggage loss insurance.

Finally, in terms of other strategies to increase market share for smaller airline companies, we suggest them to invest in the innovative advertising and promotion strategy on various social media.

Future Direction

Upon completing the project, we noticed a couple of places that could be improved in the future. We limited our ‘price-hunt’ to only 20 days, meaning that our data only contains 20 days of information. We chose this time frame to prevent the data from being too massive to handle. However, in the future, we believe that data should at least be captured all year round in order to perform better analysis and draw proper conclusions. Moreover, we could also get rid of the restriction such as the features ‘non-stop’ and ‘no carry-ons allowed’, which will provide a broader range of data and also allow more comparisons for Airlines to consider. Lastly, we think the data collected can not only benefit Airline companies, but air travelers can also take advantage of the information. Once enough data is gathered, we are able to look at the trend of ticket prices for the entire year, which will be quite obvious when tickets are the cheapest. Providing customers with advanced knowledge of the best time to purchase tickets.

References

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