

Clustering Analysis to Make Better Marketing Decisions for Sun Country Airline

Problem Statement:

To compete with larger airlines, the management team at Sun Country would like to get a deeper understanding of their customers' behaviors so that the company can make strategic decisions to generate more revenue, drive enrollment for Ufly rewards, and optimize online booking channels.

Analysis Technique:

Our team conducted an analysis of Sun Country airlines customers using an exploratory technique called the Gaussian Mixture Model. It is worth noting that Gaussian Mixture Models clustering works with continuous variables, and as categorical features were used in our analysis, the clustering results might be affected. Future improvements may be realized using a different clustering technique. We segmented the airline customers into five groups based on common attributes and behaviors. From these groups, we were able to derive recommendations that would achieve Sun Country's goals of increasing enrollment in the Ufly Rewards program as well as enabling more targeted marketing.

Cluster Grouping Results:

Based on the Gaussian Mixture clustering results, we have grouped the passengers into five segments:

Cluster	# of Customers	Total Spending	Avg. Spending	Avg. Group Trip %	Avg. Coach%	Avg. Flight Frequency	Avg. Free Tickets	Avg. Membership %	Avg. Trip Duration	Avg. Booking Time
0	33,599	46.56M	131.64/ Ticket	52.3%	86.3%	2.58/Year	30.4%	51.8%	20.93 Days	56.06 Days Before
1	279,429	239.77M	91.19/ Ticket	87.0%	81.1%	1.35/Year	0.0%	57.5%	4.98 Days	70.12 Days Before
2	493,811	319.18M	171.72/ Ticket	0.0%	92.7%	0.96/Year	0.0%	15.7%	3.11 Days	36.98 Days Before
3	599,939	405.63M	62.51/ Ticket	100.0%	100.0%	0.95/Year	0.0%	0.0%	4.37 Days	68.14 Days Before
4	117,760	0.18M	0.00/ Ticket	82.6%	94.3%	0.96/Year	100.0%	10.2%	4.85 Days	32.08 Days Before

Table 1: Cluster result summary statistics

Cluster Characteristics

Cluster 0 – Long trip Travelers:

- 68.46% of the passengers from this segment fall into the age buckets of Middle Age (36-55) and Senior (56+).
- They flew most frequently compared to other segments with an average of 2.5 times per year. Specifically, 60% of them flew 2 or more times, and 26% of the passengers flew 3 times or more per year.
- They also have the longest average trip duration days (20 days) while other segments' average trip duration is all within one week.

Cluster 1 – Frequent Flying Group Travelers:

- 91% of the passengers in this segment prefer to fly with others, and over 90.4% of passengers fly at least 1 time per year. 57% of them are already members of the Ufly rewards program.

Cluster 2 – Young Solo:

- This segment contains the highest proportion (43%) of young adults (18-35), and over 40% of young adults from the total young adult population fall into this segment.
- All passengers in this segment are flying by themselves.

Cluster 3 – Low Spending Family:

- All passengers in this segment travel in groups and are non-members. The proportion of children and teenagers in this segment is also the highest (20.7%) compared to other segments (all less than 12%).
- This segment also has the lowest average spending of \$62 compared to other segments with non-zero spending.
- This is the largest cluster, with nearly 600,000 customers falling in this category.

Cluster 4 – Tour Operator Customers:

- All passengers in this segment either used free tickets or booked through tour operators; about 83% of them were flying in groups.

Recommendations:

To achieve Sun Countries' goals of increasing customer knowledge and Ufly Rewards signup as well as optimizing online booking channels, we developed some recommendations based on our clustering results. Our group produced three recommendations that presented the greatest opportunities for Sun Country Airlines. Due to the size of the different clusters, the business impact of the recommendations will differ. Recommendations will be presented in order of importance, from most to least.

Sign-up Bonus for Family Group (Cluster 3):

Cluster 1 and Cluster 3 Comparison

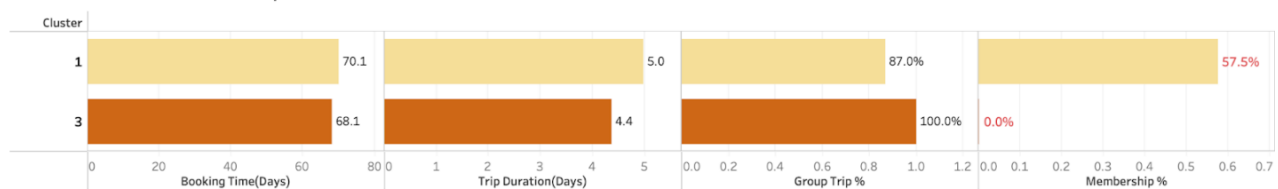


Fig 2: SCA Website Booking Percentage Comparison

As the largest customer group, Cluster 3 consists of 600k passengers but none of the customers in this segment are members of Ufly reward. Compared with cluster 1, both clusters share similar flying habits; however, cluster 1 consists of 57.5% of members. These findings reveal a great opportunity in targeting cluster 3 customers to convert them into members. Thus, we recommend offering a sign-up bonus as an incentive for customers in cluster three. Customers will receive 10000 bonus points after they sign up for the Ufly rewards program and book their first trip for three or more people.

Customized Website Banners (Cluster 1):

Website Booking % Comparison Across Clusters

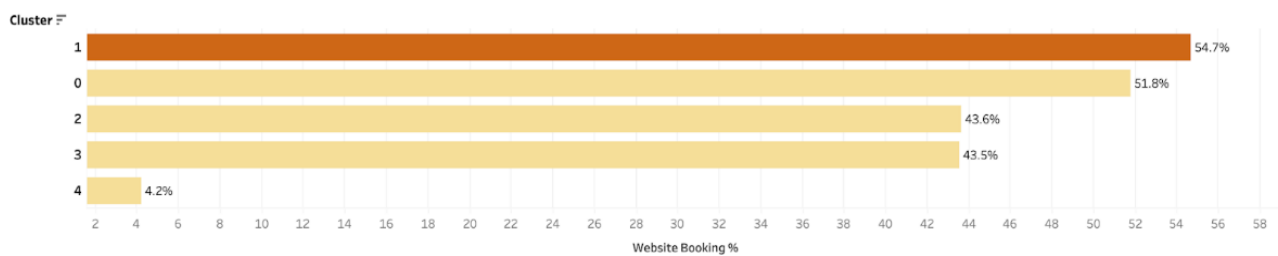


Fig 2: SCA Website Booking Percentage Comparison

In addition, looking into cluster 1, the second largest cluster, we found that the vast majority (54.7%) of customers in this cluster made their bookings on the Sun Country Website, which is an opportunity to improve customers' online website booking experience. For cluster one, their popular destinations include Las Vegas, Orlando, and Cancun. We believe adding customized website ads banners of deals to these top destinations can improve their online booking experience and may potentially drive ticket sales.

Direct Marketing:

Finally, our last recommendation aims to increase the engagement of customers in cluster two through direct marketing. Knowing this group of customers' flying habits, we recommend utilizing this information to generate more sales. For cluster two, their top destination is New York throughout the year, except for quarter one, where their top destination is Las Vegas. Furthermore, their average booking time is 36 days before their flight time. We recommend sending a marketing campaign email to this group around December giving customers a deal to purchase a ticket bundled with hotels.

Cluster 2 Top Destinations by Quarter

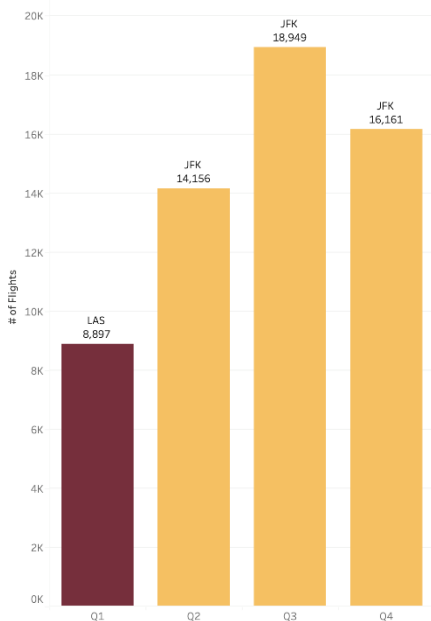


Fig 3: Cluster 2 Top Destination Each Quarter

Conclusion:

In summary, five distinct customer segments were identified with the Gaussian Mixture models. Studying these clusters, we discovered opportunities in increasing Ufly reward members in cluster 3 with a sign-up bonus, optimizing online booking websites for customers in cluster 1 by adding customized website banners, and driving more ticket sales with direct marketing to cluster 2. Due to smaller customer group size, Cluster 0 and cluster 4 were left out for recommendations. If time and resources are sufficient, further explorations on these two clusters could be done using the same clustering results.