

Detailed Report:

TravelTide Personalized Perk Reward Program

1. Project Objective

The primary objective of this project was to design a personalized perk program that aligns with TravelTide's strategic goals: increasing user engagement, incentivizing bookings, and enhancing customer satisfaction. By using data-driven segmentation and customized perks, the initiative aims to improve the relevance and efficiency of customer rewards — providing meaningful incentives that match real behaviors and needs.

2. Data Sources and Preparation

The analysis leveraged four PostgreSQL database tables: users, flights, hotels, and sessions. These were combined into a session-level master table, enriched with derived fields such as:

- Booking activity (flight/hotel)
- Discount usage (categorical & numeric)
- Session duration and intensity
- Trip characteristics (duration, lead time, cancellations)

Using Python (via a Colab notebook), I aggregated this session-level data into a user-level profile, combining personal information, behavioral patterns, and scoring metrics. This comprehensive user view served as the basis for clustering.

3. Clustering Approach and Feature Engineering

We implemented a KMeans clustering algorithm using six clusters ($k=6$) to reflect distinct user behavior patterns. The algorithm input consisted of:

- Perk scores (continuous variables): Calculated using weighted metrics for each perk opportunity, e.g., flight volume, loyalty, price sensitivity.
- Eligibility flags (binary variables): Based on dynamic thresholds (e.g., top 25%) or behavioral rules.
- Standardized values: All input variables were scaled to ensure fair distance calculation.

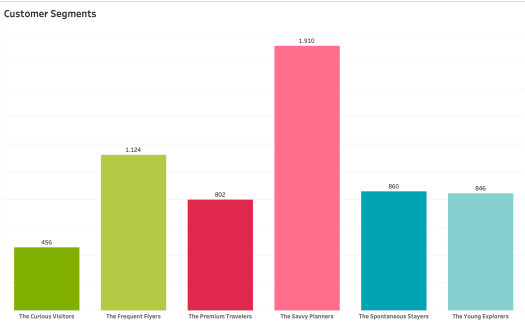
To ensure quality and interpretability, clusters were evaluated using:

- Silhouette Score (measuring cohesion/separation)
- Davies-Bouldin Index (measuring compactness/variance between clusters)

Result: A well-separated clustering solution that identifies actionable behavioral groups.

4. Customer Segments and Perk Assignments

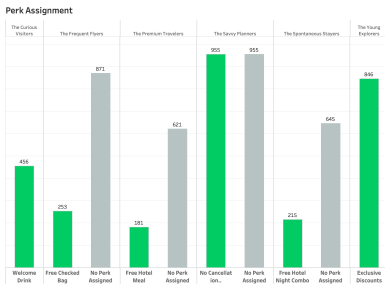
I defined six marketing-friendly segments, each assigned a perk that reflects their behaviors, preferences, and potential to engage.



Cluster	Segment Name	Profile Summary	Assigned Perk
0	The Young Explorers	Younger, low-booking users; high engagement; price sensitive	Exclusive Discounts
1	The Frequent Flyers	High-value, frequent flyers with high baggage volume	Free Checked Bag
2	The Savvy Planners	Loyal early bookers, long lead times, few cancellations	No cancellation Fees
3	The Curious Visitors	Users with many sessions but no bookings	Welcome Drink
4	The Premium Travelers	High-spending hotel bookers, longer stays	Free Hotel Meal
5	The Spontaneous Stayers	Shorter trips, moderate spending and booking frequency	Hotel Night Combo

Assignment Logic:

- For Clusters 0 and 3, all users received the perk, as the objective is to encourage initial bookings.
- For the remaining clusters, perks were assigned only to users exceeding a percentile threshold (typically the 75th percentile) of the relevant perk score to ensure efficient targeting and avoid over-distribution.



5. Visualization and Dashboard Development

To communicate findings and enable action, a comprehensive Tableau dashboard was created, including:

- A cluster overview showing distribution, demographics, and behavior
- Segment-specific dashboards with KPIs: booking volume, spend, travel habits
- Visualizations of perk assignment rates and eligibility
- A pie chart summarizing user share across segments
- Tooltips and calculated fields for marketing-friendly labeling

6. Campaign Implications and Use

This segmentation forms the basis for targeted, personalized campaigns. Each user can now be addressed:

- With tailored messaging ("As a Frequent Flyer, enjoy a free checked bag on us!")
- Via email automation or CRM tools
- With tracking logic for redemption and engagement per perk

The scoring logic, thresholds, and user profiles are all integrated into the final dataset and exportable as .csv for seamless integration into Tableau or campaign tools. They also can be adjusted if needed.

7. Next Steps

1. **Launch Targeted Campaigns:** Use email or in-app messages to announce perks based on user segment.
2. **Monitor Behavioral Impact:** Track bookings, redemptions, and session metrics over the next 6 months.
3. **Broaden Awareness:** Introduce perks to additional users outside the targeted group to increase awareness.
4. **Scale the Program:** Consider multi-perk strategies or tiered incentives based on evolving engagement.
5. **Automate Scoring:** Set up pipelines to reassign clusters and perks as user behavior evolves.