TravelTide User Segmentation and Personalized Offers

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Objective

The goal of the TravelTide project is to:

- Segment users based on travel behavior (bookings, cancellations, preferences, demographics).
- Use machine learning techniques such as:
  - KMeans clustering for user segmentation.
  - PCA (Principal Component Analysis) for visualization.
  - Random Forest Classifier for predictive modeling.
- Recommend personalized offers
- Maximize profits

Data Loading and Initial Exploration

Data Exploration:

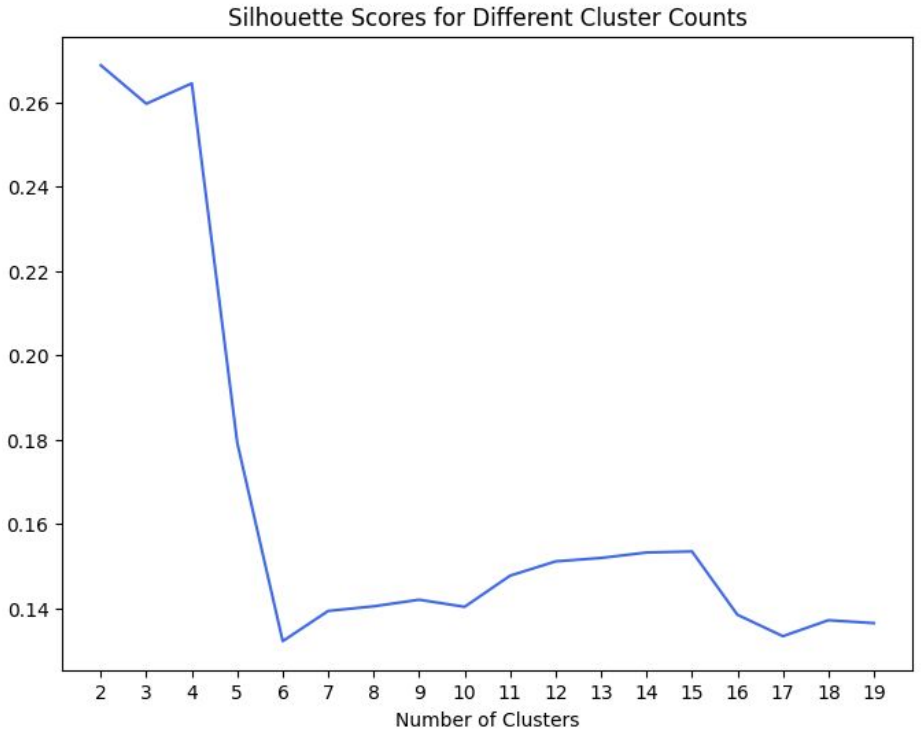
- Removed 'O' category from gender

- Handled missing values for base_fare_usd, seats, and checked_bags

- New features are added such as age, flight_hotel_booked, flight_duration_days, hotel_stay_duration, total_hotel_cost, active_days, cancellation_rate

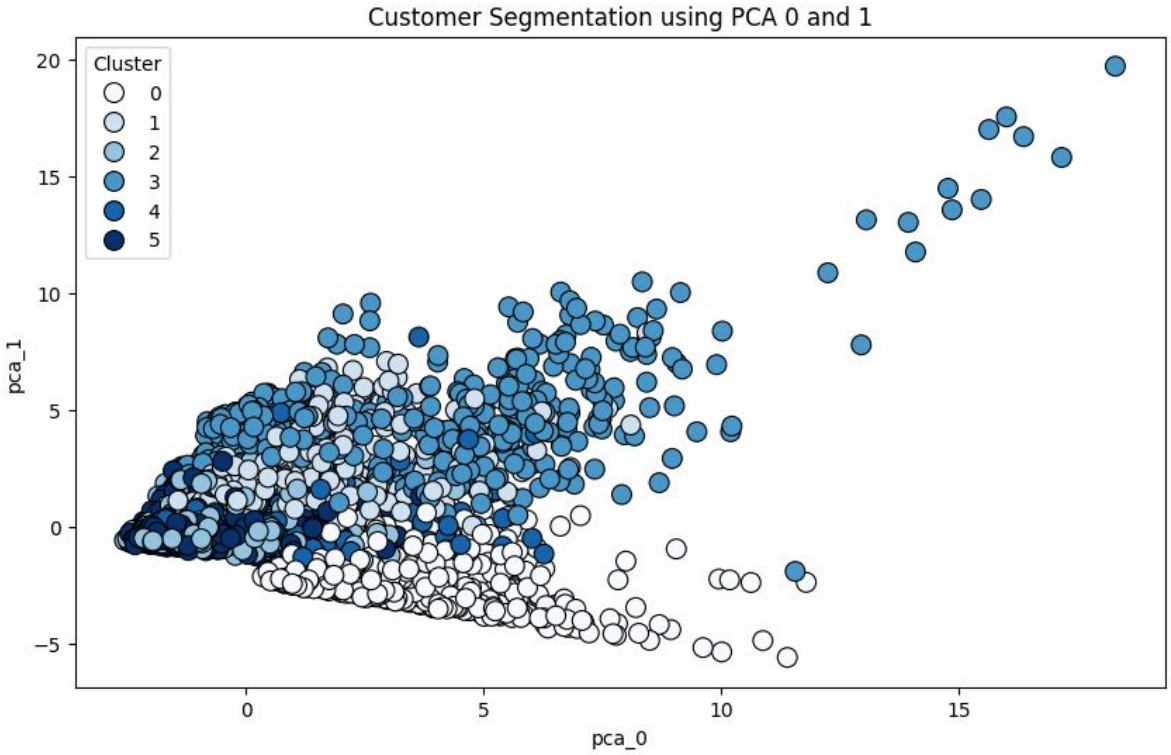
KMeans Clustering

Optimal Cluster Selection: 6

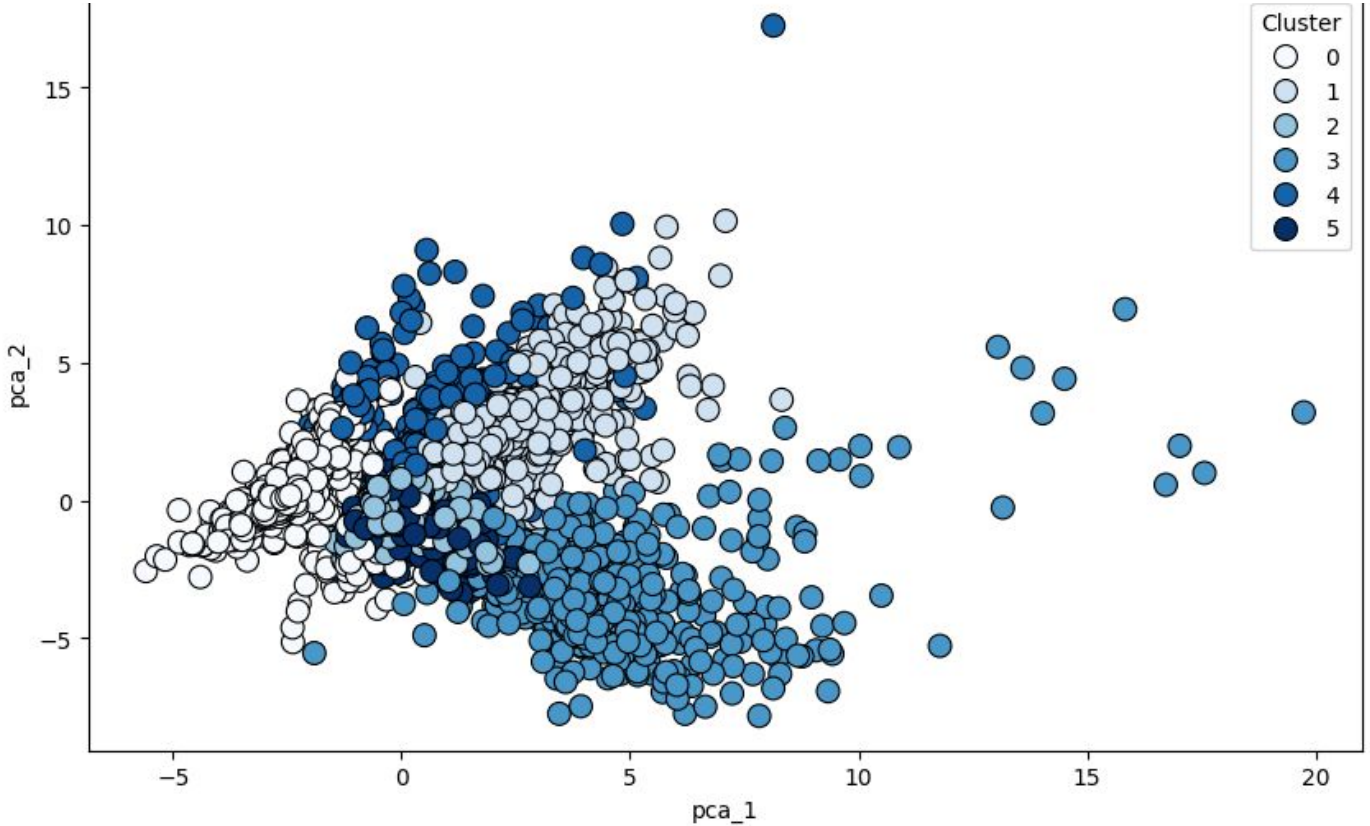


PCA for Dimensionality Reduction

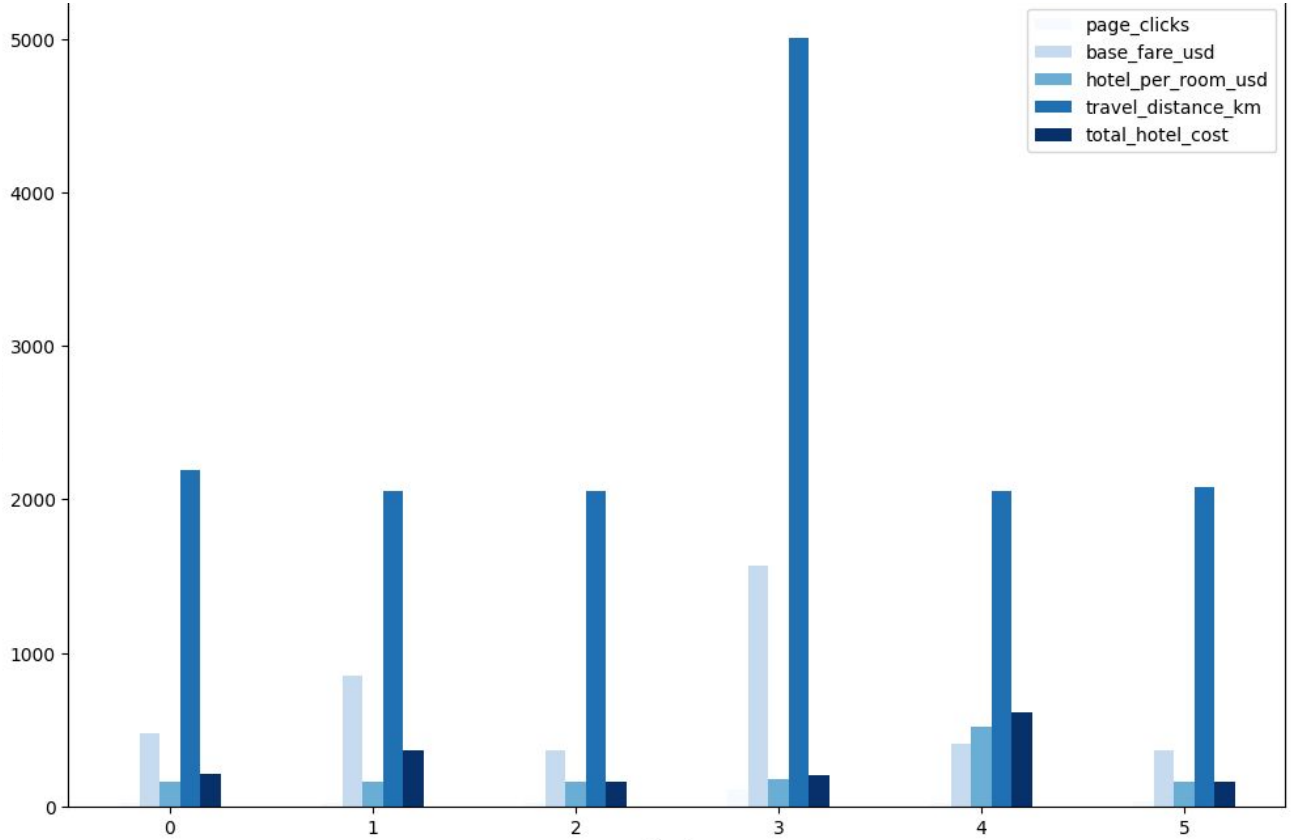
Dimensionality Reduction: 4



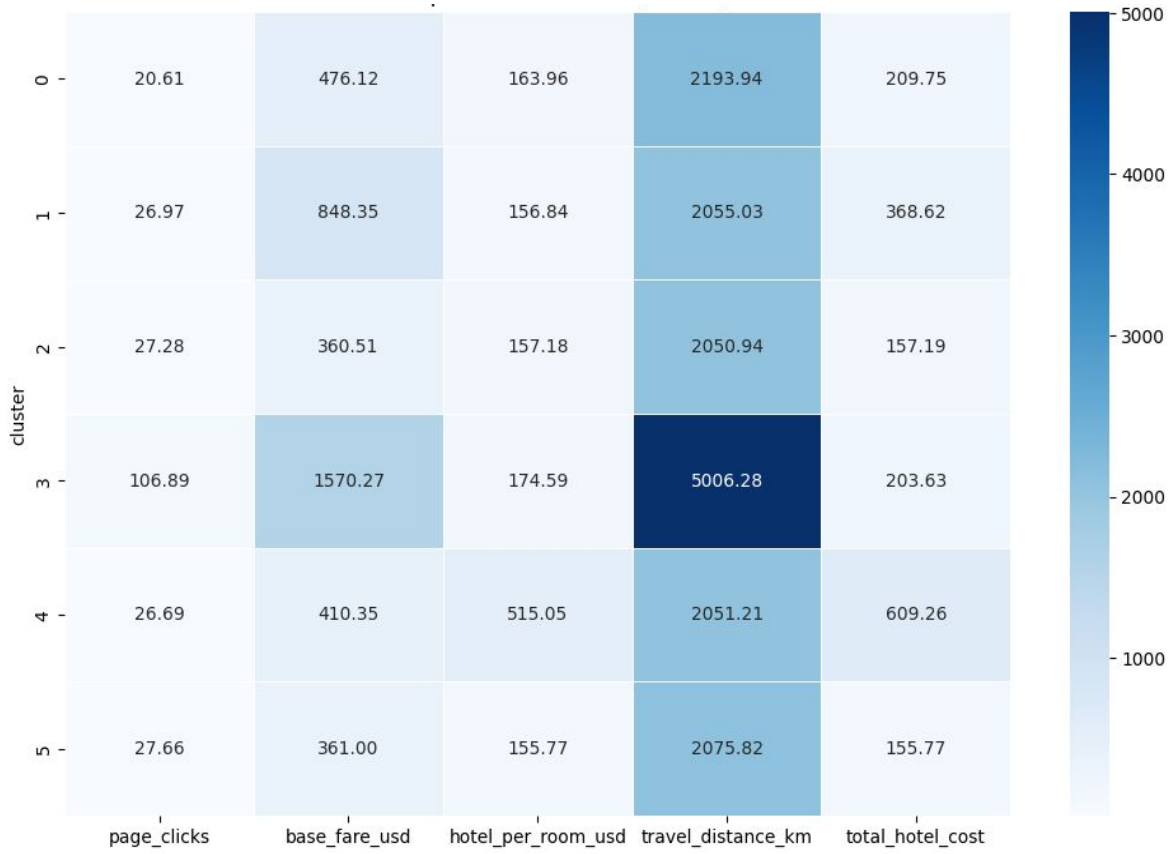
PCA1 vs 2



Cluster Analysis



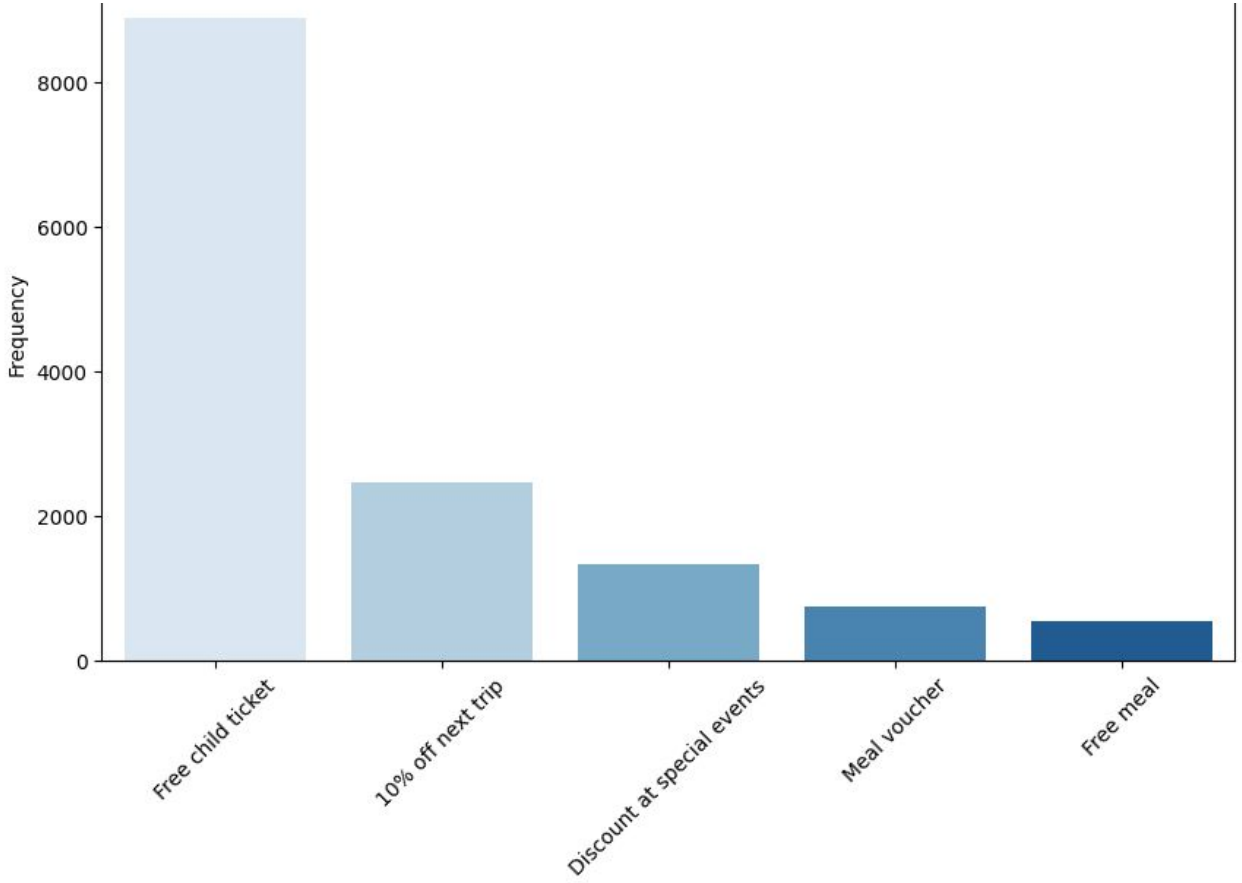
Heatmap of Cluster



Mapping to Offers

Cluster 0 : Frequent travelers	"10% off next trip"
Cluster 1 : Frequent engagement, short trips	"Discount at special events"
Cluster 2 : Budget-conscious travelers with families	"Free child ticket"
Cluster 3 : Frequent travelers with high cancellations	"Free meal"
Cluster 4 : Family travelers on short trips	"Meal voucher"
Cluster 5 : Married with children	"Free child ticket"

Recommendation Offers Viz

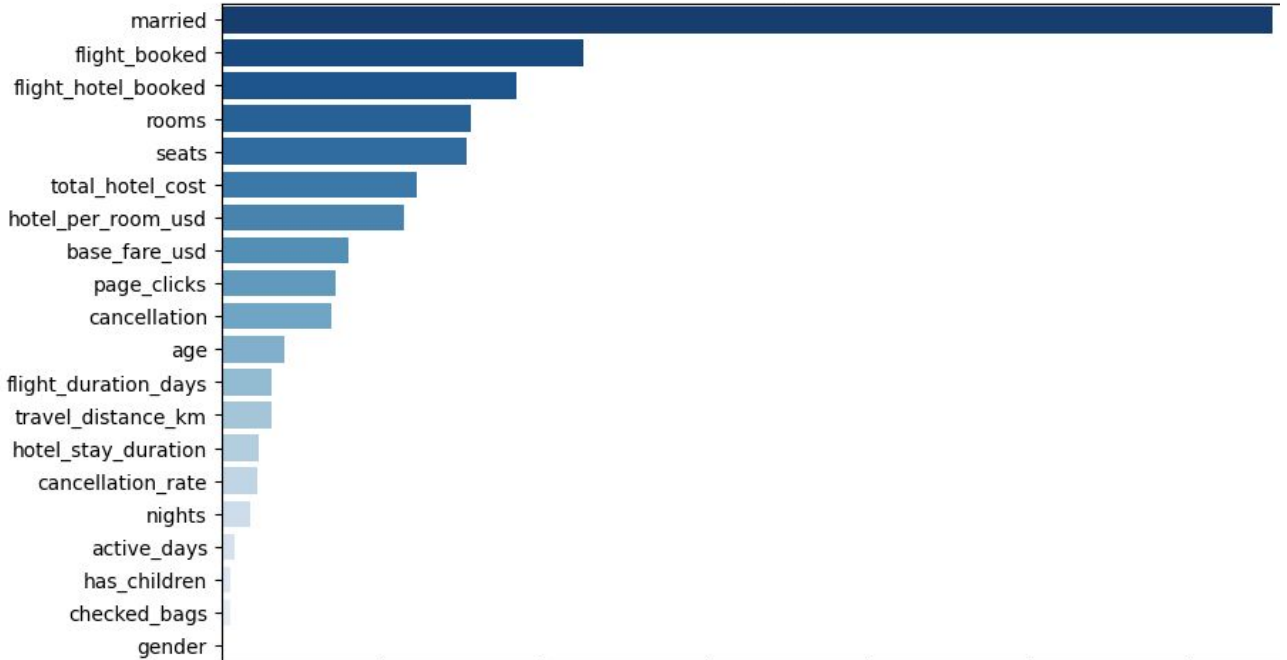


Predictive Modeling

Model Training: Random Forest Classifier

Model Evaluation: 95%+

Feature Importance:



Conclusions

- Six Clusters
- Personalized offers
- Predictive modeling

Next Steps

- Further model optimization with other algorithms.

- Real-time model integration

- More Data Collection

Thankyou