Strategic Perk Assignment: Data-Driven Optimization for Traveler Engagement

Dynamic Assignment Based on Conversion Scores

A conversion score is calculated based on overall booking proportion and sessions before purchase. This score determines whether a traveler is a fast or slow converter.

- Fast converters (33% of cases) receive reminder perks such as small discounts or loyalty bonuses.
- Slow converters (67% of cases) receive stronger perks such as large discounts or VIP services.

Cluster-Specific Perk Thresholds

Each cluster's probability is compared to a cluster-specific threshold (computed as the median for each cluster) to ensure perk assignment aligns with the likelihood of remaining within that cluster.

Luxury Traveler Focus

Luxury travelers are identified based on high spending habits and specific customer identifiers, ensuring eligibility for premium perks such as the Ultimate Prestige Package.

Perk Assignment Logic

Using both conversion score and cluster probability, perks are dynamically assigned. Bargain-sensitive travelers receive discounts, business travelers receive VIP benefits, and first-time travelers are offered enticing starter perks.

Understanding the Conversion and Cluster Probability Thresholds

The model utilizes two critical thresholds: **Conversion Score (CS)** and **Cluster Probability (CP).**

- **Cluster Probability (CP):** Defines the likelihood of belonging to a specific travel segment, ensuring perks are distributed according to travel behaviors.
- **Conversion Score (CS):** Determines the probability of booking based on past interactions.

The **conversion threshold** is selected to ensure a full distribution of perks. Lowering the threshold to the median or below increases selectivity, potentially leaving some travelers without a perk. Setting the threshold to zero broadens distribution but reduces individual perk impact.

Examples of Threshold Adjustments

- **Scenario 1: Lowering the Conversion Score Threshold to 0.1**
    - A lower threshold increases the number of travelers receiving perks, including those with a lower probability of booking.
    - This maximizes reach but may result in inefficient perk allocation.
- **Scenario 2: Increasing the Conversion Score Threshold to 0.5**
    - A higher threshold prioritizes perks for travelers with strong booking intent.
    - This improves efficiency but excludes those needing minimal incentives to convert.
- **Scenario 3: Eliminating Perks for High-Intent Users (CS ≥ 0.8)**
    - Excluding high-CS travelers directs perks to those less likely to convert without an incentive.
    - This reduces unnecessary spending but may lower overall engagement.

Recommendations for Managing Conversion in the Model

Threshold adjustments provide flexibility based on business goals:

- **Maximizing quick responses:** Assigning perks to travelers with high conversion likelihood reinforces engagement.
- **Attracting new customers:** Lowering the threshold expands the customer base.
- **Balancing retention and acquisition:** A mid-range threshold ensures a mix of frequent travelers and new customers.

This model enables **dynamic perk distribution, aligning incentives with evolving business strategies.**

The difference between a **conversion score (CS) threshold of 0.2 and 0.1** lies in the way perks are distributed and which users receive specific perks.

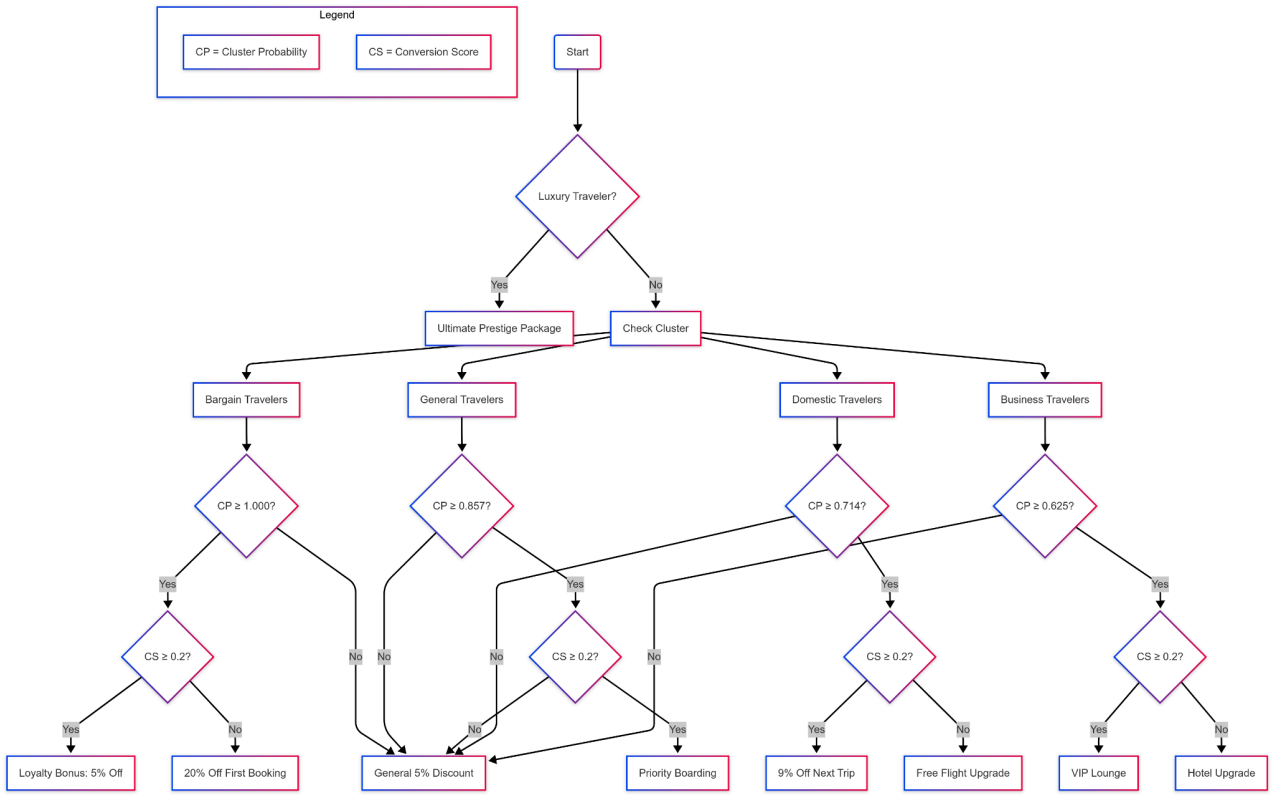
- **At CS = 0.2 (current setting):**
    - Only users with CS **≥ 0.2** qualify for targeted perks, while others receive the **General 5% Travel Discount**.
    - Most perks are allocated to users with a **moderate or high probability of conversion**, ensuring a strategic perk distribution.
- **At CS = 0.1 (lower threshold):**
    - More users qualify for specialized perks instead of just the General 5% Travel Discount.

- Users with lower conversion likelihood (CS between 0.1 and 0.2) begin receiving **more personalized perks**, increasing engagement among less likely converters.
- This results in a **wider distribution of perks**, making them more appealing to users who may not otherwise convert.

Impact of Choosing Different Conversion Score Thresholds

- **If the goal is to maximize broad engagement**, a **CS threshold of 0.1** is preferable, as more users receive specialized perks rather than a generic discount.
- **If the goal is to focus on high-intent users**, a **CS threshold of 0.2** ensures perks are given to users who are more likely to convert anyway, optimizing spending on incentives.

While in both cases **all users receive a perk**, their **distribution and level of personalization** differ. Lowering the threshold to 0.1 makes perks **more evenly spread across a broader audience**, whereas keeping it at 0.2 **focuses incentives on stronger prospects**.



Perk Breakdown by Traveler Group and Applied Thresholds

Perks are allocated based on selected **Conversion Score (CS)** and **Cluster Probability (CP) thresholds**:

- **Cluster Probability (CP):** Assigned according to median values per cluster.
- **Conversion Score (CS) Threshold: 0.2** – Ensures full perk distribution.

A higher CS threshold (e.g., 0.5) results in more efficient allocation but fewer recipients, whereas a lower threshold (e.g., 0.1) broadens distribution at the expense of targeting precision.

Perk Breakdown by Traveler Group

1. Bargain and Price-Sensitive Travelers

- **Exclusive Flash Sale Access (17.3%)** → Time-limited discounts on flights & hotels.
- **20% Off First International Booking (5.8%)** → Discount for first-time international bookings.
- **General 5% Travel Discount** → Default offer for budget-conscious travelers.

Effectiveness:

- Flash sales increase urgency and repeat purchases.
- First-time booking discounts incentivize new travelers.

2. General Travelers

- **Exclusive Flash Sale Access (17.3%)** → Flash sale promotions for quick conversions.
- **General 5% Travel Discount (48.7%)** → Fallback discount.

Effectiveness:

- Flash sales encourage immediate bookings.
- Fallback discounts ensure broad coverage.

3. Domestic and Casual Travelers

- **Extra 10% Off Next Domestic Booking (7.5%)** → Incentive for short-haul flights.
- **General 5% Travel Discount (48.7%)** → Default offer.

Effectiveness:

- Engages low-frequency travelers with incentives for future bookings.

4. Business Travelers

- **VIP Lounge & Fast Track (5.9%)** → Lounge access and priority check-ins.
- **Luxury Hotel Upgrade (6.3%)** → Suite upgrades.

Effectiveness:

- Premium perks enhance loyalty and retention.

- Luxury upgrades attract high-value customers.

5. Travelers Booking Hotels Without Flights

- **Free Flight with Hotel Stay (7.9%)** → Encourages flight bookings among hotel-only customers.

Effectiveness:

- Drives additional revenue through cross-selling.

6. Luxury Travelers

- **Ultimate Prestige Package (0.1%)** → VIP services, including first-class upgrades and concierge service.

Effectiveness:

- Ensures brand loyalty among high-spending travelers.

Final Perk Distribution

After applying the perk allocation logic, distribution occurred as follows:

- 2918 travelers received the General 5% Travel Discount.
- 1038 travelers received Exclusive Flash Sale Access.
- 472 travelers received Free Flight with Hotel Stay.
- 451 travelers received Extra 10% Off Next Domestic Booking.
- 376 travelers received Luxury Hotel Upgrade.
- 355 travelers received VIP Lounge & Fast Track.
- 346 travelers received 20% Off First International Booking.
- 34 travelers received Extra 9% Off Next Domestic Booking.
- 8 travelers received the Ultimate Prestige Package.

Conclusion

This data-driven strategy optimizes perk allocation to maximize conversions while maintaining profitability. The approach strengthens customer retention through personalization, machine learning, and continuous testing. With further optimizations, scalable strategies will enhance traveler engagement and long-term business success.

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