Project: Personalized Pricing Optimization for In-Game Event (Monteviu)

Objective:
To maximize revenue for a mobile game's two-day event by designing scalable, data-driven pricing strategies. The project progressed from a flat-price model to cluster-based personalized pricing and discounting under acceptance capacity constraints.

My Role and Contributions

1. Single-Price Revenue Optimization – Baseline Strategy
I began by analyzing willingness-to-pay data across 2M players to determine a single optimal event price. I:

- Simulated revenue over a range of price points

- Identified the optimal uniform price that balanced reach and price point

- Built revenue curves to visualize sensitivity

Result:
Optimal price: $6.00
Expected revenue: $2.54M — baseline for comparison.

2. Cluster-Based Personalized Pricing
I used K-means clustering to segment players into 3 behavioral groups based on in-game demographics and purchasing patterns. For each cluster, I:

- Prescribed a tailored event price

- Modeled revenue response curves to optimize per-segment pricing

- Scaled segment insights to the full player base

Result:
Segmented pricing: $12.00 (high WTP), $6.00 (mid), $2.00 (price-sensitive)
Expected revenue: $3.13M – a 23% uplift over the single-price strategy.

3. Capacity-Constrained Discount Strategy
To respect the platform's capacity of 10,000 accepted buyers/day, I extended the model using constrained optimization. For each cluster, I:

- Determined the best list price

- Offered tailored percentage discounts (5–80%) to maximize conversion while staying within caps

- Compared personalized discounting against flat discount campaigns

Result:

Revenue with personalized discounting: $18,056 from 2,932 buyers

Best flat discount result: $12,696 from 2,116 buyers

42% revenue uplift and 40% more buyers served with personalized offers.

Tools & Skills Used

Python (Pandas, NumPy, Matplotlib, Scikit-learn, SciPy)

Predictive modeling & customer segmentation

Constrained optimization

Revenue simulation and price sensitivity analysis

Data visualization and reporting

Outcome

A single price captured baseline revenue but ignored player heterogeneity. By segmenting and tailoring prices to player behavior, I improved revenue by 23%. Adding capacity-aware discounting further increased both reach and profit—demonstrating the power of behavioral segmentation and prescriptive analytics in digital pricing strategy.