

## Using ChatGPT for Creative Gaming: Uplift

For the *Creative Gaming: Uplift* case study, we used ChatGPT as a support tool to gain a clear understanding of **propensity and uplift models**, review the **syntax and logic** provided in the **uplift demo file**, and validate the **model-building steps**. Additionally, it helped us refine our approach to **profit calculation and scaling**, ensuring accurate implementation. This write-up explores the specific prompts used, how ChatGPT's responses aided the process, the challenges encountered, and key insights gained from the experience.

### *Interactions with ChatGPT*

#### *Specific Examples of Prompts Used*

- "How do I differentiate between propensity and uplift models in terms of application?"
- "Can you explain the logic behind the model-building steps in the uplift demo file?"
- "How should I approach scaling profit calculations when extrapolating results?"
- "What is the syntax issue below?"

### How AI Responses Helped or Hindered Understanding

#### Helpful Aspects:

1. **Understanding Propensity vs. Uplift Models**
  - ChatGPT provided a clear distinction between **propensity models** (predicting conversion probability) and **uplift models** (measuring the ad's impact).
  - Helped in identifying **when to use each model for business decision-making**.
2. **Syntax & Logic in the Uplift Demo File**
  - Reviewed the syntax and logic of **feature transformations, model training, and evaluation metrics**.
  - Clarified the purpose of **specific functions used in model implementation**.
3. **Profit Calculation & Scaling**
  - Guided how to compute **incremental profit per customer segment** based on uplift scores.
  - Provided insights into **correctly scaling profits when extrapolating to a larger audience**.

#### Hindering Aspects:

##### Code Adaptability Issues

- Some AI-generated code **required modifications** to align with the dataset's structure.
- Follow-up questions were needed to adjust outputs based on **specific column names and data formats**.

##### Scaling Confusion

- Initially, ChatGPT struggled with determining the correct scaling approach for extrapolating profits.
- Required iterative refinements before reaching the most accurate scaling method.

## Limitations

Tendency for Overgeneralization: Some responses pulled in irrelevant third-party data, requiring careful verification. ChatGPT kept giving us the wrong prompt and explanations. Also, ChatGPT occasionally provided generic answers that needed refinement. Losing ongoing conversations forced re-explanations, reducing workflow efficiency. It sometimes suggested solutions that were not optimal or required tweaking to fit our specific needs.

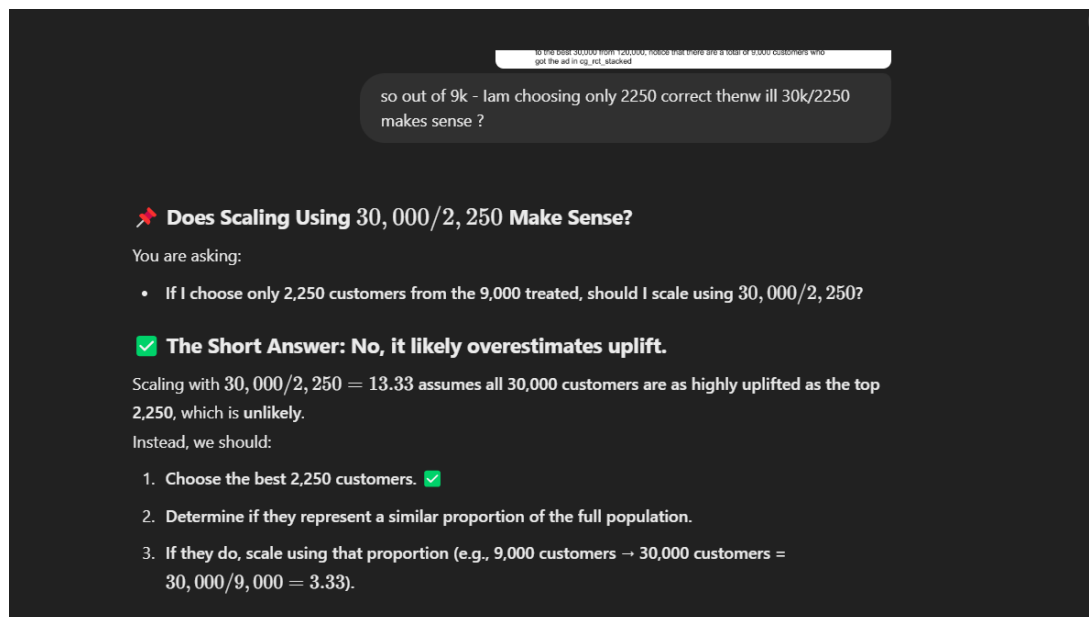
## Questions That Arose During Interactions

- How does ChatGPT determine the most efficient preprocessing approach for categorical data?
- How can GenAI tools be leveraged for real-time debugging in integrated development environments?

## How AI Complemented

Using ChatGPT for the Creative Gaming: Uplift case study primarily helped with syntax-related issues and parameter tuning for model building, allowing us to focus more on logical reasoning rather than coding complexities. It also enhanced our understanding of business use cases, helping us distinguish when to apply propensity models versus uplift models effectively. While ChatGPT streamlined the technical aspects, manual validation remained crucial to ensure accurate implementation. Moving forward, we plan to refine our approach to prompt engineering and validation, leveraging AI as a support tool to deepen our comprehension of both technical execution and strategic decision-making.

## Screenshots:



Quantile (Top % Customers)	Treated Conversion Rate	Control Conversion Rate	Group Size	Incremental Response
Top 5% (Highest Uplift)	20%	10%	3,000	$(0.20 - 0.10) \times 3,000 = 300$
Next 5%	15%	8%	3,000	$(0.15 - 0.08) \times 3,000 = 210$

- **Interpretation:**
  - The first row means that 300 more customers purchased in the treatment group compared to the control group.
  - If we targeted only the top 5% of customers, we would get 300 extra purchases due to the ad.

## 2 What is Incremental Uplift?

- **Definition:** The difference in conversion rates between the treatment and control groups, typically expressed as a percentage.
- **How It's Calculated:**
  - This measures the relative impact of the ad, normalized by the total number of customers.

Formula:

$$\text{Incremental Uplift} = \frac{\text{Incremental Response}}{\text{Total Customers in the Group}}$$

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