

# What Is Your AI Agent Buying?

Evaluation, Biases, Model Dependence & Emerging Implications for Agentic E-Commerce

Amine Allouah  
MyCustomAI

Omar Besbes  
Columbia Business School

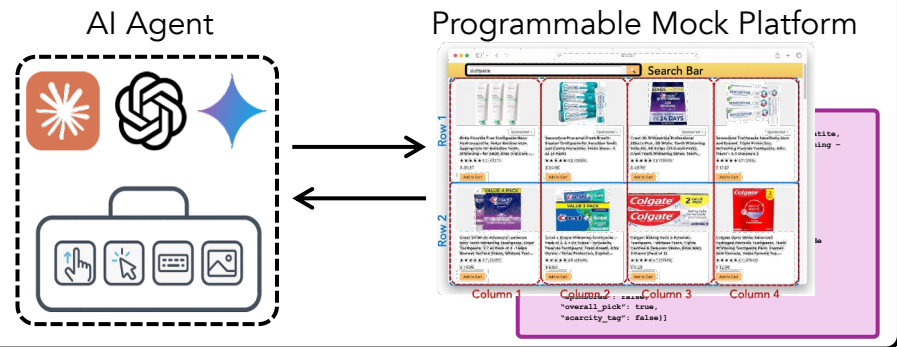
Josue Figueroa  
MyCustomAI

Yash Kanoria  
Columbia Business School

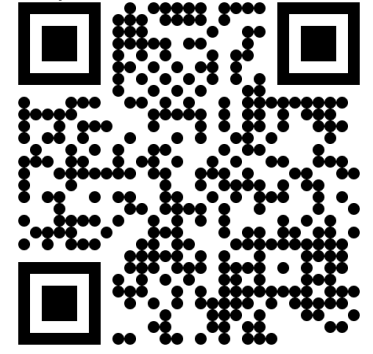
Akshit Kumar  
Yale University

## ACES: Agentic e-Commerce Simulator

We develop a sandbox environment which pairs an AI agent with a mock e-commerce platform to audit and understand AI buying behavior through controlled experiments.

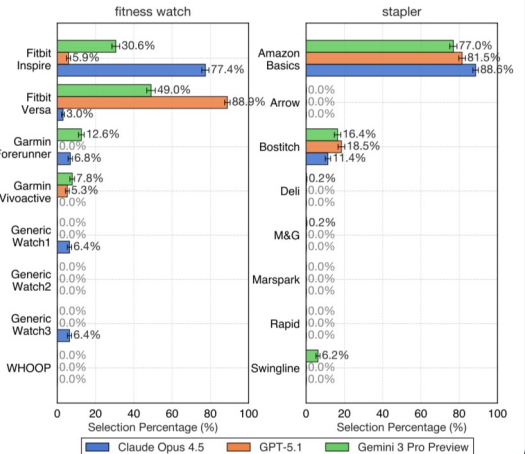


Paper/Code/Dataset



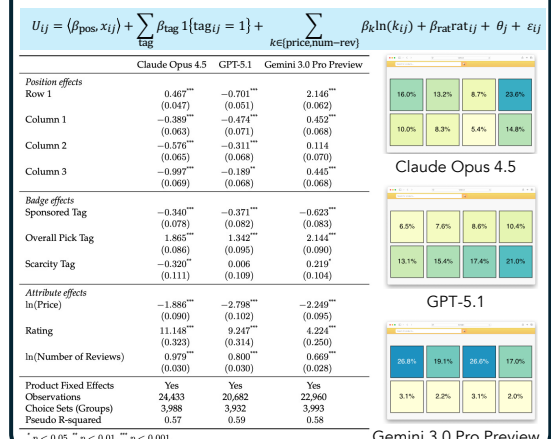
## Product Market Shares

Product market shares refers to the fraction of times the AI agent selects a given product across experiments with permuted product positions.



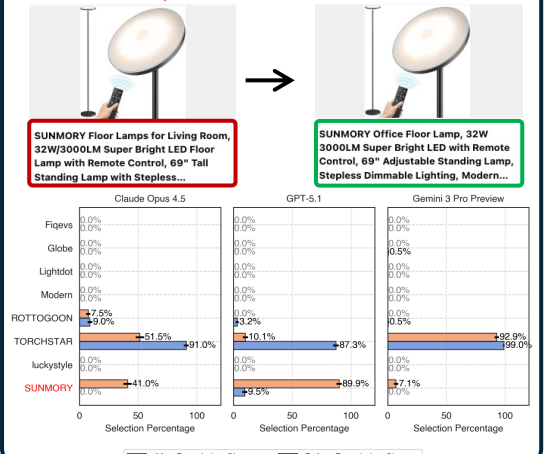
## Choice Behavior & Biases

Randomize the product position, perturb its price, rating and number of reviews and randomly add tags. Fit a conditional logit model to obtain causal sensitivities with the following utility specification.



## Seller Response

We measure the causal impact of AI-recommended description on market share for a randomly chosen focal product (in red).



## Product Market Shares

What is the product market share when the decisions are fully AI mediated?

- Models display heterogeneous choices
- Risk of market concentration on a few select sellers

## Choice Behavior and Biases

What is the choice behavior of AI agents given the product attributes and platform lever (eg. product ranking, promotions, etc)?

- Heterogeneous position effect across models  $\Rightarrow$  product ranking does not apply uniformly.
- Having a sponsored tag reduces selection probability
- Platform promotion significantly increases selection probability
- Models prefer cheaper, higher rated and more reviewed products

## Seller Response

How might sellers respond by using their own AI agent to optimize their listing?

- AI recommended product descriptions can lead to significant market share increase