Ad-Ception

When AI creates and shares its own ads

Saina, Jasmin, Mohammad

Project Overview

A study on Instagrams AI recommendation bot systems

Agent Roles

Content Generation Bots	Recommendation Bots	Human Users
Create targeted ads (text, image, video).	Deliver ads to users based on behavior and preferences.	Interact with ads, shaping AI strategies through engagement.

Phenomena Simulated

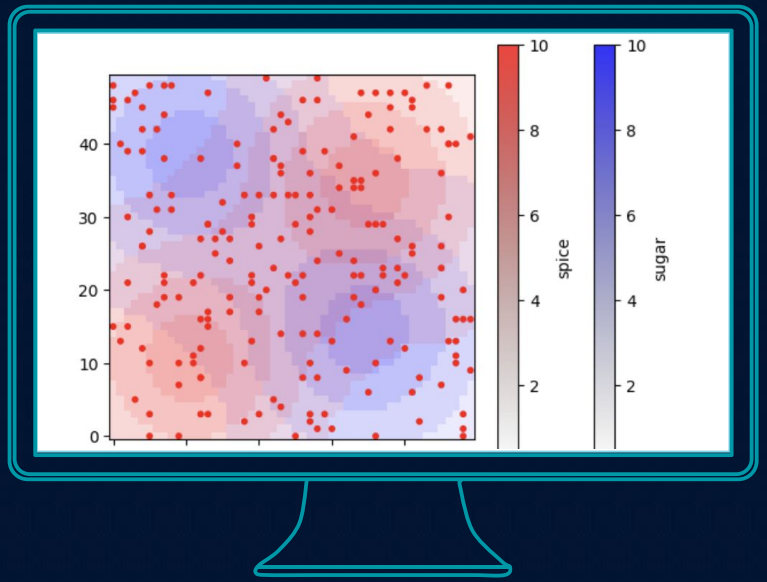
The simulation investigates how AI-generated advertisements are strategically promoted by AI recommendation systems to targeted user groups. It explores emergent behaviors such as:

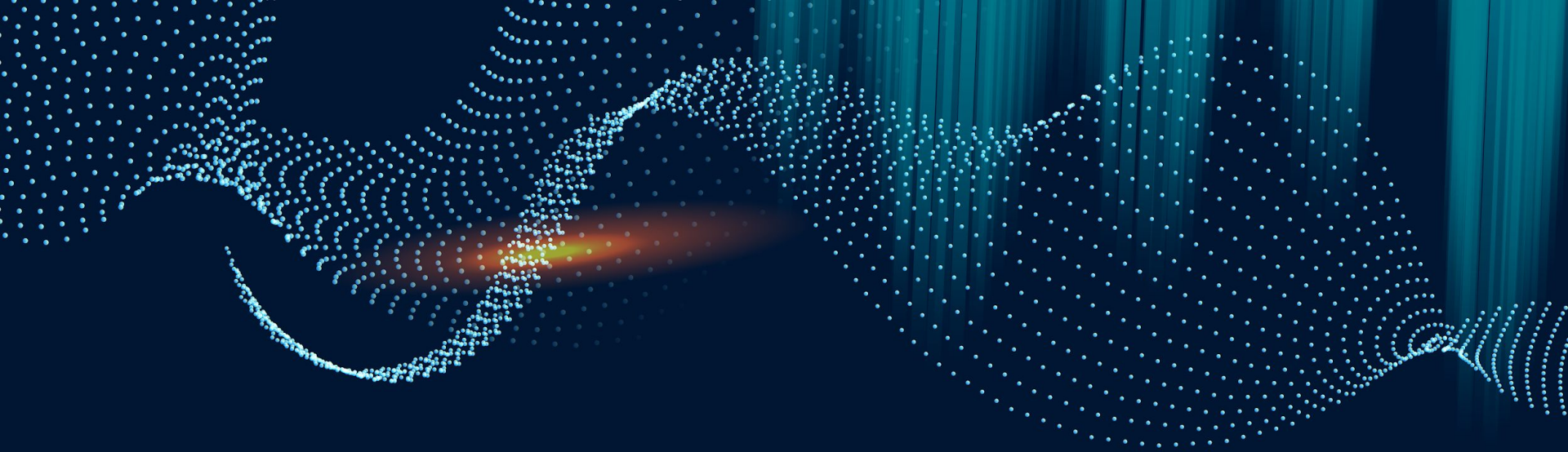
The creation of advertisement clusters (echo chambers) around shared user interests.

Dynamic pricing and feedback loops in ad distribution, shaped by user demand and engagement patterns.

Evolutionary changes in ad placement and user engagement dynamics.

Project Demo





Findings and Insights

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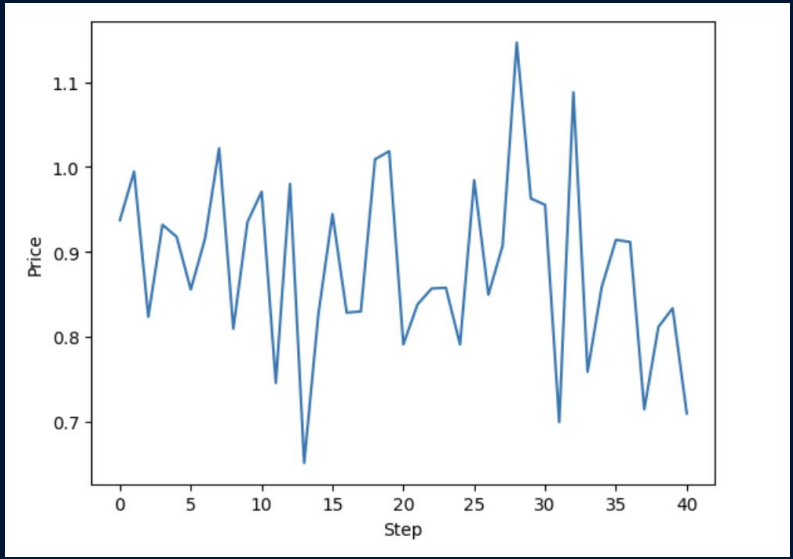


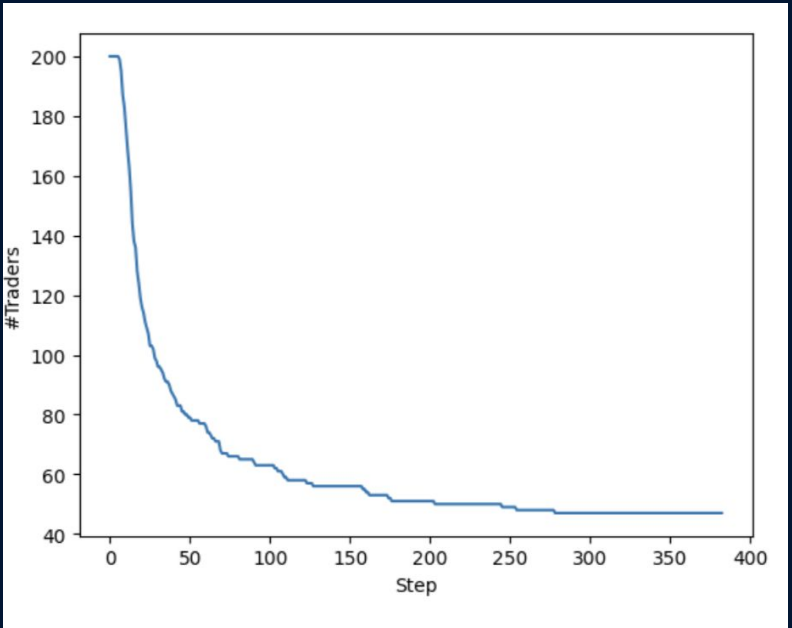
Dynamic Pricing

Just as traders adjust to fluctuating sugar and spice prices, AI-driven ad prices rise and fall based on user demand and engagement, reflecting the competitive nature of targeting valuable audiences.

Feedback Loops

In both Sugarscape and AI-driven ad systems, user actions create feedback loops that influence future behavior, driving market trends and resource availability, or ad placement effectiveness.

Findings and Insights



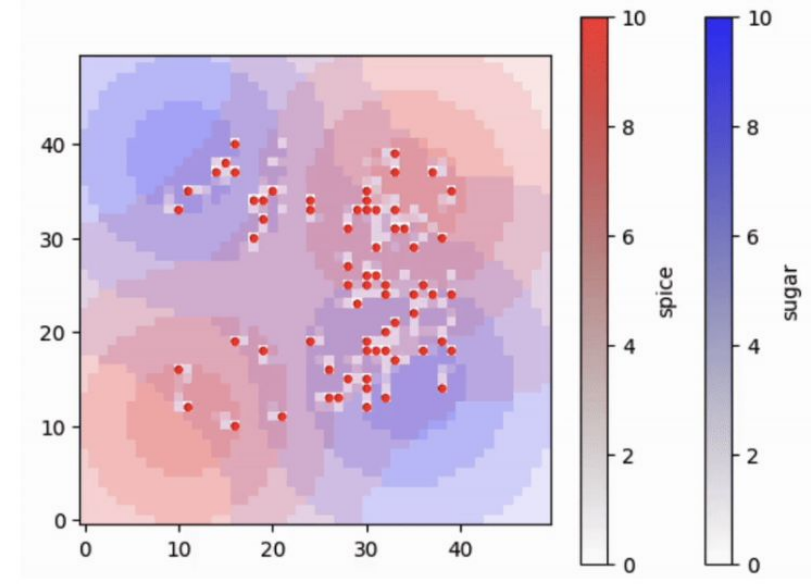
Rec Bot Competition

The sharp decline in trader numbers at the beginning mirrors the early inefficiency in AI ad bots or recommendation systems, where initial strategies fail to meet user preferences..

Adaptation

Similar to how AI recommendation systems improve by learning user preferences, the stabilizing population of traders reflects the system's ability to match users with ads they prefer, leading to more successful transactions.

Findings and Insights

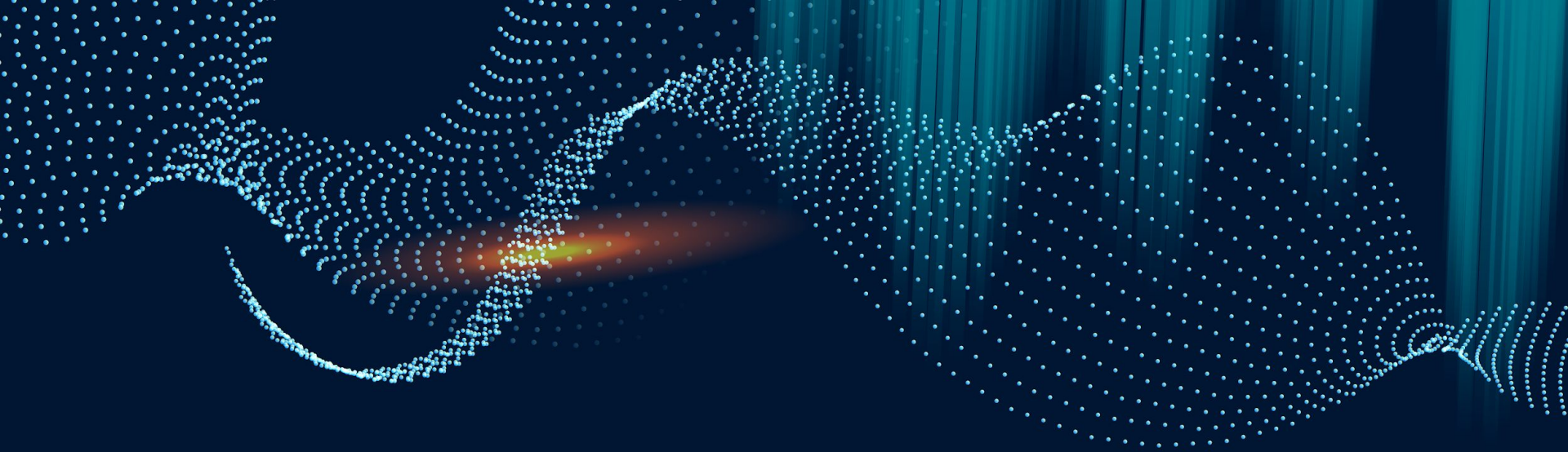


Trade Efficiency

The grouping behavior suggests that AI bots are optimizing their interactions by clustering with those who share the same preferences, allowing for more efficient trading, akin to how AI-driven marketplaces optimize matching to users based on preference for higher conversion rates.

Clustering

Bots grouping by preference (1 or 2) mirrors how AI systems, such as recommendation algorithms, tend to cluster similar users or items together to improve efficiency in serving personalized content or ads.



Reflection

Ethical Considerations and Challenges

- AI-driven advertising raises ethical and societal concerns regarding privacy, transparency, fairness, and manipulation.
- Our simulation reflects how AI agents interact, forming echo chambers and filter bubbles similar to real-world digital media ecosystems.
- We will now discuss some of the ethical concerns based on the Universal Principles of the Conscious Attention Economy (CAE)

Right-to-Privacy

Issue: AI-driven ads rely on sensitive user data (e.g., engagement metrics, browsing behavior).

Concerns:

- Platforms like Instagram use surveillance tactics to track user activity.
- AI can predict and influence user behavior without explicit consent.
- Data is often sold to third-party advertisers without user control.

Transparency in AI Advertising

Issue: Many users do not fully understand how their data is being used.

Concerns:

- AI-driven recommendations operate as black boxes, making it unclear why certain ads are shown.
- Users assume they have control, but platforms exploit this misinformation.
- Users do not have control over the extent to which their data can be used.

Fairness & Inclusivity

Issue: AI reinforces biases by creating filter bubbles and echo chambers.

Concerns:

- AI only recommends content users engage with, polarizing opinions.
- Social media algorithms can limit exposure to diverse viewpoints, reinforcing misinformation or discrimination.

Let us look at a case study performed regarding the polarisation of opinions in social media during Covid-19.

Study: A Confirmation Bias View on Social Media Induced Polarisation During Covid-19

Brief overview: This study explores how social media platforms, including Instagram, contribute to opinion polarization by reinforcing confirmation biases. It examines how algorithm-driven content curation, filter bubbles, and echo chambers intensified ideological divides during the COVID-19 pandemic.

Key Findings:

- Algorithm-Driven Content Curation – Instagram's AI promotes content similar to past interactions, limiting exposure to diverse perspectives.
- Reinforcement of Confirmation Bias – Users engage mostly with content that aligns with their beliefs, ignoring opposing viewpoints.
- Filter Bubbles & Echo Chambers – Personalized recommendations create closed communities, deepening ideological divides.
- Misinformation & Polarization – Sensational and divisive content spreads faster, increasing societal divides on issues like COVID-19 and politics.

Link: https://doi.org/10.1007/s10796-021-10222-9

Freedom from Exploitation

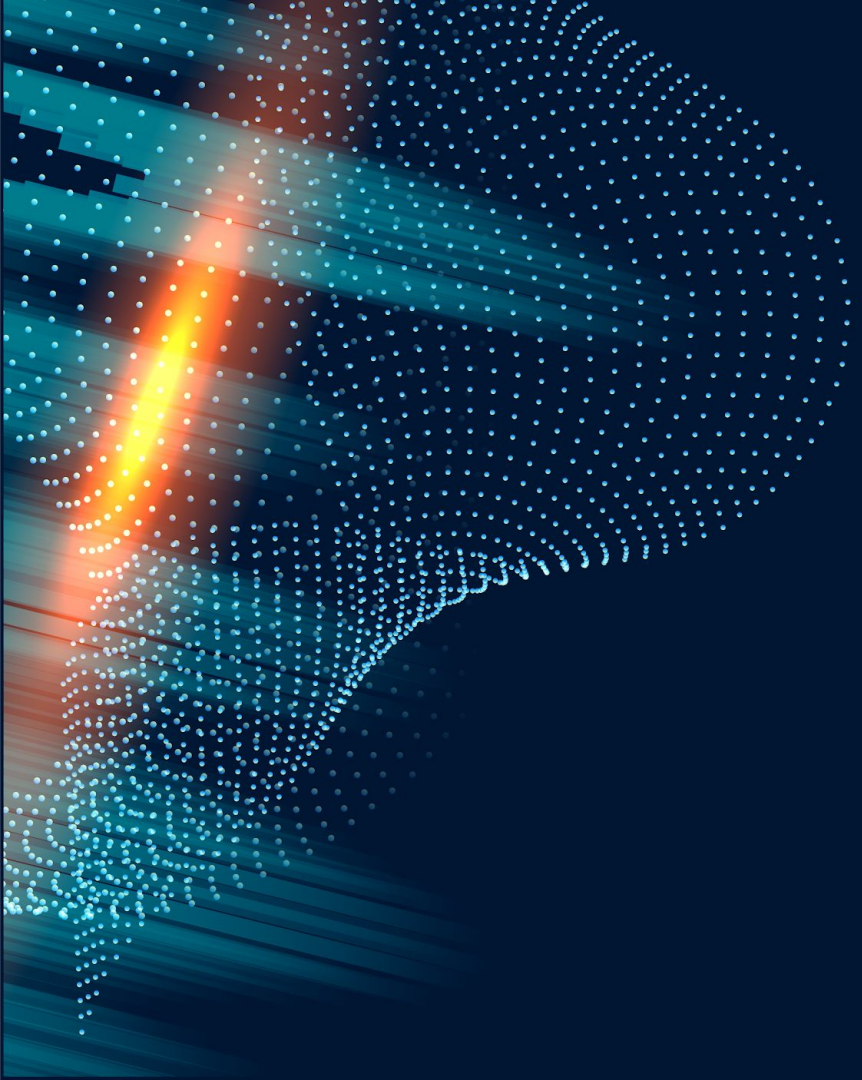
Issue: AI systems predict, influence, and manipulate user behavior for profit.

Concerns:

- AI-generated ads can exploit psychological vulnerabilities (e.g., targeting struggling individuals with gambling or payday loans).
- Social media platforms use AI to monetize user engagement, prioritizing profit over ethics.

References

- Modgil, S., Singh, R.K., Gupta, S. et al. A Confirmation Bias View on Social Media Induced Polarisation During Covid-19. Inf Syst Front 26, 417–441 (2024). https://doi.org/10.1007/s10796-021-10222-9



Q&A

Please ask us easy questions 👉👈