

# Amazon Recommendation System

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The Amazon.com logo is displayed in white text on an orange background. The word "amazon" is in a lowercase, sans-serif font, followed by ".com" in a smaller font. A curved orange arrow is positioned below the "a" and "z", pointing from the "a" to the "z".

**Video Games**

## Summary

Amazon is interested in building a customized recommendation system based on customer's ratings on **video games**.

- Customized recommendation vs. general recommendation
- How to trim down a long list of recommended video games

# Outline

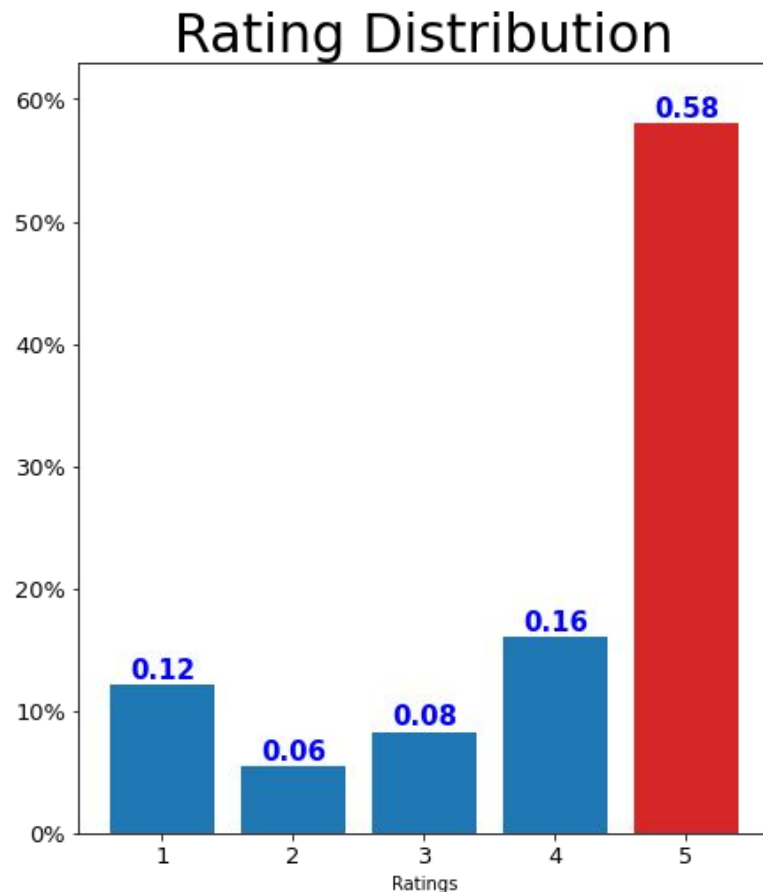
- Business Problem
- Data
- Methods
- Results
- Conclusions

# Business Problem

- 35% of Amazon's revenue from recommendations system<sup>(1)</sup>
- Various recommendations: *popularity, purchase history, browsing history*
- No recommendation based on **customers ratings**
- Video games market size increases every year<sup>(2)</sup>
- Build a new recommendation system for **video games**
- Can the new system give customers a **different** shopping experience?
- Any chance for increased revenue?

# Data

- Review on [Video Games](#)<sup>(3)</sup>
- Two datasets
  - Years between 1996 and 2018
- Rating Data
  - 2.5 million ratings scaling from 1 to 5
  - 1.5 million customers
  - 72k [video games](#)
- Meta Data
  - 72k [video games](#)
  - Title, game id number, category, brand



# Methods 1 - Build a System

## 1. Calculate ratings

## 2. Rank

## 3. Recommend

## 4. Test

- 25% of data
- Actual rating vs. calculated rating
- Error range =  $\pm 1.27$**
- Lower error

	User 1	User 2	User 3	User 4
Item 1	5	?	3	?
Item 2	4	5	?	?
Item 3	?	3	2	?
Item 4	2	5	3	?
Item 5	?	1	?	5

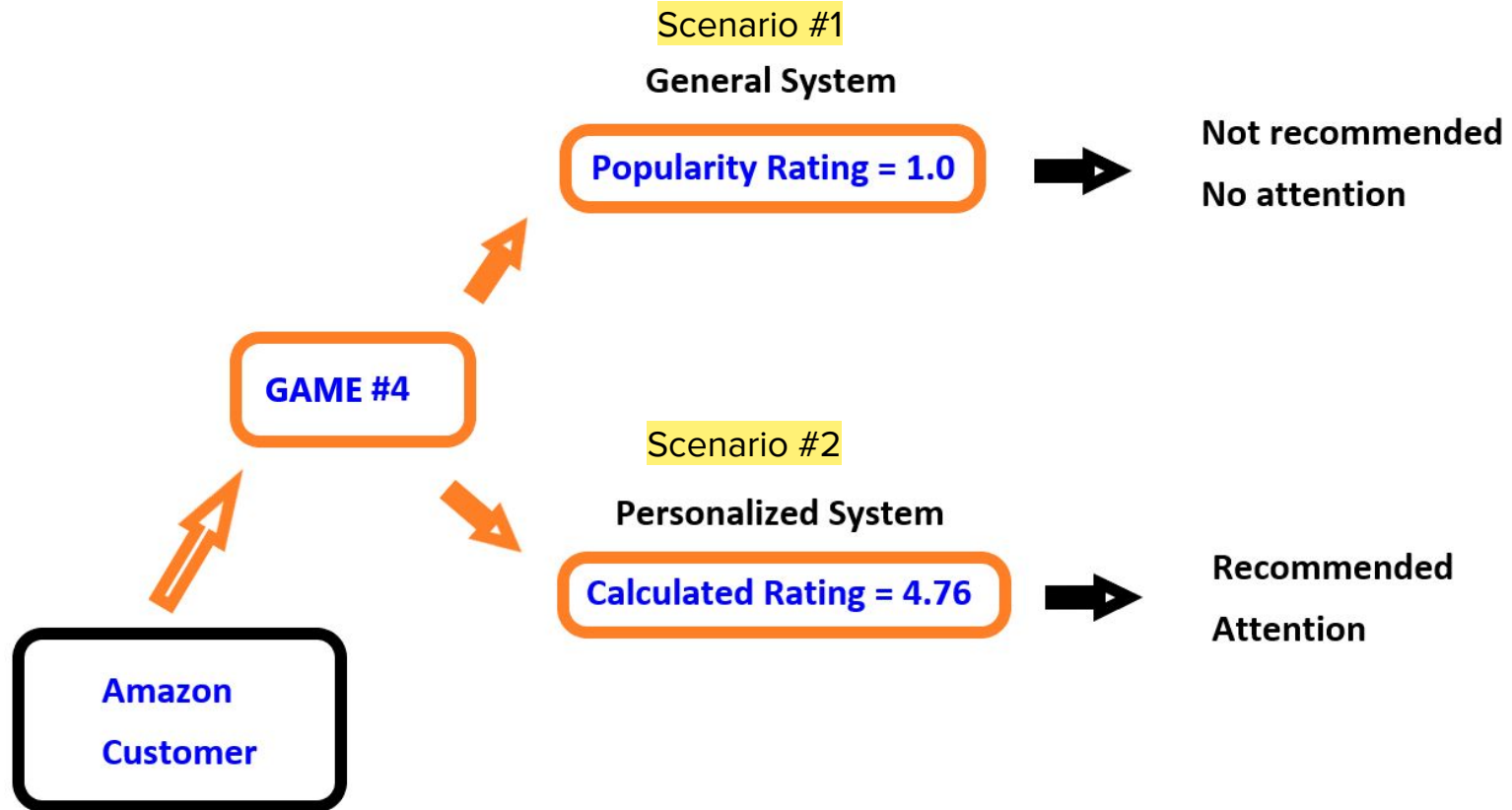
## Methods 2 - Checking Difference on a Single Item



- Game #4 with ratings of **1.0 vs 4.76**
- Generally not recommended
- Recommended by personalized system
- **Different value**
  - Different shopping experience
  - Increased chance to buy Game #4

Video Game	Popularity Rating	Calculated Rating
Game 1	5	4.76
Game 2	4.75	4.91
Game 3	5	4.83
Game 4	<b>1</b>	<b>4.76</b>
Game 5	3	4.76

# Methods 2 - Customer Experience Diagram





# Methods 2 - Checking Difference on Multiple Items

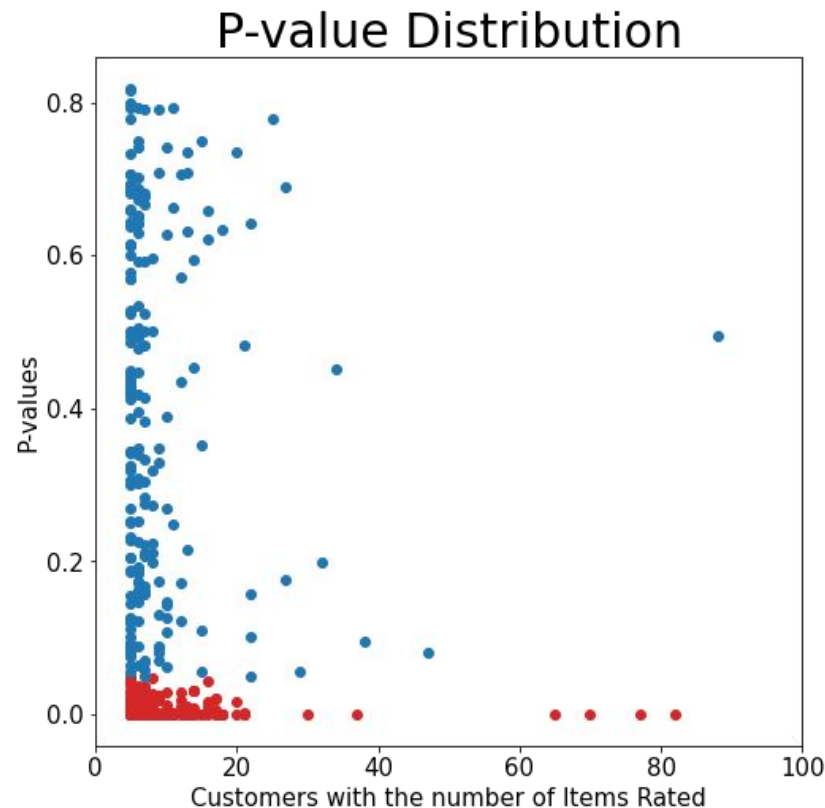


- Select a customer
- Assign calculated rating
- Comparison on two rating types
- Check p-value
  - Ranges from 0 to 1
  - Lower than 0.05 - significant difference
- **Assign p-value to the customer**
- Repeat on different customers

Video Game	Popularity Rating	Calculated Rating
Game 1	5	4.76
Game 2	4.75	4.91
Game 3	5	4.83
Game 4	1	4.76
Game 5	3	4.76
...	...	...
Game #	3	3.86

# Results - P-values

- 500 random customers selected
- **311 customers**
  - **p-value < 0.05**
  - **Different shopping experience**

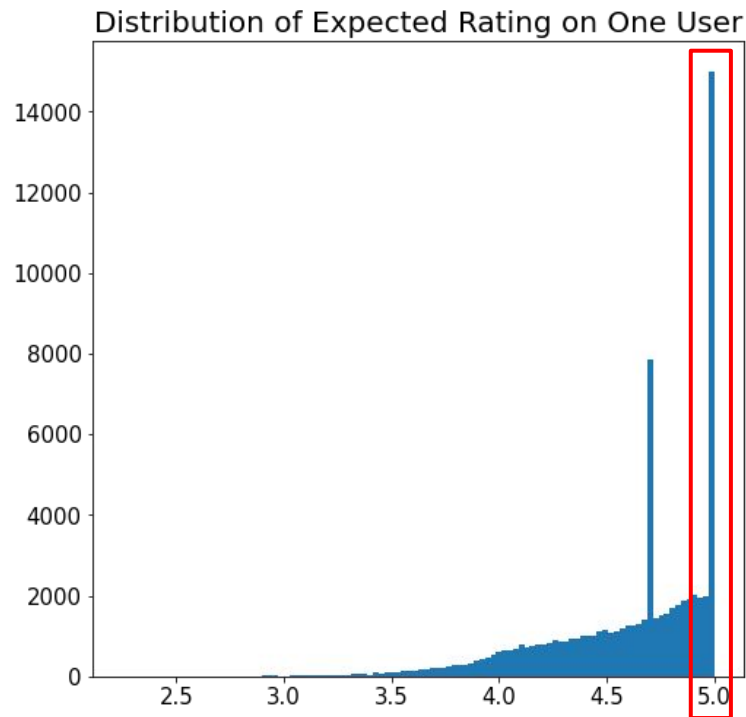


# Methods 3 - Trimming Recommendations

- More than 15,000 w/ calculated rating  $\approx 5$

- **Similarity**

- Select one video game
  - Brand - Capcom, Blizzard, Sony
  - Console - PC, Xbox, Playstation, Nintendo
- Ranges from 0 to 1
- Multiply **similarity** to calculated ratings



# Results - Trimming with Similarity

## Resident Evil 7 Biohazard - Xbox one (selected game)

Similarity	
Perfect	15 games
High	0.5%
Good	6%
Mid	10%
None	84%

Recommended Games
DMC Devil May Cry: Definitive Edition - Xbox One
Resident Evil 6 - Xbox One
Strider - Xbox One Digital Code
Devil May Cry 4: Special Edition - Xbox One
Resident Evil Origins Collection - Xbox One Standard Edition

# Conclusions

- More than 60% of customers are expected to get a different shopping experience from the personalized recommendation system built based on customers' ratings on video games. We can expect an increase in sales of games with low popularity ratings.
- A list of many games with calculated ratings  $\approx 5$  can be trimmed using the [similarity](#) on one game.

# Next Steps

- Lower the error range
  - Control data size
    - More recent data
    - Set minimum number of reviews per customer
- Gather more information for improved trimming
  - Genre (action, shooting, adventure, etc)
  - Release Date
- Discuss on where and how to display recommendations
- Repeat same process with items from a different department

# Thank You!

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**LinkedIn:** [linkedin.com/in/username/](https://www.linkedin.com/in/username/)

# Sources

1. <https://www.mckinsey.com/industries/retail/our-insights/how-retailers-can-keep-up-with-consumers>
2. <https://www.ibisworld.com/industry-statistics/market-size/video-games-united-states/>
3. <https://nijianmo.github.io/amazon/index.html>