

Recommender Systems in a Nutshell

Bogdan Pirvu

NOVOMATIC

Outline

- Introduction to Recommender Systems
- Algorithms
- Product Recommendations at Novomatic

Introduction to Recommender Systems

Trending Now



Because you liked King Arthur



Because you added Mars to your list



Top Picks for Bogdan



Trending Now

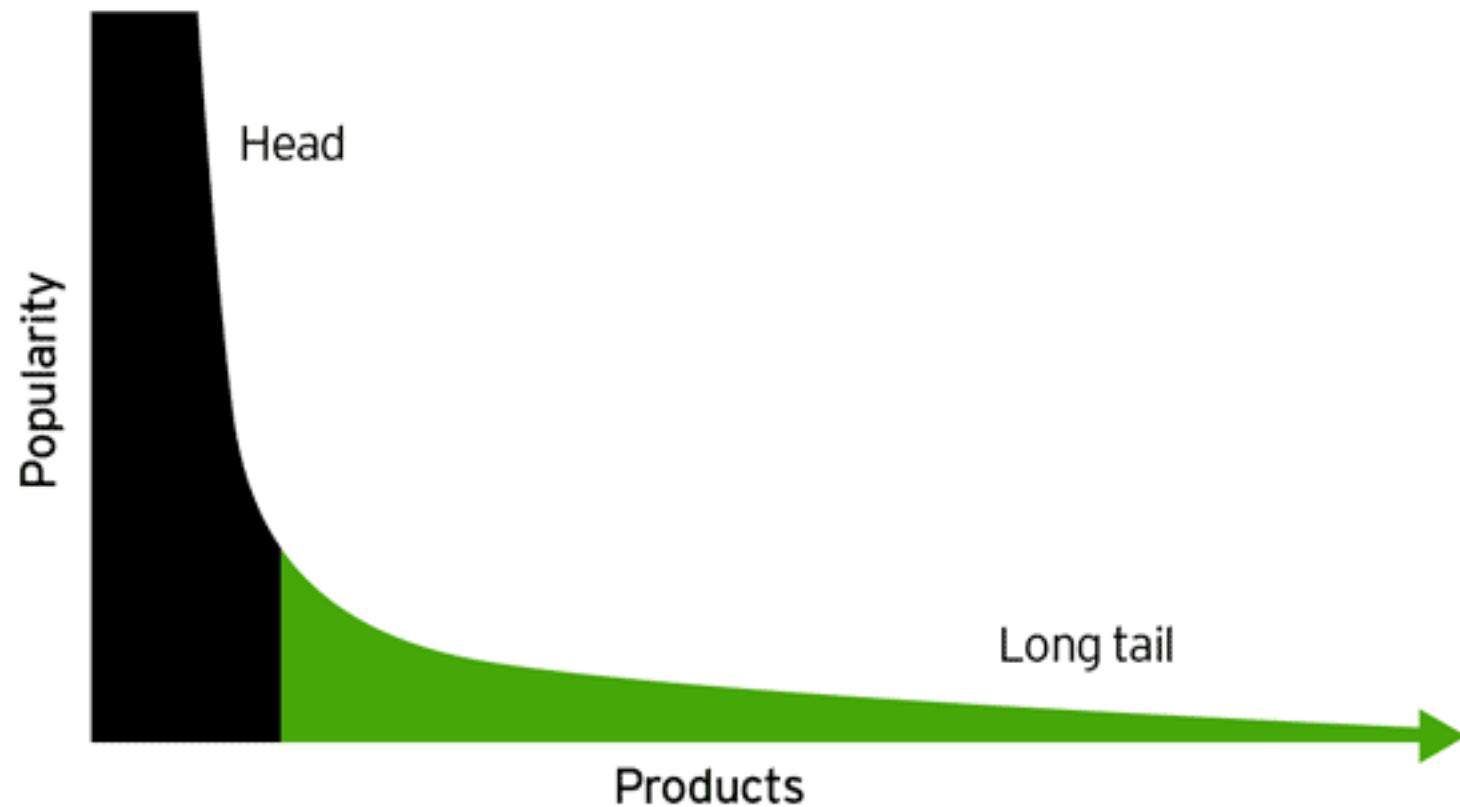


Top Picks for Bogdan



Why Recommender Systems?

- Online businesses have to opportunity to leverage Long Tail¹ effect



¹ C.Anderson, "The Long Tail", 2008

Why Recommender Systems?

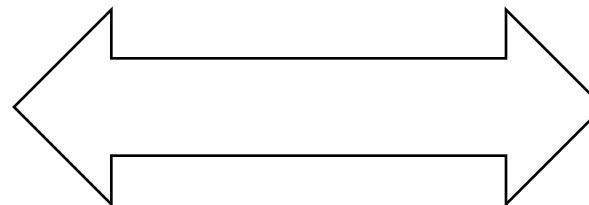
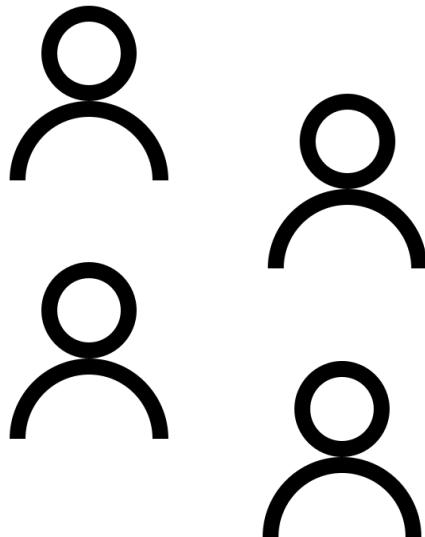
- Personalized Recommendations should improve
 - Conversion Rate
 - User engagement
 - Retention rate
 - Revenue
- The Business Value¹ of Recommendations
 - Netflix: 2/3 of the movies watched are recommended
 - Google News: recommendations generate 38% more click-through
 - Amazon: 35% sales from recommendations

¹ X. Amatriain lectures from 2014 (<http://technocalifornia.blogspot.co.at/2014/08/introduction-to-recommender-systems-4.html>)

Algorithms

Terminology

Users = Players



Items = Games



Target Variable

- Metric for “how much will a user like an item?”
- Explicit ratings
 - 1-5 stars
- Implicit ratings
 - Purchase behavior (purchased/not purchased)
 - Games/Media consumption behavior (how many times played)

Utility Matrix



| | | |
|-----|-----|-----|
| 60 | | 95 |
| | 20 | |
| 55 | | |
| 200 | | 50 |
| | 48 | 24 |
| 160 | | 40 |
| 125 | 100 | 150 |
| | 65 | |
| | | |
| 15 | | 20 |
| 25 | | |
| | 85 | |

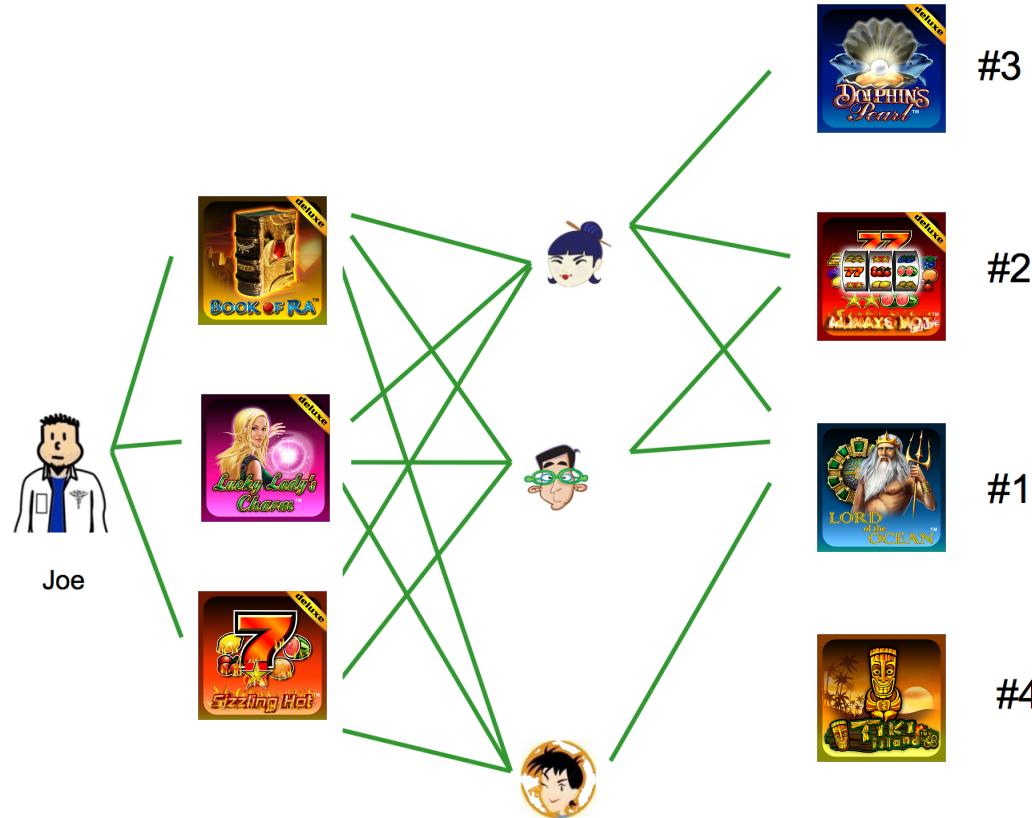
Algorithm Types

- Non-personalized Recommendations
 - Popularity-Based
- Content-Based Filtering
 - Item features necessary
 - Each user is predicted independently
- Collaborative Filtering
 - Features are learned
 - All user ratings help improve the prediction

Collaborative Filtering - Algorithms

- Neighborhood methods
 - User Similarity
 - Item Similarity
- Matrix Factorization

Intuition - User Similarity



Implementation

Item Similarity Recommender

Utility Matrix



| | | |
|-----|-----|-----|
| 60 | | 95 |
| | 20 | |
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| | 48 | 24 |
| 160 | | 40 |
| 125 | 100 | 150 |
| | 65 | |
| | | |
| 15 | | 20 |
| 25 | | |
| | 85 | |

Item Similarity Matrix

| | | | |
|---|---|---|---|
| |  |  |  |
|  | 1 | .5 | .7 |
|  | .5 | 1 | .4 |
|  | .7 | .4 | 1 |

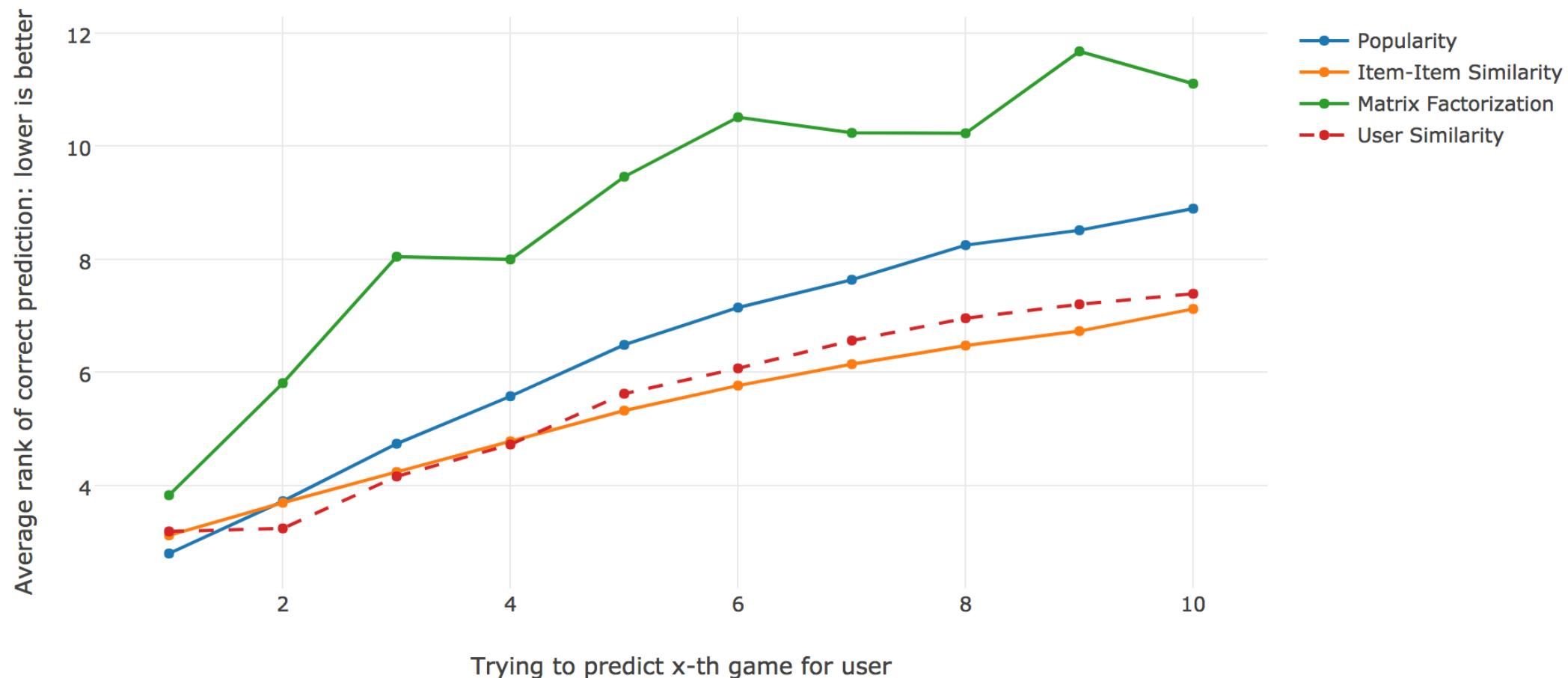
Item Similarity in Slotpark



Recommendations@Novomatic

Slotpark Integration

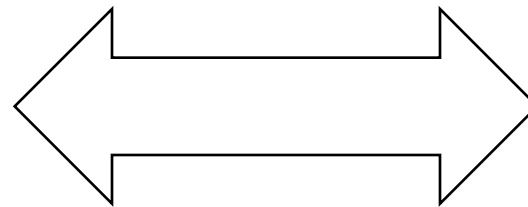
Algorithm Performance



Integration with Slotpark



Test Group



Control Group



Results

- Number of game titles
 - Statistically significant increase
- Number of sessions
 - Statistically significant increase
- Revenue
 - Increase, but not statistically significant

Thank you!

bpirvu@novomatic.com

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