

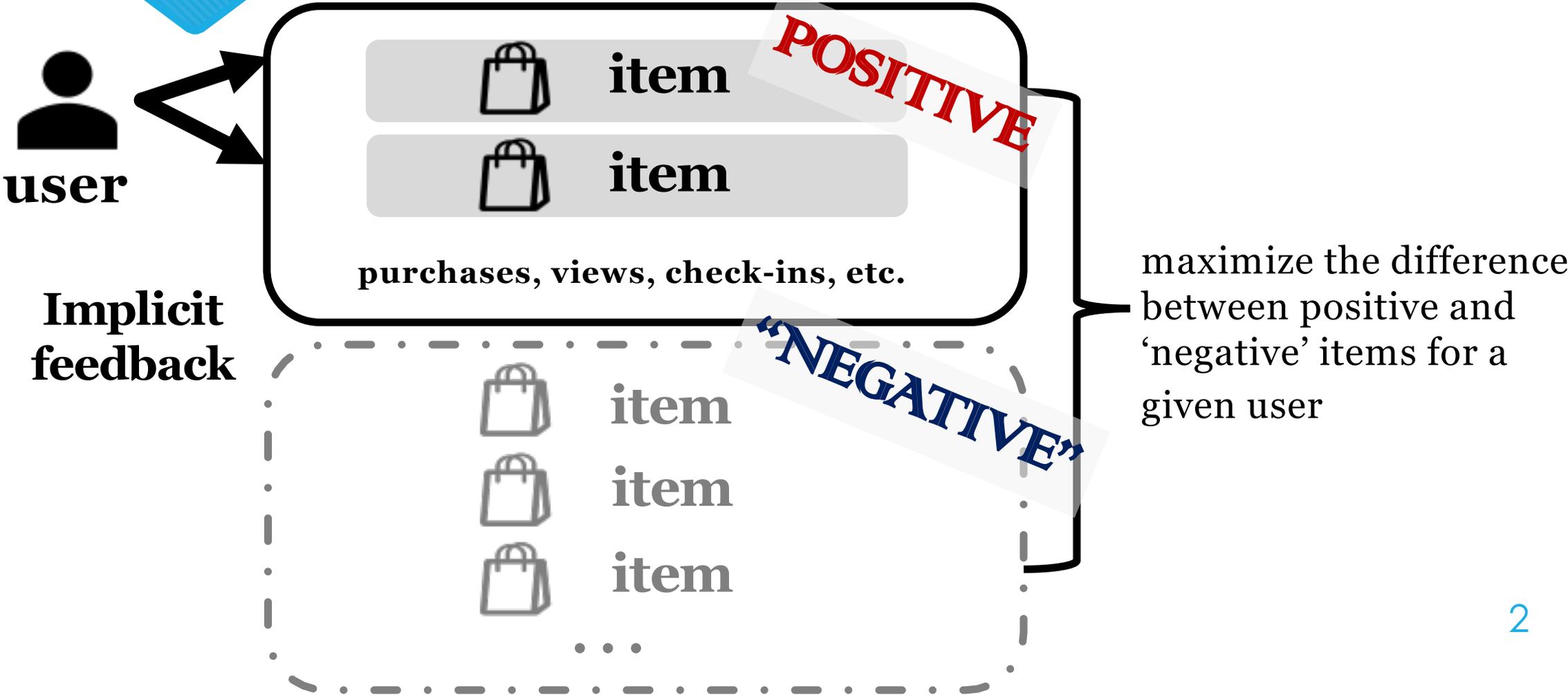
One-Class Recommendation with Asymmetric Textual Feedback

Mengting Wan, Julian McAuley

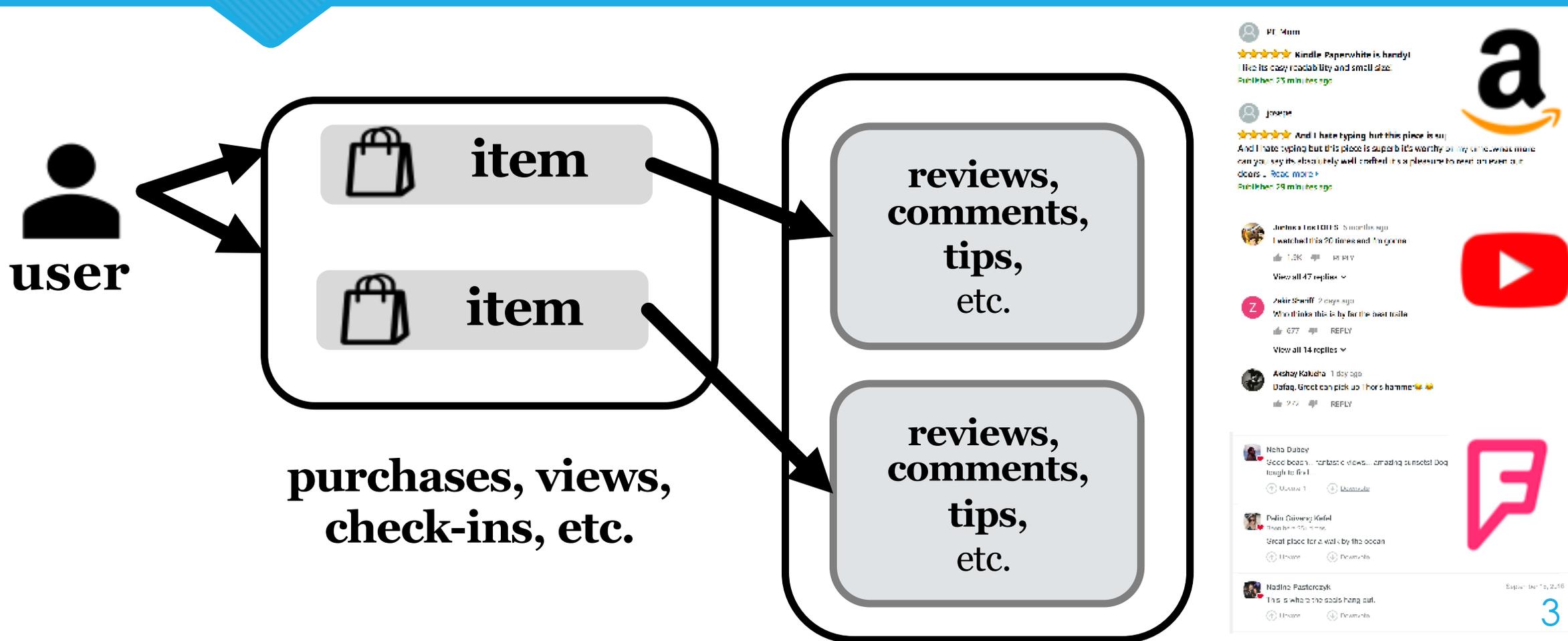
UC San Diego

SDM'18, San Diego, USA, May 2018

One-Class Recommendation



Textual Feedback



Amazon

PE Min
★★★★★ Kindle Paperwhite is handy!
I like its easy readability and small size.
Published 25 minutes ago

Joseph
★★★★★ And I hate typing but this piece is so
And I hate typing but this piece is so... it's worth it. I wish more
can you say its absolutely well crafted. It's a pleasure to read it even at
doors. [Read more](#) +
Published 29 minutes ago

Jurica Tok1018
I watched this 20 times and I'm gonna
1.5K 14 RV
View all 47 replies v

Zwie Sheriff
What I like this is by far the best trail
677 14 REPLY
View all 14 replies v

Akshay Kulkarni
Dafaq. Great can pick up 1 hour's hamme 🌟🌟
772 14 REPLY

YouTube

Neha Dubey
Good beauty... fantastic views... amazing sunset! Dog
bought to live!
1.1K 14 REPLY
View all 14 replies v

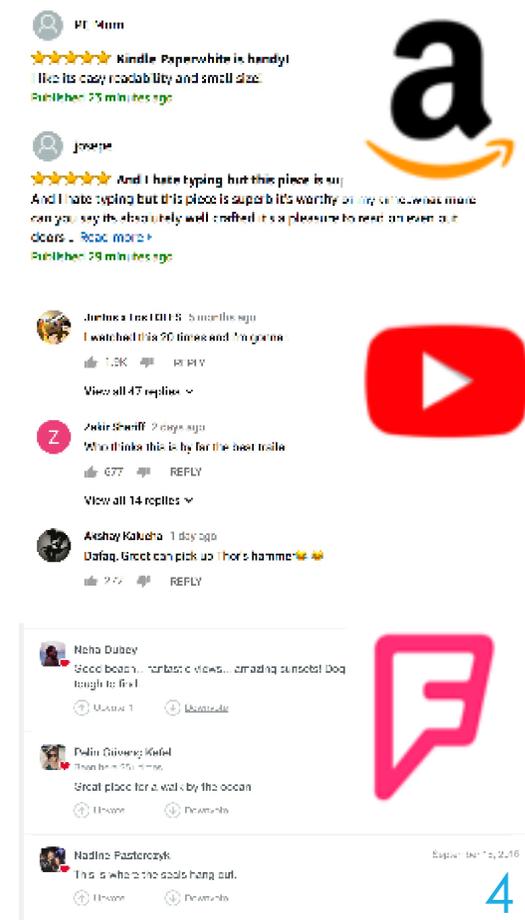
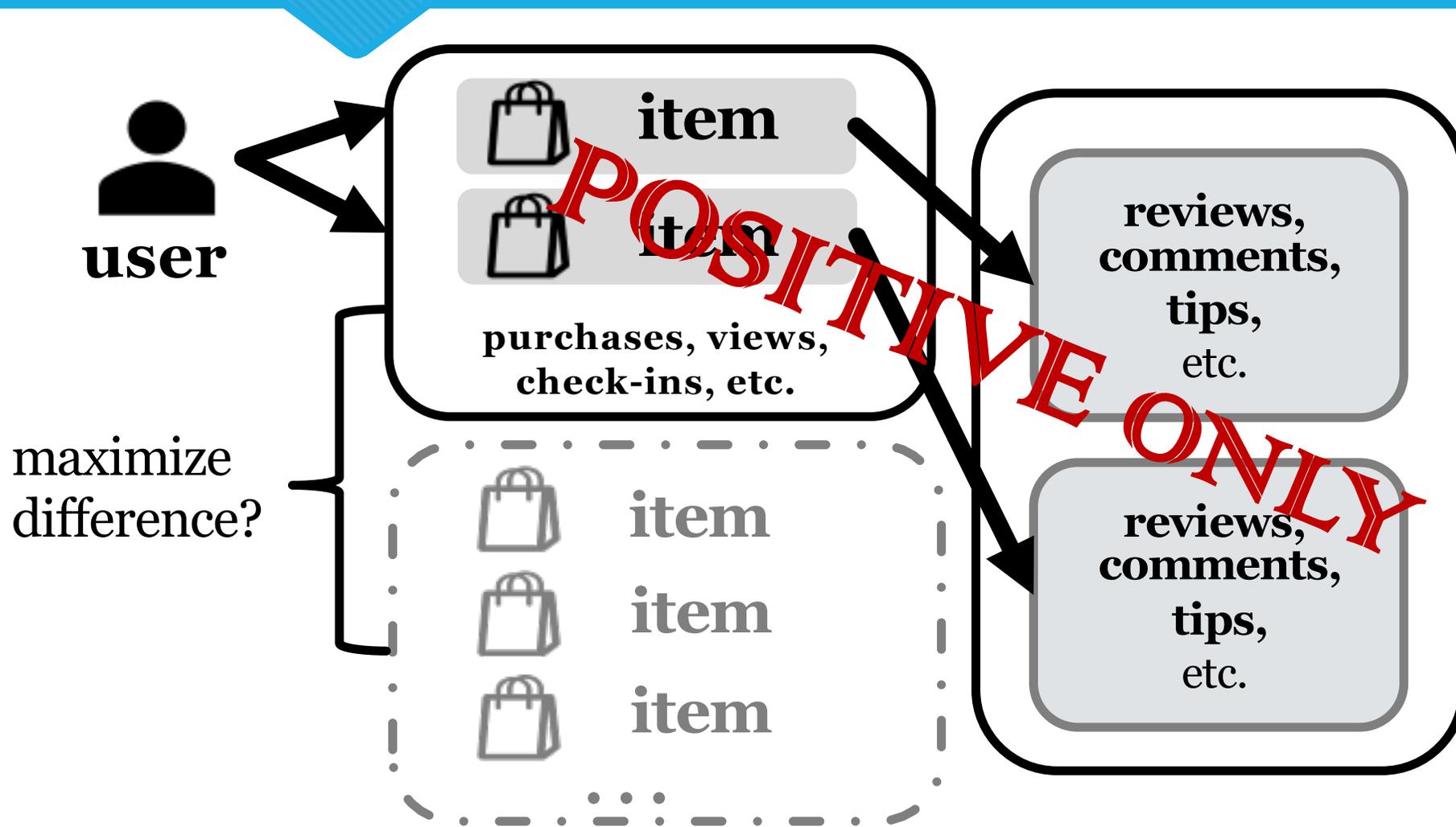
Dalini Orosow; Kefel
Great place for a walk by the ocean
1.1K 14 REPLY
View all 14 replies v

Nadine Pasterczyk
This is where the goals hang out.
1.1K 14 REPLY
View all 14 replies v

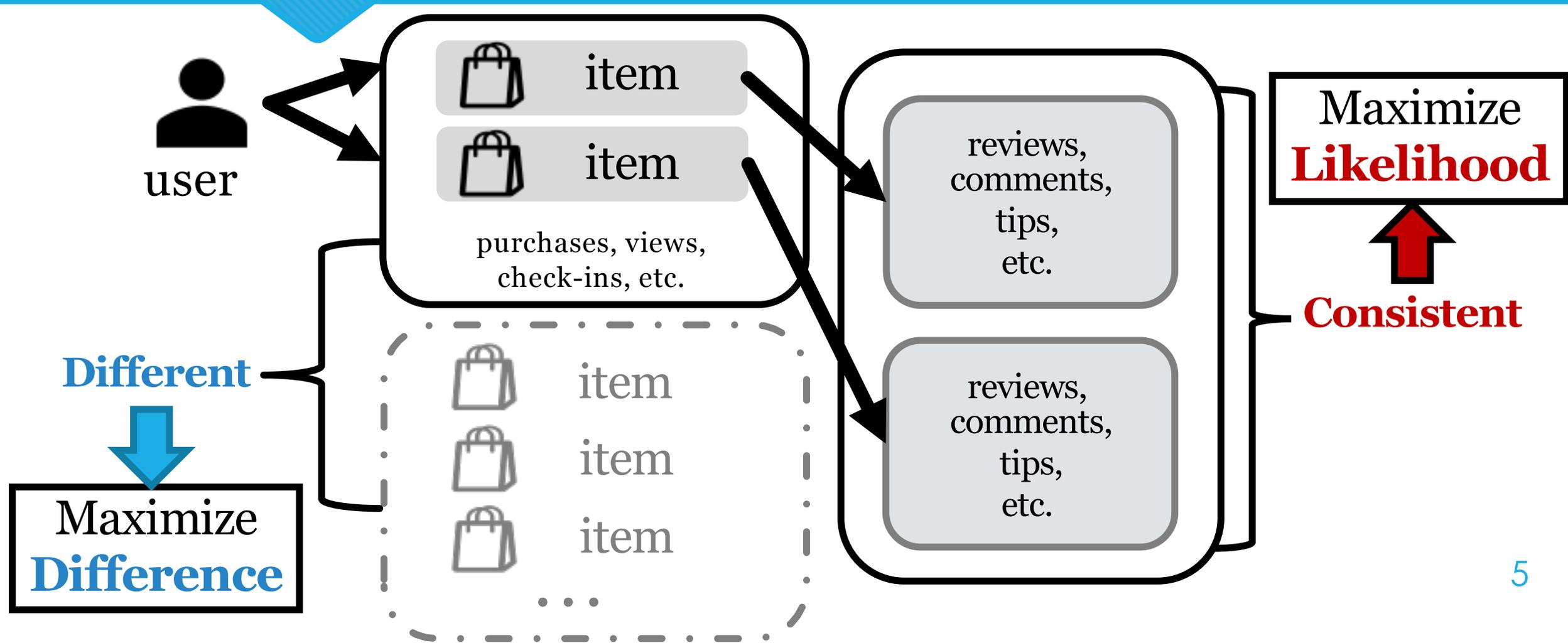
September 2, 2016

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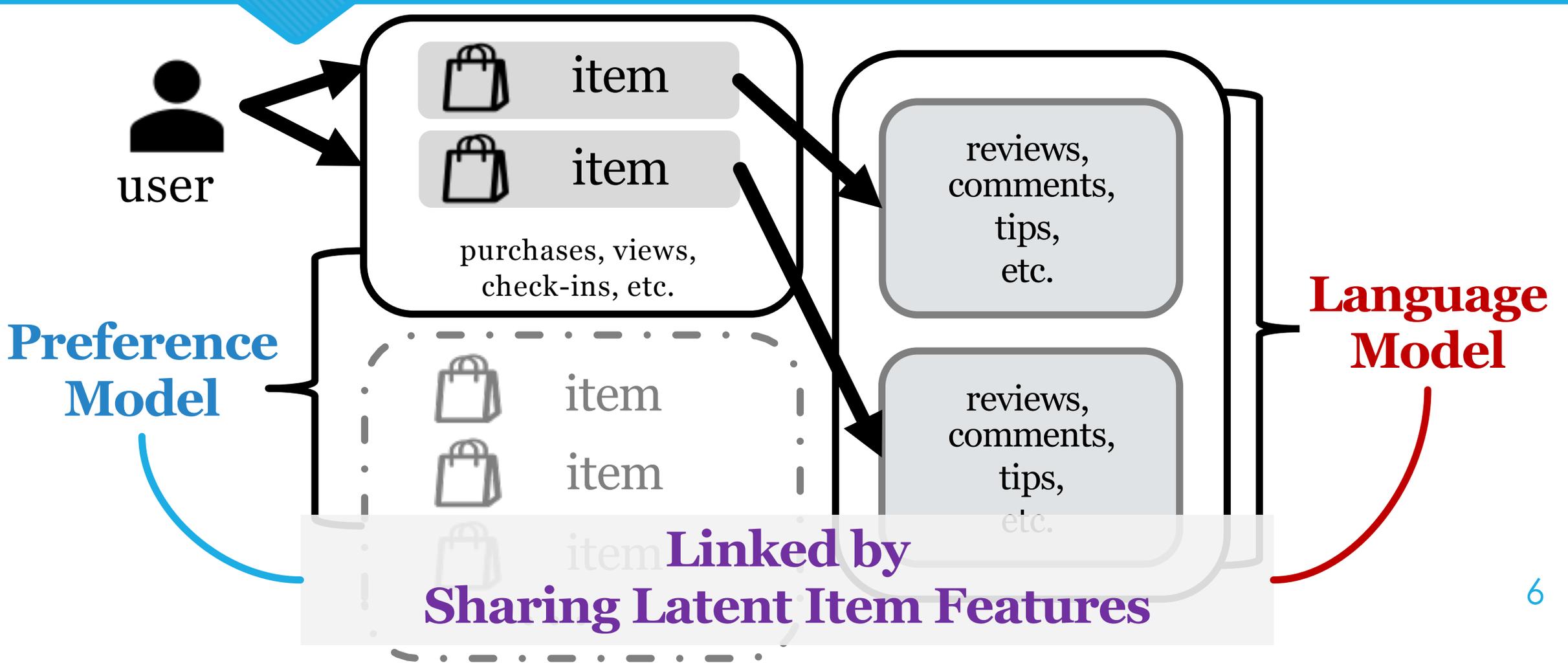
Challenge: Asymmetry



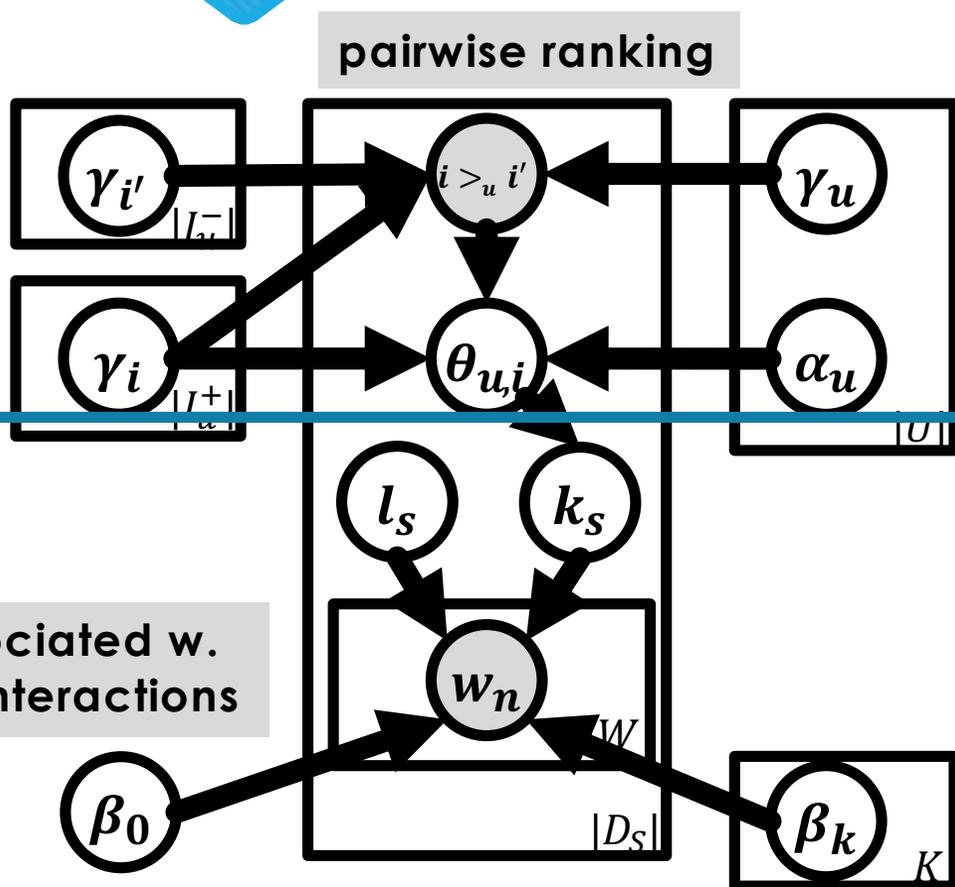
One-Class Recommendation with Asymmetric Textual Feedback



PRAST: Pairwise Ranking with Asymmetric Textual Feedback



Model Details: Preference Model



- Bayesian Personalized Ranking:

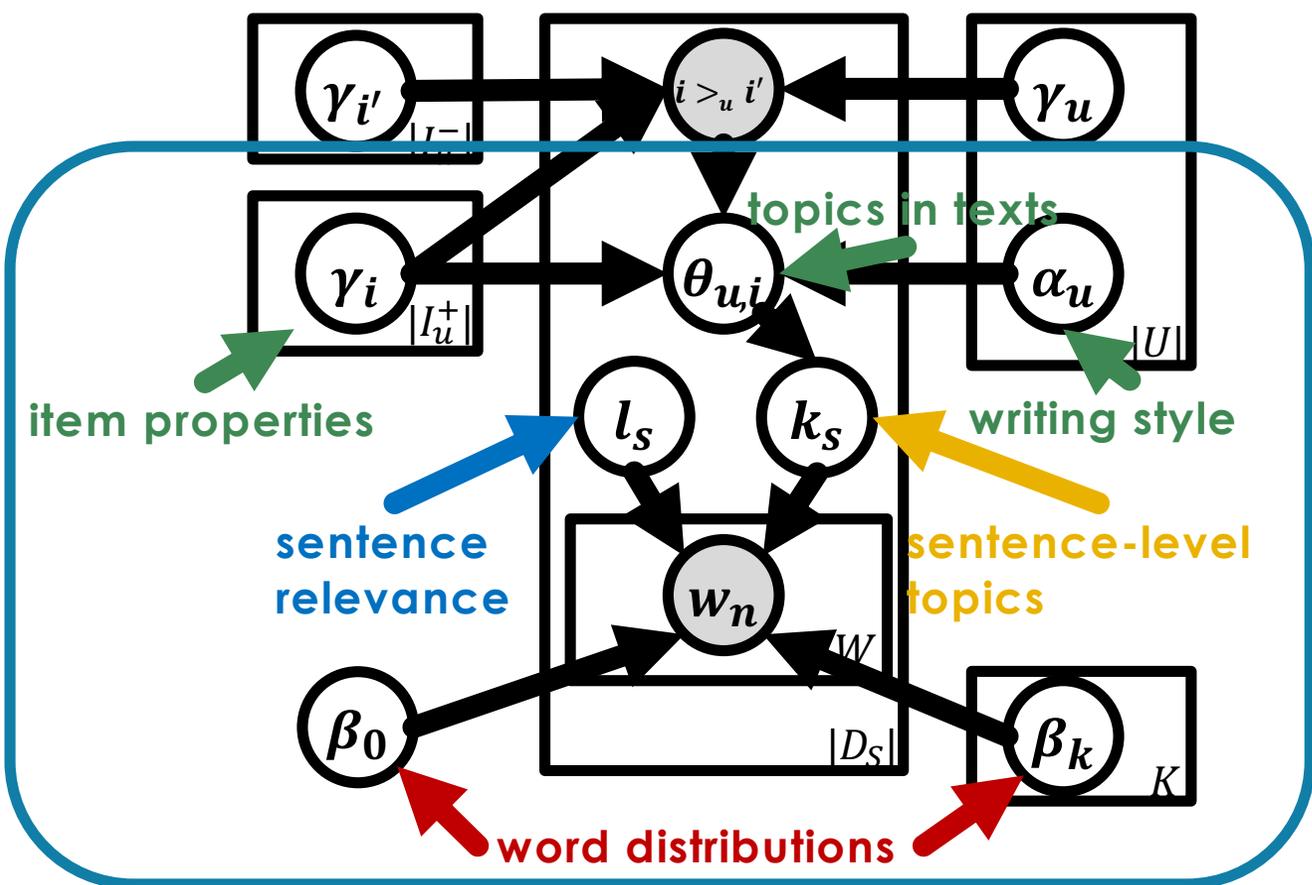
$$P(i >_u i' | \Omega) = \sigma(x_{u,i} - x_{u,i'}) = \frac{1}{1 + e^{-(x_{u,i} - x_{u,i'})}}$$

- Latent Factor Model:

$$x_{u,i} = b_0 + b_i + b_u + \langle \gamma_i, \gamma_u \rangle,$$

item properties

Model Details: Language Model



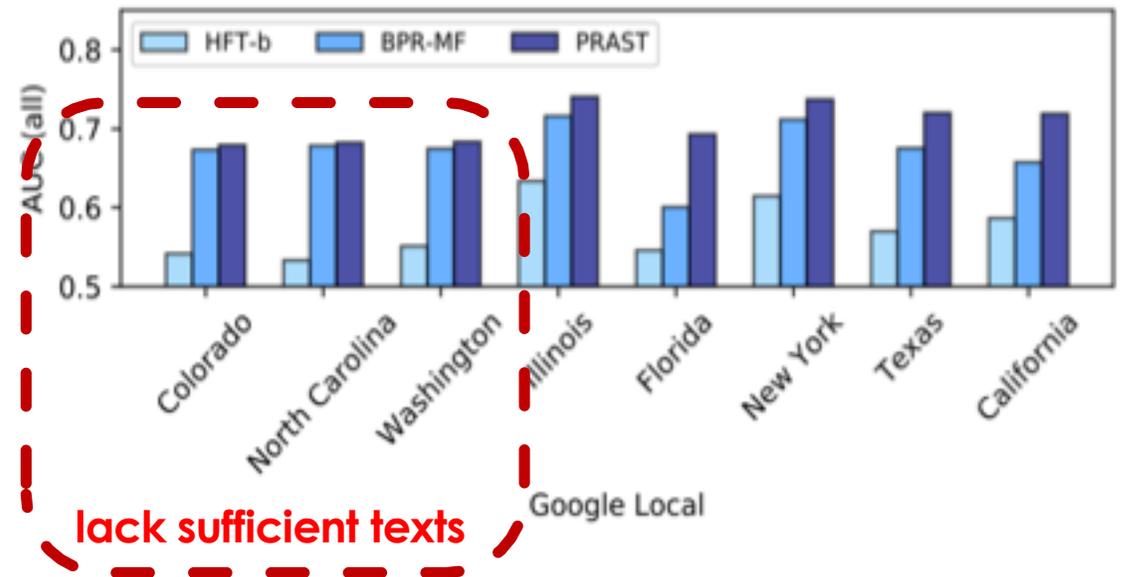
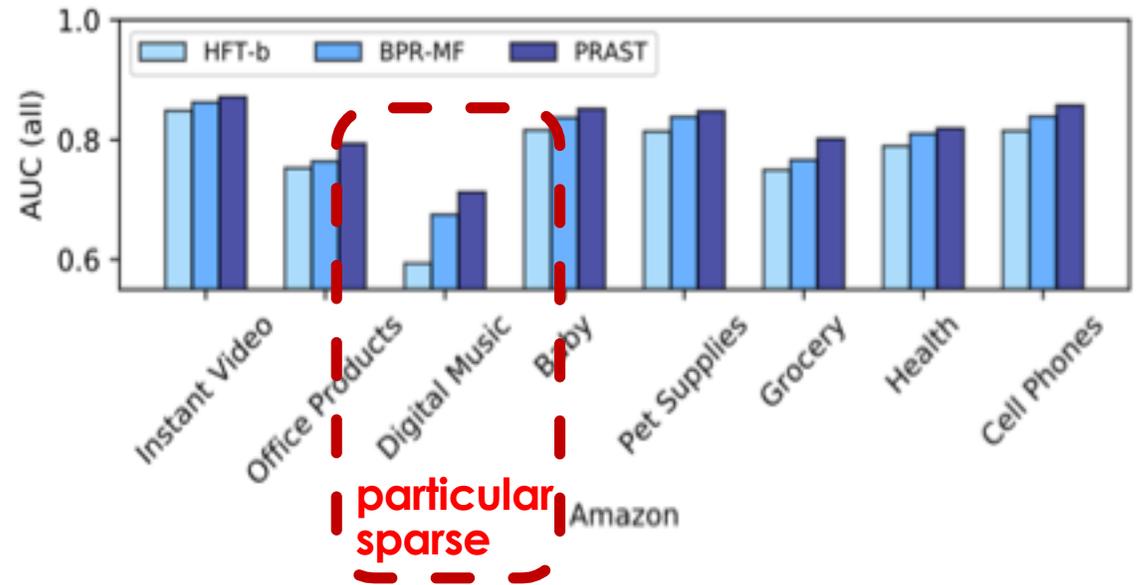
- Connecting latent item properties and topic models:
 - Sentence Relevance
 - Topic Distribution
 - Topic Assignment
 - Word Distribution

Experiments (datasets)

- Amazon
 - 8 categories: Instant Video, Office Products, Digital Music, Baby, Pet Supplies, Grocery and Gourmet Food, Health and Personal Care and Cell Phones and Accessories
 - 4.3M interactions about 849K users and 807K items
- GoogleLocal
 - Local businesses in 8 states: Colorado, North Carolina, Washington, Illinois, Florida, New York, Texas and California
 - 1.5M interactions about 184K users and 518K items (very sparse)
- Consider review/purchase action with review texts

Results (Quantitative)

- Baselines:
 - No text info.: itemPop, BPR, WARP, WRMF
 - with text info.: HFT-b, CAPRF-b
- AUC (vs. best):
 - 2.5% improv. on Amazon
 - **6.0% improv. on Amazon-cold**
 - items w. <5 actions
 - 5.0% improv. on GoogleLocal
 - **5.3% improv. on GoogleLocal-cold**
 - most items are cold in this dataset
- NDCG (vs. best):
 - 0.3% improv. on Amazon and Amazon-cold
 - 5.3% improv. on GoogleLocal
 - 5.5% improv. on GoogleLocal-cold



Conclusions and Future Work

- Pairwise Ranking with Asymmetric Textual Feedback (**PRAST**)
 - make use of asymmetric textual information in implicit feedback recommendation settings
 - jointly maximize
 - the difference between positive and 'negative' instances (preference model – pairwise ranking)
 - the likelihood of observed textual information (language model – topic modeling)
- The principle can be extended to incorporate other types of 'positive-only' side information
 - transaction timestamps
 - geo-tags
 - review helpfulness
 - product prices in transaction logs
 - etc.

Thanks!

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