# Zero-Shot Recommendation as Language Modeling

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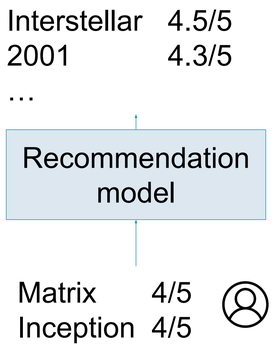
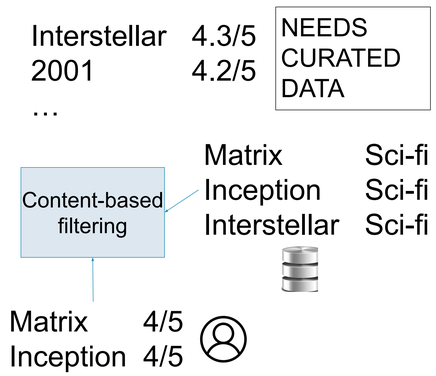
## Recommendation

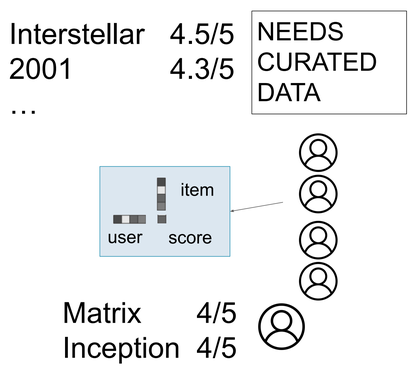


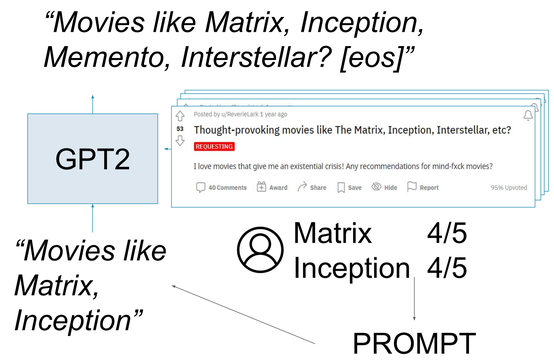

## Contributions

- ➔ Collaborative filtering with language models
- ➔ Analyses:
  - ◆ prompt analysis and prompt influence
  - ◆ LM size influence, ratings per user influence, comparison with matrix factorization

## Comparison with content-based filtering and collaborative filtering



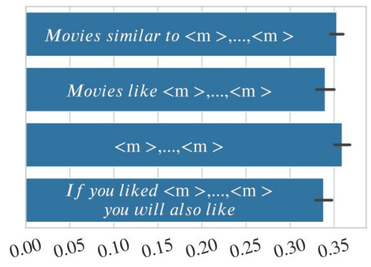




## Prompts analysis

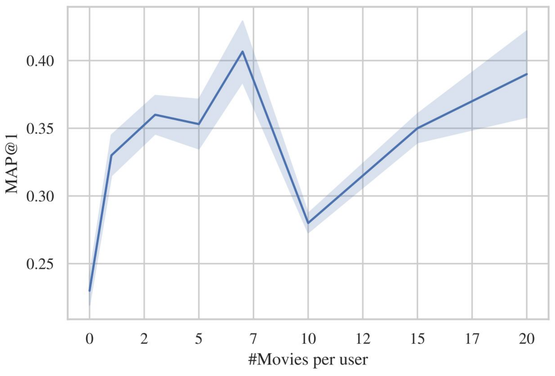
| 3-6 gram | #Count |
|---|---|
| <m> and <m> | 387 |
| <m>, <m>, <m> | 232 |
| *Movies like* <m> | 196 |
| <m>, <m>, <m>, <m> | 85 |
| *Movies similar to* <m> | 25 |

Mining prompts from the Reddit 2015 comments dataset




MAP@1 for each prompt

## Ratings per users




## Dataset and methodology

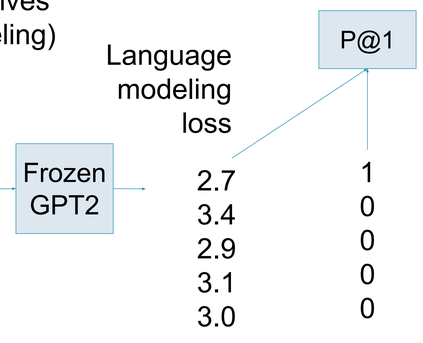
Movielens 1M Dataset
1 Million user ratings
2716 users with 21 positives and 5 negatives
Test user: (no training for language modeling)

PROMPTS u=62

*"Movies like Matrix, Inception, Interstellar"*
*"Movies like Matrix, Inception, Toy Story"*
*"Movies like Matrix, Inception, Twilight"*
*"Movies like Matrix, Inception, Rocky"*
*"Movies like Matrix, Inception, Die Hard"*

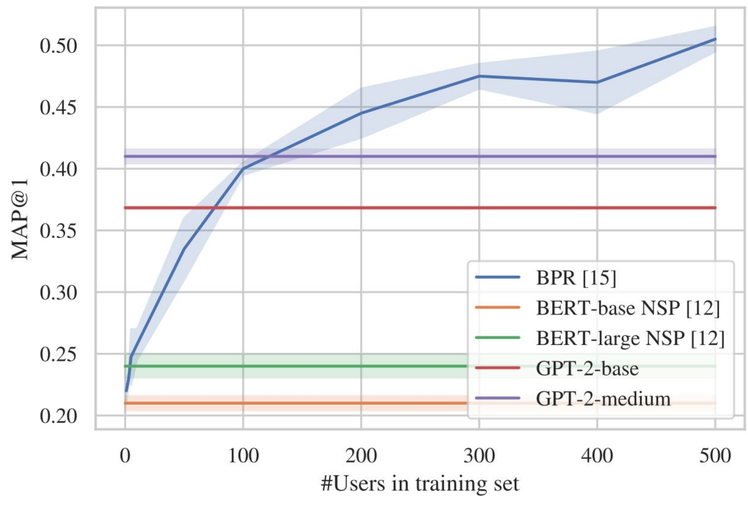
MAP = average over test users

P@1 u=62 : 1.0




rating>=4 → POSITIVE
rating<=2.5 → NEGATIVE

## Comparison with matrix factorization and NSP




## Conclusion

- ➔ The web contains collaborative filtering data
- ➔ Possible leakage between web text and MovieLens?
- ➔ Language modeling can address cold start : 1 GPT2 = 100 users
- ➔ Many possible extensions
  - ◆ finetune GPT2 for recommendation
  - ◆ hybrid model with matrix factorization

## References

[12] What does BERT know about books, movies and music? Probing BERT for Conversational Recommendation, Penha et al., Recsys20

[15] BPR: Bayesian Personalized Ranking from Implicit Feedback, Rendle et al., UAI2009

## Acknowledgments

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https://calculus-project.eu/