



Personality Bias of Music Recommendation Algorithms

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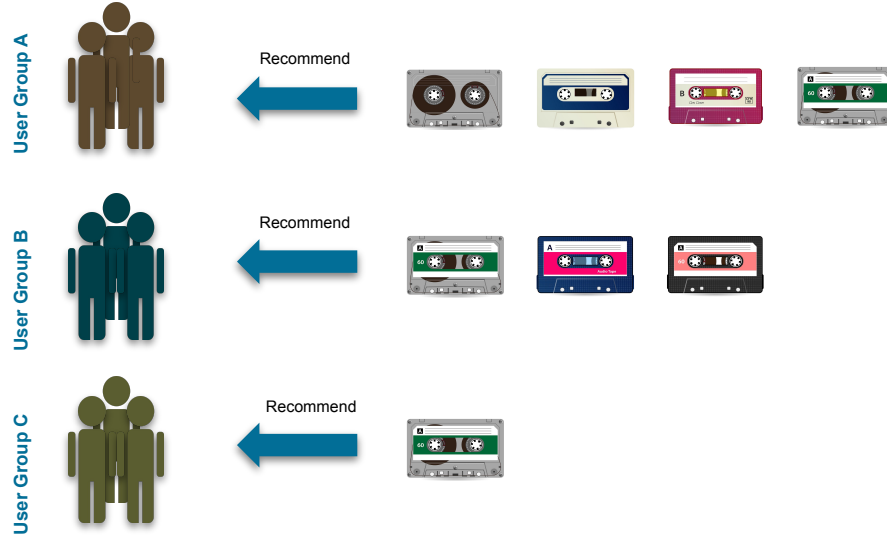
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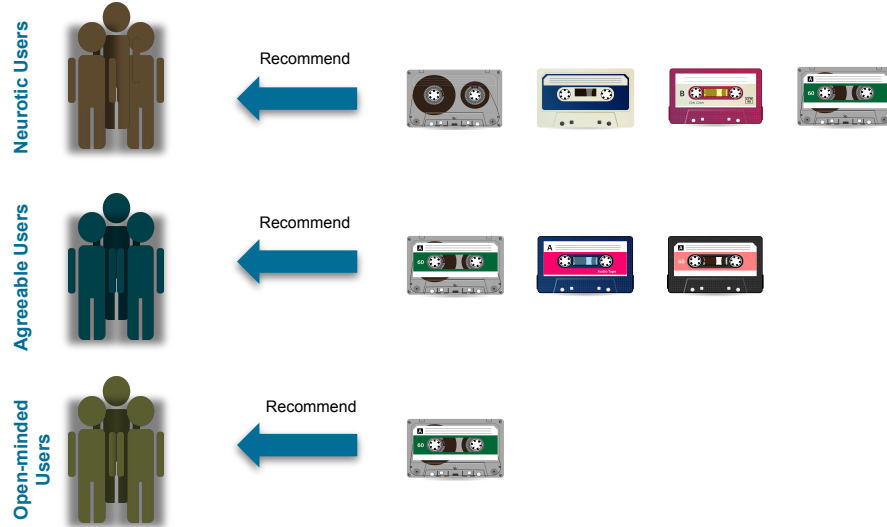


Unequal treatment of users in Recommender Systems



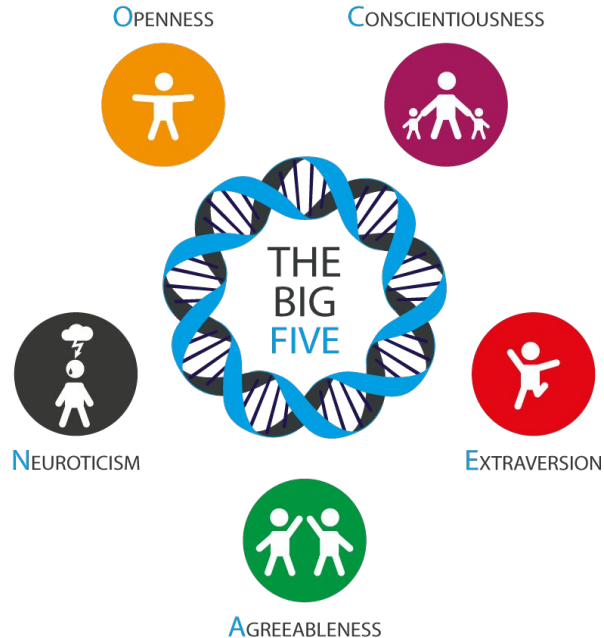
- Better or worse recommendation based on sensitive aspects of the users.
- Impact on the usefulness of the Recommender System.

Personality Bias in Recommender Systems

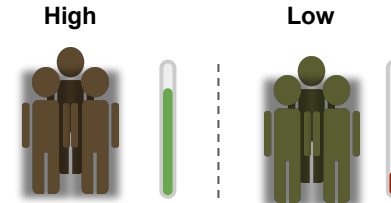


- Personality as main user aspect.
- Focusing on the Music domain.
- **Do state-of-the-art recommender system algorithms treat users differently depending on their personalities?**

User groups based on Personality Traits



- The Big Five model for Personality.
- For each personality trait, users are divided in **High** and **Low** group depending on their scores.
- Measure avg. accuracy for the two groups and compare.



Method and Results

	High Group	Low Group
Openness	↓	↑
Conscientiousness	↓	↑
Extraversion	↓	↑
Agreeableness	↑	↓
Neuroticism	↑	↓

- Dataset composed by Music Tracks shared on Twitter in 2018-2019.
- Tested algorithms:
 - Embarrassingly Shallow Autoencoders (**EASE**)
 - Sparse Linear Models (**SLIM**)
 - Variational Autoencoders for Collaborative Filtering (**Mult-VAE**)
- Recall@k and NDCG@k as accuracy metrics.
- Statistically significant differences between the two groups.

For more details, check out our paper:

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Recommender systems, like other tools that make use of machine learning, are known to create or increase certain biases. Earlier work has already unveiled different performance of recommender systems for different user groups, depending on gender, age, country, and consumption behavior. In this work, we study user bias in terms of another aspect, i.e., users' personality. We investigate to which extent state-of-the-art recommendation algorithms yield different accuracy scores depending on the users' personality traits. We focus on the music domain and create a dataset of Twitter users' music consumption behavior and personality traits, measuring the latter in terms of the OCEAN model. Investigating recall@K and NDCG@K of the recommendation algorithms SLIM, embarrassingly shallow autoencoders for sparse data (EASE), and variational autoencoders for collaborative filtering (Mult-VAE) on this dataset, we find several significant differences in performance between user groups scoring high vs. groups scoring low on several personality traits.

CCS Concepts: • **Information systems** → **Recommender systems**; *Music retrieval*; • **Applied computing** → Psychology.

Additional Key Words and Phrases: music recommender systems, personality, bias, neural networks, dataset

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