

# Trust in recommender system to solve cold start problem

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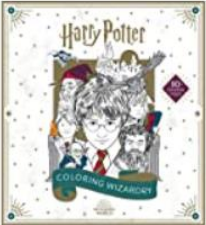
CMPE 297

Short Story Assignment


# Recommender/Recommendation Systems (RSs)

- Recommendation systems are complex artificial intelligence systems that are designed to provide a prediction to users based on a preference. Many popular e-commerce sites, such as Amazon, have adopted personalized recommendation systems for their users, suggesting items they can buy based on their past behavior.


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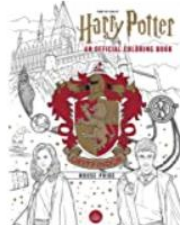
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# Collaborative Filtering

- ▶ Collaborative filtering, which filters information by using data from other users, is heavily used in practice. The recommendation process uses feedback, comments and opinions to filter through a large amount of information and filter out information that may be of interest to the target user.
- ▶ Most websites like Amazon, YouTube, and Netflix use collaborative filtering.

# Matrix Factorization

- ▶ Matrix factorization is a collaborative filtering algorithm to find the relationship between items and users' entities.

		Item			
		W	X	Y	Z
User	A		4.5	2.0	
	B	4.0		3.5	
	C		5.0		2.0
	D		3.5	4.0	1.0

Rating Matrix

=

A	1.2	0.8
B	1.4	0.9
C	1.5	1.0
D	1.2	0.8

User Matrix

X

	W	X	Y	Z
	1.5	1.2	1.0	0.8
	1.7	0.6	1.1	0.4

Item Matrix

# Cold Start Problem

- ▶ How to make the most effective recommendations without knowing anything about the user?
- ▶ Cold start can be three types: user cold start, item cold start, and system cold start
- ▶ Solution:
  - ▶ Get more data! Gain more information!

# Trust-Aware Recommender Systems

## Survey on Recommender Systems Incorporating Trust

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**Abstract**—Large amount of information generated on the web is useful for extracting useful patterns about customers and their purchases. Recommender system provides framework to utilize this information to make suggestions to user according to their previous preferences. They are intelligent systems having decision making capabilities. This in turn enhances business profit. **Recommender system endure from problems like cold start, fake profile generation and data sparsity. Inclusion of trust** in recommender system helps to alleviate these problems to a great extent. **The phenomenon of trust is derived from daily life experiences like believing the views/reviews suggested by friends and relatives for buying new things. The desideratum of this research paper is to procure a survey on how trust can be incorporated in recommender systems and the advantages trust aware recommender systems have over traditional recommender systems.** It highlights the techniques that have been used to develop trust aware recommenders and pros and cons of these techniques.

**Index Terms**—Recommender system, **Trust aware recommender system,** Collaborative filtering

### I. INTRODUCTION

Nowadays, Recommender systems (RS) have become extremely popular because of increase in information available on the web. Recommender System is a software framework that provides specific suggestions to users according to their likes and preferences. **These**

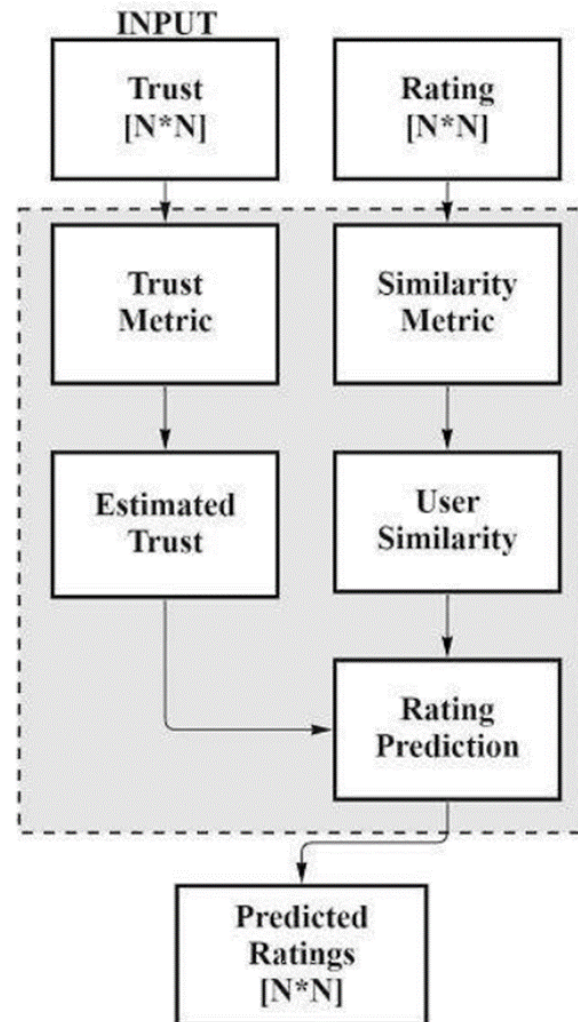
watched by the customers. Travel websites like makemytrip provide customized travel packages to the customers based on their preferences and deal with variety of users through recommender systems. This paper provides a survey on how trust can be incorporated in recommenders and what advantages it offer.

The composition of the paper is as follows: Section I mounts an exordium to the topic. A literature survey on the research done previously is stated in section II. Section III presents the issues that recommender systems face. Section IV presents definition and properties of trust in terms of RS. Section V shows the architecture of trust based recommender systems. Section VI discusses the techniques to amalgamate trust and recommender systems. Finally, concluding remarks in section VII.

### II. LITERATURE SURVEY

Studies and experiences have shown that recommenders have substantially increased sales at online websites and have contributed to expansion of business and profit for the merchants. **TARS helps to mollify the cold start challenge of RS and enhance the coverage of the RS by suggesting items to the new users.** A lot of substantial work has been done in the field of recommender

# Basic Structure of TARS



# Conclusion

- ▶ Trust-aware recommender systems are used to incorporate trust in recommender systems so that shilling attacks couldn't bias the suggestions of the recommender systems.
- ▶ We can also use trust-aware to remove the cold start problem so that new users could get suggestions from the users they trust in the system.



# Reference

- ▶ Raizada, M. (2022). Survey on Recommender Systems Incorporating Trust. 2022 *International Conference on Applied Artificial Intelligence and Computing (ICAAIC)*. <https://doi.org/10.1109/icaaic53929.2022.9792731>