

## Information Passing in Online Recommendation

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### Motivation



- Recommendations from the **system** are effective
- Personalized recommendations based on prior patterns and ratings
  - Amazon, "people who bought x also bought y"
  - MovieLens, "based on ratings of users like you..."
  - Epinions, "based on the opinions of the raters you trust" (Richardson & Domingos, 2002)

### True, but...



- We are more influenced by our friends than strangers
- 68% of individuals consulted friends and relatives before purchasing home electronics (Burke, 2003)



Social-based recommendation outperform traditional MF (Ma et al., 2008, 2011)

Picture: L. Adamic, 2005

#### Motivation



- Social influence: One person performing an action causes people connected to her to do the same (KDD'12 tutorial)
- Most existing studies focus on revenue maximization
- To understand **social influence** deeply, to inspire social-based recommendation



### **Research questions**

- In general, does social influence exist?
- Is one's social influence correlated with her follower #, followee # etc.?

• As one receives/sends out more recommendations, is it more likely that followers will accept it?



#### Explicit social influence

#### Implicit social influence



### Douban



	t5	t4	t1
	0	t3	0
3	0	t0	t0
	0	0	t2

		3	
	1	1	1
0		1	0
0	0		1
1	0	0	

#### **User-Book network**

**User-Follower network** 



Social influence is only one source of social correlation.
Homophily



Baseline: Shuffle test (Anagnostopoulos, 2008)

- Create a new graph by shuffling all the timestamps

### RQ1 Does social influence exist?



Information Pass Rate = 5/10 = 0.5

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 True IPR = 0.00125 >> Baseline IPR = 3.99 E-5







# RQ2 Does one's social influence correlated with one's centrality?

	IPR	Followee#	Follower#	Book#
IPR	1			
Followee#	0.011	1		
Follower#	0.0346*	0.3536*	1	
Book#	0.0083	0.2550*		1

One's Information pass rate is significantly but weakly correlated with his follower number

## RQ3: Does receiving more recommendations College of Computing & Informatics



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BOOKS

the state

- The more recommendations one receives for a book, the more likely that she will read the book.
- After being recommended 10 times, the probability of reading saturates.



## RQ3: Does sending more recommendations influence more readings?

BOOKS

**DVDs** 

M



 The more recommendations one made, the higher probability that those recommendations get accepted.

#### Conclusions



- Social influence does exist in our dataset.
  Need more thorough studies.
- One's social influence is significantly but weakly correlated with one's follower number.
- The more recommendation is made over a book, the higher the probability that one will read it.

#### Future work



- Once the threshold is passed, the receiver will have no more interest in the recommended book: Linear Threshold Model (Granovette, 1976).
  - Test if LTM holds in douban dataset
- Compare the recommendation success rate between different book categories



#### • Thanks!

#### • Q & A