

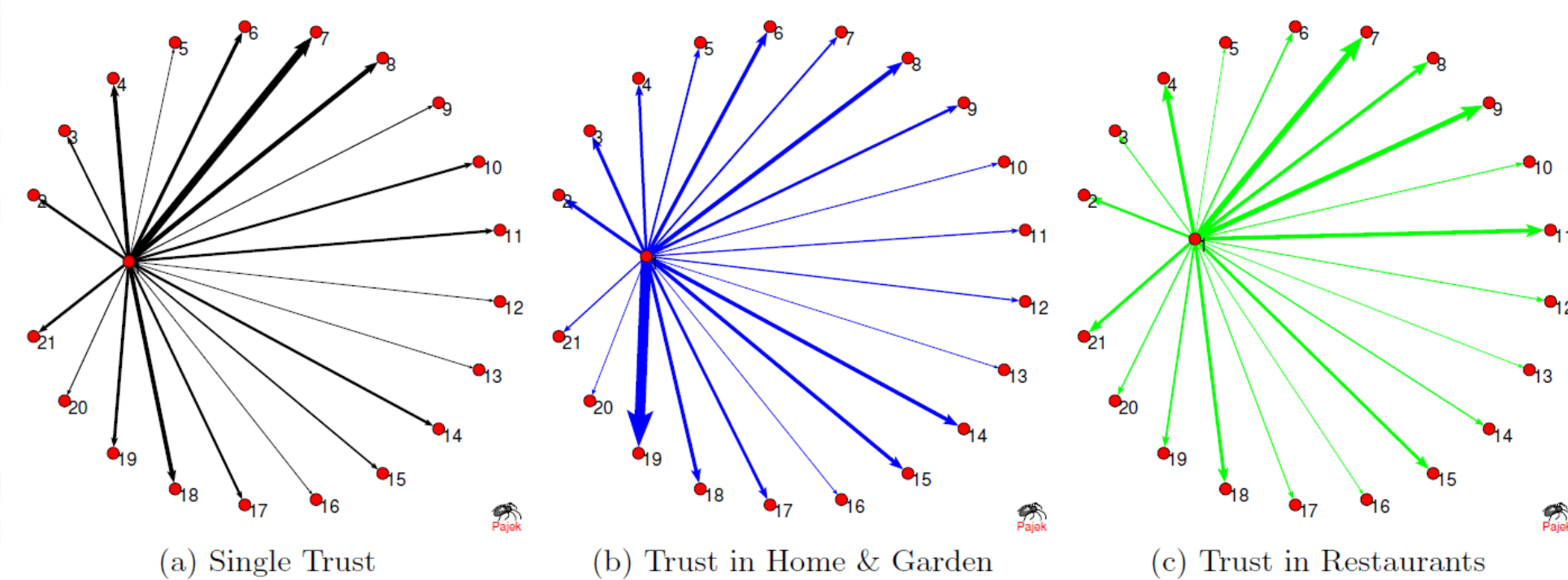
mTrust: Discerning Multi-Faceted Trust in a Connected World

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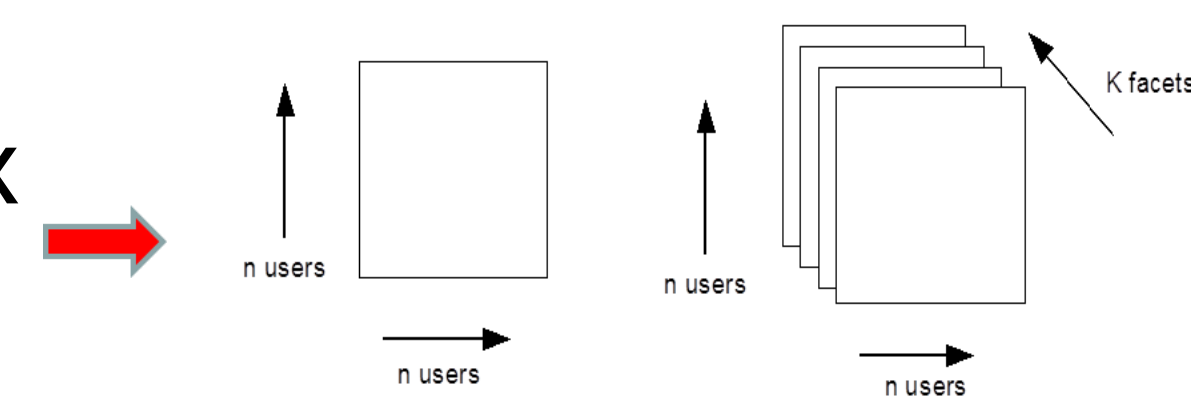
Motivation

- Trust, a social concept, has many facets
- People may place trust differently on different people
- A *Multi-Faceted* Trust example from Epinions



Methodology

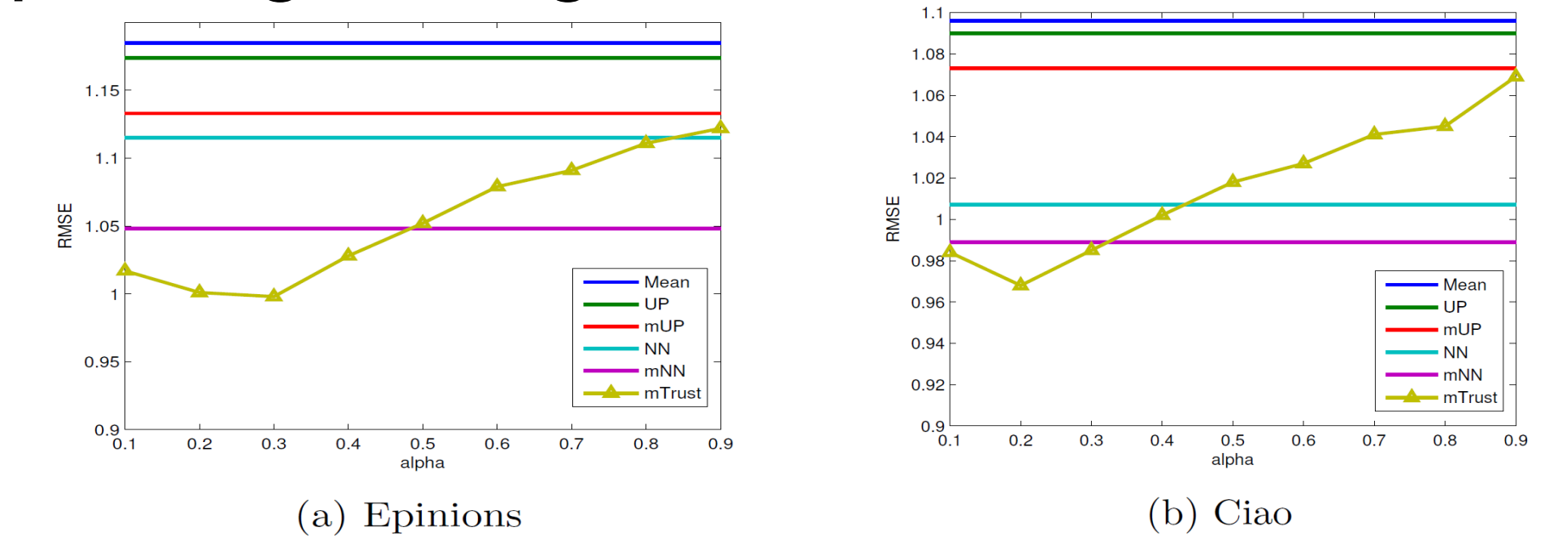
- Representation
 - From Adjacency Matrix to Tensor
- Trust Strength Inference
 - Correlation between Rating Similarity and Trust
 - Rating Prediction



$$\hat{\mathbf{R}}(u, i) = \alpha \left(\frac{\sum_k \mathbf{PF}(i, k)(\mu(k) + \mathbf{B}(u, k))}{\sum_k \mathbf{PF}(i, k)} + \mathbf{c}(i) \right) + (1 - \alpha) \frac{\sum_{k=1}^K \sum_{v \in N(u, i)} \mathbf{PF}(i, k) \mathcal{A}(v, u, k) \mathbf{R}(v, i)}{\sum_{k=1}^K \sum_{v \in N(u, i)} \mathbf{PF}(i, k) \mathcal{A}(v, u, k)}$$

Applying mTrust

- Improving Rating Prediction



- Enabling Facet-Sensitive Ranking

Electronics	Home & Garden	Computer Hardware	Hotels & Travel	Restaurants	Kids & Family	overall
Howard_Creech	dlstewart	yusakugo	popstrocks	Bryan_Carey	Freak369	Bryan_Carey
dkozin	Bryan_Carey	Gr8ful	mrkstvns	popstrocks	marytara	Freak369
yusakugo	mountainhigh	lawman67	AliventAsylum	jo.com	melissasn	popstrocks
nick1326	Freak369	ptiemann	Bryan_Carey	Bruguru	three.ster	yusakugo
paulphoto	michiman1	paulphoto	jo.com	AliventAsylum	pippadaisy	marytara

- Making Status Theory Applicable to Reciprocal Links

	Epinions						
	overall	1	2	3	4	5	6
RAT	0.332	0.228	0.221	0.231	0.207	0.208	0.216
RCT(%)	19.28	14.27	14.23	14.27	14.15	14.16	14.18

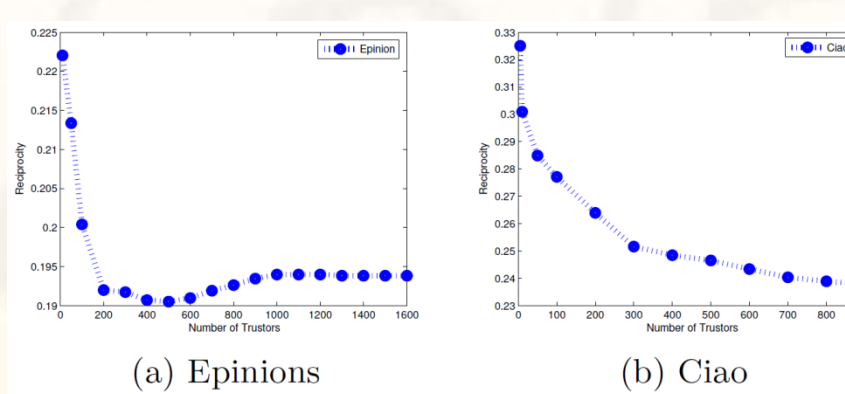
	Ciao						
	overall	1	2	3	4	5	6
RAT	0.359	0.259	0.263	0.271	0.265	0.265	0.259
RCT(%)	23.77	17.34	17.55	18.37	17.85	17.83	17.49

Data Analysis

- Datasets
 - Epinions
 - Ciao
- Reciprocal Links
- Multi-Faceted Trust

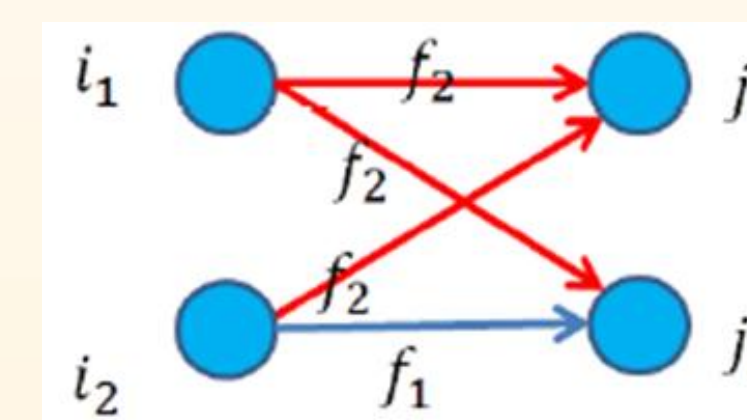
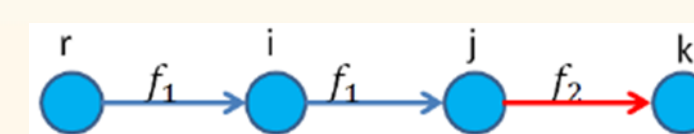
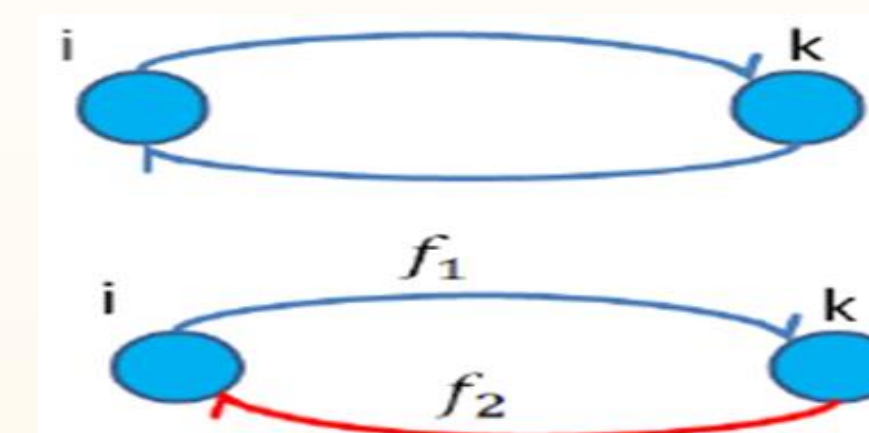
Table 1: Statistics of the Datasets

	Epinions	Ciao
# of Users	22166	12375
# of Products	296277	106797
# of Categories	27	28
# of Rating	922267	484086
# of Links	355813	237350
Ave Rating	4.05	4.21
Trust Network Density	0.0014	0.0031
Clustering Coefficient	0.1518	0.1969



Findings from mTrust

- Heterogeneous Trust Links
 - Pairs of Reciprocal Links
 - Transitive Trust Relationships
- Co-Citation Trust Relationships



Future Work

- Applying mTrust to other domains, such as the Twitter network
- Studying the evolution of multi-faceted trust

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