

FAIRY: A Framework for Understanding Relationships between Users' Actions and their Social Feeds

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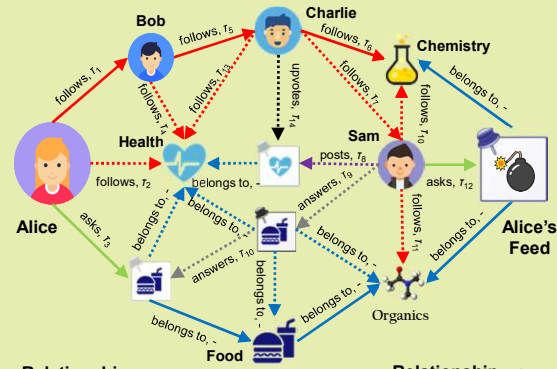
Motivation

- Personalized social feeds result from complex interplay of users' social contacts, their interests and their actions.
- Curious users might wonder about the connections between their profile (interests, actions and social contacts) and the non-obvious personalized feed items.
- Over time, users might accumulate thousands of actions which makes it impossible for them to find out these connections on their own.
- Users might not have even have access to their full profile due to the problem of **inverse privacy** (asymmetry between users' and service providers' capacity in recording and processing personal data).
- Need for a **user-side solution** for **discovering** and **ranking** relationships between users' actions and their social feeds!

How do my actions relate to this feed?

Alice Post: Bomb Alice's Feed

Discovering and Ranking the Relationships



Relationship r_1 :
Alice-Bob-Charlie-Chemistry-Bomb

Relationship r_2 :
Alice-Question-Food-Organic-Bomb

Interaction Graphs

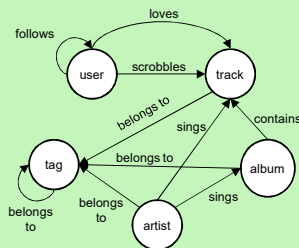
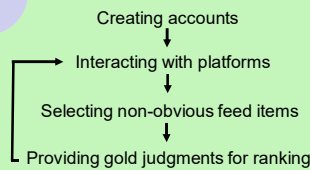
- Heterogeneous Information Networks, modeling users' interactions with the platform
- Explanation Paths: Paths connecting a user to her feed item

Ranking Relationships

- Thousands of explanation paths!
- Paths to be ranked based on usefulness/relevance and surprisal using pairwise LTR

Longitudinal Study

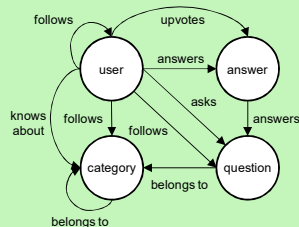
A user study on two Platforms:
Quora and Lastfm
with 20 users over 2 months



Latfm

Features

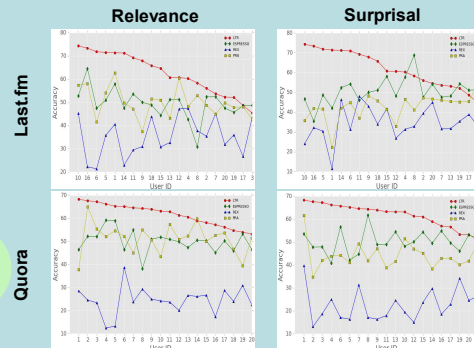
- Interpretable and accessible features
 - User features such as their influence and activity level
 - Item features such as their popularity and specificity
 - Category features such as their popularity and specificity
 - Relationship instance features such as the overall coherence of the instance
 - Relationship pattern features such as confidence and frequency



Quora

Results

LTR models beat the baselines for relationship discovery.



Path instances matter more than their patterns.

Features	Quora		Last.fm	
	Relevance	Surprisal	Relevance	Surprisal
All	60.33	60.38	56.24	54.21
No Path Instance Features	51.69	51.73	54.32	53.65
No Path Pattern Features	60.21	60.71	55.78	54.21

Ablation Study

Random sampling is effective.

Features	Quora		Last.fm	
	Relevance	Surprisal	Relevance	Surprisal
Random	60.33	60.38	56.24	54.21
Perturb users	56.36	56.66	57.77	58.57
Perturb Category	58.51	58.25	55.52	56.84
Perturb item	50.26	50.35	52.85	52.14

FAIRY gives insights on relevance and surprisal.