MODELING COMPLEX BEHAVIOR IN SOCIAL MEDIA

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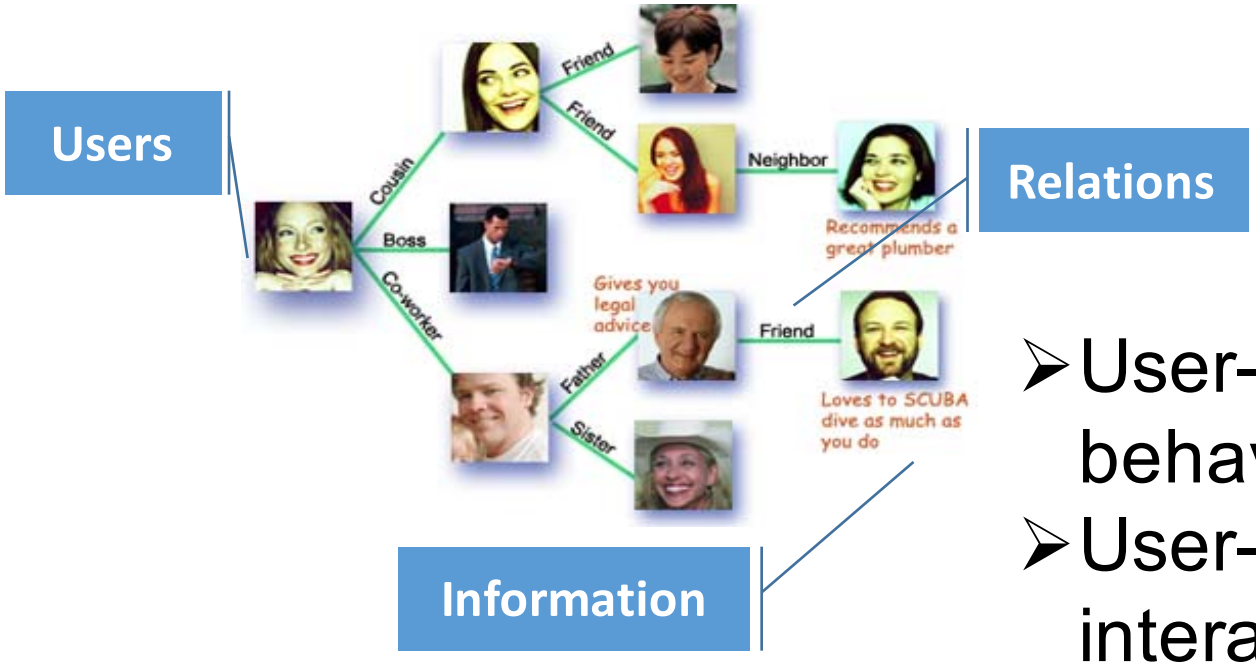
User Behavior in Social Media



- User-user interaction behaviors
- User-information interaction behaviors

User behavior is a fundamental element in social media

Behavioral Modeling

Understanding

Predicting

Intervening

Applications of Behavioral Modeling

Recommendation

amazon Google twitter YouTube

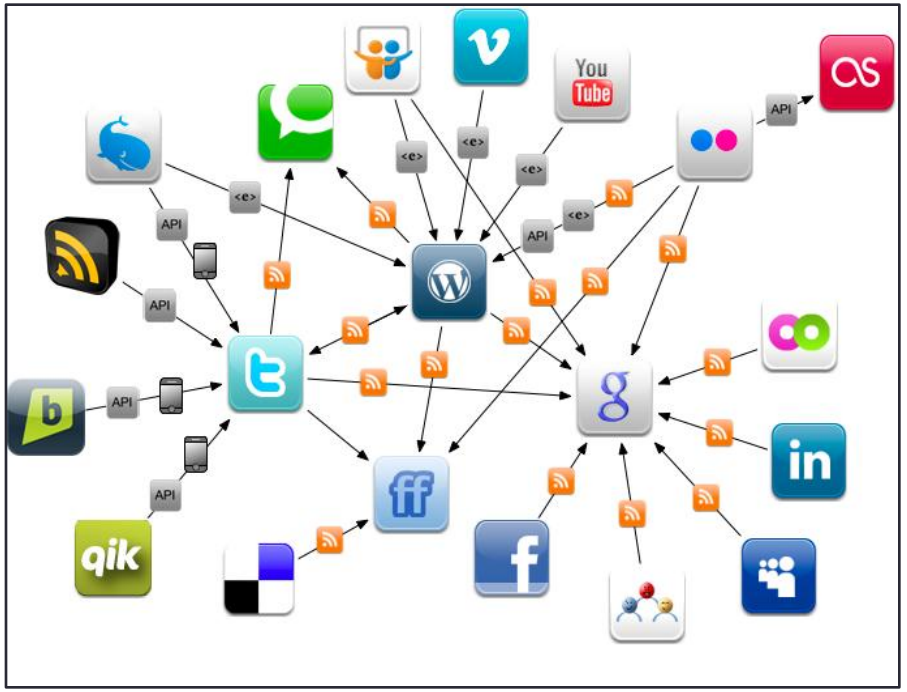
Targeting AD

Anti Spam

Scientific Value of Behavioral Modeling

Physical World

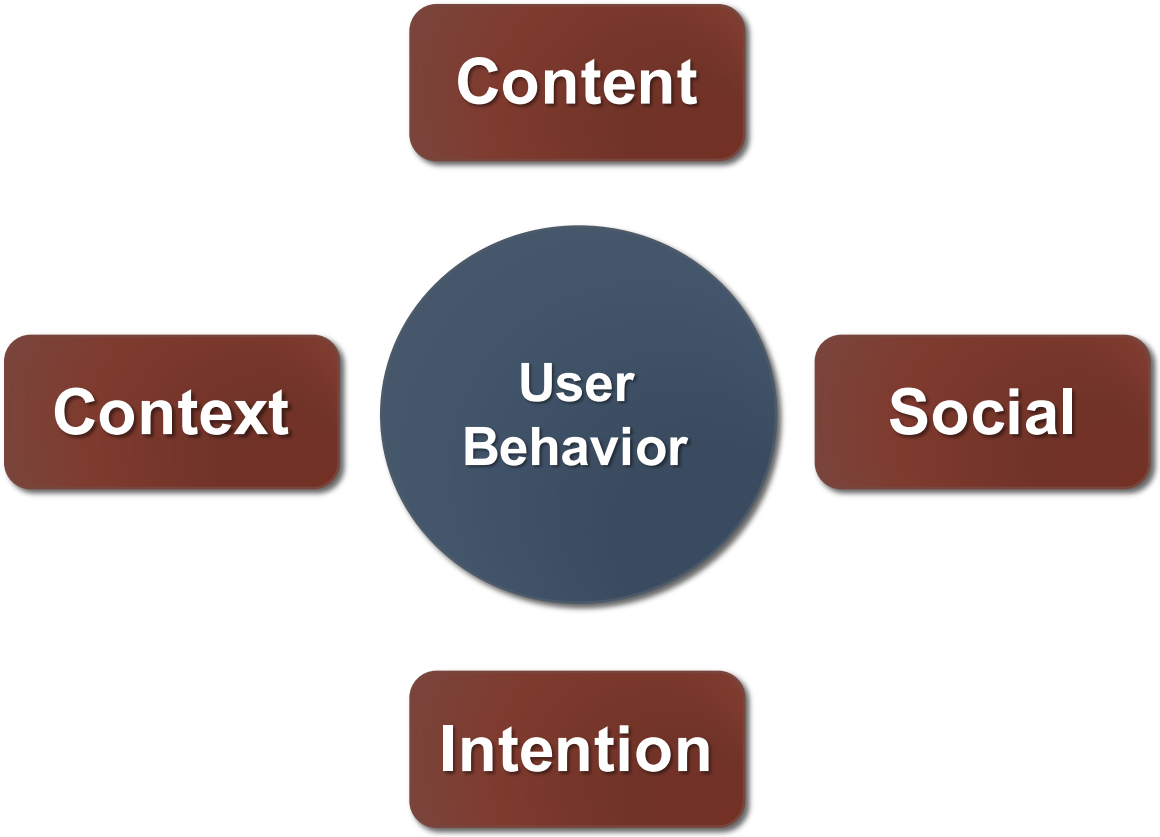
Online Social Networks



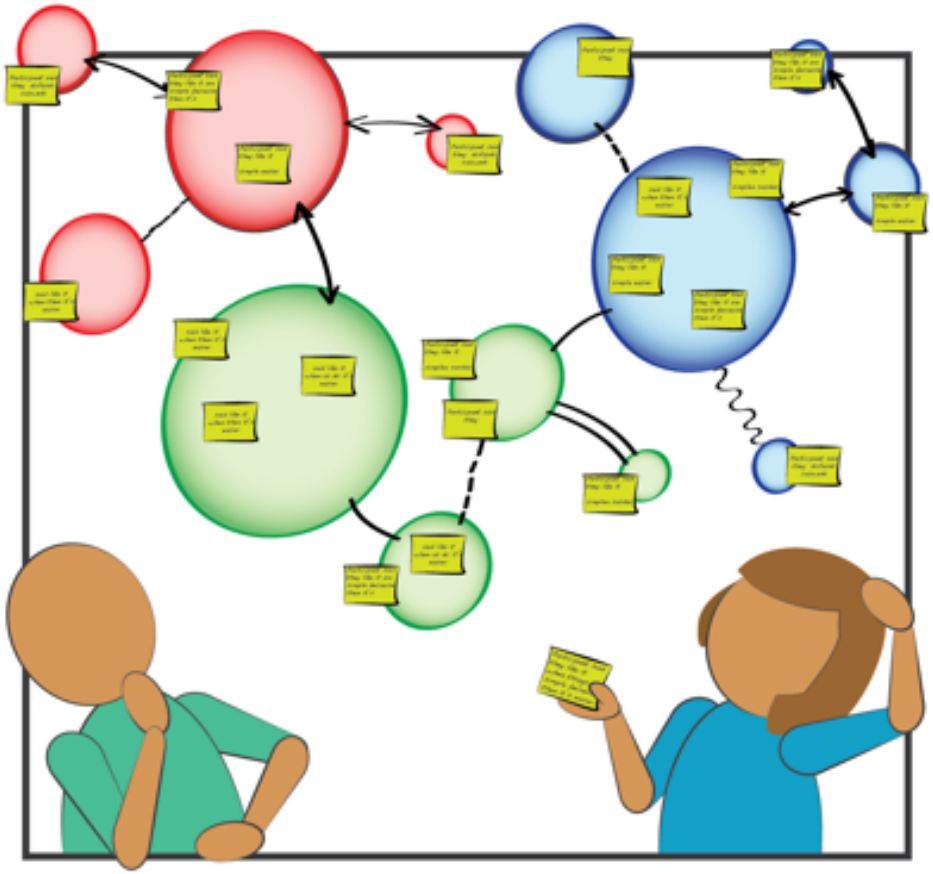
The human behaviors are broadly and deeply recorded in an unprecedented level.

This is the first time that we can get insights of human behaviors and the society from large scale real data.

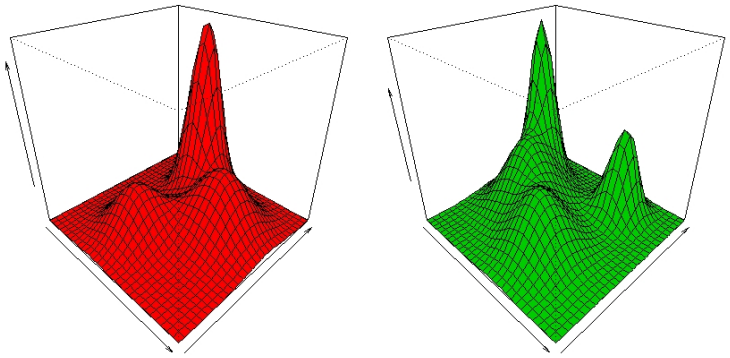
User Behaviors are Complex



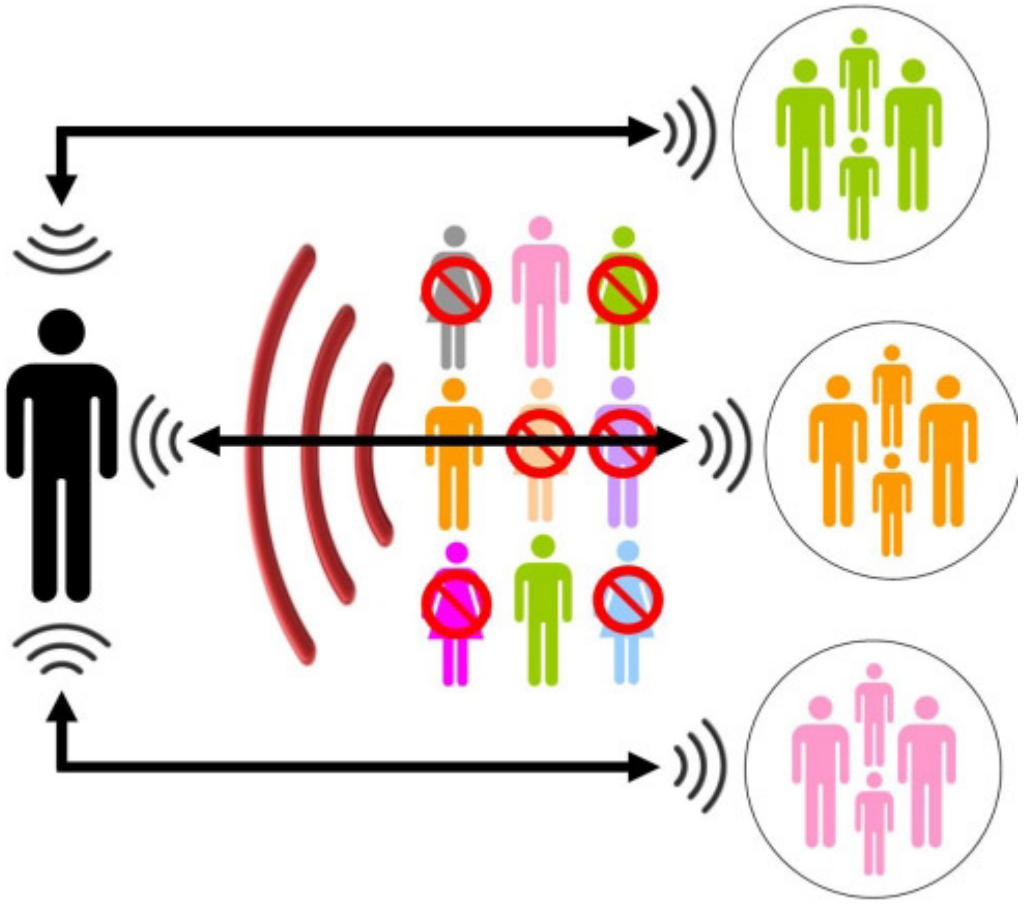
Content Related



User preference is an important driving factor for user behavior modeling.



Social Related



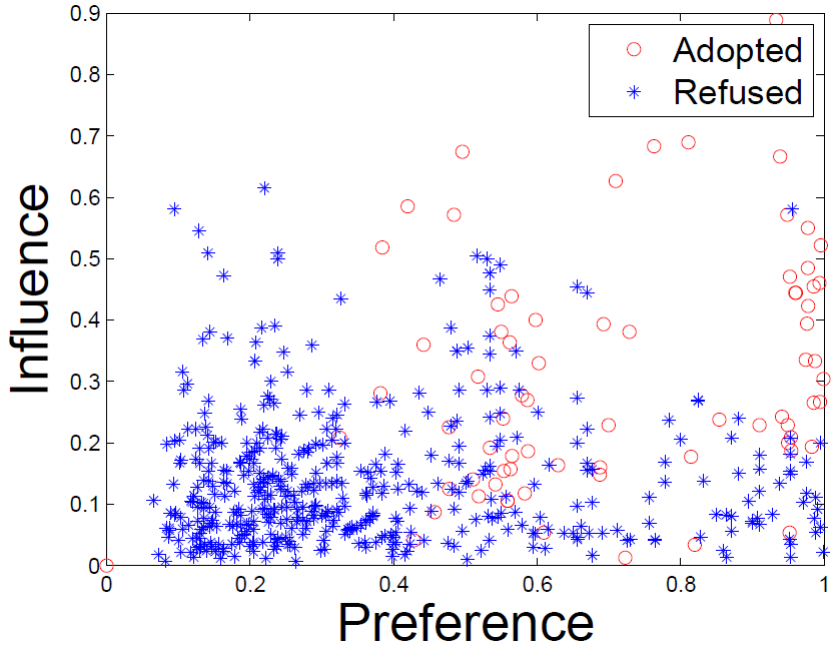
User behavior in social networks are highly dependent on social peers.

Context Related

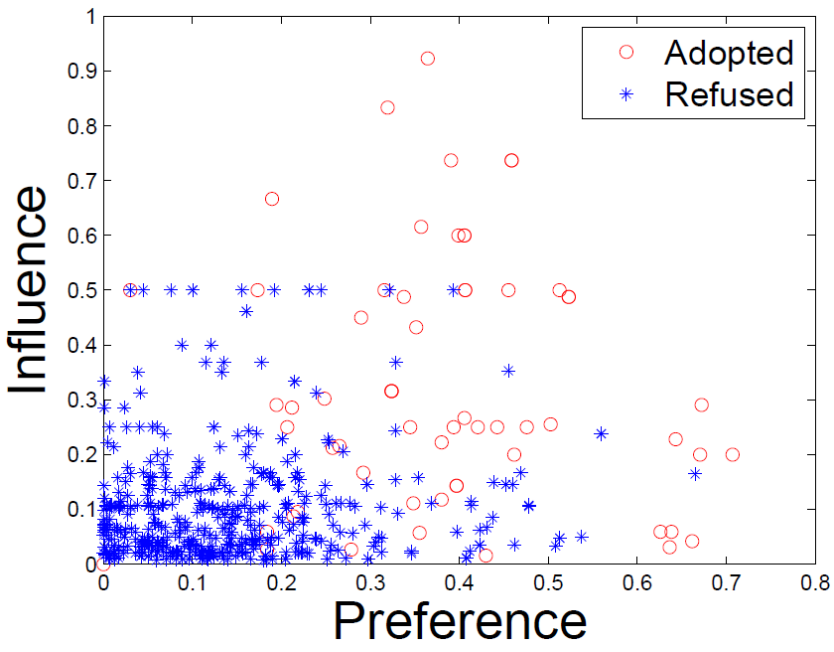
Rich context info in social networks. How to couple them with behavioral modeling?

Social Contextual Factors

- Individual Preference & Interpersonal Influence



China's Facebook:
Renren

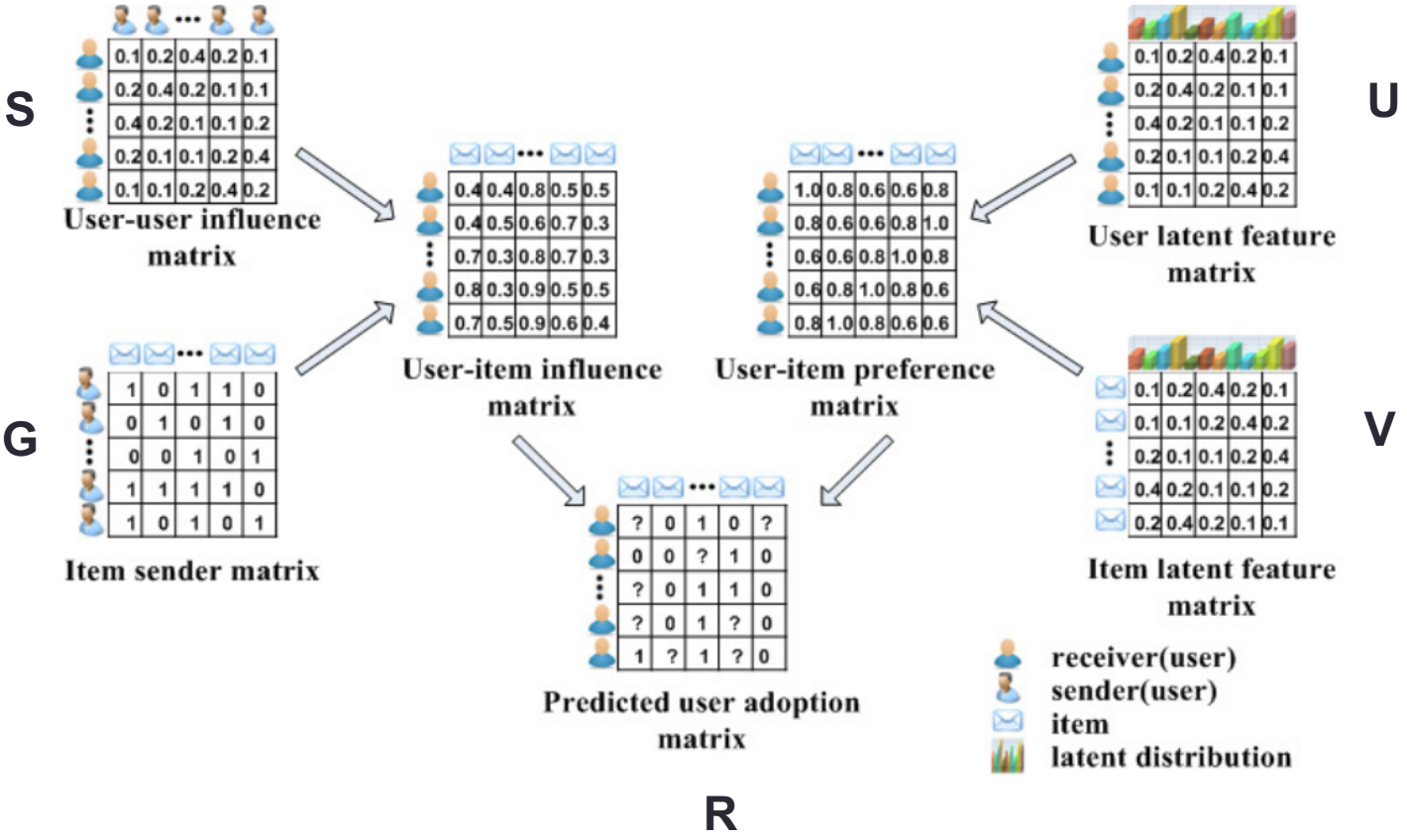


China's Twitter:
Tencent Weibo

Jiang et al. **Social Contextual Recommendation.** *CIKM*, 2012. **Social Recommendation with Contextual Information.** *TKDE,* 2014.

Social Contextual Recommendation

- ContextMF



Intention Related

REWARDS	# TICKETS GIVEN	CONSEQUENCES	# TICKETS TAKEN AWAY
Extra Math	+5	HITTING	-3
Getting along WELL with others	+3	BULLYING	-4
Good Table Manners	+4	TEASING	-1
LOVE & RESPECT	+5	LYING	-2
Obeying the FIRST TIME	+3	THROWING A FIT	-3
Calm & Quiet in STORE	+3	Ignoring Parents	-4
Extra Reading	+2	SCREAMING or YELLING	-1
CLEANING up after PLAYING	+2	BAD SPORT	-2

A nontrivial part of user behaviors are from profitable and social purposes.

Intention can account for the behaviors that cannot be well interpreted by content, social and context.

Suspicious Behavior Detection

Suspicious Behavior Detection: Current Trends and Future Directions. *Special Issue on Online Behavioral Analysis and Modeling, IEEE Intelligent Systems Magazine (ISSI)*, 2016.

Social Link Farming

- Selling Twitter followers

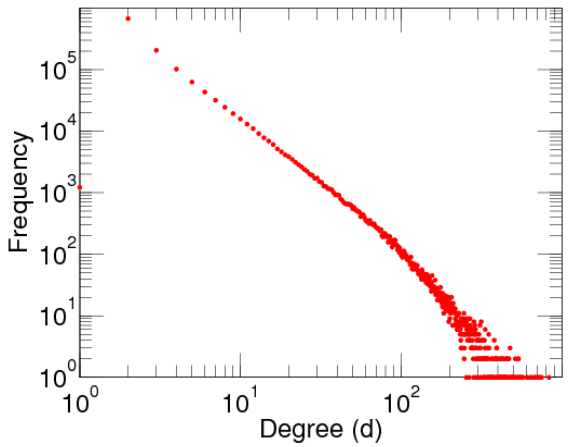
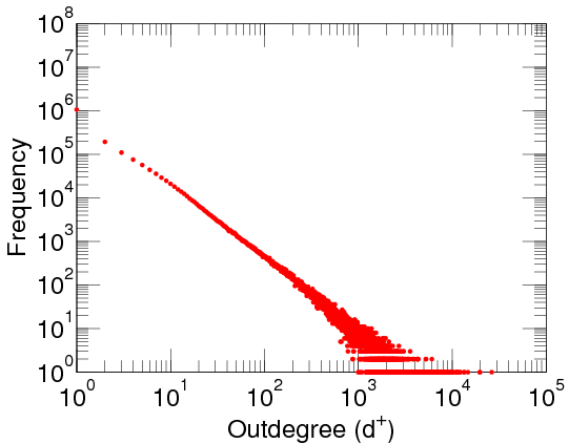
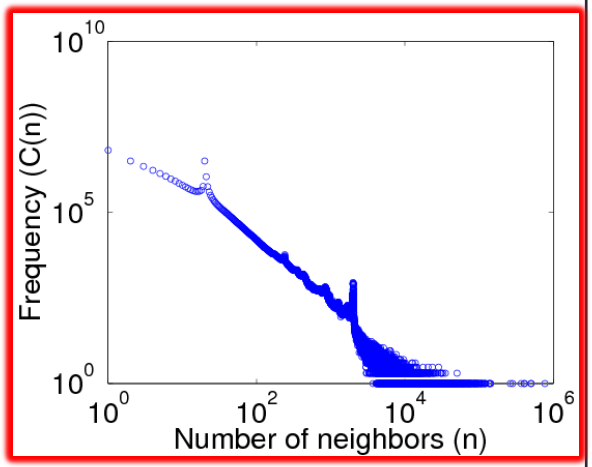
Social Link Farming

❖Selling Facebook Likes

25,000 Facebook Likes	50,000 Facebook Likes	100,000 Facebook Likes	200,000 Facebook Likes
$265	$525	$1,000	$1,750
Lifetime Replacement Warranty	Lifetime Replacement Warranty	Lifetime Replacement Warranty	Lifetime Replacement Warranty
Dedicated 24/7 Customer Service	Dedicated 24/7 Customer Service	Dedicated 24/7 Customer Service	Dedicated 24/7 Customer Service
100% Risk Free, Try Us Today	100% Risk Free, Try Us Today	100% Risk Free, Try Us Today	100% Risk Free, Try Us Today
Order starts within 24 - 48 hours	Order starts within 24 - 48 hours	Order starts within 24 -48 hours	Order starts within 24 -48 hours
Order completed within 22 days	Order completed within 35 days	Order completed within 35 days	Order completed within 35 days

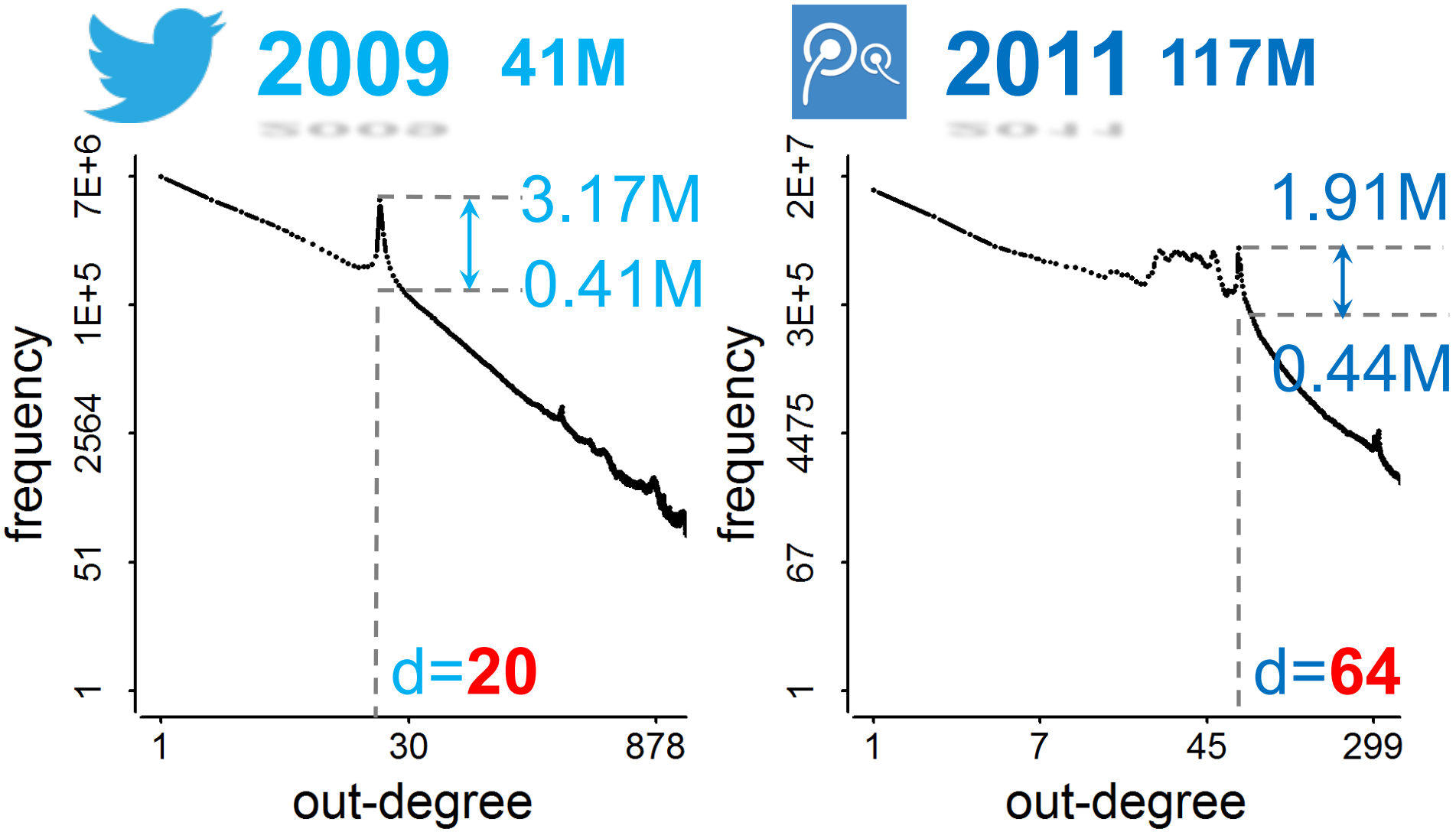
Power-Law Distribution

- Out-degree distribution

DBLP **Author**-publication	**Flickr** **User**-user	**Twitter** **Who**-follows-whom
		

[konect.uni-koblenz.de/networks/]

Jiang et al. **CatchSync: Catching Synchronized Behavior in Large Directed Graphs.** *KDD Best Paper Finalist*, 2014.

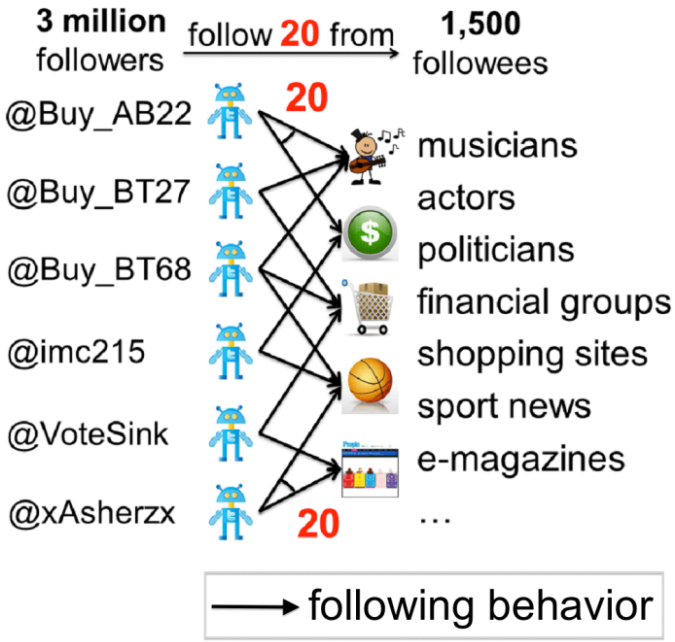


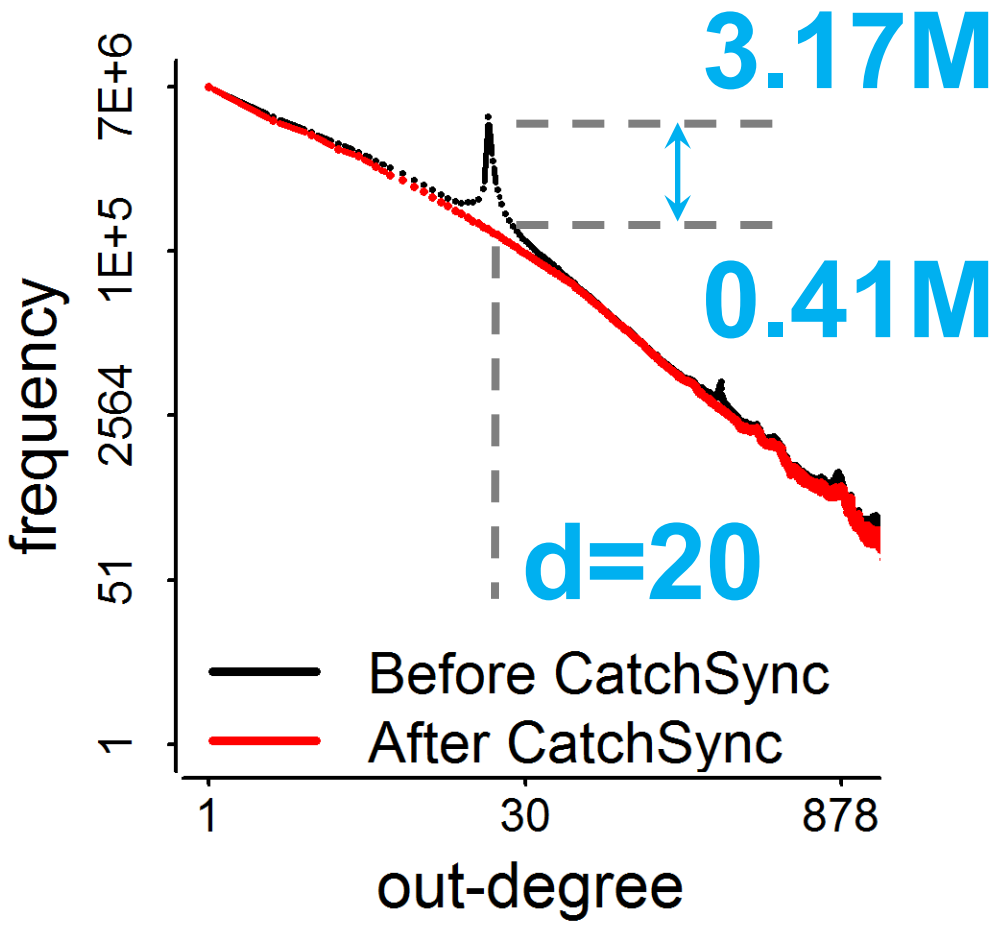
Jiang et al. **CatchSync: Catching Synchronized Behavior in Large Directed Graphs.** *KDD Best Paper Finalist*, 2014.

Catch from Twitter

2009

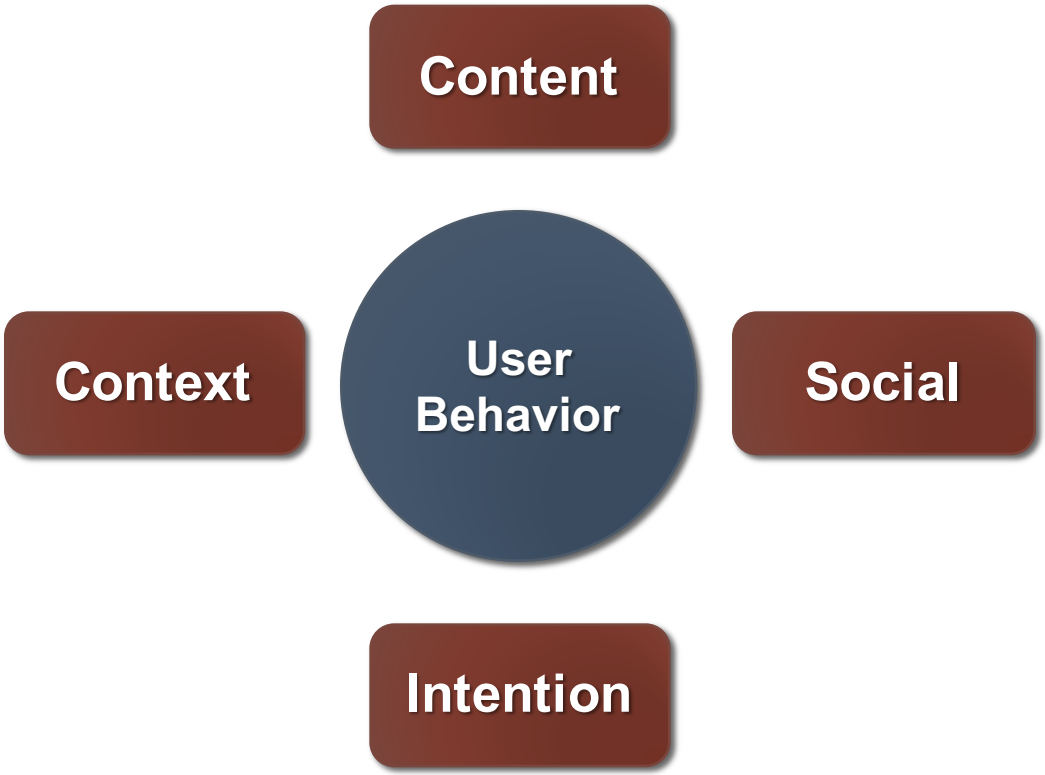
41M





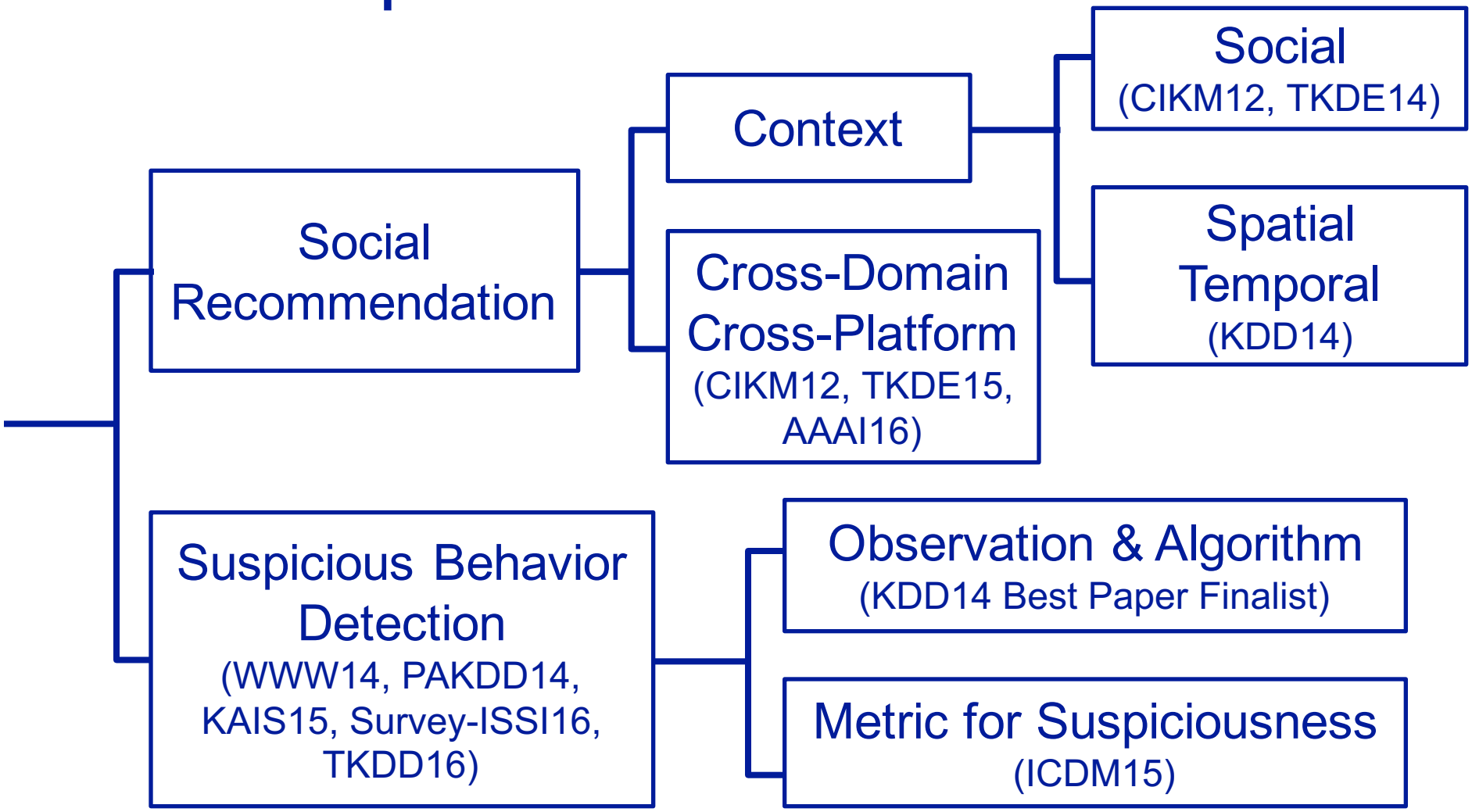
Jiang et al. **CatchSync: Catching Synchronized Behavior in Large Directed Graphs.** *KDD Best Paper Finalist*, 2014.

Behavioral Modeling



- Understand single factors
- Understand their couplings
- Unify them for behavior modeling and prediction

Roadmap


Social Recommendation
Context
Social
(CIKM12, TKDE14)
Spatial Temporal
(KDD14)
Cross-Domain Cross-Platform
(CIKM12, TKDE15, AAAI16)
Suspicious Behavior Detection
(WWW14, PAKDD14, KAIS15, Survey-ISSI16, TKDD16)
Observation & Algorithm
(KDD14 Best Paper Finalist)
Metric for Suspiciousness
(ICDM15)

THANK YOU!

Modeling Complex Behavior in Social Media

www.meng-jiang.com