

RealGraph: User Interaction Prediction at Twitter

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User Interactions at Twitter

 **Ellen DeGeneres** ✓
@TheEllenShow

⚙️ **Following**

← follow

If only Bradley's arm was longer. Best photo ever. #oscars

↩ Reply ↻ Retweet ★ Favorite ⋮ More

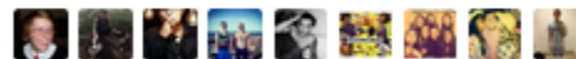
reply

retweet

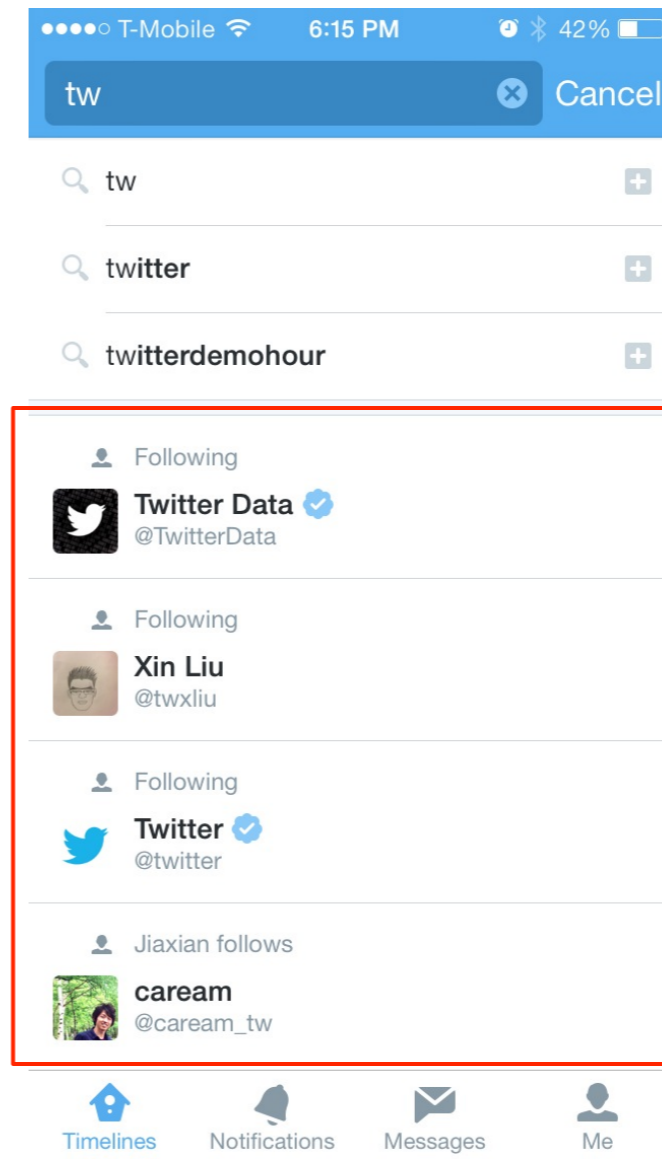
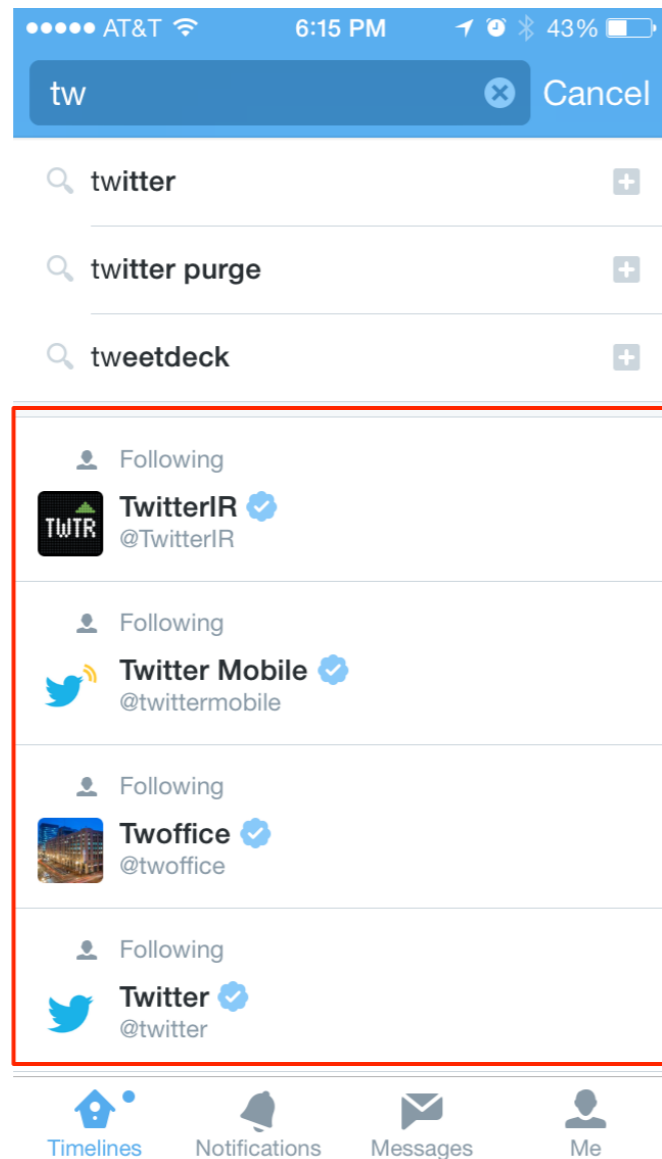
favorite



RETWEETS 3,401,876 FAVORITES 2,029,120

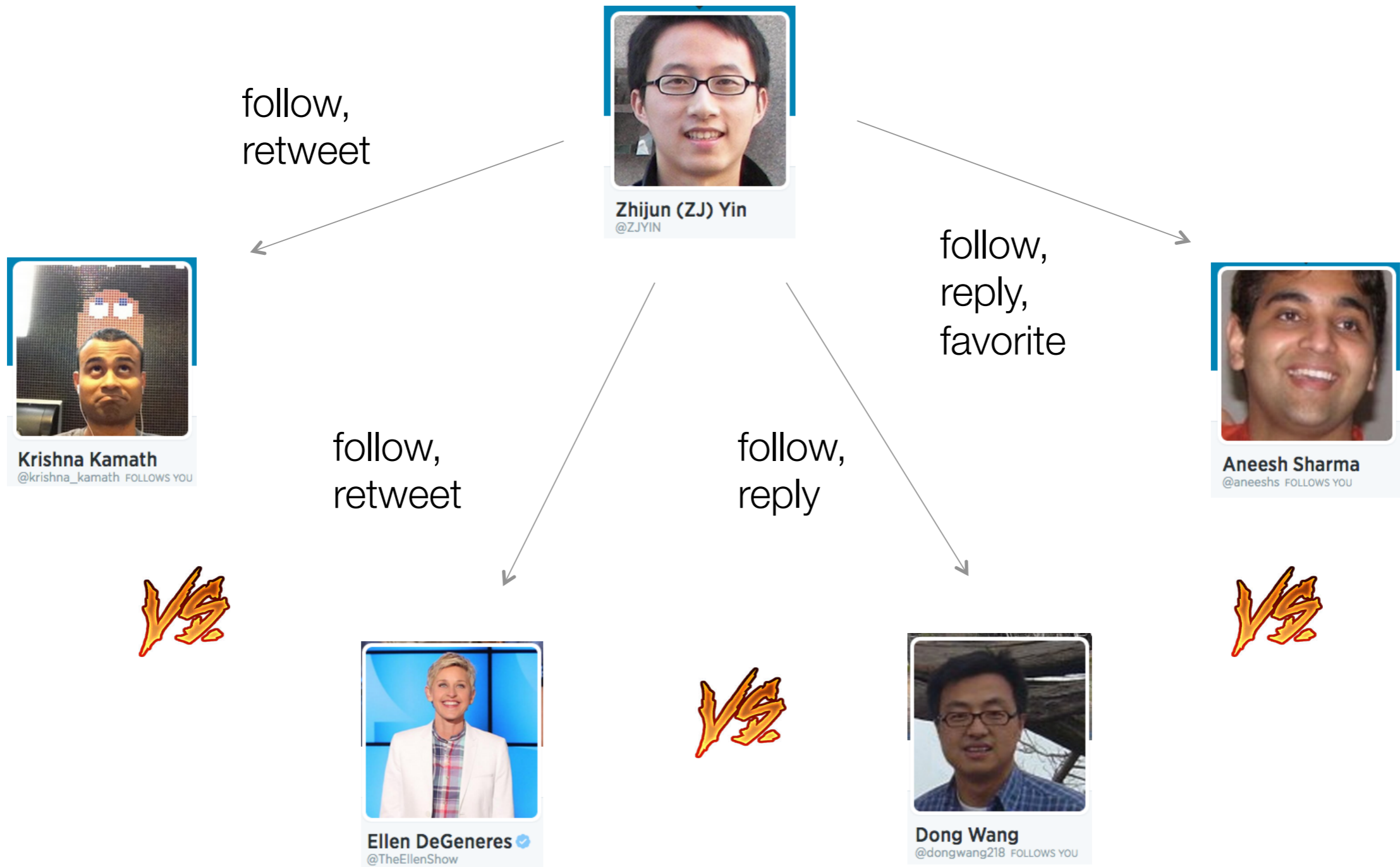


Directed Interaction Strength Estimation



TypeAhead Search





How to compare the directed interaction strength?

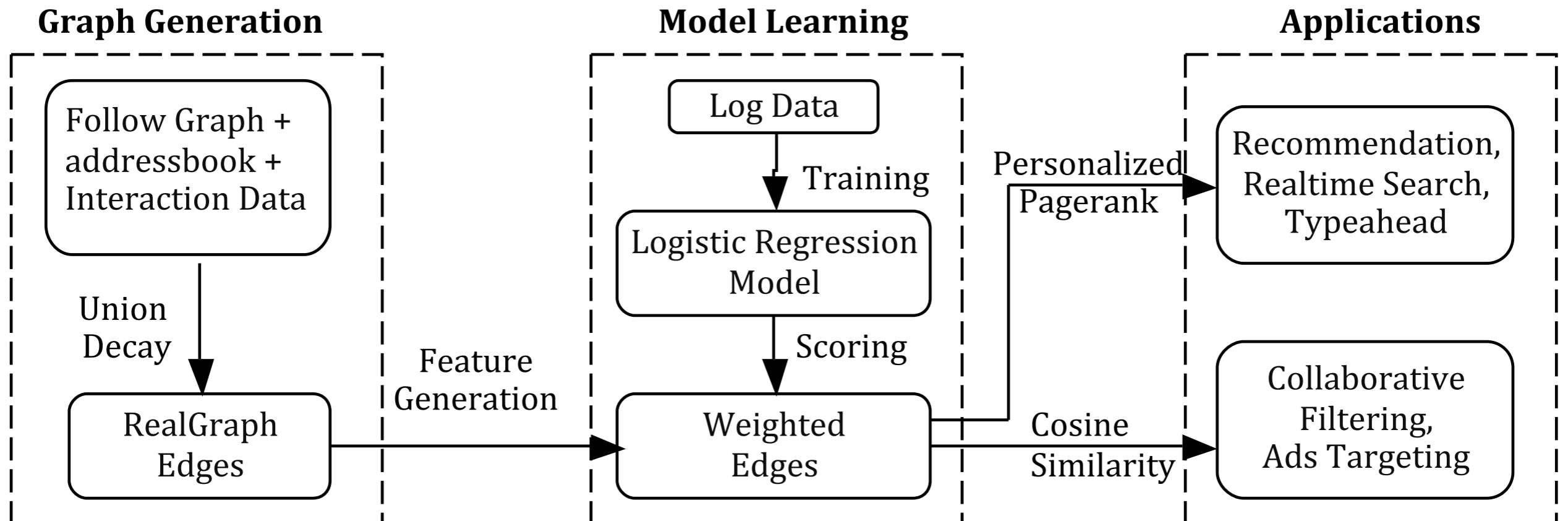


User Interaction Prediction

- Given a user pair (u, v) , PREDICT whether there is any interaction from u to v in the future.
- The probability of directed interaction is considered as the connection strength.



RealGraph Framework



Real Graph Edge based Features

- Follow types
- Interaction types
- Interaction diversity
- Graph closeness: # common neighbors in the graph
- Topic based similarity



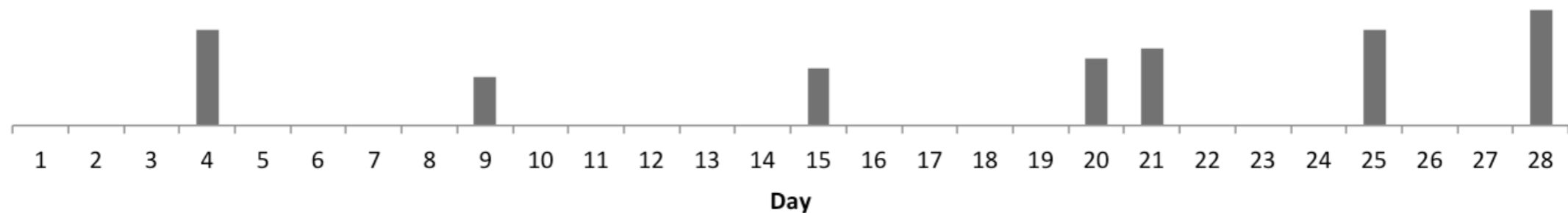
Interaction based Features

- Visible Interactions
 - A replies/retweets/favorites B's tweet
 - A mentions B
 - A messages B
- Implicit interactions
 - A clicks on B's tweet
 - A visits B's profile page



Interaction based Features

- Non-zero days: the number of days when such an interaction happens
- Mean and variance: the mean and variance of interaction counts (computed over non-zero interaction days)
- Decayed count: a daily exponentially-decayed interaction count (EWMA)



Real Graph User based Features

- Country / Language
- User activity
 - # tweets, #retweets, # favorites
 - # follows, # followers
- User reputation
 - PageRank on the follow graph

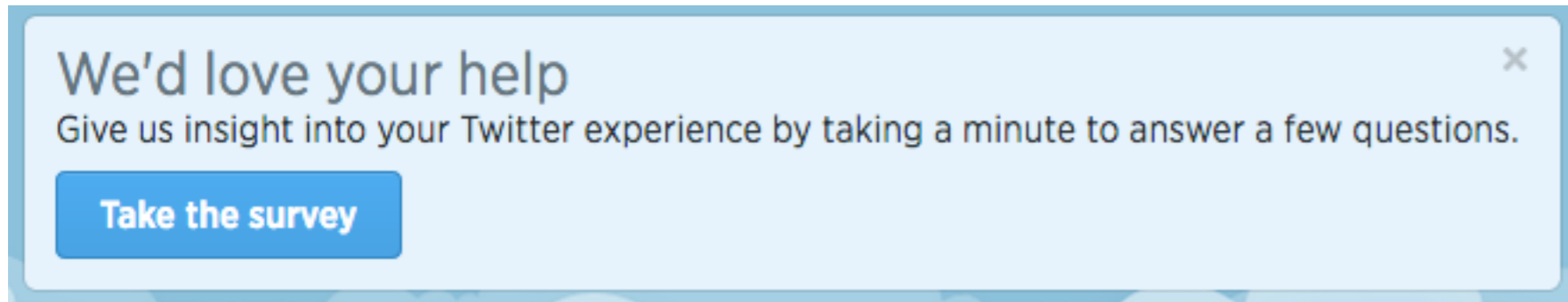


Performance of Feature Groups

Feature group	AUC
Historical interaction ewma/mean	0.830
Historical interaction non_zero_days	0.849
Historical interaction diversity	0.849
User reputation	0.852
Graph closeness	0.853
Topic similarity	0.854
User activity	0.876
User country	0.877
Address book	0.877



User Survey



14 days
10,982 responses

Below are ten people you follow. Please tell us how many Tweets from each person you find interesting.

@ZJYIN

- All or almost all of the Tweets
- Some of the Tweets
- A few or none of the Tweets

40% "All or almost all of the Tweets"

42% "Some of the Tweets"

18% "A few or none of the Tweets"



Applications

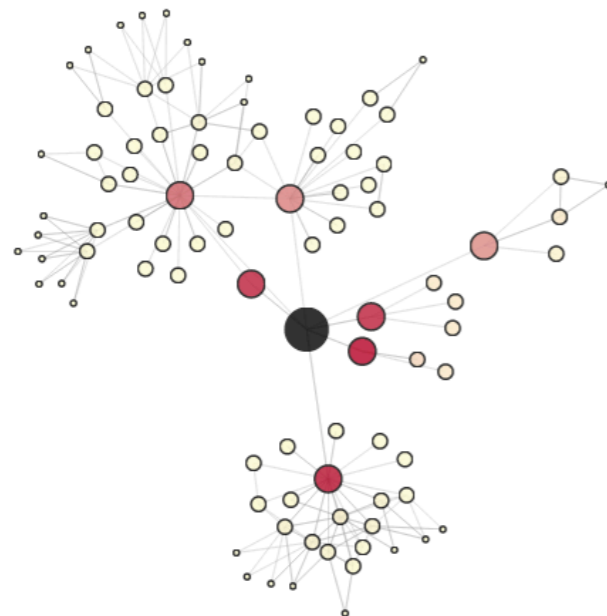
Who to follow
Twitter accounts suggested for you based on who you follow and more.

Search using a person's full name or @username Search Twitter

Shai Haim @shai
Software engineer at @twitter. Computer Science PhD. Being reindoctrinated by a baby girl. Interested in strategic grill locations.
Followed by Kostas Tsioutsoulis, Yue Zhou and Forrest H Bennett.

erik eldrige @erikeidridge
Nature lover, app developer. Like a kid in a candy factory @twitter
Followed by Ram Ravichandran, Jeremy Gordon and Babak Hamadani.

Swapnil Jain @swapnil
IIT Delhi Alum | Techie | Foodie | Veggie | Growth Engineer @Twitter
Followed by Ram Ravichandran, Yue Zhou and Jimmy Chen.



Who To Follow

Profile

Twitter Mobile
@twittermobile

431 TWEETS 26 FOLLOWING 3M FOLLOWERS

Following

You might also want to follow

Twitter Engineering @TwitterEng

Twitter Design @design

Timelines Notifications Messages Me

User Similarity

Discover

David Aron Levine @davealevine 4h
Twitter is speeding up.
pewresearch.org/fact-tank/2014...
#Ferguson

Number of posts on Twitter related to each event

Event	Approximate Post Count
Day of Shooting	146,183
5 days after	34,778
Obama comments on Ferguson	3,648,932
Trayvon Martin	1,193,218
911 tapes released	32,518
Obama says "If I had a son, he'd look like Trayvon."	394,202
Demonstration call for arrest of George Zimmerman	692,456
Zimmerman	306,790

Bill Gates @BillGates 12h
I was blown away by this teacher: b-gat.es/1BzL7at

Timelines Notifications Messages Me

Discover



Thank you!
Q & A

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