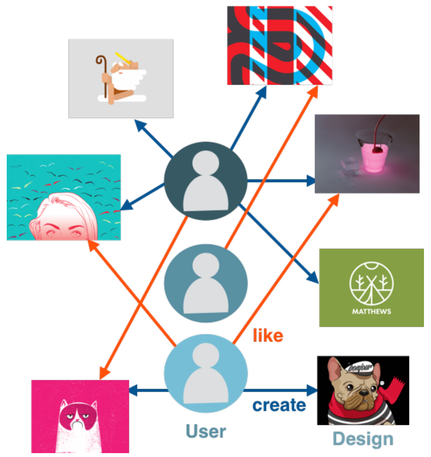
Ranking Designs and Users in Online Social Networks

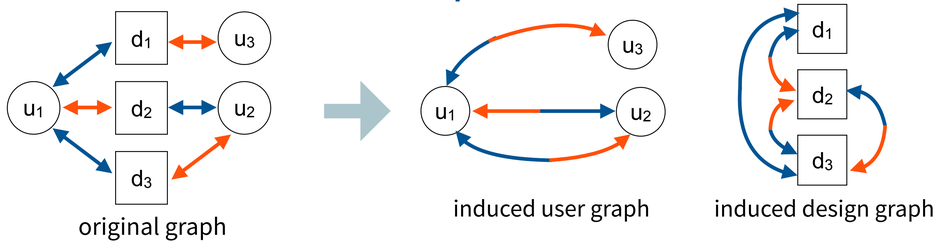
Biplab Deka — deka2@illinois.edu
Haizi Yu — haiziyu7@illinois.edu
Devin Ho — devinho2@illinois.edu
Zifeng Huang — zhuang45@illinois.edu
Jerry O. Talton — jerry@apropose.com
Ranjitha Kumar — ranjitha@illinois.edu

Can we use the network structure of online design communities to measure the relative importance of designs and users?



MODEL AND ALGORITHM

Induced Graphs



Matrix Representation

L : liking matrix
C : creation matrix
r_u : user ranking vector
r_d : design ranking vector

Iterative Algorithm

$$U = DiagZero(\alpha_1 C diag(r_d) C^\top + \alpha_2 C diag(r_d) C^\top + \alpha_3 C diag(r_d) C^\top + \alpha_4 C diag(r_d) C^\top)$$

$$r_u = PageRank(U) \qquad r_d = PageRank(D)$$

$$D = DiagZero(\beta_1 C^\top diag(r_u) C + \beta_2 C^\top diag(r_u) L + \beta_3 L^\top diag(r_u) C + \beta_4 L^\top diag(r_u) L)$$

MOTIVATION

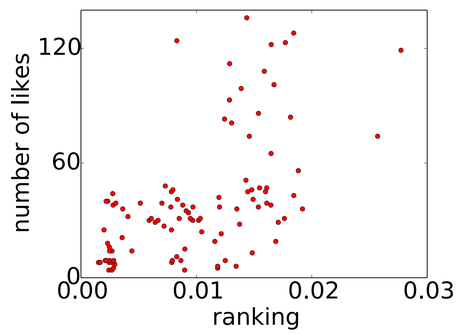
On the Web …
Not all links are equal

In design networks …
Not all likes are equal

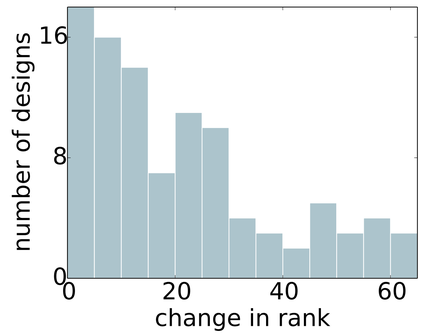
The importance of a design is influenced by the importance of its creators and promoters, and vice versa

EXPERIMENTAL RESULTS

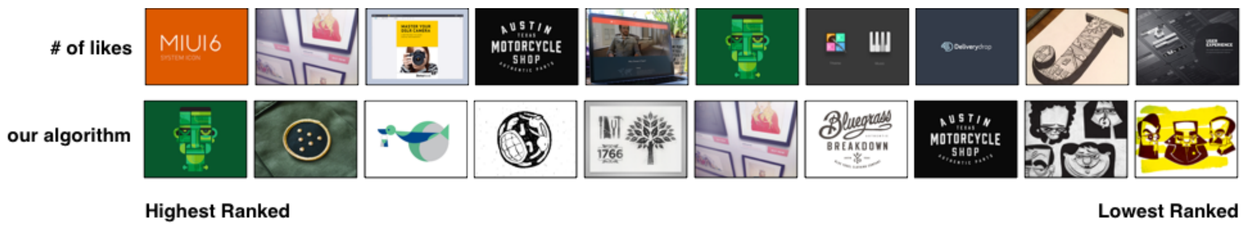
Crawled
100 designs
from
68 creators
with
1009 likes
and
2524 promoters



The number of likes and ranks are *positively correlated*



Significant *shifts* in the rank of individual designs



FUTURE WORK

Extend model to account for additional social networks features

Learn model parameters from data

Prove convergence

Identify correlations between rank and design properties

Develop mechanisms to identify and reward different types of users