



## Predicting Anchor Links between Heterogeneous Social Networks

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#### **Emergence of New Social Networks**



#### New networks try to invite users of older ones



#### New networks try to invite users of older ones



#### Networks connect to each other



#### He used Pinterest to dive deep

Welcome to Pinterest, the world's catalog of ideas

Continue with Facebook

Email

Create a password

#### Sign up

Creating an account means you're okay with Pinterest's Terms of Service, Privacy Policy



<sup>as</sup> 15

seconds to sign up (free!)



Log in

#### Networks connect to each other



Continue with Facebook

### Some information is shared between networks



### Networks can use information from each other



#### **Problem: Anchor Link Prediction**



#### **Problem: Anchor Link Prediction**





#### Why do users join a new network?

Attra 6et satisfaction from source net Number of friends in the target network Intimacy between friends Social Factors in the target network

#### Meta-Path-Based Approach



#### Number of friends in the target network

\*instances of this meta-path = \*friends in the target network





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#### **Connector Meta-Paths**



#### How to model similarity?

Similarity meta-paths







#### Intimacy between friends in the target network





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#### **Recursive Meta-Paths**



#### Classification



#### Dataset

- **•** Twitter as source network:
  - · Containing about 5k users with a total of 8m tweets
- **•** Foursquare as target network:
  - · Containing about 3.5k users with a total of 18k tips
- Common users:
  - · About 3k shared users



- Ground truth:
  - Positive Samples: Common users who joined twitter before foursquare
  - Negative Samples: Non-anchor users

#### **Experiment Settings**

- Comparison methods:
  - CICF: consistent incidence co-factorization
  - CMP. connector meta-paths only
  - RMP. recursive meta-paths only
  - CRMP. both connector and recursive meta-paths

- Experiment setup:
  - 1936 positive samples
  - 1941 negative samples
  - 5-fold cross-validation with linear SVM

#### **Experiment Results**

# Effect of heterogeneous information

Homogeneous Heterogeneous

Homogeneous Heterogeneous



CICF

Accuracy





AVC





No-SE

Accuracy

No-SE



Al

#### Conclusion

- D Problem:
  - · Anchor link prediction
  - · Different from conventional link prediction
- Method:
  - A meta-path-based approach
  - · Connector and Recursive meta-paths model different

aspects of social factors

- Future Works:
  - To model personal factors as well
  - To predict the time of link creation

#### **Thank You!**

Any Questions?

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