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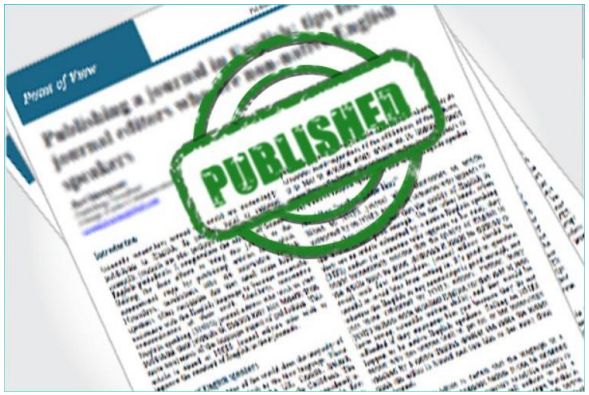
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Network Tour of Data Science
EE-558

Term Project:
Twitter for publication success? A computational investigation

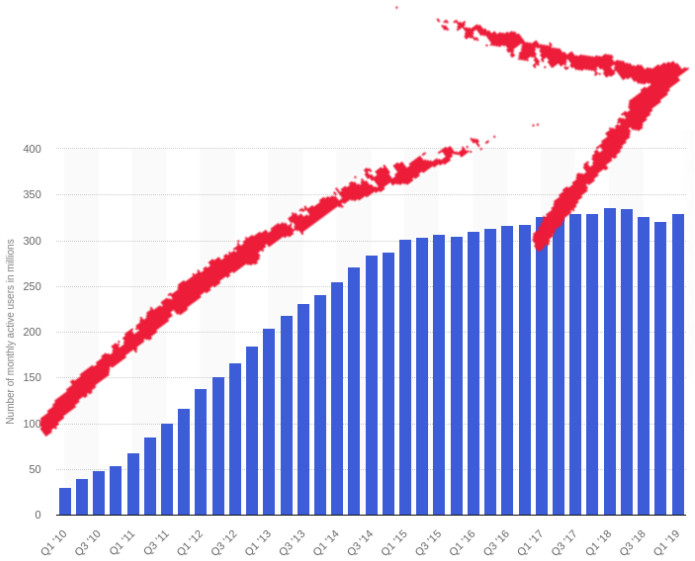
Introduction



Introduction

Introduction

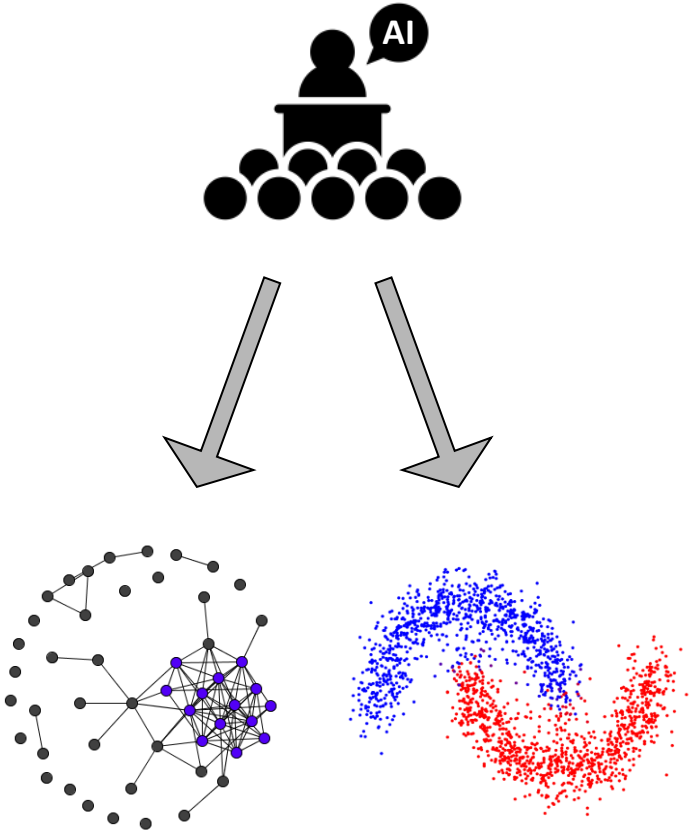
- Is it a general trend



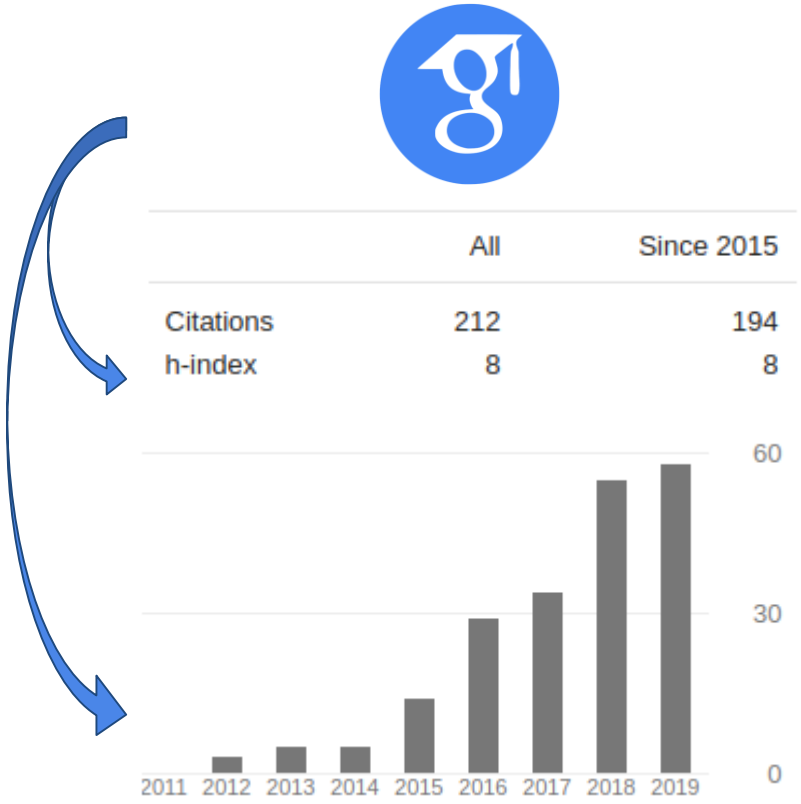
- Is it a useful strategy

Introduction

- PART I

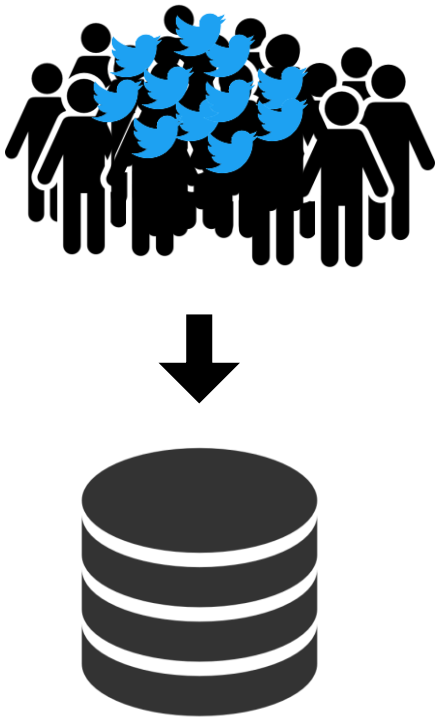


- PART II



I – Basic analysis of Twitter dataset

8605 researchers



17 Features:

# of tweets
# of followers
# of friends
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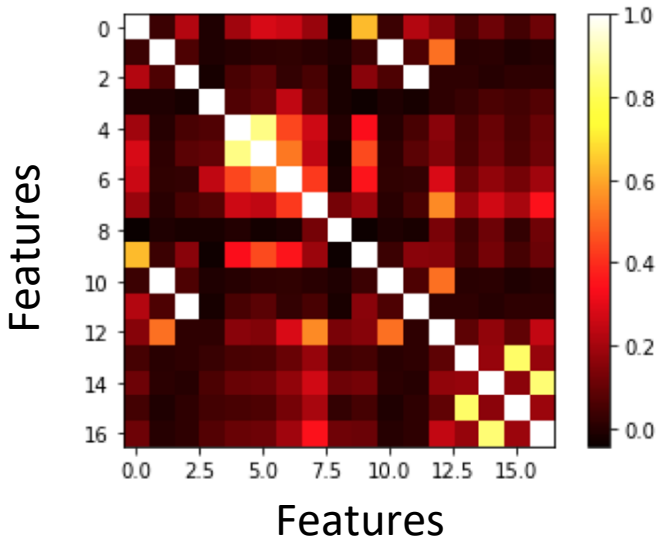
.
.
% of male-female researcher
% of phd-prof researcher
.
.
.

(Hadgu & Jäschke, 2014)

I – Basic analysis of Twitter dataset

Correlation of features

Correlation matrix



Strong correlation:
#hashtags and #conf_hashtags

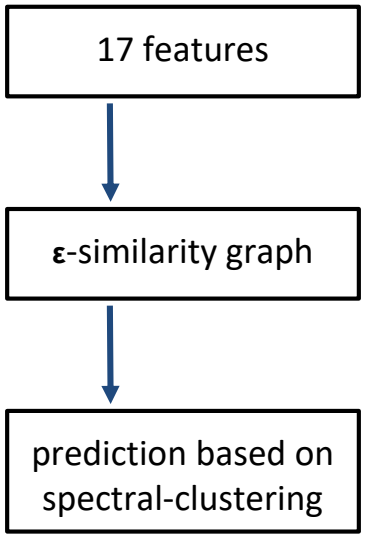
No correlation:
#publications and #followers
→ confounds: e.g., age?

Options:
a) different method?
b) different data?

I – Basic analysis of Twitter dataset

Spectral-clustering prediction

Approach:



Prediction results:

PhD vs. **Prof** ?

	precision	recall
PhD (N=911)	0.75	0.68
Prof (N=570)	0.56	0.64

✓

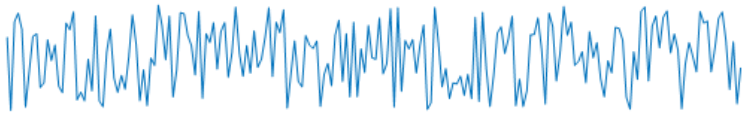
Male vs. **Female** ?

	precision	recall
Male (N=4147)	0.83	0.72
Female (N=953)	0.22	0.35

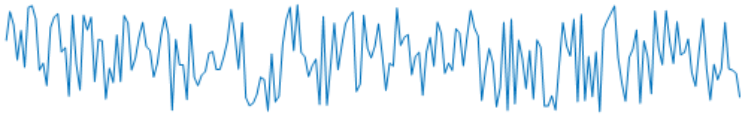
✗

→ Academic position can be predicted (above chance) from Twitter data

II – Twitter and Scholar time-series



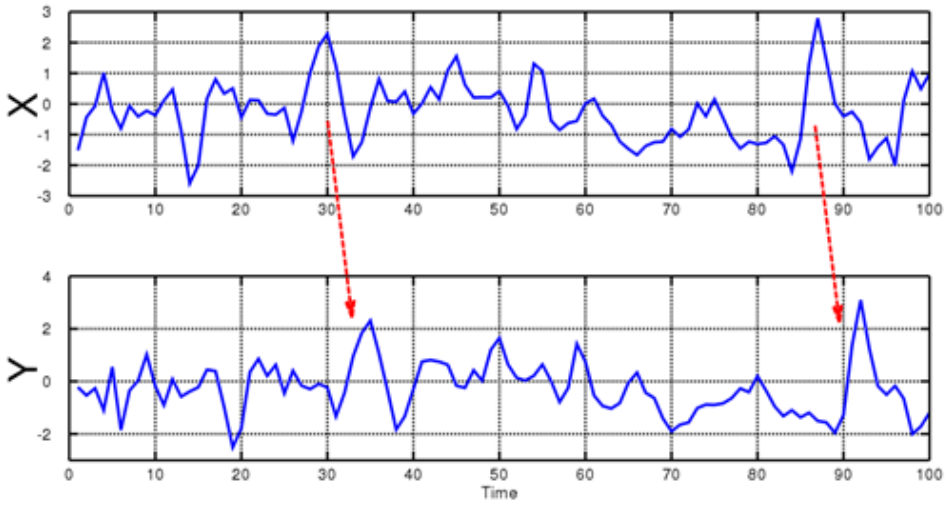
Twitter activities

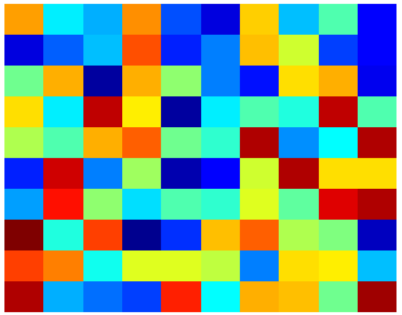


Citations numbers

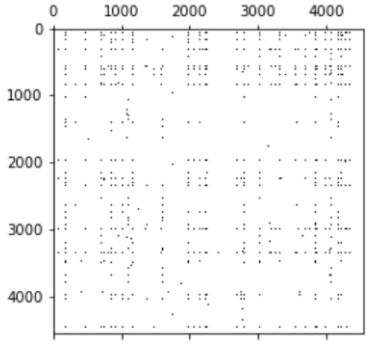
Granger causality

Granger causality





Graph properties



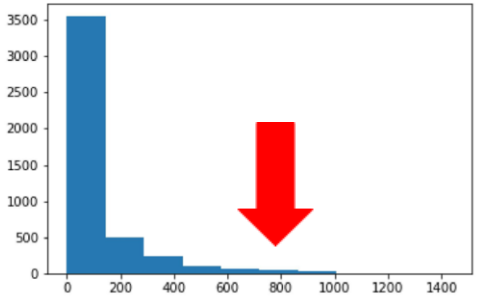
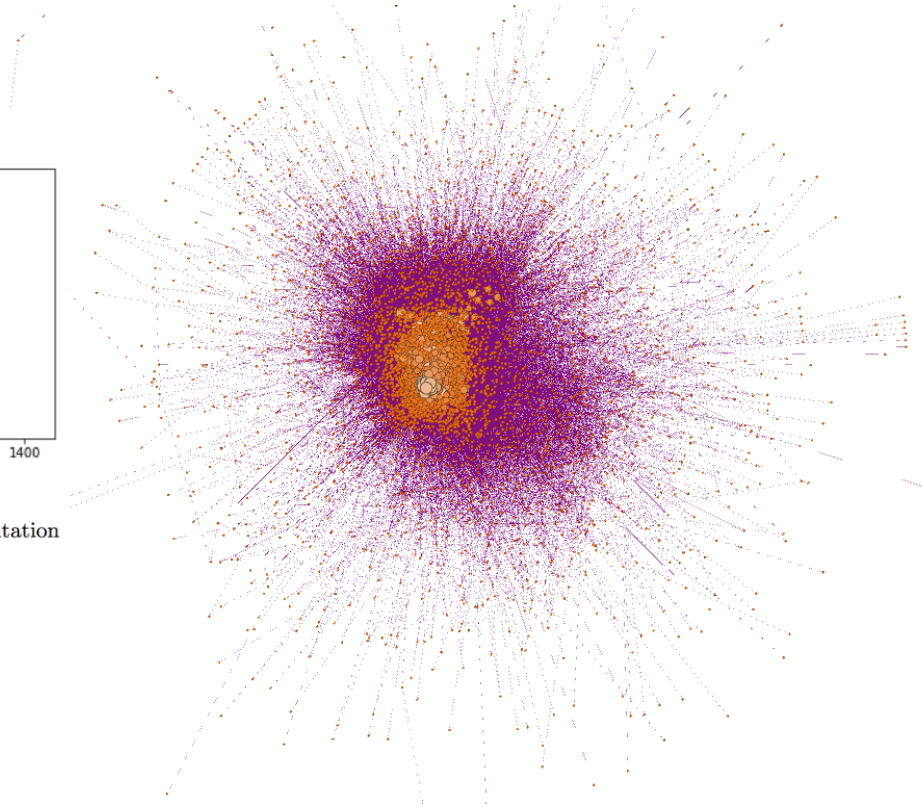


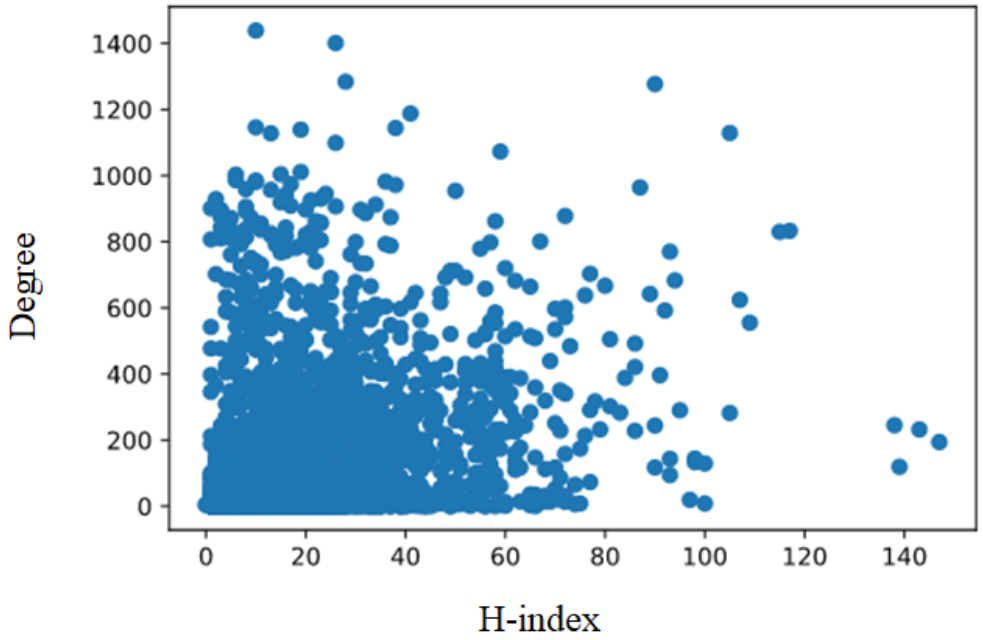
Figure 2: Left: Granger causality matrix from Twitter activity time-series to Google Scholar citation time-series Right: Degree distribution of the Twitter activity matrix



Number of connected components: 463
Average clustering coefficient: 0.155

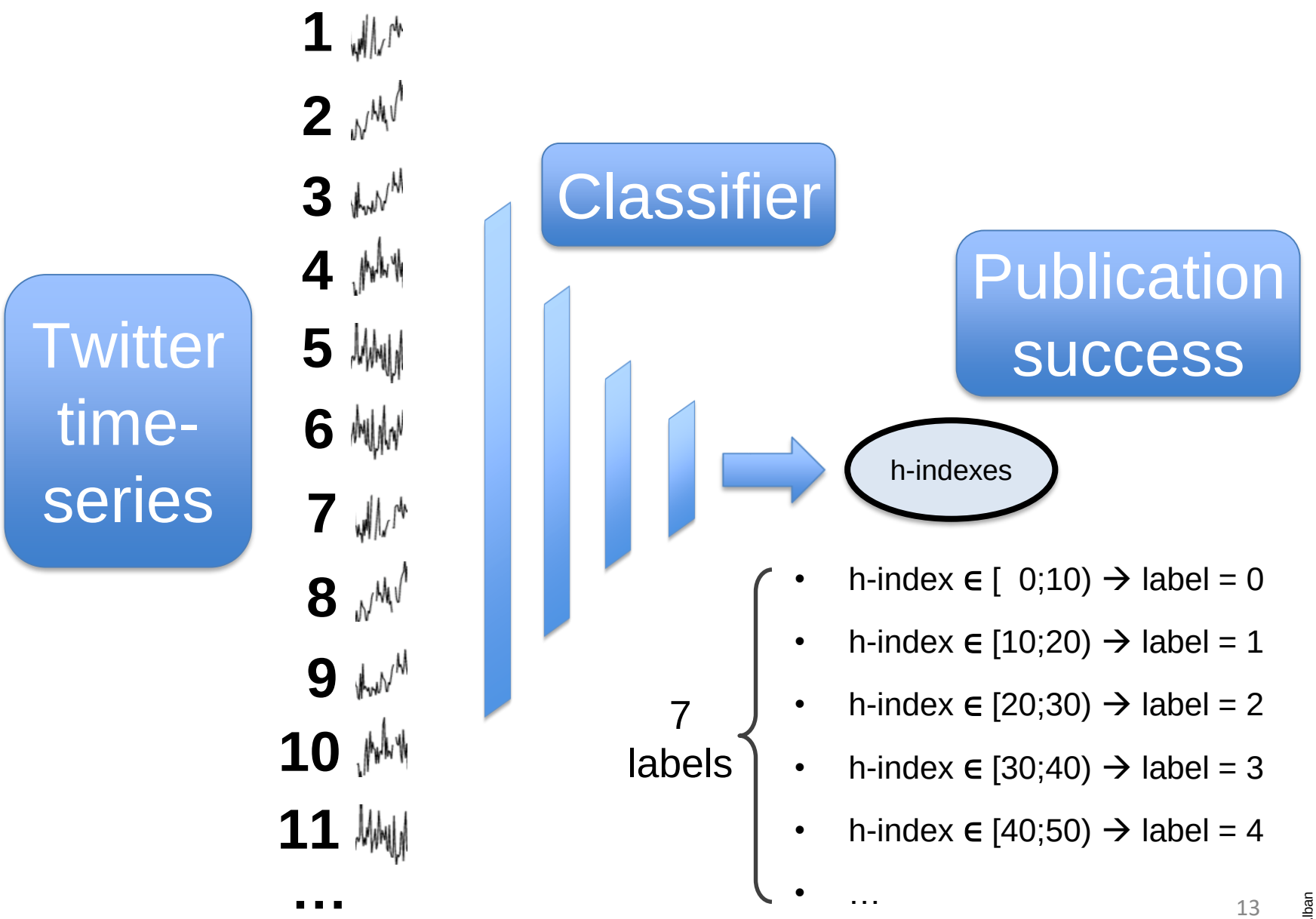
Wei

Correlation between H-index and degree of nodes



Correlation coefficient: 0.32
P-value: p<0.001

Probing Twitter time-series predictive power



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Feature enhancement with graph filtering

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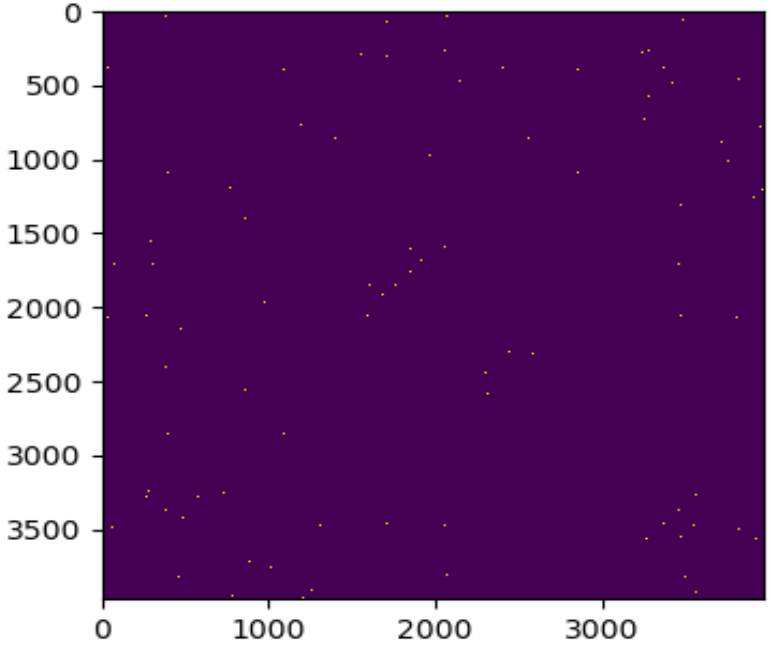

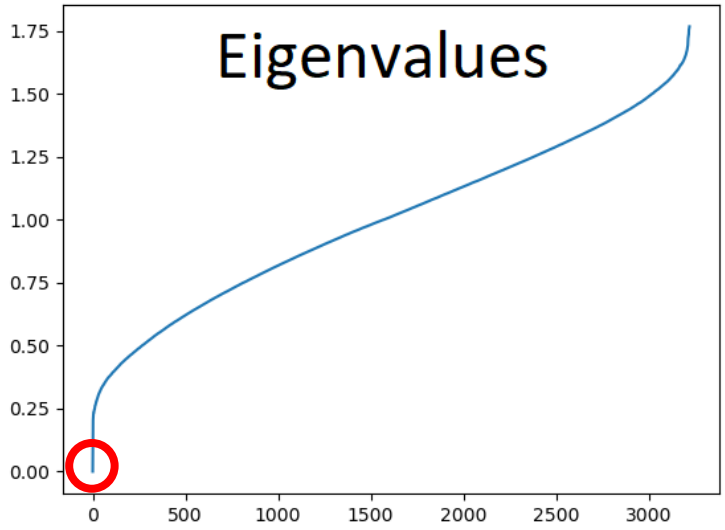

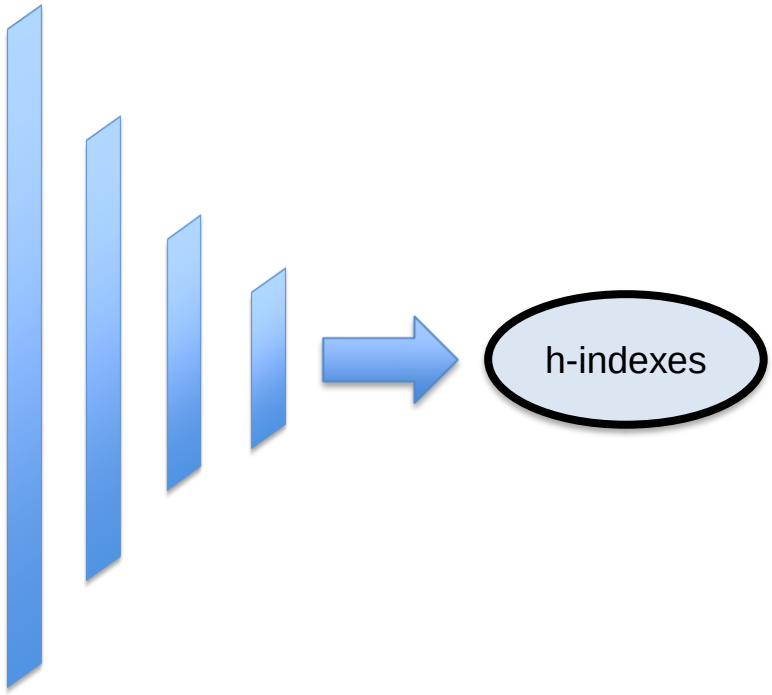

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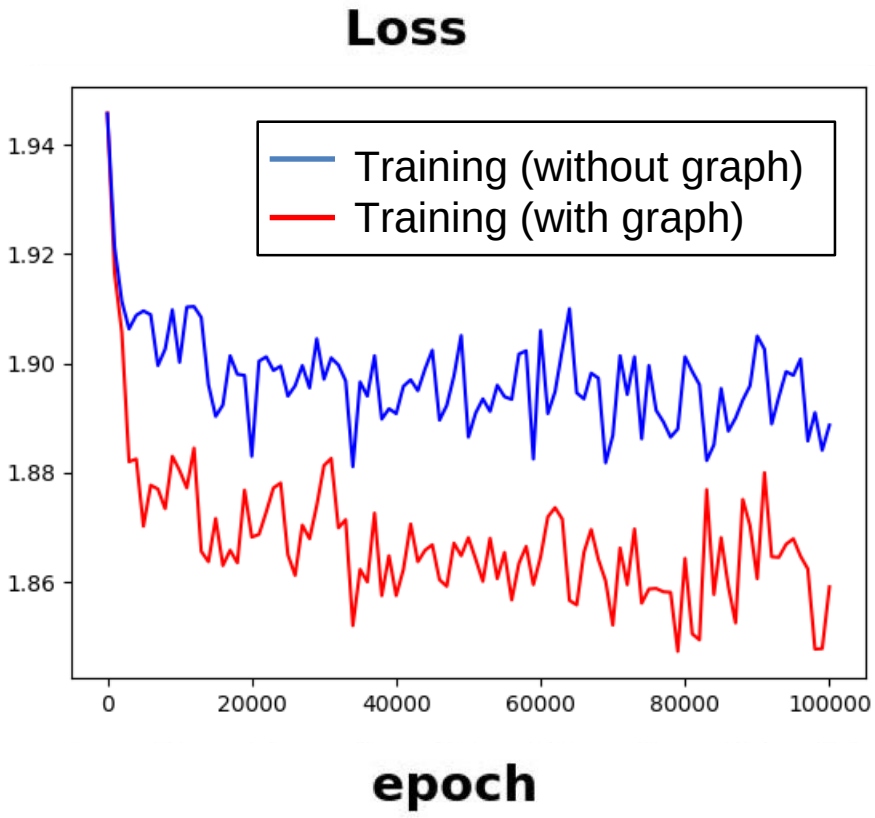
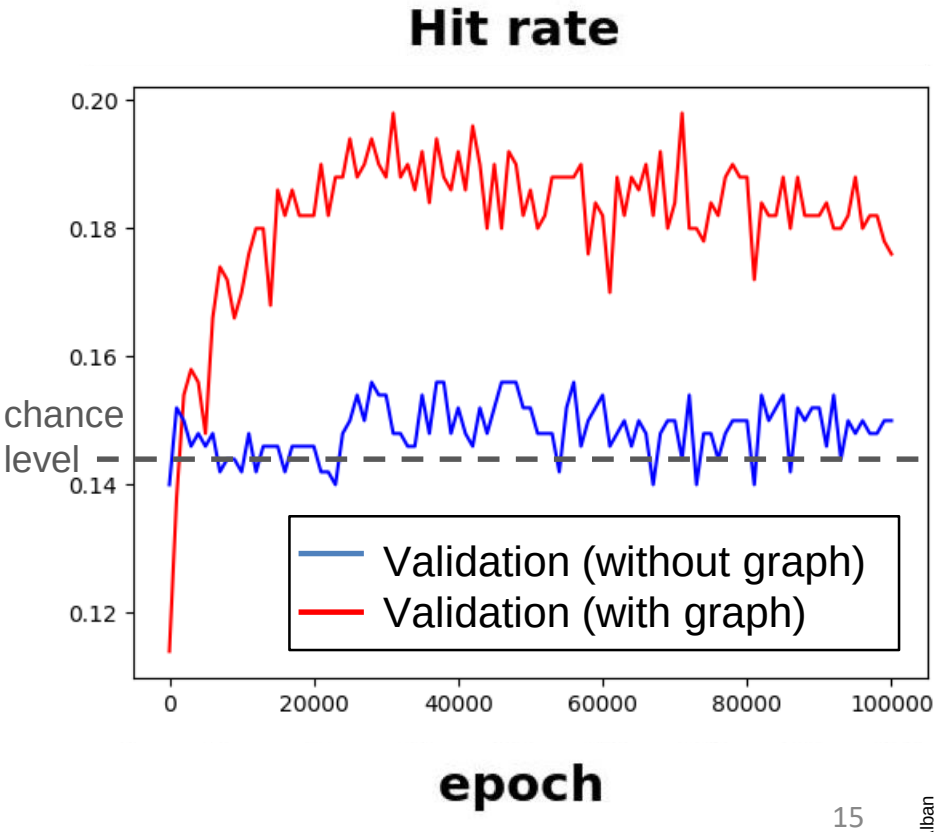
Results

- Twitter time-series are not able to predict publication success on their own, better than chance level.
- Graph filtering allows Twitter time-series to “unleash” their (small) predictive power.





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Conclusion/Discussion

1. Twitter features have predictive power for identifying academic status.
2. Node-degrees in the Granger causality matrix from Twitter to publication time-series is correlated to publication success.
3. Pure Twitter time-series can predict publication success only if they are framed, using graph filtering, in the network they live in.


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