

Package ‘seismic’

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Type Package

Title Predict Information Cascade by Self-Exciting Point Process

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Description

An implementation of self-exciting point process model for information cascades, which occurs when many people engage in the same acts after observing the actions of others (e.g. post resharings on Facebook or Twitter). It provides functions to estimate the infectiousness of an information cascade and predict its popularity given the observed history. See <<http://snap.stanford.edu/seismic/>> for more information and datasets.

URL <http://snap.stanford.edu/seismic/>

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get.infectiousness *Estimate the infectiousness of an information cascade*

Description

Estimate the infectiousness of an information cascade

Usage

```
get.infectiousness(
  share.time,
  degree,
  p.time,
  max.window = 2 * 60 * 60,
  min.window = 300,
  min.count = 5
)
```

Arguments

share.time	observed resharing times, sorted, share.time[1]=0
degree	observed node degrees
p.time	equally spaced vector of time to estimate the infectiousness, p.time[1]=0
max.window	maximum span of the locally weight kernel
min.window	minimum span of the locally weight kernel
min.count	the minimum number of resharings included in the window

Details

Use a triangular kernel with shape changing over time. At time p.time, use a triangular kernel with slope = min(max(1/(p.time/2), 1/min.window), max.window).

Value

a list of three vectors:

- infectiousness. the estimated infectiousness
- p.up. the upper 95 percent approximate confidence interval
- p.low. the lower 95 percent approximate confidence interval

Examples

```
data(tweet)
pred.time <- seq(0, 6 * 60 * 60, by = 60)
infectiousness <- get.infectiousness(tweet[, 1], tweet[, 2], pred.time)
plot(pred.time, infectiousness$infectiousness)
```

pred.cascade	<i>Predict the popularity of information cascade</i>
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Description

Predict the popularity of information cascade

Usage

```
pred.cascade(  
  p.time,  
  infectiousness,  
  share.time,  
  degree,  
  n.star = 100,  
  features.return = FALSE  
)
```

Arguments

p.time	equally spaced vector of time to estimate the infectiousness, p.time[1]=0
infectiousness	a vector of estimated infectiousness, returned by get.infectiousness
share.time	observed resharing times, sorted, share.time[1]=0
degree	observed node degrees
n.star	the average node degree in the social network
features.return	if TRUE, returns a matrix of features to be used to further calibrate the prediction

Value

a vector of predicted popularity at each time in p.time.

Examples

```
data(tweet)  
pred.time <- seq(0, 6 * 60 * 60, by = 60)  
infectiousness <- get.infectiousness(tweet[, 1], tweet[, 2], pred.time)  
pred <- pred.cascade(pred.time, infectiousness$infectiousness, tweet[, 1], tweet[, 2], n.star = 100)  
plot(pred.time, pred)
```

seismic

Predicting information cascade by self-exciting point process model

Description

This package implements a self-exciting point process model for information cascades. An information cascade occurs when many people engage in the same acts after observing the actions of others. Typical examples are post/photo resharings on Facebook and retweets on Twitter. The package provides functions to estimate the infectiousness of an information cascade and predict its popularity given the observed history. For more information, see <http://snap.stanford.edu/seismic/>.

References

SEISMIC: A Self-Exciting Point Process Model for Predicting Tweet Popularity by Q. Zhao, M. Erdogdu, H. He, A. Rajaraman, J. Leskovec, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2015.

tweet

An example information cascade

Description

A dataset containing all the (relative) resharing time and node degree of a tweet. The original Twitter ID is 127001313513967616.

Format

A data frame with 15563 rows and 2 columns

Details

- `relative_time_second`. resharing time in seconds
- `number_of_followers`. number of followers

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