Empirical Analysis of Online Social Networks

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## Dataset Overview

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Users</th>
<th>Pages (Objects)</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fengniao (forum)</td>
<td>10,000</td>
<td>80,148</td>
<td>322,399</td>
</tr>
</tbody>
</table>
Degree Distribution (User)

Follows the power law distribution
Degree Distribution (Object)

Follows the power law distribution
Collaborative Similarity

The collaborative similarity[1] of a user is defined as the average similarity among the user’s selected objects. It indicates how a user’s interests are concentrated or dispersed.

The collaborative similarity[1] of an object is defined as the average similarity among the users who select the object. It indicates how similar the users who select the same object are.

When we combine the above measurement with degree, we are going to find some interesting human behavioral patterns which we will see soon.
Collaborative Similarity (User)

Fresh (small degree) users tend to have more concentrated interests.[1]
Collaborative Similarity (Object)

Users who select the same unpopular (small degree) object would be more similar than those who select the same popular (large degree) object. [1]
Nearest Neighbors’ Degree

The nearest neighbors’ degree for a user is defined as the average degree of all the objects connected to the user.

The nearest neighbors’ degree for an object is defined as the average degree of all the users who select the object.
Nearest Neighbors’ Degree (User)

Fresh (small degree) users tend to select popular (large degree) objects. [1]
Nearest Neighbors’ Degree (Object)

Unpopular (small degree) objects are more likely be selected by active (large degree) users.[1]
How users’ interests evolve over time?

How to measure users’ interests?
we measure it via average similarity among objects collected by the user which is exactly the collaborative similarity we mentioned above.

How to measure users’ basic interests?
Via average similarity among all the objects collected by the user.

How to measure users’ temporal interests?
Via average similarity among the objects collected in a specific time difference by the user.

We calculate the average similarity among all the objects as a baseline.
Interests - Absolute Time

Absolute time (physical time)
Interests - Relative Time

Relative time (ordinal time)
Interests - Summary

The upper green line indicates users’ basic interests.

The lower green line indicates average similarity among all the objects.

The middle black curve indicates how users’ interests evolve over time.
References