Patipol Chiammunchit : Enoncé de son projet juin 2016 Profiling Community Dynamics

How to use Link Streams Interaction Density to find patterns of interactions?

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In order to assess the health of communities in Online Social Media, we need indicators. In this study, we propose to reuse existing python scripts to measure the activity of communities in terms of density of interactions. The objective is to provide visual tools to Community Managers to describe the dynamics of community.

Keywords: Social Network Analysis, Network Dynamics, Link Streams, Community Health

1 Context

This project takes place as part of a collaboration with a community management company, Standing on Giants, in order to assess Community Health.

Standing on Giants aims at helping companies engage better with their customers through the creation and management of online communities of customers. These companies use online communities to engage with their customers and gain insights on their customers' needs. To provide better solutions to its clients, Standing on Giants will like to improve the way they conduct the community management discipline.

In this particular context, the social network is implicit since Standing on Giants build their communities upon boards/forums (ie. where members do not express explicitly their relationship between each other as in Facebook, but rather publish 'posts' and 'comments'). So, one way to observe the social structure of such a community is to consider the interactions between the members.

2 Objectives

In this study, we will use a new formalism[1] to model and analyze interactions within a community: the Link Stream. A Link Stream is a list (sorted by time) of links between individuals (see Figure 1).

We propose to reuse existing python scripts to measure the activity of communities in terms of density of interactions and analyze communities from the perspective of their patterns of interactions.

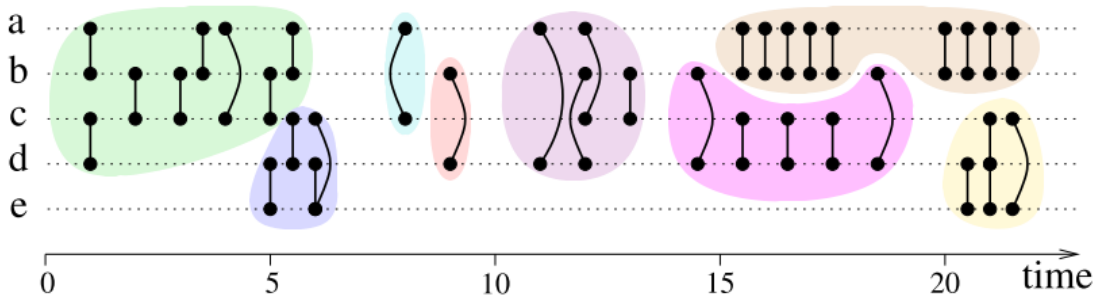

Figure 1: An example of link stream with 5 nodes [a,...,e]. Each of the 35 links represents an interaction between two individuals at a time t in [0,24]. Colored areas are communities, i.e. temporally and structurally dense series of interactions. [1]

The study will be organized in the following steps.

1. Download and understand an existing python code designed to compute Δ-density[2]. The new concept of Δ-density is introduced by a very famous research team, the Complex Network team in Paris 6 University in France [2].
2. From a toy dataset (e.g. the link stream in Figure 1), draw the evolution of Δ-density according to Δ for a set of communities (e.g. the 2 communities [a,b,c,d] and [c,d,e] in Figure 1).
3. Analyze the results and propose different profiles of interactions in communities.
4. Build/define different situations/datasets to propose a taxonomy of profiles.
5. Test on real datasets and/or write a research paper...

The agenda may change according to the student's proposals and/or interests.

Datasets : `http://webscope.sandbox.yahoo.com/catalog.php?datatype=g`

[1] We could also use Social Network Analysis and classical Graph formalism, but we believe in this new paradigm

[2] The code is available here: `https://www-complexnetworks.lip6.fr/~magnien/DynGraph/Software/Delta_Density/`

References

[1] N. Gaumont, T. Viard, R. Fournier-S'niehotta, Q. Wang, and M. Latapy. Analysis of the temporal and structural features of threads in a mailing-list. In *Workshop on Complex Networks CompleNet 2016*, Dijon, France, March 2016.

[2] Jordan Viard and Matthieu Latapy. Identifying roles in an ip network with temporal and structural density. In *Computer Communications Workshops (INFOCOM WKSHPS), 2014 IEEE Conference on*, pages 801–806. IEEE, 2014.