Computer Science > Social and Information Networks

Detecting Overlapping Temporal Community Structure in Time-Evolving Networks

Yudong Chen, Vikas Kawadia, Rahul Urgaonkar

(Submitted on 28 Mar 2013)

We present a principled approach for detecting overlapping temporal community structure in dynamic networks. Our method is based on the following framework: find the overlapping temporal community structure that maximizes a quality function associated with each snapshot of the network subject to a temporal smoothness constraint. A novel quality function and a smoothness constraint are proposed to handle overlaps, and a new convex relaxation is used to solve the resulting combinatorial optimization problem. We provide theoretical guarantees as well as experimental results that reveal community structure in real and synthetic networks. Our main insight is that certain structures can be identified only when temporal correlation is considered and when communities are allowed to overlap. In general, discovering such overlapping temporal community structure can enhance our understanding of real-world complex networks by revealing the underlying stability behind their seemingly chaotic evolution.

Comments:	12 pages, 15 figures
Subjects:	**Social and Information Networks (cs.SI)**; Learning (cs.LG); Physics and Society (physics.soc-ph); Machine Learning (stat.ML)
Cite as:	**arXiv:1303.7226 [cs.SI]**
	(or **arXiv:1303.7226v1 [cs.SI]** for this version)

Submission history

From: Yudong Chen [view email]

[v1] Thu, 28 Mar 2013 19:56:39 GMT (812kb,D)

Which authors of this paper are endorsers?