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Centrality estimation in fringe social networks: A control systems approach

Abstract. It has been long known that malicious content, e.g., fake news, originates from bots operating on fringe social networks (e.g., the now-defunct Parler) and then percolate to mainstream social networks (e.g., Twitter). It follows that effective moderation in mainstream networks depends upon proactively identifying malicious content while it becomes popular on the fringe ones. In this talk, we address the problem of detecting influential actors/social bots in fringe networks and assessing their impact on individuals' opinions. Such a problem is complicated by the nature of fringe social networks, where less information on the social structure is available, i.e., there are no "friends" or "followers". Our approach is to estimate social impact from a partial sampling of the dynamical opinions expressed by individuals. The problem is then cast as a sparse recovery problem, which we will attempt to solve through algorithms with theoretical guarantees of accuracy and excellent scalability properties, e.g., logarithmic in network size. Numerical simulations are provided to corroborate our results.

Chiara Ravazzi obtained the Ph.D. degree in Mathematics for Engineering Sciences from Politecnico di Torino in 2011. She was a visiting member at Massachusetts Institute of Technology (LIDS) in 2010 and a Post-Doc at Politecnico di Torino (DISMA, DET) from 2011 to 2016. Since 2017 she has been a Tenured Researcher of the National Research Council of Italy (CNR-IEIIT). She has been serving on the Conference Editorial Board of the IEEE CSS and as Associate Editor of the IEEE Trans. on Signal Proc. since 2019. Her current research interests lie in the broad areas of control and information theory, signal processing, optimization and learning algorithms for network systems. A common thread in her research is the study of the algorithmic foundation behind the real-world systems to provide practical solutions to large scale problems, for which conventional techniques are not computationally tractable. This philosophy propels her research with a balance in theory and applications.