Stochastic models of consensus formation in online networks

Supervisor: Colm Connaughton (Complexity and Mathematics) and Yasmin Merali (Warwick Business School)

Project Outline and Objectives

Consensus formation in online social networks is sometimes achieved without an central authority. An example would be the adoption of a particular Twitter hash-tag to describe a breaking news event or new discussion topic. Initially there are lots of competing hash-tags but very quickly the network reaches consensus on the use of one or two hash-tags. This project aims to construct simple stochastic models to study this phenomenon and address questions such as what is the expected time to reach consensus as a function of the network size, the number of initial competing options, the connectivity of the network.

Required Background and Methodology

To start with, this problem can be modeled with a simple multi-state voter model. If one is discussing Twitter, the underlying network should probably by directed since communication is not bi-directional. The student should have an interest in stochastic processes and enough numerical skills to generate complex networks with particular degree distributions and to simulate simple Markov processes on these networks.

Research Outcomes

May lead to a publication if we find anything interesting which is not known already. May be possible to connect to real data with a bit of thought.

PhD prospects

Continuation as a PhD project would require finding a different supervisor on the theoretical side since I will be away next year.

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