Efficiency of human activity on information spreading on Twitter

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In this work we address the following question: what can Twitter users do to increase their influence? We explore two avenues for this: topology and activity. We define the user efficiency on Twitter, as the ratio between the emergent spreading process and the activity employed by the user. It is a metric of influence in the network, quantified as the amount of retransmissions gained by user with each message posted, during the cascading process. We study this property by means of a quantitative analysis of the structural and dynamical patterns emergent from human interactions during six conversations on Twitter. The probability distributions of the user efficiency for all datasets have been computed. The patterns are the same in all cases. The ubiquity of the distribution, strongly suggests the existence of a universal behaviour in the relation between the individual efforts, managed by the user, and the collective reaction to such efforts, which is an emergent property of the underlying network. In general, this universality indicates that activity is not a good strategy to increase influence, as it is very costly.

We propose to model the user efficiency with biased Independent cascades on networks. 2. This model allows understanding the mechanisms that determine the resulting distributions. Each message may trigger an independent cascade regardless of the author's previous activations. Nodes may belong and participate in several cascades at the same time. The model reproduces quite well the empirical patterns.

We conclude that the efficiency patterns are independent of the way users behave, since topology dominates over activity. Instead, these patterns represent a reflection of the dynamical rules behind the spreading process, which are strongly determined by the topological features of the underlying network.

References:

A. J. Morales, J.C. Losada and R.M. Benito. " Efficiency of human activity on information spreading on Twitter". Social Networks (2014) http://dx.doi.org/10.1016/j.socnet.2014.03.007

A. J. Morales, J.C. Losada and R.M. Benito. "Users structure and behavior on an online social network during a political protest". Physica A 391 5244–5253 (2012).

J. Borondo, A. J. Morales, J. C. Losada, and R. M. Benito, "Characterizing and modeling an electoral campaign in the context of Twitter: 2011 Spanish presidential election as a case study.," Chaos, vol. 22, no. 2,p. 023138, 2012.