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Modeling Information Propagation with Survival Theory

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(Submitted on 15 May 2013)

Networks provide a skeleton for the spread of contagions, like, information, ideas, behaviors and diseases. Many times networks over which contagions diffuse are unobserved and need to be inferred. Here we apply survival theory to develop general additive and multiplicative risk models under which the network inference problems can be solved efficiently by exploiting their convexity. Our additive risk model generalizes several existing network inference models. We show all these models are particular cases of our more general model. Our multiplicative model allows for modeling scenarios in which a node can either increase or decrease the risk of activation of another node, in contrast with previous approaches, which consider only positive risk increments. We evaluate the performance of our network inference algorithms on large synthetic and real cascade datasets, and show that our models are able to predict the length and duration of cascades in real data.

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References & Citations

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