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Scalable learning of independent cascade dynamics from partial observations

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Spreading processes play an increasingly important role in modeling for diffusion networks, information propagation, marketing and opinion setting. We address the problem of learning of a spreading model such that the predictions generated from this model are accurate and could be subsequently used for the optimization, and control of diffusion dynamics. Unfortunately, full observations of the dynamics are rarely available. As a result, standard approaches such as maximum likelihood quickly become intractable for large network instances. We introduce a computationally efficient algorithm, based on a scalable dynamic message-passing approach, which is able to learn parameters of the effective spreading model given only limited information on the activation times of nodes in the network. We show that tractable inference from the learned model generates a better prediction of marginal probabilities compared to the original model. We develop a systematic procedure for learning a mixture of models which further improves prediction quality of the model.

More details at:

<https://arxiv.org/pdf/2007.06557.pdf>

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