

Leveraging Network Topology for Influence Modification in the Friedkin Johnsen Model

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Research: Path planning of autonomous vehicles, consensus in multi-agent systems, opinion dynamics in social networks

Abstract: In this talk, we consider a group of interacting agents involved in a collective decision-making process described by the Friedkin-Johnsen (FJ) opinion dynamics model. We assume that the interaction network formed by the agents is strongly connected and has multiple stubborn agents. The primary objective is to increase the influence of a desired stubborn agent over the steady state values of the opinion vector. To do so, we propose to make edge modifications that imitate the feed alterations performed by recommender algorithms. We show that the effectiveness of the edge modifications depends on the proximity of the associated nodes to some central nodes in the network. We also present the topological conditions which help identify the edge modifications that do not result in any change in the influence of the agent. Finally, we demonstrate the applicability of the results on Sampson's monastery data set.

Biography: Twinkle Tripathy is currently an Assistant Professor in the Department of Electrical Engineering of IIT Kanpur. She received a Dual Degree of M.Tech. and Ph.D. at Systems & Control Engineering, IIT Bombay in Dec. 2016. Thereafter, she served at the School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore and with the Faculty of Aerospace Engineering, Technion at Israel Institute of Technology as a post-doctoral fellow till Aug. 2020. Dr. Tripathy is the recipient of the “young woman researcher” award by Venus International Foundation in 2025 and “best woman professional award” by IEEE India in 2024.