Computer Science & Engineering Spring Lecture Series 2023

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Speaker: Jing Ma, PhD Candidate, University of Virginia

Date: Friday, February 3, 2023
Time: 12:00-1:00 EST
 Location: UConn Library Conference Room 1102
Webex: https://uconn-cmr.webex.com/meet/cdc19010

Title: When Causal Inference Meets Graph Machine Learning: Unleashing the Potential of Mutual Benefit

Abstract: Recent years have witnessed rapid development in graph-based machine learning (ML) in various high-impact domains (e.g., healthcare, recommendation, and security), especially those powered by effective graph neural networks (GNNs). Currently, the mainstream graph ML methods are based on statistical learning, e.g., utilizing the statistical correlations between node features, graph structure, and labels for node classification. However, statistical learning has been widely criticized for only capturing the superficial relations between variables in the data system, and consequently, rendering the lack of trustworthiness in real-world applications. For example, ML models often make biased predictions towards underrepresented groups. Besides, these ML models often lack explanation for human. Therefore, it is crucial to understand the causality in the data system and the learning process. Causal inference is the discipline that investigates the causality inside a system, for example, to identify and estimate the causal effect of a certain treatment (e.g., wearing a face mask) on an important outcome (e.g., COVID-19 infection). Involving the concepts and philosophy of causal inference into ML methods is often considered as a significant component of human-level intelligence and can serve as the foundation of artificial intelligence (AI). However, most traditional causal inference studies rely on strong assumptions, and focus on independent and identically distributed (i.i.d.) data, while causal inference on graphs is faced with many barriers in effectiveness. Fortunately, the interplay between causal inference and graph ML has the potential to bring mutual benefit for each other. In this talk, we will present the challenges and our contributions for bridging the gap between causal inference and graph ML, mainly including two directions: 1) leveraging graph ML methods to facilitate causal inference in effectiveness; and 2) leveraging causality to facilitate graph ML models in model trustworthiness (e.g., model fairness and explanation).

Bio: Jing Ma is a Ph.D. candidate in the Department of Computer Science at University of Virginia, under the supervision of Dr. Jundong Li and Dr. Aidong Zhang. She received her B.Eng. degree and M.Eng. degree at Shanghai Jiao Tong University with Outstanding Graduate Award. Her research interests broadly cover machine learning and data mining, especially include causal inference, graph mining, fairness, trustworthiness, and AI for social good. Her recent work focuses on bridging the gap between causality and machine learning. Her research papers have been published in top conferences and journals such as KDD, NeurIPS, IJCAI, WWW, AAAI, TKDE, WSDM, SIGIR, ECML-PKDD, AI Magazine, and IPSN. She has rich internship experience in companies and academic organizations such as Microsoft Research. She has won some important awards such as SIGKDD 2022 Best Paper Award and CAPWIC 2022 Best Poster Award.