Computer Science
Seminar

Mining and Learning from Graph Processes

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Abstract: The digital transformation has given rise to a new form of science driven by data. Graphs (or networks) are a powerful framework for the solution of data science problems, especially when the goal is to extract knowledge from and make predictions about the dynamics of complex systems such as those arising from epidemiology, social media and infrastructure. However, this representation power comes at a cost, as graphs are highly combinatorial structures, leading to challenges in search, optimization, and learning tasks that are relevant to modern real-world applications. ¡br¿ ¡br¿ In this talk, I will overview my recent work on new algorithms and models for mining and learning from graph data. First, I will show how the interplay between graph structure and its dynamics can be exploited for pattern mining and inference in networked processes, such as improving the effectiveness of testing during a pandemic. Then, I will focus on machine learning on graphs, where novel deep learning and optimization approaches for predicting graph data, such as traffic forecasting, will be described. As the last topic, I will introduce combinatorial algorithms for optimization on graphs that enable us to attack/defend their core structure, among other applications. I will end by briefly contextualizing my ongoing work as part of a broader research agenda with new related problems that I plan to address in the next few years.

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