



DISSERTATION DEFENSE



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Augmenting Structure with Text for Improved Graph Learning

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10:30am – 12:30pm

[Virtual](#)

ABSTRACT: Many important problems in machine learning and data mining, such as knowledge base reasoning, personalized entity recommendation, and scientific hypothesis generation, may be framed as learning and inference over a graph data structure. Such problems represent exciting opportunities for advancing graph learning, but also entail significant challenges. Because graphs are typically sparse and defined by a schema, they often do not fully capture the underlying complex relationships in the data. Models that combine graphs with rich auxiliary textual modalities have higher potential for expressiveness, but jointly processing such disparate modalities - that is, sparse structured relations and dense unstructured text - is not straightforward.

In this thesis, we consider the important problem of improving graph learning by combining structure and text. The first part of the thesis considers relational knowledge representation and reasoning tasks, demonstrating the great potential of pretrained contextual language models to add renewed depth and richness to graph-structured knowledge bases. The second part of the thesis goes beyond knowledge bases, toward improving graph learning tasks in information retrieval and recommender systems by jointly modeling document interactions and content. Our proposed methodologies consistently improve accuracy over both single-modality and cross-modality baselines, suggesting that, with appropriately chosen inductive biases and careful model design, we can exploit the unique complementary aspects of structure and text to great effect.

CHAIR: Prof. Danai Koutra