

CaRDS Seminar

Graph Neural Networks and Transformers: Positional Encodings as Node Embeddings

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Graph Neural Networks and Transformers are very powerful frameworks for learning machine learning tasks. For example, Transformers are the machine learning algorithms used for GPT Large Language Models (the “T” is for “Transformers”). While they were developed separately in diverse fields, current research has revealed that they have certain similarities and links. In this presentation, we focus on bridging the gap between GNNs and Transformers by offering a uniform framework that highlights their similarities and distinctions. In doing this, we perform positional encodings and identify some key properties that make the positional encodings interpretable as node embeddings, including expressiveness, efficiency, and interpretability. We show that it is possible to use positional encoding (which is a component of a Transformer network) as a node embedding (which is a component of a graph neural network) such that these encodings exhibit properties that make it almost the same as node embeddings and can be used for machine learning tasks such as node classification, graph classification and link prediction. We discuss some challenges and provide future directions.

When? Thursday, November 30 at 3.00 pm

Where? D. P. Culp University Center, Room 311 ("The Forum")

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