Opposition Report to Flip Cornel

Data Mining and Analytics, Reading Course, KTH

By Ahmed E. Samy

The seminar focused on the topic of few-shot learning and its relation to graph representation learning. Being cross-domain, the presentation was interesting, and highlighted how few-shot learning can be related to graph representation learning in different domains of speech, natural language processing and knowledge-graph completion. The following three papers were covered in the seminar:

- "Few-shot learning with graph neural networks", ICLR 2018.
- "Few-Shot Knowledge Graph Completion", AAAI 2020.
- "Few-Shot Audio Classification with Attentional Graph Neural Networks", ISCA 2020

The papers were well-chosen. They provided general principles of few-shots learning and highlighted many ways it can intersect with graph representation learning. The main idea of the papers is to use supervisory information of the few labelled nodes to generalize the learning for the nodes that don't have labels. First and third papers focused on image and audio classification respectively. The second paper addressed link prediction in knowledge graphs. One downside was that the papers had different architecture designs which made it harder to keep track of the big picture and compare between the different solutions. Also, the choice of the papers affected the discussion part afterwards where most of the discussion was mostly around the architecture of the first two papers.

The presenter, however, managed to deliver a well-structured presentation starting with an introduction of a few-shot learning and how it can be related to graph representation learning. Given the background of the audience, the introduction was much appreciated. The flow of the presentation was very smooth and logically coherent. During the discussion, the presenter showed critical thinking and the ability to discuss possible downsides and improvements over the discussed papers.

Opposition Report to Susanna Pozzeli

Data Mining and Analytics, Reading Course, KTH

By Ahmed E. Samy

The seminar focused on high-order network organization and analysis. It was well-delivered, and touched upon an interesting aspect of the node's role in network analysis. The seminar covered the following three papers:

- "Higher-order organization of complex networks", Science 2016.
- "Annotated hypergraphs: models and applications." Applied Network Science 5, 2020.
- "A Structural Graph Representation Learning Framework", WSDM 2020

The chosen papers were interesting and relevant to the background of the audience. Most research, in graph representation learning, focus on pairwise interactions between nodes. The seminar took the analysis one step further to role-based analysis. The first and third paper both relied on using motifs to represent different connectivity patterns where nodes may play different roles. However, the third paper's idea was to learn role-aware node embeddings. As for the second paper, the authors tackled the high-order aspect in terms of hypergraphs. In hypergraphs, more than two nodes can be involved in one edge, and each node may play different roles depending on the edges. Thus, the papers shared one motivation of finding insights in high-order network organizations. The choice of the papers gave a good overview onto that line of research, despite having different case studies, especially for the second paper. One concern is they all relied on well-chosen or engineered representations such as motifs to work well, and it was never clear how such information can be obtained.

On the other hand, the presenter managed to deliver a well-structured presentation and was capable of answering the opponents questions decently. However, the presenter sometimes seemed to lack some of the technical details, especially in the third paper. The presentation was very organized, but could use more illustration around the concepts and the contributions of the papers. The presenter's personal insights in terms of pros, cons, similarities and differences of the approaches, if added, can improve the presentation further.