ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

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Overlap Removal with Graph Neural Networks

The task of graph overlap removal considers an initial embedding of a graph in the Euclidian plane (also known as a "drawing" where nodes are mapped to positions), and a box is assigned to every node (its bounding dimension). The position of a node can be seen as the center of its bounding box. The node overlap removal task asks for a positioning of the nodes such that overlaps are minimized (the area of bounding boxes that overlap) which also maintains the initial layout of the graph and only repositions nodes as much as needed. As an example, one could imagine that the bounding boxes represent text boxes with labels for every node, and one tries to place the nodes such that all text is legible.
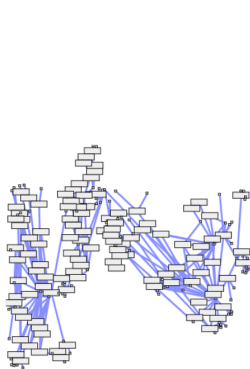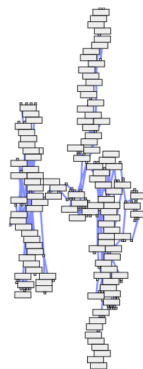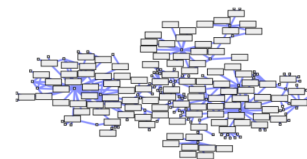
(e) *FTA*   (f) *VPSC*   (g) *PRISM*

We want to approach this problem with Graph Neural Networks (GNN), based on a previous framework we developed for graph drawing. We will start with finding suitable training data online or creating a synthetic dataset. The main part will consist of adapting the GNN architecture to fit the new task and reevaluating some design choices. Finally, we seek to compare our approach to existing algorithms.
This paper can serve as a good starting point: link

Requirements: Ability to work independently and determined to obtain results, creative thinking, knowledge of Machine Learning and Python. Ideally has worked with graph learning frameworks such as pyG before.

Contact

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