

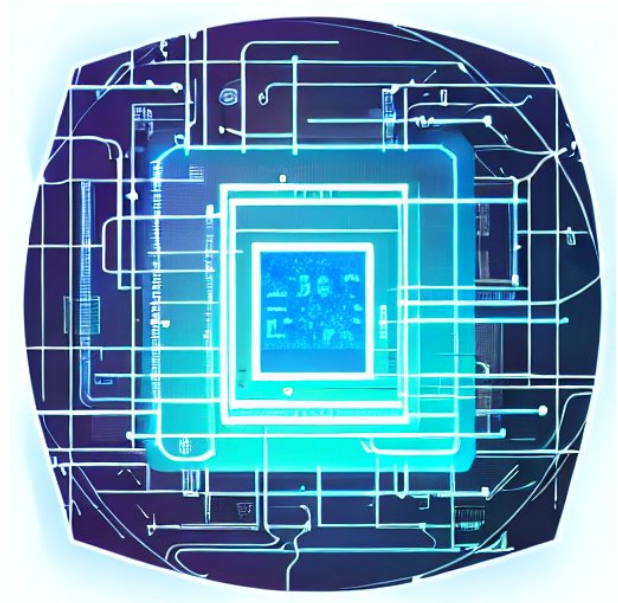


## Algorithmic Problems for GNNs

Graph Neural Networks (GNNs) have demonstrated their potential and capability of learning algorithms. With this in mind, recently, the [CLRS Benchmark](#) has been introduced by researchers from DeepMind. It is specifically designed to evaluate the ability of GNNs to learn various classic algorithms such as shortest path, sorting, or convex hull.

Many of the proposed problems of CLRS are either not necessarily graph problems, are solved by sequential algorithms or often require intermediate hints. In this thesis, we want to study graph problems that can be solved in a distributed and parallel setting. More precisely, we want to define and select several algorithmic graph problems that can also be tackled in a distributed setting. Furthermore, we want to tune the difficulty of our problems. Is it easier to decide if a solution is already correct? How can a solution be completed or made unique? The main focus is on the creation and selection of said algorithmic problems to evaluate the performance of GNN models.

Other inputs or directions are welcomed. If you have your own ideas or algorithms which are similar or just interested in algorithmic problems for machine learning we can set up a meeting to discuss a possible thesis.



**Requirements:** Strong motivation, knowledge in algorithm design, good coding skills and previous experience with Python. Knowledge in machine learning, or PyTorch is an advantage. We will have weekly meetings to discuss open questions and determine the next steps.

**Interested? Please contact us for more details!**

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