

CS3263 Project Proposal

Project Group 11

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We will work on a competition entry for the [Multi-Source Prim-Dijkstra competition](#) by TILOS AI Institute¹. The competition template is given in a [Python file](#).

Background

Multi-Source Prim-Dijkstra (MSPD) is a technique that was reported in the authors' [ISQED-2023 paper](#). The main novelty is the construction of a Steiner tree that more effectively balances the competing objectives of both:

- Minimum tree cost: Tree cost is the sum of Steiner tree edge lengths
- Minimum tree skew: Tree skew is the maximum difference in source-to-sink path lengths in a rooted (with the source terminal being the root) tree

This is done by introducing the creation of a source set, and running the existing [Prim-Dijkstra algorithm](#) starting with the source set. This has applications in areas of VLSI (very-large-scale integration) design.

In the competition, we are given a set of points with an identified root. The goal is to develop a model to predict a set of 1-3 sources that will yield a MSPD routing tree with best-possible cost-skew tradeoff in the output Steiner tree, based on the given objective functions.

Timeline

Week	Members	Description
Week 7	All	<ul style="list-style-type: none">• Read and understand the paper on MSPD
Week 8		<ul style="list-style-type: none">• Identify and discuss possible approaches to the problem• Draft a solution sketch
Week 9		
Week 10		<ul style="list-style-type: none">• Implement the discussed solution sketch• Continue testing the implementation
Week 11		
Week 12		<ul style="list-style-type: none">• Prepare the project presentation and report
Week 13		<ul style="list-style-type: none">• Submit the project report

¹ The Institute for Learning-Enabled Optimization at Scale (<https://www.tilos.ai/>)