

Unweighted Layered Graph Traversal

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Abstract:

Layered graph traversal, introduced by Papadimitriou and Yannakakis in 1989, is a variant of the shortest path problem where the underlying graph is initially unknown and only gradually revealed in layers as the searcher traverses through the graph. After several decades of research, the problem is now essentially resolved in its original formulation. In this talk, I show that what appears to be an innocuous modification of the problem — namely, that the graph is unweighted — leads to a drastic (exponential) reduction of the achievable performance guarantee. Our algorithm is randomised and extremely simple: It always chooses as probability distribution of the searcher's location the one that maximises a simple entropic regulariser defined on the revealed portion of the graph. Based on joint work with Xingjian Bai and Romain Cosson.