

Fast Pursuit of Mobile Nodes in Road Networks

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Abstract:

This paper formulates the PUG (Pursuit with Updates on Graph) problem, a pursuer-evader problem on road networks. The objective of the problem is for the pursuer to capture the evader in minimum time and with a minimum number of updates. The problem is shown to be infeasible for certain problem instances. Even when the problem is feasible, it is shown to be intractable for general graphs. A linear-time algorithm to solve PUG optimally for trees is presented. Lower bounds and an approximation algorithm for the general problem are also established. Extensive experimental results on a variety of benchmarks including the Denver metropolitan area road network show that our algorithms obtain high-quality solutions.

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