Department of Applied Mathematics and Statistics
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STUDENT SEMINAR

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RANDOM DISAMBIGUATION PATHS AND MARKOV DECISION PROCESSES

Abstract

Suppose a spatial arrangement of possibly hazardous regions needs to be speedily and safely traversed, and there is a dynamic capability of discovering the true nature of each hazard when in close proximity of it; the traversal may enter the associated region only if it is revealed to be nonhazardous. The problem of identifying an optimal policy for where and when to execute disambiguations so as to minimize the expected length of the traversal can be cast both as a completely observable Markov decision process (MDP) and as a partially observable Markov decision process (POMDP) and has been proven intractable in many broad settings. In this talk, we adapt the basic strategy of a policy called the *simulated risk disambiguation protocol* of Fishkind et al. (2006) to a different, discretized setting (a Canadian Traveller Problem with dependent edge probabilities), and we compare the performance of this adapted policy against the performance of the optimal policy—on a class of instances that are small enough for the optimal policy to be computed. On random such instances, the adapted simulated risk disambiguation protocol performed nearly as well as the optimal protocol, and used significantly less computational resources.