

Exact and Approximate Diagnosis of Probabilistic Systems

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Diagnosis of partially observable stochastic systems prone to faults was introduced in the late nineties. Diagnosability, i.e. the existence of a diagnoser, may be specified in different ways: (1) exact diagnosability (called A-diagnosability) requires that almost surely a fault is detected and that no fault is erroneously claimed while (2) approximate diagnosability (called epsilon-diagnosability) allows a small probability of error when claiming a fault and (3) accurate approximate diagnosability (called AA-diagnosability) requires that this error threshold may be chosen arbitrarily small. In this talk, I will cover three aspects of diagnosis. First, I solve semantical issues like the (non) equivalence of different notions. Then I study algorithmic issues establishing in most of the cases, the decidability status and the complexity class of the diagnosability problem. Finally, I explain how to synthesize a diagnoser when the system is diagnosable.