Statistics > Machine Learning

Sequential testing over multiple stages and performance analysis of data fusion

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We describe a methodology for modeling the performance of decision-level data fusion between different sensor configurations, implemented as part of the JIEDDO Analytic Decision Engine (JADE). We first discuss a Bayesian network formulation of classical probabilistic data fusion, which allows elementary fusion structures to be stacked and analyzed efficiently. We then present an extension of the Wald sequential test for combining the outputs of the Bayesian network over time. We discuss an algorithm to compute its performance statistics and illustrate the approach on some examples. This variant of the sequential test involves multiple, distinct stages, where the evidence accumulated from each stage is carried over into the next one, and is motivated by a need to keep certain sensors in the network inactive unless triggered by other sensors.

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