On Sample-Based Implementation of Decision Fusion Functions †

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Abstract

Optimal fusion functions have been derived for various formulations of multiple detection systems based on a complete knowledge of detector distributions. In several practical systems, however, only measurements are available. We show a general result that any fusion function with a suitable Lipschitz property, derived under the complete knowledge of the distributions, can be converted into a measurement-based one. detectors, but is not applicable to discontinuous fusion rules which often arise in practice. We then show that any fusion function with bounded variation can be converted into a measurement-based one with a somewhat weaker guarantee. These fusion functions subsume Lipschitz as well as several discontinuous fusion functions. In both cases, we show that given a sufficiently large sample, the measurement-based fusion function performs almost as well as the optimal one with an arbitrarily specified confidence.

†This research is sponsored by the Engineering Research Program of the Office of Basic Energy Sciences, U.S. Department of Energy, under Contract No. DE-AC05-00OR22725 with UT-Battelle, LLC, Office of Naval Research under order No. N00014-96-F-0415, and Ballistic Missile Defense Organization under MIPR No. 0100568954.