A Specialized Depth-First Search Algorithm For Clustering in Data Association*

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Abstract

The data association problem is one of the central problems in multi-target tracking, which is to determine from which track a particular measurement originated. The basic purpose of clustering is to divide the above problem into a number of small ones that can be solved independently. This paper casts clustering in data association as enumerating all the connected components of a graph and proposes a specialized depth-first search algorithm. The algorithm takes advantage of the following two properties: Due to the statistical independency of measurement between different scans, the multi-scan data can be partitioned into multiple independent data sets. The measurements in the same scan can not originate from an identical target and hence the candidate measurements of track in different cluster can not belong to a same cluster. The complexity analysis of the proposed algorithm is given. Numerical simulation and comparisons show that the proposed algorithm is very efficient for clustering in data association.

Keywords Data association, Clustering, Depth-first search

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