Table 1. Comparison of Multiple Target Tracking Formalisms

Formalism or Algorithm	Time Horizon Considered (No. of Samples)	Number of Data Association Hypotheses	Unresolved Data Modelled in Algorithm	Relative Performance in Dense Multiple Target Environments		Computational Complexity	
				Unresolved Data	Resolved Data	Exact Solution	Approximate Solution
Nearest Neighbor	1	1	No	Poor	Poor	Low	Low
Nearest Neighbor - M	1	1	Yes	Fair	Poor	Low	Low
Probabilistic Data Association (PDA)	1	1	No	Poor	Fair	Low	Low
Joint Probabilistic Data Association (JPDA)	1	1	No	Fair	Good	Exp	Medium
JPDAM	1	1	Yes	Good	Good	Exp	Medium
Nearest Neighbor JPDA	1	1	No	Fair	Good to Excellent	Poly	Low
Assignment	1	1	No	Fair	Good to Excellent	Poly	Medium
Dynamic Programming (Viterbi)	Many	1	No	Poor	Good	Poly	Medium
Hough Transform	Many	1	No	Fair	Good	Poly	Medium
Multiple Hypothesis Tracking (MHT)	Many	Many	No	Good	Optimal	Exp	High
MHT-M	Many	Many	Yes	Best	Excellent	Exp	High
Morefield	Many	Many	No	Fair	Excellent	Exp	High
Symmetric Measurements EKF	Many	Many	No	?	Good	Poly	High
Symmetric Measurements Exact Nonlinear Filter	Many	Many	No	?	Excellent	Exp	High
Branching	Many	Many	No	Fair	Excellent	Bounded	Med to High
Branching - M	Many	Many	Yes	Good	Excellent	Bounded	Med to High
Multi-Dimensional Assignment	Many	Many	No	Good	Excellent	-	High
Multi-Dimensional Assignment - M	Many	Many	Yes	Excellent	Excellent	-	High
Exact N-Best Hypotheses	Many	N	No	Good	Excellent	-	Med

moderate throughput (IMM and assignment using relaxation), to high throughput (MHT). The acronyms PDA, JPDA, IMM and MHT are defined in the glossary at the end of this review. In this sense, the book is up to date and covers the full spectrum of algorithms, from low throughput to high throughput. On the other hand, there are some notable lacunae in the list of algorithms covered. In particular, there is no mention of the so-called "N-Best" multiple-scan assignment algorithm developed by Danchick and Newnam [1], which is perhaps the algorithm of choice today, combining excellent performance with medium computational complexity (Table 1). More generally, it would be useful in a book of this type to have a single table (like Table 1) that summarizes all of the several dozen available algorithms, along with some quantitative measure of performance and computational complexity. All practitioners in this field carry around such a table in the back of their heads; it would be interesting to see what Professor Bar-Shalom's table looks like.

Notwithstanding these comments, this book contains several excellent quantitative performance comparisons between various algorithms. For instance, page 365 shows a nice plot comparing three algorithms (PDA, JPDA and JPDAM) for a dense multiple target environment with unresolved measurements. I have written elsewhere [2] that