雷達目標追蹤軌道平滑及壓縮之研究 = The research of radar target track smoothing and compression

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摘 要

在雷達多目標追蹤系統中，而資料相關結合對於雷達追蹤系統，主要是解決目前的軌跡與量測之間追蹤技術。競爭型類神經網路 (Competitive Hopfield Neural Network) 為一種新的演算法，將可同時解決資料融合與目標追蹤問題，此方法融合雷達量測與目前的目標軌跡，進行組合配對，以達到極佳的追蹤效果，同時本論文針對雷達目標追?軌道平滑進行研究，為了能夠了解此演算法對於追蹤效果的程度，電腦模擬結果顯示出方法不同其追蹤程度也有所改變，針對此演算法進行分析與探討。

關鍵詞 : 資料相關結合 ; 競爭型類神經網路 ; 目標追蹤 ; 軌道平滑

目錄

參考文獻

[1] K.C. Chang, C.Y. Chong, and Y. Bar-Shalom,“ Joint Probabilistic Data and Association Distributed Sensor Networks, ”IEEE Trans. Auto-ma.Contr., Vol. AC-31, pp.889-897, Oct .1986.

[2] Y. Bar-Shalom and T. Edision,“ Sonar Tracking of Multiple Targets Using Joint Probabilistic Data Association, ”IEEE Journal of Oceaning Engineering, Vol. OE-8, No 3 July 1983.

[3] Y. Bar-Shalom and T.E. Fortmann,“ Tracking and Data Association, ”Academic Press, INC. 1989.

[4] K. Mehrotra & P.R.Mahapatra,“ A Jerk Model for Tracking Highly Maneuvering Targets, ”IEEE Trans. Aerosp. Electron. Syst., Vol AES-33, pp.1094-1106, 1997.

[5] H.Lee & I-J Tahk,“ Generalized Input-Estimation Technique for Tracking Maneuvering Targets, ”IEEE Trans. Aerosp. Electron. Syst. Vol AES-35, pp.1388-1403, 1999.

[6] M. R. Morelande & S. Challa, “ Manoeuvering Target Tracking in Clutter using Particle Filters, ” IEEE Trans. Aerosp. Electron. Syst., Vol AES-41, pp.252-270, 2005.
[7] E. Emre, and J. Seo, “ A Unifying Approach to Multi-Target Tracking, ” IEEE Trans. Aerosp. Electron. Syst., Vol AES-25, pp.520-528, 1989.
[8] A. Howard & H. Seraji, “ Multi-Sensor Terrain Classification for Safe Spacecraft Landing, ” IEEE Trans. Aerosp. Electron.Syst. Vol.40, No.4, pp.1122-1131, 2004.
[9] R.E.Bethel & G.J.Paras, “ A PDF Multisensor Multitarget Tracker, ” IEEE Trans. Aerosp. Electron. Syst. Vol AES-34, pp.153-169, 1998.
[10] K.A.Fisher & P.S.Maybeck, “ Multiple Adaptive Estimation with Filter Spawning, ” IEEE Trans. Aerosp. Electron. Syst. Vol.38, No.3, pp.755-768, 2002.
[11] M. Kalandros & L. Y. Pao, “ Multisensor Covariance Control Strategies for Reducing Bias Effects in Interacting Target Scenarios, ” IEEE Trans. Aerosp. Electron. Syst., Vol AES-41, pp.153-172, 2005.
[12] R.E Lefferts, "Adaptive Correlation Regions for Alpha-Beta Tracking Filters", IEEE Trans. Areosp. Electron. System, Vol.AES-17, pp.738-747, Nov. 1981.
[13] P. Swerling, "Radar Probability of Detection for Some Additional Fluctuating Target Cases", IEEE Trans. Aerosp. Electron. Syst. Vol AES-33, pp.698-709, 1997.
[14] P.D. Hanlon and P.S. Maybeck, "Interrelation Ship of Single-Filter and Multiple-Model Adaptive Algorithms", IEEE Trans. Aerosp. Electron. Syst. Vol. AES-34, PP.934-946, 1998.
[15] E. Conte, M. Lops, and G. Ricci, "Adaptive Detection Schemes in Compound-Gaussian Clutter", IEEE Trans. Aerosp. Electron. Syst. Vol. AES-34, PP.1058-1069, 1998.
[16] R. L. Popp, K.R.Pattipati, Y.Bar-Shalom & M. Ysddanapudi , "Parallelization of a Multiple Tracking Algorithm with Superlinear Speedups", IEEE Trans. Aerosp. Electron. Syst. Vol AES-33, pp.281-290, 1997.
[17] D. J. Kershaw & R. J. Evans, "Waveform Selective Probabilistic Data Association", IEEE Trans. Aerosp. Electron. Syst. Vol AES-33, pp.1180-1189, 1997.
[18] P. D. Hanlon &P. S. Maybeck, "Interrelationship of Single-Filter and Multiple-Model Adaptive Algorithms", IEEE Trans. Aerosp. Electron. Syst. Vol AES-34, pp.934-947, 1998.
[19] S-T. Park & J. G. Lee, "Design of a Practical Tracking Algorithm with Radar Measurements", IEEE Trans. Aerosp. Electron. Syst. Vol AES-34, pp.1337-1345, 1998.
[20] E. Mazor, J. Dayan, A. Averbuch & Y. Bar-Shalom, "Interacting Multiple Model Methods in Target Tracking: A Survey," IEEE Trans. Aerosp. Electron. Syst. Vol AES-34, pp.103-124, 1998.
[21] R. E. Bethel & G. J. Paras, "A PDF Multisensor Multitarget Tracker", IEEE Trans. Aerosp. Electron. Syst. Vol AES-34, pp.153-169, 1998.
[22] H. Lee & I-J Tahk, "Generalized Input-Estimation Technique for Tracking Maneuvering Targets", IEEE Trans. Aerosp. Electron. Syst. Vol AES-35, pp.1388-1403, 1999.
[23] Magarini, M. and Spalvieri, A., “ Optimization of decentralized quantizers in rate constrained data fusion systems ” , Geoscience and Remote Sensing Symposium, 2000. Proceedings. IGARSS 2000. IEEE 2000 International, Volume: 3 , 24-28 July 2000.
[24] Koval, V., “ The competitive sensor fusion algorithm for multi sensorsystems ” , Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, International Workshop on, 2001. , 1-4 July 2001.
[25] Vershinin, Y.A. and West, M.J., “ A new data fusion algorithm based on the continuous-time decentralized Kalman filter ” , Target Tracking: Algorithms and Applications (Ref. No. 2001/174), IEE, Volume: 1, 16-17 Oct. 2001.
[26] Jae-Jun Kim and Singh, T. and Llinas, J., “ Large scale simulation of a distributed target tracking system ” , Information Fusion, 2002. Proceedings of the Fifth International Conference on, Volume: 1, 8-11 July 2002.
[27] K. A. Fisher & P. S. Maybeck, “ Multiple Adaptive Estimation with Filter Spawning ” , IEEE Trans. Aerosp. Electron. Syst. Vol. 38, No.3, pp.755-768, 2002.
[28] N. Okello & B. Ristic, “ Maximum Likelihood Registration for Multiple Dissimilar Sensors ” , IEEE Trans. Aerosp. Electron. Syst. Vol. 39, No.3, pp.1074-1083, 2003.
[29] Chamberland, J.-F. and Veeravalli, V.V., ” Decentralized detection in sensor networks ” , Signal Processing, IEEE Transactions on [see also Acoustics, Speech, and Signal Processing, IEEE Transactions on] , Volume: 51 , Issue: 2, Feb. 2003.
[30] Khawsuk, W. and Pao, L.Y., “ Decorrelated state estimation for distributed tracking using multiple sensors in cluttered environments ” , American Control Conference., 2003. Proceedings of the 2003, Volume: 4, June 4-6, 2003.
[31] Huimin Chen and Kirubarajan, T. and Bar-Shalom, Y., ” Performance limits of track-to-track fusion versus centralized estimation: theory and application [sensor fusion] , ” Aerospace and Electronic Systems, IEEE Transactions on, Volume: 39, Issue: 2, April 2003.
[32] Chang K.C., and Chong C.Y., and Bar-Shalom Y. ” Joint Probabilistic Data and Association Distributed Sensor Networks, ” IEEE Trans. Automa. Contr. Vol. AC-31, (Oct. 1986), pp.889-897, 1989 [33] Bar-Shalom Y., and Fortmann T.E. ” Tracking and Data Association, ” Academic Press, Inc., 1989.

[34] Blackman S.S. ”Multiple Hypothesis Tracking for Multiple Target Tracking, ”IEEE Aerosp. Electron. Syst. Magazine., Vol.19, (Jan. 2004), pp5-18, 2004.
[35] 張吉賢, 劉婉君, 許順棚, 盧科宇, 張鈞閔, 鍾翼能, “雷達系統改良式多模組變速估測之應用, ”2006中華民國航太學會/中華民航學會聯合學術研討會, pp. 157. (08_15-2~08_15-7).
[36] 許順棚, 張鈞閔, 周政南, 盧科宇, 張吉賢, 鍾翼能, “改良式資料相關結合技術之研究, ”2006中華民國航太學會/中華民航學會聯合學術研討會, pp. 150. s(08_08-2~08_08-6).
[37] 盧科宇, 胡國昌, 許順棚, 張鈞閔, 張吉賢, 鍾翼能, “雷達追蹤系統變速度估測研究, ”2006中華民國航太學會/中華民航學會聯合學術研討會, pp. 158. (08_16-1~08_16-6).
[38] Wan-Chun Liu, Pao-Hua Chou, Shu-Wang Lee,and Yi-Nung Chung, “A Multiple Sensor Data Fusion-Based Tracking System, ”Cross strait tri-regional radio science & wireless technology conference 2006, pp. 252-255.
[39] 李明諒, 游志忠, 陳建銓, 鄭凱仁, 鍾翼能, “雷達變速目標追蹤系統設計, ”2006海 峽兩岸三地無線科技研討會,pp. 334-337.
[40] Hsin-Ta Chen, Pao-Hua Chou, Szu-Tsung Chen, Feng-Pin Chuo, and Yi-Nung Chung, “An Dynamic Estimator for Radar Target Tracking, ”Dept. of Electrical Engineering, Da-Yeh Univ. ICSS 2005.