

# The research of applying a dynamic adaptive estimator for radar target tracking systems

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## ABSTRACT

ABSTRACT In view of the lack of dynamicity in a traditional fixed sensor system, an algorithm for tracking multiple maneuvering targets in a dynamic sensor system is proposed in this dissertation. The algorithm combines coordinate conversion logics and a multiple sensor data fusion for it to work in the dynamic sensor system. With the developed algorithm, the sensors can be installed in fixed or moving systems, which will improve the tracking accuracy and reliability of radar surveillance. Moreover, in order to overcome the problems inherent in a complex situation caused by tracking multiple maneuvering targets and to relieve the load of data association, a computation logic, including gating 1-step conditional maximum likelihood and a variable structure model as an adaptive maneuvering compensator, are applied to simultaneously solve both problems of data association and target maneuvering. In order to improve the system performance, another algorithm denoted Competitive Hopfield Neural Network (CHNN) is applied to our tracking system. In order to verify this approach, simulations of multi-target tracking problems are conducted. Computer simulation results indicate that this approach successfully tracks multiple targets in a dynamic sensor system and has good performance. Keywords: dynamic sensor system, multiple sensor data fusion, gating, 1-step conditional maximum likelihood, Competitive Hopfield Neural Network, adaptive maneuvering compensator.

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## Table of Contents

TABLE OF CONTENTS SIGNATURE PAGE LETTER OF AUTHORITY	
iii ENGLISH ABSTRACT	
iv CHINESE ABSTRACT	
v ACKNOWLEDGMENTS	
vi TABLE OF CONTENTS	
viii LIST OF FIGURES	
x LIST OF TABLES	
xi Chapter 1 INTRODUCTION	
1 1.1 Introduction	
1 1.2 Motivation	
2 1.3 Background and Objectives	
2 1.4 Scope of the dissertation	
3 1.5 Literature Review	
4 1.6 Organization of Dissertation	
6 Chapter 2 SYSTEM MODEL DEFINITIONS AND KALMAN FILTER ALGORITHM	
7 2.1 System Model Definitions	
7 2.2 Kalman Filter Algorithms	
9 Chapter 3 CONVERSIONS OF COORDINATES AND MULTIPLE SENSOR FUSION	
15 3.1 Conversion of the coordinates	
15 3.2 Multi-Sensor Fusions Algorithm	
21 Chapter 4 DATA ASSOCIATION ALGORITHM	
26 4.1 Gating Theorem	
26 4.2 Data association algorithm	
28 4.3 Applying Neural Network Technique to Data Association	
30 4.3.1 Problem Definition	
30 4.3.2 Competitive Hopfield Neural Network-based Data Association	
31 4.4 Mapping Data Association to Competitive Neural Network	

## 32 Chapter 5 MANEUVERING ESTIMATION AND SIMULATIONS

### 38 5.1 Maneuvering Estimation and Adaptive Procedure

#### 38 5.2 Simulations and results

## 40 Chapter 6 CONCLUSIONS

### 53 6.1 Conclusions

### 53 6.2 Future Research

## 53 REFERENCES

## 55 PERSONAL INFORMATION

## 61 ABOUT AUTHOR

## 61 PUBLICATIONS

### 63 (A)Journal Papers

### 63 (B)Conference Papers

### 66 (C)Thesis & Doctoral Dissertation

## 73 LIST OF FIGURES Figure 2.1 Block Diagram of Kalman Filter

9 Figure 3.1 Radar tracking system diagram

15 Figure 3.2 Sensor system coordinate diagram

16 Figure 3.3 Coordinate system diagrams

17 Figure 4.1 Gate Diagram

26 Figure 4.2 The diagram of interconnection between

36 Figure 5.1 Simulation of tracking

42 Figure 5.2 Simulation of

42 Figure 5.3

predicted targets and measurements

multi-targets (Method 1)

tracking multi-targets (Method 2)

Performance error in tracking multi-targets (Method 1)

43 Figure

5.4 Performance error of tracking multi-targets (Method 2)

43

Figure 5.5 Tracking two targets by using CHNN and adaptive procedure

44 Figure 5.6 Tracking two targets by using one-step conditional maximum likelihood and adaptive procedure

44 Figure 5.7 Tracking two targets by using CHNN and IMM algorithm

45 Figure 5.8 Tracking two targets by using one-step conditional maximum likelihood and IMM algorithm

45 Figure 5.9 Tracking four targets by using CHNN and adaptive procedure

46 Figure 5.10 Tracking four targets by using one-step conditional maximum likelihood and

adaptive procedure

46 Figure 5.11 Tracking four targets by using CHNN and IMM algorithm

47 Figure 5.12 Tracking four targets by using one-step conditional

maximum likelihood and IMM algorithm

47 LIST OF TABLES Table 5.1 Initial Condition of

Multiple Targets

48 Table 5.2 Target

Acceleration Conditions of Multiple Targets

48 Table 5.3

Tracking RMS errors of Tracking Multiple Targets

48

Table 5.4 Initial Condition of Multiple Targets

49 Table 5.5 Target Acceleration Conditions of Multiple Targets

49 Table 5.6 Simulation results of tracking two targets by using CHNN and adaptive procedure

49 Table 5.7 Simulation results of tracking two targets by using one-step conditional maximum likelihood and

adaptive procedure

50 Table 5.8 Simulation results of tracking two targets by using CHNN and IMM algorithm

50 Table 5.9 Simulation results of tracking two targets by using one-step conditional maximum

likelihood and IMM algorithm

50 Table 5.10 Simulation results of tracking four targets by using CHNN and adaptive

procedure

51 Table 5.11 Simulation results of tracking four targets by using one-step

conditional maximum likelihood and adaptive procedure

51 Table 5.12 Simulation results of tracking four targets by using

CHNN and IMM algorithm

52 Table 5.13 Simulation results of tracking four

targets by using one-step conditional maximum likelihood and IMM algorithm

52

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