



## **Kalman Filtering and Neural Networks**

Simon Haykin

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### Kalman Filtering and Neural Networks

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Kalman Filtering and Neural Networks Simon Haykin State-of-the-art coverage of Kalman filter methods for the design of neural networks

This self-contained book consists of seven chapters by expert contributors that discuss Kalman filtering as applied to the training and use of neural networks. Although the traditional approach to the subject is almost always linear, this book recognizes and deals with the fact that real problems are most often nonlinear.

The first chapter offers an introductory treatment of Kalman filters with an emphasis on basic Kalman filter theory, Rauch-Tung-Striebel smoother, and the extended Kalman filter. Other chapters cover:

- An algorithm for the training of feedforward and recurrent multilayered perceptrons, based on the decoupled extended Kalman filter (DEKF)
- Applications of the DEKF learning algorithm to the study of image sequences and the dynamic reconstruction of chaotic processes
- The dual estimation problem
- Stochastic nonlinear dynamics: the expectation-maximization (EM) algorithm and the extended Kalman smoothing (EKS) algorithm
- The unscented Kalman filter

Each chapter, with the exception of the introduction, includes illustrative applications of the learning algorithms described here, some of which involve the use of simulated and real-life data. Kalman Filtering and Neural Networks serves as an expert resource for researchers in neural networks and nonlinear dynamical systems.

An Instructor's Manual presenting detailed solutions to all the problems in the book is available upon request from the Wiley Makerting Department.



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