Neural Network Based State Estimation Of Nonlinear Systems Application To Fault Detection And Isolat

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Neural Network Based State Estimation
Neural Network-Based State Estimation for a Closed-Loop Control Strategy Applied to a Fed-Batch Bioreactor The lack of online information on some bioprocess variables and the presence of model and parametric uncertainties pose significant challenges to the design of efficient closed-loop control strategies.

Neural Network-Based State Estimation for a Closed-Loop ...
A neural network based state estimator for a general class of nonlinear dynamic system is proposed. The proposed state estimator uses cascading of a recurrent neural network structure (RNN) which learns the internal behavior of the dynamical system and a feedforward neural network (RNN) which learns the measuring relations of the system from the input-output data through prediction error minimization.

Neural Network Based State Estimation of Dynamical Systems ...
The experimental results indicate that the proposed neural network based estimation method can present accuracy and suitability for SOH estimation with low computation cost. Â© 2016 The Authors. Published by Elsevier Ltd. Selection and/or peer-review under responsibility of ICAE Keywords: Lithium-ion Battery; State-of-health; Parameter Identification; Neural Networks.

A Neural Network Based State-of-Health Estimation of ...
This paper points out the application of artificial neural network for short-term load forecasting where the projected loads are utilized to define a discrete-time state transition model (i.e., process model). The model is applied to estimate states dynamically and to generate pseudo measurements. Weights of neural network are not treated static and would be carried out under reevaluation alongside the estimation of state vector dynamically.

Neural network-based power system dynamic state estimation ...
Lecture Notes in Control and Information Sciences Neural Network-Based State Estimation of Nonlinear Systems Presents both the Linear-in-Parameter Neural Network based observer and the Nonlinear-in-Parameter Neural Network based observer approaches to nonlinear systems

Neural Network-Based State Estimation of Nonlinear Systems ...
Buy Neural Network-Based State Estimation of Nonlinear Systems: Application to Fault Detection and Isolation (Lecture Notes in Control and Information Sciences) 2010 by Heidar A. Talebi, Farzaneh Abdollahi, Rajni V. Patel, Khashayar Khorasani (ISBN: 9781441914378) from Amazon's Book Store. Everyday low prices and free delivery on eligible orders.

Neural Network-Based State Estimation of Nonlinear Systems ...
Network-based state estimation for neural networks using imperfect measurement 1. Introduction. The study on nonlinear systems have been becoming more and more important because nonlinear phenomena... 2. Preliminaries. Consider the following neural networks : (1) x ˙ (t) = − A x (t) + B f (x (...

Network-based H∞ state estimation for neural networks ...
This study is concerned with the state estimation issue for a kind of delayed artificial neural networks with multiplicative noises. The occurrence of the time delay is in a random way that is modeled by a Bernoulli distributed stochastic variable whose occurrence probability is time-varying and confined within a given interval.

Dynamic event-based state estimation for delayed ...
Neural Network-Based State Estimation of Nonlinear Systems Application to Fault Detection and Isolation

Neural Network-Based State Estimation of Nonlinear ...
Neural Network Based State of Charge (SOC) Estimation of Electric Vehicle Batteries J.A.K.S. Jayasinghe, K.K.K.D. Nadishan Department of Electronic and Telecommunication Engineering, University of Moratuwa, Sri Lanka Abstract- Accurate estimation of state of the charge (SOC) is vital for electric vehicle batteries.

Neural Network Based State of Charge (SOC) Estimation of ...
Neuronal state estimation of neural networks is a fundamental issue, aiming at estimating neuronal states from contaminated neural measurement outputs.

State Estimation for Static Neural Networks With Time ...
This study presents a nonlinear state estimator based on recurrent neural network (RNN) which uses a PI Elman neural network (PI-ENN) structure for state estimation of a squirrel-cage induction...

Neural Network Based State Estimation of Dynamical Systems ...
Abstract: This work presents the Spacecraft Pose Network (SPN), the first neural network-based method for on-board estimation of the pose, i.e., the relative position and attitude, of a known non-cooperative spacecraft using monocular vision. In contrast to other state-of-the-art pose estimation approaches for spaceborne applications, the SPN method does not require the formulation of hand-engineered features and only requires a single grayscale image to determine the pose of the spacecraft ...

Neural Network-Based Pose Estimation for Noncooperative ...
In the study, the authors are interested in investigating the stability analysis and state estimation of Markov jump static neural networks subject to time delays by the feat of Bessel–Legendre inequality.

Generalised state estimation of Markov jump neural ...
Traditional state estimation methods without integrating FACTS devices will not be suitable for power systems embedded with FACTS. In this paper the state estimation of power systems in presence of FACTS devices is presented. Hopfield neural network is simulated as an optimization tool to solve the power system state estimation problem

A Hopfield neural network based approach for state ...
A rapid neural network–based state of health estimation scheme for screening of end of life electric vehicle batteries - Alireza Rastegarpanah, Jamie Hathaway, Mohamed Ahmeid, Simon Lambert, Allan Walton, Rustam Stolkin, 2020 Skip to main content Intended for healthcare professionals

A rapid neural network–based state of health estimation ...
Neural network-aided adaptive unscented Kalman filter for nonlinear state estimation Abstract: The extended Kalman filter (EKF) is well known as a state estimation method for a nonlinear system and has been used to train a multilayered neural network (MNN) by augmenting the state with unknown connecting weights.

Neural network-aided adaptive unscented Kalman filter for ...
Firstly, the nonlinear autoregressive exogenous neural network (NARX-NN) is introduced, in which SOC is directly deemed as an NN output for learning and estimation. Secondly, a radial basis function (RBF)-based NN with unscented Kalman filter (RBFNN-UKF) is proposed, in which the terminal voltage is used as output.

Neural network-based learning and estimation of battery ...
Recently, a number of data-driven frame interpolation methods based on convolutional neural networks have been proposed. However, existing learning based methods typically estimate either flow or compensation kernels, thereby limiting performance on both computational efficiency and interpolation accuracy.

"Neural Network-Based State Estimation of Nonlinear Systems" presents efficient, easy to implement neural network schemes for state estimation, system identification, and fault detection and Isolation with mathematical proof of stability, experimental evaluation, and Robustness against unmolded dynamics, external disturbances, and measurement noises.

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Terrain relative navigation can improve the precision of a spacecraft’s state estimate by providing supplementary measurements to correct for drift in the inertial navigation system. This thesis presents a crater detector, LunaNet, that uses a convolutional neural network and image processing methods to detect craters from imagery taken by a spacecraft’s on-board camera. These detections are matched with known lunar craters, and these matches can be used as features that are input to a extended Kalman filter. Our results show that, on average, LunaNet detects approximately twice the number of craters in an intensity image as two other successful intensity image-based crater detectors, and detects more accurate crater centers and diameters than the other two detectors as well. One of the challenges of using cameras for this task is that they can generate imagery with differences in image qualities and noise levels. These differences can occur for reasons such as changes in irradiance of the lunar surface, heating of camera electronic elements, or the inherent fluctuation of discrete photons. These image noise effects are difficult to compensate for, making it important for a crater detector to be robust to noise. When trained on diverse data, convolutional neural networks are able to generalize over varied imagery. Similarly, LunaNet is shown to be robust to four types of image manipulation that result in changes to image qualities and noise levels of the input imagery. LunaNet also produces more repeatable crater detections from frame to frame throughout a trajectory, and that enables more reliable state estimation over a trajectory. A LunaNet-based EKF experiences fewer spikes in estimation error and has lower average estimation error than EKFs using other successful crater detectors.

In this book, the stability analysis and estimator design problems are discussed for delayed discrete-time memristive neural networks. In each chapter, the analysis problems are firstly considered, where the stability, synchronization and other performances (e.g., robustness, disturbances attenuation level) are investigated within a unified theoretical framework. In this stage, some novel notions are put forward to reflect the engineering practice. Then, the estimator design issues are discussed where sufficient conditions are derived to ensure the existence of the desired estimators with guaranteed performances. Finally, the theories and techniques developed in previous parts are applied to deal with some issues in several emerging research areas. The book Unifies existing and emerging concepts concerning delayed discrete memristive neural networks with an emphasis on a variety of network-induced phenomena Captures recent advances of theories, techniques, and applications of delayed discrete memristive neural networks from a network-oriented perspective Provides a series of latest results in two popular yet interrelated areas, stability analysis and state estimation of neural networks Exploits a unified framework for analysis and synthesis by designing new tools and techniques in combination with conventional theories of systems science, control engineering and signal processing Gives simulation examples in each chapter to reflect the engineering practice

This book deals with continuous time dynamic neural networks theory applied to the solution of basic problems in robust control theory, including identification, state space estimation (based on neuro-observers) and trajectory tracking. The plants to be identified and controlled are assumed to be a priori unknown but belonging to a given class containing internal unmodelled dynamics and external perturbations as well. The error stability analysis and the corresponding error bounds for different problems are presented. The effectiveness of the suggested approach is illustrated by its application to various controlled physical systems (robotic, chaotic, chemical, etc.). Contents:Theoretical Study:Neural Networks StructuresNonlinear System Identification: Differential LearningSliding Mode Identification: Algebraic LearningNeural State EstimationPassivation via Neuro ControlNeuro Trajectory TrackingNeurocontrol Applications:Neural Control for ChaosNeuro Control for Robot ManipulatorsIdentification of Chemical ProcessesNeuro Control for Distillation ColumnGeneral Conclusions and Future WorkAppendices:Some Useful Mathematical FactsElements of Qualitative Theory of ODELocally Optimal Control and Optimization Readership: Graduate students, researchers, academics/lecturers and industrialists in neural networks. Keywords:Dynamic Neural Networks;System Identification;State Estimation;Adaptive Control;Robust Control;Sliding Mode;Chaos Identification and Control;Chemical Process;Lyapunov Method;StabilityReviews:“This book is the result of many years of research and publications by the authors. Overall, it is a good one that could benefit the researchers and practitioners in the field of intelligent nonlinear control systems. Design methods and analytical results are well presented and substantiated by closely-related simulation examples and engineering applications. It is a very good addition to the libraries of those interested in the subject. It is also qualified to be used as a postgraduate-level reference.”International Journal of Adaptive Control and Signal Processing

In this book, the stability analysis and estimator design problems are discussed for delayed discrete-time memristive neural networks. In each chapter, the analysis problems are firstly considered, where the stability, synchronization and other performances (e.g., robustness, disturbances attenuation level) are investigated within a unified theoretical framework. In this stage, some novel notions are put forward to reflect the engineering practice. Then, the estimator design issues are discussed where sufficient conditions are derived to ensure the existence of the desired estimators with guaranteed performances. Finally, the theories and techniques developed in previous parts are applied to deal with some issues in several emerging research areas. The book Unifies existing and emerging concepts concerning delayed discrete memristive neural networks with an emphasis on a variety of network-induced phenomena Captures recent advances of theories, techniques, and applications of delayed discrete memristive neural networks from a network-oriented perspective Provides a series of latest results in two popular yet interrelated areas, stability analysis and state estimation of neural networks Exploits a unified framework for analysis and synthesis by designing new tools and techniques in combination with conventional theories of systems science, control engineering and signal processing Gives simulation examples in each chapter to reflect the engineering practice

The focus of this book is the application of artificial neural networks in uncertain dynamical systems. It explains how to use neural networks in concert with adaptive techniques for system identification, state estimation, and control problems. The authors begin with a brief historical overview of adaptive control, followed by a review of mathematical preliminaries. In the subsequent chapters, they present several neural network-based control schemes. Each chapter starts with a concise introduction to the problem under study, and a neural network-based control strategy is designed for the simplest case scenario. After these designs are discussed, different practical limitations (i.e., saturation constraints and unavailability of all system states) are gradually added, and other control schemes are developed based on the primary scenario. Through these exercises, the authors present structures that not only provide mathematical tools for navigating control problems, but also supply solutions that are pertinent to real-life systems.

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