

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, Lancaster, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Zurich, Switzerland*

John C. Mitchell

*Stanford University, Stanford, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*TU Dortmund University, Dortmund, Germany*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max Planck Institute for Informatics, Saarbrücken, Germany*

More information about this series at <http://www.springer.com/series/7407>

Fengyu Cong · Andrew Leung  
Qinglai Wei (Eds.)

# Advances in Neural Networks – ISNN 2017

14th International Symposium, ISNN 2017  
Sapporo, Hakodate, and Muroran, Hokkaido, Japan, June 21–26, 2017  
Proceedings, Part II

*Editors*

Fengyu Cong  
Dalian University of Technology  
Dalian  
China

Qinglai Wei  
Chinese Academy of Sciences  
Beijing  
China

Andrew Leung  
City University of Hong Kong  
Kowloon Tong  
Hong Kong

ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-319-59080-6

ISBN 978-3-319-59081-3 (eBook)

DOI 10.1007/978-3-319-59081-3

Library of Congress Control Number: 2017941494

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

© Springer International Publishing AG 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature

The registered company is Springer International Publishing AG

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

The twin volumes of *Lecture Notes in Computer Science* constitute the proceedings of the 14th International Symposium on Neural Networks (ISNN 2017) held during June 21–26, 2017, in Sapporo, Hakodate, and Muroran, Hokkaido, Japan. Building on the success of the previous events, ISNN has become a well-established series of popular and high-quality conferences on the theory and methodology of neural networks and their applications. This year’s symposium was held for the third time outside China, in Hokkaido, a beautiful island in Japan. As usual, it achieved great success. ISNN aims at providing a high-level international forum for scientists, engineers, educators, and students to gather so as to present and discuss the latest progress in neural network research and applications in diverse areas. It encouraged open discussion, disagreement, criticism, and debate, and we think this is the right way to push the field forward.

Based on the rigorous peer-reviews by the Program Committee members and reviewers, 135 high-quality papers from 25 countries and regions were selected for publication in the LNCS proceedings. These papers cover many topics of neural network-related research including intelligent control, neurodynamic analysis, memristive neurodynamics, computer vision, signal processing, machine learning, optimization etc. Many organizations and volunteers made great contributions toward the success of this symposium. We would like to express our sincere gratitude to City University of Hong Kong and Hokkaido University for their sponsorship, the IEEE Computational Intelligence Society, the International Neural Network Society, and the Japanese Neural Network Society for their technical co-sponsorship. We would also like to sincerely thank all the committee members for all their great efforts in organizing the symposium. Special thanks go to the Program Committee members and reviewers whose insightful reviews and timely feedback ensured the high quality of the accepted papers and the smooth flow of the symposium. We would also like to thank Springer for their cooperation in publishing the proceedings in the prestigious *Lecture Notes in Computer Science* series. Finally, we would like to thank all the speakers, authors, and participants for their support.

April 2017

Fengyu Cong  
Andrew C.-S. Leung  
Qinglai Wei

## Organization

## Honorary Chair

Shun'ichi Amari

RIKEN Brain Science Institute, Japan

## General Chairs

Hidenori Kawamura

Hokkaido University, Japan

Jun Wang

City University of Hong Kong, SAR China

## Advisory Chairs

Kunihiko Fukushima

Fuzzy Logic Systems Institute, Japan

Takeshi Yamakawa

Fuzzy Logic Systems Institute, Japan

## Steering Chairs

Haibo He

University of Rhode Island, USA

Derong Liu

University of Illinois, Chicago, USA

Jun Wang

City University of Hong Kong, SAR China

## Organizing Committee Chairs

Andrzej Cichocki

RIKEN Brain Science Institute, Japan

Min Han

Dalian University of Technology, China

Bao-Liang Lu

Shanghai Jiao Tong University, China

Masahito Yamamoto

Hokkaido University, Japan

## Program Chairs

Fengyu Cong

Dalian University of Technology, China

Andrew C.-S. Leung

City University of Hong Kong, SAR China

Qinglai Wei

CAS Institute of Automation, China

## Special Sessions Chairs

Long Cheng

CAS Institute of Automation, China

Satoshi Kurihara

University of Electro-Communications, Japan

Qingshan Liu

Huazhong University of Science and Technology, China

Tomohisa Yamashita

National Institute of Advanced Industrial Science

and Technology, Japan

Nian Zhang

University of District of Columbia, USA

## **Tutorial Chairs**

|                   |                                   |
|-------------------|-----------------------------------|
| Hitoshi Matsubara | Future University Hakodate, Japan |
| Keiji Suzuki      | Future University Hakodate, Japan |

## **Workshop Chairs**

|                |                                        |
|----------------|----------------------------------------|
| Mianxiong Dong | Muroran Institute of Technology, Japan |
| Jay Kishigami  | Muroran Institute of Technology, Japan |
| Yasuo Kudo     | Muroran Institute of Technology, Japan |

## **Publicity Chairs**

|                 |                                                      |
|-----------------|------------------------------------------------------|
| Jinde Cao       | Southeast University, China                          |
| Hisao Ishibuchi | Osaka Prefecture University, Japan                   |
| Zhigang Zeng    | Huazhong University of Science and Technology, China |
| Huaguang Zhang  | Northeastern University, China                       |
| Jun Zhang       | South China University of Technology, China          |

## **Publications Chairs**

|             |                                          |
|-------------|------------------------------------------|
| Jin Hu      | Chongqing Jiaotong University, China     |
| He Huang    | Soochow University, China                |
| Xinyi Le    | Shanghai Jiao Tong University, China     |
| Yongming Li | Liaoning University of Technology, China |

## **Registration Chairs**

|                 |                                         |
|-----------------|-----------------------------------------|
| Shenshen Gu     | Shanghai University, China              |
| Hiroyuki Iizuka | Hokkaido University, Japan              |
| Ka Chun Wong    | City University of Hong Kong, SAR China |

## **Local Arrangements Chairs**

|                  |                                       |
|------------------|---------------------------------------|
| Takashi Kawakami | Hokkaido University of Science, Japan |
| Koji Nishikawa   | Hokkaido University of Science, Japan |

## **Secretaries**

|             |                                        |
|-------------|----------------------------------------|
| Miki Kamata | Hokkaido University, Japan             |
| Ying Qu     | Dalian University of Technology, China |

## **Program Committee**

|            |                                     |
|------------|-------------------------------------|
| Xuhui Bu   | Henan Polytechnic University, China |
| Long Cheng | Chinese Academy of Sciences, China  |

|                       |                                                                     |
|-----------------------|---------------------------------------------------------------------|
| Fengyu Cong           | Dalian University of Technology, China                              |
| Ruxandra Liana Costea | Polytechnic University of Bucharest, Romania                        |
| Jisheng Dai           | Jiangsu University, China                                           |
| Wai-Keung Fung        | Robert Gordon University, UK                                        |
| Shenshen Gu           | Shanghai University, China                                          |
| Zhishan Guo           | Missouri University of Science and Technology, USA                  |
| Zhenyuan Guo          | Hunan University, China                                             |
| Chengan Guo           | Dalian University of Technology, China                              |
| Wei He                | Beijing University of Science and Technology, China                 |
| Sanqing Hu            | Hangzhou Dianzi University, China                                   |
| Long-Ting Huang       | Wuhan University of Technology, China                               |
| Min Jiang             | Xiamen University, China                                            |
| Danchi Jiang          | University of Tasmania, Australia                                   |
| Shunshoku Kanae       | Fukui University of Technology, Japan                               |
| Rhee Man Kil          | Korean Advanced Institute of Science and Technology,<br>South Korea |
| Chiman Kwan           | Signal Processing, Inc., Singapore                                  |
| Chi-Sing Leung        | City University of Hong Kong, SAR China                             |
| Michael Li            | Central Queensland University, Australia                            |
| Shoutao Li            | Jilin University, China                                             |
| Cheng Dong Li         | Shandong Jianzhu University, China                                  |
| Jie Lian              | Dalian University of Technology, China                              |
| Jinling Liang         | Southeast University, China                                         |
| Meiqin Liu            | Zhejiang University, China                                          |
| Ju Liu                | Shandong University, China                                          |
| Wenlian Lu            | Fudan University, China                                             |
| Biao Luo              | Chinese Academy of Sciences, China                                  |
| Dazhong Ma            | Northeastern University, China                                      |
| Tiedong Ma            | Chongqing University, China                                         |
| Jinwen Ma             | Peking University, China                                            |
| Kim Fung Man          | City University of Hong Kong, SAR China                             |
| Seiichi Ozawa         | Kobe University, Japan                                              |
| Sitian Qin            | Harbin Institute of Technology at Weihai, China                     |
| Ruizhuo Song          | Beijing University of Science and Technology, China                 |
| Qiankun Song          | Chongqing Jiaotong University, China                                |
| John Sum              | National Chung Hsing University, China                              |
| Weize Sun             | Shenzhen University, China                                          |
| Norikazu Takahashi    | Okayama University, Japan                                           |
| Christos Tjortjis     | International Hellenic University, Greece                           |
| Kim-Fung Tsang        | City University of Hong Kong, SAR China                             |
| Jun Wang              | City University of Hong Kong, SAR China                             |
| Jian Wang             | China University of Petroleum, China                                |
| Zhanshan Wang         | Northeastern University, China                                      |
| Jing Wang             | Beijing University of chemical Technology, China                    |
| Shenquan Wang         | Changchun University of technology, China                           |
| Dianhui Wang          | La Trobe University, Australia                                      |

|               |                                                                    |
|---------------|--------------------------------------------------------------------|
| Xinzhe Wang   | Dalian University of Technology, China                             |
| Zhuo Wang     | Beihang University, China                                          |
| Ding Wang     | Chinese Academy of Sciences, China                                 |
| Zhiliang Wang | Northeastern University, China                                     |
| Qinglai Wei   | Chinese Academy of Sciences, China                                 |
| Xin Xu        | National University of Defense Technology, China                   |
| Qinmin Yang   | Zhejiang University, China                                         |
| Xiong Yang    | Tianjin University, China                                          |
| Xu Yang       | Beijing University of Science and Technology, China                |
| Mao Ye        | University of Electronic Science and Technology of China,<br>China |
| Nian Zhang    | University of the District of Columbia, USA                        |
| Chi Zhang     | Dalian University of Technology, China                             |
| Jie Zhang     | Chinese Academy of Sciences, China                                 |
| Xiumei Zhang  | Changchun University of Technology, China                          |
| Jie Zhang     | Newcastle University, UK                                           |
| Bo Zhao       | Chinese Academy of Sciences, China                                 |
| Dongbin Zhao  | Chinese Academy of Sciences, China                                 |

## Contents – Part II

### Intelligent Control

|                                                                                                                                                                 |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Human-Like Robot Arm Robust Nonlinear Control Using a Bio-inspired Controller with Uncertain Properties . . . . .                                               | 3  |
| <i>Yiping Chang, Aihui Wang, Shengjun Wen, and Wudai Liao</i>                                                                                                   |    |
| Adaptive NNs Fault-Tolerant Control for Nonstrict-Feedback Nonlinear Systems . . . . .                                                                          | 11 |
| <i>Guowei Dong, Yongming Li, Duo Meng, Fuming Sun, and Rui Bai</i>                                                                                              |    |
| Neural Adaptive Dynamic Surface Control of Nonlinear Systems with Partially Constrained Tracking Errors and Input Saturation . . . . .                          | 20 |
| <i>Hairong Dong, Xiaoyu Wang, Shigen Gao, and Yubing Wang</i>                                                                                                   |    |
| An Application of Master-Slave ADALINE for State Estimation of Power System. . . . .                                                                            | 28 |
| <i>Zhanshan Wang, Haoyuan Gao, and Huaguang Zhang</i>                                                                                                           |    |
| Motion and Visual Control for an Upper-Limb Exoskeleton Robot via Learning . . . . .                                                                            | 36 |
| <i>Jian-Bin Huang, I-Yu Lin, Kuu-Young Young, and Chun-Hsu Ko</i>                                                                                               |    |
| Approximation-Based Adaptive Neural Tracking Control of an Uncertain Robot with Output Constraint and Unknown Time-Varying Delays . . . . .                     | 44 |
| <i>Da-Peng Li, Yan-Jun Liu, Dong-Juan Li, Shaocheng Tong, Duo Meng, and Guo-Xing Wen</i>                                                                        |    |
| Neural Network Based Power Tracking Control of Wind Farm . . . . .                                                                                              | 52 |
| <i>Liyuan Liang, Yongduan Song, and Mi Tan</i>                                                                                                                  |    |
| A Generalized Policy Iteration Adaptive Dynamic Programming Algorithm for Optimal Control of Discrete-Time Nonlinear Systems with Actuator Saturation . . . . . | 60 |
| <i>Qiao Lin, Qinglai Wei, and Bo Zhao</i>                                                                                                                       |    |
| Exponential Stability of Neutral T-S Fuzzy Neural Networks with Impulses . . . . .                                                                              | 66 |
| <i>Shujun Long and Bing Li</i>                                                                                                                                  |    |
| Robust NN Control of the Manipulator in the Underwater Vehicle-Manipulator System. . . . .                                                                      | 75 |
| <i>Weilin Luo and Hongchao Cong</i>                                                                                                                             |    |

|                                                                                                                                                |     |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Nonsingular Terminal Sliding Mode Based Trajectory Tracking Control<br>of an Autonomous Surface Vehicle with Finite-Time Convergence . . . . . | 83  |
| <i>Shuailin Lv, Ning Wang, Yong Wang, Jianchuan Yin, and Meng Joo Er</i>                                                                       |     |
| Saturated Kinetic Control of Autonomous Surface Vehicles Based<br>on Neural Networks . . . . .                                                 | 93  |
| <i>Zhouhua Peng, Jun Wang, and Dan Wang</i>                                                                                                    |     |
| Virtual Structure Formation Control via Sliding Mode Control<br>and Neural Networks . . . . .                                                  | 101 |
| <i>Qi Qin, Tie-Shan Li, Cheng Liu, C.L. Philip Chen, and Min Han</i>                                                                           |     |
| Neuro Adaptive Control of Asymmetrically Driven Mobile Robots<br>with Uncertainties . . . . .                                                  | 109 |
| <i>Zhixi Shen, Yaping Ma, and Yongduan Song</i>                                                                                                |     |
| Adaptive Neural Network Control for Constrained Robot Manipulators . . . . .                                                                   | 118 |
| <i>Gang Wang, Tairen Sun, Yongping Pan, and Haoyong Yu</i>                                                                                     |     |
| How the Prior Information Shapes Neural Networks for Optimal<br>Multisensory Integration. . . . .                                              | 128 |
| <i>He Wang, Wen-Hao Zhang, K.Y. Michael Wong, and Si Wu</i>                                                                                    |     |
| Fuzzy Uncertainty Observer Based Filtered Sliding Mode Trajectory<br>Tracking Control of the Quadrotor . . . . .                               | 137 |
| <i>Yong Wang, Ning Wang, Shuailin Lv, Jianchuan Yin, and Meng Joo Er</i>                                                                       |     |
| Local Policy Iteration Adaptive Dynamic Programming for Discrete-Time<br>Nonlinear Systems . . . . .                                           | 148 |
| <i>Qinglai Wei, Yancai Xu, Qiao Lin, Derong Liu, and Ruizhuo Song</i>                                                                          |     |
| A Method Using the Lempel-Ziv Complexity to Detect Ventricular<br>Tachycardia and Fibrillation . . . . .                                       | 154 |
| <i>Deling Xia, Yuetian Li, Qingfang Meng, and Jie He</i>                                                                                       |     |
| Finite-Time Synchronization of Uncertain Complex Networks<br>with Nonidentical Nodes Based on a Special Unilateral Coupling Control . . .      | 161 |
| <i>Meng Zhang and Min Han</i>                                                                                                                  |     |
| A Multiple-objective Neurodynamic Optimization to Electric<br>Load Management Under Demand-Response Program . . . . .                          | 169 |
| <i>Xinyi Le, Sijie Chen, Yu Zheng, and Juntong Xi</i>                                                                                          |     |
| Neuro-Adaptive Containment Seeking of Multiple Networking Agents<br>with Unknown Dynamics. . . . .                                             | 178 |
| <i>Guanghui Wen, Peijun Wang, Tingwen Huang, Long Cheng,<br/>and Junyong Sun</i>                                                               |     |

**Signal, Image and Video Processing**

|                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------|-----|
| Abnormal Event Detection in Videos Using Spatiotemporal Autoencoder. . . .                                          | 189 |
| <i>Yong Shean Chong and Yong Haur Tay</i>                                                                           |     |
| Enhancing Mastcam Images for Mars Rover Mission. . . . .                                                            | 197 |
| <i>Minh Dao, Chiman Kwan, Bulent Ayhan, and James F. Bell</i>                                                       |     |
| A Collective Neurodynamic Optimization Approach to Nonnegative<br>Tensor Decomposition. . . . .                     | 207 |
| <i>Jianchao Fan and Jun Wang</i>                                                                                    |     |
| A Novel Spatial Information Model for Saliency Detection . . . . .                                                  | 214 |
| <i>Hang Gao, Bo Li, and Han Liu</i>                                                                                 |     |
| Sparse Representation with Global and Nonlocal Self-similarity<br>Prior for Single Image Super-Resolution . . . . . | 222 |
| <i>Weiguo Gong, Xi Chen, Jinming Li, Yongliang Tang, and Weihong Li</i>                                             |     |
| EMR: Extended Manifold Ranking for Saliency Detection . . . . .                                                     | 231 |
| <i>Bo Li, Hang Gao, and Han Liu</i>                                                                                 |     |
| Hybrid Order $l_0$ -Regularized Blur Kernel Estimation Model for Image<br>Blind Deblurring. . . . .                 | 239 |
| <i>Weihong Li, Yangqing Chen, Rui Chen, Weiguo Gong,<br/>and Bingxin Zhao</i>                                       |     |
| Saliency Detection Optimization via Modified Secondary Manifold<br>Ranking and Blurring Depression . . . . .        | 248 |
| <i>Han Liu, Bo Li, and Hang Gao</i>                                                                                 |     |
| Noise Resistant Training for Extreme Learning Machine . . . . .                                                     | 257 |
| <i>Yik Lam Lui, Hiu Tung Wong, Chi-Sing Leung, and Sam Kwong</i>                                                    |     |
| Phase Constraint and Deep Neural Network for Speech Separation . . . . .                                            | 266 |
| <i>Zhuangguo Miao, Xiaohong Ma, and Shuxue Ding</i>                                                                 |     |
| A Neural Autoregressive Framework for Collaborative Filtering . . . . .                                             | 274 |
| <i>Zhen Ouyang, Chen Sun, and Chunping Li</i>                                                                       |     |
| Deep Semantics-Preserving Hashing Based Skin Lesion Image Retrieval . . . .                                         | 282 |
| <i>Xiaorong Pu, Yan Li, Hang Qiu, and Yinhui Sun</i>                                                                |     |
| Fast Conceptor Classifier in Pre-trained Neural Networks<br>for Visual Recognition. . . . .                         | 290 |
| <i>Guangwu Qian, Lei Zhang, and Qianjun Zhang</i>                                                                   |     |

|                                                                                                                                                          |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Video-Based Fire Detection with Saliency Detection and Convolutional Neural Networks . . . . .                                                           | 299 |
| <i>Lifeng Shi, Fei Long, ChenHan Lin, and Yihan Zhao</i>                                                                                                 |     |
| Leveraging Convolutions in Recurrent Neural Networks for Doppler Weather Radar Echo Prediction . . . . .                                                 | 310 |
| <i>Sonam Singh, Sudeshna Sarkar, and Pabitra Mitra</i>                                                                                                   |     |
| Neuroadaptive PID-like Fault-Tolerant Control of High Speed Trains with Uncertain Model and Unknown Tracking/Braking Actuation Characteristics . . . . . | 318 |
| <i>Q. Song and T. Sun</i>                                                                                                                                |     |
| A Programmable Memristor Potentiometer and Its Application in the Filter Circuit . . . . .                                                               | 326 |
| <i>Jinpei Tan, Shukai Duan, Ting Yang, and Hangtao Zhu</i>                                                                                               |     |
| Rapid Triangle Matching Based on Binary Descriptors . . . . .                                                                                            | 336 |
| <i>Min Tian and Qiu-Hua Lin</i>                                                                                                                          |     |
| An Improved Symbol Entropy Algorithm Based on EMD for Detecting VT and VF . . . . .                                                                      | 345 |
| <i>Yingda Wei, Qingfang Meng, Haihong Liu, Jin Zhou, and Dong Wang</i>                                                                                   |     |
| A Selective Transfer Learning Method for Concept Drift Adaptation . . . . .                                                                              | 353 |
| <i>Ge Xie, Yu Sun, Minlong Lin, and Ke Tang</i>                                                                                                          |     |
| On the Co-absence of Input Terms in Higher Order Neuron Representation of Boolean Functions. . . . .                                                     | 362 |
| <i>Oytun Yapar and Erhan Oztop</i>                                                                                                                       |     |
| A Genetic Approach to Fusion of Algorithms for Compressive Sensing. . . . .                                                                              | 371 |
| <i>Hanxu You and Jie Zhu</i>                                                                                                                             |     |
| Industrial Oil Pipeline Leakage Detection Based on Extreme Learning Machine Method. . . . .                                                              | 380 |
| <i>Honglue Zhang, Qi Li, Xiaoping Zhang, and Wei Ba</i>                                                                                                  |     |
| Audio Source Separation from a Monaural Mixture Using Convolutional Neural Network in the Time Domain. . . . .                                           | 388 |
| <i>Peng Zhang, Xiaohong Ma, and Shuxue Ding</i>                                                                                                          |     |
| Input Dimension Determination of Linear Feedback Neural Network Applied for System Identification of Linear Systems . . . . .                            | 396 |
| <i>Wenle Zhang</i>                                                                                                                                       |     |

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| Joining External Context Characters to Improve Chinese Word Embedding . . . . . | 405 |
| <i>Xianchao Zhang, Shike Liu, Yuangang Li, and Wenxin Liang</i>                 |     |
| Enhancing Auscultation Capability in Spacecraft. . . . .                        | 416 |
| <i>Jin Zhou and Chiman Kwan</i>                                                 |     |
| Underwater Moving Target Detection Based on Image Enhancement. . . . .          | 427 |
| <i>Yan Zhou, Qingwu Li, and Guanying Huo</i>                                    |     |

### **Bio-signal and Medical Image Analysis**

|                                                                                                                  |     |
|------------------------------------------------------------------------------------------------------------------|-----|
| A New Epileptic Seizure Detection Method Based on Degree Centrality and Linear Features . . . . .                | 439 |
| <i>Haihong Liu, Qingfang Meng, Yingda Wei, Qiang Zhang, Mingmin Liu, and Jin Zhou</i>                            |     |
| A Comparison Between Two Motion-Onset Visual BCI Patterns: Diffusion vs Contraction . . . . .                    | 447 |
| <i>Minqiang Huang, Hanhan Zhang, Jing Jin, Yu Zhang, and Xingyu Wang</i>                                         |     |
| Detecting Community Structure Based on Optimized Modularity by Genetic Algorithm in Resting-State fMRI . . . . . | 457 |
| <i>Xing Hao Huang, Yu Qing Song, Ding An Liao, and Hu Lu</i>                                                     |     |
| Pin Defect Inspection with X-ray Images . . . . .                                                                | 465 |
| <i>Hsien-Pei Kao, Tzu-Chia Tung, Hong-Yi Chen, Cheng-Shih Wong, and Chiou-Shann Fuh</i>                          |     |
| A Study on the Effects of Lesions on CA3b in Hippocampus. . . . .                                                | 474 |
| <i>Babak Keshavarz-Hedayati, Nikitas Dimopoulos, and Arif Babul</i>                                              |     |
| Enhancement of Neuronal Activity by GABA <sub>b</sub> Receptor-Mediated Gliotransmission . . . . .               | 483 |
| <i>Taira Kobayashi, Asahi Ishiyama, and Osamu Hoshino</i>                                                        |     |
| The Feature Extraction Method of EEG Signals Based on Transition Network. . . . .                                | 491 |
| <i>Mingmin Liu, Qingfang Meng, Qiang Zhang, Dong Wang, and Hanyong Zhang</i>                                     |     |
| Deep Belief Networks for EEG-Based Concealed Information Test . . . . .                                          | 498 |
| <i>Qi Liu, Xiao-Guang Zhao, Zeng-Guang Hou, and Hong-Guang Liu</i>                                               |     |
| Cluster Aggregation for Analyzing Event-Related Potentials. . . . .                                              | 507 |
| <i>Reza Mahini, Tianyi Zhou, Peng Li, Asoke K. Nandi, Huanjie Li, Hong Li, and Fengyu Cong</i>                   |     |

|                                                                                                                                                                                          |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Detection of Epileptic Seizure in EEG Using Sparse Representation and EMD . . . . .                                                                                                      | 516        |
| <i>Qingfang Meng, Shanshan Chen, Haihong Liu, Yunxia Liu, and Dong Wang</i>                                                                                                              |            |
| Scaling of Texture in Training Autoencoders for Classification of Histological Images of Colorectal Cancer . . . . .                                                                     | 524        |
| <i>Tuan D. Pham</i>                                                                                                                                                                      |            |
| Multi-channel EEG Classification Based on Fast Convolutional Feature Extraction . . . . .                                                                                                | 533        |
| <i>Qian Wang, Yongjun Hu, and He Chen</i>                                                                                                                                                |            |
| Hearing Loss Detection in Medical Multimedia Data by Discrete Wavelet Packet Entropy and Single-Hidden Layer Neural Network Trained by Adaptive Learning-Rate Back Propagation . . . . . | 541        |
| <i>Shuihua Wang, Sidan Du, Yang Li, Huimin Lu, Ming Yang, Bin Liu, and Yudong Zhang</i>                                                                                                  |            |
| Study on Differences of Early-Mid ERPs Induced by Emotional Face and Scene Images . . . . .                                                                                              | 550        |
| <i>Xin Wang, Jingna Jin, Zhipeng Liu, and Tao Yin</i>                                                                                                                                    |            |
| Comparison of Functional Network Connectivity and Granger Causality for Resting State fMRI Data . . . . .                                                                                | 559        |
| <i>Ce Zhang, Qiu-Hua Lin, Chao-Ying Zhang, Ying-Guang Hao, Xiao-Feng Gong, Fengyu Cong, and Vince D. Calhoun</i>                                                                         |            |
| Neural Oscillations as a Bridge Between GABAergic System and Emotional Behaviors . . . . .                                                                                               | 567        |
| <i>Tao Zhang, Qun Li, and Zhuo Yang</i>                                                                                                                                                  |            |
| Impacts of Working Memory Training on Brain Network Topology . . . . .                                                                                                                   | 575        |
| <i>Dongping Zhao, Qiushi Zhang, Li Yao, and Xiaojie Zhao</i>                                                                                                                             |            |
| A Novel Biologically Inspired Hierarchical Model for Image Recommendation . . . . .                                                                                                      | 583        |
| <i>Yan-Feng Lu, Hong Qiao, Yi Li, Li-Hao Jia, and Ai-Xuan Zhang</i>                                                                                                                      |            |
| <b>Author Index . . . . .</b>                                                                                                                                                            | <b>591</b> |

# Contents – Part I

## Clustering, Classification, Modeling, and Forecasting

|                                                                                                                          |    |
|--------------------------------------------------------------------------------------------------------------------------|----|
| Online Multi-threshold Learning with Imbalanced Data Stream . . . . .                                                    | 3  |
| <i>Xufen Cai, Min Yang, Rong Zhu, Xiaoyan Li, Long Ye, and Qin Zhang</i>                                                 |    |
| A Comparative Study of Machine Learning Techniques for Automatic<br>Product Categorisation . . . . .                     | 10 |
| <i>Chanawee Chavaltada, Kitsuchart Pasupa, and David R. Hardoon</i>                                                      |    |
| Bootstrap Based on Generalized Regression Neural Network<br>for Landslide Displacement for Interval Prediction . . . . . | 18 |
| <i>Jiejie Chen, Zhigang Zeng, and Ping Jiang</i>                                                                         |    |
| Multi-task Learning with Cartesian Product-Based Multi-objective<br>Combination for Dangerous Object Detection . . . . . | 28 |
| <i>Yaran Chen and Dongbin Zhao</i>                                                                                       |    |
| Collaborative Response Content Recommendation for Customer<br>Service Agents . . . . .                                   | 36 |
| <i>Cuihua Ma, Ping Guo, Xin Xin, Xiaoyu Ma, Yanjie Liang,<br/>Shaomin Xing, Li Li, and Shaozhuang Liu</i>                |    |
| Text Classification Based on ReLU Activation Function<br>of SAE Algorithm . . . . .                                      | 44 |
| <i>Jia-le Cui, Shuang Qiu, Ming-yang Jiang, Zhi-li Pei, and Yi-nan Lu</i>                                                |    |
| On Designing New Structures with Emergent Computing Properties . . . . .                                                 | 51 |
| <i>Daniela Danciu and Vladimir Răsvan</i>                                                                                |    |
| Fast Sparse Least Squares Support Vector Machines by Block Addition . . . .                                              | 60 |
| <i>Fumito Ebuchi and Takuya Kitamura</i>                                                                                 |    |
| Construction and Analysis of Meteorological Elements<br>Correlation Network . . . . .                                    | 71 |
| <i>Cui-juan Fang, Feng-jing Shao, Wen-peng Zhou, Chun-xiao Xing,<br/>and Yi Sui</i>                                      |    |
| Classifying Helmeted and Non-helmeted Motorcyclists . . . . .                                                            | 81 |
| <i>Atsushi Hirota, Nguyen Huy Tiep, Le Van Khanh, and Natsuki Oka</i>                                                    |    |
| Dominant Set Based Density Kernel and Clustering . . . . .                                                               | 87 |
| <i>Jian Hou and Shen Yin</i>                                                                                             |    |

|                                                                                                                 |     |
|-----------------------------------------------------------------------------------------------------------------|-----|
| Web Content Extraction Using Clustering with Web Structure . . . . .                                            | 95  |
| <i>Xiaotao Huang, Yan Gao, Liqun Huang, Zhizhao Zhang, Yuhua Li,<br/>Fen Wang, and Ling Kang</i>                |     |
| Optimal KD-Partitioning for the Local Outlier Detection<br>in Geo-Social Points . . . . .                       | 104 |
| <i>Teerawat Kumrai, Kyoung-Sook Kim, Mianxiong Dong,<br/>and Hirotaka Ogawa</i>                                 |     |
| V2G Demand Prediction Based on Daily Pattern Clustering<br>and Artificial Neural Networks . . . . .             | 113 |
| <i>Junghoon Lee and Gyung-Leen Park</i>                                                                         |     |
| An Arctan-Activated WASD Neural Network Approach to the Prediction<br>of Dow Jones Industrial Average . . . . . | 120 |
| <i>Bolin Liao, Chuan Ma, Lin Xiao, Rongbo Lu, and Lei Ding</i>                                                  |     |
| State Estimation for Autonomous Surface Vehicles Based<br>on Echo State Networks. . . . .                       | 127 |
| <i>Zhouhua Peng, Jun Wang, and Dan Wang</i>                                                                     |     |
| Using Neural Network Formalism to Solve Multiple-Instance Problems . . . . .                                    | 135 |
| <i>Tomáš Pevný and Petr Somol</i>                                                                               |     |
| Many-Objective Optimisation of Trusses Through Meta-Heuristics . . . . .                                        | 143 |
| <i>Nantiwat Pholdee, Sujin Bureerat, Papot Jaroenapibal,<br/>and Thana Radpukdee</i>                            |     |
| Clustering with Multidimensional Mixture Models: Analysis<br>on World Development Indicators . . . . .          | 153 |
| <i>Leonard K.M. Poon</i>                                                                                        |     |
| Logic Calculation Based on Two-Domain DNA Strand Displacement . . . . .                                         | 161 |
| <i>Xiaobiao Wang, Changjun Zhou, Xuedong Zheng, and Qiang Zhang</i>                                             |     |
| Several Logic Gates Extended from MAGIC-Memristor-Aided Logic . . . . .                                         | 170 |
| <i>Lin Chen, Zhong He, Xiaoping Wang, and Zhigang Zeng</i>                                                      |     |
| Static Hand Gesture Recognition Based on RGB-D Image<br>and Arm Removal. . . . .                                | 180 |
| <i>Bingyuan Xu, Zhiheng Zhou, Junchu Huang, and Yu Huang</i>                                                    |     |
| Real-Time Classification Through a Spiking Deep Belief Network<br>with Intrinsic Plasticity . . . . .           | 188 |
| <i>Fangzheng Xue, Xuyang Chen, and Xiumin Li</i>                                                                |     |

|                                                                                                               |     |
|---------------------------------------------------------------------------------------------------------------|-----|
| Hamiltonian-Driven Adaptive Dynamic Programming Based on Extreme Learning Machine . . . . .                   | 197 |
| <i>Yongliang Yang, Donald Wunsch, Zhishan Guo, and Yixin Yin</i>                                              |     |
| An Enhanced K-Nearest Neighbor Classification Method Based on Maximal Coherence and Validity Ratings. . . . . | 206 |
| <i>Nian Zhang, Jiang Xiong, Jing Zhong, Lara Thompson, and Hong Ying</i>                                      |     |
| Credit Risk Assessment Based on Flexible Neural Tree Model . . . . .                                          | 215 |
| <i>Yishen Zhang, Dong Wang, Yuehui Chen, Yaou Zhao, Peng Shao, and Qingfang Meng</i>                          |     |
| A Portable Prognostic System for Bearing Monitoring . . . . .                                                 | 223 |
| <i>Bulent Ayhan, Chiman Kwan, and Steven Liang</i>                                                            |     |
| Parameter Estimation of Linear Systems with Quantized Innovations. . . . .                                    | 234 |
| <i>Changchang Hu</i>                                                                                          |     |
| LSTM with Matrix Factorization for Road Speed Prediction. . . . .                                             | 242 |
| <i>Jian Hu, Xin Xin, and Ping Guo</i>                                                                         |     |

## Cognition Computation and Neural Networks

|                                                                                                      |     |
|------------------------------------------------------------------------------------------------------|-----|
| Adaptive Control Strategy for Projective Synchronization of Neural Networks. . . . .                 | 253 |
| <i>Abdujelil Abdurahman, Cheng Hu, Ahmadjan Muhammadhaji, and Haijun Jiang</i>                       |     |
| Real-Time Decoding of Arm Kinematics During Grasping Based on F5 Neural Spike Data. . . . .          | 261 |
| <i>Narges Ashena, Vassilis Papadourakis, Vassilis Raos, and Erhan Oztop</i>                          |     |
| Application of Deep Belief Network to Land Cover Classification Using Hyperspectral Images . . . . . | 269 |
| <i>Bulent Ayhan and Chiman Kwan</i>                                                                  |     |
| Reservoir Computing with a Small-World Network for Discriminating Two Sequential Stimuli . . . . .   | 277 |
| <i>Ke Bai, Fangzhou Liao, and Xiaolin Hu</i>                                                         |     |
| Single Channel Speech Separation Using Deep Neural Network . . . . .                                 | 285 |
| <i>Linlin Chen, Xiaohong Ma, and Shuxue Ding</i>                                                     |     |
| Sparse Direct Convolutional Neural Network . . . . .                                                 | 293 |
| <i>Vijay Daultani, Yoshiyuki Ohno, and Kazuhisa Ishizaka</i>                                         |     |

|                                                                                                                                                                      |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Fuzzy Modeling from Black-Box Data with Deep Learning Techniques. . . . .                                                                                            | 304 |
| <i>Erick de la Rosa, Wen Yu, and Humberto Sossa</i>                                                                                                                  |     |
| Matrix Neural Networks. . . . .                                                                                                                                      | 313 |
| <i>Junbin Gao, Yi Guo, and Zhiyong Wang</i>                                                                                                                          |     |
| Simplified Particle Swarm Optimization Algorithm Based on Improved Learning Factors. . . . .                                                                         | 321 |
| <i>Wei Gao, Chuyi Song, Jingqing Jiang, and Chenggang Zhang</i>                                                                                                      |     |
| Synchronization Analysis for Complex Networks with Interval Coupling Delay. . . . .                                                                                  | 329 |
| <i>Dawei Gong, Xiaolin Dai, Jinliang Song, and Bonan Huang</i>                                                                                                       |     |
| FPGA Implementation of the $L$ Smallest $k$ -Subsets Sum Problem Based on the Finite-Time Convergent Recurrent Neural Network . . . . .                              | 337 |
| <i>Shenshen Gu and Xiaowen Wang</i>                                                                                                                                  |     |
| Accelerating Stochastic Variance Reduced Gradient Using Mini-Batch Samples on Estimation of Average Gradient. . . . .                                                | 346 |
| <i>Junchu Huang, Zhiheng Zhou, Bingyuan Xu, and Yu Huang</i>                                                                                                         |     |
| Coexistence and Local Exponential Stability of Multiple Equilibria in Memristive Neural Networks with a Class of General Nonmonotonic Activation Functions . . . . . | 354 |
| <i>Yujiao Huang, Shijun Chen, Jie Xiao, and Pengyi Hao</i>                                                                                                           |     |
| A Reinforcement Learning Method with Implicit Critics from a Bystander. . .                                                                                          | 363 |
| <i>Kao-Shing Hwang, Chi-Wei Hsieh, Wei-Cheng Jiang, and Jin-Ling Lin</i>                                                                                             |     |
| The Mixed States of Associative Memories Realize Unimodal Distribution of Dominance Durations in Multistable Perception . . . . .                                    | 371 |
| <i>Takashi Kanamaru</i>                                                                                                                                              |     |
| Possibilities of Neural Networks for Personalization Approaches for Prevention of Complications After Endovascular Interventions. . . . .                            | 379 |
| <i>Tatiana V. Lazovskaya, Dmitriy A. Tarkhov, Gelena A. Berezovskaya, Nikolay N. Petrishev, and Ildar U. Zulkarnay</i>                                               |     |
| Relief R-CNN: Utilizing Convolutional Features for Fast Object Detection. . .                                                                                        | 386 |
| <i>Guiying Li, Junlong Liu, Chunhui Jiang, Liangpeng Zhang, Minlong Lin, and Ke Tang</i>                                                                             |     |
| The Critical Dynamics in Neural Network Improve the Computational Capability of Liquid State Machines . . . . .                                                      | 395 |
| <i>Xiumin Li, Qing Chen, Fangzheng Xue, and Hongjun Zhou</i>                                                                                                         |     |

|                                                                                                                       |     |
|-----------------------------------------------------------------------------------------------------------------------|-----|
| Exponential Stability of the Coupled Neural Networks with Different State Dimensions . . . . .                        | 404 |
| <i>Jieyin Mai, Manchun Tan, Yunfeng Liu, and Desheng Xu</i>                                                           |     |
| Critical Echo State Networks that Anticipate Input Using Morphable Transfer Functions . . . . .                       | 413 |
| <i>Norbert Michael Mayer</i>                                                                                          |     |
| INFERNO: A Novel Architecture for Generating Long Neuronal Sequences with Spikes . . . . .                            | 421 |
| <i>Alex Pitti, Philippe Gaussier, and Mathias Quoy</i>                                                                |     |
| Global Exponential Stability for Matrix-Valued Neural Networks with Time Delay . . . . .                              | 429 |
| <i>Călin-Adrian Popa</i>                                                                                              |     |
| Global Asymptotic Stability for Octonion-Valued Neural Networks with Delay . . . . .                                  | 439 |
| <i>Călin-Adrian Popa</i>                                                                                              |     |
| Convolutional Neural Networks for Thai Poem Classification . . . . .                                                  | 449 |
| <i>Nuttachot Promrit and Sajjaporn Waijanya</i>                                                                       |     |
| A Quaternionic Rate-Based Synaptic Learning Rule Derived from Spike-Timing Dependent Plasticity . . . . .             | 457 |
| <i>Guang Qiao, Hongyue Du, and Yi Zeng</i>                                                                            |     |
| Cognitive Load Recognition Using Multi-channel Complex Network Method. . . . .                                        | 466 |
| <i>Jian Shang, Wei Zhang, Jiang Xiong, and Qingshan Liu</i>                                                           |     |
| Event-Triggering Sampling Based Synchronization of Delayed Complex Dynamical Networks: An M-matrix Approach . . . . . | 475 |
| <i>Yang Tang</i>                                                                                                      |     |
| Learning Human-Understandable Description of Dynamical Systems from Feed-Forward Neural Networks. . . . .             | 483 |
| <i>Sophie Tournet, Enguerrand Gentet, and Katsumi Inoue</i>                                                           |     |
| Stability and Stabilization of Time-Delayed Fractional Order Neural Networks via Matrix Measure. . . . .              | 493 |
| <i>Fei Wang, Yongqing Yang, Jianquan Lu, and Jinde Cao</i>                                                            |     |
| Metrics and the Cooperative Process of the Self-organizing Map Algorithm. . . . .                                     | 502 |
| <i>William H. Wilson</i>                                                                                              |     |

|                                                                                                                             |            |
|-----------------------------------------------------------------------------------------------------------------------------|------------|
| A Cooperative Projection Neural Network for Fast Solving Linear<br>Reconstruction Problems . . . . .                        | 511        |
| <i>Youshen Xia</i>                                                                                                          |            |
| A Complex Gradient Neural Dynamics for Fast Complex<br>Matrix Inversion . . . . .                                           | 521        |
| <i>Lin Xiao, Bolin Liao, Qinli Zeng, Lei Ding, and Rongbo Lu</i>                                                            |            |
| Burst and Correlated Firing in Spiking Neural Network<br>with Global Inhibitory Feedback . . . . .                          | 529        |
| <i>Jinli Xie, Qinqun Zhao, and Jianyu Zhao</i>                                                                              |            |
| A Soft Computing Prefetcher to Mitigate Cache Degradation<br>by Web Robots. . . . .                                         | 536        |
| <i>Ning Xie, Kyle Brown, Nathan Rude, and Derek Doran</i>                                                                   |            |
| A Caputo-Type Fractional-Order Gradient Descent Learning<br>of BP Neural Networks . . . . .                                 | 547        |
| <i>Guoling Yang, Bingjie Zhang, Zhaoyang Sang, Jian Wang,<br/>and Hua Chen</i>                                              |            |
| Attracting Sets of Non-autonomous Complex-Valued Neural Networks<br>with both Distributed and Time-Varying Delays . . . . . | 555        |
| <i>Zhao Yang and Xiaofeng Liao</i>                                                                                          |            |
| Stability of Complex-Valued Neural Networks with Two Additive<br>Time-Varying Delay Components . . . . .                    | 564        |
| <i>Zhenjiang Zhao, Qiankun Song, and Yuchen Zhao</i>                                                                        |            |
| Alpine Plants Recognition with Deep Convolutional Neural Network . . . . .                                                  | 572        |
| <i>Tomoaki Negishi and Motonobu Hattori</i>                                                                                 |            |
| <b>Author Index . . . . .</b>                                                                                               | <b>579</b> |