Lecture Notes in Computer Science **10634**

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

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

Derong Liu · Shengli Xie
Yuanqing Li · Dongbin Zhao
El-Sayed M. El-Alfy (Eds.)

Neural Information Processing

24th International Conference, ICONIP 2017 Guangzhou, China, November 14–18, 2017 Proceedings, Part I

Springer

Editors
Derong Liu
Guangdong University of Technology
Guangzhou
China

Shengli Xie
Guangdong University of Technology
Guangzhou
China

Yuanqing Li
South China University of Technology
Guangzhou
China

Dongbin Zhao
Institute of Automation
Chinese Academy of Sciences
Beijing
China

El-Sayed M. El-Alfy
King Fahd University of Petroleum and Minerals
Dhahran
Saudi Arabia

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-70086-1 ISBN 978-3-319-70087-8 (eBook)
https://doi.org/10.1007/978-3-319-70087-8

Library of Congress Control Number: 2017957558

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

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

ICONIP 2017 – the 24th International Conference on Neural Information Processing – was held in Guangzhou, China, continuing the ICONIP conference series, which started in 1994 in Seoul, South Korea. Over the past 24 years, ICONIP has been held in Australia, China, India, Japan, Korea, Malaysia, New Zealand, Qatar, Singapore, Thailand, and Turkey. ICONIP has now become a well-established, popular and high-quality conference series on neural information processing in the region and around the world. With the growing popularity of neural networks in recent years, we have witnessed an increase in the number of submissions and in the quality of papers. Guangzhou, Romanized as Canton in the past, is the capital and largest city of southern China's Guangdong Province. It is also one of the five National Central Cities at the core of the Pearl River Delta. It is a key national transportation hub and trading port. November is the best month in the year to visit Guangzhou with comfortable weather. All participants of ICONIP 2017 had a technically rewarding experience as well as a memorable stay in this great city.

A neural network is an information processing structure inspired by biological nervous systems, such as the brain. It consists of a large number of highly interconnected processing elements, called neurons. It has the capability of learning from example. The field of neural networks has evolved rapidly in recent years. It has become a fusion of a number of research areas in engineering, computer science, mathematics, artificial intelligence, operations research, systems theory, biology, and neuroscience. Neural networks have been widely applied for control, optimization, pattern recognition, image processing, signal processing, etc.

ICONIP 2017 aimed to provide a high-level international forum for scientists, researchers, educators, industrial professionals, and students worldwide to present state-of-the-art research results, address new challenges, and discuss trends in neural information processing and applications. ICONIP 2017 invited scholars in all areas of neural network theory and applications, computational neuroscience, machine learning, and others.

The conference received 856 submissions from 3,255 authors in 56 countries and regions across all six continents. Based on rigorous reviews by the Program Committee members and reviewers, 563 high-quality papers were selected for publication in the conference proceedings. We would like to express our sincere gratitude to all the reviewers for the time and effort they generously gave to the conference. We are very grateful to the Institute of Automation of the Chinese Academy of Sciences, Guangdong University of Technology, South China University of Technology, Springer's *Lecture Notes in Computer Science* (LNCS), IEEE/CAA *Journal of Automatica Sinica* (JAS), and the Asia Pacific Neural Network Society (APNNS) for their financial support. We would also like to thank the publisher, Springer, for their cooperation in

publishing the proceedings in the prestigious LNCS series and for sponsoring the best paper awards at ICONIP 2017.

September 2017

Derong Liu
Shengli Xie
Yuanqing Li
Dongbin Zhao
El-Sayed M. El-Alfy

ICONIP 2017 Organization

General Chair

Derong Liu	Chinese Academy of Sciences and Guangdong University of Technology, China

Advisory Committee

Sabri Arik	Istanbul University, Turkey
Tamer Basar	University of Illinois, USA
Dimitri Bertsekas	Massachusetts Institute of Technology, USA
Jonathan Chan	King Mongkut's University of Technology, Thailand
C.L. Philip Chen	The University of Macau, SAR China
Kenji Doya	Okinawa Institute of Science and Technology, Japan
Minyue Fu	The University of Newcastle, Australia
Tom Gedeon	Australian National University, Australia
Akira Hirose	The University of Tokyo, Japan
Zeng-Guang Hou	Chinese Academy of Sciences, China
Nikola Kasabov	Auckland University of Technology, New Zealand
Irwin King	Chinese University of Hong Kong, SAR China
Robert Kozma	University of Memphis, USA
Soo-Young Lee	Korea Advanced Institute of Science and Technology, South Korea
Frank L. Lewis	University of Texas at Arlington, USA
Chu Kiong Loo	University of Malaya, Malaysia
Baoliang Lu	Shanghai Jiao Tong University, China
Seiichi Ozawa	Kobe University, Japan
Marios Polycarpou	University of Cyprus, Cyprus
Danil Prokhorov	Toyota Technical Center, USA
DeLiang Wang	The Ohio State University, USA
Jun Wang	City University of Hong Kong, SAR China
Jin Xu	Peking University, China
Gary G. Yen	Oklahoma State University, USA
Paul J. Werbos	Retired from the National Science Foundation, USA

Program Chairs

Shengli Xie	Guangdong University of Technology, China
Yuanqing Li	South China University of Technology, China
Dongbin Zhao	Chinese Academy of Sciences, China
El-Sayed M. El-Alfy	King Fahd University of Petroleum and Minerals, Saudi Arabia

Program Co-chairs

Shukai Duan	Southwest University, China
Kazushi Ikeda	Nara Institute of Science and Technology, Japan
Weng Kin Lai	Tunku Abdul Rahman University College, Malaysia
Shiliang Sun	East China Normal University, China
Qinglai Wei	Chinese Academy of Sciences, China
Wei Xing Zheng	University of Western Sydney, Australia

Regional Chairs

Cesare Alippi	Politecnico di Milano, Italy
Tingwen Huang	Texas A&M University at Qatar, Qatar
Dianhui Wang	La Trobe University, Australia

Invited Session Chairs

Wei He	University of Science and Technology Beijing, China
Dianwei Qian	North China Electric Power University, China
Manuel Roveri	Politecnico di Milano, Italy
Dong Yue	Nanjing University of Posts and Telecommunications, China

Poster Session Chairs

Sung Bae Cho	Yonsei University, South Korea
Ping Guo	Beijing Normal University, China
Yifei Pu	Sichuan University, China
Bin Xu	Northwestern Polytechnical University, China
Zhigang Zeng	Huazhong University of Science and Technology, China

Tutorial and Workshop Chairs

Long Cheng	Chinese Academy of Sciences, China
Kaizhu Huang	Xi'an Jiaotong-Liverpool University, China
Amir Hussain	University of Stirling, UK

James Kwok	Hong Kong University of Science and Technology, SAR China
Huajin Tang	Sichuan University, China

Panel Discussion Chairs

Lei Guo	Beihang University, China
Hongyi Li	Bohai University, China
Hye Young Park	Kyungpook National University, South Korea
Lipo Wang	Nanyang Technological University, Singapore

Award Committee Chairs

Haibo He	University of Rhode Island, USA
Zhong-Ping Jiang	New York University, USA
Minho Lee	Kyungpook National University, South Korea
Andrew Leung	City University of Hong Kong, SAR China
Tieshan Li	Dalian Maritime University, China
Lidan Wang	Southwest University, China
Jun Zhang	South China University of Technology, China

Publicity Chairs

Jun Fu	Northeastern University, China
Min Han	Dalian University of Technology, China
Yanjun Liu	Liaoning University of Technology, China
Stefano Squartini	Università Politecnica delle Marche, Italy
Kay Chen Tan	National University of Singapore, Singapore
Kevin Wong	Murdoch University, Australia
Simon X. Yang	University of Guelph, Canada

Local Arrangements Chair

Renquan Lu	Guangdong University of Technology, China

Publication Chairs

Ding Wang	Chinese Academy of Sciences, China
Jian Wang	China University of Petroleum, China

Finance Chair

Xinping Guan	Shanghai Jiao Tong University, China

Registration Chair

Qinmin Yang	Zhejiang University, China

Conference Secretariat

Biao Luo	Chinese Academy of Sciences, China
Bo Zhao	Chinese Academy of Sciences, China

Contents

Machine Learning

Reinforcement Learning

Big Data Analysis