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IFIP was founded in 1960 under the auspices of UNESCO, following the first World Computer Congress held in Paris the previous year. A federation for societies working in information processing, IFIP's aim is two-fold: to support information processing in the countries of its members and to encourage technology transfer to developing nations. As its mission statement clearly states:

IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.

IFIP is a non-profit-making organization, run almost solely by 2500 volunteers. It operates through a number of technical committees and working groups, which organize events and publications. IFIP's events range from large international open conferences to working conferences and local seminars.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is generally smaller and occasionally by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

IFIP distinguishes three types of institutional membership: Country Representative Members, Members at Large, and Associate Members. The type of organization that can apply for membership is a wide variety and includes national or international societies of individual computer scientists/ICT professionals, associations or federations of such societies, government institutions/government related organizations, national or international research institutes or consortia, universities, academies of sciences, companies, national or international associations or federations of companies.

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Zhongzhi Shi · Eunika Mercier-Laurent
Jiuyong Li (Eds.)

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Preface

This volume comprises the papers collected in the 10th IFIP International Conference on Intelligent Information Processing. As the world proceeds quickly into the Information Age, it encounters both successes and challenges, and it is well recognized that intelligent information processing provides the key to solve many challenges in the Information Age. Intelligent Information Processing supports the most advanced techniques that are able to change human life and the world. However, the path to the success is never a straight one. Every new technology brings with it many challenging problems, and researchers are in great demand to tackle the challenging problems. This conference provides a forum for engineers and scientists in research institutes, universities, and industries to report and discuss their latest research progresses in all aspects of intelligent information processing.

We received more than 80 papers, of which 37 papers are included in this volume as regular papers and 8 as short papers. All submitted papers were reviewed by at least two reviewers. We are grateful for the dedicated work of both authors and reviewers.

A conference such as this cannot succeed without the help of many individuals who contributed their valuable time and expertise. We want to express our sincere gratitude to the Program Committee members and reviewers, who invested many hours for reviews and deliberations. They have provided detailed and constructive review comments that have significantly improved the quality of the papers included in this volume.

We are very grateful to have the sponsorship of the following organizations: IFIP TC12, Guangxi University, and Institute of Computing Technology, Chinese Academy of Sciences. We would like to specially thank Cheng Zhong and Zuqiang Meng for organizing the conference and Xin Hong for carefully checking the proceedings.

Finally, we hope you find this volume inspiring and informative. We wish that the research results reported in the proceedings will bear fruit over the years to come.

August 2018

Zhongzhi Shi
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**Keynote and Invited
Presentations**

Advances in Transfer Learning

Qiang Yang

Chair Professor at Computer Science and Engineering Department,
Hong Kong University of Science and Technology, China

Abstract. Transfer learning aims to leverage knowledge from existing tasks to solve new tasks. In this talk, I will give an overview of recent advances of transfer learning and point to future works that both have practical significance and theoretical potential.

Grounding and Learning About Human Environments and Activities for Autonomous Robots

Anthony G. Cohn

Director of Research and Innovation, School of Computing,
University of Leeds, Leeds, LS2 9JT, UK
Distinguished Visiting Professor at Tongji University

Abstract. With the recent proliferation of human-oriented robotic applications in domestic and industrial scenarios, it is vital for robots to continually learn about their environments and about the humans they share their environments with. In this paper, we present a novel, online, incremental framework for *unsupervised* symbol grounding in real-world, human environments for autonomous robots. We demonstrate the flexibility of the framework by learning about colours, people names, usable objects and simple human activities, integrating state-of-the-art object segmentation, pose estimation, activity analysis along with a number of sensory input encodings into a continual learning framework. Natural language is grounded to the learned concepts, enabling the robot to communicate in a human-understandable way. We show, using a challenging real-world dataset of human activities as perceived by a mobile robot, that our framework is able to extract useful concepts, ground natural language descriptions to them, and, as a proof-of-concept, generate simple sentences from templates to describe people and the activities they are engaged in.

Artificial Intelligence Overview and Impacts

Eunika Mercier-Laurent

University of Reims Champagne-Ardenne,
Saint Drezero, France

Abstract. The recent craze for AI and limitation to data, deep learning and chat bots cover only a very small part of AI patrimony. Facing various and difficult challenges requires knowing the whole spectrum in aim to select the best approach and techniques. Environmental impact and climate change can be easily faced by right AI and alternative thinking. Smart software (and hardware) conceived using eco-design approach have a potential to reduce our impact and bring a contribution to the Planet protection.

Is Knowledge Engineering Out-of-Date?

Yueting Zhuang

Dean of College of Computer Science,
Zhejiang University

Abstract. The world is now in the era of a new wave AI technology. Though, many of us still remembered the days when knowledge Engineering along with expert system was extremely hot, in such a state that is similar to deep learning or machine learning nowadays. This talk will first give a short survey of AI, especially the concept of knowledge Engineering, rule-based expert system, and so on, and then introduce the data-driven machine learning approaches used in systems like Wikipedia, Freebase, Google Knowledge Graph etc. It will conclude that knowledge engineering is NOT out-of-date. What indeed outdated is the method of knowledge acquisition. Finally it will introduce knowledge computing engine in order to support knowledge engineering.

Deep Learning Based Image Interpretation

Lichen Jiao

School of Artificial Intelligence at Xidian University,
Xi'an, China

Abstract. With the development of sensor and data storage technology, the data acquisition becomes easier, but it brings “big data” problems, of which, Images are the most common information sources in daily life. Compared with other information sources, the images contain huge amounts of information, and its complexity, redundancy and other characteristics distinguish it from other information sources. The image processing is relatively difficult, and the human visual system has shown excellent capabilities in image processing, which attracting the attention of many researchers. The application of deep learning model in recent years has made a new progress in the study of deep neural networks and brought a new research boom.

Effective Utilization of Genomic Data

Yadong Wang

School of Computer Science and Technology,
Harbin Institute of Technology, China

Abstract. With the rapid development and wide application of high-throughput genome sequencing technology, a series of large scale international genomics study plans have been carried out. This makes an explosive and continuous growth of genomics data, and the in depth integration of genomics data and healthcare data, which triggers a “data revolution” in life science.

Nowadays, the effective use of genomics data has become an engine critical to the development of life science as well as other related fields such as healthcare, medicine, drug development, etc. Genomics data has large volume, various data structures and complex relationships, which makes it difficult to effectively analyze and utilize. State of the art genomics data analysis technologies can merely dig out 30–50% of the value of the data, i.e., the large potentials of the data cannot be fully realized. This has been one of the biggest challenges to genomics and bioinformatics.

The drawbacks of the existing analysis approaches, including (but not limited to) low sensitivity, low accuracy, low consistency, low efficiency, etc., are the bottlenecks to the effective use of genomics data. It is the main way to solve these problems by developing advanced bioinformatics algorithms, to continuously improve the quality and efficiency of data analysis. Centers for Bioinformatics of Harbin Institute of technology have made great efforts in recent years to develop a batch of innovative genomics data analysis algorithms and systems. These algorithms and systems substantially improve their performances for a series of fundamental genomics data analysis, such as sequencing read alignment, variant calling and genomics big data visualization. With these achievements, several technical bottlenecks have been breakthrough, which make large contributions to the effective use of genomics.

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