Akito Sakurai
Kôiti Hasida
Katsumi Nitta (Eds.)

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New Frontiers in Artificial Intelligence

JSAI 2003 and JSAI 2004 Conferences and Workshops
Niigata, Japan, June 2003 and Kanazawa, Japan, May/June 2004
Revised Selected Papers

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Lecture Notes in Artificial Intelligence 3609

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

Preface

This volume contains selected research results on intelligent information technology presented at the 17th and the 18th Annual Conferences of the Japanese Society for Artificial Intelligence (JSAI 2003 and JSAI 2004) and at other co-located international JSAI 2004 workshops.

Intelligent information technology is progressing year by year around the world. Japan is no exception, where researchers and engineers have long been enchanted by intelligent behavior of humans, as observed from wooden mechanical robots of the Edo era, among other things. The current interests of researchers in the field range from mathematical foundation to engineering realization, from cognitive science to robot behaviors, from language origin to document processing, from communicative mechanisms to the Internet, and so forth, as demonstrated by the fields covered in this volume.

The award-winning papers for JSAI 2003 and JSAI 2004 were selected from among all papers presented at the main conferences. They were first recommended by session chairs and general audience, then discussed in detail and finally voted on by Program Committee members.

The objective of WABM 2003 (the International Workshop on Agent-Based Modeling) was to advance efforts to foster the formation of an active multi-disciplinary community focusing on multi-agent, computational economics, organizational science, social dynamics, and complex adaptive systems. This was a continuation and extension of the First and Second AESCS (Agent-based approach to Economic and Social Complex Systems) 2001 and CS 02 (the Sixth International Conferences on Complex Systems).

The SWSW (From Semantic Web to Semantic World) workshop featured attempts to extend and generalize the semantic Web. The Semantic Web aims at a computer-understandable Web, whereas this workshop envisioned making it possible for people and artifacts to share the meaning of digital content including Web pages in order to ground the digital world in the human life-world.

EELC (the 1st International Workshop on Emergence and Evolution of Linguistic Communication) was held to promote cross-disciplinary discussions among researchers interested in the diachronic rule changes of natural language as seen in usage, grammar, and vocabulary and which depend on the social situations of the language community.

LENLS (the Workshop on Logic and Engineering of Natural Language Semantics) was organized to explore and develop a new field of dynamic semantics and to examine its application to natural language. Dynamic semantics deals with the dynamic aspects of communication and accordingly is expected to systematically address linguistic phenomena such as discourse and anaphora.

AM-2004 (the 3rd International Workshop on Active Mining) brought researchers together to discuss new directions in knowledge discovery studies for real-world applications, handling various kinds of data with actual user needs.

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Active mining emphasizes active aspects in collection, mining, and interaction with the user, in order to resolve the problem of information flood.

LSGRID 2004 (the 1st International Workshop on Life Science Grid) turned out to be a fairly large workshop and has published its post-proceedings papers as a separate LNAI volume.

We have compiled this volume in order to introduce these excellent, but internationally little-known, studies on intelligent information technology in Japan to a wider audience. We also aim to publicize these high-quality international workshop discussions, to contribute to the further development of the ever-growing studies in the field.

April 2006 Akito Sakurai

Organization

Organization and Editorial Board

The award-winning papers were selected by the Program Committee of the annual conference of JSAI (Japan Society for Artificial Intelligence) 2003 and 2004. The paper selection of each co-located international workshop was made by the Program Committee of the respective workshop. Upon the decisions of the paper awards and the paper selections, each chapter was edited by the Program Chairs of the 17th and 18th annual conference of JSAI and the co-located international workshops. The entire contents and structure of the book were managed and edited by volume editors.

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Part I

17th Annual Conference of the Japanese Society for Artificial Intelligence (JSAI 2003) Award-Winning Papers

Award-Winning Papers (Overview)

Katsumi Nitta

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On behalf of the program committee (PC) of JSAI 2003, I would like to thank all the chair persons, discussants, and attentive audience who contributed to select these awarded papers.

JSAI 2003 was held from 25 to 27 of June 2003, where 255 technical papers were presented in 42 sessions.

During JSAI 2003, at least two PC members participated in each session, and after the conference, the PC members and the session chair person nominated candidate papers for the award from each session by submitting reports which described the reasons of the nomination. As a result of the first stage, 28 papers were nominated. Then, as the second stage, PC members exchanged their opinions about evaluation of each paper by email, and finally they selected 5 papers for the award by voting. Among them, one author is declined of translating his paper in English, four papers are included in this special edition.

Followings are their overviews.

1. Bus Information System based on User Models and Dynamic Generation of VoiceXML Script by Shinichi Ueno, Fumihito Adachi, Kazunori Komatani, Tatsuya Kawahara, and Hiroshi G. Okuno:

This paper presents flexible dialogue management for various user utterance. Real dialogue data are collected by Kyoto city bus information system, and user models are construected based on the analysis. There are three categories of user models such as skill level, knowledge level of the task domain and the degree of hastiness to generate cooperative response to the user. These user models are constructed by decision tree learning technique. Features specific to spoken dialogue systems as well as semantic attributes are used in the classification. Experimental evaluation shows thet the cooperative responses adaptive to individual users serve as good guidance for novice users without increasing the dialogue durtion for the skilled users.

2. Efficient ALgorithms for Finding Frequent Substructures from Semi-structured Data Streams by Tatsuya Asai, Kenji Abe, Shinji Kawagoe, Hiroshi Arimura, and Setsuo Arikawa:

This paper presents efficient online data mining algorithms from streams of semi-structured data. Recently, new types of application programs on the network have been developed. These programs treat semi-structured data such as XML data. The semi-structured data are modeled as labeled ordered trees. The online algorithm, Stream T, receives fragments of an unseen possibly infinite semi-structured data in the document order through a data stream, and outputs the current set of frequent patterns on request at any time. These algorithms

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