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IFIP – The International Federation for Information Processing

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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Eunika Mercier-Laurent · Danielle Boulanger (Eds.)

Artificial Intelligence for Knowledge Management

4th IFIP WG 12.6 International Workshop, AI4KM 2016
Held at IJCAI 2016
New York, NY, USA, July 9, 2016
Revised Selected Papers

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Preface

The third wave of Artificial intelligence (AI) focuses more on exploring data than on knowledge. Most of the papers presented at the International Joint Conference on Artificial Intelligence (IJCAI) 2016 (http://www.ijcai-16.org/) were devoted to exploring exponentially growing data.

Knowledge management, which is still a challenge for many organizations, needs all facets of AI. This book aims to challenge researchers and practitioners in better exploring the three generations of AI and integrating international feedback from experience.

Knowledge management (KM) is a large multidisciplinary field with roots in management and AI. AI contributes to the way of thinking, knowledge modeling, knowledge processing, and problem-solving techniques. Knowledge is one of the intangible capitals that influence the performance of organizations and their capacity to innovate. Since the beginning of the KM movement in the early 1990s, companies and nonprofit organizations have experimented with various approaches.

Following the first AI4KM (Artificial Intelligence for Knowledge Management) organized by IFIP (International Federation for Information Processing) group TC12.6 (Knowledge Management) in partnership with ECAI (European Conference on Artificial Intelligence) held in 2012, and the second workshop hold during the Federated Conferences on Computer Science and Information Systems (Fedcsis) in 2014 in conjunction with the Knowledge Acquisition and Management Conference (KAM), the third manifestation initiated a partnership with IJCAI (International Joint Conference on Artificial Intelligence) in 2015. The Fourth AI4KM was held during IJCAI 16, in New York.

The objective of this multidisciplinary cooperation is still to raise the interest of AI researchers and practitioners in KM challenges, to discuss methodological, technical, and organizational aspects of AI used for KM, and to share feedback on KM applications using AI.

We would like to thank the members of the Program Committee, who reviewed the papers and helped put together an interesting program in New York. We would also like to thank all the authors. Finally, our thanks go to the local Organizing Committee and all the supporting institutions and organizations.

This volume contains selected papers presented during the workshop. After the presentation, the authors were asked to extend their proposals by highlighting their original thoughts. The selection focused on new contributions in any research area concerning the use of all AI fields for KM. An extended Program Committee evaluated the last versions of the proposals, leading to these proceedings.

We had an opportunity to host Dr. Janusz Wojtusiak from the Health Informatics Program, George Mason University, Fairfax on "Guiding Supervised Learning by Bio-Ontologies in Medical Data Analysis." His team paper describes the use of data semantics and ontologies in health and medical applications of supervised learning, and

particularly describes how the Unified Medical Language System collaborate within the AQ21 rule-learning software.

This is followed by "Using Ontologies to Access Complex Data: Applications in Bio-Imaging." The authors propose a methodology combining a semantic approach with data management for more accurate searching and sharing of complex data in an organization.

The authors of "Dynamic Ontology Supporting Local Government" present their dynamic ontology-based knowledge model, designed to share and manage urban knowledge among representative of local self-government.

The next article entitled "Conceptual Navigation for Polyadic Formal Concept Analysis" describes the authors' formal concept analysis, which is a mathematically inspired knowledge representation with wide applications in knowledge discovery and decision support.

It is followed by "Highlighting Trendsetters in Educational Platforms by Means of Formal Concept Analysis and Answer Set Programming" presenting a Web-based educational system based on the analysis of the students' behavior aimed at developing methods to improve blended and e-learning systems.

The authors of "Selection of Free Software Useful in Business Intelligence: Teaching Methodology Perspective" propose methodology and a list of criteria for selecting free software tools to teach business intelligence especially adapted to small businesses.

The contribution entitled "Internet Platform for City Dwellers Based on Open Source Systems" presents the increasing intensification of activities of urban systems and proposes an Internet platform that will synchronize all processes occurring in the smart city and support the development of new ideas for improving life in the city.

This article is followed by "Segmentation of Social Network Users in Turkey," which presents an analysis of Turkish Twitter content using the self-organizing maps method. The results obtained demonstrate that by using segmentation, an important knowledge source can be derived and used as a tool for analyzing the market penetration of advertisements.

Finally, "Toward Semantic Reasoning in Knowledge Management Systems" examines the requirements and limitations of current commercial KM systems and proposes a new approach to semantic reasoning supporting big data access, analytics, reporting, and automation-related tasks. The resulting semantic-based analytics workflow was implemented for Siemens power generation plants.

The papers in this volume cover topics at the intersection of machine learning, knowledge models, KM and Web, knowledge capturing and learning, and KM and AI.

We hope you will enjoy reading these papers.

January 2018
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Organization

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IJCAI-16

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