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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 · M. Özgür Kayalica ·
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Artificial Intelligence for Knowledge Management

8th IFIP WG 12.6 International Workshop, AI4KM 2021
Held at IJCAI 2020
Yokohama, Japan, January 7–8, 2021
Revised Selected Papers

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Preface

Welcome to the proceedings of the 8th IFIP WG 12.6 International Workshop on Artificial Intelligence for Knowledge Management (AI4KM 2021), which was held in conjunction with the 29th International Joint Conference on Artificial Intelligence and the 17th Pacific Rim International Conference on Artificial Intelligence (IJCAI-PRICAI 2020). IJCAI-PRICAI 2020 was planned to take place in Yokohama, Japan, during August 2020, but the COVID-19 pandemic changed the initial plan and the conference went online in January 2021. The virtual conference was as amazing as the previous in-person editions of IJCAI, with both engaging discussions and social events.

The technical program of IJCAI-PRICAI 2020 was very rich with new topics such as Artificial Intelligence (AI) ethics, and the main conference touched on components of knowledge management (KM) such as knowledge representation, dynamics of knowledge, knowledge base, knowledge transfer, shared knowledge, knowledge engineering, visual knowledge, and combining knowledge with deep convolutional neural networks.

Knowledge management is a large multidisciplinary field having its roots in both management and AI. 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. AI has brought additional knowledge modeling, knowledge processing, and problem-solving techniques. The AI4KM workshop aims to bridge the gap between AI and knowledge management to advance new methods for organizing, accessing, and exploiting multidisciplinary knowledge.

Understanding the benefits of knowledge management for research, organizations, and business and applying it is still a challenge for many. The overall process involving people, big data, and all kinds of computers and applications has the potential to accelerate discovery and innovation by organizing and optimizing the flow of knowledge. This collection of selected, extended, and updated papers from AI4KM 2021 aims to raise awareness among AI researchers and practitioners about KM challenges so that we can better explore all fields of AI and integrate real-world feedback from experience of AI in KM applications.

The first AI4KM workshop was organized by the International Federation for Information Processing (IFIP) Working Group 12.6 (Knowledge Management) in partnership with the European Conference on Artificial Intelligence (ECAI) in 2012, and the second workshop was held two years later during the Federated Conference on Computer Science and Information Systems (FedCSIS) in conjunction with the 20th Conference on Knowledge Acquisition and Management conference (KAM 2014). The third edition of the workshop saw the beginning of the partnership with the International Joint Conference on Artificial Intelligence (IJCAI) in 2015. The fourth AI4KM workshop was held as part of IJCAI 2016 in New York, USA, and the fifth workshop took place in Melbourne, Australia, co-located with IJCAI 2017, followed by the sixth

edition at IJCAI-ECAI 2018 in Stockholm, Sweden, and the seventh edition at IJCAI 2019 in Macao, China.

The objectives of AI4KM 2021 were to continue to promote the interest of AI researchers and practitioners in knowledge management challenges, to discuss methodological, technical and organizational aspects of AI used for knowledge management, and to share feedback on KM applications in various fields using AI.

The topic of this year's workshop was "AI for Sustainable Future".

AI4KM 2021 took place virtually during January 7–8, 2021. The workshop opened with our invited talk given by Anthony Wong, Vice President of IFIP, who addressed a timely and controversial topic: **"Ethics and Regulation of Artificial Intelligence"**. Paradoxically AI helps humans and is an object of controversy, fear, and imaginary threats. As with many inventions, AI can be used for peaceful as well as military applications. Manipulation of data to obtain the desired results leads to the infamous problem of bias. Our invited talk discussed the main threats and the ways to avoid some of them.

The first session devoted to AI for Society and Education began with a presentation on **"Ontologies Cooperation to Model the Needs of Disabled Persons"**. In France, various forms of assistance are available for people with disabilities and it is not easy to know what type of aid a given person may be entitled to. Proposed distributed ontology groups information from heterogeneous sources. A workflow guides the impaired person in finding adequate help.

The second paper proposed a **"Conceptual Framework of Intelligent Management Control System for Higher Education"**. The university management control system should consider the processing of management information for management purposes, allowing for the relationships between different groups of stakeholders. The specificity of the university operation assumes that long-term scientific research and educational programs are conducted.

The next presentation entitled **"Curriculum Vitae (CVs) Evaluation Using Machine Learning Approach"** concerned the continuation of PhD research on knowledge management powered by AI for the evaluation of international students' profiles, which was first presented during AI4KM 2018. Based on his own experience in recruitment of students, the author explains why machine learning is the most appropriate method for CV text mining. Some experiments were presented, and the results were discussed.

"University Students' Research on Artificial Intelligence and Knowledge Management. A Review and Report of Multi-case Studies" presented and discussed the analysis of students' thesis topics defended in the last 10 years in business informatics and computer science at two selected universities in Poland. This study relied on a detailed review and analysis of qualitative data.

The second session on AI for Business and Sustainable Cities began with a paper on **"Customer Churn Prediction in FMCG Sector Using Machine Learning Applications"**. The authors experimented with the contribution of various machine learning algorithms applied on a real data set obtained in the Turkish market to predict the churn behavior of the most valuable part of the existing customer base of some FMCG brands.

The next three presentations were devoted to various aspects of Smart Cities.

The first, entitled **“Crowdsourcing as a Tool Supporting Intra-city Communication”** discussed various aspects of the development of Smart City, such as civic budget and the interaction between local administration, residents, and stakeholders. The author described the concept of crowdsourcing applied to knowledge acquisition by city leaders and its impact on the decisions in a Smart City.

The following speaker addressed the **“Importance of the Internet of Things for Smart Cities”**. After defining the scope of a smart city, she presented an overview of IoT technologies and discussed their potential usefulness for the city.

Metropolitan cities are all concerned by climate change. While many conferences express wishes, the authors of the paper entitled **“Developing a Knowledge Base for Climate Change for Metropolitan Cities”** presented an incremental approach for building collaboratively a knowledge base of best practices in recycling products, beginning with the recycling of electronic devices.

The session that took place on January 8, 2021, devoted to AI for Industry and Sustainability began with the question **“Can Artificial Intelligence Effectively Support Sustainable Development?”** Sustainable development is currently among the most important challenges, and ‘sustainability’ and ‘development’ may, on the face of it, appear to be opposing objectives. However, AI can help in protecting our planet by allowing decision makers to evaluate the likely impacts of various applications and technologies, and thus apply the “right technique for the right problem”.

“Holistic Approach to Smart Factory” provided an overall view of the techniques deployed in a smart factory. The author explained how to apply AI to digital twins and how it can be integrated with the other components of a smart factory.

The next article **“Development of Big Data Analytics in a Multi-site Enterprise on the Example of Supply Chain Management”** discussed the importance of an analytical platform for multi-source data and proposed the development of analytical processing for SCM in a multi-site industrial enterprise.

“Analysing Natural Gas Prices for Turkey in the Light of a Possible Hub” provided an outlook of the global natural gas market and Turkey’s position in this business. Turkey depends on importing gas from Russia, Iran, and Azerbaijan through pipelines and LNG suppliers. The natural gas market in Turkey can become more independent by defining an international gas hub in the global gas trade system. In this respect, the pricing of large trading volumes will be an issue for the near future. This article aims to underline the importance of hub pricing through structuring a virtual hub in Turkey.

The authors of **“Predicting Power Deviation in the Turkish Power Market Based on Adaptive Factor Impacts”** presented a study of the short-term prediction of trends in the power market by selecting the influencing factors and choosing those with the highest impacts. The proposed hybrid method reduces the prediction errors.

The last article entitled **“Machine Learning Methods in the Inclinometers Readings Anomaly Detection Issue on the Example of Tailings Storage Facility”** presented methods of finding anomalies in the inclinometer readings at a tailings storage facility (TSF) using machine learning techniques, which significantly simplifies the process of identifying attention-requiring areas. The effectiveness of the algorithms was tested on data samples from various measurement points. The best method

involves building learning-based supervised classifiers in the decision-making process regarding TSF stability.

We would like to thank the members of the Program Committee, who reviewed the papers and helped put together an interesting program for AI4KM 2021. We would also like to thank all the authors and our invited speaker, Anthony Wong. Finally, our thanks go to the local Organizing Committee and all the supporting institutions and organizations.

We hope that you enjoy reading these papers.

May 2021

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Contents

Ethics and Regulation of Artificial Intelligence	1
<i>Anthony Wong</i>	
Ontologies Cooperation to Model the Needs of Disabled Persons	19
<i>Guilaine Talens and Caroline Wintergerst</i>	
A Conceptual Framework of Intelligent Management Control System for Higher Education	35
<i>Helena Dudycz, Marcin Hernes, Zdzisław Kes, Eunika Mercier-Laurent, Bartłomiej Nita, Krzysztof Nowosielski, Piotr Oleksyk, Mieczysław L. Owoc, Rafał Palak, Maciej Pondel, and Krystian Wojtkiewicz</i>	
Curriculum Vitae (CVs) Evaluation Using Machine Learning Approach.	48
<i>Rabih Haddad and Eunika Mercier-Laurent</i>	
University Students' Research on Artificial Intelligence and Knowledge Management. A Review and Report of Multi-case Studies	66
<i>Mieczysław L. Owoc and Paweł Weichbroth</i>	
Customer Churn Prediction in FMCG Sector Using Machine Learning Applications	82
<i>S. Nazlı Günesen, Necip Şen, Nihan Yıldırım, and Tolga Kaya</i>	
Crowdsourcing as a Tool Supporting Intra-city Communication	104
<i>Łukasz Przysucha</i>	
The Importance of the Internet of Things for Smart Cities	117
<i>Anna Reklewska</i>	
Developing a Knowledge Base on Climate Change for Metropolitan Cities.	130
<i>Eunika Mercier-Laurent, Guilaine Talens, and Eric Thivart</i>	
Can Artificial Intelligence Effectively Support Sustainable Development?.	144
<i>Eunika Mercier-Laurent</i>	
Holistic Approach to Smart Factory.	160
<i>Cristina Monsone</i>	
Development of Big Data Analytics in a Multi-site Enterprise on the Example of Supply Chain Management	177
<i>Paweł Pyda, Paweł Stefaniak, Helena Dudycz, and Bartosz Jachnik</i>	

Analysing Natural Gas Prices for Turkey in the Light of a Possible Hub 193
Hakan Nalbant, M. Ozgur Kayalica, Gülgün Kayakutlu,
and Gizem Kaya Aydın

Predicting Power Deviation in the Turkish Power Market Based
on Adaptive Factor Impacts 213
Denizhan Guven, Avni Ozozen, Gülgün Kayakutlu,
and M. Ozgur Kayalica

Machine Learning Methods in the Inclimeters Readings Anomaly
Detection Issue on the Example of Tailings Storage Facility 235
Wioletta Koperska, Maria Stachowiak, Bartosz Jachnik,
Paweł Stefaniak, Bartłomiej Bursa, and Paweł Stefanek

Author Index 251