

Petra Perner (Ed.)

Advances in Data Mining

Applications and Theoretical Aspects

21th Industrial Conference, ICDM 2021
New York, USA, July 14 – 18 2021
Poster Proceedings

Volume Editor

Prof. Dr. Petra Perner
FutureLab Artificial Intelligence IBaI-2

PF 10128
01446 Radeberg
E-mail: pperner@futurelab-ai-ibai-2.de

The German National Library listed this publication in the
German National Bibliography.
Detailed bibliographical data can be downloaded from [http://
dnb.ddb.de](http://dnb.ddb.de).

ibai-publishing
Prof. Dr. Petra Perner
PF 30 11 38
04251 Leipzig, Germany
E-mail: info@ibai-publishing.org
<http://www.ibai-publishing.org>

P-ISSN 1864-9734
E-ISSN 2699-5220
ISBN 978-3-942952-83-5

Copyright © 2021 ibai-publishing

Preface

The twenty-one event of the Industrial Conference on Data Mining ICDM was held in New York again (www.data-mining-forum.de) running under the umbrella of the World Congress on “The Frontiers in Intelligent Data and Signal Analysis, DSA 2021” (www.worldcongressdsa.com).

After the peer-review process, we accepted twenty-four high-quality papers for oral presentation. Ten papers are presented in the proceedings by ibai-publishing. http://www.ibai-publishing.org/html/proceedings_2021/proceedings_icdm_2021.php The topics range from theoretical aspects of data mining to applications of data mining, such as in multimedia data, in marketing, in medicine and agriculture, and in process control, industry, and society. Extended versions of selected papers will appear in the international journal Transactions on Machine Learning and Data Mining (www.ibai-publishing.org/journal/mldm).

In all, six papers were selected for poster presentations and two are published in the ICDM Poster and Industry Proceeding by ibai-publishing (http://www.ibai-publishing.org/html/proceedings_2021/proceedings_poster_icdm_2021.php).

The acceptance rate was 20%. The list of accepted papers can be found after the conference under https://www.data-mining-forum.de/past_reports_ov.php. The Corona situation was still in our control after one and a half years.

The tutorial days rounded up the high quality of the conference. Researchers and practitioner’s got an excellent insight in the research and technology of the respective fields, the new trends and the open research problems that we like to study further.

A tutorial on Data Mining, a tutorial on Case-Based Reasoning, a tutorial on Intelligent Image Interpretation and Computer Vision in Medicine, Biotechnology, Chemistry and Food Industry, and a tutorial on Standardization in Immunofluorescence were held before and in between the conferences of DSA 2021.

We would like to thank all reviewers for their highly professional work and their effort in reviewing the papers.

We also thank the members of the Futurelab Artificial Intelligence IBaI-2, Radeberg, Germany (www.futurelab-ai-ibai-2.de), who handled the conference as secretariat. We appreciate the help and understanding of the editorial staff at ibai-publishing house, who supported the publication of these proceedings (<http://www.ibai-publishing.org/html/proceeding.php>).

Last, but not least, we wish to thank all the speakers and participants who contributed to the success of the conference. We hope to see you in 2022 in New York at the next World Congress on The Frontiers in Intelligent Data and Signal Analysis, DSA

2022 (www.worldcongressdsa.com), which combines under its roof the following three events: International Conferences Machine Learning and Data Mining, MLDM (www.mldm.de), the Industrial Conference on Data Mining, ICDM (www.data-mining-forum.de), and the International Conference on Mass Data Analysis of Signals and Images in Medicine, Biotechnology, Chemistry, Biometry, Security, Agriculture, Drug Discovery and Food Industry, MDA (www.mda-signals.de), the workshops and tutorials.

July 2021 Petra Perner

21th Industrial Conference on Data Mining ICDM 2021

www.data-mining-forum.de

Chair

Petra Perner FutureLab Artificial Intelligence IBaI-2,
..... Germany

Program Committee

Ajith Abraham	Machine Intelligence Research Labs (MIR Labs), USA
Mohamed, Bourguessa	Universite du Quebec a Montreal - UQAM, Canada
Bernard Chen	University of Central Arkansas, USA
Antonio Dourado	University of Coimbra, Portugal
Jeroen de Bruin	Medical University of Vienna, Austria
Stefano Ferilli	University of Bari, Italy
Geert Gins	Glaxo Smith Kline, Belgium
Warwick Graco	ATO, Australia
Aleksandra Gruca	Silesian University of Technology, Poland
	Universidade Aberta (Portuguese Open University), Portugal
Pedro Isaias	
Piotr Jedrzejowicz	Gdynia Maritime University, Poland
Martti Juhola	University of Tampere, Finland
Janusz Kacprzyk	Polish Academy of Sciences, Poland
Lui Xiaobing	Google Inc., USA
Mehmed Kantardzic	University of Louisville, USA
Eduardo F. Morales	INAOE, Ciencias Computacionales, Mexico
Samuel Noriega	Universitat de Barcelona, Spain
Juliane Perner	Cancer Research, Cambridge Institutes, UK
Moti Schneider	Netanya Academic College, Israel
Rainer Schmidt	University of Rostock, Germany
Victor Sheng	University of Central Arkansas, USA
	Section of Medical Statistics, Fukuoka Dental College, Japan
Kaoru Shimada	
Gero Szepannek	University Stralsund, Germany

Joao Miguel Costa Sousa
Markus Vattulainen
Zhu Bing

Technical University of Lisbon, Portugal
Tampere University, Finland
Sichuan University, China

Table of Content

Variational-Autoencoder Architectures for Anomaly Detection in Industrial Processes <i>Felix Neubürger, Yasser Saeid, Thomas Kopinski</i>	1
Enhancing User's Income Estimation with Super-App Alternative Data <i>Gabriel Suárez, Juan Rafal, Maria A. Luque, Carlos F. Valencia, Alejandro Correa-Bahnsen</i>	11
<i>Index</i>	18