Communications in Computer and Information Science 1652

Editorial Board Members

Joaquim Filipe
Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh
Indian Statistical Institute, Kolkata, India

Raquel Oliveira Prates
Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil

Lizhu Zhou
Tsinghua University, Beijing, China

More information about this series at https://link.springer.com/bookseries/7899

Silvia Chiusano · Tania Cerquitelli ·
Robert Wrembel · Kjetil Nørvåg ·
Barbara Catania · Genoveva Vargas-Solar ·
Ester Zumpano (Eds.)

New Trends in Database and Information Systems

ADBIS 2022 Short Papers, Doctoral Consortium and Workshops: DOING, K-GALS, MADEISD, MegaData, SWODCH, Turin, Italy September 5–8, 2022, Proceedings

Springer

Editors
Silvia Chiusano
Politecnico di Torino
Turin, Italy

Robert Wrembel
Poznań University of Technology
Poznań, Poland

Barbara Catania
University of Genoa
Genoa, Italy

Ester Zumpano
University of Calabria
Rende, Italy

Tania Cerquitelli
Politecnico di Torino
Turin, Italy

Kjetil Nørvåg
Norwegian University of Science
and Technology
Trondheim, Norway

Genoveva Vargas-Solar
CNRS
Villeurbanne Cedex, France

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-031-15742-4 ISBN 978-3-031-15743-1 (eBook)
https://doi.org/10.1007/978-3-031-15743-1

© Springer Nature Switzerland AG 2022
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This year ADBIS – the Conference on Advances in Databases and Information Systems – celebrated its 26th anniversary.

The first ADBIS conference was held in Saint Petersburg, Russia (1997). Since then, ADBIS has taken place annually, with previous editions were held in: Poznan, Poland (1998); Maribor, Slovenia (1999); Prague, Czech Republic (2000); Vilnius, Lithuania (2001); Bratislava, Slovakia (2002); Dresden, Germany (2003); Budapest, Hungary (2004); Tallinn, Estonia (2005); Thessaloniki, Greece (2006); Varna, Bulgaria (2007); Pori, Finland (2008); Riga, Latvia (2009); Novi Sad, Serbia (2010); Vienna, Austria (2011); Poznan, Poland (2012); Genoa, Italy (2013); Ohrid, North Macedonia (2014); Poitiers, France (2015); Prague, Czech Republic (2016); Nicosia, Cyprus (2017); Budapest, Hungary (2018); Bled, Slovenia (2019); Lyon, France (2020); and Tartu, Estonia (2021).

The official ADBIS portal – http://adbis.eu – provides up to date information on all ADBIS conferences, committees, publications, and issues related to the ADBIS community.

The 26th ADBIS was held in Turin, Italy, during September 5–8, 2022, as a hybrid event. It received significant attention from both the research and industrial communities, as 90 papers were submitted to the conference. The papers were reviewed by an international Program Committee consisting of 85 members. The Program Committee selected 28 short papers from the main ADBIS conference, an acceptance rate of 42%, for inclusion in this volume. These papers cover the following topics: data modeling and visualization, data processing (fairness, cleaning, pre-processing), information and process retrieval, data access optimization, graph data, data science, and machine learning.

Additionally, this volume includes papers accepted at the five workshops and Doctoral Consortium, which accompanied ADBIS 2022. Each workshop had its own international Program Committee, whose members served as the reviewers of papers included in this volume. The maximum paper acceptance rate at each of these events did not exceed 50%. In total, 53 papers were submitted to these workshops, out of which 26 were selected for presentation and publication in this volume, giving an overall acceptance rate of 49%.

The following five workshops were run at ADBIS 2022:

DOING: 3rd Workshop on Intelligent Data – From Data to Knowledge, chaired by Mirian Halfeld-Ferrari (Université d'Orléans, France) and Carmem S. Hara (Universidade Federal do Parana, Brazil). The idea underlying DOING is to gather researchers in natural language processing, databases, and artificial intelligence to discuss two main problems: (1) how to extract information from textual data and represent it in knowledge bases, and (2) how to propose intelligent methods for handling and maintaining these databases with new forms of requests, including efficient, flexible, and secure analysis mechanisms, adapted to the user, and with quality and privacy preservation guarantees.

K-GALS: 1st Workshop on Knowledge Graphs Analysis on a Large Scale, chaired by Mariella Bonomo (University of Palermo, Italy) and Simona E. Rombo (University of Palermo, Italy). The goal of K-GALS is to provide participants with the opportunity to introduce and discuss new methods, theoretical approaches, algorithms, and software tools that are relevant to the knowledge graphs based research, especially when it is focused on a large scale. Relevant issues include how knowledge graphs can be used to represent knowledge, how systems managing knowledge graphs work, and which applications can be provided on top of a knowledge graphs, in a distributed environment.

MADEISD: 4th Workshop on Modern Approaches in Data Engineering and Information System Design, chaired by Ivan Luković (University of Belgrade, Serbia), Slavica Kordić (University of Novi Sad, Serbia), and Sonja Ristić (University of Novi Sad, Serbia). The main goal of MADEISD is to address open questions and real potentials for various applications of modern approaches and technologies in data engineering and information system design so as to develop and implement effective software services in support of information management in various organization systems.

MegaData: 2nd Workshop on Advanced Data Systems Management, Engineering, and Analytics, chaired by Feras M. Awaysheh (University of Tartu, Estonia), Fahed Alkhabbas (Malmö University, Sweden), and Said Alawadi (Uppsala University, Sweden). MegaData aims to report on the advances and trends in database deployment models and environments from both the infrastructure and application levels. This year, questions related to how to develop data as the foundation for advanced databases and information systems and what the next generation of data systems will look like led the discussion on the latest trends in modern data systems.

SWODCH: 2nd Workshop on Semantic Web and Ontology Design for Cultural Heritage, chaired by Antonis Bikakis (University College London, UK), Roberta Ferrario (ISTC-CNR, Italy), Stéphane Jean (University of Poitiers and ISAE-ENSMA, France), Béatrice Markhoff (University of Tours, France), Alessandro Mosca (Free University of Bozen-Bolzano, Italy), and Marianna Nicolosi Asmundo (University of Catania, Italy). The foundational purpose of SWODCH is to gather original research work about both application and foundational issues emerging from the design of conceptual models, ontologies, and Semantic Web technologies for the digital humanities, here understood according to its broader definition including cultural heritage, digital history, archaeology, and related fields. The application-oriented focus of SWODCH, on the other hand, aims at bringing together stakeholders from various scientific fields involved in the development or deployment of Semantic Web solutions, including computer scientists, data scientists, and digital humanists.

The ADBIS 2022 Doctoral Consortium (DC) provided a forum for PhD students to present their research projects to the scientific community. DC papers describe the status of PhD students' research, a comparison with relevant related work, their results, and plans on how to experiment, validate and consolidate their contribution. Through the Doctoral Consortium, PhD students receive feedback from a selected group of mentors about potential opportunities and perspectives and suggestions to pursue their work. The PhD Consortium allows PhD students to establish international collaborations with members and participants of the ADBIS community.

The 2022 edition of the ADBIS DC included seven papers accepted after a very selective peer-review process, which are published in this volume. Additionally, the ADBIS 2022 DC program included a panel about strategies for preparing for post-PhD life with professionals with accomplished careers in academia, industry, and entrepreneurship.

The ADBIS 2022 Organizing Committee supported diversity and inclusion by offering some grants, supporting a few researchers to participate in the conference and become part of the ADBIS community. All the grants were assigned based on the underrepresented community, gender, and role/position. The grants include:

- two free regular registrations, assigned to researchers from Argentina and Brazil,
- three regular registration fee discounts of 200 Euros, assigned to researchers from Estonia, Lebanon, and Italy, and
- four regular registration fee discounts of 150 Euros, assigned to researchers from Croatia, France, and Italy.

We would like to wholeheartedly thank all participants, authors, PC members, workshop organizers, session chairs, doctoral consortium chairs, workshop chairs, volunteers, and co-organizers for their contributions in making ADBIS 2022 a great success. We would also like to thank the ADBIS Steering Committee and all sponsors.

July 2022

Silvia Chiusano
Tania Cerquitelli
Robert Wrembel
Kjetil Nørvåg
Barbara Catania
Genoveva Vargas-Solar
Ester Zumpano

Organization

General Chair

Silvia Chiusano	Polytechnic University of Turin, Italy

Program Committee Chairs

Tania Cerquitelli	Polytechnic University of Turin, Italy
Robert Wrembel	Poznan University of Technology, Poland

Workshop Chairs

Kjetil Nørvåg	Norwegian University of Science and Technology, Norway
Barbara Catania	University of Genoa, Italy

Doctoral Consortium Chairs

Genoveva Vargas-Solar	CNRS, LIRIS, France
Ester Zumpano	University of Calabria, Italy

Local Organization Committee Chairs

Luca Cagliero	Polytechnic University of Turin, Italy
Paolo Garza	Polytechnic University of Turin, Italy
Bartolomeo Vacchetti	Polytechnic University of Turin, Italy
Giovanni Malnati	Polytechnic University of Turin, Italy

Publicity Chair

Oscar Romero	Polytechnic University of Catalonia - BarcelonaTech, Spain

Proceedings Chair

Khalid Belhajjame	Paris Dauphine University - PSL, France

Special Issue Chair

Ladjel Bellatreche	ISAE-ENSMA, France

Diversity and Inclusion Chair

Jérôme Darmont	University of Lyon 2, France

Steering Committee

Andreas Behrend	TH Köln, Germany
Ladjel Bellatreche	ISAE-ENSMA, France
Maria Bielikova	Kempelen Institute of Intelligent Technologies, Slovakia
Barbara Catania	University of Genoa, Italy
Jérôme Darmont	University of Lyon 2, France
Johann Eder	Universität Klagenfurt, Austria
Johann Gamper	Free University of Bozen-Bolzano, Italy
Tomáš Horváth	Eötvös Loránd University, Hungary
Mirjana Ivanović	University of Novi Sad, Serbia
Marite Kirikova	Riga Technical University, Latvia
Manuk Manukyan	Yerevan State University, Armenia
Raimundas Matulevicius	University of Tartu, Estonia
Tadeusz Morzy	Poznan University of Technology, Poland
Kjetil Nørvåg	Norwegian University of Science and Technology, Norway
Boris Novikov	National Research University, Higher School of Economics, Saint Petersburg, Russia
George Papadopoulos	University of Cyprus, Cyprus
Jaroslav Pokorný	Charles University in Prague, Czech Republic
Oscar Romero	Polytechnic University of Catalonia - BarcelonaTech, Spain
Sergey Stupnikov	Russian Academy of Sciences, Russia
Bernhard Thalheim	University of Kiel, Germany
Goce Trajcevski	Iowa State University, USA
Valentino Vranić	Slovak University of Technology in Bratislava, Slovakia
Tatjana Welzer	University of Maribor, Slovenia
Robert Wrembel	Poznan Unviersity of Technology, Poland
Ester Zumpano	University of Calabria, Italy

Program Committee

Alberto Abelló	Polytechnic University of Catalonia - BarcelonaTech, Catalonia
Cristina D. Aguiar	University of São Paulo, Brasil
Syed Muhammad Fawad Ali	IBM, Germany
Bernd Amann	Sorbonne University, France
Witold Andrzejewski	Poznan University of Technology, Poland
Daniele Apiletti	Polytechnic University of Turin, Italy
Costin Badica	University of Craiova, Romania
Sylvio Barbon Junior	University of Trieste, Italy
Andreas Behrend	University of Bonn, Germany
Khalid Belhajjame	Paris Dauphine University - PSL, France
Ladjel Bellatreche	ISAE-ENSMA, France
András Benczúr	Eötvös Loránd University, Hungary
Fadila Bentayeb	University of Lyon 2, France
Maria Bielikova	Kempelen Institute of Intelligent Technologies, Slovakia
Sandro Bimonte	INRAE, France
Pawel Boiński	Poznan University of Technology, Poland
Zoran Bosnić	University of Ljubljana, Slovenia
Omar Boussaid	University of Lyon 2, France
Drazen Brdjanin	University of Banja Luka, Bosnia and Herzegovina
Damiano Carra	University of Verona, Italy
Jérôme Darmont	University of Lyon 2, France
Claudia Diamantini	Marche Polytechnic University, Italy
Christos Doulkeridis	University of Piraeus, Greece
Johann Eder	University of Klagenfurt, Austria
Markus Endres	University of Passau, Germany
Javier A. Espinosa-Oviedo	University of Lyon, France
Georgios Evangelidis	University of Macedonia, Greece
Flavio Ferrarotti	Software Competence Centre Hagenberg, Austria
Alessandro Fiori	Polytechnic University of Turin, Italy
Flavius Frasincar	Erasmus University Rotterdam, The Netherlands
Johann Gamper	Free University of Bozen-Bolzano, Italy
Matteo Golfarelli	University of Bologna, Italy
Marcin Gorawski	Silesian University of Technology, Poland
Jānis Grabis	Riga Technical University, Latvia
Francesco Guerra	University of Modena and Reggio Emilia, Italy
Giancarlo Guizzardi	Federal University of Espirito Santo, Brazil
Tomas Horvath	Eötvös Loránd University, Hungary

Mirjana Ivanović	University of Novi Sad, Serbia
Stefan Jablonski	University of Bayreuth, Germany
Aida Kamišalić	University of Maribor, Slovenia
Zoubida Kedad	University of Versailles, France
Attila Kiss	Eötvös Loránd University, Hungary
Julius Köpke	Alpen-Adria University of Klagenfurt, Austria
Dejan Lavbič	University of Ljubljana, Slovenia
Yurii Litvinov	St. Petersburg State University, Russia
Audrone Lupeikiene	Vilnius University, Lithuania
Federica Mandreoli	University of Modena and Reggio Emilia, Italy
Yannis Manolopoulos	Open University of Cyprus, Cyprus
Patrick Marcel	University of Tours, France
Sara Migliorini	University of Verona, Italy
Angelo Montanari	University of Udine, Italy
Lia Morra	Polytechnic University of Turin, Italy
Tadeusz Morzy	Poznan University of Technology, Poland
Boris Novikov	National Research University, Higher School of Economics, Russia
Kjetil Nørvåg	Norwegian University of Science and Technology, Norway
Andreas Oberweis	Karlsruhe Institute of Technology, Germany
George Papadopoulos	University of Cyprus, Cyprus
András Pataricza	Budapest University of Technology and Economics, Hungary
Jan Platos	Technical University of Ostrava, Czech Republic
Jaroslav Pokorný	Charles University in Prague, Czech Republic
Giuseppe Polese	University of Salerno, Italy
Alvaro E. Prieto	University of Extremadura, Spain
Elisa Quintarelli	University of Verona, Italy
Miloš Radovanović	University of Novi Sad, Serbia
Franck Ravat	University of Toulouse, France
Stefano Rizzi	University of Bologna, Italy
Oscar Romero	Polytechnic University of Catalonia, Spain
Gunter Saake	University of Magdeburg, Germany
Kai-Uwe Sattler	TU Ilmenau, Germany
Milos Savic	University of Novi Sad, Serbia
Claudia Steinberger	University of Klagenfurt, Austria
Sergey Stupnikov	Russian Academy of Sciences, Russia
Bernhard Thalheim	University of Kiel, Germany
Goce Trajcevski	Iowa State University, USA
Raquel Trillo-Lado	University of Zaragoza, Spain
Genoveva Vargas Solar	CNRS, LIRIS, France

Goran Velinov	Ss. Cyril and Methodius University, North Macedonia
Peter Vojtas	Charles University in Prague, Czech Republic
Isabelle Wattiau	ESSEC and Cnam, France
Marek Wojciechowski	Poznan University of Technology, Poland
Vladimir Zadorozhny	University of Pittsburgh, USA
Ester Zumpano	University of Calabria, Italy

Additional Reviewers

Stylianos Argyrou	Joseph Giovanelli
Paul Blockhaus	Nicolas Labroche
Miroslav Blšták	Christos Mettouris
Andrea Brunello	Simone Monaco
Gabriel Campero Durand	Federico Motta
Andrea Chiorrini	Uchechukwu Njoku
Francesco Del Buono	Thomas Photiadis
Chiara Forresi	Matúš Pikuliak
Marco Franceschetti	Nicola Saccomanno
Matteo Francia	Vladimir A. Shekhovtsov
Verena Geist	Emanuele Storti

Contents

ADBIS Short Papers: Data Understanding, Modeling and Visualization

On an Extensible Conceptual Data Model by a Non-formal Example 3
Manuk G. Manukyan

Understanding Misinformation About COVID-19 in WhatsApp Messages 14
Antônio Diogo Forte Martins, José Maria Monteiro, and Javam C. Machado

Automatic Inference of Taxonomy Relationships Among Legal Documents 24
Irene Benedetto, Luca Cagliero, and Francesco Tarasconi

Visualisation of Numerical Query Results on Industrial Data Streams 34
Miran Ismaiel Nadir and Kjell Orsborn

ADBIS Short Papers: Fairness in Data processing

Clustering-Based Subgroup Detection for Automated Fairness Analysis 45
Jero Schäfer and Lena Wiese

Open Science in the Cloud: The CloudFAIR Architecture for FAIR-compliant Repositories 56
João Pedro C. Castro, Lucas M. F. Romero, Anderson Chaves Carniel, and Cristina D. Aguiar

Detecting Simpson's Paradox: A Step Towards Fairness in Machine Learning 67
Rahul Sharma, Minakshi Kaushik, Sijo Arakkal Peious, Markus Bertl, Ankit Vidyarthi, Ashwani Kumar, and Dirk Draheim

ADBIS Short Papers: Data Management Pipeline, Information and Process Retrieval

FusionFlow: An Integrated System Workflow for Gene Fusion Detection in Genomic Samples 79
Federica Citarrella, Gianpaolo Bontempo, Marta Lovino, and Elisa Ficarra

ProSA Pipeline: Provenance Conquers the CHASE 89
Tanja Auge, Moritz Hanzig, and Andreas Heuer

A Tabular Open Data Search Engine Based on Word Embeddings for Data Integration 99
Alberto Berenguer, Jose-Norberto Mazón, and David Tomás

The Use of M2P in Business Process Improvement and Optimization 109
Meriem Kherbouche, Yossra Zghal, Bálint Molnár, and András Benczúr

Embedding Process Structure in Activities for Process Mapping and Comparison 119
Andrea Chiorrini, Claudia Diamantini, Laura Genga, Martina Pioli, and Domenico Potena

ADBIS Short Papers: Data Access Optimization

Bulk Loading of the Secondary Index in LSM-Based Stores for Flash Memory 133
Wojciech Macyna and Michal Kukowski

Blink: Lightweight Sample Runs for Cost Optimization of Big Data Applications 144
Hani Al-Sayeh, Muhammad Attahir Jibril, Bunjamin Memishi, and Kai-Uwe Sattler

ADBIS Short Papers: Data Pre-processing and Cleaning

A RoBERTa Based Approach for Address Validation 157
Yassine Guermazi, Sana Sellami, and Omar Boucelma

Empirical Comparison of Semantic Similarity Measures for Technical Question Answering 167
Nabil Moncef Boukhatem, Davide Buscaldi, and Leo Liberti

Denoising Architecture for Unsupervised Anomaly Detection in Time-Series 178
Wadie Skaf and Tomáš Horváth

Discretizing Numerical Attributes: An Analysis of Human Perceptions 188
Minakshi Kaushik, Rahul Sharma, Ankit Vidyarthi, and Dirk Draheim

ADBIS Short Papers: Modeling and Querying of Graph Databases

Interactive Knowledge Graph Querying Through Examples and Facets 201
Yael Amsterdamer and Laura Gáspár

It's Too Noisy in Here: Using Projection to Improve Differential Privacy on RDF Graphs 212
Sara Taki, Cédric Eichler, and Benjamin Nguyen

Modeling and Querying Sensor Networks Using Temporal Graph Databases ... 222
Bart Kuijpers, Valeria Soliani, and Alejandro Vaisman

Indexing Continuous Paths in Temporal Graphs 232
Bart Kuijpers, Ignacio Ribas, Valeria Soliani, and Alejandro Vaisman

ADBIS Short Papers: Data Science and Machine Learning

Unsupervised Extractive Text Summarization Using Frequency-Based Sentence Clustering 245
Ali Hajjar and Joe Tekli

Experimental Comparison of Theory-Guided Deep Learning Algorithms 256
Simone Monaco and Daniele Apiletti

Hyper-parameters Tuning of Artificial Neural Networks: An Application in the Field of Recommender Systems 266
Vaios Stergiopoulos, Michael Vassilakopoulos, Eleni Tousidou, and Antonio Corral

Exploring Latent Space Using a Non-linear Dimensionality Reduction Algorithm for Style Transfer Application 277
Doaa Almhaithawi, Alessandro Bellini, and Stefano Cuomo

A Novel Method for University Ranking: Bounded Skyline 287
Georgios Stoupas and Antonis Sidiropoulos

QLDT: A Decision Tree Based on Quantum Logic 299
Ingo Schmitt

DOING: 3rd Workshop on Intelligent Data – From Data to Knowledge

Using Provenance in Data Analytics for Seismology: Challenges and Directions 311
Umberto Souza da Costa, Javier Alfonso Espinosa-Oviedo, Martin A. Musicante, Genoveva Vargas-Solar, and José-Luis Zechinelli-Martini

Storing Feature Vectors in Relational Image Data Warehouses 323
Guilherme Muzzi Rocha, Piero Lima Capelo, Anderson Chaves Carniel, and Cristina Dutra Aguiar

Automatic Classification of Stigmatizing Articles of Mental Illness: The Case of Portuguese Online Newspapers 332
Alina Yanchuk, Alina Trifan, Olga Fajarda, and José Luís Oliveira

A Multiplex Network Framework Based Recommendation Systems for Technology Intelligence 344
Foutse Yuehgoh, Sonia Djebali, and Nicolas Travers

Relation Extraction from Clinical Cases for a Knowledge Graph 353
Agata Savary, Alena Silvanovich, Anne-Lyse Minard, Nicolas Hiot, and Mirian Halfeld Ferrari

Privacy Operators for Semantic Graph Databases as Graph Rewriting 366
Adrien Boiret, Cédric Eichler, and Benjamin Nguyen

K-GALS: 1st Workshop on Knowledge Graphs Analysis on a Large Scale

A Collaborative Filtering Approach for Drug Repurposing 381
Simone Contini and Simona E. Rombo

A Review: Biological Insights on Knowledge Graphs 388
Ylenia Galluzzo

CiteRank: A Method to Evaluate Researchers Influence Based on Citation and Collaboration Networks 400
Fabrizio Angiulli, Fabio Fassetti, and Cristina Serrao

MADEISD: 4th Workshop on Modern Approaches in Data Engineering and Information System Design

Abstract Machine for Operational Semantics of Domain-Specific Language 413
William Steingartner, Róbert Baraník, and Valerie Novitzká

Machine Learning-Based Model Categorization Using Textual and Structural Features 425
Alireza Khalilipour, Fatma Bozyigit, Can Utku, and Moharram Challenger

Architecture Design of a Networked Music Performance Platform for a Chamber Choir 437
Jan Cychnerski and Bartłomiej Mróz

Defining Software Architecture Modalities Based on Event Sourcing Architecture Pattern 450
Olga Jejić, Milica Škembarević, and Slađan Babarogić

Supporting Data Types in Neo4j 459
Kornelije Rabuzin, Maja Cerjan, and Snježana Križanić

Systematic Literature Review for Emotion Recognition from EEG Signals 467
Paulina Leszczełowska and Natalia Dawidowska

Semantically-Driven Secure Task Execution over Wireless Sensor Networks 476
Niki Hrovatin, Aleksandar Tošić, and Michael Mrissa

MegaData: 2nd Workshop on Advanced Data Systems Management, Engineering, and Analytics

Stored and Inherited Relations with PKN Foreign Keys 487
Witold Litwin

Implementing the Comparison-Based External Sort 500
Michael Polyntsov, Valentin Grigorev, Kirill Smirnov, and George Chernishev

Document Versioning for MongoDB 512
Lucia de Espona Pernas and Ela Pustulka

SWODCH: 2nd Workshop on Semantic Web and Ontology Design for Cultural Heritage

Developing and Aligning a Detailed Controlled Vocabulary for Artwork 529
Luana Bulla, Maria Chiara Frangipane, Maria Letizia Mancinelli, Ludovica Marinucci, Misael Mongiovì, Margherita Porena, Valentina Presutti, and Chiara Veninata

Using Wikibase for Managing Cultural Heritage Linked Open Data Based on CIDOC CRM 542
Joonas Kesäniemi, Mikko Koho, and Eero Hyvönen

Megalithism Representation in CIDOC-CRM 550
Ivo Santos, Renata Vieira, Cassia Trojahn, Leonor Rocha, and Enrique Cerrillo Cuenca

Ontology for Analytic Claims in Music 559
Emilio M. Sanfilippo and Richard Freedman

Testing the Word-Based Model in the Ontological Analysis of Modern Greek Derivational Morphology 572
Nikos Vasilogamvrakis, Maria Koliopoulou, Michalis Sfakakis, and Giannoula Giannoulopoulou

Analyses of Networks of Politicians Based on Linked Data: Case ParliamentSampo – Parliament of Finland on the Semantic Web 585
Henna Poikkimäki, Petri Leskinen, Minna Tamper, and Eero Hyvönen

Neural Word Sense Disambiguation to Prune a Large Knowledge Graph of the Italian Cultural Heritage 593
Erica Faggiani, Stefano Faralli, and Paola Velardi

Doctoral Consortium

Querying Sensor Networks Using Temporal Property Graphs 607
Erik Bollen

Formalization of Data Integration Transformations 615
Théo Abgrall

Models and Query Languages for Temporal Property Graph Databases 623
Valeria Soliani

Termination and Confluence of an Extended CHASE Algorithm 631
Andreas Görres

Towards Prescriptive Analyses of Querying Large Knowledge Graphs 639
Mohamed Ragab

Knowledge Extraction from Biological and Social Graphs 648
Mariella Bonomo

Digital Twins for Urban Mobility 657
Chiara Bachechi

Author Index 667