

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at <http://www.springer.com/series/7409>

Irene Garrigós · Manuel Wimmer (Eds.)

Current Trends in Web Engineering

ICWE 2017 International Workshops
Liquid Multi-Device Software and EnWoT,
practi-O-web, NLPIT, SoWeMine
Rome, Italy, June 5–8, 2017
Revised Selected Papers

Editors
Irene Garrigós
Universidad de Alicante
Alicante
Spain

Manuel Wimmer
Institute of Software Technology
and Interactive Systems
TU Wien
Vienna
Austria

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-74432-2 ISBN 978-3-319-74433-9 (eBook)
<https://doi.org/10.1007/978-3-319-74433-9>

Library of Congress Control Number: Applied for

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

© Springer International Publishing AG, part of Springer Nature 2018

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, express 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.

Printed on acid-free paper

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



Preface

ICWE 2017 marked the 17th edition of the International Conference on Web Engineering and was held during June 5–8, 2017, in Rome, Italy. As in previous years, the conference main program was complemented by a number of co-located workshops, tutorials, and a doctoral consortium. All of these satellite events are designed to give researchers and practitioners an opportunity to interact in a setting that is both more informal and focused at the same time. This volume presents revised contributions to the workshops and tutorials.

Workshops have always played an important role in the ICWE community as they are a vessel both for exploring new trends and for in-depth discussions on core topics of Web engineering. This year two new workshops were presented at the conference, one focused on the Web of Things and other focused on the design and development of open data and services on the Web as well as open source. On the other hand, most of the well-established workshops broadened their focus to harbor contributions addressing novel and emerging requirements and opportunities, such as Web mining, recommendations in social media, natural language processing, or liquid software and services. At the same time, classic themes, such as Web modeling, ontology engineering, social networks, adaptivity, the Semantic Web, were also represented during the workshop program.

A total of five workshop proposals were submitted and reviewed by the workshop Program Committee with respect to topicality and chance of success. Based on their recommendations, the workshop chairs accepted the five workshops. Two of these workshops were jointly held by their organizers, and thus also have joint proceedings. The four workshops whose papers are included in this volume are:

- Liquid Multi-Device Software and EnWoT 2017: Second International Workshop on Liquid Multi-Device Software and First International Workshop on Engineering the Web of Things
- practi-O-web 2017: International Workshop on the Practice of the Open Web
- NLPIT 2017: Third International Workshop on Natural Language Processing for Informal Text
- SoWeMine 2017: Third International Workshop on Mining the Social Web

Messages from the organizers of the four workshops are presented here. In addition to the workshops, three tutorials were held at ICWE 2017. The tutorial summaries are also included in this volume:

- Liquid Web Applications: This tutorial addressed the Liquid Software concept in the context of Web applications.
- Model-Based Development of JavaScript Web Applications: This tutorial presented a model-based approach for the development of plain JavaScript Web applications.

- Big Web Data: Warehousing and Analytics – Recent Trends and Future Challenges: This tutorial explored the state of the art of big Web data warehousing and analytics as well as future challenges.

This proceedings volume would not have been possible without the work of the enthusiastic and committed workshop and tutorial organizers. Therefore, our first thank you is to all our colleagues who dedicated their time and skills to making the ICWE 2017 satellite events a success. In particular, we would like to thank the members of the workshop Selection Committee whose careful evaluations of the submitted workshop proposals were an invaluable asset in assembling the ICWE 2017 workshop program. The success of any individual workshop largely depends on the quality and quantity of submissions. Keeping this reality in mind, our thanks also go out to the researchers and practitioners who contributed their work to this volume. Finally, we would like to thank the general chair of ICWE 2017, Riccardo Torlone, and the program chairs, Jordi Cabot and Roberto De Virgilio, for their feedback and constant support.

August 2017

Irene Garrigós
Manuel Wimmer

Organization

Workshop Selection Committee

Silvia Abrahao	Universitat Politecnica de Valencia, Spain
Cinzia Cappiello	Politecnico di Milano, Italy
Sven Casteleyn	Universitat Jaume I, Spain
Oscar Diaz	University of the Basque Country, Spain
Michael Grossniklaus	University of Konstanz, Germany
Maristella Matera	Politecnico di Milano, Italy
Gustavo Rossi	UNLP, Argentina
Elena Simperl	University of Southampton, UK
Antonio Vallecillo	Universidad de Malaga, Spain
Marco Winckler	Paul Sabatier University, France

Overcoming the Language Barrier with BabelNet and Multilingual Disambiguation of Text (Keynote Talk)

Roberto Navigli

Department of Computer Science of the Sapienza
University of Rome, Italy

Abstract. Multilinguality is a key feature of today's Web, and it is this feature that we leverage and exploit in our research work at the Sapienza University of Rome's Linguistic Computing Laboratory, which I am going to overview and showcase in this talk. I will start by presenting BabelNet¹, the largest multilingual encyclopedic dictionary and semantic network (now also a knowledge base), which covers 271 languages and 14 million concepts and named entities. BabelNet provides both coverage for all the open-class parts of speech, thanks to the seamless integration of WordNet, Wikipedia, Wiktionary, OmegaWiki, Wikidata and the Open Multilingual WordNet. Next, I will present Babelify², a unified approach that leverages BabelNet to jointly perform word sense disambiguation and entity linking in arbitrary languages, with performance on both tasks on a par with, or surpassing, those of task-specific state-of-the-art supervised systems. Babelify also includes a language-agnostic setting in which languages can be mixed in arbitrary ways. Finally, I will describe the most recent developments, including deep learning approaches to latent vector representations of meaning and word sense disambiguation.

¹ <http://babelnet.org>.

² <http://babelify.org>.

Contents

Joint Workshop on Engineering the Web of Things and Liquid Multi-Device Software

An Adaptive Formal Metamodel for Semantic Complex Event Processing-Driven Social Internet of Things Network	7
<i>Francesco Nocera and Angelo Parchitelli</i>	
Semantic Discovery in the Web of Things	19
<i>Fernando Serena, María Poveda-Villalón, and Raúl García-Castro</i>	
Challenges When Moving from Monolith to Microservice Architecture	32
<i>Miika Kalske, Niko Mäkitalo, and Tommi Mikkonen</i>	
IoT Application Deployment Using Request-Response Pattern with MQTT	48
<i>Antti Luoto and Kari Systä</i>	
Wireless Brain-Computer Interface for Wheelchair Control by Using Fast Machine Learning and Real-Time Hyper-Dimensional Classification	61
<i>Valerio F. Annese, Giovanni Mezzina, and Daniela De Venuto</i>	
Case Study: Building a Serverless Messenger Chatbot	75
<i>Jyri Lehvä, Niko Mäkitalo, and Tommi Mikkonen</i>	
Four Key Factors to Design a Web of Things Architecture.	87
<i>Francesco Bruni, Claudio Pomo, and Gaetano Murgolo</i>	
Liquid Transfer of User Identity	92
<i>Sivamani Thangavel and Kari Systä</i>	
Engineering Task-Automation Systems for Domain Specificity	108
<i>Carmelo Ardito, Giuseppe Desolda, and Maristella Matera</i>	
A Homemade Pill Dispenser Prototype Supporting Elderly.	120
<i>Paolo Buono, Fabio Cassano, Alessandra Legretto, and Antonio Piccinno</i>	
Towards an Acceptance Testing Approach for Internet of Things Systems . . .	125
<i>Maurizio Leotta, Filippo Ricca, Diego Clerissi, Davide Ancona, Giorgio Delzanno, Marina Ribaudò, and Luca Franceschini</i>	

International Workshop on the Practice of the Open Web

ABC Algorithm for URL Extraction 143
Lalit Mohan Sanagavarapu, Sourav Sarangi, and Y. Raghu Reddy

Towards a UML and IFML Mapping to GraphQL 149
*Roberto Rodriguez-Echeverria, Javier Luis Cánovas Izquierdo,
and Jordi Cabot*

Accessing Government Open Data Through Chatbots 156
*Simone Porreca, Francesco Leotta, Massimo Mecella, Stavros Vassos,
and Tiziana Catarci*

Using Ontologies for Official Statistics: The Istat Experience 166
*Raffaella M. Aracri, Roberta Radini, Monica Scannapieco,
and Laura Tosco*

Ontology Population from Raw Text Corpus for Open-Source Intelligence. . . 173
Giulio Ganino, Domenico Lembo, and Federico Scafoglieri

**3rd International Workshop on Natural Language Processing
for Informal Text**

Named Entity Recognition in Twitter Using Images and Text. 191
Diego Esteves, Rafael Peres, Jens Lehmann, and Giulio Napolitano

Online Expectation Maximization for Language Characterization
of Streaming Text 200
Jonathan Wintrode, Nhat Bui, Jan Stepinski, and Chris Reed

3rd International Workshop on Mining the Social Web

Analysing Cultural Events on Twitter 213
Brigitte Juanals and Jean-Luc Minel

Harvesting Knowledge from Social Networks: Extracting Typed
Relationships Among Entities 223
Andrea Caielli, Marco Brambilla, Stefano Ceri, and Florian Daniel

Novel Comment Spam Filtering Method on Youtube: Sentiment Analysis
and Personality Recognition 228
*Enaitz Ezpeleta, Iñaki Garitano, Ignacio Arenaza-Nuño,
José María Gómez Hidalgo, and Urko Zurutuza*

Mining Communication Data in a Music Community: A Preliminary Analysis	241
<i>Fabio Calefato, Giuseppe Iaffaldano, Filippo Lanubile, Antonio Lategano, and Nicole Novielli</i>	
Measuring Personal Branding in Social Media: Towards an Influence Indication Score	252
<i>Evanthia Faliagka, Kostas Ramantas, Maria Rigou, and Spiros Sirmakessis</i>	
ICWE 2017 Tutorials	
Big Web Data: Warehousing and Analytics: Recent Trends and Future Challenges	265
<i>Alfredo Cuzzocrea</i>	
Model-Based Development of JavaScript Web Applications	267
<i>Gerd Wagner</i>	
Liquid Web Applications: ICWE2017 Tutorial	269
<i>Andrea Gallidabino, Tommi Mikkonen, Niko Mäkitalo, Cesare Pautasso, Kari Systä, Antero Taivalsaari, and Jari Voutilainen</i>	
Author Index	273