



ISSN
1351-3249

NATURAL LANGUAGE ENGINEERING

Edited by
Ruslan Mitkov
Branimir K. Boguraev

VOLUME 27 PART 1 JANUARY 2021

CAMBRIDGE
UNIVERSITY PRESS

Natural Language Engineering meets the needs of professionals and researchers working in all areas of automatic language processing, whether from the perspective of theoretical or corpus linguistics, translation, lexicography, computer science or engineering. Its aim is to bridge the gap between traditional computational linguistics research and the implementation of practical applications with potential real-world use. As well as publishing original research articles on a broad range of topics - from text analysis, machine translation, information retrieval, speech processing and generation to integrated systems and multi-modal interfaces - it also publishes special issues on specific natural language processing methods, tasks or applications. The journal welcomes survey papers describing the state of the art of a specific topic. The Journal of Natural Language Engineering also publishes the popular Industry Watch and Emerging Trends columns as well as book reviews.

EDITORS

Ruslan Mitkov (Executive Editor), University of Wolverhampton, UK. Email: R.Mitkov@wlv.ac.uk
Branimir K. Boguraev, IBM Thomas J. Watson Research Center, USA. Email: bran@us.ibm.com

ASSOCIATE EDITORS

Diana Inkpen, University of Ottawa, Canada. Email: Diana.Inkpen@uottawa.ca and Sandra Kübler, University of Indiana, USA. Email: skuebler@indiana.edu

BOOK EDITOR

Diana Maynard, University of Sheffield, UK. Email: d.maynard@sheffield.ac.uk

INDUSTRY WATCH EDITOR

Robert Dale, Language Technology Group, Australia. Email: rdale@language-technology.com

EMERGING TRENDS EDITOR

Kenneth Church, Baidu, CA, USA. Email: kennethchurch@baidu.com

FOUNDING EDITORS

Roberto Garigliano, SenseGraph Ltd., UK.
John I. Tait, johntait.net Ltd., UK. Email: john@johntait.net

EDITORIAL BOARD

Kevin Bretonnel Cohen, University of Colorado, USA
Ondřej Bojar, Charles University, Czech Republic
Gregory Grefenstette, Florida Institute for Human & Machine Cognition (IHMC), USA
Tracy Holloway King, A9 Amazon, USA
Jing Jiang, Singapore Management University, Singapore
Sandra Kübler, University of Indiana, USA
Lori Lamel, LIMSI, France
Suresh Manandhar, NAAMI Institute, Nepal
Alessandro Moschitti, Amazon, USA
Preslav Nakov, Qatar Computing Research Institute, HBKU, Qatar
Roberto Navigli, Sapienza University of Rome, Italy
Kemal Oflazer, Carnegie Mellon University, Qatar
Constantin Orasan, University of Surrey, UK

Sebastian Padó, University of Stuttgart, Germany
Simone Paolo Ponzetto, University of Mannheim, Germany
Nasredine Semmar, CEA LIST, France
Khalil Sima'an, University of Amsterdam, The Netherlands
Richard Sproat, Google, USA
Tomek Strzalkowski, University at Albany, USA
Maite Taboada, Simon Fraser University, Canada
Hwee Tou Ng, National University of Singapore, Singapore
Alfonso Ureña López, University of Jaen, Spain
Aline Villavicencio, Federal University of Rio Grande do Sul, Brazil and University of Sheffield, UK
Xiaojun Wan, Peking University, China
Bonnie Webber, University of Edinburgh, UK
Min Zhang, Soochow University, China

EDITORIAL ASSISTANTS

Sandra Elfiky, University of Wolverhampton, UK
April Harper, University of Wolverhampton, UK
Sara Moze, University of Wolverhampton, UK
Maria Kunilovskaya, University of Wolverhampton, UK

Rocío Caro Quintana University of Wolverhampton
Branislava Šandrih University of Wolverhampton and University of Belgrade