



ISSN
1351-3249

NATURAL LANGUAGE ENGINEERING

Edited by

Ruslan Mitkov

Branimir K. Boguraev

VOLUME 27 PART 3 MAY 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: boguraev@gmail.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

Heike Adel, Bosch Center for Artificial Intelligence, Germany
Pushpak Bhattacharyya, Indian Institute of Technology, India
Kevin Bretonnel Cohen, University of Colorado, USA
Ondřej Bojar, Charles University, Czech Republic
Burcu Can, University of Wolverhampton, UK
Alexander Gelbukh, Instituto Politécnico Nacional (IPN), Mexico
Tracy Holloway King, A9 Amazon, USA
Chu-ren Huang, The Hong Kong Polytechnic University
Jing Jiang, Singapore Management University, Singapore
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
Hwee Tou Ng, National University of Singapore, Singapore
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
Wajdi Zaghouani, Hamad Bin Khalifa University, Qatar
Min Zhang, Soochow University, China

EDITORIAL ASSISTANTS

Sandra Elfiky, University of Wolverhampton, UK
Anne Eschenbrücher, University of Wolverhampton
April Harper, University of Wolverhampton, UK
Sara Moze, University of Wolverhampton, UK
Maria Kunilovskaya, University of Wolverhampton, UK
Rocío Caro Quintana, University of Wolverhampton, UK
Hadeel Saadany, University of Wolverhampton
Branislava Šandrih, University of Wolverhampton, UK and University of Belgrade, Serbia