

Lecture Notes in Artificial Intelligence

11107

Subseries of Lecture Notes in Computer Science

LNAI Series Editors

Randy Goebel

University of Alberta, Edmonton, Canada

Yuzuru Tanaka

Hokkaido University, Sapporo, Japan

Wolfgang Wahlster

DFKI and Saarland University, Saarbrücken, Germany

LNAI Founding Series Editor

Joerg Siekmann

DFKI and Saarland University, Saarbrücken, Germany

More information about this series at <http://www.springer.com/series/1244>

Petr Sojka · Aleš Horák
Ivan Kopeček · Karel Pala (Eds.)

Text, Speech, and Dialogue

21st International Conference, TSD 2018
Brno, Czech Republic, September 11–14, 2018
Proceedings

Editors

Petr Sojka
Faculty of Informatics
Masaryk University
Brno, Czech Republic

Aleš Horák
Faculty of Informatics
Masaryk University
Brno, Czech Republic

Ivan Kopeček
Faculty of Informatics
Masaryk University
Brno, Czech Republic

Karel Pala
Faculty of Informatics
Masaryk University
Brno, Czech Republic

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Artificial Intelligence
ISBN 978-3-030-00793-5 ISBN 978-3-030-00794-2 (eBook)
<https://doi.org/10.1007/978-3-030-00794-2>

Library of Congress Control Number: 2018954548

LNCS Sublibrary: SL7 – Artificial Intelligence

© Springer Nature Switzerland AG 2018, corrected publication 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.

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

Preface

The annual Text, Speech and Dialogue Conference (TSD), which originated in 1998, has entered its third decade. In the course of this time, thousands of authors from all over the world have contributed to the proceedings. TSD constitutes a recognized platform for the presentation and discussion of state-of-the-art technology and recent achievements in the field of natural language processing (NLP). It has become an interdisciplinary forum, interweaving the themes of speech technology and language processing. The conference attracts researchers not only from Central and Eastern Europe but also from other parts of the world. Indeed, one of its goals has always been to bring together NLP researchers with different interests from different parts of the world and to promote their mutual cooperation.

One of the declared goals of the conference has always been, as its title says, twofold: not only to deal with language processing and dialogue systems as such, but also to stimulate dialogue between researchers in the two areas of NLP, i.e., between text and speech people. In our view, the TSD Conference was successful in this respect in 2018 again. We had the pleasure of welcoming three prominent invited speakers this year: Kenneth Ward Church presented a keynote with a proposal of an organizing framework for deep nets titled “Minsky, Chomsky & Deep Nets”; Piek Vossen presented the Pepper robot in “Leolani: A Reference Machine with a Theory of Mind for Social Communication”; and Isabel Trancoso reported on “Speech Analytics for Medical Applications”.

This volume contains the proceedings of the 21st TSD Conference, held in Brno, Czech Republic, in September 2018. In the review process, 53 papers were accepted out of 110 submitted papers, leading to an acceptance rate of 48%.

We would like to thank all the authors for the efforts they put into their submissions and the members of the Program Committee and reviewers who did a wonderful job selecting the best papers. We are also grateful to the invited speakers for their contributions. Their talks provide insight into important current issues, applications, and techniques related to the conference topics.

Special thanks go to the members of the Local Organizing Committee for their tireless effort in organizing the conference.

We hope that the readers will benefit from the results of this event and disseminate the ideas of the TSD Conference all over the world. Enjoy the proceedings!

July 2018

Aleš Horák
Ivan Kopeček
Karel Pala
Petr Sojka

Organization

TSD 2018 was organized by the Faculty of Informatics, Masaryk University, in cooperation with the Faculty of Applied Sciences, University of West Bohemia in Plzeň. The conference webpage is located at <http://www.tsdconference.org/tsd2018/>.

Program Committee

Elmar Nöth (General Chair), Germany
Rodrigo Agerri, Spain
Eneko Agirre, Spain
Vladimir Benko, Slovakia
Archana Bhatia, USA
Jan Černocký, Czech Republic
Simon Dobrisek, Slovenia
Kamil Ekstein, Czech Republic
Karina Evgrafova, Russia
Yevhen Fedorov, Ukraine
Volker Fischer, Germany
Darja Fiser, Slovenia
Eleni Galiotou, Greece
Björn Gambäck, Norway
Radovan Garabík, Slovakia
Alexander Gelbukh, Mexico
Louise Guthrie, UK
Tino Haderlein, Germany
Jan Hajič, Czech Republic
Eva Hajičová, Czech Republic
Yannis Haralambous, France
Hynek Hermansky, USA
Jaroslava Hlaváčová, Czech Republic
Aleš Horák, Czech Republic
Eduard Hovy, USA
Denis Jouviet, France
Maria Khokhlova, Russia
Aidar Khusainov, Russia
Daniil Kocharov, Russia
Miloslav Konopík, Czech Republic
Ivan Kopeček, Czech Republic
Valia Kordoni, Germany
Evgeny Kotelnikov, Russia
Pavel Král, Czech Republic
Siegfried Kunzmann, Germany
Nikola Ljubešić, Croatia
Natalija Loukachevitch, Russia
Bernardo Magnini, Italy
Oleksandr Marchenko, Ukraine
Václav Matoušek, Czech Republic
France Mihelić, Slovenia
Roman Mouček, Czech Republic
Agnieszka Mykowiecka, Poland
Hermann Ney, Germany
Karel Oliva, Czech Republic
Juan Rafael Orozco-Arroyave, Colombia
Karel Pala, Czech Republic
Nikola Pavesić, Slovenia
Maciej Piasecki, Poland
Josef Psutka, Czech Republic
James Pustejovsky, USA
German Rigau, Spain
Marko Robnik Šikonja, Slovenia
Leon Rothkrantz, The Netherlands
Anna Rumshinsky, USA
Milan Rusko, Slovakia
Pavel Rychlý, Czech Republic
Mykola Sazhok, Ukraine
Pavel Skrelin, Russia
Pavel Smrž, Czech Republic
Petr Sojka, Czech Republic
Stefan Steidl, Germany
Georg Stemmer, Germany
Vitomir Štruc, Slovenia

Marko Tadić, Croatia
Tamas Varadi, Hungary
Zygmunt Vetulani, Poland
Aleksander Wawer, Poland
Pascal Wiggers, The Netherlands

Yorick Wilks, UK
Marcin Wolinski, Poland
Alina Wróblewska, Poland
Victor Zakharov, Russia
Jerneja Žganec Gros, Slovenia

Additional Reviewers

Ladislav Lenc
Marton Makrai
Malgorzata Marciniak
Montse Maritxalar
Jiří Martinek
Elizaveta Mironyuk

Arantza Otegi
Bálint Sass
Tadej Skvorc
Jan Stas
Ivor Uhliarik

Organizing Committee

Aleš Horák (Co-chair), Ivan Kopeček, Karel Pala (Co-chair), Adam Rambousek (Web System), Pavel Rychlý, Petr Sojka (Proceedings)

Sponsors and Support

The TSD conference is regularly supported by International Speech Communication Association (ISCA). We would like to express our thanks to the Lexical Computing Ltd. and IBM Česká republika, spol. s r. o. for their kind sponsoring contribution to TSD 2018.

Contents

Invited Papers

Minsky, Chomsky and Deep Nets	3
<i>Kenneth Ward Church</i>	
Leolani: A Reference Machine with a Theory of Mind for Social Communication	15
<i>Piek Vossen, Selene Baez, Lenka Bajčetić, and Bram Kraaijeveld</i>	
Speech Analytics for Medical Applications.	26
<i>Isabel Trancoso, Joana Correia, Francisco Teixeira, Bhiksha Raj, and Alberto Abad</i>	

Text

Sentiment Attitudes and Their Extraction from Analytical Texts	41
<i>Nicolay Rusnachenko and Natalia Loukachevitch</i>	
Prefixal Morphemes of Czech Verbs	50
<i>Jaroslava Hlaváčová</i>	
LDA in Character-LSTM-CRF Named Entity Recognition	58
<i>Miloslav Konopík and Ondřej Pražák</i>	
Lexical Stress-Based Authorship Attribution with Accurate Pronunciation Patterns Selection	67
<i>Lubomir Ivanov, Amanda Aebig, and Stephen Meerman</i>	
Idioms Modeling in a Computer Ontology as a Morphosyntactic Disambiguation Strategy: The Case of Tibetan Corpus of Grammar Treatises	76
<i>Alexei Dobrov, Anastasia Dobrova, Pavel Grokhovskiy, Maria Smirnova, and Nikolay Soms</i>	
Adjusting Machine Translation Datasets for Document-Level Cross-Language Information Retrieval: Methodology.	84
<i>Gennady Shtekh, Polina Kazakova, and Nikita Nikitinsky</i>	
Deriving Enhanced Universal Dependencies from a Hybrid Dependency-Constituency Treebank	95
<i>Lauma Pretkalniņa, Laura Rituma, and Baiba Saulīte</i>	

Adaptation of Algorithms for Medical Information Retrieval for Working on Russian-Language Text Content	106
<i>Aleksandra Vatian, Natalia Dobrenko, Anastasia Makarenko, Niyaz Nigmatullin, Nikolay Vedernikov, Artem Vasilev, Andrey Stankevich, Natalia Gusarova, and Anatoly Shalyto</i>	
CoRTE: A Corpus of Recognizing Textual Entailment Data Annotated for Coreference and Bridging Relations	115
<i>Ajifah Waseem</i>	
Evaluating Distributional Features for Multiword Expression Recognition . . .	126
<i>Natalia Loukachevitch and Ekaterina Parkhomenko</i>	
MANÓCSKA: A Unified Verb Frame Database for Hungarian	135
<i>Ágnes Kalivoda, Noémi Vadász, and Balázs Indig</i>	
Improving Part-of-Speech Tagging by Meta-learning	144
<i>Lukasz Kobyliński, Michał Wasiluk, and Grzegorz Wojdyga</i>	
Identifying Participant Mentions and Resolving Their Coreferences in Legal Court Judgements.	153
<i>Ajay Gupta, Devendra Verma, Sachin Pawar, Sangameshwar Patil, Swapnil Hingmire, Girish K. Palshikar, and Pushpak Bhattacharyya</i>	
Building the Tatar-Russian NMT System Based on Re-translation of Multilingual Data	163
<i>Aidar Khusainov, Dzhavdet Suleymanov, Rinat Gilmullin, and Ajrat Gatiatullin</i>	
Annotated Clause Boundaries' Influence on Parsing Results	171
<i>Dage Särg, Kadri Muischnek, and Kaili Müürisep</i>	
Morphological Analyzer for the Tunisian Dialect.	180
<i>Roua Torjmen and Kais Haddar</i>	
Morphosyntactic Disambiguation and Segmentation for Historical Polish with Graph-Based Conditional Random Fields	188
<i>Jakub Waszczuk, Witold Kieraś, and Marcin Woliński</i>	
Do We Need Word Sense Disambiguation for LCM Tagging?	197
<i>Aleksander Wawer and Justyna Sarzyńska</i>	
Generation of Arabic Broken Plural Within LKB	205
<i>Samia Ben Ismail, Sirine Boukedi, and Kais Haddar</i>	
Czech Dataset for Semantic Textual Similarity	213
<i>Lukáš Svoboda and Tomáš Brychcín</i>	

A Dataset and a Novel Neural Approach for Optical Gregg Shorthand Recognition.	222
<i>Fangzhou Zhai, Yue Fan, Tejaswani Verma, Rupali Sinha, and Dietrich Klakow</i>	
A Lattice Based Algebraic Model for Verb Centered Constructions.	231
<i>Bálint Sass</i>	
Annotated Corpus of Czech Case Law for Reference Recognition Tasks	239
<i>Jakub Harašta, Jaromír Šavelka, František Kasl, Adéla Kotková, Pavel Loutocký, Jakub Mišek, Daniela Procházková, Helena Pullmannová, Petr Semenišín, Tamara Šejnová, Nikola Šimková, Michal Vosinek, Lucie Zavadilová, and Jan Zibner</i>	
Recognition of the Logical Structure of Arabic Newspaper Pages	251
<i>Hassina Bouressace and Janos Csirik</i>	
A Cross-Lingual Approach for Building Multilingual Sentiment Lexicons . . .	259
<i>Behzad Naderalvojud, Behrang Qasemizadeh, Laura Kallmeyer, and Ebru Akcapinar Sezer</i>	
Semantic Question Matching in Data Constrained Environment	267
<i>Anutosh Maitra, Shubhashis Sengupta, Abhisek Mukhopadhyay, Deepak Gupta, Rajkumar Pujari, Pushpak Bhattacharya, Asif Ekbal, and Tom Geo Jain</i>	
Morphological and Language-Agnostic Word Segmentation for NMT	277
<i>Dominik Macháček, Jonáš Vidra, and Ondřej Bojar</i>	
Multi-task Projected Embedding for Igbo.	285
<i>Ignatius Ezeani, Mark Hepple, Ikechukwu Onyenwe, and Chioma Enemu</i>	
Corpus Annotation Pipeline for Non-standard Texts	295
<i>Zuzana Peliknov and Zuzana Nevilov</i>	
Recognition of OCR Invoice Metadata Block Types	304
<i>Hien T. Ha, Marek Medved', Zuzana Nevěřilová, and Aleš Horák</i>	
Speech	
Automatic Evaluation of Synthetic Speech Quality by a System Based on Statistical Analysis	315
<i>Jiří Přibíl, Anna Přibilová, and Jindřich Matoušek</i>	
Robust Recognition of Conversational Telephone Speech via Multi-condition Training and Data Augmentation.	324
<i>Jiří Málek, Jindřich Ždánský, and Petr Červa</i>	

Online LDA-Based Language Model Adaptation.	334
<i>Jan Lehečka and Aleš Pražák</i>	
Recurrent Neural Network Based Speaker Change Detection from Text Transcription Applied in Telephone Speaker Diarization System	342
<i>Zbyněk Zajíc, Daniel Soutner, Marek Hruží, Luděk Müller, and Vlasta Radová</i>	
On the Extension of the Formal Prosody Model for TTS	351
<i>Markéta Jůzová, Daniel Tihelka, and Jan Volín</i>	
F ₀ Post-Stress Rise Trends Consideration in Unit Selection TTS	360
<i>Markéta Jůzová and Jan Volín</i>	
Current State of Text-to-Speech System ARTIC: A Decade of Research on the Field of Speech Technologies	369
<i>Daniel Tihelka, Zdeněk Hanzlíček, Markéta Jůzová, Jakub Vít, Jindřich Matoušek, and Martin Grüber</i>	
Semantic Role Labeling of Speech Transcripts Without Sentence Boundaries	379
<i>Niraj Shrestha and Marie-Francine Moens</i>	
Voice Control in a Real Flight Deck Environment.	388
<i>Michal Trzos, Martin Dostl, Petra Machkov, and Jana Eitlerov</i>	
Data Augmentation and Teacher-Student Training for LF-MMI Based Robust Speech Recognition	403
<i>Asadullah and Tanel Alumäe</i>	
Using Anomaly Detection for Fine Tuning of Formal Prosodic Structures in Speech Synthesis.	411
<i>Martin Matura and Markéta Jůzová</i>	
The Influence of Errors in Phonetic Annotations on Performance of Speech Recognition System.	419
<i>Radek Šafařík, Lukáš Matějů, and Lenka Weingartová</i>	
Deep Learning and Online Speech Activity Detection for Czech Radio Broadcasting	428
<i>Jan Zelinka</i>	
A Survey of Recent DNN Architectures on the TIMIT Phone Recognition Task	436
<i>Josef Michálek and Jan Vaněk</i>	

WaveNet-Based Speech Synthesis Applied to Czech: A Comparison with the Traditional Synthesis Methods 445
Zdeněk Hanzlíček, Jakub Vít, and Daniel Tihelka

Phonological Posteriors and GRU Recurrent Units to Assess Speech Impairments of Patients with Parkinson’s Disease 453
Juan Camilo Vásquez-Correa, Nicanor Garcia-Ospina, Juan Rafael Orozco-Arroyave, Milos Cernak, and Elmar Nöth

Phonological i-Vectors to Detect Parkinson’s Disease 462
N. Garcia-Ospina, T. Arias-Vergara, J. C. Vásquez-Correa, J. R. Orozco-Arroyave, M. Cernak, and E. Nöth

Dialogue

Subtext Word Accuracy and Prosodic Features for Automatic Intelligibility Assessment 473
Tino Haderlein, Anne Schützenberger, Michael Döllinger, and Elmar Nöth

Prosodic Features’ Criterion for Hebrew. 482
Ben Fishman, Itshak Lapidot, and Irit Opher

The Retention Effect of Learning Grammatical Patterns Implicitly Using Joining-in-Type Robot-Assisted Language-Learning System 492
AlBara Khalifa, Tsuneo Kato, and Seiichi Yamamoto

Learning to Interrupt the User at the Right Time in Incremental Dialogue Systems 500
Adam Chýlek, Jan Švec, and Luboš Šmídl

Towards a French Smart-Home Voice Command Corpus: Design and NLU Experiments 509
Thierry Desot, Stefania Raimondo, Anastasia Mishakova, François Portet, and Michel Vacher

Classification of Formal and Informal Dialogues Based on Emotion Recognition Features 518
György Kovács

Correction to: A Lattice Based Algebraic Model for Verb Centered Constructions E1
Bálint Sass

Author Index 527