Lecture Notes in Artificial Intelligence 11697

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Kamil Ekštein (Ed.)

Text, Speech, and Dialogue

22nd International Conference, TSD 2019
Ljubljana, Slovenia, September 11–13, 2019
Proceedings

Springer

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ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Artificial Intelligence
ISBN 978-3-030-27946-2 ISBN 978-3-030-27947-9 (eBook)
https://doi.org/10.1007/978-3-030-27947-9

LNCS Sublibrary: SL7 – Artificial Intelligence

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Preface

The annual International Conference on Text, Speech, and Dialogue (TSD), which emerged in 1998, constitutes a recognized platform for the presentation and discussion of state-of-the-art technology and recent achievements in computer processing of natural language. It has become a broad interdisciplinary forum, interweaving the topics 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 bringing together NLP researchers with various interests from different parts of the world and to promote their mutual co-operation. One of the ambitions of the conference is, as its name suggests, not only to deal with dialogue systems but also to improve dialogue among researchers in areas of NLP, i.e., among the "text" and the "speech" and the "dialogue" people.

The TSD 2019 was again a very special year: The TSD conference got truly international as it left the Czech Republic for the first time in its 22-year-long history. The Program Committee decided that the existing good repute of the conference might be further boosted by embedding it into the group of international conferences not only by international participants but also by changing venues around the world and involving local Organizing Committees from different countries. In order to make this beginning of the new era as smooth as possible, we picked a destination in Central Europe not far from the country of TSD origin, the Czech Republic. Thanks to long-lasting co-operation and friendship with the ASR & NLP researchers from the University of Ljubljana, Slovenia, the choice was thus easier. The first non-Czech venue of the TSD conference was therefore the beautiful Slovenian capital Ljubljana.

The TSD 2019 conference was held on the campus of the co-organizing institution, the Faculty of Electrical Engineering of the University of Ljubljana, during September 11–13, 2019. The conference schedule and the keynote topic was again co-ordinated with the Interspeech Conference and TSD 2019 was listed as an Interspeech 2019 satellite event. Like its predecessors, TSD 2019 highlighted the importance of language and speech processing to both the academic and scientific worlds and their most recent breakthroughs in current applications. Experienced researchers and professionals as well as newcomers in the field found in the TSD conference a forum to communicate with people sharing similar interests.

This volume contains a collection of submitted papers presented at the conference. Each of them was thoroughly reviewed by three members of the conference reviewing team consisting of more than 60 top specialists in the conference topic areas. A total of 33 accepted papers out of 73 submitted, altogether contributed by 174 authors and co-authors, were selected by the Program Committee for presentation at the conference and for publication in this book. Theoretical and more general contributions were presented in common (plenary) sessions. Problem-oriented sessions as well as panel discussions then brought together specialists in narrower problem areas with the aim of exchanging knowledge and skills resulting from research projects of all kinds.

Last but not least, we would like to express our gratitude to the authors for providing their papers on time, to the members of the conference reviewing team and the Program Committee for their careful reviews and paper selection, and to the editors for their hard work preparing this volume. Special thanks go to the members of both local Organizing Committees for their tireless effort and enthusiasm during the conference organization.

September 2019

Kamil Ekštein
Miloslav Konopík

Organization

The 22nd International Conference on Text, Speech, and Dialogue – TSD 2019 – was organized by the NTIS (New Technologies for the Information Society) P2 Research Centre of the Faculty of Applied Sciences, University of West Bohemia in Plzeň (Pilsen), Czech Republic, in co-operation with the Faculty of Electrical Engineering, University of Ljubljana, Ljubljana, Slovenia, and co-organized by the Faculty of Informatics, Masaryk University in Brno, Czech Republic.

The conference website is located at http://www.kiv.zcu.cz/tsd2019/ or http://www.tsdconference.org/.

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Keynote Speakers

The organizers would like to thank the following respected scientists and researchers for delivering their keynote talks:

Ryan Cotterell
Denis Jouvet
Bhiksha Raj
Aline Villavicencio

Acknowledgments

The organizers would like to give special thanks to the following reviewers who substantially contributed to the successful completion of the TSD 2019 review process by voluntarily agreeing to deliver reviews beyond their duties:

Anuj Goyal
Ondřej Pražák
Carlos Ariel Ferrer Riesgo
Jakub Sido

Sponsoring Institutions

The organizers would like to express their immense gratitude to the following establishments for providing extra funding that helped to keep the conference fees reasonable:

Springer-Verlag GmbH, Heidelberg, Germany
CLARIN.SI, Ljubljana, Slovenia

Abstracts of Invited Talks

Mitigating Gender Bias in Morphologically Rich Languages

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Abstract. Gender bias exists in corpora of all of the world's languages: the bias is a function what people talk about, not of the grammar of a language. For this reason, data-driven systems in NLP that are trained on this data will inherit such bias. Evidence of bias can be found in all sorts of NLP technologies: word vectors, language models, coreference systems and even machine translation. Most of the research done to mitigate gender bias in natural language corpora, however, has focused solely on English. For instance, in an attempt to remove gender bias in English corpora, NLP practitioners often augment corpora by swapping gendered words: i.e., if "he is a smart doctor" appears, add the sentence "she is a smart doctor" to the corpus as well before training a model. The broader research question asked in this talk is the following: How can we mitigate gender bias in corpora from any of the world's languages, not just in English? As an example, the simple swapping heuristic for English will not generalize to most of the world's languages. Indeed, such a solution would not even apply to German, since it marks gender on both nouns and adjectives and requires gender agreement throughout a sentence. In the context of German, this task is far more complicated: mapping "er ist ein kluger Arzt" to "sie ist eine kluge Ärztin" requires more than simply swapping "er" with "sie" and "Arzt" with "Ärztin"–one also has to modify the article ("ein") and the adjective ("klug"). In this talk, we present a machine-learning solution to this problem: we develop a novel neural random field that generates such sentence-to-sentence transformations, enforcing agreement with respect to gender. We explain how to perform inference and morphological reinflection to generate such transformations without any labeled training examples. Empirically, we illustrate that the model manages to reduce gender bias in corpora without sacrificing grammaticality with a novel metric of gender bias. Additionally, we discuss concrete applications to coreference resolution and machine translation.

Adversarial Attacks on ML Systems

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Abstract. As neural network classifiers become increasingly successful at various tasks ranging from speech recognition and image classification to various natural language processing tasks and even recognizing malware, a second, somewhat disturbing discovery has also been made. It is possible to fool these systems with carefully crafted inputs that appear to the lay observer to be natural data, but cause the neural network to misclassify in random or even targeted ways.

In this talk we will discuss why such attacks are possible, and the problem of designing, identifying, and avoiding attacks by such crafted "adversarial" inputs.

Multiword Expressions and Idiomaticity: How Much of the Sailing Has Been Plain?

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Extended Abstract

Much progress has been made in designing accurate word representations [2–4], with improvements for language technology applications like machine translation and text simplification. Precise natural language understanding requires adequate treatments both of single words and of larger units. In particular, one commonly held assumption for constructing the representation for larger units like expressions, phrases and sentences, is that the meaning of the unit can be constructed from the meanings of its parts, in what is known as the Compositionality Principle. While it allows an interpretation to be generated even for unseen combinations of known words, it may not be adequate for expressions like idioms, verb-particle constructions and compound nouns as they often display idiomaticity. For instance, this is the case of *loan shark* with the meaning of a person who lends money at extremely high interest rates (rather than a fish that can be borrowed). Therefore it is important to identify which words in a sentence form an expression [5], and whether an expression is idiomatic [1, 6] and should be treated as a unit, as this determines if it can be interpreted from a combination of the meanings of their component words or not. In this talk I discuss advances on the identification and treatment of multiword expressions in texts, focusing in particular on techniques for modelling idiomaticity.

Acknowledgements. This talk includes joint work with Carlos Ramisch, Marco Idiart, Silvio Cordeiro, Rodrigo Wilkens, Felipe Paula and Leonardo Zilio.

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