

8th Symposium on Languages, Applications and Technologies

SLATE 2019, June 27–28, 2019, Coimbra, Portugal

Edited by

Ricardo Rodrigues

Jan Janoušek

Luís Ferreira

Luísa Coheur

Fernando Batista

Hugo Gonçalo Oliveira



Editors

Ricardo Rodrigues 

CISUC, University of Coimbra, Portugal
Polytechnic Institute of Coimbra, Portugal
rmanuel@dei.uc.pt

Luís Ferreira 

Instituto Politécnico do Cávado e Ave,
Barcelos, Portugal
lufer@ipca.pt

Fernando Batista 

ISCTE-IUL, Lisbon, Portugal
INESC-ID, Lisbon, Portugal
fernando.batista@iscte-iul.pt

Jan Janoušek

Czech Technical University, Prague, Czech Republic
jan.janousek@fit.cvut.cz

Luísa Coheur 

Instituto Superior Técnico, Lisbon, Portugal
INESC-ID, Lisbon, Portugal
luisa.coheur@inesc-id.pt

Hugo Gonçalves Oliveira 

CISUC, University of Coimbra, Portugal
hroliv@dei.uc.pt

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■ Preface

SLATE, the Symposium on Languages, Applications and Technologies, is an international scientific event about languages, currently on its 8th edition. This volume compiles the proceedings of this edition, SLATE'19, held at the University of Coimbra, Portugal, on the 27th and 28th of June, 2019.

We often use languages — alas, languages are one of the most defining features of human beings since the dawn of times. For most of mankind's time on earth, languages were used only to communicate between ourselves. Later, however, they came also to be used to communicate with computers, instructing them, and then to receive data and information from them. More recently, with the advent of computer networks, languages for computers to communicate between themselves were also developed.

For each of the previous forms of communication, there are different kinds of languages, but they still share many similarities. In SLATE, we are interested in discussing these kinds of languages. Discussions in this symposium are organized in three main tracks:

- **HHL Track:** Processing Human-Human Languages, dedicated to the presentation and discussion of Natural Language Processing (NLP) tools and applications;
- **HCL Track:** Processing Human-Computer Languages, where researchers, developers, and educators exchange ideas and information on the latest academic or industrial work on design, processing, assessment and applications of programming languages;
- **CCL Track:** Processing Computer-Computer Languages, a broad space for discussing (mark-up) languages for communication between computers, including those used for visualization and presentation of information to the end user.

This volume is all about the use of languages in diverse contexts by humans and computers, and their processing. It compiles 23 papers — 10 long and 13 short — accepted for presentation on the three main tracks of SLATE'19.

In addition to the presentation of the papers, the symposium included two keynote talks: (i) *Structured Text and Image Generation — Structured Auto-Regressive Models with Latent Predictor Networks*, by Wang Ling, from DeepMind Technologies Limited; and (ii) *Ranking Programming Languages for their Energy Efficiency*, by João Paulo Fernandes, from the Department of Informatics Engineering of the University of Coimbra.

We feel confident that these works provide a valuable, even if brief, insight of what is currently being done in the areas of each track, in particular, and in language technologies, in general, being grateful to each of the authors of the selected papers, and to the keynote speakers for their participation.

As General Chairs of SLATE'19, we would like to thank the people without whom this event would have never been possible, namely: the four track chairs, *Luísa Coheur* and *Fernando Batista* (HHL), *Jan Janoušek* (HCL), and *Luís Ferreira* (CCL), for their valuable help when it came to making decisions of a scientific character; all members of the Scientific Program Committee of each track, for their effort in reviewing the submitted papers; both keynote speakers, *Wang Ling* and *João Fernandes*, for telling us about their current research, impactful in the scope of the symposium; jeKnowledge, a junior company of the University of Coimbra, for helping us in the local organization of the event, with a special mention going to *Miguel Marques*, *Rafaela Antunes*, and *Joana Santos*.

A word of gratitude should be also given to our institutional partners from the University of Coimbra, namely: our research center, the Center for Informatics and Systems of the

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University of Coimbra (CISUC), for their logistic support at several levels; the Faculty of Science and Technologies (FCTUC), more precisely the direction board of the Department of Informatics Engineering (DEIUC), for its logistic support at various stages, the direction board of the Department of Mathematics (DMUC), for letting us use their space, and *Gabinete de Apoio à Divulgação* (GAD), for providing us with materials for the participants in the symposium. A special thank you note goes to *Márcia Espírito Santo* (from DEIUC) and to *Jorge Ávila* (from CISUC).

Last but not least, we would like to thank: our sponsors, namely Critical Software, SA, Talkdesk, Inc, and Nestlé Portugal, SA; Dagstuhl Publishing, for the publication of these peer-reviewed proceedings; and EasyChair, whose system was crucial to manage all the Program Committee work, from paper submissions to reviews and notifications.

Hugo Gonçalo Oliveira
Ricardo Rodrigues
General Chairs

■ List of Authors

Alberto Simões
Polytechnic Institute of Cávado and Ave
Barcelos, Portugal
asimoes@ipca.pt

Ana Alves
CISUC and Polytechnic Institute of Coimbra
Coimbra, Portugal
ana@dei.uc.pt

António Teixeira
University of Aveiro
Aveiro, Portugal
ajst@ua.pt

Baris Tekin Tezel
Dokuz Eylul University
İzmir, Turkey
baris.tezel@deu.edu.tr

Beatriz Calderón
University of Santiago de Compostela
Santiago de Compostela, Spain
beatriz.calderon.cerrato@rai.usc.es

Bostjan Slivnik
University of Ljubljana
Ljubljana, Slovenia
bostjan.slivnik@fri.uni-lj.si

Carla Lopes
University of Porto
Porto, Portugal
ctl@fe.up.pt

Cátia Dias
INESC-ID and Instituto Superior Técnico
Lisboa, Portugal
catiadias089@gmail.com

Christopher Shulby
University of São Paulo
São Paulo, Brazil
chrisshulby@gmail.com

Cristiana Araújo
University of Minho
Braga, Portugal
decristianaraaujo@hotmail.com

Dietmar Seipel
University of Würzburg
Würzburg, Germany
dietmar.seipel@uni-wuerzburg.de

Falco Nogatz
University of Würzburg
Würzburg, Germany
falco.nogatz@uni-wuerzburg.de

Geylani Kardas
Ege University
İzmir, Turkey
geylani.kardas@ege.edu.tr

Gonçalo Carnaz
University of Évora
Évora, Portugal
goncalojfcarnaz@gmail.com

Hugo Gonçalo Oliveira
CISUC and University of Coimbra
Coimbra, Portugal
hroliv@dei.uc.pt

Jaroslav Porubán
Technical University of Košice
Košice, Slovakia
jaroslav.poruban@tuke.sk

João Ferreira
University of Coimbra
Coimbra, Portugal
jdcoelho@student.dei.uc.pt

João Lameiras
University of Minho
Braga, Portugal
pg35398@alunos.uminho.pt

José Devezas
University of Porto
Porto, Portugal
jld@fe.up.pt

José João Almeida
University of Minho
Braga, Portugal
jj@di.uminho.pt

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José Paulo Leal
University of Porto
Porto, Portugal
zp@dcc.f.c.up.pt

Julia Kübert
University of Würzburg
Würzburg, Germany
julia.kuebert@stud-mail.uni-wuerzburg.de

Luís Martins
University of Minho
Braga, Portugal
lmfmr@gmail.com

Luísa Coheur
INESC-ID and Instituto Superior Técnico
Lisboa, Portugal
luisa.coheur@l2f.inesc-id.pt

Maksym Ketsmur
University of Aveiro
Aveiro, Portugal
mvk@ua.pt

Maria João Varanda Pereira
Polytechnic Institute of Bragança
Bragança, Portugal
mjoao@ipb.pt

Mariana Gaspar Fernandes
INESC-ID and Instituto Superior Técnico
Lisboa, Portugal
mariana.gaspar.fernandes@tecnico.ulisboa.pt

Mário Antunes
Polytechnic Institute of Leiria
Leiria, Portugal
mario.antunes@ipleiria.pt

Martinho Aragão
University of Minho
Braga, Portugal
martinhoaragao@gmail.com

Matej Madeja
Technical University of Košice
Košice, Slovakia
matej.madeja@tuke.sk

Mónica Guimarães
Fafe Municipal Archive
Fafe, Portugal
monikaguimaraes@gmail.com

Nuno Almeida
University of Aveiro
Aveiro Portugal
nunoalmeida@ua.pt

Pablo Gamallo
University of Santiago de Compostela
Santiago de Compostela, Spain
pablo.gamallo@usc.es

Patricia Martin-Rodilla
Spanish National Research Council
Santiago de Compostela, Spain
patricia.martin-rodilla@incipit.csic.es

Paulo Quaresma
University of Évora
Évora, Portugal
pq@uevora.pt

Pedro Cunha
University of Porto
Porto, Portugal
up201405950@fc.up.pt

Pedro Fialho
L2F/INESC-ID and University of Évora
Évora, Portugal
peter.fialho@gmail.com

Pedro Rangel Henriques
University of Minho
Braga, Portugal
pedrorangelhenriques@gmail.com

Ricardo Filipe
Polytechnic Institute of Coimbra
Coimbra, Portugal
ricardo.ferreira.filipe@gmail.com

Ricardo Queirós
Polytechnic Inst. of Porto and INESC TEC
Porto, Portugal
ricardo.queiros@gmail.com

Ricardo Rodrigues
CISUC and Polytechnic Institute of Coimbra
Coimbra, Portugal
rmanuel@dei.uc.pt

Rok Novosel
University of Ljubljana
Ljubljana, Slovenia
novosel.rok@gmail.com

Rui Mendes
University of Minho
Braga, Portugal
azuki@di.uminho.pt

Salvador Abreu
University of Évora
Évora, Portugal
spa@uevora.pt

Samuel Silva
University of Aveiro
Aveiro, Portugal
sss@ua.pt

Sérgio Nunes
University of Porto
Porto, Portugal
ssn@fe.up.pt

Timur Galeev
Kazan Federal University
Kazan, Respublika Tatarstan, Russia
tigaleev@kpfu.ru

Vítor Nogueira
University of Évora
Évora, Portugal
vbn@di.uevora.pt

Vladimir Bochkarev
Kazan Federal University
Kazan, Respublika Tatarstan, Russia
vbochkarev@mail.ru

Xavier Gómez Guinovart
University of Vigo
Vigo, Spain
xgg@uvigo.gal

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Hugo Gonalo Oliveira
CISUC and University of Coimbra
Portugal

Ricardo Rodrigues
CISUC and Polytechnic Inst. of Coimbra
Portugal

Track Chairs

Human-Human Languages

Lu sa Coheur
IST and INESC-ID
Portugal

Fernando Batista
ISCTE-IUL and INESC-ID
Portugal

Human-Computer Languages

Jan Janou ek
Czech Technical University
Czech Republic

Computer-Computer Languages

Lu s Ferreira
Polytechnic Institute of C vado and Ave
Portugal

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Hugo Gonalo Oliveira
CISUC and University of Coimbra
Portugal

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CISUC and Polytechnic Inst. of Coimbra
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jeKnowledge and University of Coimbra
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Davide Carneiro
Polytechnic Institute of Porto
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Diana Santos
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Fernando Batista
ISCTE–IUL and INESC–ID
Portugal

Hugo Gonçalo Oliveira
CISUC and University of Coimbra
Portugal

Irene Castellón
University of Barcelona
Spain

Irene Rodrigues
University of Évora
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Ivan Lukovic
University of Novi Sad
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Jakub Swacha
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Jan Janoušek
Czech Technical University
Czech Republic

Jan Kollar
Technical University of Košice
Slovakia

Jaroslav Porubän
Technical University of Košice
Slovakia

João Fernandes
University of Coimbra
Portugal

Joaquim Silva
Polytechnic Institute of Cávado and Ave
Portugal

Jorge Baptista
University of Algarve
Portugal

José Luís Sierra Rodriguez
Complutense University of Madrid
Spain

José Paulo Leal
University of Porto
Portugal

Josep Silva Galiana
Polytechnic University of Valencia
Spain

Luís Ferreira
IST and INESC–ID
Portugal

Luís Morgado da Costa
Nanyang Technological University
Singapore

Luísa Coheur
IST and INESC–ID
Portugal

Maria João Varanda Pereira
Polytechnic Institute of Bragança
Portugal

Marjan Mernik
University of Maribor
Slovenia

Miguel Solla
University of Vigo
Spain

Mikel Forcada
University of Alicante
Spain

Nuno Lopes
Polytechnic Institute of Cávado and Ave
Portugal

Nuno Carvalho

University of Minho

Portugal

Pablo Gamallo

University of Santiago de Compostela

Spain

Pedro Rangel Henriques

University of Minho

Portugal

Ricardo Queirós

Polytechnic Institute of Porto

Portugal

Ricardo Rocha

University of Porto

Portugal

Salvador Abreu

University of Évora

Portugal

Thierry Declerck

Saarland University at Saarbrücken

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