



15th International Workshop on Spoken Language Translation

Bruges, Oct. 29 - 30, 2018

Proceedings

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Proceedings of the

**International Workshop on
Spoken Language Translation**

October 29-30, 2018

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Edited by
Marco Turchi
Jan Niehues
Marcello Federico

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Foreword

The International Workshop on Spoken Language Translation (IWSLT) is an annually scientific workshop, associated with an open evaluation campaign on Spoken Language Translation, where both scientific papers and system descriptions are presented.

Since 2004, the annual workshop has been held six times in Asia, five times in America, and three times in Europe. This year, the 15th International Workshop on Spoken Language Translation is hosted Europe, in awesome Bruges, Belgium from 29th to 30th October 2018. The reason was to co-locate IWSLT with other two important and related conferences: the Conference on Machine Translation (WMT) and the Conference on Empirical Methods for Natural Language Processing (EMNLP), both taking place in Brussels, after IWSLT.

The IWSLT workshop includes presentations of scientific papers in dedicated technical sessions, either in oral or poster form. Scientific papers cover theoretical and practical issues in the field of machine translation, spoken language translation, automatic speech recognition, text-to-speech synthesis. This year, we received 26 submissions of scientific papers, which were carefully peer-reviewed by members of the program committee. Out of them, 12 were selected for publication based on their technical merit and relevance to the workshop. The proceedings of IWSLT are published on the workshop website.

As in the past editions, IWSLT will assign a best student paper award for which this year we have selected two finalists that will give an oral presentation of their work.

The workshop will also include the presentation and discussion of the outcomes of the 2018 IWSLT evaluation campaign, which this year focused on two tasks: low resource machine translation of TED Talks from Basque to English, and speech translation of lectures from English to German.

The low resource translation task addressed a conventional bilingual text translation task, but given the difficulty of the proposed translation direction and the scarcity of available parallel data, we supported the development of deep learning models also leveraging parallel data from related languages.

The speech translation task also introduced several novel aspects with respect to the past, which pushed participants to go beyond the usual pipeline approach of cascading automatic speech recognition and machine translation. First, this year we only evaluated end-to-end performance, so that every participant had to generate German translations based on the English audio. Second, for participants who wanted to focus on one component of the pipeline, we provided baseline components for the other parts. Third, we introduced a special evaluation condition to test end-to-end models, namely deep learning models directly mapping source language speech into target language text. For this condition, we provided an aligned TED corpus of English audio and German texts.

For each proposed task, monolingual and bilingual language resources, as needed,

were provided to participants in order to train their systems. Another novelty we introduced this year was to extend the evaluation period from one week to one month, so that participants could better plan their effort. Blind test sets were released at the begin of July, and all translation outputs produced by the participants were evaluated using several automatic translation quality metrics. Finally, each participant was requested to submit a paper describing his system and the utilized resources. System papers went through a peer-review process only aiming at improving their overall quality.

The efforts of the organizers were definitely rewarded. The IWSLT evaluation campaign attracted this year 15 research teams, 8 taking part to the low-resource translation task, and 9 to the speech translation task. The presentations of the corresponding 15 system description papers will be as usual preceded by an overview talk of the evaluation campaign given by one of the organizers.

Before opening the workshop a few words of acknowledgment.

I would like to express my gratitude to the evaluation committee, Jan Niehues, Mauro Cettolo, Sebastian Stüker, Luisa Bentivogli, and Roldano Cattoni for preparing such a great playground for the research community. To the program chair Marco Turchi and all the program committee members for arranging an excellent workshop program. To Margit Rödder, for taking care of the website and all the local and financial arrangements.

Finally, I would like to thank our generous sponsors for supporting IWSLT. Our gold sponsors *Amazon Web Services* and *AppTek*, and, our silver sponsor *M*Modal*. This year sponsors will have the opportunity to give a short corporate presentation at our workshop, which I'm sure will enrich IWSLT with an industry perspective on spoken language translation and provide additional networking opportunities in our community.

I wish all the participants a fruitful and engaging IWSLT workshop!

Welcome to Bruges!

Marcello Federico
Workshop Chair IWSLT 2018

Organizers

Chairs

Marcello Federico (FBK, Italy /Amazon, USA): Workshop
Marco Turchi (FBK, Italy) : Program
Jan Niehues (KIT,Germany): Evaluation
Alex Waibel (CMU, USA/KIT, Germany): Steering Committee

Local and Financial Chair

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Roldano Cattoni (FBK, Italy)
Marcello Federico (FBK, Italy/Amazon, USA)

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Laurent Besacier, LIG (France)

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Philip Kohen, John Hopkins University (USA)
Julia Kreuzer, Heildeberg University (Germany)
Roland Kuhn, NRC (Canada)
Yves Lepage, Waseda University (Japan)
Will Lewis, Microsoft (USA)
Qun Liu, DCU (Ireland)
Evgeny Matusov, Apptek (Germany/USA)
Surafel Melaku Lakew, FBK (Italy)
Markus Müller, KIT(Germany)
Graham Neubig, CMU (USA)
Michael Paul, ATR-Trek (Japan)
Stephan Peitz, Apple (USA)
Maja Popović, DCU (Ireland)
Matt Post, Amazon Research
Elizabeth Salesky, CMU (USA)
Carolina Scarton, University of Sheffield (UK)
Lane Schwartz, U. Illinois (USA)
Rico Senrich, University of Edinburgh (UK)
Matthias Sperber, KIT(Germany)
Felix Stahlberg, University of Cambridge (UK)
Ales Tamchyna, Charles University (Czech Republic)
Jörg Tiedemann, H. Helsinki (Finland)
Antonio Toral, University Groningen (The Netherlands)
Vincent Vandeghinste, KU Leuven (Belgium)
David Vilar, Amazon Research (Germany)
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Marion Weller, Stuttgart University (Germany)
Philip Williams, University of Edinburgh (UK)

Acknowledgments

IWSLT 2018 is proud to present its gold sponsor



and its silver sponsor



Participants

	SLT		Low-resourced MT
	Baseline	End-to-End	
USTC-NEL (CHINA)	✓	✓	
ADAPT (IRELAND)			✓
University of Helsinki (FINLAND)			✓
MeMAD (FINLAND)	✓		
Prompsit (SPAIN)			✓
AppTek (GERMANY)	✓		
Sogou-TIIC (CHINA)	✓		
SRPOL-UEDIN (UK/POLAND)			✓
AFRL (USA)	✓		✓
KIT (GERMANY)	✓	✓	
Alibaba (CHINA)	✓		
CUNI (CZECH)			✓
FBK (ITALY)		✓	✓
JHU/KyotoU (USA/JAPAN)		✓	
SGNLP (KOREA)		✓	

Program

Monday, October 29th, 2018

08:30-09:00	Workshop Registration
09:00-09:15	Welcome Remarks <i>Marcello Federico (Workshop Chair)</i> Amazon-FBK, USA, Italy
09:15-10:05	Invited talk: Multimodal Machine Translation <i>Prof. Lucia Specia</i> University of Sheffield, UK
10:05-11:05	INDUSTRIAL SESSION
10:05-10:20	Gold sponsor presentation: AppTek
<i>Coffee Break (10:20-10:50)</i>	
10:50-11:05	Silver sponsor presentation: M*Modal
11:00-12:00	EVALUATION CAMPAIGN
11:05-12:00	Report on the 15th IWSLT Evaluation Campaign, IWSLT 2018 <i>Jan Niehues, Roldano Cattoni, Sebastian Stüker, Mauro Cettolo, Marco Turchi, Marcello Federico</i> KIT & FBK, Germany, Italy
<i>Lunch (12:00-13:30)</i>	
13:30-15:00	ORAL SESSION I
13:30-14:00	Samsung and University of Edinburgh's System for the IWSLT 2018 Low Resource MT Task <i>Philip Williams, Marcin Chochowski, Pawel Przybysz, Rico Sennrich, Barry Haddow and Alexandra Birch</i> UEDIN & Samsung R&D Institute, UK, Poland
14:00-14:30	The USTC-NEL Speech Translation system at IWSLT 2018 <i>Dan Liu, Junhua Liu, Wu Guo, Shifu Xiong, Zhiqiang Ma, Rui Song, Chongliang Wu and Quan Liu</i> USTC & IFLYTEK Co. LTD, China

14:30-15:00	Unsupervised Parallel Sentence Extraction from Comparable Corpora <i>Viktor Hangya, Fabienne Braune, Yuliya Kalasouskaya and Alexander Fraser</i> LMU & Volkswagen Data Lab Munich, Germany
<i>Coffee Break (15:00-15:30)</i>	
15:30-17:30	POSTER SESSION
	The JHU/KyotoU Speech Translation System for IWSLT 2018 <i>Hirofumi Inaguma, Xuan Zhang, Zhiqi Wang, Adithya Renduchintala, Shinji Watanabe and Kevin Duh</i> JHU & KyotoU, USA, Japan
	The ADAPT System Description for the IWSLT 2018 Basque to English Translation Task <i>Alberto Poncelas, Kepa Sarasola and Andy Way</i> DCU, Ireland
	The University of Helsinki submissions to the IWSLT 2018 low-resource translation task <i>Yves Scherrer</i> HelsinkiU, Finland
	Prompsit's Submission to IWSLT 2018 Low Resource Machine Translation Task <i>Victor M. Sánchez-Cartagena</i> Prompsit, Spain
	The AFRL IWSLT 2018 Systems: What Worked, What Didn't <i>Brian Ore, Eric Hansen, Katherine Young, Grant Erdmann and Jeremy Gwinup</i> AFRL, USA
	Alibaba Speech Translation Systems for IWSLT 2018 <i>Fei Huang, Nguyen Bach and Chongjia Ni</i> Alibaba, China
	The MeMAD Submission to the IWSLT 2018 Speech Translation Task <i>Umut Sulubacak, Aku Rouhe, Jörg Tiedemann, Stig-Arne Grönroos and Mikko Kurimo</i> HelsinkiU & AaltoU, Finland
	Neural Speech Translation at AppTek <i>Evgeny Matusov, Patrick Wilken, Parnia Bahar, Julian Schamper, Pavel Golik, Albert Zeyer, Joan Albert Silvestre-Cerda, Adria Martinez-Villaronga, Hendrik Pesch and Jan-Thorsten Peter</i> AppTek, Germany
	KIT's IWSLT 2018 SLT Translation System <i>Matthias Sperber, Ngoc Quan Pham, Thai Son Nguyen, Jan Niehues, Markus Müller, Thanh-Le Ha, Sebastian Stüker and Alex Waibel</i> KIT, Germany
	CUNI Basque to English Submission in IWSLT18 <i>Tom Kocmi, Dušan Variš and Ondřej Bojar</i> CUNI, Czech Republic
	Adapting Multilingual NMT to Extremely Low Resource Languages, FBK's Participation of the Basque-English Low Resource MT, IWSLT 2018 <i>Surafel M. Lakew and Marcello Federico</i> FBK, Italy

	<p>The Sogou-TIIC Speech Translation System for IWSLT 2018 <i>Yuguang Wang, Liangliang Shi, Linyu Wei, Weifeng Zhu, Jinkun Chen, Zhichao Wang, Shixue Wen, Wei Chen, Yanfeng Wang and Jia Jia</i> Sogou & TIIC, China</p>
	<p>Fine-tuning on Clean Data for End-to-End Speech Translation: FBK @ IWSLT 2018 <i>Mattia Antonino Di Gangi, Roberto Dessì, Roldano Cattoni, Matteo Negri and Marco Turchi</i> FBK, Italy</p>
	<p>Using Spoken Word Posterior Features in Neural Machine Translation <i>Kaho Osamura, Takatomo Kano, Sakriani Sakti, Katsuhito Sudoh and Satoshi Nakamura</i> NIST & RIKEN, Japan</p>
	<p>Transfer Learning in Multilingual Neural Machine Translation with Dynamic Vocabulary <i>Surafel Melaku Lakew, Aliia Erofeeva, Matteo Negri, Marcello Federico and Marco Turchi</i> FBK & UniTN, Italy</p>
	<p>Data Selection with Feature Decay Algorithms Using an Approximated Target Side <i>Alberto Poncelas, Gideon Maillette de Buy Wenniger and Andy Way</i> DCU, Ireland</p>
18:30-19:30	GUIDED TOUR THROUGH BRUGES
19:30-	DINNER IN THE BREWERY “DE HALVE MAAN”

Tuesday, October 30th, 2018

09:00-10:00	ORAL SESSION II
09:00-09:30	Multi-Source Neural Machine Translation with Data Augmentation <i>Yuta Nishimura, Katsuhito Sudoh, Graham Neubig and Satoshi Nakamura</i> NIST & CMU, Japan, USA
09:30-10:00	Word Rewarding for Adequate Neural Machine Translation <i>Yuto Takebayashi, Chenhui Chu, Yuki Arase and Masaaki Nagata</i> OsakaU & NTT Corporation, Japan
10:00-10:15	INDUSTRIAL SESSION
10:00-10:15	Gold sponsor presentation: Amazon
<i>Coffee Break (10:15-10:45)</i>	
10:45-12:15	ORAL SESSION III
10:45-11:15	Analyzing Knowledge Distillation in Neural Machine Translation <i>Dakun Zhang, Josep Crego and Jean Senellart</i> Systran, France
11:15-11:45	Learning to Segment Inputs for NMT Shows Preference for Character-Level Processing <i>Julia Kreuzer and Artem Sokolov</i> HeidelbergU & Amazon, Germany
11:45-12:15	Machine Translation Human Evaluation: a comprehensive investigation of evaluation based on Post-Editing and its relation with Direct Assessment <i>Luisa Bentivogli, Mauro Cettolo, Marcello Federico and Christian Federmann</i> FBK & Amazon & Microsoft, Italy, USA
<i>Lunch (12:15-13:30)</i>	
13:30-15:00	ORAL SESSION IV
13:30-14:00	Multi-paraphrase Augmentation to Leverage Neural Caption Translation <i>Johanes Effendi, Sakriani Sakti, Katsuhito Sudoh and Satoshi Nakamura</i> NIST & RIKEN, Japan
14:00-14:30	A Machine Translation Approach for Modernizing Historical Documents Using Back Translation <i>Miguel Domingo and Francisco Casacuberta</i> UPV, Spain
14:30-15:00	Word-based Domain Adaptation for Neural Machine Translation <i>Shen Yan, Shahram Khadivi, Leonard Dahlmann, Pavel Petrushkov and Sanjika Hewavitharana</i> eBay Inc, USA
<i>Coffee Break (15:00-15:30)</i>	
15:30-16:45	PANEL SECTION
14:00-15:00	Panel: The future of machine and speech translation <i>Panelists: Evgeny Matusov (AppTek), Will Lewis (Microsoft), Kevin Duh (JHU), Marcin Junczys-Dowmunt (Microsoft) and Lucia Specia (University of Sheffield)</i> Moderator: Sebastian Stüker (KIT)
16:45-17:00	CLOSING REMARKS + ANNOUNCEMENTS

Keynotes

Multimodal Machine Translation

Lucia Specia, Imperial College London/Sheffield University

Abstract

Humans interact with the world through multiple modalities (hearing, vision, etc.). This is also true when understanding and generating language. Computational models for language processing, however, are traditionally limited to exploring language only (spoken or written). In this talk I will cover recent work in the area of multimodal machine learning for machine translation, where vision is used as additional modality, and where the goal is to achieve structured language grounding. I will also provide an overview on approaches that explore multimodality for language grounding in other sequence to sequence models: automatic speech recognition and spoken language translation.

Evaluation Campaign