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Luis Fernando D'Haro ·
Zoraida Callejas · Satoshi Nakamura
Editors

Conversational Dialogue Systems for the Next Decade

Editors

Luis Fernando D'Haro
Speech Technology Group - Information
Processing and Telecommunications
Center (IPTC)
Universidad Politécnica de Madrid
Madrid, Spain

Zoraida Callejas
Department of Languages and Computer
Systems
Universidad de Granada, CITIC-UGR
Granada, Spain

Satoshi Nakamura
Information Science
Nara Institute of Science and Technology
Ikoma, Japan

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Preface

The 11th International Workshop on Spoken Dialogue Systems (IWSDS 2020) was held remotely on 21–23 September 2020, in Madrid, Spain. This year’s conference theme was “Conversational Dialogue Systems for the Next Decade”, being its target to present the current research trends and discuss the roadmap of research and development of dialogue systems for the following years.

The IWSDS conference series constitute a consolidated forum where international researchers, practitioners and stakeholders working in the field of spoken dialogue systems and associated technologies, can disseminate their current research and applications, discuss technological challenges, present their success stories and share their complementary visions about the future of the technology. IWSDS 20 was grounded on the experience and knowledge generated in the previous editions:

- IWSDS’09 (Irsee, Germany),
- IWSDS’10 (Gotemba Kogen Resort, Japan),
- IWSDS’11 (Granada, Spain),
- IWSDS’12 (Paris, France),
- IWSDS’14 (Napa, USA),
- IWSDS’15 (Busan, Korea),
- IWSDS’16 (Saariselkä, Finland),
- IWSDS’17 (Farmington, PA, USA),
- IWSDS’18 (Singapore, Singapore) and
- IWSDS’19 (Siracusa, Italy).

The conference invited and received paper submissions on the following topics:

- Engagement and emotion in human–robot interactions.
- Digital resources for interactive applications.
- Multimodal and machine learning methods.
- Companions, personal assistants and dialogue systems.

- Proactive and anticipatory interactions.
- Educational and healthcare robot applications.
- Dialogue systems and reasoning.
- Big data and large-scale spoken dialogue systems.
- Multilingual dialogue systems.
- Spoken dialogue systems for low-resource languages.
- Domain transfer and adaptation techniques for spoken dialogue systems.

However, submissions were not limited to these topics, and submission of papers in all areas related to spoken dialogue systems was encouraged. The contributions were grouped into four categories: a) long research papers targeting reports on mature research results, b) short research papers targeting smaller case studies or ongoing but interesting and original research efforts, c) position papers to present novel research ideas or viewpoints which describe trends or fruitful starting points for future research and elicit discussion and finally d) demo submissions—system papers to demonstrate innovative or industrial-based research.”

The program included three keynotes by renowned international experts:

- Prof. Zhou Yu, University of California, Davis, USA,
- Dr. Rafael E. Banchs, Nanyang Technological University (NTU), Singapore, and
- Dr. Jason Weston, Facebook Research AI, FAIR, USA.

The keynote speech by Prof. Zhou Yu was entitled: “Seamless Natural Communication between Humans and Machines”. In her talk, she started briefly describing how dialogue systems such as Alexa and Siri are now part of our daily lives, allowing us without much effort to book flights, make restaurant reservations and even helping people to prepare themselves for interviews. Unfortunately, most current dialogue systems are rule-based, and therefore, they do not scale or generalize to different domains or tasks. Therefore, Prof. Zhou pointed that one of the first steps into moving forward is to properly design the data collection phase to cover realistic dialogues specially when using crowdsourcing platforms. Then, she described a dialogue model leveraged on using multitask learning and semantic scaffolds in order to achieve good dialogue performance even with limited collected data. Then, she described a methodology based on finite-state transducers to track both semantic actions and conversational strategies to improve the model’s coherence. Finally, she described an important, but sometimes forgotten, aspect of the dialogue design by considering the ethical issues and human factors that are needed when deploying dialogue systems.

Dr. Rafael Banchs presented a keynote entitled “FINDING NEMD”, an interesting acronym for new evaluation metrics for dialogue. This keynote described, in a very refreshing and creative way inspired in the movie with a similar name, an epic journey across the seas of data and data-driven applications to tame conversational AI creatures for the benefit of science and humankind. In his talk, Dr. Banchs started pointing to the recent proliferation of conversational AI creatures that are mostly superficially navigating on shallow waters with regards to language

understanding and generation. Unfortunately, this shallow understanding is causing these new types of creatures to fail on properly diving in the deep oceans of human-like usage of language and intelligence. Therefore, the need for new automatic metrics inspired not only in recent deep neural networks approaches but also grounding on traditional techniques like discourse analysis, common sense reasoning or linguistics were presented providing a new horizon for research and development.

Finally, the keynote speech by Dr. Jason Weston was entitled: “Better dialogue generation!”. Dr. Weston started showing some of the current problems on generative dialogue models where the standard maximum likelihood training approach is not able to address. This mechanism produces generations that rely on too much copying, contain repetitions, overuse frequent words, and at a deeper level, contain logical flaws. Therefore, he described how all of these problems can be addressed by extending the recently introduced unlikelihood loss. Thanks to this appropriated loss function, it is possible to regularize generated outputs to match human distributions effectively solving the first three issues. For the last important general issue, he discussed that applying unlikelihood to collected data of what a model should not do is effective for improving logical consistency, potentially paving the way to generative models with greater reasoning ability.

In addition, the IWSDS 2020 included three special sessions:

- WOCHAT+DBDC: Workshop on chatbots and conversational agents and dialogue breakdown detection challenge,
- E-HEALTH: Dialogue systems for mental e-health and
- SLCT-IberLang: Speech language and conversation technologies for Iberian languages.

The WOCHAT+DBDC session was organized by Ryuichiro Higashinaka (Nippon Telegraph and Telephone Corporation, Japan), João Sedoc (Johns Hopkins University, USA), Luis F. D’Haro (Universidad Politécnica de Madrid, Spain) and Rafael E. Banchs (Nanyang Technological University, Singapore). This was the seventh event of a “Workshop and Special Session Series on Chatbots and Conversational Agents”. WOCHAT aims at bringing together researchers working on problems related to chat-oriented dialogue with the objective of promoting discussion and knowledge sharing about the state of the art and approaches in this field, as well as coordinating a collaborative effort to collect/generate data, resources and evaluation protocols for future research in this area. The session focused on original research contributions on all aspects of chat-oriented dialogue, including closely related areas such as knowledge representation and reasoning, language generation and natural language understanding, among others. The session presented papers in areas such as chat-oriented dialogue systems, data collections and resources, information extraction, natural language understanding and generation, general domain knowledge representation, common sense and reasoning, emotion detection and generation, sense of humour detection and generation, user studies and system evaluation. In addition, this special session hosted the fifth

edition of the dialogue breakdown challenge (DBDC5) which focuses on developing machine learning approaches to detect dialogue breakdowns on human–chatbot dialogue sessions. In this edition, in addition to the original breakdown detection task, error classification and sentence generation tasks were included as well as new data sets from ChatEval (<https://chateval.org/>) and a newly collected human–chatbot dialogue in languages other than English.

The E-HEALTH session was organized by Zoraida Callejas (Universidad de Granada, Spain), Raquel Justo (Universidad del País Vasco, Spain), María Inés Torres (Universidad del País Vasco, Spain), Raymond Bond (Ulster University, Northern Ireland) and Anna Esposito (Università degli Studi della Campania Luigi Vanvitelli), all members of the H2020 MSCA-RISE project MENHIR (no. 823907, <http://menhir-project.eu>). This special session brought together researchers and practitioners from academia and industry working on the multidisciplinary area of conversational systems for mental e-health. While most dialogue systems are designed for utilitarian purposes, e.g. make a booking in a restaurant, enabling spoken dialogue between human and machines can also have a great potential to enhance users' well-being. In particular, dialogue-based applications can be a feasible and effective tool to foster mental health due to their flexibility and naturalness. These applications are beginning to be used in mental health for reminding, encouraging, tracking, offering support or even providing interventions. The special session papers addressed several of the wide range of scientific and technical challenges related to the use of dialogue systems for mental e-health, including aspects related to natural language and speech processing, knowledge management, emotion/sentiment analysis, dialogue management, user modelling, user experience design as well as practical issues such as corpora acquisition and annotation, user involvement and evaluation.

The SLCT-IberLang session was organized by David Griol Barres (Universidad de Granada, Spain), Jerónimo Arenas García (Universidad Carlos III de Madrid, Spain), David Pérez Fernández, Doaa Samy, María José del Olmo Toribio, María Inés Rodríguez Pelarda, Marta Morales García, Josié Ramón Granger Alemany and Juan de Dios Llorens González (Secretaría de Estado para el Avance Digital. Plan de Impulso de las Tecnologías, Spain). The general aim for this workshop sponsored by the Spanish Plan for the Advancement of Language Technology was to promote the development of natural language processing, machine translation and conversational systems in Spanish and co-official languages. The main guidelines defined for the plan include a) increasing the amount, quality and availability of linguistic infrastructure in Spanish and in Spain's co-official languages, b) fostering the language industry by promoting knowledge transfer and internationalization from the research field to industry, c) improving the quality and capacity of public services and d) supporting creation, standardization and distribution of language resources created by the management activities performed by the public administrations. The session brought interesting recent initiatives and studies, shaping new opportunities for collaboration among academic institutions, public administrations and companies.

IWSDS 2020 received a total of 43 submissions, where each submission was reviewed by at least three Program Committee members. The committee decided to accept a total of 31 papers distributed as follows: for the general track, 13 long papers, four short papers, one demo paper and two position papers and then, four papers for the E-HEALTH session, three papers for the WOCHAT+DBDC session and four papers for the SLCT-IberLang session.

This year, the IWSDS Organizing and Steering Committee made an important effort in promoting the conference activities among different research, academic and industrial partners. Thanks to this initiative, the conference received three gold sponsors and five endorsements. Concretely, the gold sponsors were Vicomtech¹ (Spain) a top research centre specialized in digital technologies related to visual computing and interaction and artificial intelligence, Lekta.ai² (Poland–Spain) a leader industry partner specialized on deploying conversational agents applied to the real world, and the Chinese and Oriental Languages Information Processing Society³ (Colips) a non-profit professional organization that contributes to advance the research of computer processing and one of the IWSDS traditional supporters. The endorsed partners were 1) Special Interest Group on Discourse and Dialogue (SigDial), 2) the International Speech and Communication Association (ISCA), 3) Universidad Politécnica de Madrid (Spain), 4) the Information Processing and Telecommunications Centre, UPM (Spain) and 5) European Language Resources Association (ELRA). We thank all for their economical support, sharing of ideas and needs allowing participants to move towards a new frontier for the conference, scientific knowledge and industry applicability.

Last but not least, as editors and organizers of the conference, we would like to thank the IWSDS Steering Committee and the more than 100 members of the IWSDS 2020 Scientific Committee for their timely and efficient contributions and for completing the review process on time. In addition, we would like to express our gratitude to the members of the Local Committee who highly contributed to the success of the workshop, making it an unforgettable experience for all participants. Thank you all for your logistic support; without it IWSDS 2020 would not have been such a remarkable conference.

With our highest appreciation,

Luis Fernando D’Haro
Zoraida Callejas
Satoshi Nakamura

¹ <https://www.vicomtech.org/en/>.

² <https://lekta.ai/>.

³ <http://www.colips.org/>.

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The editors want to thank our gold sponsors that highly contributed to the organization and promotion of IWSDS. In concrete, we want to thank: Vicomtech (Spain), Lekta.ai (Poland-Spain) and Colips (Singapore). Besides, we received the endorsement of the following institutions: 1) Special Interest Group on Discourse and Dialogue (SigDial), 2) the International Speech and Communication Association (ISCA), 3) Universidad Politécnica de Madrid (Spain), 4) the Information Processing and Telecommunications Center, UPM (Spain) and 5) the European Language Resources Association (ELRA). We thank you all for your support which allowed us to move towards a new frontier for the scientific knowledge and industry applicability.

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About the Editors

Prof. Luis Fernando D'Haro is Associate Professor at Universidad Politécnica de Madrid (ETSIT, UPM, Spain). His current research is focused on spoken dialogue, natural language processing and language and speaker recognition systems. He has published more than 130 papers in peer-reviewed journals, books and conferences. He co-led the international Dialog State Tracking Challenges (DSTC) in 2015, 2016 and 2017 and the WOCHAT series workshops that target the advance of chatbots systems and their automatic evaluation since 2015. He was local Organizer for INTERSPEECH 2014, HAI 2016, and the International Workshop on Spoken Dialog Systems (IWSDS) in 2018. He is currently General Chair for IWSDS2020, Chief Guest Editor for a special issue at Computer Speech and Language for DSTC7, and Co-Organizer for DSTC9, DBDC5 and Chanel workshop at JSALT2020.

Prof. Zoraida Callejas obtained a Ph.D. in 2008 at the University of Granada (Spain) where she currently is Associate Professor. Her research focuses on areas related to dialogue systems, emotion processing and user modelling. She has published more than 140 contributions to scientific journals, books and conferences. She has participated in multiple projects in European and Spanish calls and is currently Coordinator of the EU H2020-MSCA-RISE project MENHIR and the BONAPPETIT project on conversational systems for mental health and the adoption of healthy habits by children, respectively. She has organized multiple conferences, workshops and meetings, the most recent are IEEE BIBM 2018, NII SHONAN meeting on spoken multimodal dialogue systems technology for pervasive computing (2019), and IWSDS 2020.

Dr. Satoshi Nakamura is Director of data science centre, Professor of Nara Institute of Science and Technology (NAIST), Team Leader of RIKEN AIP and Honorary Professor of Karlsruhe Institute of Technology, Germany. He received

Ph.D. from Kyoto University in 1992. He was Director of ATR spoken language communication research laboratories in 2005–2008. He was Director General of Keihanna Research Laboratories, National Institute of Information and Communications Technology, in 2009–2010. His research interests include speech processing, spoken dialogue systems and natural language processing. He was a member of IEEE SLTC 2016-2018 and an elected board member of International Speech Communication Association, ISCA. He received Antonio Zampolli prize in 2012 and retained the title of ATR Fellow, IPSJ Fellow, IEEE Fellow and ISCA Fellow.