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# Chatbot Research and Design

5th International Workshop, CONVERSATIONS 2021  
Virtual Event, November 23–24, 2021  
Revised Selected Papers

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# Preface

## Introduction

Driven by the interest of commercial and public sector service providers, chatbots are increasingly available as a user interface to information and services. Application areas span from customer service and marketing on the one hand, to education, coaching, and therapy on the other. Chatbots are also used as a channel for information support regarding the COVID-19 pandemic by health authorities worldwide. The increased interest in open domain chatbots, motivated by advances in natural language processing and large language models, as well as strengthened capabilities of social or relational chatbots contribute to making the scope of interest for chatbot applications truly broad. In response to the current interest in chatbots, as well as the variety of chatbot application areas, chatbot research is a growing academic field involving a wide range of disciplines.

The CONVERSATIONS workshop series was established to serve as a venue for sharing and collaboration across researchers and disciplines identifying with the field of chatbot research. Here, researchers and practitioners have enjoyed a yearly meeting place, starting with the initial workshop organized as a full day event under the International Conference on Internet Science, INSCI 2017. Since 2019, the CONVERSATIONS workshop has been organized as a two-day stand-alone event for cross-disciplinary sharing and collaboration, involving researchers and practitioners from the humanities, social sciences, management, design, technology research, and human-computer interaction.

Across the CONVERSATIONS workshop series, some key directions for chatbot research have emerged. The continued development and improvement of chatbot applications clearly require research on enabling technologies, platforms, and systems. Successful uptake and use of chatbots also require new knowledge on user needs and motivations, chatbot user experience, and conversational design, as well as ethical considerations and social implications. There is also emerging interest in how to design for collaboration and service provision in networks of users and chatbots.

This year's workshop, CONVERSATIONS 2021, was the fifth event in the series. The workshop was arranged as an online event due to the COVID-19 pandemic. It was hosted during November 23–24, 2021, by the University of Oslo in collaboration with SINTEF, the University of Amsterdam, the Centre for Research and Technology Hellas, Durham University, the University of Edinburgh, and the University of Agder. About 180 participants from 31 countries attended the workshop.

## Paper Invitation, Review, and Revision

We developed the workshop Call for Papers based on key research directions identified over the workshop series. The Call for Papers was distributed to the network of researchers and practitioners associated with the workshop series as well as relevant general mailing lists within fields such as human-computer interaction, information

retrieval, communication research, and information systems research. Three submission categories were allowed for the workshop: full papers, position papers, and groupwork proposals. In total, we received 35 submissions: 25 full papers, five position papers, and two groupwork proposals. All submitted full papers and position papers were subject to a rigorous double-blind review process. Each paper was reviewed by three independent reviewers drawn from the Program Committee. The review process of each submission was led by one of the seven workshop organizers, i.e., each led three to five reviewer processes. Acceptance decisions were made in a dedicated organizers' meeting. Submissions authored by a workshop organizer were reviewed and decided without involvement of, and blind to, the authoring organizer.

Twelve submissions were accepted as full papers – one without changes, two after minor revision, and nine after major revision. Revisions were accepted after a final control for compliance with reviewer change requests and, when needed, additional revisions were requested. The acceptance rate for full papers was 48%.

## Workshop Outcomes

The workshop program spanned two days and included two keynote speakers, one groupwork, and five paper sessions.

The workshop keynote speakers were Roger K. Moore, University of Sheffield, and Ana Paiva, University of Lisbon. In his talk, Moore provided an overview of research on embodied and disembodied conversational agents and discussed research themes common to both. Paiva, in her talk, presented research advances and discussed challenges regarding interaction in groups of humans and agents.

The workshop groupwork was organized by Giuseppe Aceto and Federica Tazzi, Assist Digital, and involved a collaborative exercise applying a speculative design approach to identify challenges and opportunities in future chatbots.

The paper sessions were constituted of full papers and position papers organized in five topical clusters. As these proceedings only include the accepted full papers, here these are organized in three themes: chatbot user insight, chatbots supporting collaboration and social interaction, and chatbot UX and design.

The first theme, chatbot user insight, includes four papers on studies that provide insight into users' chatbot perceptions or preferences, addressing a varied set of application domains. De Cicco et al. present a study on chatbot user acceptance, applying an adapted technology acceptance model to understand the factors that impact intention to use in the retail domain. Koebel et al. provide insight from domain experts to support the design of chatbot applications to support older adults with cognitive impairments. Félix and Ribeiro summarize findings from co-creation sessions to enable the design of improved dialogues in chatbots for cancer patients. Hobert presents findings from a longitudinal study of a chatbot for supporting students during a university course in computer programming, identifying student needs and preferences based on their chatbot interactions.

The second theme, chatbots supporting collaboration and social interaction, concerns how chatbots may support collaboration and how to design for social interaction in chatbots. Taule et al. present a study on how chatbots supporting human resource management are taken up as part of the organizational interplay involving human resource

professionals, the chatbot, and the organization at large. Alves et al. contribute the design and study of a chatbot to support newcomer participants in open-source software projects. Yildiz et al. propose an approach for flexibly integrating social practices in chatbot interaction, and Lobo et al. suggested how a cognitive frames model may be applied to support chatbot adaptation to social context.

The third theme, chatbot UX and design, addresses different approaches to strengthen chatbot UX through the design of chatbot interaction or appearance. Chaves and Gerosa present a study on user perceptions of variation in conversational register, with implications for conversational design in chatbots. Kamoen et al. investigate different designs for a voting advice chatbot, and how these impact user experience as well as the benefit of the chatbot interaction to the user. Mooshammer and Etzrodt, in a study of relevance for the design of voice interaction, address how gender-neutral voices impact user experience. Finally, Pawlik provides a study on the effect of gendered anthropomorphic design clues on performance expectancy, effort expectancy, social influence and, ultimately, behavioral intention.

Three papers were nominated for the CONVERSATIONS best paper award. These papers were those with the highest reviewer scores, excluding any organizer authored papers. From the three highest scoring papers, the best paper was selected by the workshop organizers. The award for the CONVERSATIONS 2021 best paper was given to Sandra Mooshammer and Katrin Etzrodt for their paper “Social Research with Gender-Neutral Voices in Chatbots – The Generation and Evaluation of Artificial Gender-Neutral Voices with Praat and Google WaveNet”. The other best paper nominees were Maria Inês Lobo, Diogo Rato, Rui Prada, and Frank Dignum for their paper “Socially Aware Interactions: From Dialogue Trees to Natural Language Dialogue Systems”, and Eren Yildiz, Suna Bensch, and Frank Dignum for their paper “Incorporating Social Practices in Dialogue Systems”.

The engaging paper sessions, keynote talks, and groupwork, along with a record number of participants, enabled CONVERSATIONS 2021 to fill its purpose as a multi-disciplinary venue for sharing and collaboration for chatbot researchers and practitioners. These post-workshop proceedings are a key result of the workshop, as these make the content of the workshop available for a broader audience, to support future chatbot research. As organizers, we already look forward to the next CONVERSATIONS, to be held in 2022.

November 2021

Asbjørn Følstad  
 Theo Araujo  
 Symeon Papadopoulos  
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 Morten Goodwin  
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