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# Towards a New generation of Personalized Intelligent Conversational Agents

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## ABSTRACT

The Personalized Intelligent Conversational Agents workshop focuses on both long-term engaging spoken dialogue systems and text-based chatbots, as well as conversational recommender systems. The goal of the workshop is to stimulate discussion around problems, challenges, possible solutions and research directions regarding the exploitation of natural language processing and machine learning techniques to learn user features and to use them to personalize the dialogue in the next generation of intelligent conversational agents.

## CCS CONCEPTS

• **Human-centered computing** → **Personal digital assistants; User studies; Natural language interfaces; HCI theory, concepts and models; Empirical studies in HCI**; • **Computing methodologies** → *Discourse, dialogue and pragmatics*; • **Security and privacy** → *Social aspects of security and privacy*.

## KEYWORDS

conversational agents, personalization, recommender systems, privacy, evaluation

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## 1 INTRODUCTION

Recent years have seen the rise of conversational agents (CAs) in everyday life: chatbots that use written communications above all, but also spoken digital assistants. Moreover, conversation is becoming a key mode of human-computer interaction. However, despite much recent success in natural language processing and dialogue research, the communication between a human and a system is still in its infancy. In this context, dialogue personalization could be key to narrow part of the gap, making sense of users' features (e.g., preferences, expertise, communication style, emotions, personality) when engaged in a conversation with a system. Learning user features directly from the dialogue with a CA, in order to adapt its response, is an opportunity to improve the interaction with the user. Conversational recommender systems can exploit the same paradigm to improve the interaction between the user and system and better elicit information about the user. By exploiting personalized dialogue strategies, users' preferences can be gathered in a very natural and straightforward fashion and this will lead to more effective recommendations.

This workshop is first and foremost intended as a venue to bring together researchers from different disciplines that work on personalized intelligent agents from diverse angles such as design, implementation and evaluation of solutions based on natural language processing, personalization, privacy-protection and (health) data, (cognitive) architectures and frameworks, context analyses. We are also very interested in studies on the effectiveness of behaviour change support systems and changing health related behaviour (such as quit smoking, lose weight, etc.) and on personalized recommender systems.

We have the following preliminary program in mind for a fruitful workshop:

- (1) Paper presentations

- (2) Project lightning talks
- (3) Invited talk
- (4) Discussion in break-out sessions
- (5) Panel discussion in break-out sessions

## 2 WORKSHOP TOPICS

In our workshop we extracted several topics from the papers, which range from persuasive chatbots, behaviour change, customizable chatbots, pragmatics, user experience and privacy, communication, empathy, implicit user information, social presence and human likeness of conversational agents. Here we list briefly what each paper presenter will talk about:

- The work of Charlotte van Hooijdonk and Christine Liebrecht entitled "Chatbots in the tourism industry: the effects of communication style and brand familiarity on social presence and brand attitude" focuses on communication style, specifically on three factors: formality of language, invitational rhetoric and familiarity. Their talk will be about how much these factors contribute to a better chatbot experience in the domain of tourism
- Rebecca Wald, Evelien Heyselaar, and Tibor Bosse zoom in on the aspect of user trust and chatbot interpersonal communication competence through customization of a chatbot via anthropomorphic cues in their paper titled "Make your own. The Potential of Chatbot Customization for the Development of User Trust".
- Concerns of user privacy and security is covered in the work of Martha Larson, Nelleke Oostdijk, and Frederik Zuiderveen Borgesius, titled "Not directly stated, not explicitly stored: Conversational Agents and the Privacy Threat of Implicit Information". The authors state that many conversational agents collect personal and sensitive data from users without user awareness and this issue requires attention for more legal protection of users' data.
- The challenges in behaviour change support system applications are discussed in the paper "Unaddressed challenges in persuasive dieting chatbots" by Simone Balloccu, Ehud Reiter, Matteo Gioele Collu, Federico Sanna, Manuela Sanguinetti, and Maurizio Atzori. The authors address the current state of the art and challenges for persuasive conversational agents that support people with healthy eating habits.

## 3 RELATED PROJECTS

An important part of this workshop is to outline current research in personalized conversational agent and stimulate collaboration and dissemination. As a starting point for the group discussions we will host a session with lightning talks from researcher involved in several ongoing research projects focusing on personalized intelligent conversational agents: (1) BLISS, behaviour-based language-interactive speaking systems<sup>1</sup>, (2) Look Who's Talking<sup>2</sup>, (3) eCG family

<sup>1</sup><http://bliss.ruhosting.nl>

<sup>2</sup><https://look.uvt.nl>

clinic<sup>3</sup>, (4) Smooth Operators<sup>4</sup>, (5) Hybrid Intelligence<sup>5</sup>, (6) Studies and Research on Intelligent Conversational Systems with TIM s.p.a., (7) LEAVES, optimizing the mental health and resilience of older Adults that have lost their spouse via blended, online therapy<sup>6</sup>, (8) Staying Alone together: Developing Fake News Immunity<sup>7</sup>

## 4 DISCUSSION

Some questions that motivate this workshop and will be discussed in the break-out sessions or panel:

- What is the impact of personalization for dialogue in different contexts?
- How is it possible to learn user features from dialogue?
- How do personalization and engagement change in the presence of a multi-agent system environment?
- What is the role played by dialogue structures in shaping human-computer roles?
- How to effectively merge data coming from social network and from self-tracking devices with the ones derived from dialogue for personalization purposes?
- How do people deal with privacy issues? Are they willing to trade better personalization with a larger tracking of their activities on the Web and in everyday life?
- How do we develop agents for health-related conversations where trustworthiness and credibility of the agent are crucial?
- How do we establish a social relation between people and agents so that people are willing to continue to engage with them? How can an agent's personality contribute to engagement?
- How do we measure and evaluate (the factors that determine) long-term user engagement?

We hope the workshop can serve as a platform for fruitful discussions of known problems with modeling user features to personalize conversational systems, and for connecting people working on and interested in personalized intelligent conversational systems that lead to new collaborations.

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<sup>3</sup><https://www.zonmw.nl/over-zonmw/e-health-en-ict-in-de-zorg/programmas/project-detail/indi/ecg-family-clinic-the-electronic-cardiovascular-genetic-family-clinic-to-facilitate-genetic-screeni/>

<sup>4</sup><https://www.conversationalagentsresearch.com/>

<sup>5</sup><https://www.hybrid-intelligence-centre.nl/projects/>

<sup>6</sup><https://www.leaves-project.eu>

<sup>7</sup><https://fakenewsimmunity.liverpool.ac.uk>