Is CUI Design Ready Yet? A Workshop on Community Practices and Gaps in CUI Design & Resource Development

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ABSTRACT

As CUIs become more prevalent in both academic research and the commercial market, it becomes more essential to design usable and adoptable CUIs. While research has been growing on the methods for designing CUIs for commercial use, there has been little discussion on overall community practice of developing design resources to aid in practical CUI design. The aim of this workshop therefore is to bring the CUI community together to discuss the current practices for developing tools and resources for practical CUI design, the adoption (or non-adoption) of these tools and resources, and how these resources are utilized in the training and education of new CUI designers entering the field. This workshop will bring together all parts of the CUI community to have meaningful discussions on how CUI design resources are currently developed, and how we can improve these resources and tools to aid in their adoption in practical CUI design, and CUI academic & industry design training.

CCS CONCEPTS

• **Human-centered computing** → *Human computer interaction (HCI)*; HCI design and evaluation methods;

KEYWORDS

conversational user interface, voice user interface, design methods, design heuristics, CUI, design methods

1 BACKGROUND

Text and voice based Conversational User Interfaces (CUI) are becoming extremely popular in modern user interfaces. These interfaces are commonplace in consumer-level devices such as Amazon Echo and Google Home as well as customer service enterprise systems. Although currently used for simple tasks, such as setting alarms, playing and controlling music, or requesting the weather [1], there is a significant drive to increase the capability of interaction with these systems to more closely resemble natural conversation.

The interest in CUI interactions from the HCI community is growing and research in this domain is increasing rapidly, particularly in the design and usability of CUIs. Key challenges have been identified, including the need to: (1) understand and identify aspects of appropriate CUI design [5, 6, 10, 14, 15, 18, 34] (2) identify and develop tools and heuristics to support the design of CUIs [9, 16, 26, 37]; (3) map and address accessibility, ethical, privacy and trust issues surrounding the use and development of CUIs [2, 17, 35]; (4) develop core theoretical concepts to understand user interaction behaviour with these types of interfaces [10, 12] and (5) identify appropriate design for multiple user contexts [4, 33].

At the same time, demand in the commercial market for conversational & voice devices and applications is growing. Current HCI research illustrates many existing usability issues in even the most current commercial CUIs, such as Google Home and Amazon Alexa. Some of these core issues consist of: difficulties with the amount of information that can be remembered, system feedback, learnability, and recognition errors [13, 19, 28, 31]. Yet there is currently a lack of discussion about the current community practices used in CUI design - and in particular, the development of tools and resources to aid designers in practical CUI design. Though some have been developed [20, 21, 28, 36, 37], there is a perceived lack of industry focused tools and heuristics to aid in CUI design. It's been shown, in a study by Murad [30] with over 100 designers, that the lack of guidelines and heuristics are one of the largest barriers to proper VUI design. This need is also evident in major companies' efforts to present their own guidelines, such as those from Amazon, Google, and Apple, etc. Current expert designers in industry are also often lacking the proper training and resources needed to know how to develop good CUIs [26, 27], which hinders the transfer of design knowledge to new designers entering the field.

1.1 Workshop Aims

This workshop comes at a time where research on CUI usability, design, and development is at an exponential growth. We are also seeing a large commercial push and demand for usable CUIs - many of which we've already seen the likes of, such as Google Assistant, Amazon Alexa, and Siri. This workshop will be bringing together researchers, developers, designers, and industry practitioners to discuss:

- The community of practice around the development of theoretical and practical design resources and tools for CUIs (such as guidelines, heuristics, prototype & assessment tools, etc)
- Industry training and support resources for achieving a consistency of design practice
- Academic based teaching principles for designing CUIs
- How to develop and foster academia-industry relations to develop and evolve best practices in the design of CUIs

This workshop will build upon growing momentum in this area [7, 9, 11, 22–25, 32]. Over the past 5 years, the CUI community has successfully brought together researchers and industry practitioners from speech, dialogue, computational linguistics, human-machine interaction, speech interface design and voice UX research. In the past few years we have tackled topics such as designing speech interactions, conversational analysis, and conversational design. At CHI '19, the community turned its attention to the deficit of theoretical and methodological perspectives [8]. At CHI '20, we began to move towards a more holistic perspective on this space, by inviting the broad CHI community to help define the grand challenges that this community needs to address along with appropriate methods, theories, application, and approaches for such challenges [3]. At CHI '21, we brought the focus more closely to practical CUI design, by bringing both academic researchers and industry practitioners together in order to help bridge the gap between academia and industry in CUI design [29]. This workshop builds further on the workshop from CHI 2021, with the aim of bringing the CUI community back together to discuss the current state of design resource and tool development for practical CUI design. As the field has had many decades to explore and develop different design practices, the goal is to critically look at the practices we now use, how we can fill in missing gaps, and how can we adapt or develop new resources to aid both practical CUI designers, and CUI design educators.

We are interested in attracting a broad range of perspectives in different areas of CUI research, including but not limited to:

- Development of guidelines and heuristics for CUI design
- Development of prototyping and usability assessment tools for CUI design
- Design systems for Conversational UX
- Transferring "implications of design" from academic research to practical resources and tools for CUI design
- Design resources and considerations for voice and speech interfaces
- Usage of design methods and resources in CUI industry and academic training
- How conversational flow, analysis, and psycho-linguistics can implicate CUI design resources

- Designing for specific domains (e.g. automotive interfaces, healthcare & wellbeing)
- Designing for multimodality & multiparty challenges
- Designing for accessibility and inclusion e.g. underrepresented or marginalized users
- Designing for Ethics, privacy, explainability, trust and transparency

The proposed workshop looks to gather researchers, designers and practitioners from both industry and academia to discuss the current community practice of developing design tools and resources for CUI design, and to discuss how to improve their wider adoption into practical CUI design and CUI design education. The workshop will focus on employing the unique capabilities of our community to bring perspectives from both industry and academia, in order to identify the real practical challenges in CUI design, and to connect academic research in CUI design and development with industry practitioners.

2 ORGANIZERS

This workshop is organized by leading researchers and practitioners from the CUI community, bringing together representatives from academia and industry to map and develop the grands challenges facing the field.

Christine Murad is a PhD Candidate at the Technologies for Aging Gracefully lab in the Department of Computer Science at the University of Toronto. Her research looks at the usability and design of conversational voice interfaces, and exploring the development of different tools and resources (such as design heuristics) to aid in intuitive and user-friendly conversational voice interaction. She has been publishing research on CUI design across conferences like CHI, CUI, and MobileHCI since 2018, and she's co-organized several related workshops at CHI '19 - '21, IUI '20 and CSCW '20. She is currently a member of the CUI conference series steering committee.

Dr. Cosmin Munteanu is an Associate Professor at the University of Waterloo, and Associate Director of the Technologies for Ageing Gracefully lab. His area of expertise is at the intersection of Human-Computer Interaction, Automatic Speech Recognition, Natural Language Processing, Mobile Computing, and Assistive Technologies. He has extensively studied the human factors of using imperfect speech recognition systems, and has designed and evaluated systems that improve humans' access to and interaction with information-rich media and technologies through natural language. Cosmin has organized speech interaction workshops and panels at SIGCHI conferences such CHI, MobileHCI, and IUI for almost a decade, and has frequently delivered courses on designing voice interactions at these venues.

Dr. Benjamin R. Cowan is an Assistant Professor at University College Dublin's School of Information & Communication Studies. His research lies at the juncture between psychology, HCI and computer science in investigating how theoretical perspectives in human communication can be applied to understand phenomena in speech based human-machine communication. He is the co-founder of the International CUI conference series and has run a number of workshops at CHI and Mobile HCI on designing speech and language technologies.

Dr. Leigh Clark is a Senior UX Researcher at Bold Insight UK. His research explores how CUIs can be made more inclusive and trustworthy, and how linguistic theory can be implemented and redefined for CUI interactions. He is a co-founder of the ACM SIGCHI Conversational User Interfaces (CUI) conference.

Dr. Martin Porcheron is a Senior UX Researcher at Bold Insight UK, and was previously a Senior Lecturer in the Computational Foundry at Swansea University. He leads on studies of users' experience of technologies such as conversational interfaces in many different settings, ranging from pubs through to the home. He has recently co-organised workshops at CHI '18–'23 and CSCW '16, '17, and '20 on topics including collocated interaction with technologies and conversational user interfaces. He is a member of the CUI conference series steering committee and ACM CUI 2023 General Chair.

Dr. Joel Fischer is a Professor of Human-Computer Interaction at the University of Nottingham, UK. His research takes a human-centred view to understand adoption and embedding of AI-infused technologies into everyday life and work, with a particular interest in language- and speech-based interaction. His work on the empirical study of voice interfaces has been published at CHI, CUI and CSCW and he has extensive experience co-organising workshops on conversational interaction.

Dr. Heloisa Candello is a research scientist and a manager of the Human-centred & responsible tech, at the IBM Research laboratory in Brazil. Her main research interest is applying design methods to understand how people interact with Artificial Intelligence-based systems, particularly conversational systems. Heloisa leads and conducts research activities in HCI to understand the social impact, and motivation of using conversational technologies. Her research has resulted in numerous conference publications (ACM CHI, CUI, CSCW, DRS, DUXU, IUI) and recognition in the HCI field. Heloisa has also organized several workshops and conferences in the area.

Raina Langevin is a PhD Candidate at University of Washington in the Department of Human Centered Design & Engineering. Her research has contributed to the development of validated usability heuristics for conversational user interfaces. In her work, she designs and builds conversational interfaces that leverage human-centered methods to facilitate the uptake of health interventions. She has published research on CUI design in HCI venues (e.g., CHI, CUI) and Informatics venues (e.g., ACI). She is also a member of the CUI programme committee.

3   PRE-WORKSHOP PLANS

The website will provide the call for participation; workshop aims; agenda and outcomes; workshop date; organizer's short-bio and contact. The selected papers will be available on the website dedicated for the workshop (https://speech-interaction.org/CUI2023).

Participants will be asked to contribute either a position paper or a position statement that illustrates or speaks to a research project or practice that reflects on CUI design methods, tools/resources, or design training. Papers and statements will be reviewed by the organizing committee, and participants will be selected based on their ability to add to the discussion in light of bringing a diverse and representative set of presenters to foster a two-way conversation

between industry and academia, and bringing light to the gaps in methods, tools, and practices in CUI design. Papers should be submitted to christine.murad@mail.utoronto.ca, and selected papers will be available online on the website dedicated to the workshop, https://speech-interaction.org/CUI2023. At least one author of each accepted paper/statement must attend the workshop.

4   WORKSHOP STRUCTURE

We propose a half-day workshop consisting of short presentations, followed by brainstorming breakout and open group sessions. We expect a maximum of 20-25 registered participants, in order to promote discussion and to group participants for relevant breakout sessions appropriately.

(1) **Introductions (30 minutes)**. Brief introductions from organizers and participants on workshop structure, goals and interest in CUI research.

(2) **Breakout Session 1: Discussing existing community CUI design practices (45 minutes)**. Participants will be split up into groups. Each pair will be asked to discuss the existing state and community practice of resources, methods, and tools for CUI Design. Groups will be prompted to identify the different types of resources that exist for CUI design, along with specific examples, and their experiences in both developing and using these tools in CUI design.

(3) **Break (10 minutes)**

(4) **Breakout Session 2: Discussing design resource and adoption gaps (45 minutes)**. Participants will be split up into new groups (to encourage participants to meet and discuss with new people). Participant groups will consider the previous discussion of the existing community practices for developing design resources and tools from the first session, and will be asked to identify gaps in both the resources that exist, and the issues that exist in the adoption of different design resources (both in practical CUI design and CUI design training) - including identifying issues in existing tools and resources that prevent wide adoption.

(5) **Plenary Session: Brainstorming new tools and adoption methods (45 minutes)**: Participants will come together after to discuss how the CUI community can help address the current gaps in both the development of resources for CUI design, the issues in adoption of resources, and the improvement of CUI design training (both in academia and industry). Organizers will synthesize the discussions from the prior session to develop a key list of tools that the CUI community identifies as necessary to be developed in order to advance CUI design with the participants, and how the CUI community can start working forward to develop these. Potential projects for post-workshop will be discussed to begin addressing these.

4.1   Workshop Delivery

This workshop will be held as a hybrid workshop, though participants will be encouraged to attend in person. All open-group sessions will be live-streamed through Zoom, and online participants will be able to give their presentations remotely, with in-person participants able to see them live-projected in the room. For breakout

sessions, online participants will be placed in their own breakout room that will remain consistent throughout the workshop. One of the organizers or a student volunteer will be given access to international Zoom accounts that can be used to manage the online participants. We will use either Mural (https://www.mural.co/) or Miro (https://miro.com/) to provide online participants with an area for recording and brainstorming ideas that get discussed within the workshop.

We will use Microsoft Powerpoint's live captioning feature to provide live captioning for the duration of the workshop, by routing Zoom audio to Microsoft Powerpoint and letting subtitles show on a blank slide. This is a method that we have used in previous virtual workshops which have worked very well. If possible, we will also recruit a live captioner for the duration of the workshop, making use of Zoom's live captioning capabilities where one person can type in captions to the meeting live.

5 POST-WORKSHOP PLANS

The expected workshop outcomes include:

- Identification of key gaps in CUI design resources and adoption of existing resources in practical CUI design and CUI education
- A proposal for a post-workshop report of the methods and practices that were identified as necessary to develop CUI design resources and tools, and improve their wider adoption in practical CUI design and CUI design education
- Reconnecting, sustaining and extending the existing CUI community of researchers
- Encourage collaborations to initiate future work based on the needs that have been identified at the workshop

6 CALL FOR PARTICIPATION

Researchers and industry practitioners working in the field of Conversational User Interfaces (CUIs) are invited to submit to our workshop at CUI 2023. The aim of this workshop is to gather researchers, designers and practitioners from both industry and academia to discuss the current community practice of developing design tools and resources for CUI design, and to discuss how to improve their wider adoption into practical CUI design and CUI design education. Those interested are asked to submit either a position paper or a statement of interest that illustrates or speaks to a research project or practice that reflects on the development of resources, tools, and/or design implications for CUI design, and their wider adoption to practical CUI design and CUI design education. We are looking for perspectives from all different areas of CUI research, from conversation analysis, psycholinguistics, interaction design, voice & speech research, etc.

Position paper submissions should be between 3 to 6 pages including references, and position statements should be about one page. The submission should describe authors' work related to the workshop goals and also their interest to participate. Papers and statements will be reviewed by the organizing committee, and participants will be selected based on their ability to add to the discussion in light of bringing a diverse and representative set of presenters to foster a two-way conversation between industry and

academia, and bringing light to the gaps in methods, tools,and practices in CUI design. Papers and statements should be submitted to christine.murad@mail.utoronto.ca. Further details can be found on the workshop website: www.speech-interaction.org/CUI2023.

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