Conversational Health Interfaces in the Era of LLMs: Designing for Engagement, Privacy, and Wellbeing

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Abstract

As Large Language Models (LLMs) revolutionize Conversational User Interfaces (CUIs) in health and wellbeing, these technologies offer unprecedented potential to enhance user wellbeing by improving physical health, psychological resilience, and social connectivity. However, the integration of such advanced AI into everyday CUI health applications brings substantial challenges, including privacy, user agency, and the psychological impacts of AI interactions. This workshop will provide a platform for collaborative dialogue to explore leveraging these advancements to improve health outcomes while addressing the ethical challenges and risks. Through presentations, breakout sessions, and collaborative discussions, participants will delve into themes such as designing multimodal CUI interventions, structuring conversational interventions for privacy and engagement, personalizing user experiences, and developing proactive and context-adaptive CUI strategies. These discussions aim to develop effective, user-centered CUI strategies that ensure the benefits of LLM-driven innovations are realized without compromising user wellbeing.

CCS Concepts

• **Human-centered computing** → **Natural language interfaces**; **Sound-based input / output**.

Keywords

natural language interface, health, wellbeing, conversational agents

*Both authors contributed equally to this proposal.

1 Motivation

The expanding integration of CUIs, powered by LLMs, within health and wellbeing applications presents significant potential to enhance user wellbeing and support broader health outcomes [4, 7, 14, 22, 31, 33, 37]. The global market for healthcare-focused conversational AI technologies is expanding rapidly, projected to grow from USD 10.80 billion to USD 80.50 billion by 2032, with a CAGR of 25.02% between 2023 and 2032 [27, 29, 32]. This growth has largely been driven by conversational AI's use for chronic disease management and the growing population of elderly people. Such interfaces can profoundly influence physical health, psychological resilience, and social connectivity, facilitating personalized and accessible health management [4, 18, 27].

However, the deployment of such technologies is not without challenges. Critical issues such as ensuring data privacy, maintaining user agency, and mitigating the psychological impacts of AI interactions in health and wellbeing applications must be carefully navigated [1, 3, 10, 15, 28]. This workshop aims to provide a platform for discussions on maximizing the beneficial impacts and resolving challenges of CUIs health and wellbeing in an era of advanced LLM-driven CUIs while effectively identifying and mitigating potential risks [16] and addressing ethical considerations to prevent misuse and fully realize the benefits of the technology [17, 21].

Past workshops have highlighted the importance of CUI in health and wellbeing [5, 11, 13, 16, 30], however, the last workshop specifically focused on CUIs for health and wellbeing was conducted at CHI 2020 [16] which preceded the long-term social impacts of COVID and the wide-spread user adoption of LLMs [8, 19, 34]. Given the significant advancements in LLMs that enable more human-like conversational experiences [38, 39], and the evolving challenges and solutions in CUI applications for health [7, 12, 20, 23, 36], a fresh discussion is critical.

This workshop aims to foster a dialogue to explore these challenges and opportunities, discussing how to optimize the beneficial impacts of LLM-powered CUIs on health and wellbeing while effectively managing and mitigating associated risks. Participants

will engage in examining themes such as privacy-centric conversational interventions, proactive and adaptive strategies and agency which are pivotal in designing CUIs that are not only effective but also ethically sound and user-friendly. These discussions will help in developing frameworks and collaborations that will guide the ethical development and practical application of CUIs in health and wellness, ensuring they enhance rather than compromise user wellbeing.

2 Goals of the Workshop

The primary aim of this workshop is to provide a dynamic platform for in-depth discussions and collaborations among researchers, designers and practitioners focused on CUI for health and wellbeing. It is structured to achieve several specific goals:

2.1 Idea Exchange

This segment of the workshop is designed to facilitate the exchange of ideas among participants, focusing on the latest innovations, challenges, and potential solutions in the realm of AI-powered CUI for health and wellbeing in light of today's LLM advancements. The goal is to spark dynamic discussions that can lead to novel insights and approaches in the design and implementation of CUI systems. Participants will be encouraged to share their experiences and perspectives in an open forum, fostering an environment of learning and mutual inspiration. This exchange will not only enhance understanding but also help in identifying gaps in current research and practice, setting the stage for future collaborations.

2.2 Fostering Collaboration and Community

This workshop aims to cultivate a collaborative community of researchers who are passionate about advancing CUI in health and wellness contexts. By encouraging the development of collaborative papers and projects, participants will find thought partners for ongoing and future research or ideation. Structured breakout sessions, collaborative presentations, and post-workshop activities, such as shared online interest groups and personal network building, will support these efforts. Our objective is to establish long-term partnerships and a continuous dialogue within a supportive network that can collectively address the complex challenges at the intersection of conversational technology and health and wellbeing. This community-building initiative will not only foster immediate collaborative outputs but also sustain inspirational relationships that propel further innovations in CUI for health and wellbeing research.

2.3 Publication

A key outcome of this workshop will be a post-workshop publication that synthesizes the insights and discussions generated during the event. This publication will aim to capture the collective expertise and innovative ideas of the participants, offering a cohesive perspective on the future direction of CUIs in health and wellness, particularly in light of the advancements in LLMs.

The publication will outline the main challenges identified, propose potential solutions, and highlight areas requiring further research and development. For those interested in leveraging CUIs to enhance health and wellbeing outcomes, this publication will serve as a research agenda for researchers and a guide to putting research into implementable practice for industry professionals. Our goal is to submit this publication to a white paper, blog or article in Interactions Magazine ensuring dissemination and impact within the CUI research community.

Participants will be encouraged to contribute their viewpoints and case studies, which will be integrated into the publication under the guidance of the workshop organizers. This collaborative approach not only enriches the content of the paper but also aims to foster a sense of ownership and engagement among the workshop attendees.

3 Organizers

Shashank Ahire is a PhD candidate in the Human-Computer Interaction group at Leibniz University Hannover. His research focuses on developing proactive voice interventions for the health and wellbeing of knowledge workers [1, 2]. His work has been published in venues such as CUI, CHI, HAI and EAI-PervasiveHealth.

Melissa Guyre is a Product Management Lead at Panasonic Well, focusing on AI-driven family wellness product incubation, including the development of a conversational AI Family Wellness Coach. Previously, she was a product executive at Traeger Inc. and Yummly (a subsidiary of Whirlpool Corp.). Melissa is also a M.S. candidate in Human Factors in Information Design at Bentley University, focusing on innovation, intelligent user interfaces, and conversational AI design with work published at CUI.

Bradley Rey is an Assistant Professor at the University of Winnipeg in the Department of Applied Computer Science. His research focuses designing and developing in-situ wearable interfaces that empower people to better explore and make sense of their personal health data anytime and anywhere [25, 26]. His work has resulted in several publications across venues such as CHI, CUI, IMWUT, CG&A, and MHCI.

Minha Lee is an Assistant Professor at the Eindhoven University of Technology in the Department of Industrial Design, with a background in philosophy, digital arts, and HCI. Her research concerns morally relevant interactions with various agents like robots or chatbots, exploring moral concepts like compassion and trust. She organized workshops at several ACM venues, including CHI, CUI, HRI, and CSCW.

Heloisa Candello is a research scientist and manager of the Human-centered and Responsible Technologies group at IBM Research. Her work focuses on human and social aspects of Artificial Intelligence systems, particularly CUI. Currently, she is leading a project that aims to bring "conscious" access to micro-credit by enhancing non-traditional financial practices of low-income small business owners with AI technology in the Global South. Her research resulted in several publications in leading conferences (CHI, CUI, CSCW, DRS) and recognition in the HCI and Design field.

4 Workshop Overview

4.1 Workshop Themes

This section outlines specific themes that the the workshop could address, offering participants a detailed overview of the topics for exploration. These themes are critical in designing CUIs that effectively enhance health and wellbeing.

Structuring Conversations

CUIs have the potential to support health and wellness by providing timely, accessible, and personalized interventions. However, conversation-based interactions can be socially intrusive, increase attentional burden, and may not always align with users' in-situ needs (e.g., while working out at the gym or while outside for a run). Poorly timed or overly lengthy responses risk becoming disruptive rather than supportive, leading to disengagement over time. Addressing these challenges requires careful consideration of how conversational interactions can be structured to encourage, motivate, and assist users while remaining contextually appropriate.

This workshop will provide a platform for researchers and practitioners to explore strategies for designing CUIs that effectively balance responsiveness and discretion in health-related contexts. Discussions will focus on tailoring output to different environments, such as public and private settings, as well as adapting to user states, including moments of focus or distraction. Another area of interest is how CUIs can optimize the length, tone, and cadence of interactions to sustain engagement without overwhelming users. Additionally, participants are encouraged to examine how adaptive mechanisms can dynamically adjust responses based on user preferences, past interactions, and situational awareness, ensuring that interventions remain relevant and unobtrusive. Submissions may also address how these systems can adapt to changes in user behavior, health status, and environmental conditions, leveraging learning-based approaches to refine interventions.

Privacy and Trust Concerns

While voice-based CUIs can effectively capture attention, they also raise significant privacy concerns [1]. Users have expressed discomfort with receiving sensitive health-related messages in shared environments, where audible interventions may lead to unintended disclosure of personal information. However, privacy challenges are not limited to voice interactions. Even text-based CUIs, particularly those handling sensitive health and well-being data, can raise concerns regarding data security, unintended exposure, and trust in how personal information is stored and processed.

Designing CUIs for health applications requires careful consideration of discretion, ensuring that interventions respect user privacy while remaining effective. Workshop participants will be encouraged to submit and discuss strategies which may include enabling users to customize how and when information is delivered, using context-aware mechanisms to adjust the level of detail in shared environments, and implementing robust security measures to protect sensitive data. This workshop invites discussion on challenges and solutions for maintaining privacy and trust in CUIs, exploring how these systems can safeguard personal health information while fostering engagement and well-being.

User Groups and Personalization

CUIs must cater to diverse user groups [9], each with unique health and wellness needs, communication preferences, and technological familiarity. Factors such as age, cognitive abilities, cultural background, current health status, and health literacy all play a role in shaping how users interact with CUIs and what types of interventions are most effective.

To enhance individual health outcomes, personalization must be achieved at scale through adaptive dialogue, contextual awareness, and user modeling. This includes tailoring vocabulary and tone based on user preferences, adjusting response complexity for different levels of health literacy, and dynamically modifying interaction styles based on user engagement patterns. Additionally, multimodal integration—such as combining voice with subtle haptic or visual feedback—can further refine personalization while addressing accessibility concerns.

However, scaling personalization presents challenges, including ethical considerations around data privacy, overcoming the cold-start problem, the need for transparent and interpretable AI-driven adaptations, and balancing automation with user control. We encourage workshop participants to address these challenges which may require solutions pertaining to user profiling methods, explainable AI techniques, and mechanisms for continuous user-driven customization.

Preemptive and Proactive Interventions

CUIs have the potential to move beyond reactive interactions by proactively offering health and wellness support based on user behavior, context, and inferred needs (i.e., the CUI-initiated conversation). While proactive virtual assistants (VAs) have been studied in limited home settings [6, 24, 35], their effectiveness in other environments remains under-explored.

Within proactive interventions, one key challenge we encourage workshop participants to explore is timing. Interventions are most effective when delivered at opportune moments, maximizing user receptivity and engagement. Conversely, poorly timed interventions can lead to frustration, dismissal, or even negative sentiment toward the CUI.

To address this, workshop participants could explore incorporating intelligent mechanisms for context awareness. Including leveraging behavioral cues, physiological signals, and current activity to optimize intervention timing. Additionally, personalization plays a critical role in ensuring that proactive interactions align with user preferences, balancing helpfulness with intrusiveness. Workshop participants could consider the ethical implications of proactivity, including consent mechanisms and user control over the frequency and nature of proactive interventions.

User Agency

In conversational interactions, users often express concerns about having little to no agency during their engagement with CUIs [24]. While agency may be less critical in reactive smart speaker interactions, such as playing music, conducting searches, or controlling smart home devices, health and well-being applications demand a higher degree of user agency. Given the sensitive nature of health-related information, a lack of control over when and

Table 1: Proposed Schedule for Workshop

Time	Session	Description
9:00am to 9:15am	Introduction and Briefing	Introduction from the Organizers, highlight the goals of the workshop and explaining the plan for the day.
9:15am to 9:30am	Icebreaker and Research Interest Sharing	All participants will participate in an icebreaker that also serves to introduce them and their areas of research interest. Research interests related to the domain of CUIs for health and wellbeing will be noted down for participant interest matching.
9:30am to 10:15am	Paper Presentations and Research Interest Sharing	Each participant who submitted a paper will have 5-8 minutes to present their workshop paper, followed by 2-3 minutes of Q&A and discussion session.
10:15am to 10:45am	Break-out Group Formation	Participants will be divided into groups of 3-4 based on their experience and expertise at this time in order to facilitate conversation and group connection during the coffee break. Each group will be given one of the following challenges outlined in Table 2 to work on after the coffee break.
10:45am to 11:00am	Coffee Break	Time for networking and building future collaborations.
11:00am to 11:45am	Group Activity	Groups work on their assigned challenges outlined in Table 2.
11:45am to 12:15pm	Group Presentations	Groups will present their ideas to the fellow workshop participants, followed by a Q&A and discussion. Each group will be given 3-minutes to present their ideas.
12:15pm to 12:30pm	Future Plans and Conclusion	Summarization of key takeaways and discussion on next steps for collaborative efforts and research initiatives.

Table 2: Workshop Themes and Corresponding Breakout Group Challenges

Theme	Objective	Challenge Description
Structuring Conversations	Design conversational interactions that respect situational context.	**Context-Adaptive CUI**: Design a CUI that dynamically adjusts its behavior based on comprehensive contextual analysis, enhancing the relevance and effectiveness of health interventions.
Privacy and Trust Concerns	Address privacy issues in CUI, focusing on discreet and secure interactions.	**Privacy-Sensitive Interaction**: Develop strategies to ensure conversational interventions maintain privacy without compromising user interaction quality.
User Groups and Personalization	Tailor CUI to diverse user groups, enhancing personalization and relevance.	**Personalized User Experience**: Design a CUI that adapts to the specific health and wellness needs and preferences of different user groups.
Proactive Interventions	Design CUIs that proactively support health and wellness based on user behavior.	**Proactive Health Support**: Create a system that initiates health support interventions based on predictive analytics.
User Agency	Enhance user control and agency in interactions with CUI.	**User Control CUI**: Brainstorm ways to give users more control over their health and wellbeing interactions, especially in managing sensitive information.

how such data is conveyed can lead to significant privacy concerns, potentially discouraging users from engaging with CUIs altogether.

To enhance agency in CUIs, workshop participants are encouraged to explore design mechanisms that allow individuals to manage their interaction preferences, including the timing, mode, and level of detail in responses. This could for example involve understanding what controls are desired and then exploring how to best offer control of these. Another key consideration which can be explored is transparency and explainability. Exploring how users interpret given information and ensuring they understand why a

CUI is making a suggestion or providing certain information is important within health and well-being contexts.

4.2 Proposed Schedule for Workshop

As outlined in Table 1, this half-day workshop is structured into several sessions.

4.3 Call for Participation

We invite researchers, practitioners, and enthusiasts from various disciplines to share their insights and contribute to the synthesis

of knowledge in this area of CUI and health and wellbeing. While formal paper submissions are welcomed, they are not mandatory for participation.

Attendees may choose to engage by submitting:

- Position papers or short research papers (up to 4 pages, following the ACM Extended Abstract format [1]) detailing studies, novel systems, new theories, or ongoing challenges in the field.
- Short expressions of interest that outline their background and interest in the workshop themes. These can be submitted via email to the organizers and should include a brief description of the applicant's relevant experience and a link to their professional or scholarly webpage.

The Call for Participation will be shared across multiple channels, including mailing lists (e.g. CUI-ANNOUNCEMENTS@listserv.acm.org) and social media platforms (e.g., Slack, LinkedIn, Facebook, Twitter). At least one author must attend the workshop. Paper submissions should be made through the designated platform. Submissions will be lightly reviewed by the organizing committee based on their relevance to the workshop topics and their potential to contribute to the goals of the workshop. Accepted papers will be posted on the workshop website[2].

Important dates for the workshop:

- April 19, 2025: Participation call and publicity
- May 16, 2025: Submission deadline
- May 28, 2025: Notification [will be adjusted based on early-bird conference registration due]
- June 20, 2025: Camera-ready deadline
- July 08, 2025: Workshop day

4.4 Proceedings and Post-Workshop Plans

Following the conclusion of the workshop, we intend to publish the outputs generated during the event, such clustered themes, sketches, position papers, and any developed conceptual frameworks, on this workshop's website. In addition, with the consent of the authors, paper submissions received as part of the workshop will also be made available on the website. The workshop website will remain as a hub to sustain further collaboration among participants. This initiative is aimed at fostering ongoing dialogue and collaboration among participants and extending the reach of the innovative contributions made during the workshop to a broader audience within the CUI community interested in health and wellbeing.

5 Diversity and Inclusion Considerations

We aim to create an inclusive environment that welcomes diverse perspectives from across the globe, representing various fields such as HCI, public health, psychology, and AI ethics. We particularly encourage participation from students and early career researchers (due the role conference workshops can play in supporting the career growth of such attendees).

5.1 Workshop Accessibility and Inclusivity

5.1.1 Venue Accessibility: The venue will be fully accessible to ensure that all participants, including those with disabilities, can engage fully with the workshop activities.

5.1.2 Material Accessibility: All workshop materials will be provided in various accessible formats based on the specific needs of the attendees.

5.1.3 Inclusivity Measures: Prior to the workshop, we will conduct surveys to identify specific needs of participants to ensure that everyone can participate fully and effectively.

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