

Special Issue on Conversational Agents for Healthcare and Wellbeing

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Conversational agents (CAs) are systems that interact with humans through natural language user interfaces. They include systems with a range of conversational capabilities and modalities. For example, there are text- or voice-only question-answering interactions such as Apple Siri, Google Assistant, and Amazon Alexa, and there are also multimodal conversational AI agents that can engage users in long-term dialogues. Advances in speech recognition, natural language processing, and computer vision have resulted in a greater acceptance and use of CAs. CAs have already started to play important roles in various healthcare settings, including assisting clinicians during consultations, assisting consumers in changing health behaviours, and helping patients such as the elderly in their living environments.

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There have been several systematic reviews on the use of CAs in health and wellbeing recently. Although the field still appears to be nascent, the emerging evidence has shown user acceptance of CAs in the healthcare domain as well as the early promises in boosting healthcare outcomes in both physical and mental health. Despite the increasing adoption and the benefits of using CAs to support health and wellbeing, the review studies also revealed (i) patient safety was rarely examined, (ii) health outcomes were inadequately measured, and (iii) no standardised evaluation methods were employed. There were also limitations in reporting the technical implementation details of CAs used, making the replicability of prior studies problematic.

In addition to addressing some of the current challenges and limitations, this special issue features cutting-edge research on designing, developing, and evaluating CAs for health and wellbeing that aim to improve health outcomes and services, and satisfy unique application needs (e.g., safety, trust, and user experience). The seven articles included in this special issue cover many application areas ranging from mental health and social support to information seeking to coaching. Amongst the accepted articles, mental health and social support themes represented the primary research foci. The articles also covered different population groups including older adults, young adults, and homeless people. Based on their foci, we have grouped the articles in this special issue by three areas: mental health, older adult wellbeing, and social support and coaching.

The first group includes three articles focusing on supporting people's mental health through self-reporting, counselling, and testing of a set of mental health prompts.

The first paper, "*Experiences of a Speech-Enabled Conversational Agent for the Self-Report of Wellbeing Among People Living with Affective Disorders: An In-The-Wild Study*" by Maharjan, Doherty, Rohani, Bækgaard, and Bardram, reports on a user study with a speech-enabled conversational agent to support self-reporting of wellbeing at home. The target user group is people living with affective disorders. This 4-week study involved 20 people and the post-study interviews showed the CA supported engaging and sustainable self-report experiences. Drawing upon the findings, the paper provides a valuable set of challenges and corresponding design strategies.

The next paper, "*Chatbots to Support Young Adults' Mental Health: An Exploratory Study of Acceptability*" by Koulouri, Macredie, and Olakitan, provides an in-depth investigation of the value and potential of CAs for providing mental health support for young adults. Based on a survey of 150 young adults, the authors designed a mental health chatbot prototype. The authors have also shown evidence that chatbots are an acceptable solution for mental health support among young adults and identify systematic challenges to both technology and use environment.

The third paper, "*I don't know what you mean by 'I am anxious': A New Method for Evaluating Conversational Agent Responses to Standardised Mental Health Inputs for Anxiety and Depression*" by Eagle, Blau, Bales, Desai, Li, and Whittaker, evaluates CA responses to mental health questions. The authors tested two text-based chatbots and four voice assistants with probes derived from two widely used mental health diagnostic surveys for depression and anxiety. Their findings have discussed the impact of text- and voice-based CAs for both anxiety and depression management. The authors provide suggestions to improve the quality of CA responses to mental health questions.

The second group includes two articles that focus on older adults' wellbeing. In "*Empirical Study of Older Adult's Voice Assistant Use for Health Information Seeking*" by Brewer, Pierce, Upadhyay, and Park, the authors report the results of two studies of how older adults, aged 65 and over, use conversational assistants, such as Siri, Alexa, and Google Home to obtain health information. The studies have identified several participants' challenges of interacting with conversational assistants. The authors have also discussed design recommendations for CAs in these use cases as well as ethical issues in using these devices for personal medical information.

The next paper, “*Discourse Behaviour of Older Adults Interacting with a Dialogue Agent Competent in Multiple Topics*” by Razavi, Schubert, van Orden, Ali, Kane, and Hoque, explores the use of a virtual avatar for older adults at risk of social anxiety or isolation to practice casual conversation. In studying dialogue with multiple avatar interactions across several weeks, the authors have found the benefits of allowing older adults to practise casual conversations, particularly with challenging and emotional topics. The authors have also discussed how such interactions could improve quality of life alongside guidance on designing effective social agents.

The third group includes two articles that focus on social support and coaching. In the first paper “*Relational Agents for the Homeless with Tuberculosis Experience: Providing Social Support Through Human-agent Relationships*”, Jang, Im, Kang, and Baek focus on supporting socially vulnerable and isolated people using a **relational agent (RA)**, a kind of CA) in a qualitative study with the homeless people with tuberculosis experience. The article examines the needs of the target population across three major areas: user environment, user cognition, and user behavioural characteristics. The study has revealed users’ perception and expectations of RAs in such a situation. The study has also highlighted privacy-related problems typically associated with voice interaction in social settings.

The last article, “*A Multilingual Neural Coaching Model with Enhanced Long-term Dialogue Structure*” by López Zorrilla and Torres, describes a novel method for creating CAs that can coach users on nutrition using end-to-end machine learning, instead of hand-crafted rules. The authors use a Wizard-of-Oz technique to collect conversation data involving the coaching of people about nutrition. These conversations were then used to train neural network models. They demonstrate that long-term dialogue structure can be learned and that the same models work with multiple languages, including Spanish, French, Norwegian, and English. In addition, the technique can be generalized to other kinds of tasks and contexts beyond healthcare coaching.

In summary, the articles in this special issue present innovative contributions in advancing the technologies and evaluations of CAs for healthcare and wellbeing, covering three important areas: mental health, older adults’ well-being, and social support and coaching with a focus on a vulnerable, less studied, and often ignored population. We believe the work featured in this special issue offers a good representation of the current studies on CAs for healthcare and wellbeing. We hope the contributions will help shape the future of the design, development, and research in this rapidly advancing field and facilitate collaborations across disciplines.

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