Anthropomorphic Virtual Assistant to Support Self-Care of Type 2 Diabetes in Older People: A Perspective on the Role of Artificial Intelligence

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Introduction

- The global prevalence of diabetes is escalating. Attributable deaths and avoidable health costs related to diabetes represent a substantial burden and threaten the sustainability of contemporary healthcare systems. Information technologies are an encouraging avenue to tackle the challenge of diabetes management.
- Anthropomorphic virtual assistants designed as relational agents have demonstrated acceptability to older people and may promote long-term engagement.
- The VASelfCare project aims to develop and test a virtual assistant (VA) software prototype to facilitate the self-care of older adults with type 2 diabetes mellitus.
- Machine learning techniques to provide a more personalised user experience with the prototype, by means of behaviour adaptation of the virtual assistant to users’ preferences or emotions or to develop chatbots. The effect of these sophisticated approaches on relevant endpoints, such as users’ engagement and motivation, needs to be established in comparison to less responsive options.

VASelfCare prototype

- The interface displays an anthropomorphic Virtual Assistant (called Vitória), an empathic character capable of speaking and expressing emotions through facial and body animations.
- The prototype operates without the need of internet access, in Android tablet devices.
- The user communicates with Vitória using buttons.
- The virtual assistant communicate with users following repeated structured stages in each interaction.
- Behaviour Change Techniques (BCTs) are incorporated in some stages such as “Assessment” and “Counselling.”

Architecture of the prototype

Opportunities for adding AI to the prototype include:
- Context sensitive rule-based dialogue controller
- Reinforcement learning, allowing for behaviour adaptation based on
  - user’s evaluation
  - assessment of user’s facial emotions
- Conversational interaction (chatbot)

Conclusions / Future work

- Artificial intelligence, and particularly machine learning techniques, represent promising approaches to provide a more personalized user experience with the VASelfCare prototype.
- Responsive relational agents, designed to detect frustration and to empathically respond to it, have shown a positive effect on users’ attitudes. There is the need to evaluate this in clinical populations.
- The question “what kind of animated agent used in what kind of domain influence what aspects of the user’s attitudes or performance?”, posed nearly twenty years ago, is still open.