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# Argument-based Person-Tailored Human-Agent Dialogues to Support Health and Well-Being in Older Adults

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## Academic dissertation

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## Abstract

Supporting health and well-being in later life requires attention to the activities, goals, motives, and contexts that make everyday life meaningful. This thesis investigates how dialogue between a human and a software agent can be person-tailored to support reflection and planning related to health and well-being. The aim is to develop and investigate computational models and mechanisms that relate agent support to a person's activities and motives, dialogue purpose, and context.

The thesis contributes models for representing purposeful human activity and mechanisms for using this knowledge in human-agent collaboration. Grounded in Activity Theory and argumentation frameworks the contributions connect activities with goals, motives, actors, instruments, and context; address different dialogue purposes and potentially competing motives; and support the generation of person-tailored arguments. Using a participatory design methodology, a diary agent was developed in collaboration with occupational therapists; its purpose is to work with the individual to construct diary entries that support reflection on past activities and the planning of future ones. Models and mechanisms were complemented by generative AI, where the generated narratives are guided by argumentation types and argumentation schemes grounded in structured personal information. The interaction design enables collaboration as well as user control and corrections. Argument mining was used to examine the argumentation structure and the extent to which the narratives are based on the individual's information.

Across six formative evaluation studies, the importance was shown of both topic and context for health-related dialogue. Evaluations with domain experts and older adults show opportunities and limitations of person-tailored narratives, including difficulties in communicating intended narrative purposes and the importance of cultural relatability and personal relevance. Technical evaluation shows that argumentation-scheme guidance increases explicit premises but does not independently produce a significant improvement in persona grounding. Argument mining can support inspection of argumentative structure but the study did not provide evidence for supporting autonomous verification. Further, requirements for grounding, explainability, emotional safety, and human ownership were elicited.

To summarise, the thesis shows how purposeful activity, multiple motives, dialogue purposes, structured reasoning, generative narratives, and human participation can be connected in person-tailored human-agent dialogue while keeping personal meaning and human interpretation central.

**Keywords:** Human-AI Collaboration, Human-Agent Dialogue, Collaborative Reasoning, Argumentation, Personalised Storytelling, Activity Theoretical Framework, Agent Self-Reflection, Older Adults, Health and Well-being

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