Adaptive Human-Agent Dialogues for Reasoning about Health

Jayalakshmi Baskar
Advisors: Helena Lindgren and Lars Erik Janlert

The aim of this research is to enable dialogues between a human actor and an intelligent software agent for the purpose of handling health-related issues in a home environment.

The challenges to build such human-agent dialogue system are that the agent needs to be autonomous, and utilise a semantic model shared between the human and agent for communication and knowledge exchange purposes. The agent also needs to handle knowledge obtained from different heterogeneous sources in the environment. Moreover, it needs to reason and make decisions in the presence of uncertain and incomplete information. In some situations, it needs to analyse the information and generate new knowledge and learn from it. Also it needs to be cooperative and be able to deal with the affective components and topics in a dialogue.

A persona representing an older adult and a scenario were used in analyses, which includes dialogues with healthcare representatives aimed at supporting her in health-related concerns. Activity theoretical models of human activity have been used in analyses and reviews of related work.

Four semantic models were identified and formalised which are needed for accomplishing human-agent dialogues, which adapt to the human agent’s needs and priorities: 1) a domain model, which contains generic knowledge about the particular knowledge domain [1], 2) a user model, which contains the collected knowledge about the human agent [2], 3) an agent model, which represents the agent’s own knowledge base, goals and priorities [3], and 4) a dialogue activity model, which provides the relations between topics, generic and specific goals and actions to be made by the participating agents in a dialogue. The formal definitions include dialogue moves and types of dialogues [3].

The prototype human-agent dialogue system presented in [4] is being further developed based on the resulting semantic model for adaptive human-agent dialogues. The participating agents use the ACKTUS core ontology as common vocabulary [1, 2], and a generic knowledge base available for the adaptive agent is also modelled using ACKTUS. Future work includes a pilot evaluation study involving therapists and a group of older adults.

References: