

Summary

Helping people by understanding

Ambient agents supporting task execution and depression treatment

The field of Ambient Intelligence describes electronic environments that are sensitive and responsive to the presence of humans. These environments are invisibly integrated in the surroundings of humans and aim to make life easier. This can be in the personal atmosphere by adapting the color of the walls to your mood, or by ordering groceries automatically when you run out. It can also be used for professional applications such as a system that monitors an elderly person's health so that s/he can continue living at home, or a car that checks whether the driver is fit to drive before allowing the engine to start. In this thesis, two examples are described: a fully automated treatment for depression and a support system for persons executing complex tasks.

An ambient intelligent system is smart: it knows who is in the room, what the person is doing and what the preferences of the person are. The system adapts to him or her and therefore puts the person in the center and not the technology. To be able to provide personalized and intuitive services, it is important for the application to contain knowledge about humans and their functioning. A system can show a more human-like understanding by analyzing and processing information from sensors using such knowledge.

The ambient intelligence systems in this thesis are agent-based. An intelligent agent is an autonomous software program that can interact with the environment in order to achieve goals. Ambient agents contain knowledge about the person interacting with the agent and about the specific task of the agent. The ability to obtain more knowledge via sensors and the ability to reason about this information makes the agent human-aware. Theories from psychology, cognitive science and biomedical science are translated into formal models to be used in Ambient Intelligent agent. For example as a virtual patient following depression therapy. The virtual human can be used to predict behavior so that advice can be given and unwanted situations can be prevented. Virtual humans can also be used to study behavior without having to perform real life experiments - for new depression treatments for example. Different models can be integrated in an application to make the system aware of the person so that personalized support can be provided.

This thesis explores the design of ambient intelligent agents in two research domains: mood and depression, and task execution. The research topic task execution takes place in a professional working environment. Persons executing complex tasks in demanding environments are influenced greatly by their state of mind. A human-aware ambient agent system can provide dedicated support by monitoring not only the task itself, but also by monitoring the well-being of the person performing the task. In the field of mood and depression, the mood of a depressed person is monitored with the long-term goal of improving the well-being. Again, a human-aware ambient agent system can provide personalized support and advice based on knowledge about depression, the treatment and the person following the treatment.