

Research project for the profile Computer Science

Realistic avatars as virtual companions

Background

With the advances in machine learning and generative artificial intelligence, the likelihood of creating a believable, realistic virtual agent or an avatar of an existing person is around the corner. Such an agent or avatar might look and sound like a familiar person an individual (i.e., synthesized from person's own speech and voice), and can have plausible emotional expressions, including eye contact assuming eye tracking is present.

Goals / Methods / Approach

In the context of this master's project, we envision a through exploration of a) how to generate a realistic avatar both in terms of look and speech, including eye contact b) examine if this realistic avatar could be trained as a companion that entertains and assists people who might have health issues, specifically, older adults with cognitive health issues. In the context of the former, a technology research and experimentation to identify the state of the art approaches to creating realistic avatars is needed, and research prototypes (based on existing libraries or own programming) needs to be created for extended reality (most likely programming in Unity, though you are free to choose different software environments / frameworks). For the latter, we expect some machine learning efforts to optimize the solution to a user group (e.g., such as those with mild cognitive impairment), or personalize it for an individual (e.g., for yourself, as a proof of concept), then a user experiment in which target users' reactions are measured, with special attention to the well-known uncanny valley effect especially with the eye tracking and simulated facial expressions present (i.e., when the realism levels are high but still not convincing, making it uncomfortable or 'creepy').

Required skills: Experience in programming, analytical thinking, willingness to learn VR programming and 3D content creation, interest in statistical approaches to quantitative data analysis, visualization and interaction design, serious games, scientific research.

Others: The project language is English but operational German would be useful for the user experiments. The project is linked to an existing Innosuisse project in collaboration with Altoida AG and Hirslanden Clinic.

Tasks for the MSE candidate

The project can be implemented in 2 to 3 stages, e.g., Project P7 (requirements analysis, interaction and visualization concepts, first avatar prototypes), Project P8 (user-centered design/ initial user testing, improved prototypes) and Project P9 (final prototypes, personalization, controlled experiments for validation)



Study type: Full time
 Part time 50%

Project organization: Single and/or in a project team both possible

Projektfinanzierung: --

Workplace: Windisch

Advisor: Prof. Dr. Arzu Çöltekin, arzu.coltekin@fhnw.ch

image: freepik.com