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A Touching Agent: Integrating Touch in Social Interactions between Human and Embodied Conversational Agent in an Immersive Environment

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Embodied Conversational Agents (ECA)
- Artificial social agent with a body, or at least part of a body, designed to interact and talk with humans or other agents.
- Can use non verbal communication (gestures, facial expressions) and generate rapport.

Social Touch & Technology
- Social touch is particularly useful to communicate emotions, and essential to individuals’ well-being. Yet, only few communication technologies include it.
- Three kinds of social touch technologies: detection and sensing, mediation and simulation.
- However, very difficult to imitate natural haptic sensations via technology: vibrations feel unnatural, force-feedback can be heavy in terms of equipment, temperature is hard to set up (esp. in real time), etc.

The immersive room
The virtual environment and the agent are projected on the walls and the floor in stereoscopic 3D. The user can then see everything in 1:1 scale through the glasses.

Main research questions
To which extent granting an ECA the ability to touch and be touched would enhance its ability to communicate emotions and to build and maintain a social and emotional relationship with a human? From the agent’s perspective: when and how to touch the human, and how to react to being touched?

Integrating touch to the interactive loop
A traditional interactive loop between human and autonomous social agent is based on the ability of the agent to perceive the human’s behaviour in the environment, to then reason and decide how to answer, and to eventually provide his answer to the human via some kind of interface.

The place of social touch in such a loop with, in red, our main interests and contributions.

Giving the agent a sense of touch
The agent’s body can detect whether the human is touching the agent or not, and how (where, for how long, velocity,...), based on the spatial coordinates. However, the agent is intangible and thus we need to provide haptic feedback to make it able to touch the human.

Haptic feedback device
- Voice coils can be used to produce richer vibration patterns on our pre-defined hit, caress and tap touch types.
- More diversified and detailed frequencies for interesting noises (white, pink, ...)
- Implemented in a tactile sleeve device.

Integrating touch to the interactive loop

The place of social touch in such a loop with, in red, our main interests and contributions.

Has touch happened? If so, what type of touch could it have been (hit, caress,...)? If not, is it likely soon?

Social interpretation of the perceived touch based on context and knowledge of the agent.

Decision of whether to touch or not, how, and overall answering behaviour.

Preliminary Interpretation

Touch Types

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