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Induction of the being-seen-feeling by an embodied conversational agent in a socially interactive context

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To communicate with human interlocutors, embodied conversational agent use multi-modal signals. The goal of our project was to implement a social eye-gaze in a agent to evaluate its effect in interlocutors. Precisely, we focused on the being-seen-feeling (BSF) during a socially interactive context. This feeling is labeled as the inference we have when we have the impression that someone is able to see us [3]. The being-seen-feeling influences our behaviors and even physiological parameters [2, 5, 7]. The influence of the BSF can be analysed through how we use our eyes and our body during an interaction or through scales participants answer after their interaction with an agent. Our goal was to conceive a socially interactive paradigm and to analyse on those parameters to answer our problematic: what is the effect of an agent social eye-gaze in a human interlocutor?

1 OUR EXPERIMENT

Greta [8] is a real-time three dimensional embodied conversational agent with a 3D model of a human-like appearance compliant with MPEG-4 animation standard. It is able to communicate using a rich palette of verbal and nonverbal behaviors (talk, facial expression, gesture, gaze and head movements). Two standard XML languages FML [4] and BML [10] are used to encode, respectively, its communicative intentions and behaviors based on the standard SAIBA architecture. Given communicative intentions specified in an FML file or a simple speech GRETA generates multi-modal behaviors relying on three different modules: Meaning Miner [9], NVBG [6] and a module that searches the Ideational units in the speech[1].



Figure 1: Emma in the market stall

The experimental setup consists in a virtual environment made in Unity (fig.1), a Kinect 2 to track the gaze of the participant and the GRETA platform that will communicate with the environment in Unity. More precisely, Unity contains a fruit stand and a virtual agent behind it playing the role of a seller. Two agents were used. Vanessa and Emma were exactly the same except for their shirt color, how they handle the interaction and the use of their eye-gaze. Emma had a green shirt and looked at its interlocutors directly. Unlike Vanessa, which had a red shirt, Emma had no doubt and no errors but only correct guesses about the choices of products made by participants through their gaze. To make the agent look at something or someone, we used a mobile invisible object that moved to reach the position of a known object or a position in the space. The known object names in the scene were marked with the symbol #. The objects in the scene were parsed to make a list of all the entities that were observable in Unity. That list was sent to GRETA and through a simple interface we could choose the agent gaze target by sending back to Unity the name of the entity. Our targets were the four crates, a cash register or two empty objects to look directly (Emma) or in a deviated direction (Vanessa) toward the human. We designed a Wizard of Oz protocol in which the task was not apparently related to our problematic and the cover-story only was known by participants. They were told they had to interact with two autonomous agents successively to train them manage a market stall. After a participant's eye-gaze calibration, they had to choose one of four products present in the stand according to a grocery list by directing their eye-gaze only. Eight product choices were made by participants per agent. Participants couldn't speak freely with the agents but only use head movements for "yes" or "no" or tell vocally the quantity wanted for the chosen product. Emma and Vanessa could say "I see you have chosen lemons. They are well done and at 1 euros 80 per kilogram. How many do you want?". Only Vanessa might say "I have a doubt, have you chosen orange peppers?". In the condition "without BSF", the purpose was to make the participant think, along with the eye-gaze, that Vanessa was not paying attention to him/her by making errors and showing doubts. This condition was compared to "with BSF" in which Emma's direct eye-gaze was supposed to induce the sense of being seen in the interlocutor with only correct guesses. Fifteen voluntary persons participated in our paradigm. Most of them were college students. Each procedure lasted 45 minutes in average. Every videos and scales from every participants will be statistically analyze to answer our problematic.

Video Link:
https://drive.google.com/file/d/1skCasE5IlTI8pGXBxIE0Oipmm I1AI-KZ/view?usp=drivesdk

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