

 Open access • Book Chapter • DOI:10.1007/1-4020-3051-7_1

Greta. a believable embodied conversational agent — [Source link](#)

Isabella Poggi, Catherine Pelachaud, F. de Rosis, Valeria Carofiglio ...+1 more authors

Institutions: University of Grenoble, University of Paris, University of Bari

Published on: 01 Jan 2005

Topics: Autonomous agent, Dialog system, Context (language use) and Gesture

Related papers:

- [Embodied conversational agents](#)
- [Multimodal intelligent information presentation](#)
- [Towards a common framework for multimodal generation: the behavior markup language](#)
- [Embodiment in conversational interfaces: Rea](#)
- [The Cognitive Structure of Emotions](#)

Share this paper:    

View more about this paper here: <https://typeset.io/papers/greta-a-believable-embodied-conversational-agent-5c52e80hsb>



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

Mickaëlla Grondin-Verdon, Nezih Younsi, Michele Grimaldi, Catherine Pelachaud, Laurence Chaby, Lola Canamero

► To cite this version:

Mickaëlla Grondin-Verdon, Nezih Younsi, Michele Grimaldi, Catherine Pelachaud, Laurence Chaby, et al.. Induction of the being-seen-feeling by an embodied conversational agent in a socially interactive context. IVA GALA, Sep 2021, University of Fukuchiyama, Fukuchiyama City, Kyoto, Japan, Japan. 10.1007/1-4020-3051-7_1 . hal-03342893

HAL Id: hal-03342893

<https://hal.archives-ouvertes.fr/hal-03342893>

Submitted on 13 Sep 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

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

Mickaëlla Grondin-Verdon
ISIR, Grenoble Alpes University
Paris, France
mickaella.grondin-verdon@etu.univ-
grenoble-alpes.fr

Nezih Younsi
ISIR, Polytech Sorbonne
Paris, France
ne.younsi@gmail.com

Michele Grimaldi
ISIR, Sorbonne University
Paris, France
michele.grimaldi@isir.upmc.fr

Catherine Pelachaud
CNRS, ISIR, Sorbonne University
Paris, France
catherine.pelachaud@upmc.fr

Laurence Chaby
CNRS, ISIR, Sorbonne University
Paris, France
laurence.chaby@upmc.fr

Lola Canamero
CNRS, ETIS, Cergy Paris University
Paris, France
lola.canamero@cyu.fr

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/1skCasE5IIIT8pGXBxIE0OipmmI1AI-KZ/view?usp=drivesdk>

REFERENCES

- [1] Geneviève Calbris. 2011. *Elements of meaning in gesture*. Vol. 5. John Benjamins Publishing.
- [2] Roser Cañigüeral and Antonia F de C Hamilton. 2019. Being watched: Effects of an audience on eye gaze and prosocial behaviour. *Acta psychologica* 195 (2019), 50–63.
- [3] Roser Cañigüeral and Antonia F de C Hamilton. 2019. The role of eye gaze during natural social interactions in typical and autistic people. *Frontiers in Psychology* 10 (2019), 560.
- [4] Dirk Heylen, Stefan Kopp, Stacy C Marsella, Catherine Pelachaud, and Hannes Vilhjálmsón. 2008. The next step towards a function markup language. In *Intelligent Virtual Agents*. Springer, 270–280.
- [5] Helena Kiilavuori, Veikko Sariola, Mikko J Peltola, and Jari K Hietanen. 2021. Making eye contact with a robot: Psychophysiological responses to eye contact with a human and with a humanoid robot. *Biological Psychology* 158 (2021), 107989.
- [6] Jina Lee and Stacy Marsella. 2006. Nonverbal behavior generator for embodied conversational agents. In *International Workshop on Intelligent Virtual Agents*. Springer, 243–255.
- [7] Aki Myllyneva and Jari K Hietanen. 2015. There is more to eye contact than meets the eye. *Cognition* 134 (2015), 100–109.
- [8] Isabella Poggi, Catherine Pelachaud, F. Rosis, Valeria Carofiglio, and Berardina Carolis. 2005. *Greta. A Believable Embodied Conversational Agent*. 3–25. https://doi.org/10.1007/1-4020-3051-7_1
- [9] Brian Ravenet, Chloé Clavel, and Catherine Pelachaud. 2018. Automatic nonverbal behavior generation from image schemas. In *Proceedings of the 17th international conference on autonomous agents and multiagent systems*. 1667–1674.
- [10] Hannes Vilhjálmsón, Nathan Cantelmo, Justine Cassell, Nicolas Chafai, Michael Kipp, Stefan Kopp, Maurizio Mancini, Stacy Marsella, Andrew Marshall, Catherine Pelachaud, Zsófia Ruttkay, Kristinn Thórisson, Herwin Welbergen, and Rick Werf. 2007. The Behavior Markup Language: Recent Developments and Challenges. 99–111.