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Fake Empathy and Human-Robot Interaction (HRI):
A Preliminary Study

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ABSTRACT

Empathy is a basic emotion trigger for human beings, especially while regulating social relationships and behaviour. The main challenge of this paper is study whether people's empathic reactions towards robots change depending on previous information given to human about the robot before the interaction. The use of false data about robot skills creates different levels of what we call 'fake empathy'. This study performs an experiment in WOZ environment in which different subjects (n=17) interacting with the same robot while they believe that the robot is a different robot, up to three versions. Each robot scenario provides a different 'humanoid' description, and out hypothesis is that the more human-like looks the robot, the more empathically can be the human responses. Results were obtained from questionnaires and multi- angle video recordings. Positive results reinforce the strength of our hypothesis, although we recommend a new and bigger and then more robust experiment.

KEYWORDS

Emotions, Empathy, Fake, HRI, Human-Robot Interaction, Robots, WOZ

INTRODUCTION

Empathy is the capacity of one entity to recognise or understand another's state of mind (at a cognitive level, Nummenmaa et al., 2008) or emotion. Humans and other animals are able to perform empathy. Empathy and imitation have the same neural correlates: mirror neurons. Recent studies have discovered the neural basis of learning by mirror neurons (Rizzolatti & Craighero, 2004; Ramachandran, 2005) and functional magnetic resonance imaging (fMRI) has been intensively employed to investigate the functional anatomy of empathy (for reviews see Decety & Jackson, 2006; Decety & Lamm, 2006; deVignemont & Singer, 2006; Krämer et al., 2010). Following this interest, very recently has appeared a research on neural correlated of empathy toward robotics (Rosenthal-von der Pütten et al., 2013). The emotional basis of empathy is something obvious and it makes possible the self-learning by imitation. Artificial empathy will be useful for robots that are performing learning-by-observation tasks following human actions. At the same time, humans working closely with robots will project and look for empathic responses of those artificial entities. Thus, the mechanisms by which humans establish empathic bonds with robots are of maximum interest. Kwak et al. (2013) have recently explored how human empathy toward a robot can be affected by the presence of a robot, showing that

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their study participants empathized more with a physically embodied robot than with a physically disembodied robot, indicating the impact of physical embodiment on human empathy. This question is critical for home-care robots, the next step into the spreading of robotics worldwide. And even for industrial robots, the human positive attitude towards the robot can improve the production results[1]. Leite et al. (2013) have also shown with their study that artificial companions capable of behaving in an empathic manner, which involves the capacity to recognise another's affect and respond appropriately, are more successful at establishing and maintaining a positive relationship with users.

CONCEPTUAL FRAMEWORK

Our paper is mainly devoted to the possibility of managing human empathy towards robots, and, basically, it tries to answer to a very important question in Human-Robot Interaction Studies: how do humans develop expectations of robots? In order to find an answer, we will explore two different ideas into next subsections.

HRI and Expectations

The field of Human-Robot Interactions despite of being relatively young is well studied (Goodrich & Schultz, 2007; Dautenhahn 2007a, 2007b). On the side, the list of human behavior studies is overwhelming, covering data from Anthropology, Sociology, Psychology, or Linguistics, among several fields. But something that it's clear is that "there is a property of behavior that could hardly be more basic and is, therefore, often overlooked: behavior has no opposite. In other words, there is no such thing as non-behavior or, to put it even more simply: one cannot not behave. Now, if it is accepted that all behavior in an interactional situation has message value, i.e., is communication, it follows that no matter how one may try, one cannot not communicate (Watzlawick, Beavin & Jackson, 1967; italics are ours). This is true for the target of our study: human beings. People behave and communicate to other people following a rich set of variables or constraints, some verbal, others non-verbal. At the same time, humans observe, expect and assign to other entities several kinds of behaviors, that is, humans are active agents that construct representations of behavioral events. People assign not anthropomorphic properties to objects or animals, but also ascribed mental states to their robotic pets, as happened one decade ago with robot pet AIBO owners (Friedman, Kahn & Hagman, 2003). This is the result of the adjustment between the real and the expected output of an event, from a human emotional perspective. Vallverdú (2016) has called it 'emotional fitness', and expresses the process by which human agents fulfill the interactive process with other agents or objects once there is a (conscious or unconscious) difference between the expected result and the real one. For that reason, people speak to their cats, horses or dogs. During this communication process, humans make a representation and then evaluate the information according to it as well as with the selected and processed data. Thus, one of the crucial moments on a HRI is the management of the expected emotions (Damm et al., 2011). At the same time, it is clear that usually people do not display their actual feelings, as this could be an evolutionary disadvantage (Fridlund, 1994).

Therefore, and from all previous data, we can affirm that people tend to expect some specific feedback from their robotic encounters, and act accordingly to it (Jacobsson, 2009; Bainbridge et al., 2009; Nomura, Kanda & Suzuki, 2009). Gendered reactions towards machines or (Nass,Moon & Green, 1997) robots are an example of this process (Schermerhorn, Scheutz & Crowell, 2008; Carpenter et al., 2009; Couper, Singer & Tourangeau, 2004; Crowell et al., 2009), or even the perception of robots according to the assigned gender (with the assumed cultural biases or gender roles, (Jung, Waddell, & Sundar, 2016; Powers et al., 2005). These research results can be of the outmost interest for future market on service or sexual robotics (Levy, 2007). Here is very important to see that the aim of this project is to see whether we can induce different specific expectations towards robots into human beings, and whether these humans will be influenced by these expectations into their behavioral actions towards the robots. Consequently, we performed three studies to examine expectations and reactions to a robot's identity within a single-user setting.

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