

Persuasion Based on Personality Traits:

Using a Social Robot as Storyteller

Raul Paradedda, Carlos Martinho, Ana Paiva
INESC-ID & Instituto Superior Técnico
University of Lisbon - Portugal

raul.paradedda@tecnico.ulisboa.pt, carlos.martinho@gaips.inesc-id.pt, ana.paiva@gaips.inesc-id.pt

ABSTRACT

We propose to create a model based on Personality Traits (PT) to persuade players interacting with a social robot in the context of Interactive Storytelling (IS). With this model, we expect to predict the best decisions based on players' PT and be able to persuade them to make decisions improving motivation, satisfaction and memorization. For this, the PT will be categorized according to the MBTI theory and a storytelling scenario will be used to create, measure and evaluate the model. Our work requires experiments regarding persuasion techniques based on PT using social robots, and how to relate the decision points in IS to PT.

Keywords

Human Robot Interaction; Interactive Storytelling; Persuasion; Personality Traits.

1. INTRODUCTION

Persuasion techniques are used in many forms during our everyday activities, not only in subtle ways (verbal, gaze or pointing) but also in not so subtle (corporal approach and threats). These techniques focus on influencing a person to do some task, accept an idea or even give something in return. For example, in the area of assistive robotics, it is possible to use social robots to influence humans to choose the healthiest food. Yetm when persuasion is applied by a non-living agent, the task can be more complicated and in fact, lead to the undesired result.Strategies to obtain better results can be used. One such strategy is the use of personalized and directed persuasion based on the subject's Personality Traits (PTs).

Because each person has her/his own traits, goals and motivations, persuasion may work for one person but not for the other [7]. Because of this, it is important to categorize the PT of the subject to be persuaded. In literature, there are many instruments that can be used for this categorization, in particular the Big 5 and the Myers-Briggs Type Indicator (MBTI). In this sense, we chose the MBTI [10] to

support a personalized persuasion strategy, because of the characteristic that we consider to be ideal to allow the contextualization of the score obtained, e.g., liberals score high on intuition and conservatives score high on sensation.

A personalized persuasion technique embedded into a social robot has some advantages. For instance, the robot can use a model of persuasion based on PTs to influence the subject to make decisions according to her/his own preferences, improving the motivation in the task. As such, the main goal of this work is to develop a model that can identify a participant's PT through decisions made in a specific task. We intend to create a scenario where it will be possible to categorize the participant's PT. The application area chosen is interactive storytelling, and we decided to create an IS scenario, a communication context already used in persuasion scenarios. In the scenario, the participant will interact by making actions at Decision Points (DP) during a story narrated by a social robot.

We believe the storytelling scenario will allow us to create a model capable of identifying the player's MBTI PT based on the decisions taken and a social persuasion system able to predict and persuade the player to choose the better action to enjoy the task more fully.

2. BACKGROUND

The art of persuasion began with Greek politicians that used rhetoric and elocution to try to persuade the audience. Since that time, storytelling is used to persuade. However, the strategies and conditions for persuasion have changed and evolved over the years. Nowadays, it is possible to use technology and in particular personalisation to improve the effectiveness of persuasion.

2.1 Conditions for Persuasion

Persuasion could be done in many ways, from a simple gaze, or an aggressive pointing, to a very well prepared narrative. Narratives are messages that present information in a story format, designed to engage the audience, typically involving a protagonist, and containing emotionally appealing information. In some cases, storylines are embedded with the intent of influencing behavior (eg. promote healthy behaviors [7]). In this sense, a well-defined narrative should present characteristics that make participants to focus on certain events occurring in the narrative [3].

2.2 Persuading the Listener

Our scenario involves a robot, which just by its appearance can be considered by itself persuasive. However, its

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

HRI '17 Companion March 06-09, 2017, Vienna, Austria

© 2017 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-4885-0/17/03.

DOI: <http://dx.doi.org/10.1145/3029798.3034824>

degree of persuasion may change when its head and eyes move towards the listener and when the gestures and gaze work together at the same time [5]. Furthermore, gazing gestures promote entertainment and make the conversation more natural: using gaze and gesture together is a better persuasion strategy than separately [4].

In the research presented in [2], results from social psychology's area of persuasion were used to influence the user in predictable ways in a digital storytelling scenario. The authors applied important concepts of persuasion, and carried out a small study where they successfully influenced the players of a story to follow a specific path through the use of an expert source manipulation.

2.3 Storytelling and Social Robotics

Storytelling is used to increase the meta-linguistic knowledge about patterns and language structure, expand vocabulary with new words, allow creative speech, and a space to learn themes [6]. Furthermore, the use of a physical robot is considered to be more engaging, more helpful, give better and more useful advice, and be more effective communicators [9]. In [8], a social robot told a story and persuaded participants to make monetary donations, using strategies such as small talk and facial expressions. According to [1, 8], starting the conversation using small talk and sadness facial expressions has a positive influence on participants' trust and may allow for more effective persuasion.

3. METHODOLOGY

Combining the characteristics of storytelling with the use of PT in the process of persuasion may improve its effectiveness. However, the degree of challenge in some tasks may not be in accordance with the desire, capacity, will, or user's personality. Keeping this fact in mind, we intend to create a model capable of identifying the player's PT in real-time using DP in an IS context and have a social robot persuade the player to choose specific actions.

We have divided the project into two phases:

Phase 1: The MBTI test consisting of a questionnaire with 70 questions that identifies and describes 16 distinctive personality types that result from interactions among the preferences. These types are typically referred to as an abbreviation of four letters associated with four type preferences. For example, ESTJ: Extraversion (E), Sensing (S), Thinking (T), Judgment (J) or INFP: Introversion (I), iNtuition (N), Feeling (F), Perception (P). Each question identifies a pair of preferences, for example, the first question analyzes whether the person is 'E' or 'I', the second analyzes whether they are 'S' or 'N', etc.

In this phase, 200 subjects answered to the questionnaire. We identified 30 questions that most categorize the PT in each pair of preferences, seven to 'EI' and 'SN', and nine to the others. These questions were selected using the Kappa Correlation algorithm. This selection informed the creation of a story where each DP is strongly related to these specific questions. Then, in the story we will investigate: (1) if the decisions are made according to the participant's PT; (2) if possible paths can be recorded according to the PT; and, (3) whether or not users with the same PT choose the same path. Finally, the results will make our initial baseline for the DP in the story.

Phase 2: We will use a social robot to persuade the participant (based on the model created in the first phase) to

choose actions based on his/her PT, in one scenario, and in another will choose actions opposite to his/her PT. We intend to endow the robot with narrative, pointing, and gaze persuasion.

Finally, through a final questionnaire, we intend to investigate: if the participant noted the persuasion performed by the robot and how it affected the decisions taken; if he/she liked the end of the story; and, knowing the story, if he/she would make different decisions at each decision point. Then, we will verify if persuasion affects achieved by the model.

In summary, we aim to measure the impact of a social robot endowed with PT based persuasion in a scenario of IS. Moreover, we aim to investigate and analyze the impact of PT on decision making and if the decisions are predictable.

4. ACKNOWLEDGMENTS

The first author would like to acknowledge the National Council for Scientific and Technological Development (CNPq) program Science without Border process number: 201833/2014-0 and Universidade do Estado do Rio Grande do Norte - Brazil. Also, this work was supported by national funds through Fundação para a Ciência e a Tecnologia (FCT) reference UID/CEC/50021/2013 and through project AMIGOS (PTDC/EEISII/ 7174/2014).

5. REFERENCES

- [1] T. Bickmore and J. Cassell. Relational agents: a model and implementation of building user trust, 2001.
- [2] R. Figueiredo and A. Paiva. "I want to slay that dragon!": influencing choice in interactive storytelling, 2010.
- [3] M. C. Green and T. C. Brock. The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5):701–721, 2000.
- [4] J. Ham, R. H. Cuijpers, and J.-J. Cabibihan. Combining Robotic Persuasive Strategies: The Persuasive Power of a Storytelling Robot that Uses Gazing and Gestures. *International Journal of Social Robotics*, 7(4):479–487, 2015.
- [5] T. Iio, M. Shiomi, K. Shinozawa, T. Akimoto, K. Shimohara, and N. Hagita. Investigating entrainment of people's pointing gestures by robot's gestures using a WOz method. *International Journal of Social Robotics*, 3(4):405–414, 2011.
- [6] J. Kory and C. Breazeal. Storytelling with robots: Learning companions for preschool children's language development. *Communication Research*, pages 643–648, 2014.
- [7] E. Moyer-Gusé. Toward a Theory of Entertainment Persuasion: Explaining the Persuasive Effects of Entertainment-Education Messages. *Communication Theory*, 18(3):407–425, 2008.
- [8] R. B. Paradedda, M. Hashemian, R. A. Rodrigues, and A. Paiva. How Facial Expressions and Small Talk May Influence Trust in a Robot. pages 169–178. Springer International Publishing, Kansas City, 2016.
- [9] A. Powers, S. Kiesler, S. Fussell, and C. Torrey. Comparing a computer agent with a humanoid robot. In *Human-Robot Interaction (HRI), 2007 2nd ACM/IEEE International Conference on*, pages 145–152, 2007.
- [10] The Myers & Briggs Foundation. The Myers & Briggs Foundation - MBTI® Basics, 2014.