Would You Follow the Suggestions of a Storyteller Robot?

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Abstract. This work describes a study in development that uses an autonomous social robot to act as storyteller and persuader in an interactive storytelling scenario. The robot employs techniques of persuasion to try to convince the audience to take a specific path in the story. The autonomous storyteller robot performs facial expression and head movements to express emotions regarding the story flow and the person's decisions. Through a pilot study with four participants, we were able to identify the improvements needed. The findings revealed that the robot could give better suggestions to try to persuade a person before s/he makes a final decision. At the same time, we believe that some interaction changes could potentially increase the motivation, interest and engagement of users in the task.

Keywords: Interactive storytelling · Social robotics · Persuasion

1 Introduction

The way that a story can be told has changed over time. In the old times, stories have been told as paintings on the walls while nowadays technological innovations provide the possibility of using creative resources to tell stories. For example, it may be possible to increase the motivation and interest of the audience via social robotics. Robots have been used for a wide range of purposes, such as education [5] and persuasion [7]. This happens because they are considered to be engaging and motivational. They also help encourage imagination, especially on children [1].

However, when there is interaction with social robots some ethical challenges and practical issues arise [10]. For example, in an interactive scenario where the robot acts as a persuasive agent storyteller, the person might not understand or trust in the persuasive cues given by the storyteller. So, some strategies can be applied to avoid those issues. For instance, trying to gain the robot trust through small talk [9], using gaze to the desired target [3] or even saying utterances in cues format [2].

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Given these ideas, this work describes a study in progress that uses an autonomous social robot to act as storyteller and persuader in an interactive storytelling (IS) scenario. We aim with this study to evaluate how suggestive a social robot can be, as well as the efficacy of persuasion techniques as trust, gaze and utterance cues.

2 Materials and Methods

According to McWilliams [6] and the website Kidmunication[1], in the art of storytelling, facial expressions are essential features and have a greater impact when combined with voice. In fact, without facial expressions, a story becomes a flat and limp narration, instead of a magical and engaging tale. As a result, the teller would look just plain bored and disinterested. Considering the importance of facial expressions, we decided to use a robot that can perform those features, the EMYS robot. EMYS[2] is a robot only with a head that can represent emotions using facial expressions (Fig. 1).

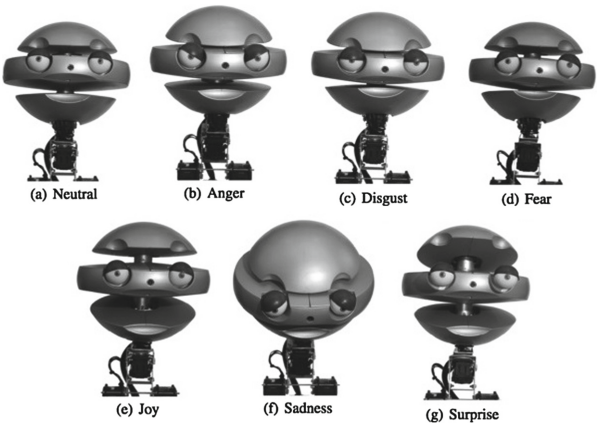

Fig. 1. Facial expressions performed by EMYS robot [4].

The story used in the scenario was written with the aid of a specialist in education. The story happens in the Middle Ages (or Medieval Period), the user performs the role of a country leader that received a threat from another country. Person's goal is to prevent her/his country from falling into the enemy hands. In this scenario, **immersion** is an important feature to make the participant feel like s/he is a part of the story. To captivate the person's attention and to

[1] Facial Expression and Masks in Storytelling — Kidmunication. Available at http://kidmunication.com/telling-stories/story_telling_training/facial-expressions-and-masks-in-storytelling. Accessed on: 07/16/2018.

[2] EMYS. Available at https://emys.co/.

increase her/his immersion during the story flow, each scene includes a representative image of what is happening in the story and the robot tells the narrative regarding each scene. The screen disposition of the prototype developed in C# can be seen in Fig. 2.

As our scenario is an IS, each scene presents a Decision Point (DP) with two options that lead the listener to another path within the story (buttons left and right in Fig. 2). Depending on the decision made, the robot reacts positively or negatively, expressing joy or anger respectively. For each scene, the robot has its own desired option, and if the listener chooses the option according to the robot, it reacts positively, otherwise, negatively.

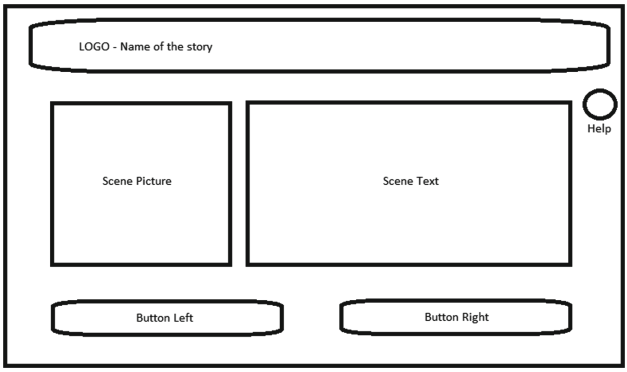

Fig. 2. Screen disposition of the prototype presented to participants.

Since we have chosen the EMYS robot, our first persuasion strategy to influence the listener consists of mainly non-verbal cues such as gaze, head movements, robot's facial expression (emotions) and embodiment. In sum, the robot performs gaze movements at the desired option in every DP, suggesting that the listener should choose that option.

3 Current Status and Future Directions

Using the scenario above, we performed a pilot study with four participants (two males; two females) to identify any possible gaps and improvements in the proposed methodology. We recognised that the system needs to improve the persuasion gaze methodology and the interaction with the robot.

The system interaction suffered changes, and now in this new version, the listener must inform the robot of his/her intention of choice. Then, the robot performs gaze movements towards his intended option. If the person's intended decision is different from the robot's suggestion, the robot will play an anger emotion expressing its discontent followed by an utterance cue, notifying the

player that s/he will lose. Otherwise, the animation performed will be a joyful one, and the utterance cue will encourage the person to follow that path.

In future, our goal is to add to our current system a tool of suggestion in the form of utterance cues as well as a trust module. Mainly because, if the person does not trust in who is giving the advice, the reliability of the message transmitted is affected, making the person not be influenced to change their attitude, motivation and thoughts. With the trust module, the robot will try to increase the level of trust that a person can feel towards the robot. The work of Paradeda et al. [9] presents evidence that small talk can increase the trust felt during the experience. Following this line of work, we seek to implement small talk before the beginning of the story.We believe that a higher level of trust may result in increased acceptance of suggestions.

Moreover, using the story from the research of Paradeda et al. [8], we intend to apply the modifications mentioned before in an IS system capable of identifying the listener's Personality Traits (PT). In this sense, we will incorporate the person's PT in the system, which the robot will use to determine its desired option.

4 Conclusion

In this paper, we describe a prototype used to measure the effects of persuasion strategies performed by a social robot in an interactive storytelling scenario. From a pilot study, it was possible to identify changes that should be made in the persuasion approach. The use of a social robot acting as a storyteller can increase the motivation, interest and engagement in the task.

In sum, this work is aimed to identify better strategies for a social robot to perform suggestions or even persuade a person in a task that is necessary to make decisions. Moreover, we aim to highlight the powerful capabilities of social storytelling robots.

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References

1. Chen, G.D., Nurkhamid, Wang, C.Y.: A survey on storytelling with robots. In: Chang, M., Hwang, W.Y., Chen, M.P., Müller, W. (eds.) Edutainment Technologies. Educational Games and Virtual Reality/Augmented Reality Applications. Edutainment 2011. LNCS, vol. 6872, pp. 450–456. Springer, Heidelberg (2011). https://doi.org/10.1007/978-3-642-23456-9_81
2. Figueiredo, R., Paiva, A.: Affecting choices in interactive storytelling. In: AAAI Fall Symposium: Computational Models of Narrative (2010)

3. Ham, J., Bokhorst, R., Cabibihan, J.: The influence of gazing and gestures of a storytelling robot on its persuasive power. In: International Conference on Social Robotics (2011)
4. Kedzierski, J., Muszyński, R., Zoll, C., Oleksy, A., Frontkiewicz, M.: Emys – emotive head of a social robot. Int. J. Soc. Rob. **5**(2), 237–249 (2013)
5. Kory, J.J.M.: Storytelling with robots: Effects of robot language level on children's language learning. Ph.D. thesis, Massachusetts Institute of Technology (2014)
6. McWilliams, B.: Effective storytelling-a manual for beginners. Accessed 8 Mar 2007 (1998)
7. Mutlu, B., Forlizzi, J., Hodgins, J.: A storytelling robot: modeling and evaluation of human-like gaze behavior. In: 2006 6th IEEE-RAS International Conference on Humanoid Robots, pp. 518–523. IEEE (2006)
8. Paradeda, R., Ferreira, M.J., Martinho, C., Paiva, A.: Using interactive storytelling to identify personality traits. In: Nunes, N., Oakley, I., Nisi, V. (eds.) ICIDS 2017. LNCS, vol. 10690, pp. 181–192. Springer, Cham (2017). https://doi.org/10.1007/978-3-319-71027-3_15
9. Paradeda, R.B., Hashemian, M., Rodrigues, R.A., Paiva, A.: How facial expressions and small talk may influence trust in a robot. In: Agah, A., Cabibihan, J.-J., Howard, A.M., Salichs, M.A., He, H. (eds.) ICSR 2016. LNCS (LNAI), vol. 9979, pp. 169–178. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-47437-3_17
10. Salem, M., Lakatos, G., Amirabdollahian, F., Dautenhahn, K.: Towards safe and trustworthy social robots: ethical challenges and practical issues. Social Robotics. LNCS (LNAI), vol. 9388, pp. 584–593. Springer, Cham (2015). https://doi.org/10.1007/978-3-319-25554-5_58