Communication Training in Virtual Reality:
A Training Application for the Dutch Railways

Eric Jutten[1], Edward Bosma[1], Kiki Buijs[1], Romy Blankendaal[2] and Tibor Bosse[3]

[1] The Simulation Crew, Nijmegen, The Netherlands
[2] TNO, Soesterberg, The Netherlands
[3] Radboud University, Nijmegen, The Netherlands
eric.jutten@simulationcrew.com

1   Introduction

Virtual reality (VR) provides many promising opportunities with regard to training of communication skills, as it provides a medium where users can safely practice their skills by engaging in social interactions with Intelligent Virtual Agents through verbal and non-verbal modalities [1]. This way, VR allows users to practice what to say when, for instance to learn how to respond to a nervous interlocutor, or how to communicate professionally under increasing levels of stress. The ability for people to practice their skills is of great importance, as the transfer of 'knowing how to do something' to 'actually doing it' is difficult, even when one knows what he/she is expected to do [2].

In 2019, The Simulation Crew has developed an interactive VR communication trainer that allows users to interact with Intelligent Virtual Agents through speech. To process the user's input and generate appropriate output, the system makes use of a number of AI techniques, including speech recognition, multi-modal social signal analysis, and dialog modelling. These features allow the user to interact with the system using free speech, which distinguish it from many communication trainers that based on multiple choice menus (e.g., [1]). As a result, users have a more natural experience while interacting with the virtual agents. Hence, users are encouraged to be more actively involved with the material and come up with their own input, which may result in better outcomes after training [3]. In addition to the verbal communication, this application also takes into account various aspects of the non-verbal communication of the user, such as prosody and gaze direction. It can thus provide the user feedback on the effect of non-verbal behaviours such as nodding and humming on the interlocutor.

2   Application

The NS (the largest passenger rail transport company in the Netherlands), is highly interested in the use of a VR communication training for their personnel and willing to cooperate in scientific research. Within NS, education and training of their personnel is of great importance. Traditionally, this is often done by making use of role play. How-

ever, employees sometimes feel uncomfortable when participating in role play, especially with other people present and watching them while practicing. They therefore encounter the feeling of being assessed instead of a safe environment to practice.

Within this new VR communication training, employees are instructed to help a disabled passenger to get on the train. In this scenario, employees can practice with more visual tasks like situating the gangway, but also with social tasks related to communication with passengers. This pilot consists of several use cases, for instance allowing users to practice in a quiet scenario, or in scenarios that include several stress factors.

Users typically play the scenarios twice with the opportunity to make mistakes, repeat the actions and learn. They are also provided the opportunity to intentionally make mistakes in order to see the effect on the development of the scenario. The effect of the users' actions on the development of the scenario provides users with feedback during their training. An example of this type of feedback is the verbal and non-verbal response of the passenger (e.g., when the user ignores a request, the passenger may become upset). In addition, at the end of the scenario users receive feedback on their performance, both by the passenger and by the system.

The training concludes with a scenario where the user encounters several stress factors. Within this scenario, users will be distracted from their original task in order to challenge them to keep communicating professionally when encountering distractions that resemble distractions in real-life.

3   Conclusion

In August 2020, a pilot evaluation of the training system has been conducted in collaboration with Radboud University and TNO. During three sessions, a total of 30 employees of NS have tested the system, and both qualitative and quantitative feedback was gathered. Our preliminary conclusion is that participants were generally very positive about the system, and even though they signalled various points for improvement they were particularly enthusiastic about the ability to engage with the virtual agents in an 'open' conversation using free speech. Furthermore, they confirmed that this type of training offers promising possibilities for training their personnel, in particular for new employees. A working demonstration of the system will be presented at the conference.

References

1. Blankendaal, R.A.M., Gerritsen, C., Otte, M., & Bosse, T. (2018). A virtual reality application for aggression de-escalation training in public transport. In: 30th Benelux Conference on Artificial Intelligence, BNAIC 2018 (pp. 5-20).
2. Kahlke, R.M., McConnell, M.M., Wisener, K.M., and Eva, K.W. (2020). The disconnect between knowing and doing in health professions education and practice. Adv Heal Sci Educ. 2020; 25(1):227-240. doi:10.1007/s10459-019-09886-5.
3. Deslauriers L, McCarty LS, Miller K, Callaghan K, Kestin G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. Proc Natl Acad Sci USA. 2019; 116(39):19251-19257. doi:10.1073/pnas.1821936116.