

## **Two Basic Aspects of Virtual Agents' Behavior: Collision Avoidance and Presence Strategies**

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Virtual Agents (VAs) are embedded in virtual environments for two reasons: they enliven architectural scenes by representing more realistic situations, and they are dialogue partners. They can function as training partners such as representing students in a teaching scenario, or as assistants by, e.g., guiding users through a scene or by performing certain tasks either individually or in collaboration with the user. However, designing such VAs is challenging as various requirements have to be met. Two relevant factors will be briefly discussed in the talk:

(1) VAs are often in the immediate vicinity of users. Thus, collision avoidance strategies have to be implemented allowing users to maintain their personal space as violations cause discomfort. We will present results of our user study in which we immersed 27 participants in a small-scale office with the task of reaching the office door. Their way was blocked either by their male or female virtual co-worker. The VA showed different behavioral patterns regarding gaze and locomotion. Our results indicate that participants preferred collaborative collision avoidance: they expect the VA to step aside in order to get more space to pass while being willing to adapt their own walking paths. The study was presented at the IEEE Symposium on 3D User Interfaces 2016 [1].

(2) Assistive VAs are usually in an almost constant contact with the user. However, in some applications they are required only temporarily. Consequently, presenting them only when needed might be advisable. We expect users to prefer VAs with low presence times as well as low fallback times to get quick support. However, as both factors are linked, a suitable trade-off for these presence strategies needs to be found. Thus, we plan to conduct a user study in order to find design guidelines for VAs in such situations. We will discuss our hypotheses and planned study design. These will be presented as poster at the 16th International Conference on Intelligent Virtual Agents [2].

[1] Bönsch, A., Weyers, B., Wendt, J., Freitag, S., & Kuhlen, T. W. (2016, March). Collision Avoidance in the Presence of a Virtual Agent in Small-Scale Virtual Environments. In *2016 IEEE Symposium on 3D User Interfaces (3DUI)* (pp. 145-148). IEEE.

[2] Bönsch, A., Vierjahn, T. & Kuhlen, T.W. Evaluating Presence Strategies of Temporarily Required Virtual Assistans. To be presented at 16th International Conference on Intelligent Virtual Agents (IVA). September 2016