

Exploring people's perception of geometric features, personalities and emotions in videos with virtual humans

14 May 2019, by Ingrid Fadelli



A screenshot of one of the videos shown to participants, where pedestrians are replaced by virtual humans. Credit: Araujo et al.

Researchers at Pontifical Catholic University of Rio Grande do Sul have recently carried out a study aimed at evaluating people's perceptions of geometric features, personalities and emotions presented in video sequences with virtual humans. Their study, outlined in a paper pre-published on arXiv, merges computer science tools with psychology research practices.

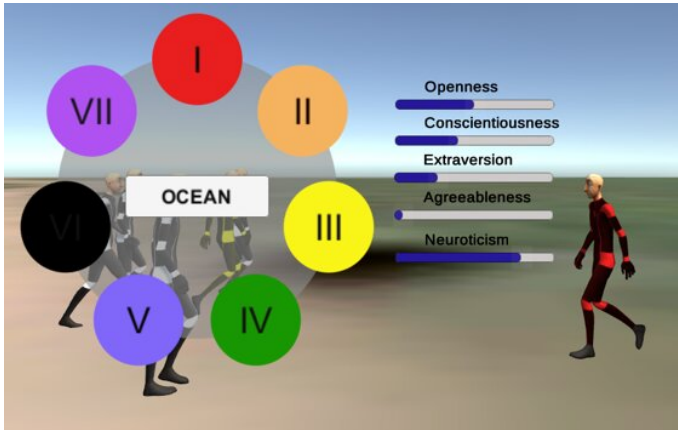
"Our recent work is part of a larger project in collaboration with the psychology department at our university," the researchers told TechXplore, via email. "The main idea is to investigate emotions, personalities and cultural aspects detection in pedestrians and crowds from video sequences. In the context of the present paper, this research involving [perception](#) comes from the need to know if users can perceive emotions and personalities in virtual characters and if camera's position or type of character can influence their

perception."

For their experiments, the researchers adapted a dataset that contained tracking files of pedestrians captured in spontaneous videos, changing humans in the footage into identical virtual characters. Their goal was to evaluate whether people who watched the footage could focus on the behavior of the virtual humans in the videos instead of being distracted by other features.

A total of 73 participants were asked to answer questions about geometric features such as distances or speeds, as well as about the emotions and personalities of the virtual characters in the videos. Ultimately, the goal of the researchers was to evaluate whether people can perceive geometric features as well as emotions and personalities when pedestrians in videos are represented by [virtual humans](#).

"The main motivation of our study was to evaluate the area of [personality](#) and emotion detection in video sequences, i.e. we wanted to know if people perceive qualitatively what can be detected in video sequences," the researchers explained. "We evaluated the perception of people through simulated scenes in a 3-D environment shown through a questionnaire with questions about geometric characteristics, personalities and emotions."



The values of each OCEAN (personality model) dimension derived from the virtual agent highlighted in red. Credit: Araujo et al.

The videos used by the researchers were created by applying a 3-D viewer that simulates particular characteristics on a dataset of pedestrian videos, called Cultural Crowds. Participants were shown these simulations and asked to guess particular characteristics in each individual video.

The analyses carried out by the researchers were divided into two parts. First, the researchers evaluated participants' perceptions of geometric characteristics, such as density, angular variation, distances and speeds, then their perceptions related to emotion and personality.

"Our assessment of the results we collected was that points of view really do interfere with people's perceptions," the researchers said. "With more studies this can help understand high density perceptions of large crowded events, or understand complex events (panic situations, transitions of emotions, etc.) through different points of view, among other things."

The researchers observed that even if they did not disclose the personalities and emotions expressed by the virtual agents and did not explain how these were calculated, participants were generally able to perceive and identify them, possibly by looking at geometric features. Their study provides some interesting insight into how humans perceive

geometric characteristics, emotions and personalities in real-world situations, such as on the road.

"Our main hypothesis is that pedestrians behave according to their internal intrinsic characteristics such as personality, emotion and cultural aspects, and that such aspects can be observed in terms of physical and geometrical behaviors," the researchers said. "We intend to continue working in this direction, performing new analyses and studies that further explore pedestrian behaviors in crowds."

More information: How much do you perceive this? An analysis on perceptions of geometric features, personalities and emotions in virtual humans (extended version). arXiv:1904.11084 [cs.GR]. arxiv.org/abs/1904.11084

Rodolfo Migon Favaretto et al. Detecting personality and emotion traits in crowds from video sequences, *Machine Vision and Applications* (2018). [DOI: 10.1007/s00138-018-0979-y](https://doi.org/10.1007/s00138-018-0979-y)

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