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Investigating interactions between machines: a case study using facial expression recognition and virtual avatars

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Abstract

Computer vision is a field of artificial intelligence which revolves around enabling machines to derive meaningful information from visual inputs (Zafeiriou, Zhang, and Zhang, 2015: 1). Researchers have shown a focused interest on using computer vision to develop a machine which can both interpret and classify human behaviour, movements, and emotions through only visual information (Zafeiriou et al., 2015: 2). What was found through a literature review was that there is a gap in knowledge in computer vision for studies which do not rely heavily on human analysis. The presented research study aimed to work towards filling this gap by investigating an interaction between the goals of computer vision through using virtual avatars from the *Animaze* library to imitate human emotional expressions that were then analysed by *FaceReader's* expression recognition component. This study created a machine-based interaction which analysed how changes of the facial features on a virtual avatar could alter the analysis of a computer vision program interpreting emotional expressions in the face. The results of this experiment were separated into three sections to answer three guiding research questions and to provide a wider scope of analysis. An analysis of FaceReader's results presented several findings surrounding computer vision and virtual avatar interactions, with the most notable finding being that even slight changes in the shape and size of facial features on a virtual avatar can produce vastly different emotional expression readings. It was also found that it is possible to influence *FaceReader's* expression analysis to produce higher, or lower, intensity averages of the emotional expressions through the use of specific facial features. Overall, the presented research found information that one could argue was already proven for human facial recognition, but value was provided in this research being potentially used as a steppingstone towards further development in the use of facial recognition on virtual avatars.

Keywords: Computer Vision; Facial Recognition; Virtual Avatar; Emotional Expressions; FaceReader; Animaze