Debriefing

Thank you for participating in this study in the area of cognitive psychology. The goal of our study is to investigate how people perceive and judge scene images generated by neural networks.

A guiding principle of human cognition research is the use of simple stimuli (e.g., orientation or colour) whose physical properties can be easily manipulated and thus researchers can observe corresponding changes of participants' responses to the stimuli. To apply this approach to the real-world visual environment, we need to prepare realistic scene stimuli whose physical properties can be tightly controlled. The computer vision research recently developed generative adversarial networks (GANs)[1,2] that offers a data-driven method for generating artificial but highly realistic and well-controlled images. In this study, we tried to validate the GAN-defined scene images as a tool for studying human cognitive system. Specifically, we tested if the images generated from similar features in the GAN's algorithm are indeed perceived similarly by human observers.

In the study, you viewed scene images generated by the GANs and rated the similarity of those images. Especially, the shown images were controlled to change continuously with smooth transitions of physical properties. We quantified the physical similarity of those images by calculating the pixel-wise correlation. Then, to quantify the perceptual similarity of the images, we asked you to judge the subjective similarity level of the images using 6-point scales. By comparing the pixel-wise correlation and perceptual similarity ratings, we will assess whether those two measurements are correlated and thus determine the degree that the physical similarity of the scene images is reflected in human perceptual similarity.

Completion of this study will inform human cognition in realistic visual environment by validating GAN-defined scene stimuli and applying the stimuli to various domains of cognitive research. If you are interested in this topic, check out the materials below:

Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y. (2014). Generative adversarial nets. In *Advances in neural information processing systems* (pp. 2672-2680).
Yang, C., Shen, Y., & Zhou, B. (2019). Semantic hierarchy emerges in deep generative representations for scene synthesis. *arXiv preprint arXiv:1911.09267*.

If you have any questions, please contact us by email at bernhardt-walther@psych.utoronto.ca.

Thanks for participating in our experiment!