Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)

SUBJECT: Detection of human psychological states and traits using AI, based on movement tracking in immersive VR environments.

SUPERVISOR: dr hab. Cezary Biele - Ośrodek Przetwarzania Informacji - Państwowy Instytut Badawczy

cezary.biele@opi.org.pl

ASSISTANT SUPERVISOR: dr Paweł Kobyliński - Ośrodek Przetwarzania Informacji - Państwowy Instytut Badawczy

pawel.kobylinski@opi.org.pl

DESCRIPTION:

Despite the long tradition of experimental psychology, the methods of measurement used in the discipline have changed little over that time. They are still based on subjective self-reporting or, in situations where objective measurements are necessary, use psychophysiological methods that require sophisticated data analysis and are usually very uncomfortable for the subjects. At the same time, new technological developments such as immersive virtual reality (IVR) carry the potential to revolutionize psychology, still, the potential of IVR for psychology remains untapped. During IVR experiments, it is possible to have total control over the environment in which the subject is placed and, above all, it is possible to record data on how subjects move in the virtual world. And this, in turn, is directly related to psychological states and characteristics. However, at present it is not clear if it is possible to extract information valuable from the perspective of psychological science from such data.

The purpose of research carried out on this topic will be to create tools (such as machine learning and data science tools, IVR environments and others) to verify the hypothesis that it is possible to infer the psychological states and traits of people in the IVR environment solely on the basis of analysis of their movement data.

The outcome of this research will allow researchers and practitioners to easily collect and analyze data on psychological states (such as emotions) and personality traits of subjects or patients. This will enable research that is currently unfeasible, opening new doors for psychology in its quest to become, according to its definition, a behavioural science, as well as creating the potential to understand better how people function in IVR.

BIBLIOGRAPHY:

Biele, C (2022) Human movements in Human-Computer Interaction. Springer

Jeong, D. C., Xu, J. J., & Miller, L. C. (2020). Inverse Kinematics and Temporal Convolutional Networks for Sequential Pose Analysis in VR. 2020 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), 274–281.

Kobylinski, P., Pochwatko, G., Biele, C.: VR Experience from Data Science Point of View: How to Measure Inter-subject Dependence in Visual Attention and Spatial Behavior. In: Intelligent Human Systems Integration 2019. pp. 393–399. Springer International Publishing (2019).

Tabbaa, L., Searle, R., Bafti, S. M., Hossain, M. M., Intarasisrisawat, J., Glancy, M., & Ang, C. S. (2022). VREED: Virtual Reality Emotion Recognition Dataset Using Eye Tracking & Physiological Measures. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol., 5(4), 1–20.

Xu, H., Li, L., Fang, M., Zhang, F.: Movement human actions recognition based on machine learning. Int. J. Online Eng. 14, 193 (2018).

Wierzbowski, M., Pochwatko, G., Borkiewicz, P., Cnotkowski, D., Pabiś-Orzeszyna, M., & Kobyliński, P. (2022). Behavioural Biometrics in Virtual Reality: To What Extent Can We Identify a Person Based Solely on How They Watch 360-Degree Videos? 2022 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct), 417–422.