Research project and supervisor team

Supervisory Team	Dr Prapa Rattadilok Dr Christopher Roadknight Professor David Daley
Short introduction & description of research project	Eye gaze has been used for identifying different kinds of mental disorders such as Autism Spectrum (AS) [5], Attention Deficit Hyperactivity Disorder (ADHD) and anxiety [3]. Recent progress in eye gaze analyses also makes feasible inexpensive, non-intrusive and rapid evaluations of mental health [4]. With an increased accessibility of smartphones, a number of eye gaze related studies have moved from using specialist hardware to smartphone cameras for identifying the relationship between an individual's mental states and their eye gaze [2]. As many as 90% of individuals on the AS (iAS) experience atypical sensory modality: audition, vision, touch, taste and smell [6]. Their physical reactions to these sensory inputs can manifest as stress which are controlled by our autonomic nervous system and presents itself as increased heart rate, sweat response, and body movement [1]. Existing research on sensory management recommendation systems for iAS have successfully measured these reactions using smartwatches [7]. However, in controlled experiments iAS with somatosensory aversion tend to reject, interfere with or remove smartwatches as well as other wearables. The stigma surrounding mental health in China was also presented in a survey indicating the need for an inconspicuous assistive technology for iAS [8]. This project proposes an expansion of existing research on sensory management recommendation systems, by including a no-contact alternative source of information such as eye gaze using smartphone camera: 1) to enhance the system's usability and 2) to reduce conspicuousness of such systems. References: [1] National Institute of Mental Health. (nd.). [Online] 5 Things You Should Know About Stress. Available at: https://www.nimh.nih.gov/health/publications/stress/19-mh-8109-5-things-stress_142898.pdf (Accessed 21 December 2020). [2] Brousseau, B., Rose, J., and Eizenman, M. (2020). Hybrid Eye-Tracking on a Smartphone with CNN Feature Extraction and an Infrared 3D Model. Sensors, vol. 20(2). [3] Shishido, E., Ogawa, S., Miyata, S., Yamamoto, M., Inada, T., Ozaki, N. (2019). Application of eye trackers for understanding mental disorders: Cases for schizophrenia and autism spectrum disorder. Neuropsychopharmacology Reports, vol. 39 (2), pp. 72-77.

	[4] Itti, L. (2015). New Eye-Tracking Techniques May Revolutionize Mental Health Screening. Neuron, vol. 88 (3), pp. 442-444. [5] Wang, S., Jiang, M., Duchesne, X. M., Laugeson, E. A., Kennedy, D. P., Adolphs, R., and Zhao, Q., (2015). Atypical Visual Saliency in Autism Spectrum Disorder Quantified through Model-Based Eye Tracking. Neuron, vol. 88 (3), pp. 604-616. [6] Robertson, C. E., & Baron-Cohen, S. (2017). Sensory Perception in Autism. Nat Rev. Neuroscience, 18: 671-684. [7] Xue, Z. Yang, L., and Rattadilok, P. (2019). Quantifying the Effects of Temperature and Noise on Attention-Level using EDA and EEG Sensors. In: Wang, H., Siuly, S., Zhou, R., Martin-Sanchez, F., and Zhang, Y., Huang, Z. (eds.) Health Information Science, Vol. 11837, pp. 250-262. [8] Deng, L., and Rattadilok, P. (2020). The need for and barriers to using assistive technologies among individuals with Autism Spectrum Disorders in China. The Journal of Assistive Technology.
Contact points	Dr. Prapa Rattadilok prapa.rattadilok@nottingham.edu.cn