Project title: Enhancing thermal imaging data

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Short description:
It is probably ok to say that most of us are not too excited about injections, needles or blood in general. However, needles and blood are quite unique in that they may cause unpleasant physical reactions such as light-headedness, dizziness, nausea and even fainting in some individuals. In the FAINT project we study the interaction between the psychological, neurological and physiological responses at play in blood donors. Even though there is scientific evidence that the brain has a negative reaction to seeing needles and blood, and that donors who experience fear, anxiety or stress are more likely to faint, the mechanism behind this response is not yet understood. Even people who are not consciously afraid of needles can experience psychical and hormonal stress, without being aware of it.

We record(ed) the physiological response of donors by means of infrared thermal imaging (ITI) video recordings. This is an innovative method for measuring emotional and physical symptoms by merely looking for specific signals in the face. In addition, we collect(ed) RGB video data using a regular camera. The first step of the project is to identify signals that predict whether someone is likely to experience a vasovagal response from RGB and thermal video data. We have collected footage of 200 donors donating blood and are looking for a data science master student who is keen on seeing whether it is possible to enhance the thermal imaging data by integration of the signals of simultaneous acquired RGB and ITI recordings. Can you create a system to line up both data streams?

Required skills
- Programming in Python / C++ / R / Matlab
- Interest in image processing
- Machine learning skills
- Good communication and presentation skills
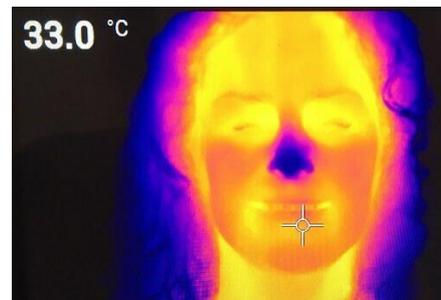
References
1. [Prevention of needle-induced fainting through infrared thermal imaging and serious games (sanquin.org)](#)
2. Zhou, W., Guo, Q., Lei, J., Yu, L., & Hwang, J.-N. (2021). ECFFNet: Effective and Consistent Feature Fusion Network for RGB-T Salient Object Detection. IEEE Transactions on Circuits and Systems for Video Technology, 1–1. https://doi.org/10.1109/TCSVT.2021.3077058
3. Kopaczka, M., Schock, J., Nestler, J., Kielholz, K., & Merhof, D. (2018). A combined modular system for face detection, head pose estimation, face tracking and emotion recognition in thermal infrared images. 2018 IEEE International Conference on Imaging Systems and Techniques (IST), 1–6. IEEE. https://doi.org/10.1109/IST.2018.8577124

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