Project Proposal

I can see your heartbeat – Implementing rPPG-Methods to Assess Heart Rates in a Web Application

Background: Remote photoplethysmography (rPPG) is the contactless monitoring of the blood volume pulse, and consequently the heart rate, using a regular camera. Classical rPPG methods make use of signal processing techniques, while recent methods utilize large deep learning models. [1]

We developed the Simulated Interaction Task (SIT) [2], a digital application designed to measure qualitative and quantitative differences in social behaviour. The SIT is currently in use in multiple clinical studies, for example to detect Autism Spectrum Disorder (ASD) in adults or assess social anxiety in children. Participants perform the test on a laptop while their faces are recorded via a web cam.

You will implement rPPG Methods in the existing SIT web application, providing users with immediate feedback of their heart rate during the test. You will integrate a pretrained rPPG model within the existing code and infrastructure (JavaScript, JATOS backend).

- **Tasks:**
    - Implement the rPPG model in the existing SIT web application
    - Display immediate feedback to the user
- **Challenges:**
    - Pre-processing of videos: face detection and alignment
    - Movement Artifacts
- **Incentives:**
    - Interesting project with further usage in actual clinical applications and ongoing studies
    - Interdisciplinary group environment with close supervision

This project can be adapted to a Bachelor or Master Thesis with an additional scientific contribution (please reach out).

References:

[1] Norden, M., Mayer, A., Molkenthin, D., Stubenvoll, C. & Drimalla, H. Validation of a Digital Stress Test (DST) for the induction of acute stress responses. (2022) doi:10.17605/OSF.IO/XWU9A.

[2] Drimalla, Hanna, et al. "Towards the automatic detection of social biomarkers in autism spectrum disorder: Introducing the simulated interaction task (SIT)." *NPJ digital medicine* 3.1 (2020): 25.

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