MSc projects at the Computational Emotion Neuroscience Group

Scaling up computational emotion research

Background

Research on human emotions is both conceptually and technically challenging. Eliciting emotions requires carefully designed experiments, while recording emotional responses concurrently at the level of behavior, subjective states, and physiology requires complex measurement setups. Therefore, most studies on emotions are done in strictly controlled lab settings and on relatively small, and demographically homogeneous groups of participants. Recently, however, crowdsourcing platforms have allowed researchers to scale up studies to large numbers of participants, thus improving the generality of derived conclusions. In projects outlined below, we offer master students opportunities to tackle the challenge of scaling up emotion research by harnessing crowdsourcing and taking advantage of widely available consumer-grade sensors.

Your project

We offer three project themes, with the exact scope being defined depending on the length of the project (3, 6, or 12 months):

(P1) **Crowdsourcing behavioral experiments for emotion research**.

In this project, you will set up the software infrastructure to deliver behavioral experiments over crowdsourcing platforms (e.g. Amazon Mechanical Turk). You will also implement several behavioral paradigms that are already in use in emotion research. You will deploy the developed tasks, collect the data, and verify its quality, in comparison with the data collected in-lab.

(P2) **Measuring physiological emotional responses using consumer-grade hardware**

Today, measuring physiological emotional responses requires a number of dedicated, research-grade devices such as eye trackers, heart rate and respiration sensors, electromyograph, etc. In this project, you will investigate the potential of consumer-grade hardware (e.g. web-cameras, built-in microphones, smartphones, etc.) for the measurement of emotional responses. You will implement signal processing and machine learning pipelines in order to derive physiological signals from audio-video recordings of participants. You will test these pipelines both in the lab scenario and in the crowdsourcing scenario.

(P3) **Methods of eliciting emotions in crowdsourced experiments**

Although numerous methods of eliciting emotions have been developed for in-lab experiments, eliciting emotions in online experiments is largely an unexplored issue. In this project, you will investigate potential novel methods of eliciting emotions, tailored to online experiments. You will conduct in-lab and online experiments using both the standard and novel methods of eliciting emotions. Using recorded behavioral and physiological responses, you will compare the novel methods of elicitation to the standard ones, for both in-lab and online scenarios.

Your profile

We seek these three profiles, corresponding to projects described above:

(P1) You have a background in software engineering, computer science or related fields. Alternatively, your background is in neuroscience, biology, psychology, or related fields, but you have experience with programming. Knowledge of web technologies (in particular, JavaScript) and ability to conduct data analyses (e.g. in Python, R, or MATLAB) is required.

(P2) You have a background in computer science, software engineering, or related fields. You have experience with applying machine learning, computer vision, and signal processing techniques using languages such as Python, R, or MATLAB. Knowledge of web technologies (in particular, JavaScript) is desirable.

(P3) You have a background in psychology, neuroscience, biology, or related fields. Previous experience with running studies on human participants, ability to program experimental paradigms, and to analyze acquired data in MATLAB or Python is desirable.

Workplace
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Supervision
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