Data-driven insights for affective anxiety management based on feedback from emotional

Aim of the course

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This course aims to introduce students to the data-driven approach to mental health care and personalized solutions. We take a step beyond existing online intervention solutions: We will focus on current research regarding anxiety and anxiety related psychophysiological markers with a special focus on electrodermal activity. One intriguing idea is using multiple measurement sites instead of building on the "one true arousal" assumption, as implied by MIT professor, Rosalind Picard's Multiple Arousal theory. Electrodermal activity is an effective marker of emotional arousal, useful in gauging state anxiety. Unlike many other psychophysiological markers, it can be measured and analyzed relatively easily. Thus, effective interventions can be built using real-time, objectively measured feedback from electrodermal activity to reduce anxiety effectively. The course will introduce students to the topic through a range of related literature. Focus will be on practical exercises using devices measuring electrodermal activity, with an emphasis on the most interesting electrodermal patterns and attributes related to anxiety. Aside widening theoretical knowledge in this novel area, the course will focus on providing practical knowledge about data-driven techniques of anxiety management and the use of wireless devices measuring electrodermal activity. Implications for anxiety research and in anxiety interventions based on electrodermal feedback will be discussed in detail and acquired knowledge will be utilized in developing and carrying out a measurement and / or intervention plan using these devices.

Learning outcome, competences

knowledge:

- mastering anxiety and emotional arousal related literature
- understanding methodology of psychophysiological measurement and research

attitude:

- scientific and empirical, with an emphasis on data-driven, practical solutions
- critical thinking in concluding research results

skills:

- efficient application of psychophysiological markers in anxiety research and intervention
- ability to plan and carry out measurements / or intervention using data-driven solutions
- proficiency in using Obimon EDA devices measuring electrodermal activity
- ability to formulate an independent opinion based on the topics and findings discussed

Content of the course

Topics of the course

In addition introducing related literature, students will also learn to use devices measuring electrodermal activity (see Obimon EDA at obimon.com) in practical classes. Anxiety interventions developed by the Adaptation Research Group will be used as examples (see vizsgaszorongas.elte.hu). Specific methods, data, results and implications aiming at reducing students' test anxiety, for e.g. will be discussed on the practical classes. One of the requirements for the completion of the course is independent literature search in a chosen topic related to the subject of anxiety and electrodermal activity. Based on this knowledge, students will formulate their own research questions and hypotheses and present a research plan to carry out or demonstrate as a small pilot study in class. Understanding and analyzing the collected data will be carried out together in class.

Learning activities, learning methods

Introduction to the topics of anxiety, emotional arousal and electrodermal activity.

- Practical sessions on using devices for electrodermal measurements

- Introduction to anxiety measurements and interventions
- Choosing group assignment involving literature search of a chosen topic
- Completion and presentation of the group assignment, with in-class discussion: summarizing results of the literature search and related research plan and measurement methods to be used
- Execution of the group research in class and discussion of the collected data and results
- Feedback and evaluation of the course, future directions

Lectures, practical classes, group assignments, research planning and execution.

Evaluation of outcomes

Learning requirements, mode of evaluation, criteria of evaluation:

The final grade will be based on

- quality of the literature summary of a chosen topic
- planning and execution of a pilot study
- activity on the classes.

Reading list

Compulsory and recommended reading list

Mandatory and recommended readings for the course will be specified and provided electronically in each semester. See basic handbook and open-access readings on the topic below as examples:

Dawson, M. E., Schell, A. M., & Filion, D. L. (2007). The electrodermal system. In Handbook of psychophysiology, 3rd ed. (pp. 159-181). New York, NY, US: Cambridge University Press.

Giannakakis, G., Grigoriadis, D., Giannakaki, K., Simantiraki, O., Roniotis, A., & Tsiknakis, M. (2019). Review on psychological stress detection using biosignals. IEEE Transactions on Affective Computing, 1. https://doi.org/10.1109/TAFFC.2019.2927337

Kasos, K., Kekecs, Z., Csirmaz, L., Zimonyi, S., Vikor, F., Kasos, E., Veres, A., Kotyuk, E., Szekely, A. (2020). Bilateral comparison of traditional and alternate electrodermal measurement sites. Psychophysiology, 57(11). https://doi.org/10.1111/psyp.13645

Kasos K, Zimonyi S, Gonye B, Köteles F, Kasos E, Kotyuk E, Varga K, Veres A, Szekely A. (2019) Obimon: An open-source device enabling group measurement of electrodermal activity. Psychophysiology, 56(8). https://doi.org/10.1111/psyp.13374

Kasos, K., Zimonyi, S., Kasos, E., Lifshitz, A., Varga, K., & Szekely, A. (2018). Does the Electrodermal System "Take Sides" When It Comes to Emotions? Applied Psychophysiology and Biofeedback. https://doi.org/10.1007/s10484-018-9398-0

Picard, R. W., Fedor, S., & Ayzenberg, Y. (2015). Multiple Arousal Theory and Daily-Life Electrodermal Activity Asymmetry. Emotion Review, 8(1), 62–75. https://doi.org/10.1177/1754073914565517