THESIS/INTERNSHIP PROPOSAL

Subject:	**Analysis of affective nonverbal reactions in a context of tabletop games**
Supervisors and Co-supervisors:	**Radoslaw Niewiadomski** **Irem Arici**
Field of research:	**Affective Computing**
Motivations and general objectives:	Several techniques for emotion recognition from facial expression, speech, full-body motion have been studied intensively for at least two decades. Independently of the chosen method, all of them require creation of appropriate datasets. While, several approaches exist for affect-related data collection and annotation, still rare are studies that have attempted to build real-life emotions datasets, i.e., collections of affect-related data, where experimenters do not have direct control over the emotion elicitation process. The aim of this thesis is to explore a novel approach to **gather and analyze** video segments depicting emotional human reactions in the context of **popular table, board, or card games**. Playing games is a universal social experience, and the dynamics of certain games often elicit strong emotional reactions in players—usually positive, but spanning a broad range of emotions, including negative ones. Collected by a student videos should enable the automatic analysis of facial expressions, bodily posture, and auditory cues using standard Python libraries for processing human nonverbal behaviors, such as MediaPipe and PyFeat. The student will investigate existing games, to identify significant in-game events that may elicit specific emotional reactions in players, such as surprise or relief. The primary objective of this exploratory study is to identify clusters of situations within games [1] that may lead to emotional reactions, and consequently gather video segments of players' nonverbal reactions. A key advantage of this approach is that the collected video segments do not require manual annotation, which is time consuming. In the next stage, the student will perform an analysis of the collected video segments. The analysis should conclude with the clustering of players' expressive behaviors (e.g., in terms of facial activity). For example, it could result in a set of clusters representing the various facial

	reactions to winning the game—that is, the different reactions of players when someone wins. The expected outcome of the thesis is a set of clusters containing specific expressive patterns among all participants, which can be associated with each significant event in the game. The student will have the opportunity to develop innovative solutions and contribute to scientific publications.
Required skills:	• Basic programming skills (use of the MediaPipe, Pyfeat, OpenFace)
Work Plan:	The student is expected to carry out the following tasks: • conduct a literature survey on novel techniques for data collection in affective computing. • investigate existing tabletop games in terms of emotion elicitation. • collect a new dataset of video recordings of persons playing these games. • provide a set of relevant video segments corresponding to significant events in the game. • perform clustering based on nonverbal behaviors (e.g., Action Units). • write the thesis report.
References:	[1] Bassano, C., Ballestin, G., Ceccaldi, E., Larradet, F., Mancini, M., Volta, E., Niewiadomski, R., A VR Game-based System for Multimodal Emotion Data Collection, 12th annual ACM SIGGRAPH conference on Motion, Interaction and Games 2019 (MIG 2019), October 28-30, 2019, Newcastle Upon Tyne, United Kingdom. doi: 10.1145/3359566.3364695
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