

## THESIS/INTERNSHIP PROPOSAL

<b>Subject:</b>	<b>Analysis of affective nonverbal reactions in context of video games</b>
<b>Supervisors and Co-supervisors:</b>	<b>Radoslaw Niewiadomski Irem Arici</b>
<b>Field of research:</b>	<b>Affective Computing</b>
<b>Motivations and general objectives:</b>	<p>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.</p> <p>The aim of this thesis is to explore a novel approach to <b>gather and analyze video</b> segments depicting emotional human affective nonverbal reactions by utilizing available online video repositories, with a specific focus on publicly accessible <b>video game streaming platforms</b>. The platforms often provide synchronized video streams of the game and the accompanying nonverbal behaviors of the player. This streaming medium enables the investigation of facial expressions, bodily posture, and auditory cues while concurrently accessing the currently played sequence within a video game.</p> <p>The student will investigate existing online materials, primarily analyzing popular video games to identify significant in-game events that may elicit specific emotional reactions in players, such as surprise or fear. The primary objective of this exploratory study is to identify situations within video games [1] that may lead to specific emotional reactions and subsequently gather video segments of cooccurring players' nonverbal reactions. A key advantage of this approach is that the collected video segments do not require manual annotation, which is time consuming.</p> <p>In the next stage, the student will perform an analysis of the collected video segments using standard Python libraries for processing nonverbal behavior data (e.g., MediaPipe, PyFeat). These libraries can be used to extract information about facial muscle activity, head movements, and other nonverbal cues. The analysis should conclude with the clustering of players' expressive behaviors (e.g., in terms of facial activity) related to specific events in the game. For example, it</p>

	<p>could result in a set of clusters representing the various facial reactions to winning the game—that is, the different reactions that players show when winning a game.</p> <p>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.</p>
<b>Required skills:</b>	<ul style="list-style-type: none"> <li>• Interest in computer games</li> <li>• Basic programming skills (use of the MediaPipe, Pyfeat, OpenFace)</li> </ul>
<b>Work Plan:</b>	<p>The student is expected to carry out the following tasks:</p> <ul style="list-style-type: none"> <li>• conduct a literature survey on novel techniques of data collection in affective computing</li> <li>• investigate video games in terms of emotion elicitation</li> <li>• collect the relevant video segments on online platforms</li> <li>• provide the dataset of relevant videos</li> <li>• perform the analysis of collected video segments</li> <li>• develop baseline classifiers</li> <li>• write thesis report</li> </ul>
<b>References:</b>	<p>[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</p> <p>[2] Shaghayegh Roohi, Elisa D. Mekler, Mikke Tavast, Tatu Blomqvist, and Perttu Hämäläinen. 2019. Recognizing Emotional Expression in Game Streams. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '19). Association for Computing Machinery, New York, NY, USA, 301–311. <a href="https://doi.org/10.1145/3311350.3347197">https://doi.org/10.1145/3311350.3347197</a></p> <p>[3] C. Ringer, J. A. Walker and M. A. Nicolaou, "Multimodal Joint Emotion and Game Context Recognition in League of Legends Livestreams," 2019 IEEE Conference on Games (CoG), London, UK, 2019, pp. 1-8. doi: 10.1109/CIG.2019.8848060.</p>
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