

THESIS/INTERNSHIP PROPOSAL

Subject:	Facial expression intensity detection
Supervisors and Co-supervisors:	Radoslaw Niewiadomski
Field of research:	Affective Computing
Motivations and general objectives:	<p>Introduction</p> <p>Existing datasets for facial expression analysis and classification often lack naturalistic expressions and diversity. Consequently, their usefulness for development of machine learning models to be used in real-world applications is limited. To bridge this gap, a new dataset was recently proposed [1], containing short extracts from movies where expressions are more naturalistic and contextually varied. Unlike datasets created in laboratory settings, films capture a broader spectrum of emotions, attitudes, and states. Moreover, all segments of the dataset are annotated based on perceived intensity using a scale from 1 to 5, with 5 representing the highest intensity.</p> <p>This thesis aims to explore various approaches for automatically estimating the intensity of facial expressions using the extended version of dataset described above. In the first part, the student will learn the methodology used [1] to extend the PIFE dataset. The result is a set of short videos segments each of them annotated by 3-5 raters in terms of perceived intensity.</p> <p>Next, the student will develop a set of models to estimate perceived expression intensity in the collected videos. The solutions considered include various regression approaches and models that operate on time series data. For the extracted video segments, the student will use the ratings provided by human participants—who have previously evaluated the intensity of facial expressions—as a baseline, and will conduct a systematic comparison between the developed machine-learning models and human evaluations.</p> <p>The expected outcome of the thesis is a computational model able to estimate the perceived intensity of facial expressions on short video segments. The student will have the opportunity to develop innovative solutions and contribute to scientific publications.</p>
Required skills:	<ul style="list-style-type: none">• Basic programming skills in Python (PyFeat, MediaPipe) and machine learning models

Work Plan:	<p>The student is expected to carry out the following tasks:</p> <ul style="list-style-type: none"> • conduct a literature survey on computational models for emotion intensity estimation. • extend the existing dataset [1] by adding new segments and new rankings • create computational models for emotion intensity estimation, e.g., using various regression methods. • write the thesis report.
References:	<p>[1] Tiuleneva M., Castano E., Niewiadomski, R., How Do We Perceive the Intensity of Facial Expressions? The PIFE Dataset for Analysis of Perceived Intensity, In Proceedings of 12th International Conference on Affective Computing and Intelligent Interaction (ACII), September 15-18, Glasgow, UK, 2024, pp. 99-106.</p>
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