



A New Era of Emotion Understanding: Insights from ACII 2023

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The ACII 2023 (Affective Computing and Intelligent Interaction) conference, held 10-13 September 2023 at the MIT Media Lab - widely recognized as the birthplace of affective computing, brought together researchers and innovators from the fields of affective computing, artificial intelligence (AI) and affective science. This report aims to distill and articulate the conference's key dialogs, emerging technologies, and pressing ethical and methodological challenges.

Interdisciplinary Synergy for Emotion Understanding

The ACII 2023 conference was a vibrant demonstration of the growing interdependence between AI methods and models of emotional science. For example, there was interdisciplinary dialogue at the EPiC Workshop, a unique half-day event that brought together experts from multiple disciplines (including psychologists, computer scientists, engineers, and physiologists) to advance understanding of emotions using biometric data. Dr. Stanislaw Saganowski (a computer scientist) pointed out that despite the sophistication of the theories used, there were no clear solutions for the emotion prediction challenge associated with the workshop. The results from the challenge highlighted the complexity of predicting emotions from biometric data and the inherent challenges of such predictions. Saganowski suggested several approaches to address this challenge, including improving dataset quality and re-examining the field to identify systemic factors that may limit the effectiveness of models. Echoing this, Dr. Maciej Behnke (a psychologist) emphasized the need for computer scientists to collaborate with psychologists to gain a more comprehensive understanding of emotional states. Behnke noted that significant progress in both affective computing and emotional science relies heavily on interdisciplinary collaboration, blending technical know-how with profound insights into human emotions.

At the workshop, Dr. Lisa Barrett (a psychologist) provided a unique perspective on the complexity of emotional experience when she introduced two contrasting paradigms: the traditional typological approach and the innovative population approach. The typological paradigm, a common refrain throughout the conference, categorizes emotions into fixed taxonomies, treating each "type" as the standard, with variances seen as deviations. While familiar, this approach often overlooks the nuanced nature of emotions. Barrett challenged this norm by advocating for the population approach. This approach embraces the fluidity of emotional experience and views variations not as anomalies but as integral aspects of the emotional spectrum. Using anger as an example, Barrett discussed how no expression (from screaming to subtle acts of retaliation) was an outlier, but rather a fundamental component that defines the emotion. Barrett's emphasis on the population approach as a means of understanding emotions in their natural, varied states offered a fresh perspective of emotions not as rigid, natural classes, but as dynamic, culturally embedded experiences. Relevant to this is the proposal of the award-winning paper "Belief Mismatch Coefficient(BMC)" by Wu et al. [1]. Their proposed BMC metric addresses the particular issue of uncertainty in both the experience and reporting of emotions. In so doing, the metric contributes to navigation of the dynamic nature, ambiguity, and intricacy of emotions in affective computing and psychological models.

English LLMs and Understanding of Emotions

One of the most striking takeaways from ACHI 2023 was the revolutionary role of large language models (LLMs) in affective computing. For example, the work in [2] presented at the conference suggests that vision-language models like CLIP have introduced groundbreaking capabilities in the field of visual sentiment analysis. Notably, in the context of the FI dataset (a dataset of 23,308 images labeled with 8 emotion categories), the CLIP zero-shot approach outperforms current state-of-the-art models in terms of accuracy in emotion classification. The presented study in [3] further highlights advanced accuracy of LLMs (i.e., GPT-4) in predicting emotional evaluations across diverse contexts, while adhering to established appraisal theories. These suggest that language models can contribute to our understanding of the intricate relationship between goal-relevance, emotional intensity, and emotional variance. The work in [3], also presented at the conference, similarly highlights GPT-4 (the latest iteration of the very well known GPT language models) as a powerhouse in emotional reasoning. The authors show that unlike its predecessor, GPT-3.5, this newer iteration demonstrates impressive accuracy in predicting emotional evaluations, e.g., in the Milton Bradley's Battleship board game setting, which is known to share a similar underlying appraisal structure to the coin-flip game. It also aligns with established appraisal theories, highlighting its ability to illuminate the underlying causes of human emotions. Beyond emotion recognition, the skill of LLMs in empathic response was also highlighted at the conference. ChatGPT in particular was rigorously evaluated in a dedicated study [4]. The results are encouraging, with the model accurately identifying emotions and generating appropriate responses in 91.7% of cases. Even though this was below the average observed in participants without Asperger syndrome/autism,

the finding is promising for development of emotionally intelligent AI-human interactions in both everyday and clinical contexts.

The ACII 2023 studies discussed above highlight significant advance in emotion intelligence in language models. However, these studies and other discussions at the conference make clear that the topic still requires careful consideration and research, either because of challenges that persist or due to new issues that have emerged. One of the challenges that remain for LLMs in affective recognition is the use of other signals with affective signals together with these models. Dr. Mohammed Soleymani highlighted at the conference that real-world improvements with multimodality are often marginal when compared to the effectiveness of LLM alone. Another issue is confounding factors. For example, study [5] presented at the conference identified high impact of headsets and microphones in video observation and understanding. The ethical concern of bias was also highlighted. Based on a (novel) approach that utilizes LLMs to generate text perturbations that simulate language proficiency levels based on Common European Framework of Reference (CEFR) characteristics, study [6] showed decrease in emotion-recognition-in-conversation performance as language proficiency diminished. This points to the potential of language proficiency bias, which can manifest in misunderstanding of non-native accents and misinterpretation of emotional cues whose first language is not English. Fairness and bias were highlighted at the conference beyond the topic of LLMs, e.g. in the studies of [6][7], which emphasized the need for more inclusive datasets and called for diversity to ensure equitable outcomes. This emphasis is relevant to the case of LLMs and emotion understanding especially as most studies are based on limited data, e.g. demographic representation from a university environment, which, for instance, has implication for deployment of these models in populations with different or diverse cultural and demographic groups. Other ethical risks that come to mind include humans interacting with chatbots or other LLM-based computer programs unaware. Ethical issues need to be assessed to ensure responsible and ethical use and minimization of potential harm. This has become emphasized with tightening regulations (e.g. the European Union's proposed AI Act), arguably sparked by the general growth and leaps of LLMs. The affective computing community discussed this regulation in particular at a tutorial at the conference, including its potential impact on research in the area.

In conclusion

In a special session following the close of ACII 2023, we had the privilege of conducting an exclusive interview with Prof. Rosalind Picard, who served as the General Chair for the conference, at her office in the Affective Computing research group at the MIT Media Lab. This interview offered unique and personal insight, but also an echo of recurring themes on the current state and future directions of affective computing. We conclude with her sentiment that, "Emotional intelligence, it's not just about learning how to recognize a facial expression or getting some rules for responding to one like you. But it's really about understanding the context of the situation."

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