IEEE Transactions on Fuzzy Systems

Call for Papers

Special Issue on Fuzzy Affective Computing Systems

Aim and Scope

Affective computing refers to the study that focuses on recognizing, interpreting, processing, and simulating human emotions. As an interdisciplinary field, affective computing integrates concepts from computer science, cognitive science, social science, medical science, and further more. The goal of affective computing is to build automatic systems and technologies to enable computers and machines to detect, interpret, and appropriately respond to (human) emotions, enhancing human-computer interaction, and improving various applications across industries. In recent years, affective computing has been gaining popularity and attention across various fields due to its promising potential in various applications, such as education, healthcare, and business services, which can extensively boost the quality of our daily lives. Although various studies have been developed on affective computing, there are still difficulties challenging the community to develop effective methods for understanding, simulating, and responding to human emotions. The challenges span several aspects. For example, emotions are fuzzy and contain uncertainties, which makes it difficult to precisely categorize them, especially since most existing datasets are annotated with categorical labels. Moreover, emotions are subjective; they usually vary among individuals with different personalities and cultural backgrounds, which makes them hard to interpret. Furthermore, emotions are complex, and the semantics may differ alongside different contexts, which challenges models to understand them. Lastly, existing methods usually demand large amounts of labeled data whereas obtaining affective data with high-quality annotations can be extremely costly.

Fuzzy systems are promising in boosting current affective computing research due to several reasons. Firstly, fuzzy systems are advantageous in dealing with ambiguity and uncertainties, providing a framework to represent and process imprecise emotional states. Secondly, fuzzy systems can effectively adapt to individual differences by designing personalized fuzzy rules and fuzzy sets according to the learned individual characteristics, preferences, and historical data to achieve more realistic affective computing. Thirdly, fuzzy systems are more advantageous for data-efficient learning, because some fuzzy systems can perform learning and inference based on a relatively small amount of data, and even with fuzzy or noisy labels, which makes large amounts of annotated data not a necessity. Lastly, fuzzy systems offer good interpretability: human-understandable fuzzy rules explain the decision-making process, membership functions demonstrate the certainty of the interpreted emotions, and the simpler structure compared with other models ensures an easier interpretation. As a result, there is a keen need to develop more effective affective computing methods endowed by the advantages of fuzzy systems.

This special issue seeks original contributions reporting the most recent progress on affective computing with fuzzy systems. It targets a mixed audience of researchers and product developers from several communities, *i.e.*, affective computing, machine learning, automation, robotics, and others. The topics of interest include, but are not limited to:

- Fuzzy emotion theory from psychological perspectives
- Fuzzy systems for affective content understanding from uni-modal text, image, or speech
- Macro- and micro-expression recognition with fuzzy systems
- Emotional body gesture recognition with fuzzy systems
- Multi-modal emotion recognition with fuzzy systems
- Emotional content synthesis, generation, and manipulation with fuzzy systems
- Fuzzy-deep learning hybrid models for affective computing
- Fuzzy logic-driven affective computing with large language, vision, and multi-modal models
- Fuzzy system-based affective computing with limited data
- Weakly-supervised affective computing with fuzzy systems

- Fuzzy inference systems (*e.g.*, Mamdani, Sugeno, or adaptive neuro-fuzzy inference systems) for affective computing
- Fuzzy control systems in affective robotics
- Context-aware fuzzy systems for human-computer interaction
- Security, privacy, and ethics of fuzzy affective computing systems
- Fuzzy affective computing systems-based applications in healthcare, education, art design, *etc*.

Submission Guidelines

All authors should read "Information for Authors" before submitting a manuscript at Information for Authors. Submissions should be through the IEEE TFS journal website http://mc.manuscriptcentral.com/tfs-ieee. It is essential that your manuscript is identified as a Special Issue contribution:

- Ensure you choose "Special Issue" when submitting.
- A cover letter must be included which includes the title "Fuzzy Affective Computing Systems".

Important Dates

- Submission deadline: January 31, 2025
- First notification: March 31, 2025
- Revision submission: May 31, 2025
- Notification of acceptance: July 31, 2025
- Anticipated publication: September 2025

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