Sixth IEEE international conference on Image Processing Applications and System

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Possibility theory and new trends with Artificial Intelligence Applications

Session chair: Jihen Frikha

Abstract – The confluence of possibility theory and artificial intelligence (AI) represents a paradigm shift in intelligent system development, marking a powerful union of these two fields. Possibility theory, with its foundation in non-classical logic and set theory, offers a unique framework for handling uncertainty and imprecision, crucial for the development of robust AI systems that can operate effectively in real-world environments. Unlike traditional probability theory, which relies on precise numerical probabilities, possibility theory uses possibility distributions to represent the degree of possibility of events, allowing for a more flexible and nuanced approach to managing uncertainty. This framework enables AI systems to reason under conditions of incomplete or unreliable data, a common challenge in many domains. For instance, in medical diagnostics, possibility theory can empower AI models to analyze complex medical data with missing information, leading to more accurate diagnoses and personalized treatment plans. In industrial settings, AI systems leveraging possibility theory can optimize manufacturing processes, predict equipment failures, and manage supply chains, all while accommodating the inherent uncertainties of real-world operations. This approach extends to smart cities, where AI models informed by possibility theory can manage traffic flow, optimize energy consumption, and enhance public safety by interpreting real-time data, even in the presence of incomplete or ambiguous information. The synergy between possibility theory and AI fosters the development of intelligent systems that are not only powerful but also resilient, adaptable, and capable of making informed decisions in the face of uncertainty, ushering in a new era of robust AI applications across diverse fields.

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