



02-04 NOVEMBER 2026 IN SOUSSE, TUNISIA

CALL FOR PAPERS FOR SPECIAL SESSION PROPOSAL

SPECIAL SESSION 13

Trustworthy Multimodal Fusion in Healthcare: Learning Under Uncertainty, Incompleteness, and Clinical Constraints

Session description :

This special session will provide an in-depth exploration of the rapid advancement of multimodal artificial intelligence, which has enabled the integration of heterogeneous healthcare data sources, including medical imaging, clinical records, physiological signals, and patient-generated data. However, most existing approaches assume ideal conditions—complete, well-aligned, and noise-free modalities—which rarely reflect real-world clinical environments.

This special session focuses on trustworthy and clinically grounded multimodal fusion under realistic constraints. It aims to address key challenges such as learning from missing, incomplete, and asynchronous modalities, handling uncertainty and conflicting information, and ensuring robustness across clinical settings and populations.

Beyond purely data-driven approaches, the session emphasizes knowledge-guided and human-centered fusion strategies, where clinical expertise is integrated into the modeling process to enhance interpretability and decision reliability. It also explores emerging directions including causal and evidential reasoning frameworks for multimodal learning, enabling models to move beyond spurious correlations toward more meaningful and transferable insights.

In addition, the session highlights the need for rigorous and clinically relevant evaluation protocols, considering real-world deployment scenarios, distribution shifts, and safety-critical requirements. By bringing together researchers and practitioners from machine learning, biomedical engineering, and clinical domains, this session aims to foster interdisciplinary dialogue and advance the development of robust, reliable, and clinically actionable multimodal AI systems.

Session chairs :

- **Marouene CHAIEB**, Manouba Univ., TN
- **Dhekra BEN SASSI**, Tunis Univ., TN
- **Nour BEN AMEUR**, Manouba Univ., TN
- **Imen KAMEL**, Manouba Univ., TN

- Multimodal fusion under missing, incomplete, or asynchronous modalities
- Uncertainty-aware multimodal learning and confidence estimation
- Handling noisy, conflicting, and heterogeneous healthcare data sources
- Reliability, robustness, and generalization across clinical environments
- Knowledge-guided and hybrid (data-driven + domain knowledge) fusion approaches
- Human-in-the-loop and clinician-guided multimodal systems
- Causal inference and evidential reasoning for multimodal healthcare AI
- Causal discovery and inference from heterogeneous clinical modalities
- Explainability and interpretability in multimodal decision-making
- Evaluation protocols for real-world deployment and clinical validation
- Multimodal learning under distribution shifts and cross-site variability
- Safety, trustworthiness, and risk-aware AI in healthcare applications
- Benchmarking and reproducibility of multimodal fusion systems
- Integration of multimodal data for decision support systems in medicine
- Ethical considerations, bias, and fairness in multimodal healthcare AI

Important Dates



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