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IEEE Journal of Selected Areas in Sensors Special Section on

**The Generative AIs Assisted by
Sensors: Novel Systems and
Applications (focus on Smart
Healthcare and Manufacturing)**

In recent years, Generative AI (GenAI) has emerged as a pivotal and rapidly evolving technology across diverse domains. It has not only expanded application boundaries and created new industrial value but has also reshaped the global business landscape. Despite these advances, GenAI still faces critical research and development challenges in several high-stakes domains that demand exceptional precision and reliability—such as intelligent healthcare, robotics, and advanced manufacturing. While these fields differ substantially in their applications, they share several fundamental GenAI research issues that remain unresolved. These challenges span from the core technologies of multimodal data generation and fusion to advanced applications including digital twins and human–AI collaboration. Notably, both foundational and application-level innovations rely heavily on sensor data for accurate perception and interaction. For instance, diagnostic AI models trained on synthetic medical images or physiological signals have yet to receive FDA approval due to concerns over the trustworthiness of generated data labels. Although various data augmentation methods, such as GANs and VAEs, have been explored, the reliability of AI-generated samples without expert validation remains questionable and requires rigorous verification approaches. Similar reliability challenges are also observed in advanced manufacturing, particularly in synthetic sensor data generation for semiconductor equipment. This Special Section aims to address these pressing challenges by focusing on sensor-assisted GenAI systems and applications in intelligent healthcare, robotics, and manufacturing. It seeks innovative, feasible, and interdisciplinary solutions, encouraging researchers to propose strategies, share findings, and advance the state of the art in trustworthy and sensor-assisted GenAI technologies.

Original research contributions, tutorials and review papers are sought in sensor-assisted GAI related areas including (but not limited to):
- Novel sensor-assisted GAI systems and/or applications in smart healthcare
- Novel sensor-assisted GAI systems and/or applications in robotics
- Novel sensor-assisted GAI systems and/or applications in smart manufacturing
- Novel and reliable data augmentation methods for sensor-fusion and multi-modal systems
- Sensor-driven LLM/VLM model development in these applications
- Innovative application development of generative systems, including transfer learning and federated learning
- Novel real-world applications and validations based on sensor-assisted GAI

Solicited and invited papers shall undergo the standard IEEE Journal of Selected Areas in Sensors (JSAS) peer review process. All manuscripts must be submitted on-line, via the IEEE Author Portal, see https://ieee.atyponrex.com/journal/jsas. When submitting, please indicate in the "Manuscript Type" roll down menu that the paper is intended for the "emerging brain imaging, decoding technologies and clinical applications" Special Section. Authors are particularly encouraged to **suggest names of potential reviewers** for their manuscripts in the space provided for these recommendations in *Manuscript Central.* For manuscript preparation and submission, please follow the guidelines in the *Information for Authors* at IEEE Journal of Selected Areas in Sensors web page, https://ieee-jsas.org/

Deadlines:

- Manuscript Submission: September 1st, 2026
- Notification of Acceptance: October 1st, 2026
- Final Manuscript Due: November 1st, 2026
- Published in IEEE Xplore: December 1st, 2026

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