

IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS

J-BHI Special Issue on “Generative Adversarial Networks in Biomedical Image Computing”

Generative adversarial networks (GANs) continue to receive broad interest in computer vision due to their capability for data generation or data translation. Adversarial learning also has become a state-of-the-art approach for generating plausible and realistic images. GAN has been rapidly adopted in many applications cross healthcare and biomedicine, addressing problems in image reconstruction, segmentation, classification, and cross-modality synthesis. Despite GAN substantial progress in these areas, their application to medical image computing still faces challenges and unsolved problems remain. For example, how to synthesize realistic or physically-plausible imagery from small datasets? What are the best GAN architectures and loss functions for specific image computing tasks? When is possible to conduct unsupervised/weak versus supervised deep learning? How to deal with noisy and incomplete data? How to deal with data that is only partially labelled or annotated? How to ensure that learning from GAN-synthesized data generalizes to real-world data? How to develop GAN architectures that integrate biomedical imaging with other biomedical data like omics, radiological text reports, electronic health records, etc.?

This special issue will provide a state-of-the-art representation of algorithms and methods that progress the field of research and applications into advanced GANs in biomedical imaging. We seek contributions that include, but are not limited to:

- GAN-based medical image synthesis, segmentation, registration, reconstruction.
- Un/semi/weakly-supervised learning with GANs in biomedical image computing.
- Multi-modality and cross-modality GANs linking imaging phenotypes to non-imaging biomedical data.
- Novel GAN architectures, loss functions, and theoretical developments.
- Novel methods, metrics and theories metrics for GAN performance assessment.
- Methods increasing medical interpretability of GAN-based models and results.
- GAN under limited, sparse, incomplete, and noisy data inputs.
- GAN under small-sample-size data, and datasets with incomplete or limited annotations.
- Theoretical analysis and comparisons of alternative GAN approaches.
- New datasets and benchmarks, and evaluation protocols suitable for GANs in biomedical imaging.

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Key Dates

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| Deadline for Submission: | 15 Feb 2021. 31 Dec 2020. |
| First Reviews Due: | 05 Mar 2021. 20 Feb 2021. |
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| Final Decision: | 20 Jun 2021 |