

Special Issue on

Deep Learning as a Gateway to Predictive, Preventive, Personalized, and Participatory Medicine

CALL FOR PAPERS

In recent years, a novel artificial intelligence (AI) paradigm termed Deep Learning (DL) has revolutionized the fields of computer vision, predictive analytics, and computer-aided decision-making. Deep neural networks (DNNs) have been able to outperform human experts in both complex data integration and decision-making tasks in a number of fields, ranging from social network analysis to genomics, proteomics, and image/signal processing. The ability to seamlessly integrate multimodal, multidomain, and multiscale data in order to extract diagnostically relevant information is expected to become increasingly important in nascent fields such as precision oncology or precision neurophysiology.

A key requirement of DL is the availability of large amounts of training data, as well as computational power. In this context, in recent years very large publicly available “big”-data curated medical imaging and metadata repositories (such as the Human Connectome Project, UK Biobank, Whole Slide Imaging Repository, and the Cancer Imaging Archive to name a few) have become available. Researchers are therefore now in a position to build and validate AI frameworks with a true potential to impact clinical neuroscience research, enhance decision-making in clinical practice, and empower clinical trials through personalized patient-wise predictions.

While spanning a broad range of topics, the focus of this special issue will be on the exploitation of cutting-edge AI techniques for complex diagnostic evaluation and strategic decision-making for personalized medicine applications. We encourage cross-disciplinary original research contributions which aim to bridge the gap between last-generation DL techniques and biomedical and clinical disciplines—such as cellular and molecular biology, pathology, oncology, and neurology—to both generate novel, multimodal, and multidomain biomarkers and augment the potential for innovative, personalized patient-management strategies. Review articles focused on these topics are also welcome.

Potential topics include but are not limited to the following:

- ▶ Strategies for interpretation and visualization of DNN models
- ▶ AI-based reconstruction, processing, and analysis of medical images
- ▶ Deep learning-based analysis of histological/cytological images
- ▶ Predicting histological/cytological tissue characteristics from noninvasive in vivo imaging (MRI, PET, and CT)
- ▶ Multimodal and multidomain medical data integration
- ▶ Strategies for handling data sparsity and paucity in medical applications of DL
- ▶ Intelligent vital signs monitoring in intensive care units
- ▶ Intelligent patient stratification and scheduling in diagnostic facilities
- ▶ Artificial-intelligence-based therapeutic decision support
- ▶ AI strategies for prediction of longitudinal patient trajectories
- ▶ Deep learning in preclinical imaging
- ▶ Deep-radiomics: image segmentation and analysis
- ▶ Deep learning for genome-scale-omics and multiomics data analysis
- ▶ Automated reasoning and metareasoning in medicine
- ▶ Models and systems for network-based analysis of general population health

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/cmmm/dlgp/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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