

# IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS

## J-BHI Special Issue on “Open and Interpretable AI in Computational Pathology”

Recent years have seen exponential advances in the quality of state-of-the-art Machine Learning (ML) models covering many fields in medicine. Particularly, ML and artificial intelligence (AI) tools have been widely exploited in the field of pathological image analysis to examine and assess the function of human organs and/or to provide trustworthy prediction of diseases. However, black-box nature of classical AI/ML tools have limited its clinical use. Thus, a growing need to build more transparent and explainable ML/AI tools has opened a new research avenue several known as explainable or Interpretable AI. This has found great interests in many medical image analysis fields. In particular, building trustworthy and explainable AI systems are of immense importance in computational pathology to facilitate high-quality healthcare to patients. Despite their widespread, most of the existing ML models are becoming less interpretable, i.e., neither provide explanations nor trustworthy for the predictions. Furthermore, several other challenges exist, such as ethical, legal, social, and technological issues of the existing AI. Trustworthy and explainability in AI tools based on Deep Learning (DL) is an emerging field of research with great promise for increased high-quality healthcare. Particularly, it refers to AI/DL tools and techniques that produce human-comprehensible solutions, i.e., provide explanations and interpretations for disease diagnosis and predictions, as well as recommended actions. The explainable solution will enable enhanced prediction accuracy with decision understanding and traceability of actions taken. Interpretable AI aims to improve human understanding, determine the justifiability of decisions made by the machine, introduce trust and reduce bias. This special issue calls for and attract recent studies and research work focusing on interpretable AI methods to generate human readable explanations. Particularly those with the purpose to (i) improve the trust and reduce analysis bias, (ii) stimulate discussion on the system designs, and (iii) use and evaluate novel explainable AI for improving the accuracy of pathology workflows for disease diagnostic and prognostic. We invite researchers working on practical use-cases of trustworthy AI models that discuss adding a layer of interpretability and trust to powerful algorithms, such as neural networks and ensemble methods for delivering near real-time intelligence

Only high-quality and original research contributions will be considered. The special issue will highlight, but not be limited to, the following topics:

- Emerging AI for the analysis of digitize pathology image
- Trustworthy AI in computational pathology
- Explainable AI for computational pathology
- Explainable AI for whole slide image (WSI) analysis
- Advanced AI for WSIs Registration
- AI-based systems using human-interpretable image features (HIFs) for improved clinical outcomes
- Human level explainable AI
- Detection and discovery of predictive and prognostic tissue biomarkers
- Histopathologic biomarker assessment using advanced AI systems for accurate personalized medicine.
- AI-assisted computational pathology for cancer diagnosis
- Immunohistochemistry scoring.
- Interpretable deep learning and human-understandable machine learning
- Trust and interpretability
- Theoretical aspects of explanation and interpretability in AI

### **Guest Editors**

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### **Key Dates**

- Submission deadline: **December 20, 2021**
- First reviews due: **March 1<sup>st</sup>, 2021**
- Revised manuscript due: **April 1<sup>st</sup>, 2021**
- Final decision: **June 30<sup>th</sup>, 2021**
- Camera ready version: **July 1<sup>st</sup>, 2021**

