

IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS

J-BHI Special Issue on “Foundation Models for the Next Generation of Biomedical and Health Intelligence”

Foundation models, or large AI models, are models recently emerging with massive scales in both parameter-wise and data-wise, the magnitudes of which can reach beyond billions. Once pretrained, large AI models demonstrate impressive performance in various downstream tasks, showing generalist intelligence. A prime example is the ChatGPT, whose capability has compelled people’s imagination about the far-reaching influence that large AI models can have and their potential to transform different domains of our lives. The recent advances in data science and AI algorithms have endowed large foundation AI models with strengthened generative and reasoning capabilities, significantly distinguishing them from early deep learning models. In health informatics, the advent of foundation models has brought new paradigms in the design of methodologies and the practices of data collection, as foundation models can leverage self-supervision and reinforcement learning in training, relieving the burden of curating large-scale annotated datasets. With the ubiquity of medical internet of things (such as pervasive wearable sensors), the massive medical and clinical history (such as electronic health records (EHRs)), the prevalent medical imaging for diagnosis (such as computed-tomography (CT) scans), the growing discovery of genomic sequences, and more, the abundance of multi-modal biomedical, clinical, and health data provides the opportunities to develop, validate, and advance foundation models for breakthroughs in health-related areas, fostering the next generation of biomedical and health intelligence.

This special issue aims to bring together innovative research and discussions on biomedical and health foundation models. We are looking for high-quality original research articles that present new ideas, principles, theories, and applications of foundation models in the field of biomedical and health informatics. We also welcome perspectives highlighting the current challenges, potential pitfalls, ethical and safety issues about foundation models, and the future directions of addressing these challenges.

Topics of interest include but not limited to:

- 1) Basic research on new theories, principles, and structures of biomedical and health foundation models
- 2) Basic research on the interpretability and explainability of biomedical and health foundation models
- 3) Prompt engineering in biomedical and health foundation models
- 4) Data engineering in biomedical and health foundation models
- 5) Large-scale biomedical and health dataset
- 6) Multi-modal learning and alignment for biomedical and health foundation models
- 7) Efficient computing for biomedical and health foundation models
- 8) Adversarial robustness of biomedical and health foundation models
- 9) Applications of foundation models in biomedical and health informatics
- 10) New evaluation paradigms for biomedical and health foundation models
- 11) New computer systems for biomedical and health foundation models
- 12) Decentralised methods for developing and deploying biomedical and health foundation models
- 13) Foundation model ethics, safety, privacy, and regulations in biomedicine and healthcare

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Key Dates

Deadline for Submission: 01 April, 2024

First Reviews Due: 01 May, 2024

Revised Manuscript Due: 01 June, 2024

Final Decision: 01 July, 2024