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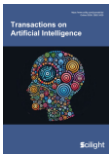

Editorial

Perspectives on Artificial Intelligence for Medicine

Lanjing Zhang [1] and Yanjun Li [2,3,*]

[1] Department of Chemical Biology, Ernest Mario School of Pharmacy, Rutgers University, Piscataway, NJ 08854 USA
[2] Department of Medicinal Chemistry, Center for Natural Products, Drug Discovery and Development, University of Florida, Gainesville, FL 32610, USA
[3] Department of Computer & Information Science & Engineering, University of Florida, Gainesville, FL 32611, USA
* Correspondence: yanjun.li@ufl.edu

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Artificial Intelligence (AI) is transforming every aspect of medicine—from drug discovery and diagnosis to clinical decision-making and personalized treatment. With the rise of large language models (LLMs), self-supervised learning, and transformer-based architectures, the intersection of AI and medicine has reached a pivotal moment. This collection on AI for Medicine, published in the *Transactions on Artificial Intelligence* (*TAI*), brings together cutting-edge research. We believe it will advance the state of the art in both fundamental AI techniques and their application to medical and biological domains.

The articles in this collection span a rich spectrum of challenges in biomedical informatics, covering topics from drug-drug interaction (DDI) prediction and cross-platform transcriptomic analysis to automated clinical classification and video-based activity recognition. The diversity and depth of these contributions underscore the evolving synergy between modern AI methodologies and critical medical applications.

The article titled "Self-Supervised Based Multi-View Graph Presentation Learning for Drug-Drug Interaction Prediction" [1] introduces SMG-DDI, a novel graph-based framework that leverages both inter-view and intra-view molecular graph representations for DDI prediction. The use of self-supervised learning allows the model to overcome the data scarcity challenge often encountered in biomedical settings. By capitalizing on large-scale unlabeled chemical datasets, the proposed method demonstrates superior accuracy across small, medium, and large datasets—surpassing existing DDI prediction approaches.

In the article titled "Normalization and Selecting Non-Differentially Expressed Genes Improve Machine Learning Modelling of Cross-Platform Transcriptomic Data" [2], the authors tackle a pressing challenge in medical machine learning: model generalization across heterogeneous transcriptomic platforms. Through an innovative approach that utilizes non-differentially expressed genes (NDEGs) for normalization, the study achieves improved classification of breast cancer subtypes across RNA microarray and RNA-seq datasets. This work highlights the potential of biological insight—in the form of stable gene expression—as a guide for robust AI model design.

The article titled "LLM-Prompting Driven AutoML: From Sleep Disorder—Classification to Beyond" [3] explores the creative use of LLMs as reasoning agents in the AutoML pipeline. By leveraging LLMs for classifier design through structured prompting, the authors demonstrate that decomposed prompts can lead to the discovery of performant classifiers like support vector machines, achieving an impressive F1-score of 0.919 in sleep disorder classification. This work represents a promising paradigm shift, where natural language interaction becomes a functional tool for AI model automation.

Finally, the article titled "SUGAR: A Sequence Unfolding Based Transformer Model for Group Activity Recognition" [4] addresses the scalability challenges of applying Transformer architectures to long video sequences. The authors propose a sequence unfolding/folding strategy combined with localized attention mechanisms to reduce computational overhead. Achieving accuracy over 93% on the Volleyball dataset, SUGAR demonstrates potential for a wide range of sequential medical video analysis tasks, such as surgical workflow recognition and patient monitoring in intensive care units.

Together, these articles reflect key advancements in both methodological rigor and practical impact. They exemplify the growing maturity of AI applications in medicine, pushing beyond traditional supervised learning

into areas such as self-supervision, prompt engineering, and scalable transformer architectures tailored for biomedical data. We are grateful to the authors for their outstanding contributions and the reviewers for their critical and constructive feedback throughout the review process. We also thank the TAI editorial board for their support and guidance in making this collection possible.

We hope this collection will serve as a valuable resource for researchers and practitioners interested in the future of AI-powered medicine and healthcare.

Collection Editors

Lanjing Zhang, MD, is the Chair of the Department of Pathology and Laboratory Medicine, Princeton Medical Center, Plainsboro, NJ. He is also a Research Professor of Chemical Biology at Rutgers Ernest Mario School of Pharmacy, Piscataway, NJ, a Full Member of Rutgers Cancer Institute of New Jersey. His research focuses on epidemiology, machine learning, computational biology, hepatology and cancer. Dr Zhang has published more than 130 articles and letters. He has mentored more than 10 undergraduate and graduate students, and was funded by the NSF and NIH, USA as the principal investigator. His honors include the Ramzi Cotan Award from the US and Canadian Academy of Pathology, the Presidential Award from Sonic Healthcare USA and the MERIT (R37) Award from the NCI, NIH. He served on a panel of the Medical Devices Advisory Committee, U.S. FDA, regularly reviews grant proposals for U.S. and foreign governmental agencies, presided the New Jersey Society of Pathology (2019-2021) and chaired the steering committee of Cancer Epidemiology Service, New Jersey State Department of Health. Dr Zhang is on the editorial boards of several peer-reviewed biomedical journals.

Dr. Zhang earned his medical and master's degrees from Tongji Medical University, Wuhan, China. After a postdoc fellowship at University of Michigan Medical School, Ann Arbor, MI, he completed his pathology residency at the Mount Sinai Hospital, New York, NY, and gastrointestinal and liver pathology fellowship at Hospital of the University of Pennsylvania, Philadelphia, PA.

Yanjun Li, Ph.D., is an Assistant Professor (AI Initiative) in the Department of Medicinal Chemistry at the University of Florida (UF), Gainesville, FL, and a courtesy Assistant Professor in the Department of Computer & Information Science & Engineering at UF. His research interests span the fields of deep learning, drug discovery, and AI4Science, with a distinct focus on deep generative modeling for *de novo* small molecule, RNA, and protein design and geometric deep learning for molecular recognition. Dr. Li's work aims to develop innovative AI algorithms for addressing fundamental challenges in life sciences with broad scientific impacts and for discovering functional molecules to improve human health.

Dr. Li earned his Ph.D. degree in Computer Science from UF and then worked as a Senior Research Scientist at the Institute of Deep Learning, Baidu Research USA, Sunnyvale, CA, and later at Calico Life Sciences, South San Francisco, CA, an Alphabet-founded research laboratory for human aging research. In 2023, he joined UF as a tenure-track Assistant Professor.

Conflicts of Interest

The authors declare no conflict of interest.

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