Guest Editorial: Machine Learning for AI-Enhanced Healthcare and Medical Services: New Development and Promising Solution

Ke Yan, Zhiwei Ji, Qun Jin, and Qing-Guo Wang

Healthcare and medical services are always among the top concerns for humans, especially under the special situation of COVID-19 pandemic, started from early 2020. In the field of computational biology and bioinformatics, scientists seek various possibilities using computer technologies, especially artificial intelligence (AI) enhanced methods, for healthcare services and medical diagnoses. For example, over the past few years, scientists have been working hard to identify the internal relationships between gene microarrays, cells, tissues, organisms, diseases, etc., and apply the AI, machine learning and deep learning technologies looking for more innovative solutions for new diseases, such as COVID-19. In fact, nowadays, AI technology, such as the convolutional neural network (CNN), is considered has one of the most important computer technologies and has been widely applied in the fields of healthcare engineering, medical research, disease diagnosis, cancer/tumor analysis and etc. Using existing accumulated data, machine learning technologies, such as CNN, are able to identify possible diseases, make immediate decision for medical treatment and provide precious advices for better life-style. Although significant progresses have been made via machine learning technologies for medical research, there remain gaps between the computer theories and real-world application requirements. Moreover, there are still areas in healthcare and medical research that machine learning technologies can hardly fit in. Therefore, exploring the possibility of using machine learning technology in the fields of healthcare and medical research is demanded.

This special issue entitled 'Machine Learning for AI-Enhanced Healthcare and Medical Services: New Development and Promising Solution' in ACM/IEEE Transactions of on Computational Biology and Bioinformatics aims to provide an international forum for:

1) bringing together the greatest research efforts in computational biology, bioinformatics and biomedical research by finding and developing effective and efficient techniques for healthcare and medical diagnosis;
2) exploring future-generation interesting and practical medical diagnosis/healthcare applications in AI, machine learning, automation systems, big data, knowledge-based system, logic-based system, etc., to provide novel ideas and solutions in the related fields; and
3) addressing the real-world challenges in the fields of AI-based healthcare and medical diagnosis by utilizing modern machine learning, including deep learning technologies for automatic monitoring/diagnosing/evaluating all possible medical diseases, and produce a more reliable and promising application environment to develop those technologies.

Submission for this special issue started from December 2018 and closed in July 2020. In nearly one and half years, we received in total 69 paper submissions. A few paper submissions were invited from the selected best papers (significantly extended) of the 2018 International Conference on Information Technology in Medicine and Education (ITME 2018, held in China Jiliang University, Hangzhou, China, held in Oct. 19-21, 2018). All submitted manuscripts had gone through at least two rounds of revisions with reviewers in the related fields, including computer science, bioinformatics, computational biology and etc. Some papers went through more than four rounds of revisions. The final acceptance rate is around 29% with 20 accepted papers in this special issue.

The guest editors would like to thank all authors submitting their valuable works to this special section of ACM/IEEE Transactions of on Computational Biology and Bioinformatics (TCBB), as well as all anonymous reviewers for their great effort reviewing the submitted articles, providing constructive comments and suggestions and assisting the editors reaching the final decision. Special thanks will be sent to the editor-in-chief (EIC), Prof. Aidong Zhang and the EIC's secretary, Joyce Arnold, for their precious time and valuable instructions that help us prepare and finalize this special issue.

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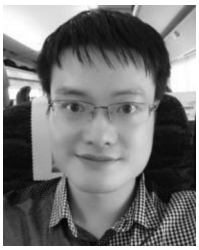

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