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Special Issue

Explainable AI and Deep Learning Applied in Medical Field

Guest Editor

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Message from the Guest Editor

Dear Colleagues,

Human biology is complicated and difficult to understand making medical doctors irreplaceable. However, there is a quote “R.O.A.D. to success” where R.O.A.D. stands for four medical specialties – Radiology, Ophthalmology, Anesthesiology, and Dermatology. According to a survey from Uniformed Services University in Bethesda, all fourth-year medical students were asked which specialties has highest lifestyle (1-9, with 9 being highest). Dermatology (8.4), radiology (8.1), ophthalmology (8.0), and anesthesiology (7.5) were rated in the highest 4 out of 18 medical specialties. These specialties are considered easier, doctors in these specialties have a higher lifestyle and better work/life balance. Recently, the AI and deep learning have been rapidly applied in every fields. Several supervised learning, semi-supervised learning, and self-supervised learning techniques are available, each one with its own purposes and advantages. In medical field, these four medical specialties become most easily applied in this new technology straightaway. However, it is crucial and vital to achieve deep learning models with high predictive knowledge and high estimation of the target. Also, another issue is explanatory power whether it is possible to extract human understandable knowledge from the deep learning model. Such explainable knowledge is important to check whether or not the obtained model

makes sense to the domain experts. There is always a tradeoff between the performance and explainability. Increasing model interpretability allows a better acceptance of the data mining results by the domain users and this is particularly relevant in critical applications, such as medicine field. In this special issue, we try to look how good the AI and deep learning algorithms can replace medical doctors' jobs or just reduce their work loads. Also, how good the explainable AI can open this black-box by using novel algorithms to extend more applications in the other specialties in medical field. This special issue will host such progress. Both research and review articles are welcome.

Prof. Dr. Jiann-Shing Shieh and Dr. Maysam F. Abbod

Guest Editors

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