

Special Issue Proposal for Expert Systems

Deep Neural Networks for Biomedical Data and Imaging

Deep Learning has a great impact on advanced real-world problem solving since it can deal with complex and big amount of data. One of the recent successful applications of deep learning is biomedical imaging and there is a remarkable research effort using medical image data (obtained via MR, tomography, X-Ray, pathology, microscopy, breast CAD, etc.) to perform especially diagnosis-oriented studies considering vital diseases such as human brain disorders diseases (i.e. Alzheimer's, Parkinson, Sleep Disorders) or cancer (i.e. breast cancer, lung cancer, skin cancer). The literature often reports effective results, and thus the use of deep learning for biomedical imaging is a research hot topic.

Deep Learning is essentially a collection of advanced neural networks such as convolutional neural networks (CNN), deep belief networks (DBN), or auto-encoder neural networks. CNN is the most famous among them but all of these deep learning techniques can be successfully applied in biomedical imaging studies. In some cases, it has been also possible to combine them in hybrid-modeled solutions for improved results. Here, the key questions for understanding the performance of such deep neural networks could be (1) How effective can these neural networks detect a disease, via biomedical imaging? (2) How fast and early can they perform a diagnosis? (3) How can they accomplish the same performance for different types of diseases? (4) How can they contribute to the current and future of medicine?, by moving over the biomedical imaging?

The objective of this special issue is to gather original research works contributing to the literature in terms of using deep neural networks for biomedical imaging. In detail, the research works on this special issue will include the effective use of Deep Neural Network models to run image analysis tasks for understanding the medical image data accurately and diagnosing different types of vital diseases.

The topics of interests in this special issue include, but are not limited to:

- Deep Neural Networks for medical image detection, recognition, and segmentation,
- Deep Neural Networks for human brain disorder diseases diagnosis,
- Deep Neural Networks for cancer diagnosis,
- Real application experiences of Deep Neural Networks usage for biomedical imaging,
- Use of Deep Neural Networks over mixed medical data including also images,
- Enhancing diagnosis and classification via Deep Neural Networks,
- Improving traditional diagnosis methods via Deep Neural Networks.

The authors are encourage greatly to submit data or any supplementary material with each article, and possible experiences-feedback reported by physicians and medical staff since these may add important value in terms of increasing visibility, and citations. Also, negative results are awaited since they will contribute to understanding the current and future potentials of Deep Learning, particularly for biomedical imaging.

Schedule:

Submission of manuscript: July 15, 2021
First notification: September 15, 2021
Submission of revised manuscript: November 15, 2021
Final notification: December 15, 2021

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Oscar Castillo holds the Doctor in Science degree (Doctor Habilitatus) in Computer Science from the Polish Academy of Sciences (with the Dissertation "Soft Computing and Fractal Theory for Intelligent Manufacturing"). He is a Professor of Computer Science in the Graduate Division, Tijuana Institute of Technology, Tijuana, Mexico. Also, he is serving as Research Director of Computer Science and head of the research group on Hybrid Fuzzy Intelligent Systems. Currently, he is President of HAFSA (Hispanic American Fuzzy Systems Association) and Past President of IFSA (International Fuzzy Systems Association). Prof. Castillo is also Chair of the Mexican Chapter of the Computational Intelligence Society (IEEE). He also belongs to the Technical Committee on Fuzzy Systems of IEEE and the Task Force on "Extensions to Type-1 Fuzzy Systems". He is also a member of NAFIPS, IFSA, and IEEE. He belongs to the Mexican Research System (SNI Level 3). His research interests are in Type-2 Fuzzy Logic, Fuzzy Control, Neuro-Fuzzy, and Genetic-Fuzzy hybrid approaches. He has published over 300 journal papers, 10 authored books, 40 edited books, 200 papers in conference proceedings, and more than 300 chapters in edited books, in total more 770 publications according to Scopus (H index=49), and more than 900 according to Research Gate (H index=61). He has been Guest Editor of several successful Special Issues in the past, like in the following journals: Applied Soft Computing, Intelligent Systems, Information Sciences, Non-Linear Studies, Fuzzy Sets and Systems, JAMRIS and Engineering Letters. He is currently Associate Editor of the Information Sciences Journal, Applied Soft Computing Journal, Granular Computing Journal, and the IEEE Transactions on Fuzzy Systems. Finally, he has been elected IFSA Fellow and MICAI Fellow member last year. He has been recognized as a Highly Cited Researcher in 2017 by Clarivate Analytics because of having multiple highly cited papers in Web of Science.