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J-B HI Special Issue on “Multi-modal joint learning in healthcare imaging”

With the rapid development of medical imaging hardware and other medical equipment, the healthcare domain has entered into a multi-modal information era. Tons of multi-modal data, including images such as X-ray, CT, and even different sequences of MRI, and medical reports are uploaded to the PACS or patient electronic system every day. To make the artificial intelligence systems better understand the healthcare problem, it is essential to leverage the information from different sources since it is a fact that leveraging information from multi-modal sources helps in better diagnosis and treatment planning. Multi-modal joint learning aims to build models that can process and relate information from different modalities, by leveraging the advantages of different modalities such as images, medical reports, pathological tests, waveform data, wearable data, genetics data, etc. Joint learning including contrastive learning based on paired multi-modal information has proven effective for image models in the training or pre-training phase for the downstream tasks. Multi-modal joint learning could also mean teaching a model by taking the information from one modality and using the information from another modality as references.

In this new space, researchers have been focusing on inventing new techniques or using existing image-based models and/or natural language processing models to detect and classify diseases, segment regions of interest for the purpose of radiotherapy, to predict the response of the treatments, to convert radiological image to reports, and so on.

Topics of interest include, but are not limited to, the following:

- Multi-modal information fusion
- Multi-modal learning
- Multi-modal contrast learning
- Multi-modal image registration/fusion/representation
- Image and report joint learning
- Graph-based techniques for data fusion for healthcare
- Downstream tasks using multi-modal information
- Combination of image and signals
- Multi-modal learning for animal healthcare
- Combining multi-modal data for domain adaptation, transfer learning, etc
- Leveraging multi-modal data for few shot learning, zero shot learning, etc
- Using multi-modal data for continual learning or other scenarios for learning from less data

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