Scaling Siamese Neural Network for Cross-Domain Few Shot Learning in Medical Imaging

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Abstract : Cross-domain learning in the medical field is a research challenge as many conditions, like in oncology imaging, use different imaging modalities. Moreover, in most of the medical learning applications, the sample training size is relatively small. Although few-shot learning (FSL) through the use of a Siamese neural network was able to be trained on a small sample with remarkable accuracy, FSL fails to be effective for use in multiple domains as their convolution weights are set for task-specific applications. In this paper, we are addressing this problem by enabling FSL to possess the ability to shift across domains by designing a two-layer FSL network that can learn individually from each domain and produce a shared features map with extra modulation to be used at the second layer that can recognize important targets from mix domains. Our initial experimentations based on mixed medical datasets like the Medical-MNIST reveal promising results. We aim to continue this research to perform full-scale analytics for testing our cross-domain FSL learning.