

Learning from Small Amount of Medical Data with Noisy Labels: A Meta-Learning Approach

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Abstract : Computer vision systems recently made a big leap thanks to deep neural networks. However, these systems require correctly labeled large datasets in order to be trained properly, which is very difficult to obtain for medical applications. Two main reasons for label noise in medical applications are the high complexity of the data and conflicting opinions of experts. Moreover, medical imaging datasets are commonly tiny, which makes each data very important in learning. As a result, if not handled properly, label noise significantly degrades the performance. Therefore, a label-noise-robust learning algorithm that makes use of the meta-learning paradigm is proposed in this article. The proposed solution is tested on retinopathy of prematurity (ROP) dataset with a very high label noise of 68%. Results show that the proposed algorithm significantly improves the classification algorithm's performance in the presence of noisy labels.

Keywords : deep learning, label noise, robust learning, meta-learning, retinopathy of prematurity

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