先端科学技術研究科　修士論文要旨

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要旨

A common assumption in meta-learning is that meta-training and meta-test tasks are drawn from the same distribution. However, this assumption is often not fulfilled. Under such task shift, standard meta-learning algorithms do not work as desired since their unbiasedness is no longer maintained. In this paper, we propose a new meta-learning method called Importance Weighted Meta-Learning (IWML), which preserves unbiasedness even under task shift. Our approach uses both labeled meta-training datasets and unlabeled datasets in tasks obtained from the meta-test task distribution to assign weights to each meta-training task. These weights are determined by the ratio of meta-test and meta-training task densities. Our method enables the model to focus more on the meta-training tasks that closely align with target tasks during the meta-training process. We meta- learn neural network-based models by minimizing the expected weighted meta- training error, which is an unbiased estimator of the expected error over target tasks. The task density ratio is estimated using kernel density estimation, where the distance between tasks is measured by maximum mean discrepancy. Our empirical evaluation on few-shot classification datasets demonstrates a significant improvement of IWML over standard meta-learning methods and state-of-the-art task augmentation strategies.