Meta-learning with many tasks

Meta-learning accelerates the learning on new tasks by extracting meta-knowledge from historical tasks. Obviously, the larger the number of tasks to learn from, the more meta-knowledge can be learned. However, popular meta-learning algorithms like MAML only learn a globally-shared meta-model. This can be problematic when the task environments are complex, and a single meta-model is insufficient to capture the diversity of meta-knowledge. Morever, sampling tasks from the large set of tasks in each training iteration also increases variance in the stochastic gradient, resulting in slow convergence. In this talk, we propose to to address these problems by structuring the task model parameters into multiple subspaces, so that each subspace represents one type of meta-knowledge. Moreover, variance reduction is incorporated into meta-learning so as to achieve fast convergence. Experiments on various meta-learning tasks demonstrate its effectiveness over state-of-the-art algorithms.

Biography

Prof. Kwok is a Professor in the Department of Computer Science and Engineering, Hong Kong University of Science and Technology. Pr of. Kwok served/is serving as an Associate Editor for the IEEE Transactions on Neur al Networks and Learning Systems, Neurocomputing, Artificial Intelligence Journal, International Journal of Data Science and Analytics, and on the Editorial Board of Machine Learning. He is also serving / served as Senior Area Chairs of major machine learning / AI conferences including NeurIPS, ICML, ICLR, IJCAI, and as Area Chairs of conferences including AAAI and ECML. Prof Kwok will be the IJCAI-2025 Program Chair.