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Preface

It is our great pleasure to announce the publication of this special section in JCST: "Learning from Small Samples".

Machine learning has achieved great success in various tasks. With the rapid growth of model size as in deep networks, the learning models become more and more complex, typically requiring a large scale of training samples with label annotations. However, in real-world applications, labeled data is usually limited. And it could be rather expensive to collect more labeled data because the labeling process is time consuming and requires domain expertise.

As a consequence, it becomes a major challenge to learn from a dataset with only a small amount of labeled samples. This special section is launched and aims to seek high-quality research work on learning from small samples. Each submission to this special section underwent a rigorous peer-review process overseen by the leading editor and the guest editors. At least two rounds of peer-review were carried out on each accepted paper. Finally, three contributions were selected for publication in this special section out of 26 submissions. These contributions show advanced technologies on learning from small samples, including disambiguation-based partial label learning, source-free domain adaptation, and deep cascade models.

The paper "Partial Label Learning via Conditional Label Aware Disambiguation" studies a weakly supervised learning problem, where each instance is partially annotated with a candidate set consisting of one ground-truth label and some other noisy labels. The authors propose to simultaneously train the model with label constraints and perform pseudo-labeling under a unified framework. The method can achieve state-of-the-art performance even when the training examples are not precisely labeled.

The paper "Source-Free Unsupervised Domain Adaptation with Sample Transport Learning" tries to learn from small samples by transferring knowledge from other related domains. The authors propose a source-free method to jointly model unsupervised domain adaptation and sample transport learning. The method does not require access to the source domain data, and thus could be widely applied to tasks with privacy concerns. Moreover, the method seeks the most valuable instances for labeling through an effective selection strategy, and can significantly reduce the number of labeled examples for training the model.

The paper "Multi-Scale Deep Cascade Bi-Forest for Electrocardiogram Biometric Recognition" considers an interesting application of electrocardiogram biometric recognition, where the key challenge is to obtain robust performance with small training data. The authors propose a deep cascade framework to incorporate multi-scale signal coding with deep cascade coding. By dealing with noisy signals with sparse representation and exploiting discriminative information with adaptive weighted pooling, the method achieves effective and robust results even with a small training set.

We would like to thank all authors for submitting their works to this special section and all reviewers for their great efforts in offering constructive and timely reviews on each submission. Last but not least, we are grateful to JCST for hosting this special section.

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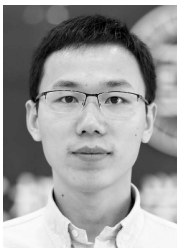

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