Self-Adaptive Label Filtering Learning for Unsupervised Domain Adaptation

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Problems & Ideas

- Problems of conventional pesudo-lables-based UDA approaches:
  - Most of the existing UDA methods align class-wise distributions resorting to target domain pseudo-labels, for which hard labels may be misguided by misclassifications while soft labels are confusing with trivial noises so that both of them tend to cause frustrating performance.
- Ideas: The self-adaptive label filtering learning (SALFL) framework is proposed from both the statistical and the geometrical perspectives, which filters out the misclassified pseudo-labels to reduce negative transfer.

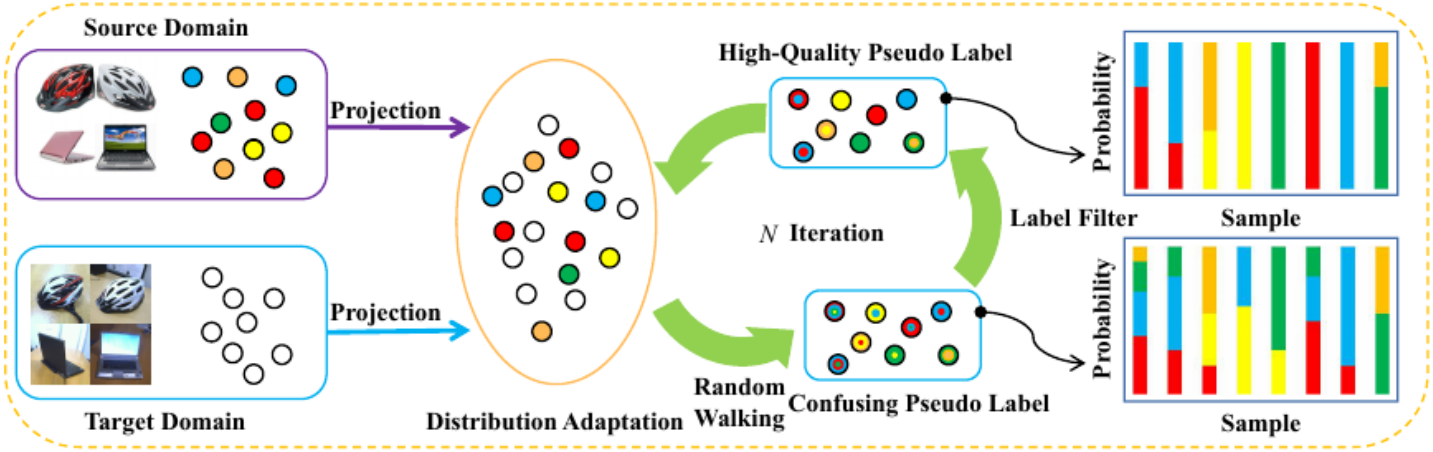
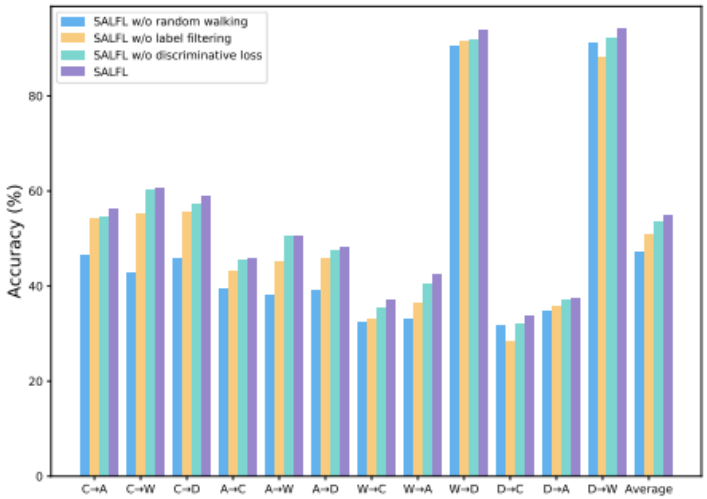
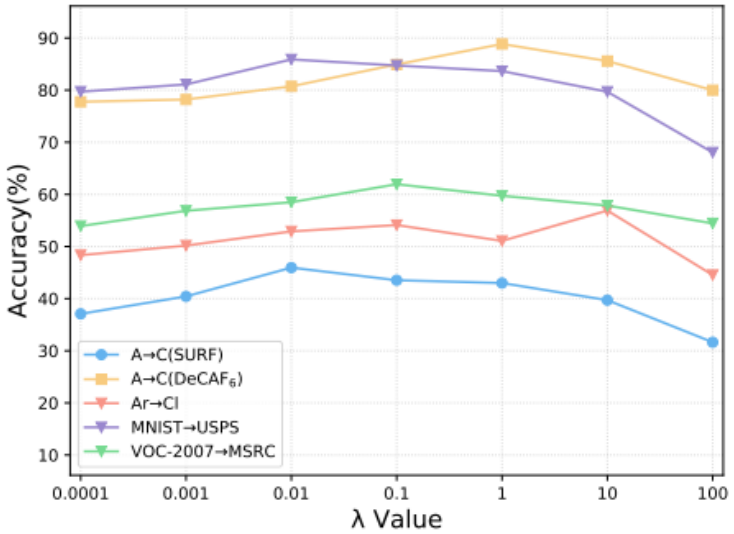


Illustration of the proposed framework. The probability that a sample belongs to one class is represented by the area occupied by its corresponding color. The more colors in a sample, the more confusing that sample is.

Main Contributions

- Contributions:
  - A self-adaptive label filtering learning (SALFL) framework is proposed for unsupervised domain adaptation (UDA) by aligning the source and target domains from both statistical and geometrical perspectives, which filters out the confusing probabilities by self-adaptive label filtering;
  - In the SALFL framework, more general joint distribution adaptation form is proposed with the refined cross-domain labels and an efficient alternating optimization algorithm is built, with time complexity ;
  - Extensive evaluations and comparisons are conducted to demonstrate the superiority of the proposed method.





Left: Ablation study results on Office-10 + Caltech-10 with the SURF feature; Right: Parameter sensitivity of λ.