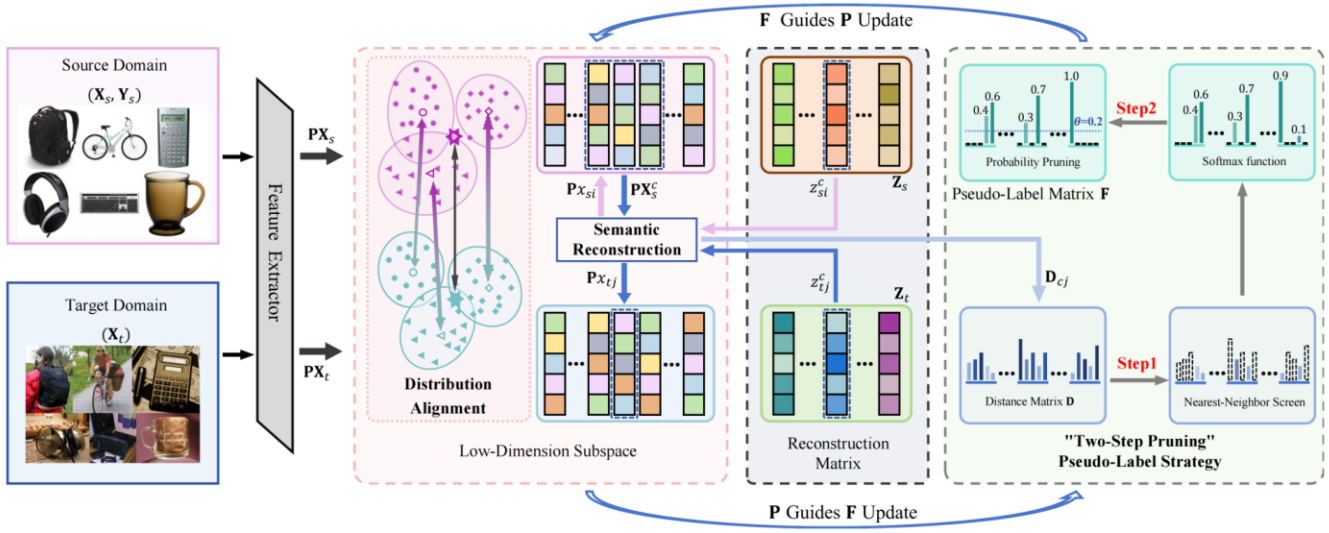
Semantic Reconstruction Coupled Reliable Pseudo-Label Learning for Unsupervised Domain Adaptation

Mengtao YANG, Yueying LIU, Gaohao YI, Hao ZHOU, Yazhou YANG, Tingjin LUO

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Problems & Ideas

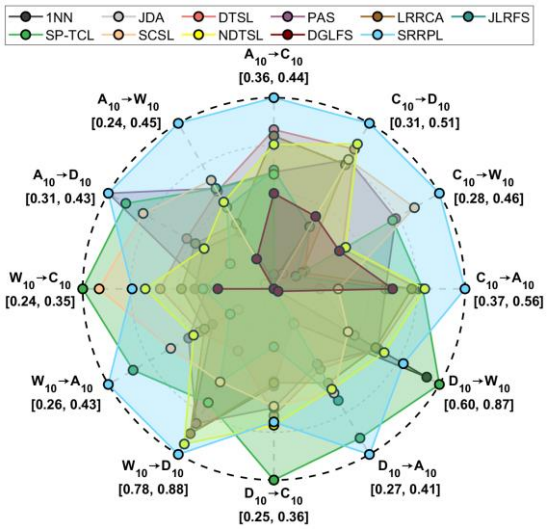
- Existing problems of traditional unsupervised domain adaptation:
  - When using pseudo-labels, the constraints of unreliable labels on model performance are ignored.
  - When linearly reconstructing target samples using all source domain samples, interference from heterogeneous samples is introduced, which reduces the discriminability of the learned features.
- **Our ideas:** Design a "two-step pruning" pseudo-label strategy and construct a class-level semantic reconstruction matrix.

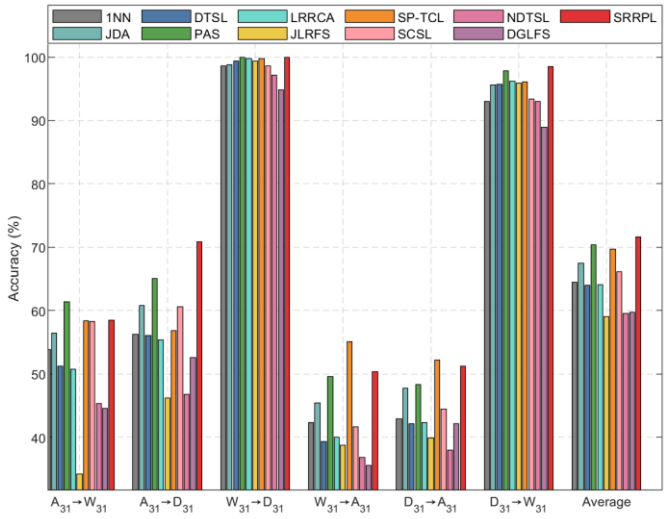


Data from both domains are projected into a common low-dimensional subspace, where target domain samples can be linearly represented by source samples from each class to generate a ”distance” matrix. Subsequently, a ”two-step pruning” pseudo-label transformation strategy is applied based on this distance matrix to enhance pseudo-label reliability. Meanwhile, marginal and class-conditional distribution discrepancies between the two domains are minimized to achieve distribution alignment.

Main Contributions

- Contributions:
  - We propose a novel method that effectively reduces domain shift by integrating the "two-step pruning" pseudo-label strategy and class-level reconstruction matrices.
  - An efficient alternating iterative algorithm is devised to optimize the resulting non-convex objective function.
  - Comprehensive experiments conducted on 52 cross-domain image recognition tasks demonstrate the effectiveness of the proposed SRRPL method.





Accuracy performance of different methods on CMU-PIE and COIL20 datasets. Left: the Office-Caltech-10; Right: Office-31.