Return of Frustratingly Easy Domain Adaptation

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Domain Shift

CORrelation Alignment (CORAL)

Algorithm 1 CORAL for Unsupervised Domain Adaptation

Input: Source Data $D_s$, Target Data $D_t$
Output: Adjusted Source Data $D_s'$

$C_s = \text{cov}(D_s) + \text{eye}($size$(D_s, 2))$

$C_t = \text{cov}(D_t) + \text{eye}($size$(D_t, 2))$

$D_s' = D_s - C_s D_s C_s^{-1}$

% whitening source

$D_t' = D_t - C_t D_s C_s^{-1}$

% re-coloring with target covariance

COVrelation Alignment (CORAL)

Why CORAL fails to align

1. Distributions are different
2. Align Ds by aligning COVs

Train Classifier on Transformed Source and Test on Target

Whitening both Domains

Whitening Source

Re-Coloring with Target Cov

Closed form solution

Whitening followed by re-coloring

Table 4: Object recognition accuracies of all 6 domain shifts on the Testbed Cross-Dataset (Tommasi and Tuytelaars 2014) dataset with DECAF-fc7 features, using the “full training” protocol.

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<th>A-W</th>
<th>T-D</th>
<th>T-W</th>
<th>S-D</th>
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Table 3: Object recognition accuracies of all 12 domain shifts on the Office-Caltech10 dataset (Gong et al. 2012) with SURF features, using the “full training” protocol.

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Table 2: Object recognition accuracies of all 6 domain shifts on the standard Office dataset (Saenko et al. 2010) with deep features, following the protocol of (Donahue et al. 2014; Zheng et al. 2014; Ganin and Lempitsky 2015).

Conclusion

- Improvement is consistent
- Larger improvement on strongly correlated features (e.g., deep features)

Full paper to appear in proceedings of AAAI-16, preprint is available on arXiv.
This research was supported by NSF Awards IIS-1451244 and IIS-1212928.