TPA 11: Domain Adaptation Using Transformation Matrix for Object Categorization

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Problem Statement: This is a problem of unsupervised domain adaptation [2, 3], where a few unlabeled training samples are available from the target domain. The source domain is transformed to an intermediary representation such that each instance of the transformed source domain is a linear combination of the instances of the target domain. The problem can be formulated as an optimization framework, which can be solved using Augmented Lagrange Multiplier method. This problem can also handle multiple source transformation, where training samples are obtained from more than one source domain to aid the classification task in the target domain.

Input:

• Training images of different object categories from source domain.

Expected Output:

• Class label of test images obtained from target domain.

Dataset Office Dataset [2] containing 31 classes of objects on 3 domains (Amazon, DSLR and Webcam)

Hint for excellence: Results are to be analyzed using measures like classification accuracy and precision/recall/F measures. Comparative study with nave combination and source-only and target-only methods are to be shown. Bonus marks are awarded for any new/modified functions used for estimating weight matrix for transformed source domain.

References

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- K. Saenko, B. Kulis, M. Fritz and T. Darrell, "Adapting Visual Category Models to New Domains" In Proc. ECCV, September 2010
- 3. Sinno Jialin Pan and Qiang Yang , A Survey on Transfer Learning, In IEEE Transactions on Knowledge and Data Engineering (IEEE TKDE). Volume 22, No. 10, Pages 1345-1359, 2010.

Additional References

- 1. Jeff Donahue, Judy Hoffman, Erik Rodner, Kate Saenko, Trevor Darrell , Semi-Supervised Domain Adaptation with Instance Constraints; CVPR 2013.
- 2. Sumit Shekhar, Vishal Patel, Hien Nguyen, Rama Chellappa, Generalized Domain-Adaptive Dictionaries, CVPR 2013.