SEMINARIO

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Double-Weighting for single and multi-source covariate shift adaptation

Abstract: Supervised classification traditionally assumes that training and testing samples are drawn from the same underlying distribution. However, practical scenarios are often affected by distribution shifts, such as covariate shift, where the marginal distribution over the instances (covariates) differs while the label conditional distribution remains the same. Most of the existing techniques are based on reweighted approach that assigns larger weights to the training samples that are more likely to be at testing. However, the performance of such approaches can be poor under support mismatch or when the above weights take large values. In addition, in multi-source scenarios, existing approaches do not exploit complementary information among sources, and equally combine sources for all instances. We propose a learning methodology based on a double-weighting approach for single and multi-source covariate shift adaptation. The presented methods assign weights for both training and testing instances. For multi-source, the weights are source-dependent, obtained jointly using information from all sources. Theoretically, we develop generalization bounds for the proposed methods that show a significant improvement in the effective sample size in comparison with existing methods. The proposed methods achieve enhanced classification performance in both synthetic and empirical experiments.

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