Supplementary Material to the Paper: Joint Transfer and Batch-mode Active Learning

A: More results on biomedical image data sets

Figure 7 (a) shows the two dimensional representation of re-weighted Fly-FISH image samples (source) and the query images selected from the BDGP data set (target) by following the two stage strategy *2S-TAL*. Figure 7 (b) shows the re-weighted Fly-FISH images and the query set selected from BDGP data set by the proposed joint optimization framework *JO-TAL*. Figures 7 (c) and 7 (d) show the results for the cases with BDGP as the source and Fly-FISH as target or test data set. We observe similar results as with synthetic data. The proposed method is able to select complementary instances from the two data sets. Please refer to Figure 7 (b), we clearly see that the source domain instances that got higher weight combined with the selected target domain instances, better represent the distribution of the target domain data than the distribution represented by the corresponding instances in Figure 7 (a), which are selected based on 2-stage strategy *2S-TAL*. Similar results are also observed for the cases shown in Figure 7 (c) and Figure 7 (d).

B: More results on Sentiment Analysis data set

Figure 8 shows the comparative performance of *JO-TAL* on Sentiment Analysis data set. The first and second names in the title of the figures refer to the source and target domain respectively. Figures 8 (a) and 8 (b) show the results with electronics and book data sets as source domains, while documents belonging to the category of dvd forming the target domain, respectively. We observe that for both cases *JO-TAL* and *JO-TAL-Ent* performed better than *2S-TAL* by 7% to 10% [3]. We also observe that incorporation of transfer learning has improved the classification accuracies on dvd data set by 13% and 8% with electronics and book as source domain data, respectively. This can be explained by the MMD values, which are 0.0321 and 0.0290 for book vs. dvd and electronics vs. dvd data sets respectively. Lower MMD value between electronics and dvd, signify more relatedness in the data distribution than in the case of book vs. dvd.

We observe very similar phenomenon in Figures 8 (c) and 8 (d), with electronics as target and book and dvd being the source domains respectively. In both the cases, *JO-TAL* and *JO-TAL-Ent* performed better than *2S-TAL* by 8% to 10%. Besides, *JO-T-Rand* performed better than *2S-TAL* by 3% with dvd as source domain data. We also observe that incorporation of transfer learning has improved the classification accuracy by 18% and 6% with dvd and book as source domain data respectively. This again is consistent with the distribution differences measured by their respective MMD values, which are 0.0329 and 0.0290 for book vs. electronics and dvd vs. electronics data set respectively.

We have obtained similar results with other six combinations of the Sentiment Analysis data sets, such as electronics vs. book, kitchen vs. book, kitchen vs. dvd, kitchen vs. electronics, dvd vs. kitchen and dvd vs. book.

[3] All differences in accuracies are measured at number of labeled instances from target = 50.

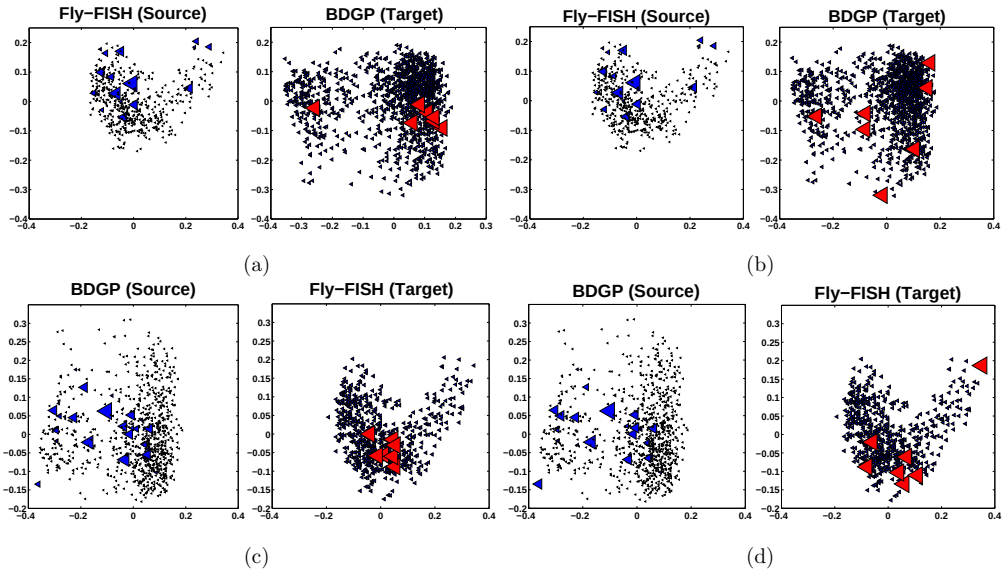

Figure 7. Re-weighted data from Fly-FISH and query data points from BDGP (red triangles) data set based on (a) *2S-TAL* and (b) *JO-TAL*. Re-weighted data from BDGP and query data points from Fly-FISH (red triangles) data set based on (c) *2S-TAL* and (d) *JO-TAL*. Figures best viewed in color.

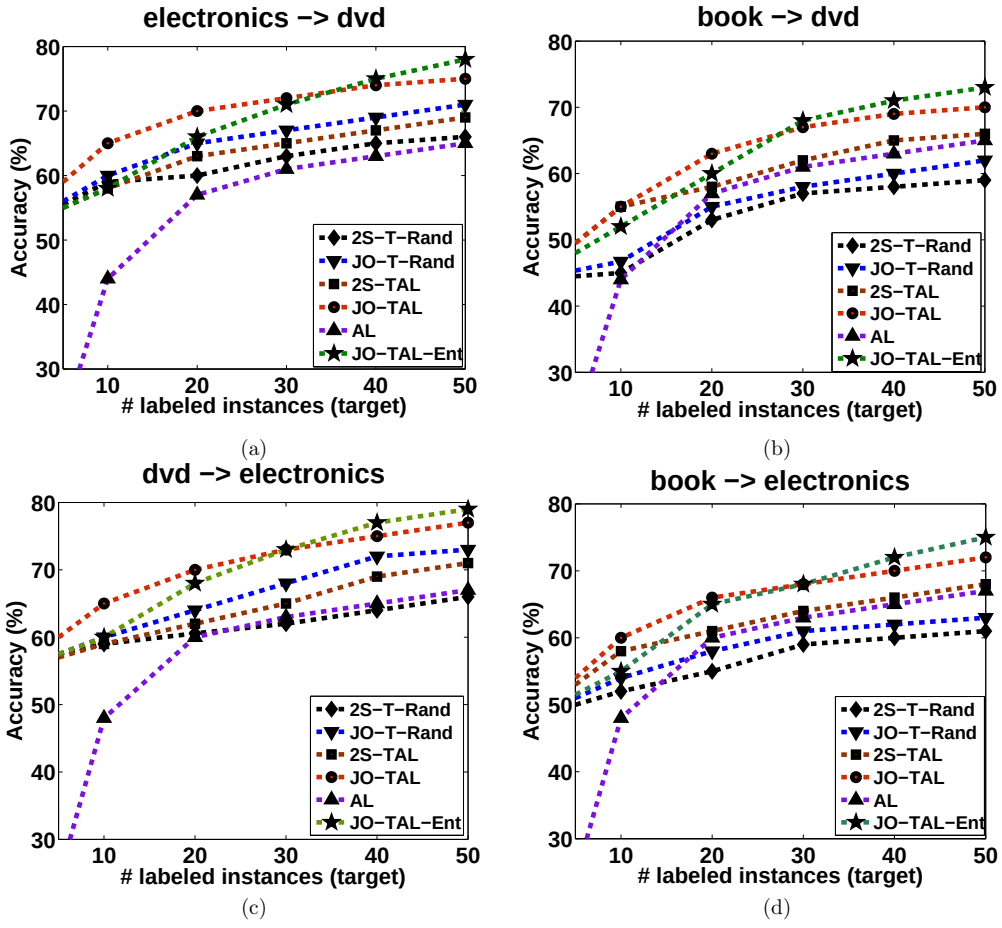

Figure 8. Comparative performance on Sentiment Analysis data set.