Supplementary material to the MLMI 2014 article titled:
"Topological Descriptors of Histology Images"

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Abstract. This document contains additional results that could not be
included in our main article due to space constraints. It contain ad-
ditional results that use the accuracy metric and more features from
persistence diagrams.

Fig. 1 and Fig. 2 reports additional AUC statistics results obtained when top
75 persistence bars are used arranged in birth order.

Fig. 3 and Fig. 4 reports results for accuracy statistics for all the experiments.
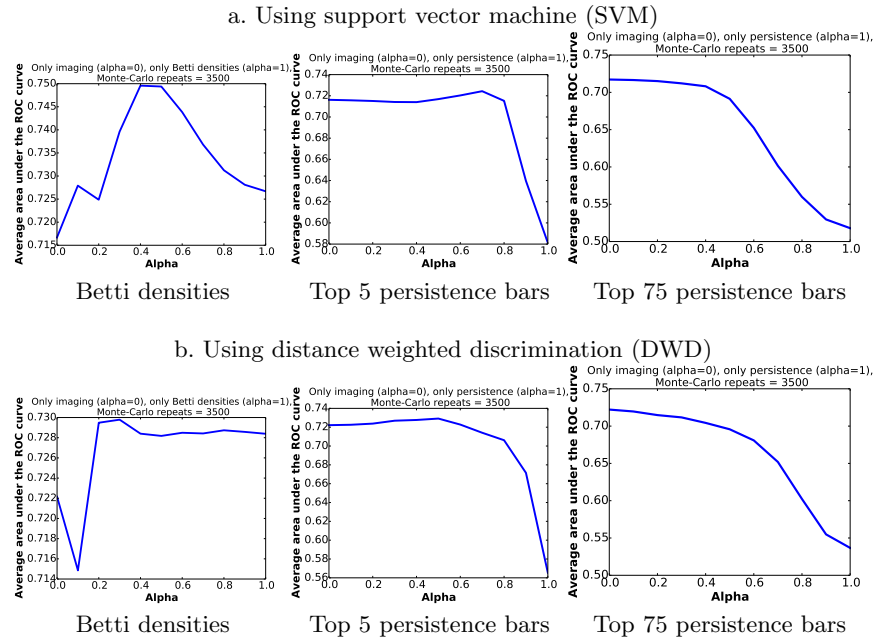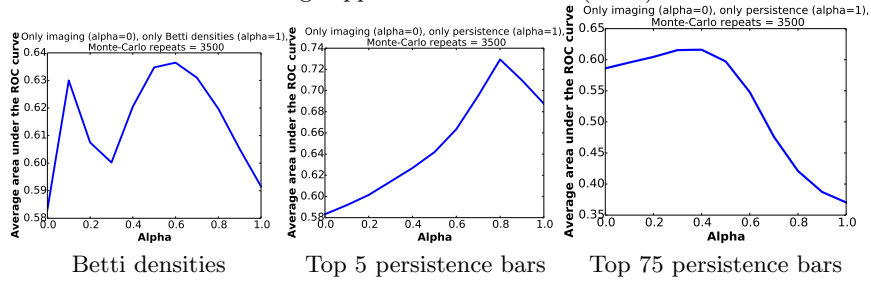
a. Using support vector machine (SVM)

Betti densities   Top 5 persistence bars   Top 75 persistence bars

b. Using distance weighted discrimination (DWD)

Betti densities   Top 5 persistence bars   Top 75 persistence bars

Fig. 1: AUC statistics for repeated 5-fold cross validation for Basal vs Luminal A:
combining topological summaries with imaging features constructed using local patches
suggests improvement in performance for certain cases.

a. Using support vector machine (SVM)

Betti densities   Top 5 persistence bars   Top 75 persistence bars

b. Using distance weighted discrimination (DWD)

Betti densities   Top 5 persistence bars   Top 75 persistence bars
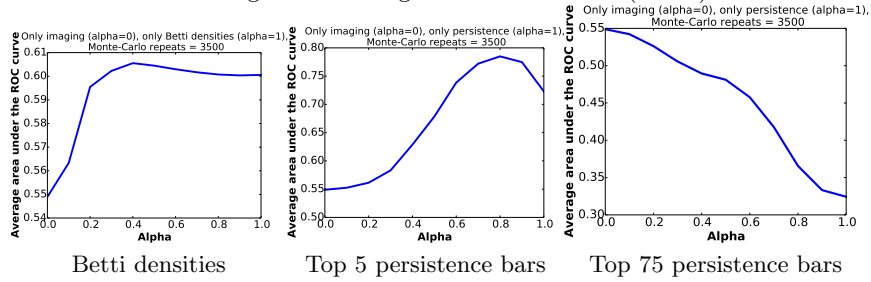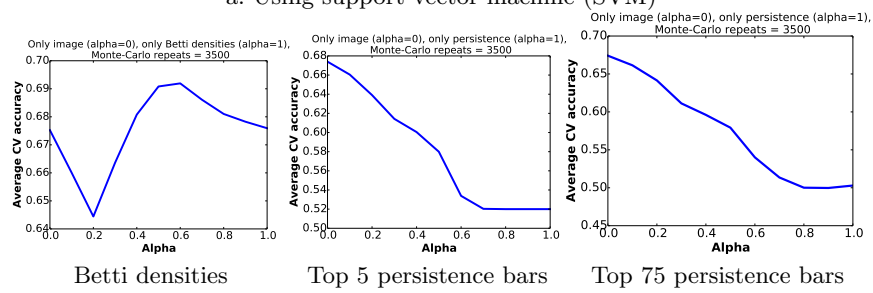
Fig. 2: AUC statistics for repeated 5-fold cross validation for Luminal B vs HER2: combining topological summaries with imaging features constructed using local patches suggests improvement in performance for certain cases.

a. Using support vector machine (SVM)

Betti densities   Top 5 persistence bars   Top 75 persistence bars

b. Using distance weighted discrimination (DWD)

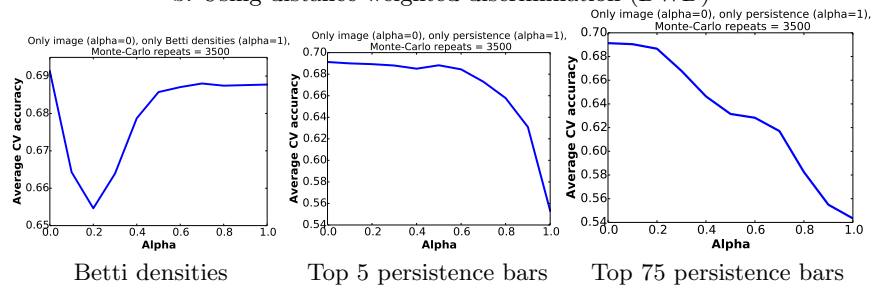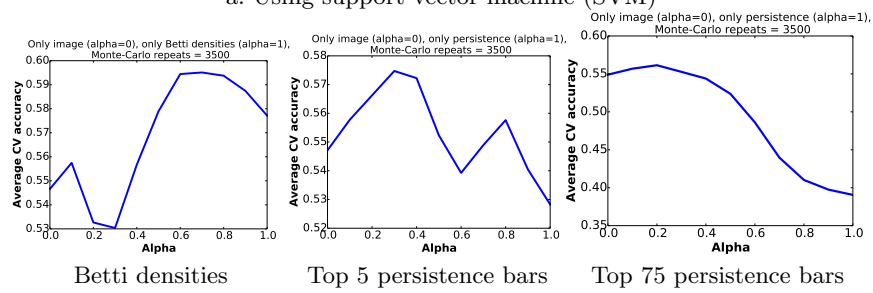Betti densities   Top 5 persistence bars   Top 75 persistence bars

Fig. 3: Accuracy statistics for repeated 5-fold cross validation for Basal vs Luminal A: combining topological summaries with imaging features constructed using local patches suggests improvement in performance for certain cases.

a. Using support vector machine (SVM)

Only image (alpha=0), only Betti densities (alpha=1),
Monte-Carlo repeats = 3500

Only image (alpha=0), only persistence (alpha=1),
Monte-Carlo repeats = 3500

Only image (alpha=0), only persistence (alpha=1),
Monte-Carlo repeats = 3500

Betti densities   Top 5 persistence bars   Top 75 persistence bars

b. Using distance weighted discrimination (DWD)

Only image (alpha=0), only Betti densities (alpha=1),
Monte-Carlo repeats = 3500

Only image (alpha=0), only persistence (alpha=1),
Monte-Carlo repeats = 3500

Only image (alpha=0), only persistence (alpha=1),
Monte-Carlo repeats = 3500

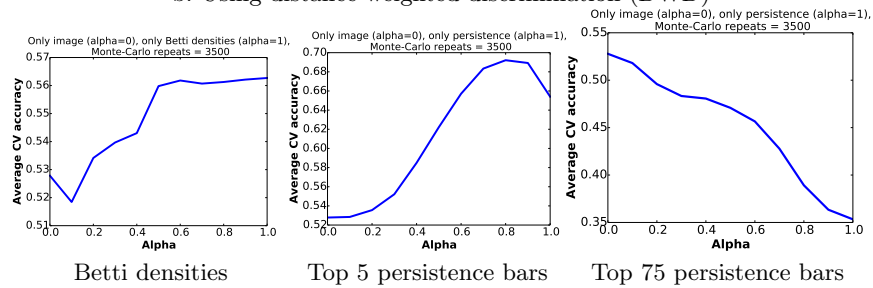Betti densities   Top 5 persistence bars   Top 75 persistence bars

Fig. 4: Accuracy statistics for repeated 5-fold cross validation for Luminal B vs HER2: combining topological summaries with imaging features constructed using local patches suggests improvement in performance for certain cases.