

Acknowledgments

We thank the anonymous reviewers for their comments and suggestions. Gary Doran was supported by GAANN grant P200A090265 from the US Department of Education and NSF grant CNS-1035602. Soumya Ray was partially supported by CWRU award OSA110264.

References

- Andrews, S.; Tsochantaridis, I.; and Hofmann, T. 2003. Support vector machines for multiple-instance learning. In *Advances in Neural Information Processing Systems*, 561–568.
- Ascher, D.; Dubois, P. F.; Hinsen, K.; Hugunin, J.; and Oliphant, T. 2001. *Numerical Python*. Lawrence Livermore National Laboratory, Livermore, CA.
- Auer, P.; Long, P. M.; and Srinivasan, A. 1998. Approximating hyper-rectangles: learning and pseudorandom sets. *Journal of Computer and System Sciences* 57(3):376–388.
- Babenko, B.; Verma, N.; Dollár, P.; and Belongie, S. 2011. Multiple instance learning with manifold bags. In *Proceedings of the International Conference on Machine Learning*, 81–88.
- Behmardi, B.; Briggs, F.; Fern, X.; and Raich, R. 2012. Regularized joint density estimation for multi-instance learning. In *IEEE Statistical Signal Processing Workshop*, 740–743.
- Bergstra, J., and Bengio, Y. 2012. Random search for hyperparameter optimization. *The Journal of Machine Learning Research* 13:281–305.
- Blum, A., and Kalai, A. 1998. A note on learning from multiple-instance examples. *Machine Learning Journal* 30:23–29.
- Dahl, J., and Vandenberghe, L. 2009. CVXOPT: A python package for convex optimization.
- Demšar, J. 2006. Statistical comparisons of classifiers over multiple data sets. *The Journal of Machine Learning Research* 7:1–30.
- Dietterich, T. G.; Lathrop, R. H.; and Lozano-Pérez, T. 1997. Solving the multiple instance problem with axis-parallel rectangles. *Artificial Intelligence* 89(1–2):31–71.
- Diochnos, D.; Sloan, R.; and Turán, G. 2012. On multiple-instance learning of halfspaces. *Information Processing Letters*.
- Kearns, M. J., and Schapire, R. E. 1994. Efficient distribution-free learning of probabilistic concepts. *Journal of Computer and System Sciences* 48(3):464–497.
- Kundakcioglu, O.; Seref, O.; and Pardalos, P. 2010. Multiple instance learning via margin maximization. *Applied Numerical Mathematics* 60(4):358–369.
- Li, Y.-F.; Kwok, J. T.; Tsang, I. W.; and Zhou, Z.-H. 2009. A convex method for locating regions of interest with multi-instance learning. In *Machine Learning and Knowledge Discovery in Databases*. Springer. 15–30.
- Long, P., and Tan, L. 1998. PAC learning axis-aligned rectangles with respect to product distributions from multiple-instance examples. *Machine Learning* 30(1):7–21.
- Mangasarian, O., and Wild, E. 2008. Multiple instance classification via successive linear programming. *Journal of Optimization Theory and Applications* 137:555–568.
- Ray, S., and Craven, M. 2005. Supervised versus multiple instance learning: an empirical comparison. In *Proceedings of the 26th International Conference on Machine Learning*, 697–704.
- Sabato, S., and Tishby, N. 2012. Multi-instance learning with any hypothesis class. *Journal of Machine Learning Research* 13:2999–3039.
- Settles, B.; Craven, M.; and Ray, S. 2008. Multiple-instance active learning. In *Advances in Neural Information Processing Systems*, 1289–1296.
- Simon, H. U. 2012. Pac-learning in the presence of one-sided classification noise. *Annals of Mathematics and Artificial Intelligence* 1–18.
- Tragante do O, V.; Fierens, D.; and Blockeel, H. 2011. Instance-level accuracy versus bag-level accuracy in multi-instance learning. In *Proceedings of the 23rd Benelux Conference on Artificial Intelligence*.
- Xu, X. 2003. Statistical learning in multiple instance problems. Master’s thesis, The University of Waikato.