

Analysis of the paper

November 6, 2021

Yawer Abbas
B20CI050

Technical Update

1. Support Vector Machine (SVM) Technical Update:

1) Kernel functions are one of the most important components of Support Vector Machine. Therefore, improper kernel functions can reduce the efficiency of the classification by projecting the data into a space where linear separation is not possible. To find a suitable kernel, each can linearly combine several kernel matrices corresponding to a particular similarity measure. The most commonly used kernel functions are polynomials, radial basis functions, , and sigmoid kernels.

2) Whenever the dataset is large, is usually a common problem with increased runtime. It is important to address this issue. Therefore, some updates need to be made to the to increase the efficiency of the support vector machine classifier . The runtime values also depend on the dimensions of the dataset. For a given data dimension of , a linear kernel SVM can significantly reduce the execution time of the . This may not be the result of the non-linearly separable data. Research in this area is ongoing.

2. Multiple instance learning Technical Update:

1) Extreme Learning Machine Based MIL (ELMMIL) has proven to be more efficient than some common MIL classification methods. ELMMIL selects the most suitable instance from each package over a single hidden layer forward link network (SLFN) and trains a modified ELM model to update the output weights. This learning approach often depends on the number of hidden nodes and can easily lead to overfitting problems. Using Bayesian inference, this study presents a Bayesian ELM (BELM) (BELMMIL)-based MIL algorithm for solving MIL classification problems.

2) A query placement model in which instances are obtained by repeatedly querying Oracle in a way that can capture relationships between instances.

we can also use cnn to MLP to deal with non linearity which also can be use to deal with

multiple instance problem

knn can be used over data for improving the data clustering so bag formation process can speed up also PCA can be prove useful as it can reduce the dimension in the datasets . [12pt]

Reference

P. Auer. On learning from multi-instance examples: Empirical evaluation of a theoretical approach. In Proc. 14th International Conf. on Machine Learning, pages 21- 29. Morgan Kaufmann, San Francisco, CA, 1997.

C. Carson, M. Thomas, S. Belongie, J. M. Hellerstein, and J. Malik. Blobworld: A system for region-based image indexing and retrieval. In Proceedings Third International Conference on Visual Information Systems. Springer, 1999.

A. Demirez and K. Bennett. Optimization approaches to semisupervised learning. In M. Ferris, O. Mangasarian, and J. Pang, editors, Applications and Algorithms of Complementarity. Kluwer Academic Publishers, Boston, 2000.

T. G. Dietterich, R. H. Lathrop, and T. Lozano-Perez. Solving the multiple instance problem with axis-parallel rectangles. Artificial Intelligence, 89(1-2):31- 71 , 1997.

T. Gartner, P. A. Flach, A. Kowalczyk, and A. J. Smola. Multi-instance kernels. In Proc. 19th International Conf. on Machine Learning. Morgan Kaufmann, San Francisco, CA, 2002.

T. Joachims. Transductive inference for text classification using support vector machines. In Proceedings 16th International Conference on Machine Learning, pages 200- 209. Morgan Kaufmann, San Francisco, CA, 1999.

P.M. Long and L. Tan. PAC learning axis aligned rectangles with respect to product distributions from multiple-instance examples. In Proc. Compo Learning Theory, 1996.

O. Maron and T. Lozano-Perez. A framework for multiple-instance learning. In Advances in Neural Information Processing Systems, volume 10. MIT Press, 1998.

O. Maron and A. L. Ratan. Multiple-instance learning for natural scene classification. In Proc. 15th International Conf. on Machine Learning, pages 341- 349. Morgan Kaufmann, San Francisco, CA, 1998.

J. Ramon and L. De Raedt. Multi instance neural networks. In Proceedings of ICML2000, Workshop on Attribute- Value and Relational Learning, 2000.

B. Schölkopf and A. Smola. Learning with Kernels. Support Vector Machines, Regularization, Optimization and Beyond. MIT Press, 2002.

Multiple Instance Learning with Query Bags - Piotr Dollar

Multiple-Instance Learning Approach via Bayesian Extreme Learning Machine