Comparison of Approaches to Photometric Redshift Estimation of Quasars

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Abstract. We probe many kinds of approaches used for photometric redshift estimation of quasars, including KNN (K-nearest neighbor algorithm), Lasso (Least Absolute Shrinkage and Selection Operator), PLS (Partial Least Square regression), ridge regression, SGD (Stochastic Gradient Descent) and Extra-Trees.

Keywords. Photometric redshifts, quasars, data mining, machine learning

1. Sample and Methods

The sample is cross-identified by SDSS DR7, UKIDSS DR8 and ALLWISE. 24,089 quasars are obtained (Zhang *et al.* 2013). Based on the input pattern $10C + r$, the performance of KNN, Lasso, PLS, Ridge, SGD, Extra-Trees are compared in figure 1.
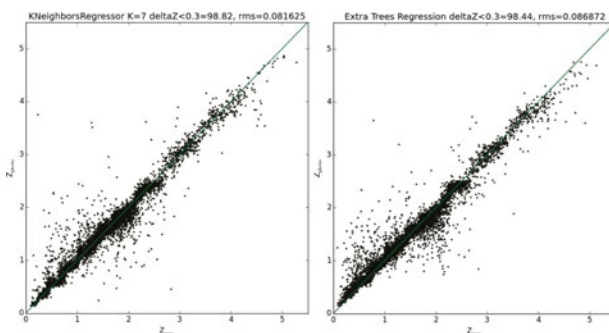

Figure 1. The first: the photometric redshift estimation by KNN ($k = 7$); the second: the photometric redshift estimation by Extra-Trees (estimator = 90); the third: comparison of photometric redshift estimation by six approaches.

2. Conclusions

The experimental results show that when the input pattern $10C + r$ is adopted, KNN has the best performance, Extra-Trees has better performance, the others achieve bad accuracy.

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Reference

Zhang Yanxia, Ma He, Peng Nanbo, Zhao Yongheng, Wu Xue-bing, *AJ*, 2013, 146, 22 (10pp)