Statistical Estimation and Inference under a Semiparametric Finite Mixture Model

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Abstract:

We consider the estimation and inference problem of a finite mixture model based on data from multiple samples, each of which is from a mixture of two common components. Under the assumption that the ratio of the two component densities takes a known parametric form, we obtain maximum semiparametric likelihood estimates of the parameters via EM or MM algorithms, and establish the large sample results for those estimators. We then propose an empirical likelihood ratio-based statistic for testing statistical hypotheses on mixing proportions. To test the density ratio assumption, a goodness-of-fit test is suggested. Simulation studies and examples will be given.