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ROBUST BOOSTING ALGORITHM FOR MULTICLASS CLASSIFICATION BY ETA-DIVERGENCE

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A Boosting algorithm for multiclass classification problem is studied. A general algorithm using a monotonically increasing convex loss function was investigated and its information geometrical structure was clarified in the framework of the Bregman divergence, however it was not clear that which loss function is suitable for practical use or has favorable statistical properties. Also it is often pointed out that the typical Boosting algorithm, AdaBoost which is derived from the exponential loss function is very sensitive to noise included in a dataset. In this paper, we propose new robust Boosting algorithms associated with mislabel models by minimizing the Eta-divergence under two constraints: one constraint introduces a model which assumes that a probabilistic mislabeling occurs independently of an input and the other constraint conduces a model whose mislabeling mechanism is associated with an input. Possible behaviors of several boosting algorithms are theoretically and empirically investigated focusing on the robustness for the proposed algorithm.