

Fast Classification Using Sparse Decision DAGs

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Classification problems have been widely studied during the last two decades and we now have algorithms that perform even better than human being for some tasks. However, for a wide class of applications ranging from object detection in images to designing triggers in experimental physics, one needs to satisfy strong computational requirements during test time in addition to high classification accuracy. In this talk, I will present a novel approach for dealing with such problems in a way that bridges supervised techniques to reinforcement learning methods. Given a sequence of weak classifiers, the basic idea is to let each instance "choose its own path" among the classifiers by evaluating some and skipping others. The sequence of weak classifiers is provided by AdaBoost and the decisions are learnt within a Markov decision process framework. The result is a sparse decision DAG that can be seen as a generalization of cascades classifiers introduced by Viola and Jones. In addition to presenting the framework and some benchmarks for the classification task, I will also discuss some properties of the algorithm which relate it to deep learning.