
**Abstract**

Spotting tasks require accurate detection of target patterns from a background of richly varied non-target inputs. Examples include keyword spotting from continuous acoustic input, spotting cars in satellite images, and finding printed text on images which contain complex graphics. The performance measure of interest for these tasks, called the figure of merit, is the detection rate for target patterns when the false alarm rate is in an acceptable range. A new approach to training spotters is presented which computes the figure of merit gradient for each input pattern using fast sort algorithms and then directly maximizes the figure of merit using backpropagation. This eliminates the need for thresholds during training. It also uses network resources to model Bayesian a posteriori probability functions accurately only for patterns which have a significant effect on the detection accuracy over the false alarm rate of interest. Figure of merit training increased detection accuracy by as much as 5 percentage points for a simple hybrid radial basis function (RBF) - hidden Markov model (HMM) wordspotter on the credit-card speech corpus. An extensive set of experiments is currently being performed on a new high-performance RBF-HMM wordspotter to adjust all RBF parameters and also add structure to a non-keyword filler model using figure of merit training.