

## 825—B138

**Visual field classification comparing neural networks, statistical classifiers, Statpac, and a glaucoma expert.** P.A. Sample, J.M. Williams, E.Z. Blumenthal, K. Chan, T.-W. Lee, R.N. Weinreb, T.J. Sejnowski, M.H. Goldbaum. Glaucoma Center and Visual Function Laboratory, and Institute for Neural Computing, University of California, San Diego, and Computational Neurobiology Laboratory, Salk Institute, La Jolla, CA 92093.

**Purpose.** To compare a variety of classification techniques for separating normal and glaucomatous visual fields. **Methods.** Data was from 155 eyes with and 271 eyes without glaucomatous optic neuropathy; determined by masked stereophoto evaluation. Visual fields were not used to classify subjects. We used a multilayer perceptron (MLP), a support vector machine (SVM), a mixture of Gaussian and a mixture of independent component analysis (ICA) to classify standard Humphrey 24-2 visual. The absolute threshold values for 52 test locations and age were inputs for training with cross-validation. Results were compared to results with a linear discriminant function, Statpac indices, the Glaucoma Hemifield Test (GHT) and a glaucoma expert. **Results.** The area under the ROC curve and the sensitivity/specificity (set close to 90%) for the best of each type of analysis below.

Classifier	Type	area	Sensitivity	Specificity
Glaucoma experts	human		0.748	0.90
Linear discriminant function	statistical	0.835	0.626	0.90
Glaucoma hemifield test	global index		0.660	0.99
Pattern standard deviation	global index	0.880	0.736	0.93
Mixture of Gaussian	neural network	0.902	0.774	0.90

**Conclusion.** Mixture of ICA and mixture of Gaussian were the best performing neural networks comparing well with the expert and the best index, PSD. These networks have utility in situations where a glaucoma expert is not available or for newer visual field tests where statistical analysis packages are not yet developed.

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