

## **Comparison of ARTMAP Neural Networks for Classification for Face Recognition from Video**

**ABSTRACT--** In applications of face recognition from video, the What-and-Where fusion neural network has been shown to reduce the generalization error by effectively accumulating a classifier's predictions over time, according to each individual in the environment. In this paper, fuzzy ARTMAP and ARTMAP-IC are compared for the classification of faces detected in video frames within the What-and-Where fusion neural network. ARTMAP refers to a family of neural network architectures that can perform fast on-line incremental learning to account for novelty encountered in the field, and process video streams at a high speeds, making them attractive for complex real-time applications. ARTMAP-IC expands on the well-known fuzzy ARTMAP by using a distributed activation of category neurons, and by biasing distributed predictions according to the number of times these neurons are activated by training set patterns. Average performance of What-and-Where fusion system is compared to that of the reference  $k$ -NN classifier in terms of generalization error, convergence time and compression, using a data set of real-world video sequences. Simulation results indicate that when ARTMAP-IC is used, it can achieve a recognition rate that is significantly lower (about 20%) than if fuzzy ARTMAP is used, and comparable to that of  $k$ -NN alone. Indeed, ARTMAP-IC is less effective than fuzzy ARTMAP with the complex decision boundaries and the limited training data found in complex video data.