

MASTERS DEGREE DEFENSE  
COMPUTER SCIENCE DEPARTMENT

**Use of Neural Networks to Detect Impaired Cheating on the  
Computerized CERAD Word List Memory Test**

By

Timothy Chan

The computerized CERAD word list memory test, also known as the Enhanced Mental Skills Test (EMST), is one of several tools used by the Long Term Care (LTC) insurance industry to screen applicants for mild cognitive impairment (MCI) or dementia, which if detected, would result in denial of a policy. Telephone administration of this test often leads to a high incidence of cheating. An unpublished statistical method using logistic regression has previously been developed in an attempt to detect cheating. This method used a two step approach: 1) distinguish cheaters from non-cheaters 2) distinguish impaired-cheaters from unimpaired-cheaters. We employed the use of neural networks and compared our results with this data. We found that our neural network did a better job in step 1 by virtue of having a dominating average ROC curve, thus, a greater average area under the ROC curve (AUROC), and narrow confidence bands, indicating low variability of the model. We found the same could not be said of step 2: our model was dominated by the statistical method and had wider confidence bands than in step 1. We explored a one step approach and produced a model with an even higher rate of variability and a lesser average AUROC than the previous models. The two step and one step neural network models were compared with each other using specific cutoff values. The two step approach marginally outperformed the one step approach by having a higher sensitivity with roughly equivalent positive predictive value (PPV) and specificity.

Date: Thursday, March 13, 2008

Time: 12:00 - 1:00 pm

Location: 8-48 Computer Science Conference Room

Advisor / Committee Chair: Dr. Amar Raheja  
Committee Members: Dr. Chung Lee, Dr. Daisy Tang