Title: Learning with Mean-Variance Filtering, *SVM* and Gradient-based Optimization

Name, address, email: Vladimir Nikulin, the Australian National University, Canberra, Australia, vladimir.nikulin@anu.edu.au

Acronym of the best entry: *GbO+MVf+SVM2*

Reference: Learning with Mean-Variance Filtering, *SVM* and Gradient-based Optimization, Vladimir Nikulin. In Proceedings IJCNN06, to appear.

Method:
We consider several models, which employ gradient-based method as a core optimization tool. Experimental results were obtained in a real time environment during WCCI-2006 Performance Prediction Challenge. None of the models were proved to be absolutely best against all five datasets. Furthermore, we can exploit the actual difference between different models and create an ensemble system as a complex of the base models where the balances may be regulated using special parameters or confidence levels.

Overfitting is a usual problem in the situation when dimension is comparable with sample size or even higher. Using mean-variance filtering we can reduce the difference between training and test results significantly considering some features as a noise.

Results:
In the challenge we rank 12th as a group and our best entry is 47th, according to the average rank computed by the organizers.

Dataset	Our best entry				The challenge best entry			
	Test AUC	Test BER	BER guess	Guess error	Test AUC	Test BER	BER guess	Guess error
ADA	0.8225	0.1851	0.165	0.0201	0.8304	0.1696	0.155	0.0146
GINA	0.9403	0.0566	0.05	0.0066	0.9639	0.0361	0.0388	0.0027
HIVA	0.6588	0.3536	0.245	0.1086	0.7129	0.2871	0.27	0.0171
NOVA	0.9474	0.0507	0.05	0.0007	0.9542	0.0458	0.0503	0.0045
SYLVA	0.9644	0.0212	0.012	0.0092	0.9937	0.0063	0.0058	0.0005
Overall	0.8667	0.1334	0.1044	0.029	0.891	0.109	0.104	0.0079

Keywords:
Gradient-based optimization, support vector machines, feature selection, logit model, ensemble method