Department of Automatic Control & Systems Engineering
would like to announce the following seminar:

Information Theoretic Novelty Detection

Speaker: Dr Maurizio Filippone

Department of Computer Science
University of Sheffield

Tuesday 7 July 2009
at 14:10

Location: St Georges Mappin Building LT2

Tea and Biscuits will be served afterwards.

ABSTRACT

In this talk, we present a novel approach to online change detection problems when the training sample size is small. The proposed method is based on estimating the expected information content of a new data point in the null hypothesis that it has been generated from the same distribution as the training data. In the case of the Gaussian distribution, our approach is analytically tractable and closely related to classical statistical tests, since the expected information content is independent from the statistics of the generating distribution. Such a test naturally takes into account the variability of the statistics due to the finite sample effect, and thus it allows to control the false positive rate even when only a small training set is available. We then discuss two different extensions of the presented method. In the first, we propose an approximation scheme to evaluate the information content of a new data point in the case when the generating distribution is a mixture of Gaussians. Finally, we study the extension to autoregressive time series with Gaussian noise, thus removing the i.i.d. assumption. The experiments conducted on synthetic and real data sets show that our method maintains a good overall accuracy, but significantly improves the control over the false positive rate.