

# UW CENTER FOR PATTERN ANALYSIS AND MACHINE INTELLIGENCE

## GRADUATE SEMINAR SERIES

### Visual Similarity and Change Detection using Maximum Mean Discrepancy

**Speaker:** Michael Diu

**Date:** January 16, 2013

**Time:** 4:00 pm – 4:30 pm

**Place:** E5 (5128) Refreshments will be served

#### **Abstract :**

The need to quantify similarity between two groups of objects is prevalent throughout the signal processing world, for example to match small image patches in visual tracking applications. Traditionally, measures such as the Mahalanobis distance or Kullback-Leibler divergence are commonly employed - but these require expensive covariance computations, or involve the evaluation of complicated integrals.

Maximum Mean Discrepancy (MMD) is a recently popularized metric distance measure that is computationally simpler - involving the inner product between the difference in means of the two distributions - yet statistically powerful, because these distributions are mapped into a high-dimensional, nonlinear feature space using kernels, whereupon the means are estimated via the Parzen estimator.

Our work applies this statistical measure traditionally associated with unordered groups of data and time series of 1-D data, to detecting changes in temporal or spatial series of 2-D problems. We discuss appropriate data representations and kernels to be used in conjunction with MMD on both supervised learning problems (scene categorization) and unsupervised ones (scene change detection).