

The University of Hong Kong  
Department of Psychology

*Departmental Seminar*

***NIMBLE: Robust Classification of Objects, Faces, and Flowers  
Using a Biologically-inspired Vision System***

Date: April 3, 2012 (Tuesday)  
Time: 11:30 a.m. to 12:30 p.m.  
Venue: Room 624, Knowles Building, HKU  
Speaker: Professor Gary Cottrell  
Department of Computer Science and Engineering  
University of California, San Diego  
USA

People, unlike computer vision systems, can recognize a large number of objects and faces in a robust manner, in a variety of lighting conditions and with partial views. We have developed a biologically-inspired visual classifier called NIMBLE, for NIM with Bayesian Likelihood Estimation, that uses fixations based upon a salience map. The salience map and the information extracted from each fixation use the same features learned in an unsupervised way from natural images. An object is learned by storing the fixations and labels in an exemplar-based memory. At recognition time, a salience map is again generated and the extracted fixations compared with those in memory using Bayesian updates. The model parameters were tuned on Birds and Butterflies datasets, and then applied unchanged to Faces, Objects, and Flowers. This is in sharp contrast to most computer vision systems, which are usually tuned for the particular application. The model achieved state of the art performance for systems using a single feature type. Our approach achieves 78.5% accuracy on Caltech-101 and 75.2% on the 102 Flowers dataset when trained on 30 instances per class and it achieves 92.7% accuracy on the AR Face database with 1 training instance per person. The same features and parameters are used across these datasets to illustrate its robust performance.