



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics  
**DISSERTATION PROPOSAL**

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**Sequential Learning of Visual Features, and Statistical  
Model for Object Detection with Occlusion Reasoning**

**FRIDAY, March 1, 2013, at 1:00 PM**  
103 Eckhart Hall, 5734 S. University Avenue

**ABSTRACT**

We propose a sequential unsupervised learning algorithm for visual features, and a statistical model for object detection with occlusion reasoning. The sequential learning of visual features is built upon the patchwork-of-parts framework. New features are added to the visual vocabulary only when the existing features cannot adequately explain the given images. The resulting algorithm is highly intuitive and very interpretable. In our statistical model for object detection, we introduce a novel standardization scheme that stabilizes the log likelihood ratios in a hypothesis test of object against non-object. This stability across objects of different sizes provides a unified framework to test for partially occluded objects with arbitrary occlusion. As part of our experiments, we take advantage of our standardization scheme and build a remarkably simple ellipse detector that requires no training at all.

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