Image Annotation and Tag Completion via Kernel Metric Learning and Noisy Matrix Recovery

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When: December 21st from 10a-12p

Where: 3112 Engineering Building

Abstract:
Recently large-scale image tagging has become a hot topic in the interdisciplinary areas of machine learning and computer vision. This thesis introduces two novel image tagging algorithms that mainly capture the essential relationship between/within images and tags even when the given tags are incomplete and noisy. To mitigate the high computational cost and significant information loss as in traditional metric learning, a regression-based robust kernel metric learning algorithm is proposed, where the PSD property is automatically ensured and numeric constraints over tags are applied to improve the annotation efficiency and accuracy. To handle the incompleteness and noise within user-provided image tags, a tag completion algorithm with noisy matrix recovery is proposed, where the observed tags are assumed to be independently sampled from unknown distributions, and the goal is to recover that tag probability matrix based on the partially revealed tags that could be noisy.