Background

Text-based image search is widely used when people access online images. Direct results given by search engines are usually unsatisfactory:
- Ambiguity in texts
- Gap between textual and visual contents

Image Re-ranking: refine the text-based results by visual information

Motivations

Graph-based methods are prevalent and effective

- Image distance is a corner stone of graph-based methods
- Distances based on low-level visual features suffer from semantic gap
- Learn a high-level distance, adaptive to each query

Framework

Define a high-level distance based on Anchor Concept Graph

Methods

Learning anchor concepts
- Anchor concepts: most visually-coherent query expansions

Algorithm 1: Concept Discovery through Query Expansion

\[ V^c = \text{high-level distances} \]

Estimating Concept Correlations
- Anchor concepts are correlated to each other
- Estimated using Google Kernel[3]

Concept Projections
- Represent images using anchor concepts
- Encode each image using a M-dim probability vector
- Multi-class SVM is used to perform encoding

ACG Distance
- Smooth (incorporating concept correlations)
- Difference

\[ \text{Dataset: MSRA-MM (68 queries) and INRIA (352 queries)} \]

Evaluation Metric: NDCG

Examples (top to bottom: initial, SIFT dist, ACG dist)

Reference