Object-Graphs for Context-Aware Category Discovery

Yong Jae Lee and Kristen Grauman
Input: unlabeled pool of novel images

Compute multiple-segmentations for each unlabeled image

An unknown region within an image

Closest nodes in its object-graph

\[ K(s_i, s_j) = K_{app}(s_i, s_j) + K_{obj-graph}(s_i, s_j) \]
MSRC-v2 set1

- Unknown (5): building, tree, cow, airplane, bicycle
- **Known** (16): grass, sheep, sky, water, face, car, flower, sign, bird, chair, road, cat, dog, body, boat
- Void: void, horse, mountain
Replicating result

Discovery

set1: 5 unknowns / 16 knowns
Low quality known object classifiers

Sampling
• 1/2 training data for each known class (54% data)
• 1/3 training data for each known class (44% data)
• 1/4 training data for each known class (33% data)
1/2 training data

![Graph showing purity vs. number of clusters for two methods: Object-Graph and App. Only. The graph plots purity on the y-axis and the number of clusters on the x-axis. The Object-Graph method is represented by a blue line, and the App. Only method is represented by a red line. The graph shows that the Object-Graph method generally has a higher purity than the App. Only method as the number of clusters increases.](image-url)
1/3 training data
1/4 training data
Overall (#run = 3 instead of default 10)

![Graph showing the relationship between the number of clusters and purity for different data splits. The graph includes lines for 'full train', '1/2 train data', '1/3 train data', '1/4 train data', and 'App. Only'. The x-axis represents the number of clusters, ranging from 0 to 35, and the y-axis represents purity, ranging from 0.2 to 0.55. The graph indicates that as the number of clusters increases, the purity generally increases as well.](image-url)