Overview

Insight-DCU participated in the instance search (INS) and semantic indexing (SIN) tasks in 2014. Two very different approaches were submitted for INS, one based on features extracted using pre-trained deep convolutional neural networks (CNNs), and another based on local SIFT features, large vocabulary visual bag-of-words aggregation, inverted index-based lookup, and geometric verification on the top-N retrieved results. Two interactive runs and two automatic runs were submitted, the best interactive runs achieved a mAP of 0.135 and the best automatic 0.12. Our semantic indexing runs were based also on using CNN features, and on SVM classifiers with linear and RBF kernels. One run was submitted to the main task, two to the no annotation task, and one to the progress task. Data for the no-annotation task was gathered from Google Images and ImageNet. The main task run has achieved a mAP of 0.086, the best no-annotation runs had a close performance to the main run by achieving a mAP of 0.080, while the progress run had 0.043.


Instance Search using CNN features

A target image dataset was built by uniformly extracting keyframes for every shot with a sample rate of 1/4 fps. The resulting dataset contained 647,628 keyframes.

Features

The system used Caffe and the pretrained ImageNet models extract 4096D CNN features for each keyframe from layer 7 of the network. CNN features extracted globally for whole query image and also locally on region around target object mask. SCG object candidates also extracted for some of the queries, and local CNN features computed on these candidates.

Semantic Indexing

4096D CNN features from pre-trained ImageNet 2011 model, extracted from layer 7 using Caffe. Standard mirroring and cropping expansion, followed by average pooling applied.

Details

- Harris-Laplace detector, SIFT descriptor
- Vocabulary Size: 1M
- Inverted index, Lp-Norm IDF weighting
- Multiple query and jointed average scoring
- Geometric verification on top 100 results
- Query expansion using top 20 results

Runs

One automatic run, mAP 0.120.