

IoC Distinguished Lecture Series

Robust and Computationally Efficient Image Co-Segmentation



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Date: 11 April 2018 (Wednesday)
Time: 4:30 - 5:30 pm (Preceded by Reception at 4:00 pm)
Venue: SCT 909, Science Tower,
Ho Sin Hang Campus, Hong Kong Baptist University

Abstract

If one is given a large number (N) of images sourced from various places and under different contexts, but having at least "something" in common, then the extraction of the object common in all these images is known as co-segmentation. The first part of the talk will explain how this can be solved using the concept of maximum common subgraph (MCS) matching. This problem becomes very challenging if only an unknown number (say $M < N$) of these images contain the co-segmentable common object. This is quite natural as not everyone in the crowd is looking at the same object. Unfortunately, MCS cannot be applied to co-segment this outlier-ridden image set. We introduce a new concept called maximally occurring common subgraph (MOCS) matching, which is capable of handling such outliers in the data. Unfortunately the search becomes prohibitive. We provide a greedy solution to MOCS matching problem by defining an intermediate graphical representation called latent class graph. This requires only $O(N)$ matching operations and ensures globally consistent matching of the common object regions across images.

In the second part of the talk, we shall discuss how the same problem can also be solved using statistical mode detection in the multi-dimensional feature space of all super-pixel segments in the image set. We assume that the dominant mode and its neighbors in the feature space correspond to the image segments that partially constitute the common object in every image. We obtain the complete objects using an LDA based region growing of the partial object regions. We shall present the details of these methods in the talk and shall illustrate the efficacy of the proposed solutions in solving the co-segmentation problem.

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