A Multi-cut Formulation for Joint Segmentation and Tracking of Multiple Objects ax16_9

Wednesday, June 28, 2017 5:05 PM

1 Tries to jointly solve motion segmentation and MOT problems by creating a graph with nodes representing both point trajectories and detections and finding minimum cost multi cuts for this graph

2 Since there are two kinds of nodes, there are three kinds of edges that can connect these together → C_L, C_h and C_{hL} respectively join $V_L - V_L$, $V_h - V_h$ and $V_L - V_h$; V_L → point trajectories and V_h → detections

3 The potentials or costs of these edges are mostly given by heuristics

3.1 a point sampling rate is used instead of feature detectors and all points with "significant underlying image structure" are tracked using large displacement OF

3.2 The familiar FBE is used to end trajectories that are inconsistent and wherever this happens, new trajectories are inserted to maintain the sampling rate (.?)

3.3 C_L is computed by combining motion, spatial and color distances between the trajectories → motion and color are computed only for those with common lifetimes while spatial is also computed for those without temporal overlap.

3.4 C_h is computed from simple features based on IOU

3.5 C_{hL} is computed by combining the spatio-temporal distance between the point and the center of the detection with the value of the segmentation template at the point

4. The solution to the MC-MC problem is APX hard so heuristics (47 years old) are used to get approx. solutions that are apparently good enough in practice.

5 A lot of heuristics are used for computing the edge costs for each of the datasets where different ones seem to be needed depending on the exact nature of the detections → too many detections need to be grouped into tracklets while too sparse ones, for instance those obtained after non maximum suppression require a crude empirical normalizing factor.

6- A general performance observation is that the false negatives decrease while false positives rise