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Unsupervised Motion Segmentation in Videos

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Abstract

Motion segmentation of a video is generally considered as the task of identifying independently moving objects in videos and learning their motions and appearances in an unsupervised manner. Successful motion segmentation schemes can provide useful intermediate-level information for higher tasks, for example object recognition in videos. However, the problem is difficult to solve since no prior knowledge about the videos are assumed. Generative models, such as layer-representation, are commonly used as the framework for inferring unknowns. Approximate inference in these models is hampered by local minima problems. Low-level clues from the video, obtained independently from the generative model, can constrain the search space and reduce the chance of the top-down inference algorithms falling into local minima. I will be presenting a number of ways for obtaining useful low-level information, which can aid the inference in the generative models, and secondly how these cues can be integrated with the generative model in a probabilistically meaningful manner. The second half of the talk, a number of ways for performing approximate inference in these combined models will be presented. I will be also showing how off-the-shelf toolboxes such as netlab can be used to implement the approximate inference algorithms.