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Motion segmentation based on edge detection(CSE424)

Summary

This paper introduces a method to get images from an occluded background efficiently and with minimal calculations through pattern recognition.

The text discusses the significance of model-based motion segmentation in computer vision. Various methods are highlighted, including the use of statistical theory to estimate model parameters and motion regions. Notable techniques mentioned include Markov random fields and multiscale Gibbs models, Kalman filters, Probabilistic Data Association Filters, the level set method, and a MAP (Maximum A Posteriori) method.

One common challenge in these methods is occlusion, where moving objects can hide parts of the background, making segmentation less accurate. The paper introduces a new model-based segmentation approach designed to accurately capture the edges of moving objects with reduced computational complexity. The paper's structure includes a brief introduction to their motion segmentation method in section 2, a detailed description of a background edge removal method based on pattern recognition in section 3, and the presentation of experimental results in section 4.

After applying the Canny operator, an edge mask image is generated, serving as the data source for the pattern recognition process. The paper makes an assumption that the background either moves as a rigid body or remains stationary. Based on this assumption, the edges in the mask image are categorized into two types: background or object. If the pixels on both sides of an edge move in the same way, it is classified as part of the background. Conversely, if the pixels on either side of the edge move differently, it is considered part of the moving object.

Limitation :

The assumptions indicate that it needs a high resolution video or image to apply the method. So we can deduce that a low quality content will not be that accurate.

The paper tries to identify objects from previous used data sources which may not be valid for today.

Synthesis:

Papers like this paved the way for self-driving cars and drones for object detection which have huge applications further down the lane. This can also be used for medical and security purposes for low computational hardware.