

Fast and Scale-Adaptive Target Tracking via PCA-SIFT

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Abstract : As the main challenge for target tracking is accounting for target scale change and real-time, we combine Mean-Shift and PCA-SIFT algorithm together to solve the problem. We introduce similarity comparison method to determine how the target scale changes, and taking different strategies according to different situation. For target scale getting larger will cause location error, we employ backward tracking to reduce the error. Mean-Shift algorithm has poor performance when tracking scale-changing target due to the fixed bandwidth of its kernel function. In order to overcome this problem, we introduce PCA-SIFT matching. Through key point matching between target and template, that adjusting the scale of tracking window adaptively can be achieved. Because this algorithm is sensitive to wrong match, we introduce RANSAC to reduce mismatch as far as possible. Furthermore target relocating will trigger when number of match is too small. In addition we take comprehensive consideration about target deformation and error accumulation to put forward a new template update method. Experiments on five image sequences and comparison with 6 kinds of other algorithm demonstrate favorable performance of the proposed tracking algorithm.

Keywords : target tracking, PCA-SIFT, mean-shift, scale-adaptive

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