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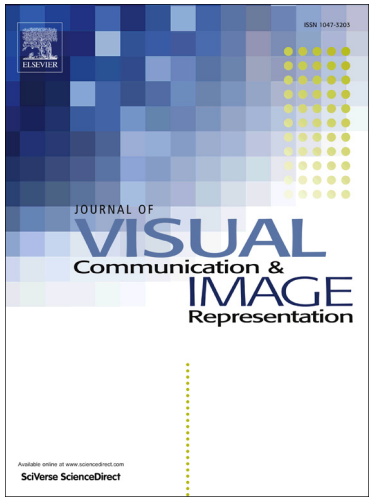

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Correlation Filter Tracker based on Sparse Regularization

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Abstract

Recently, correlation filter-based trackers have achieved the competitive performance both on accuracy and robustness. To learn a classifier effectively, these methods exploit a periodic assumption of the training samples to model the processing of dense sampling in Fourier domain. However, the periodic assumption introduces unwanted boundary effects, which severely degrades the performance of tracking model.

To lower the boundary effects, we propose a multi-scale ℓ_1 regularized correlation filter tracker (MSL1CFT), which leverages the different regularization parameters to penalize each correlation filter coefficient in the learning process. Our method can learn the correlation filter model on a significantly larger set of negative training samples, without worsening the positive samples. We further present a fast solver to our model utilizing the Alternating Direction Method of Multipliers (ADMM) technique. The extensive empirical evaluations on two benchmark datasets: OTB2013 and VOT2015 demonstrate that our method outperforms the state-of-the-art approaches in tracking accuracy and robustness.

Keywords: Object tracking; Correlation filter; Adaptive ℓ_1 regularization; Occlusion handling

1. Introduction

Visual tracking has long been a fundamental problem in computer vision field, since it plays a crucial role in a wide range of practical applications (*e.g.*, intelligent surveillance, autonomous navigation, human computer interaction, action recognition). However, in real-world scenes, some challenging factors, such as