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PII: S0923-5965(18)30062-6
DOI: https://doi.org/10.1016/j.image.2018.01.005
Reference: IMAGE 15320

To appear in: *Signal Processing: Image Communication*

Received date : 13 July 2017
Revised date : 23 January 2018
Accepted date : 23 January 2018

Please cite this article as: J. Wang, W. Liu, W. Xing, S. Zhang, Visual object tracking with multi-scale superpixels and color-feature guided Kernelized correlation filters, *Signal Processing: Image Communication* (2018), https://doi.org/10.1016/j.image.2018.01.005

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Visual Object Tracking with Multi-Scale Superpixels and Color-Feature Guided Kernelized Correlation Filters☆

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Abstract

While discriminative correlation filter based tracking algorithms have achieved competitive results and demonstrated successfully, there still remain some challenges, such as handling the scenarios of scale variation, fast motion, etc. A region of interest with a fixed size, which is usually used by discriminative correlation filter based tracking algorithms to train correlation filter and track object, makes the trackers hard to deal with the challenges of fast motion and scale variation. It also restricts the use of object structure information. In this paper, we propose a Multi-Scale Superpixels and Color Feature Guided Kernelized Correlation Filters (MSSCF-KCF) to deal with the problems mentioned above. Firstly, we treat tracking procedure as optimizing the combination of components of an object, and propose a multi-scale superpixel method to segment object image based on a proposed global confidence mask which determines the center and size of object patches automatically. Then, KCF is embedded into Bayesian filter framework, in which the proposed color guided confidence map is viewed as an observation model, to expand the tracking range and improve the performance when handling fast motion. Finally, we propose a center distance matrix of each object patch to use structure information of object. A novel min-max criterion as well as drop-out strategy is used to search the optimal

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