

# Author's Accepted Manuscript

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PII: S0031-3203(15)00437-9  
DOI: <http://dx.doi.org/10.1016/j.patcog.2015.11.017>  
Reference: PR5580

To appear in: *Pattern Recognition*

Received date: 17 June 2015  
Revised date: 10 September 2015  
Accepted date: 16 November 2015

Cite this article as: Xuwei Shen, Xiubao Sui, Kechen Pan and Yuanrong Tao, Adaptive pedestrian tracking via patch-based features and spatial-temporal similarity measurement, *Pattern Recognition*, <http://dx.doi.org/10.1016/j.patcog.2015.11.017>

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# Adaptive pedestrian tracking via patch-based features and spatial-temporal similarity measurement

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## Highlights

- A patch-based appearance model is proposed according to stable properties.
- The number of valid patches in particles is automatically adjusted.
- A spatial-temporal similarity measurement is formulated for tracking and updating.
- A shadow removal algorithm is introduced to build a robust tracker under abrupt illumination.
- An extensive comparison with state-of-art methods.

## Abstract

The existing pedestrian tracking algorithms are still challenging under abrupt illumination, occlusions, out of field of view, and cluttered backgrounds. In this paper, we propose a novel tracking framework to handle the above tracking failures. The framework consists of two steps: image shadow removal and tracking by association. Shadow removal tackles tracking failures under large illumination variation between shaded and non-shaded area. Tracking by association is based on particle filter. Inspired by the observation that the different parts in one pedestrian target have different stable properties, we represent the target with perceptual hashing (PH) and color self-similarity at patch level, and design an adaptive patch-based similarity measurement which simultaneously considers the spatial and temporal appearance information of the target.

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