

Accepted Manuscript

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PII: S0950-7051(17)30274-5
DOI: [10.1016/j.knosys.2017.06.001](https://doi.org/10.1016/j.knosys.2017.06.001)
Reference: KNOSYS 3928



To appear in: *Knowledge-Based Systems*

Received date: 28 January 2017
Revised date: 29 May 2017
Accepted date: 1 June 2017

Please cite this article as: Sohailah Alyammahi, Harish Bhaskar, Dymitr Ruta, Mohammed Al-Mualla, People Detection and Articulated Pose Estimation Framework for Crowded Scenes, *Knowledge-Based Systems* (2017), doi: [10.1016/j.knosys.2017.06.001](https://doi.org/10.1016/j.knosys.2017.06.001)

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People Detection and Articulated Pose Estimation Framework for Crowded Scenes

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Abstract

In this paper, we propose a novel articulated pose estimation framework for the simultaneous detection of the human as a whole and their constituent body parts in crowded scenes. The model uses a single discriminative classifier that searches for dependent limbs thereby alleviating the independent inference limitation of other state-of-the-art models. The proposed framework is a hierarchical model that detects humans at both macro and micro levels by fusing global and local detectors. The proposed methodology is validated using a publicly available crowd dataset captured indoors in a sports stadium. Detection results are assessed using the percentage of correctly localized parts (PCP) evaluation metric and compared against competing baselines. Our experimental results report mean detection accuracy of 85% for the global upper body, 95% for the head, 82% for the torso, 71% and 60% for upper and lower arms respectively. A systematic analysis of results also verifies that the proposed model outperforms the state-of-the-art models in terms of detection rate, accuracy and computational complexity.

Keywords: Crowd scenes, hierarchical model, joint model, support vector machines, deformable part models, percentage of correctly localized parts.

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