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Fully-automated person re-identification in multi-camera surveillance system with a robust kernel descriptor and effective shadow removal method

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Abstract

In this paper, a fully-automated person Re-ID (Re-identification) system is proposed for real scenarios of human tracking in non-overlapping camera network. The system includes two phases of human detection and Re-ID. The human ROIs (Regions of Interest) are extracted from human detection phase and then feature extraction is done on these ROIs in order to build human descriptor for Re-ID. Unlike other approaches which deal with manually-cropped human ROIs for person Re-ID, in this system, the person identity is determined based on the human ROIs extracted automatically by a combined method of human detection. Two main contributions are proposed on both phases of human detection and Re-ID in order to enhance the performance of person Re-ID system. First, an effective shadow removal method based on score fusion of density matching is proposed to get better human detection results. Second, a robust KDES (Kernel DEScriptor) is extracted from human ROI for person classification. Additionally, a new person Re-ID dataset is built in real surveillance scenarios from multiple cameras. The experiments on benchmark datasets and our own dataset show that the person Re-ID results using the proposed solutions

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