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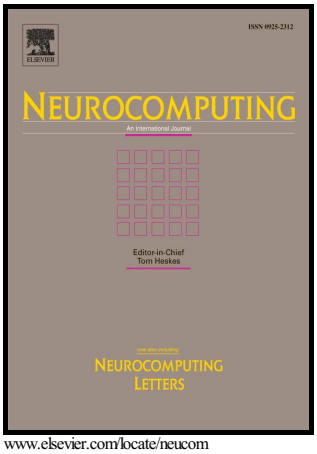

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Funnel-Structured Cascade for Multi-View Face Detection with Alignment-Awareness

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Abstract

Multi-view face detection in open environment is a challenging task due to diverse variations of face appearances and shapes. Most multi-view face detectors depend on multiple models and organize them in parallel, pyramid or tree structure, which compromise between the accuracy and time-cost. Aiming at a more favorable multi-view face detector, we propose a novel funnel-structured cascade (FuSt) detection framework. In a coarse-to-fine flavor, our FuSt consists of, from top to bottom, 1) multiple view-specific fast LAB cascade for extremely quick face proposal, 2) multiple coarse MLP cascade for further candidate window verification, and 3) a unified fine MLP cascade with shape-indexed features for accurate face detection. Compared with other structures, on the one hand, the proposed one uses multiple computationally efficient distributed classifiers to propose a small number of candidate windows but with a high recall of multi-view faces. On the other hand, by using a unified MLP cascade to examine proposals of all views in a centralized style, it provides a favorable solution for multi-view face detection with high accuracy and low time-cost. Besides, the FuSt detector is alignment-aware and performs a coarse facial part prediction which is beneficial for subsequent face alignment. Extensive experiments on two challenging datasets, FDDB and AFW, demonstrate the effectiveness of our FuSt detector in both accuracy and speed.

Keywords: face detection, multi-view, cascade, multilayer perceptron

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