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Generalizing Intersection Kernel Support Vector Machines for Color Texture Based Recognition

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Abstract: This paper presents a novel recognition approach in which the component-adaptive color co-occurrence matrices (CACCMs) are designed to characterize color and texture cues in the images, while histogram intersection kernel support vector machines (HIKSVMs) are generalized to the version compatible to color co-occurrence matrix (CCM), called CCM intersection kernel support vector machines (CIKSVMs). An ensemble learning framework is proposed for synchronously training the optimal marginal CIKSVMs and corresponding CACCMs' extractors. This learning architecture is applicable to an arbitrary color space employed for image coding, while we pay utmost attention to a perceptual uniform color space for the prominent potential in image proprieties' display. For the formulation of recognition algorithm, the set of multi-channel CACCMs (CAMCMs) of per sample is utilized to get a balance between discriminative power and computational efficiency, while multiple marginal CIKSVMs are combined by weighted majority voting. The effectiveness of our approach is validated by promising results obtained from four experimental datasets.

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