Pattern Recognition and Image Processing (II)

Organizers: Yuan Yan Tang, Yulong Wang
October 10 (Monday), 15:30-17:00, InterContinental Budapest, Panorama I
Session Chairs: Yuan Yan Tang, Yulong Wang

#1099 Effective Subpixel Edge Detection for LED Probes

Chung-Yen Su (TW), Li-An Yu (TW), Nai-Kuei Chen (TW)

The market of light-emitting devices (LED) is growing dramatically over these years. To test the quality of LEDs, lots of LED probes are required. Therefore, it is important to develop an effective method to measure the angle (around 10 degrees) and the radius (15 ?m ~ 30 ?m) of a produced LED probe. In this study, we propose a new subpixel edge detection for LED probes. The proposed method mainly consists of a coarse edge detection by Canny operators and a fine edge detection by a reconstructive method. In addition, an Otsu thresholding and a reflecting-point removal are included to reduce noise and increase accuracy. Compared to the previous methods, the proposed method can further reduce angle error up to 19.5% and the radius error up to 24.8%, respectively.

#1556 Improved ADMM based TV minimized Image Deblurring Without Boundary Artifacts

Dániel Hadházi (HU), Áron Horváth (HU), Gábor Horváth (HU)

Edge preserving (e.g. total variation minimized) regularized image deblurring methods are actively researched with many practical applications. Formally this type of deblurring is equivalent to a convex non-smooth optimization problem. In this paper we describe an ADMM optimization based effective algorithm which can be considered as an improved version of a previously published method. Due to the introduced modifications different loss functions can be easily used, positivity constraint is applied and the speed of the convergence of deblurring is also increased. The quality of the deblurring in the cases of using different loss functions is compared qualitatively and quantitatively and the accelerating rate of the convergence is also examined. For these measurements benchmark images were used. Based on our experiments we suggest to consider Huber function as loss function instead of the commonly used quadratic functions.

#1708 Rotation-Invariance Can Further Improve State-of-the-Art Blind Deconvolution Techniques

Vladik Kreinovich (US), Fernando Cervantes (US), Bryan Usevitch (US)

In many real-life situations, we need to reconstruct a blurred image in situations when no information about the blurring is available. This problem is known as the problem of blind deconvolution. There exist techniques for solving this problem, but these techniques are not rotation-invariant. Thus, the result of using this technique may change with rotation. So, if we rotate the image a little bit, the method, in general, leads to a different deconvolution result. Therefore, even when the original reconstruction is optimal, the reconstruction of a rotated image will be different and, thus, not optimal. To improve the quality of image decomposition, it is desirable to modify the current state-of-the art techniques by making them rotation-invariant. In this paper, we show how this can be done, and we show that this indeed improves the quality of blind deconvolution.

#1072 Phase Congruency Based Edge Saliency Detection and Rate Control for Perceptual Image and Video Coding

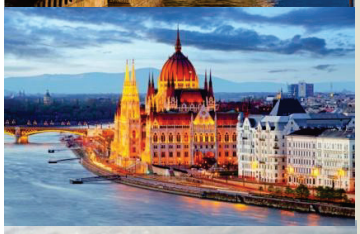
Sam Kwong (HK), Wei Gao (HK)

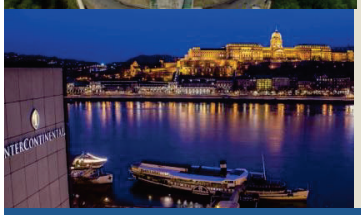
Phase Congruency (PC) features are firstly introduced into image and video coding field in this paper. As an effective tool to measure the edge information for image textures, PC change can be used to evaluate the compression loss, i.e. the coding distortions in image and video coding. Firstly, the compression influences on PC maps are given and analyzed. Secondly, the relationship between the consumed bits and the PC distortion are modeled. Lastly, the Mean-Squared-Error (MSE) based and PC distortion based optimized Coding Tree Unit (CTU) level bit allocation solutions are combined as a two step bit allocation and rate control method for intra frames for High Efficiency Video Coding (HEVC). Experimental results demonstrate that, compared with the state-of-the-art JCTVC-K0103 and JCTVC-M0257 methods, for small size videos, the proposed method can achieve significant R-D performance gains, and also works well on PC map preservation, quality smoothness and bit rate accuracy.

#1912 Discriminant Dictionary Learning with Sparse Embedding on Face Recognition

Yefei Chen (CN), Jianbo Su (CN)

Sparse dictionary learning on face recognition focuses on representing a face linearly by a set of atoms from the dictionary. How to learn a dictionary is a key issue to sparse representation. Structured dictionary has been used during the process of dictionary learning in order to improve the performance of classification. However, we consider that dictionary should not only be composed of a discriminant dictionary for identity or class information, but also a common dictionary which may contains disturbances and some common features for all class. Meanwhile, most of the proposed methods learns features and dictionary separatively, which may decrease the classification ability. Because projecting the source domain into a low dimensional space before dictionary learning will fail to catch some vital class-specific information which may be learned from dictionary learning. In this paper, a discriminant dictionary learning method with sparse embedding is proposed. Both discriminant and common dictionary are learned under the constraints on pairwise distance of sparsity coefficients, and the projection matrix is learned jointly. Experiments show that our method achieves better performance than other state-of-art methods on face recognition.



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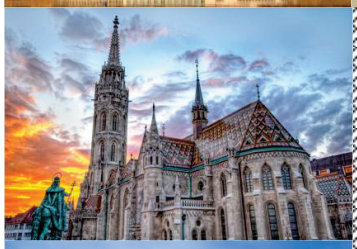

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