Analysis of Vehicle Number Plate Recognition

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Abstract:- Automatic License plate identification has many applications in traffic systems. In this paper, we propose many techniques such as forward motion deblurring, scale based region growing, blur estimation, blind image deblurring, no- reference metric for enhancing details of license plate images and obtain deblurred images.

***Key Words*:-** Low quality images, Enhancement model, License plate text detection, License plate recognition

1. INTRODUCTION

Automatic license Plate Recognition (LPR) without human intervention or influence is of great importance in the field of image processing and pattern recognition. This is because LPR plays a vital role in numerous applications especially in real time environments, such as toll collection of expressway, surveillance and management systems of unattended parking lots, traffic control, and customs control. In addition, license plate recognition is used in control systems for areas with limited accessibility, such as embassies, factories, army barracks, and elite city quarters and for identifying lost or stolen vehicles. Since LPR is required by real time applications as mentioned above, high detection and recognition rates are necessary to meet the requirement of such real time applications. Though two decades have been spent for improving LPR systems according to situations, there are still several challenges in achieving high detection and recognition rates.

II. LITERATURE SURVEY

Yijuan Lu, Qi Tian et al (2015) proposed BSIFT: Toward Data-Independent Codebook for Large Scale Image Search. This paper presents a framework for Bag-of-Words (BoWs) model based on Scale Invariant Feature Transform (SIFT) has been widely used in large-scale image retrieval applications. Feature quantization by vector quantization plays a crucial role in BoW model, which generates visual words from the high- dimensional SIFT features, so as to adapt to the inverted file structure for the scalable retrieval. Traditional feature quantization approaches suffer several issues, such as necessity of visual codebook training, limited reliability, and update inefficiency. To avoid the above problems, in this paper, a novel feature quantization scheme is proposed to efficiently quantize each SIFT descriptor to a descriptive and discriminative bit-vector, which is called binary SIFT (BSIFT).Our quantizer is independent of image collections. In addition, by taking the first 32 bits out from BSIFT as code word, the generated BSIFT naturally lends itself to adapt to the classic inverted file structure for image indexing. Moreover, the quantization error is reduced by feature filtering, code word expansion, and query sensitive mask shielding. Without any explicit codebook for quantization, our approach can be readily applied in image search in some resource-limited scenarios. We evaluate the proposed algorithm for large scale image search on two public image data sets. Experimental results demonstrate the index efficiency and retrieval accuracy of our approach.

Dingcheng Yang, Xiaoxiao Zhou et al(2015) proposed Energy cooperation in multi-user wireless powered relay networks. This paper presents a frame work for Energy cooperation schemes are considered in wireless cooperative networks; in these networks multiple pairs of users communicate with each other, assisted by an energy harvesting relay that gathers energy from the received signal by applying a power splitting scheme and forwards the received signal by using the harvested energy. This study is focused on the energy cooperation strategies for the relay to distribute the harvested energy between the multiple user pairs in amplify-and-forward and in decode-and-forward modes. Specifically, optimal solutions without energy cooperation at the relay node are first proposed and then the authors formulate the energy cooperation optimization problem. This optimization problem is non-convex. They propose an iterative energy cooperation solution to maximize the system throughput by assigning the proper harvested energy to each user pair for both types of forwarding models. They show that with the proposed method, the update in each iteration consists of a group of convex problems with a continuous parameter. Moreover, they derive the optimal solution to these convex problems in closed-form and it is shown that the solution can converge to a local optimum. Simulation results

demonstrate that the proposed algorithm outperforms the traditional non-cooperation method.

Shicheng Zheng, Li Xu et al (2013) proposed Forward Motion Deblurring. This paper presents a framework for handle a special type of motion blur considering that cameras move primarily forward or backward. Solving this type of blur is of unique practical importance since nearly all cars, traffic and bike-mounted cameras follow out-of plane translational motion. We start with the study of geometric models and analyze the difficulty of existing methods to deal with them. We also propose a solution accounting for depth variation. Homographies associated with different 3D planes are considered and solved for in an optimization framework. Our method is verified on several natural image examples that cannot be satisfyingly dealt with by previous methods. Motion blur is one ubiquitous problem in photo taking. Previous deblurring approaches model the degradation in different ways. For example, it is common to assume uniform blur with only in-plane translation or take into account camera rotation. While prior models are effective on images produced under their respectively defined conditions, there are still a bunch of blurred images that find no solution in restoration using existing techniques. Motion blur caused by out-of-plane translation falls into this set.

Yiming Liu_ Jue Wang, Sunghyun Cho et al (2013) proposed A No-Reference Metric for Evaluating the Quality of Motion Deblurring. This paper presents a framework for Methods to undo the effects of motion blur are the subject of intense research, but evaluating and tuning these algorithms has traditionally required either user input or the availability of ground-truth images. We instead develop a metric for automatically predicting the perceptual quality of images produced by state-of-the-art deblurring algorithms. The metric is learned based on a massive user study, incorporates features that capture common deblurring artifacts, and does not require access to the original images (i.e., is “no reference”). We show that it better matches user-supplied rankings than previous approaches to measuring quality, and that in most cases it outperforms conventional full-reference image-similarity measures. We demonstrate applications of this metric to automatic selection of optimal algorithms and parameters, and to generation of fused images that combine multiple deblurring results. The wide availability and ever-increasing sophistication of modern image processing and computational photography algorithms has brought about a need to evaluate their results. For instance, for a task such as image deblurring, a realistic characterization of image quality and the presence or absence of artifacts is necessary to select between different methods, as well as to choose parameters for each algorithm. Lacking an automated method for image quality assessment, many systems resort to asking the user. This, however, becomes increasingly impractical if dozens of algorithms and hundreds of parameter settings must be compared. While a large scale user study (using, for example, the Amazon Mechanical Turk) might be able to compare many combinations of algorithms and parameters, it would be unrealistic to use this methodology for every image that is processed. Haichao Zhang, David Wipf et al (2014) proposed Multi-Observation Blind Deconvolution with an Adaptive Sparse Prior. This paper presents a framework for describes a robust algorithm for estimating a single latent sharp image given multiple blurry and/or noisy N observations. The underlying multi-image blind deconvolution problem is solved by linking all of the observations together via a Bayesian-inspired penalty function, which couples the unknown latent image along with a separate blur kernel and noise variance associated with each observation, all of which are estimated jointly from the data. This coupled penalty function enjoys a number of desirable properties, including a mechanism whereby the relative-concavity or sparsity is adapted as a function of the intrinsic quality of each corrupted observation. In this way, higher quality observations may automatically contribute more to the final estimate than heavily degraded ones, while troublesome local minima can largely be avoided. The resulting algorithm, which requires no essential tuning parameters, can recover a sharp image from a set of observations containing potentially both blurry and noisy examples, without knowing a priori the degradation type of each observation. Experimental results on both synthetic and real-world test images clearly demonstrate the efficacy of the proposed method. Multi-observation blind deconvolution problems exist under various guises in fields such as signal/ image processing, computer vision, communications, and controls. For example, in communications it is frequently known as multi-channel blind equalization, where the objective is to estimate an unknown input signal that drives the output of several observed channels without knowledge of the source signal or the channel. Blind Image Deblurring Using Spectral Properties of Convolution Operators.

Guangcan Liu, Shiyu Chang et al (2014) proposed Blind Image Deblurring Using Spectral Properties of Convolution Operators. This paper presents a framework for Blind deconvolution is to recover a sharp version of a given blurry image or signal when the blur kernel is unknown. Because this problem is ill-conditioned in nature, effectual criteria pertaining to both the sharp image and blur kernel are required to constrain the space of candidate solutions. While the problem has been extensively studied for long, it is still unclear how to regularize the blur kernel in an elegant, effective fashion. In this paper, we show that the blurry image itself actually encodes rich information about the blur kernel, and such information can indeed be found by exploring and utilizing a well-known phenomenon, that

is, sharp images are often high pass, whereas blurry images are usually low pass. More precisely, we shall show that the blur kernel can be retrieved through analyzing and comparing how the spectrum of an image as a convolution operator changes before and after blurring. Subsequently, we establish a convex kernel regularizer, which depends only on the given blurry image. Interestingly, the minimize of this regularize guarantees to give a good estimate to the desired blur kernel if the original image is sharp enough. By combining this powerful regularizer with the prevalent non blind devonvolution techniques, we show how we could significantly improve the deblurring results through simulations on synthetic images and experiments on realistic images.

Junhua Mao, Houqiang Li et al (2014) proposed Scale Based Region Growing for Scene Text Detection. This paper presents a framework for Scene text is widely observed in our daily life and has many important multimedia applications. Unlike document text, scene text usually exhibits large variations in font and language, and suffers from low resolution, occlusions and complex background. In this paper, we present a novel scale-based region growing algorithm for scene text detection. We first distinguish SIFT features in text regions from those in background by exploring the inter and intrastatistics of SIFT features. Then scene text regions in images are identified by scale-based region growing, which explores the geometric context of SIFT key points in local regions. Our algorithm is very effective to detect multilingual text in various fonts, sizes, and with complex background. In addition, it offers insights on efficiently deploying local features in numerous applications, such as visual search. We evaluate our algorithm on three datasets and achieve the state-of-the-art performance. With the increasing popularity of high-performance and low price digital camera devices and smart phones, explosive growth of photos/ images are taken in daily life. In those images, it is widely observed that scene text frequently appears in the form of ads, graffiti, and signs. Lots of efforts have been made to understand the content of these images in multimedia community.

Chao Wang, Yong Yue et al (2013) proposed NEAS: A non-edge specific adaptive scheme for highly robust blind motion deblurring of natural images. This paper presents a framework for Blind motion deblurring estimates a sharp image from a motion blurred image without the knowledge of the blur kernel. Although significant progress has been made on tackling this problem, existing methods, when applied to highly diverse natural images, are still far from stable. This paper focuses on the robustness of blind motion deblurring methods towards image diversity - a critical problem that has been previously neglected for years. We classify the existing methods into two schemes and analyze their robustness using an image set consisting of 1.2 million natural images. The first scheme is edge specific, as it relies on the detection and prediction of large-scale step edges. This scheme is sensitive to the diversity of the image edges in natural images. The second scheme is non-edge specific and explores various image statistics such as the prior distributions. This scheme is sensitive to statistical variation over different images. Based on the analysis, we address the robustness by proposing a novel non-edge specific adaptive scheme (NEAS) which features a new prior that is adaptive to the variety of textures in natural images. By comparing the performance of NEAS against the existing methods on a very large image set, we demonstrate its advance beyond the state of the art.

JoAo P. Oliveira, Mario et al (2014) proposed Parametric Blur Estimation for Blind Restoration of Natural Images: Linear Motion and Out-of-Focus. This paper presents a framework for new method to estimate the parameters of two types of blurs, linear uniform motion (approximated by a line characterized by angle and length) and out-of-focus (modeled as a uniform disk characterized by its radius), for blind restoration of natural images. The method is based on the spectrum of the blurred images and is supported on a weak assumption, which is valid for the most natural images: the power-spectrum is approximately isotropic and has power-law decay with the spatial frequency. We introduce two modifications to the radon transform, which allow the identification of the blur spectrum pattern of the two types of blurs above mentioned. The blur parameters are identified by fitting an appropriate function that accounts separately for the natural image spectrum and the blur frequency response. The accuracy of the proposed method is validated by simulations, and the effectiveness of the proposed method is assessed by testing the algorithm on real natural blurred images and comparing it with state-of-the-art blind deconvolution methods.

Wengang Zhou, Ming Yang et al (2014) proposed Towards Codebook-Free: Scalable Cascaded Hashing for Mobile Image Search. This paper presents a framework for State-of-the-art image retrieval algorithms using local invariant features mostly rely on a large visual codebook to accelerate the feature quantization and matching. This codebook typically contains millions of visual words, which not only demands for considerable resources to train offline but also consumes large amount of memory at the online retrieval stage. This is hardly affordable in resource limited scenarios such as mobile image search applications. To address this issue, we propose a codebook-free algorithm for large scale mobile image search. In our method, we first employ a novel scalable cascaded hashing scheme to ensure the recall rate of local feature matching. Afterwards, we enhance the matching

precision by an efficient verification with the binary signatures of these local features. Consequently, our method achieves fast and accurate feature matching free of a huge visual codebook. Moreover, the quantization and binarizing functions in the proposed scheme are independent of small collections of training images and generalize well for diverse image datasets. Evaluated on two public datasets with a million distractor images, the proposed algorithm demonstrates competitive retrieval accuracy and scalability against four recent retrieval methods in literature. These mobile devices generally equip cameras which become one of the most natural and convenient portals from the physical space to the digital world. Thus, the ubiquitous access to both digital photos and internet sheds bright light on many emerging applications based on mobile image search. For instances, searching similar landmark or product images among visual media resource online may allow users to explore valuable information such as reviews or discounts on the spot.

III. CONCLUSION

We have proposed forward motion debluring, blind image debluring for enhancing license plate image quality to improve the performances of license plate recognition methods. The proposed model works based on the fact that the real and complex number power of derivative has the ability to study the abrupt changes affected by multiple factors for license plate images. Experimental results on enhancement show that the proposed model outperforms the existing methods. To show the effectiveness of the proposed model, we also conducted experiments on text detection and recognition for the enhanced images through several text detection and binarization methods .Finally we reduce the bluring of license plate images.

IV. REFERENCES

[1] W. Zhou, H. Li, R. Hong, Y. Lu, and Q. Tian, “Bsift: toward data independent codebook for large scale image search,” IEEE Transactions on Image Processing (TIP), vol. 24, no. 3, pp. 967–979, 2015

[2] W. Zhou, M. Yang, H. Li, X. Wang, Y. Lin, and Q. Tian, “Towards codebook-free: Scalable cascaded hashing for mobile image search,” IEEE Transactions on Multimedia (TMM), vol. 16, no. 3, pp. 601–611, 2014.

[3] S. Cho and S. Lee, “Forward motion deblurring,” ACM Transactions on Graphics (TOG), vol. 28, no. 5, pp. 145:1–145:8, Dec 2009.

[4] Q. Shan, J. Jia, and A. Agarwala, “High-quality motion deblurring from a single image,” ACM Transactions on Graphics (TOG), vol. 27, no. 3, pp. 73:1–73:10, 2008.

[5] J. Oliveira, M. Figueiredo, and J. Bioucas-Dias, “Parametric blur estimation for blind restoration of natural images: linear motion and outof- focus,” IEEE Transactions on Image Processing (TIP), vol. 23, no. 1

[6] C. Wang, Y. Yue, F. Dong, Y. Tao, X. Ma, G. Clapworthy, H. Lin,and X. Ye, “Nonedge-specific adaptive scheme for highly robust blind motion deblurring of natural imagess,” IEEE Transactions on Image Processing (TIP), vol. 22, no. 3, pp. 884–897, Mar 2013.

[7] J.-F. Cai, H. Ji, C. Liu, and Z. Shen, “Blind motion deblurring from a single image using sparse approximation,” in Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Jun2009, pp. 104–111.

[8] J. Mao, H. Li, W. Zhou, S. Yan, and Q. Tian, “Scale based region growing for scene text detection,” in Proceedings of the 21st ACM international conference on Multimedia, Oct 2013, pp. 1007–1016.

[9] G. Liu, S. Chang, and Y. Ma, “Blind image deblurring using spectral properties of convolution operators,” IEEE Transactions on Image Processing(TIP), vol. 23, no. 12, pp. 5047–5056, Dec 2014.

[10] H. Zhang, D. Wipf, and Y. Zhang, “Multi-observation blind deconvolution with an adaptive sparse prior,” IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), vol. 36, no. 8, pp. 1628–1643, Aug 2014.