ISSN 2350-1022
International Journal of Recent Research in Mathematics Computer Science and Information Technology
Vol. 4, Issue 1, pp: (42-46), Month: April 2017 – September 2017, Available at: www.paperpublications.org

NUMBER PLATE IMAGE DETECTION FOR FAST MOTION VEHICLES USING BLUR KERNEL ESTIMATION AND ANN

S.KALAIVANI[1], K.PRAVEENA[2], T.PREETHI[2], N.PUNITHA[2]

[1]Research Scholar, [2]UG Student, Department of Computer Science & Engineering,
Manakula Vinayagar Institute of Technology, Puducherry, India

***Abstract*: Many recent advancements have been introduced in both hardware and software technologies. Out of these technologies, we gain a lot of interest in Image Processing. As the eccentric identification of a vehicle, number plate is a key clue to discover theft and over-speed vehicles. The captured images from the camera are always in low resolution and suffer severe loss of edge information, which cast great challenge to existing blind deblurring methods. The blur kernel can be showed as linear uniform convolution and with angle and length estimation. In this paper, sparse representation is used to identify the blur kernel. Then, the length of the motion kernel has been estimated with Radon transform in Fourier domain. We evaluate our approach on real-world images and compare with several popular blind image deblurring algorithms. Based on the results obtained the supremacy of our proposed approach in terms of efficacy.**

***Keywords:* Image Segmentation, Angle Estimation, Length Estimation, Deconvolution Algorithm, Artificial Neural Network.**

1. INTRODUCTION

The term digital image refers to processing of a two dimensional picture by a digital computer. In a broader context, it implies digital processing of any two dimensional data. A digital image is an array of real or complex numbers represented by a finite number of bits. An image given in the form of a transparency, slide, photograph or an X-ray is first digitized and stored as a matrix of binary digits in computer memory. This digitized image can then be processed and/or displayed on a high-resolution television monitor. For display, the image is stored in a rapid-access buffer memory, which refreshes the monitor at a rate of 25 frames per second to produce a visually continuous display.

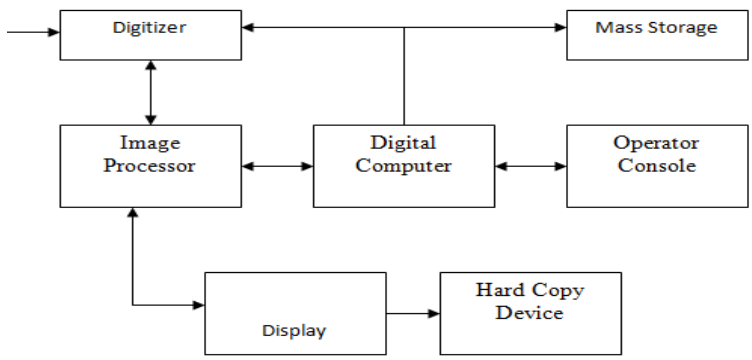

Fig.1. Image Processing System

ISSN 2350-1022

International Journal of Recent Research in Mathematics Computer Science and Information Technology
Vol. 4, Issue 1, pp: (42-46), Month: April 2017 – September 2017, Available at: www.paperpublications.org

ESTIMATION OF BLUR KERNEL:

Generally, the blur kernel is determined by the relative motion between the moving vehicle and static surveillance camera during the exposure time. When the exposure time is very short and the vehicle is moving very fast, the motion can be regarded as linear and the speed can be considered as approximately constant. In such cases, the blur kernel of number plate image can be modeled as a linear uniform kernel with two parameters: angle and length . In the following we introduce how to utilize sparse representation on over-complete dictionary to evaluate the angle of kernel robustly. After the angle estimation, frequency domain-based method is proposed to estimate the length of kernel

2. RELATED WORKS

A. AN NONEDGE-SPECIFIC ADAPTIVE SCHEME FOR HIGHLY ROBUST BLIND MOTION DEBLURING OF NATURAL IMAGES:

This 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. 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.

B. AN EFFICIENT DOCUMENT IMAGE DEBLURING ALOGRITHM:

Deblurring camera- based document image is an important task in digital document processing, since it can improve both the accuracy of optical character recongnition systems and the visual quality of document images. Traditional deblurring algorithms have been proposed to work for natural- scene images. However the natural- scene images are not consistent with document images. In this paper, the distinct characteristics of document images are investigated. It is based on document image foreground segmentation

C. PRINCIPAL VISUAL WORD DISCOVERY FOR AUTOMATIC LICENSE PLATE DETECTION:

In this paper License plates detection is widely considered a solved problem, with many systems already in operation. However, the existing algorithms or systems work well only under some controlled conditions. There are still many challenges for license plate detection in an open environment, such as various observation angles, background clutter, scale changes, multiple plates, uneven illumination, and so on. In this paper, we propose a novel scheme to automatically locate license plates by principal visual word (PVW), discovery and local feature matching.

D. UNDERSTANDING BLIND DECONVOLUTION ALGORITHMS.

This Blind deconvolution is the recovery of a sharp version of a blurred image when the blur kernel is unknown. Recent algorithms have afforded dramatic progress, yet many aspects of the problem remain challenging and hard to understand. The goal of this paper is to analyze and evaluate recent blind deconvolution algorithms both theoretically and experimentally. We explain the previously reported failure of the naive MAP approach by demonstrating that it mostly favors no-blur explanations.

3. EXISTING SYSTEM

Blind image deconvolution is an ill-posed problem that requires regularization to solve. However, many common forms of image prior used in this setting have a major drawback in that the minimum of the resulting cost function does not correspond to the true sharp solution. Accordingly, a range of workaround methods are needed to yield good results (e.g. Bayesian methods, adaptive cost functions, alpha-matte extraction and edge localization). In this paper we introduce a new type of image regularization which gives lowest cost for the true sharp image. This allows a very simple cost formulation to be used for the blind deconvolution model, obviating the need for additional methods. Due to its simplicity the algorithm is fast and very robust. We demonstrate our method on real images with both spatially invariant and spatially varying blur.

In this work bluring kernel is formed by constraint equation in which the first term is the likelihood that takes into account the formation model Eqn. 1 The second term is the new l1=l2 regularizer on x which encourages scale-invariant sparsity in the reconstruction. To reduce noise in the kernel, we add l1 regularization on k. The constraints on k (sum-to-1 and non-negativity) follow from the physical principles of blur formation. The scalar weights and   control the relative strength of the kernel and image regularization terms. Eqn. 2 is highly non convex. The standard approach to optimizing such a problem is to start with an initialization on x and k, and then alternate between x and k updates [4]. To make consistent progress along each of the unknowns and avoid local minima as far as possible, only a few iterations are performed in each update.

4. PROPOSED SYSTEM

In this paper, we target on this challenging BID problem: blind deblurring of fast moving license plate, which is severely blurred and even unrecognizable by human. Our goal is to recover a sharp license plate with confidence that the restored license plate image can be recognized by human effortlessly.This is one of the best algorithm to make the blurred image to the deblurred image.

Generally speaking, the blur kernel is dominated by the relative motion between the moving car and static surveillance camera, which can be modeled as a projection transform [15]. However, the kernel can be approximated by linear uniform motion blur kernel. The task of blur kernel estimation can be reduced to the estimation of two parameters in the linear motion kernel: angle (θ) and length (l). Given a linear kernel $I^{\wedge}_{\theta,l}, k_{\theta,l}$, a corresponding deblurred image $I^{\wedge}_{\theta,l}$ can be obtained by applying NBID on the blurred image B with $k_{\theta,l}$.

Then the sparse representation coefficients of $I^{\wedge}_{\theta,l}$ on pre-trained dictionary can be denoted as $A(\theta, l)$, which is a function of θ and l. We observe that $A(\theta, l)$ shows very useful quasi-convex characteristic under a fixed l. By utilizing this interesting characteristic, we can infer the true angle of the blur kernel efficiently.

Once the angle is determined, on the direction parallel to the motion, the power spectrum of blurred image is obviously affected by the linear kernel based on which the spectrum is a sinc-like function, and the distance between its two adjacent zero-crossings in frequency domain is determined by the length of kernel.

In order to reduce the effect of noise and improve the robustness of length estimation, we utilize the Radon transform in frequency domain. After kernel estimation, we obtain the final deblurring result with a very simple NBID algorithm.

The Architecture Diagram of our proposal is shown in fig.2,

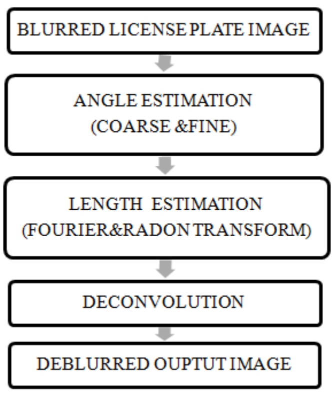

Fig. 2. Architecture Diagram

In this system, After the deblurred image is obtained, the system cannot identify the numbers and the characters present in it, So We are applying the Artificial Neural Networks, to identify the numbers and the characters from the deblurred image.

SYSTEM REQUIREMENTS

SOFTWARE REQUIREMENT:

Operating system Windows 8.0

MATLAB R2015a

HARDWARE REQUIREMENTS:

Processor: Minimum 450 MHZ processor recommended 700 MHZ.

RAM: Minimum 1GB recommended 4GB

The output of our proposed system shown in fig. 3 will look similar to that of the previous work but with some additional features like extracting the characters from the blurred image.

Fig.3. Output of Deblurred Image

The Output image of Artificial Neural Network is shown in the fig 4.

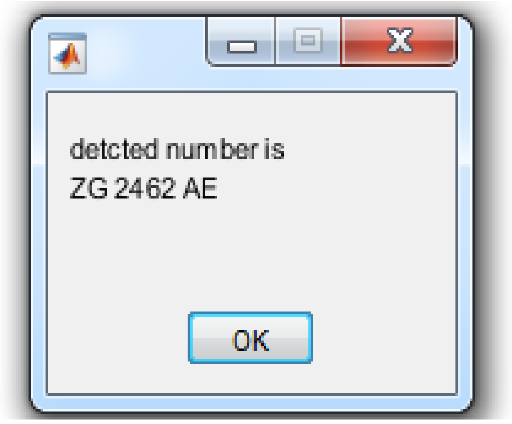

Fig 4

5. CONCLUSION

In this paper, we propose a novel kernel parameter estimation algorithm for license plate from fast-moving vehicles. Under some very weak assumptions, the license plate deblurring problem can be reduced to a parameter estimation problem. An interesting quasi-convex property of sparse representation coefficients with kernel parameter (angle) is uncovered and exploited. This property leads us to design a coarse-to-fine algorithm to estimate the angle efficiently. The length estimation is completed by exploring the well-used power-spectrum character of natural image. One advantage of our algorithm is that our model can handle very large blur kernel. As shown by experiments ivory the license plate that cannot be recognized by human, the deblurred result becomes readable.

ISSN 2350-1022

International Journal of Recent Research in Mathematics Computer Science and Information Technology
Vol. 4, Issue 1, pp: (42-46), Month: April 2017 – September 2017, Available at: www.paperpublications.org

Another advantage is that our scheme is more robust. This benefits from the compactness of our model as well as the fact that our method does not make strong assumption about the content of image such as edge or isotropic property. In our scheme, we only use very simple and naïve NBID algorithm.

And there is still obvious artifact in the deblurred results. However, for many practical applications, people are more interested in identifying the semantics of the image. From this view, our scheme brings great improvement on the license plate recognition.

REFERENCES

[1] Y.-W. Tai, H. Du, M. S. Brown, and S. Lin, “Correction of spatially varying image and video motion blur using a hybrid camera,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 32, no. 6, pp. 1012–1028, Jun. 2010

[2] W. Zhou, H. Li, Y. Lu, and Q. Tian, “Principal visual word discovery for automatic number plate detection,” IEEE Trans. Image Process., vol. 21, no. 9, pp. 4269–4279, Sep. 2012

[3] L. Xu, S.Zheng, and J. Jia, “Unnatural l0 sparse representation for natural image deblurring,” in Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR), Jun. 2013, pp. 1107–1114.

[4] Q. Shan, J. Jia, and A. Agarwala, “High-quality motion deblurring from a single image,” ACM Trans. Graph., vol. 27, no. 3, p. 73, 2008

[5] J. P. Oliveira, M. A. T. Figueiredo, and J. M. Bioucas-Dias, “Parametric blur estimation for blind restoration of natural images: Linearmotion and out-of-focus,” IEEE Trans. Image Process., vol. 23, no. 1, pp. 466–477, Jan. 2014

[6] J.-F. Cai, H. Ji, C. Liu, and Z. Shen, “Blind motion deblurring from a single image using sparse approximation,” in Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR), Jun. 2009, pp. 104–111.

[7] M. Elad and M. Aharon, “Image denoising via sparse and redundant representations over learned dictionaries,” IEEE Trans. Image Process., vol. 15, no. 12, pp. 3736–3745, Dec. 2006