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New Technique to Read Linear Barcodes

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Abstract: Spatial domain dynamic template matching technique is capable of reading linear blur barcodes taken by low resolution camera. The proposed system treats barcode reading under the binary waveform analysis. The graphical model is designed which gives the relationship between scanline of blur barcode and deblurr barcode. The programming based algorithm used to retrieve the symbol of barcode.

Keywords: Barcode, Edge Detection, Deblurring Barcode, Extract Barcode

I. INTRODUCTION

In today's digital world barcode technology is widely used in various industries. Barcodes represent data with the width and the parallel lines, and may be referred to as 1D barcodes. 2D barcodes represented as depicted Binary data in geometric patterns such as dots or squares within images. It is used to keep the records of products and also to find the product using barcode.

When captured, the original barcode is degraded by blur caused by a bad focalization or a camera movement, in addition to noise, the whole resulting in a blurred noisy barcode. Barcode scanning systems like LASER scanning systems and more recently charged coupled devices are used. These systems are costly and the basic requirement of these systems is barcode images should be highly focused. The proposed method is able to handle the blur barcode image.

II. RELATED WORK

There are many techniques invented to read the barcodes. Some of them are not able to handle the blur barcode image. The basic requirement for these techniques is image should be highly focussed. Some techniques are listed below:

A. Microfluidic Lens

J. Massieu et al. (2007) [2] proposed Microfluidic Lens method to read the barcode. This method is based on adjusting the lens assembly to provide auto focusing. To focus properly trained person is required. Also this microfluidic lens is costly hence it is not possible for everyone to read the barcode.

B. Blind Deconvolution

S. Esedoglu et al. (2004) [3] proposed Blind Deconvolution method to read the blur barcode. This method modelled systematically the interaction of neighbouring bars in the barcode under convolution with a kernel, as well as the estimation of the unknown parameters of the kernel from global information contained in the observed signal.

C. Blind Detection of Barcode

N. Drigi, Y. Delignon et al. (2010) [4] proposed Blind Detection of Barcode. In this method the channel impulse response, the noise power and the symbols were estimated by taking into account the signal structure.

III.PROPOSED WORK

Spatial domain dynamic template matching system works entirely in the spatial domain, and is capable of reading linear barcodes from low-resolution images containing severe OOF blur. This system treats linear barcode scanning under the perspective of deformed binary waveform analysis and classification.

The block diagram of system given as follows:

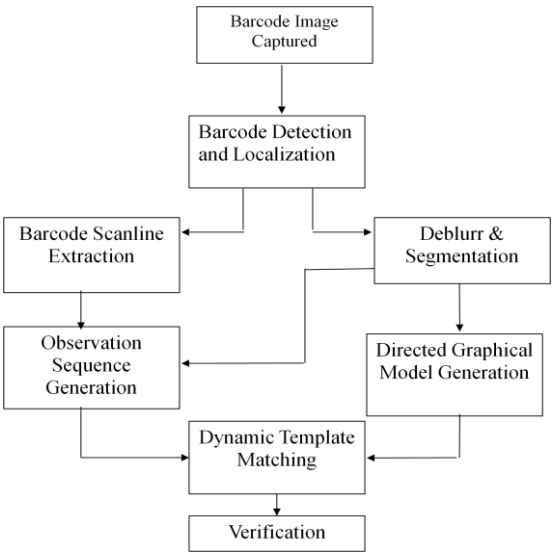

Fig.1 Block Diagram of Dynamic Template Matching Technique.

This project introduces new system for linear barcode reading, which is robust to severe OOF blur. As linear barcode reading is essentially the classification of deformed images to a finite set of possible values, this method treated linear barcode scanning under the

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perspective of deformed binary waveform analysis and classification. A dynamic template matching scheme has been designed to match deformed barcode signal against reference waveforms for barcode value detection. More specifically, once the location of the barcode and blur level is detected, deformed barcode waveform is extracted from the blurred image and segmented. After normalization, these waveform segments are compared with pre-computed standard reference waveform segments at the estimated blur level through dynamic programming by inferencing a directed graphical model. Then the reference waveform most similar to the observed barcode waveform is found. After being verified, the found reference waveform's corresponding barcode value is treated as the output of the proposed barcode scanning system.

IV. RESULTS

To extract the barcode from the blur image edge detection along with morphological operations and to deblurr the image wiener filtering are used.
Image with blur given as input:

Fig.2 Input Image


Fig.3 Image after applying gray thresholding

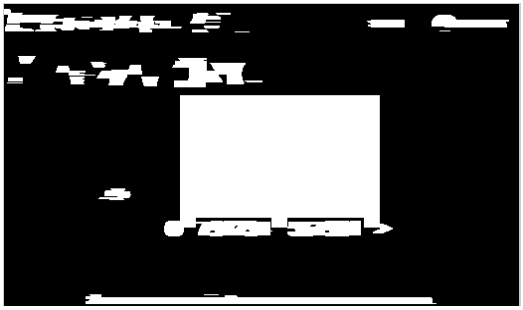
Fig.4 Edge detection

Fig.5 Dialed Image

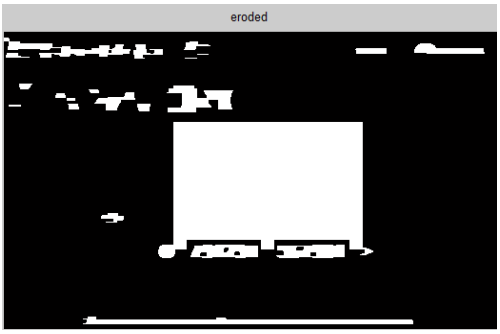

Fig.6 Eroded Image

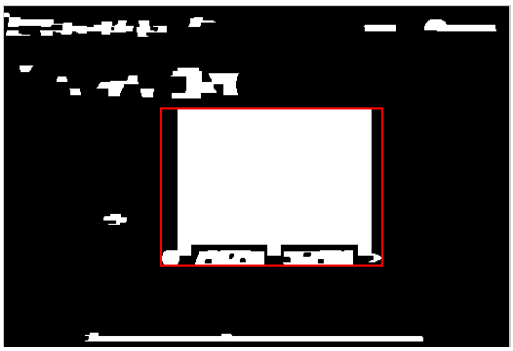
Fig.7 Boundary Detection

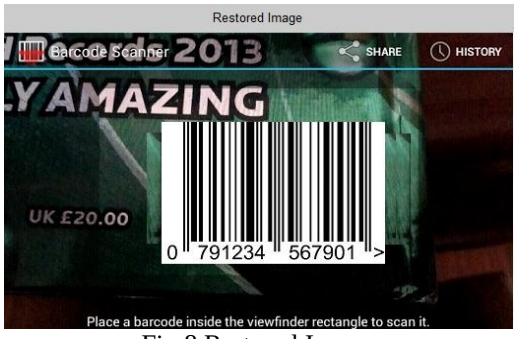

Fig.8 Restored Image

Fig.9 Extracted Barcode

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V. CONCLUSION

Hence, by using edge detection and morphological operations barcode is extracted from the blur image.

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