Using QR Code Detection and Recognition Total Variations and LDA Approach

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***Abstract*— In the recognition of the QR code, the information stored within the QR code can be easily retrieved by a decoding process that utilizes an image-capturing device with at least 300,000 pixels combined with the application of decoding software. The decoding is also not restrained by the angle of the image because the captured image can be rotated to the correct angle before performing the decoding. The scope of this project is to perform various creative designs for improving the analyzation of captured QR code image and blurring through the regularization analysis. The QR code images can be observed by digital video cameras. Such as the low quality of the image. The total variation approach developed by the spilt Bergman iteration method and its also used in this investigation to improving the recognition of a observed QR code image. Decomposed a blurred QR code image into various levels. Then using point spread function to calculate the weighting values to denoising and deblurring the QR code.**

Keywords*— *QR BarCode , Total variations flow ,Point spread Function , LDA Approach , Error detection.

I. INTRODUCTION (*Heading 1*)

The QR code stored the various information the decoding process easily retrieved QR code image-capturing device with at least large pixels combined with the application of decoding software. The angle of the captured image can be rotated to the correct angles before its performance of the decoding and encoding process is also not restrained.

The scope of this project is to perform the various creative designs for improving the analyzation of observed QR code image and blur through regularization analysis. QR code images can be observed by digital video cameras.various factors contribute to to the QR code decoding process failure, such as the low capacity of a image. Focus that the important factors with an affects the quality of image. This method discusses the out-of-focusing QR code image and aims to developed the recognition of the contents in the QR code image.

Bergman iteration method implemented by various total variation approach. That is also used to in this investigation and development to the recognition of observed QR code image.

A blurred QR code image is decomposed into various levels. the weighting values to denoising and deblurring of QR code is calculated by using point spread function(PSF).

Fig.1 A QR Bar Code

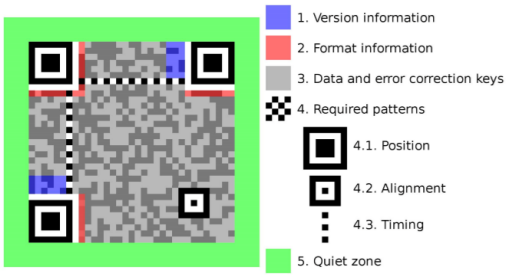


Fig.2 Scale Conversion Diagram

A. *Deblurring Process*

Note that there are currently worth of various regularization based methods are used to deblurring the general images. For a signal f , many attempt to minimize the values.

$$E(u,\varphi) = F(u * \varphi - f) + R1(u) + R2(\varphi)$$

over all u and PSFs φ, where F denotes a fidelitterm, the Ri means regularizes, often total variation

type and *u* is the recovered image . Recent work used to identify the blur images and improve the deblurring images process.

II. OVERVIEW

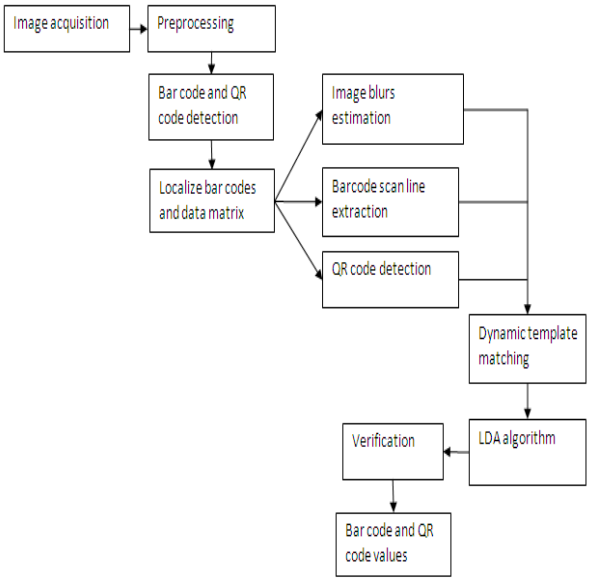
Every communication between the user and an intermediate helped device is visualized using a Quick Response (QR) code.

The main goal is to keeping the user-experience is the same as in advanced authentication methods as much as possible, while preventing key-logging attacks.

The main contribution of a new practical blur removal algorithm is specifically evaluating the decoding motion-blurred QR codes with CPU- and memory-constrained wearable computers.

Improve general purpose de-blurring methods from the literature by adapting each step to the specific properties of QR codes that ensures fast convergence to the correct solution.
It is also provide and evaluate a new initialization scheme that greatly improves convergence and the quality of the results in removing large motion blur.

III. SYSTEM ARCHITECTURE



. Fig.3 System Architecture

IV. IMAGE ACQUISITION

Reading and QR code reading via dedicated scanners is the nature technology. it is Commercially laser-based and hand-held barcode scanners achieve robust reading with a reasonable fixed price.

Recently, there has been increasing interest also accessing barcodes with regular cell phones, without the deblurr to a dedicated device.

Unfortunately, the low quality images captured by cell phone cameras. The cell phone cameras in the market are equipped with low-grade lenses, generally must focusing capability, often produce blurred images.

Many cell phones have a flash and motion blur and noise can be expected by various low ambient light. It is merged with low quality image resolution, Its make difficult to reading barcode in certain situations. All readers have limited performance in existing image-based barcode and when it comes to images taken in difficult light conditions. In order to improve accurate, barcode reading apps usually prompt the user to position of the camera to ensuring the barcode covers of the frame is possible to QR code.

This operation can be performed with some requirements and a certain amount of communication with the user. The barcode frame is corrected used to all the viewfinders. In this module, we can get input image from users. And this image contains bar codes and values. Based on this image can extract values. Implement preprocessing steps to eliminate noises from images.

This module to perform the gray scale conversion operation to identify black and white illumination and to perform the filtering operations using the Median filter is to filter out noise that has corrupted image.

It is based on a statistical approach. In this type of filters method is designed for a desired frequency response. Medium filtering is a nonlinear operation that can be used in image processing to reducing the “pepper and salt” noise. The medium filter is more expensive than convolution when the goal is simultaneously to reduce noise and preserve edges.

Implement the edge detection techniques to locate the Edges for bar codes. Barcode scan line extraction and image blur estimation techniques are used to provide edges for bar codes.

(a) (b) (c)

Fig. 4 Clean bar code

V. EDGE DETECTION AND LOCALIZATION

Based on state variable sequence modeling of linear barcode, when blur level d is less than one half of the total length of a barcode symbol, given a scan line of a barcode symbol.

Determine a scan line segmentation scheme to have each created waveform segment jointly determined by only two neighboring state variables, and make it be independent from any other state variables in the state variable sequence, with the exception that the waveform segments located at the left or right boundary of the scan line is solely determined by
The first or the last state variable. Each state variable is discrete valued representing one or more neighboring symbol character.

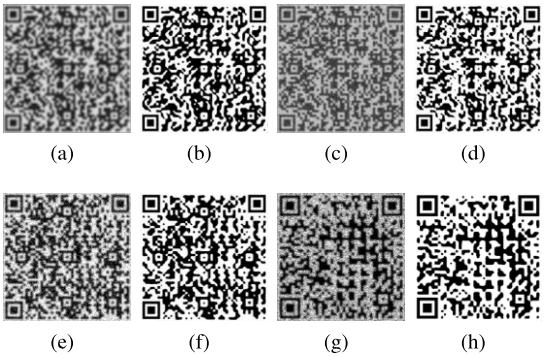


Fig. 5 Unprocessed and clean bar code

VI. BARCODE AND QR CODE EXTRACTION

After blur estimation, we can analyze edges for images. Using observed sequence to analyze each edge for code and separate edges from image that contains bar codes.

Blind deconvolution process refers to the deconvolution without expensive knowledge and impulse response function used in the convolution.

VII. TEMPLATE MATCHING

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. Each linear barcode symbol is composed of a series of concatenated symbol characters, and each character is discrete values can always decompose a linear barcode symbol into a sequence of state variables.

Verify extract bar code images and templates based on covariance matrix formula. Linear discriminate analysis and the Fisher's linear discriminate methods are used in pattern recognition and machine learning to finding a linear combination of features that characterizes or separates two or more classes of objects or events.

Thus the result combination may be used to a linear classifier or more common dimensionality reduction before later classification.

LDA method is closely related to various regression analysis, which also attempt to expressed a one dependent variable as a linear combination of other features and measurements.

VIII. VERIFICATION

However, It is used a categorical non-dependent variable and continuous dependent variables, which discriminate analysis has a continuous independent variables and categorical dependent variable.

Logistic regression and probability regression are more similar to LDA, as they explained that a categorical variable by the values of continuous independent variables.

The other methods are preferable in applications where it is not required to assume that the independent variables are normally distributed. which is a fundamental assumption of the LDA method. Based on LDA method,can provide corresponding values for bar code.

IX.CONCLUSION

Using proposed model can recognition QR code highly accurate. It also uses powerful developer library which recognizes barcodes from digital images. Detects multiple barcodes and QR codes from black & white, grayscale, palletized and color images. A robust method for blind deconvolution of QR code signals in the presence of blur, noise and with non-uniform illumination is presented here.

Based on the resolution of the associated inverse problem with genetic algorithms on a mixed search space, it allows decoding in a robust and reproducible way, a very noisy and blurred QR code image. Returns the type of each QR code recognized. It is fast, accurate & easy to use hence it is very beneficial in current business market.

QR code recognition is a highly accurate and powerful developer library which recognizes barcodes from digital images hence it is fast , accurate and reduces manual

work proposed model will capable to read blurred image so it is helpful to read barcode on old objects like old book in the Digital Book Library.

FUTURE ENHANCEMENT:

In future, extend our work to implement this approach to detecting the QR codes using neural network classification algorithm

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