De noising and De-blurring of QR Codes By Using Median filter

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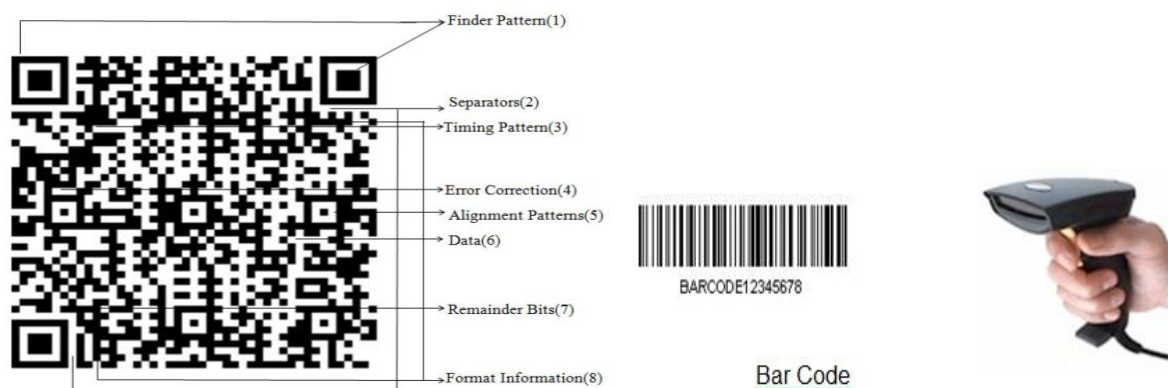
Abstract: QR code is generally used for embedding messages such that people can conveniently use mobile devices to capture the QR code and acquire information through a QR code reader , But these QR codes are effected by blurring and noise so we need to de-blurring or de convolution and de noising the QR code to obtain the original QR code from noisy QR code .Here median filter is used to denoising the QR code
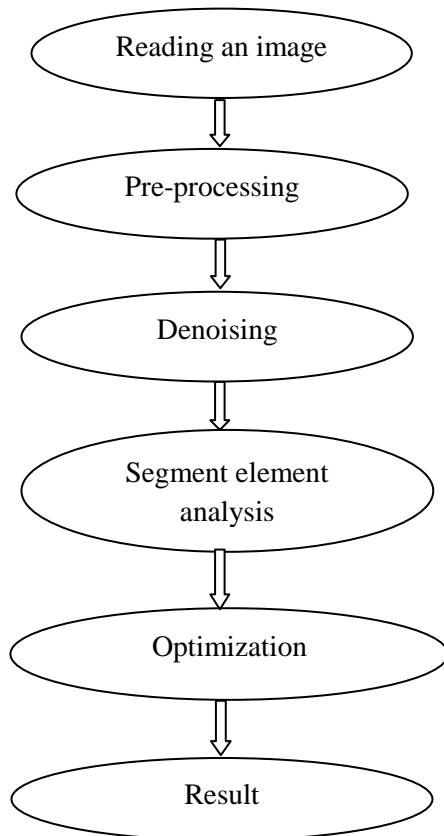
Introduction:

With the increasing popularity of smart phones, QR code (Quick Response Code) has become a popular form for acquiring information of specific object/event in our daily life and numerous applications are built based on QR codes. QR bar codes (Quick Response bar codes) are a type of matrix 2D bar codes that were originally created to track information during the manufacturing process. QR code encode several important information's so we have to de nosing the QR code from the noisy QR code. we are using median filter to denoising the QR code.

II. Differences between QR code and Bar code:

A QR code is a type of bar code. A bar code is one dimensional whereas QR codes are two dimensional. Bar codes can store only very little information. QR codes can hold far, more data. Bar codes cannot tolerate disfiguration. QR codes can tolerate loss (configurable between 0 to 30%).

III. Project algorithm:

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      ┌─────────────────────┐
      │  Reading an image   │
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                ▼
      ┌─────────────────────┐
      │   Pre-processing    │
      └─────────────────────┘
                │
                ▼
      ┌─────────────────────┐
      │     Denoising       │
      └─────────────────────┘
                │
                ▼
      ┌─────────────────────┐
      │  Segment element    │
      │     analysis        │
      └─────────────────────┘
                │
                ▼
      ┌─────────────────────┐
      │    Optimization     │
      └─────────────────────┘
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      ┌─────────────────────┐
      │       Result        │
      └─────────────────────┘
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III.I. Reading an image:

First, you need a **QR-code** app and a Smartphone or tablet equipped with a camera. iOS users should check out Red Laser. Android fans can try either Red Laser or **QR** Droid, and BlackBerry users will like **QR Code** Scanner Pro. All of these apps are free to download, and each one should handle any standard **QR code** just fine.

III.II. Pre-processing:

Image pre-processing is a critical step in the procedure of QR Code recognition. The results of image pre-processing have a vital impact on the QR Code recognition rate. The algorithm proposed for QR Code recognition process is based on the following

- ➢ collection of QR code image
- ➢ Image gray
- ➢ Image binarization.
- ➢ Image perspective transform
- ➢ location and detection

Pre-processing performs two methods those are:
- ➢ Rescaling
- ➢ De blurring

III.II .a. Rescaling:

Rescaling means either we have to increases or diminishes the dimensions of captured images. When we scan a QR code other unwanted image borders may be get captured .so we have to eliminate the excess borders by using box car, this process we called it as rescaling.

III.II.b. De blurring:

With the minimizing kernel, proceed to de blur the De noised signal via weighted total variation blur. By the symmetric point spread function deconvolution, the weighted total variation flow of De blurred image is reconstructs a PSF of de noise and blurred image, then results clean De blurred and De noised image.

III.III. De noising:

Image de noising is an important image processing task, both as a process itself, and as a component in other processes. The main properties of a good image
De noising model are that it will remove noise while preserving edges. Here image is de noised by using median filter.
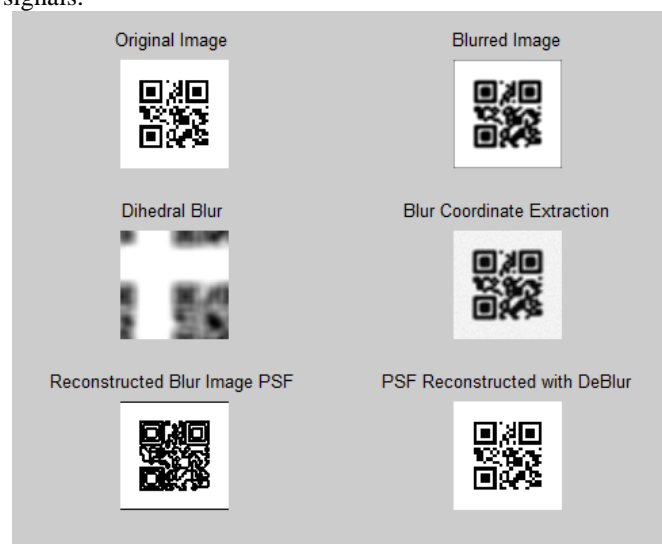
III.IV. Structural element analysis:

Every QR code is in the form a n*n square matrix. In structural element analysis, we are multiplying the original matrix with sub matrix which is small square matrix when compared to original matrix. The sub matrix should include either 0 or 1. if negative co-efficient are existed there will be chance of increasing the noise. the result obtained by multiplying the original matrix with sub matrix is the cumulative value or mean value of the matrix .

III.V. Optimization:

QR code optimization is the latest encoding method used in mobile as they can be read quickly by a cellular phone. It is a two dimensional barcode which comprises black square mazes in a white background.

IV. Result:

The regularization based algorithm for deblurring and denoising of QR bar codes will be presented and tested with QRCode reader. We applied our algorithm to a class of blurred and noisy bar codes with either Gaussian blur or motion blur and noise, then tested the results using QRCode reader, comparing readability for the original and cleaned signals.

V. Conclusion:

Blurring and Noising effects on QR code is eliminated by using deblurring and denoising techniques .In this paper noise was eliminated by using median filter.we tested the results using QR code reader,hence we eliminate the noise effect on QR code.

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