

Process of Detecting Barcodes Using Image Processing

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Abstract: Barcodes are the efficient way to encoding the machine readable information on most books and products. The barcode reading system is based on image processing, providing more information than laser barcode readers at a time. So, it's started gaining more importance than laser barcode readers. In this paper, we are adopting some type of barcode algorithms which segmenting the barcode patterns from images. In this paper, we are going to adopt the effective barcode algorithm for various types of images and also the suggestions to improve the efficiency of the information.

Keyword: Barcodes, peak detection, image processing, barcode recognition, resolution images, android applications, skew detection, decoding, webcam

1. Introduction

Barcodes are the symbols which represents the products information which is present at the backside of the product of a company. Barcodes are the thick and thin lines which are parallel to each other and it is in the form of rectangle shape. Barcodes are easy way to enter the information of the product than the manual methods. Its speed and reliability improves many operations like forwarding, packing, reception, and manufacturing. Barcodes can be found in the libraries (in the backside of book), factories, blood banks, supermarkets etc. Barcodes are the easy way of rapid data input. This information refers to the information which stores the companies purchase and sales of the product separately. When the barcodes are reading using laser scanning device, a signal is generated and it is processed by some software stored in the computer. This information is used to specify the product which is selected. This information provides opportunities to companies to sale their products. There are many types of barcodes name as, EAN, EAN-13, EAN-8, Code 39, Code 93, Code 128 and UPC (Universal Product Code) which is very popular and they comes under 1D barcodes. EAN-13 is used in the Europe and Turkey, UPC is used in the Canada and America. EAN-13 was originally called as European article number and now it is called as international article number.

In the above figure 1, the thick black colour lines represents '1' and blank represents '0'. There are 12 numbers in the barcode and each number has 7 bits. It has 3 start, 3 stop and 5 bits in the middle for referencing. In the above figure EAN-13 is used to determine the process of reading barcode. Barcodes are arranged in a bit string according to the thickness of lines. This paper describes the different useful method which helps in reading of barcodes more efficiently. The information is collected from the journal and other references, the methods are very useful in real-time applications as observed.

2. Types of Methods for Reading of Barcodes

2.1 The Process of Reading Barcodes through Image Processing Using Digital Camera

In this approach the barcode reading is directly done from the camera images by edge detection algorithm to obtain the barcode borders and some threshold mechanism to process the image as binary shapes. In the edge detection approach, the edges of the image is detected and then white areas are given into arrays and threshold process obtained the number from white and black areas of the image. The resultant image is:



Figure 1: Barcode sample (EA N-13)



Figure 2: The resultant image of the barcode from the sample image

2.2 Readers of Barcodes Using Mobile Phones Camera

In this approach the images of barcode can be captured using the mobile phones camera device. This approach is basically used 2D barcode detection which has four corners. The image which is captured by the embedded camera device of a mobile is in deformed shape. In this paper an algorithm called as inverse perspective transformation is used to normalize the deformed shape of an image.

2.3 Skew Detection for the 2D Barcode Images

In this approach, two processes are used for detecting 2D barcode. This approach is basically based on the Hough transformation which is an expensive process; it quickly obtains the skew angles of the images and making it applicable for real-time applications. In this approach, it first does the segmenting process which searches for the barcode region and the line fitting process, fitting the line for the barcode and obtains the skew angle. This approach, shows in the results that, it reduces the running time and it can detect the image even the high noise.

2.4 Recognition of Highly Distorted and Resolution Images

In this approach, the barcode recognition can be done even when the image quality is low, blurring, colour saturation where the code density is less than two pixels. The proposed algorithm gives accurate and fast result within the specified time constraint. This algorithm can be used in small portable devices like mobile phones

2.5 Barcode Recognition Systems

This approach is described by Kuroki, Tetsuo Satou, Takayuki Yoneoka, Noriakikayaniori, Tadaakikitamura, Ypichitagaki [1] which tells that by using the computer technology we can develop the barcode recognitions system which is one of the most important tools for recognizing of their product uniquely for the company. Generally retail shops use the handy barcode reader which is used for small amounts of products, while the big organisations use the barcode recognition systems using image processing for reading their large amount of diverse products.

2.6 Barcode Reader Health Applications on Android Mobiles

Navya Shridhar C S, Dr. Mohan K G [2] proposed a new application for reading barcodes by using the camera of a mobile phone. In this approach, the modern android mobiles have barcode scanner for health application which captures the image of the products barcode and sends to the products server which sends back the information about the product. The application does three steps:

1. Process the barcode.
2. Communicate with products server using web services.
3. Server module design.

It helps the users by providing good guide for the product they selected for their health.

3. Conclusion

In this paper we have discussed various methods of barcode detection which are different and perform within their limit individually. There must be a technique which is globally applicable for all types of barcode images. So, the future research gives the scope for such barcode methods which helps preserving the necessary details of a barcode.

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