Designing a 2D Color Barcode for Mobile Application

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Abstract:- **This paper presents designing a Color Barcode for Mobile Applications, 2D barcodes have gained popularity as one of the key pervasive technologies for mobile applications on smart phones. They can be used as shortcuts to URL links, a means to store contact information for easy transfer admission tickets or boarding passes and tokens for retrieving digital information, such as public transportation timetables or fresh produce production information, either directly from the barcode itself or through a networked database server. Most mobile applications use black-and-white 2D barcodes that carry only a limited amount of encoded data. A color barcode framework for mobile phone applications by exploiting the spectral diversity aborted by the cyan (C), magenta (M), and yellow (Y) print colorant channels commonly used for color printing and the complementary red (R),green (G), and blue (B) channels, respectively, used for capturing color images. Specifically, we exploit this spectral diversity to realize a three-fold increase in the data rate by encoding independent data in the C, M, and Y print colorant channels and decoding the data from the complementary R, G and B channels captured via a mobile phone camera. To mitigate the effect of cross-channel interference among the printcolorant and capture color channels, we develop an algorithm for interference cancellation. To estimate the model parameters required for crosschannel interference cancellation, we propose two alternative methodologies: a pilot block approach that uses suitable selections of colors for the synchronization blocks and an expectation maximization approach that estimates the parameters from regions encoding the data.**

Keywords - 2-D barcodes, Aztec codes, color barcodes, interference cancellation, quick response (QR) codes.

I. INTRODUCTION

In this paper designing of 2D color barcode for mobile application, we use the more relaible and simple system. This is the barcode use in social area and the save database in that securely. In this chapter we see the whole information about 2D color barcode.

a. *Problem Definition*

Barcodes have been widely used from many years, which perform the important role of accessing a database. However, the traditional one-dimensional bar codes have information storage density. The vertical dimension does not carry any information but only provides a redundancy that is especially convenient for decoding by handset laser scanner when the user is not careful about the orientation and registration. Now a days more and more applications require a much longer barcode to encoding larger amount of information tips such as the price, product name, manufacturer, functionality, and expiration date of a product. Therefore the 2D bar codes were designed to carry significantly more data than its 1D barcode. A scanner, such as a charge coupled device (CCD) scanner, is generally used in industries to scan a 2D barcode. The evaluation of camera phones may change the current status. Resolution limit, distortion, out of focus blurring, and noise with illumination variety induced by the phone camera are the killers of direct use of most existing 2D bar code for mobile phones[6].
In this paper we are trying to solve this problem by designing and experimentally evaluating algorithms for retrieving digital data from color cells by using interference cancellation framework so as to minimize their error rates. We are go- ing to perform an experimental study of the practical performance of several color classifiers and clusters. This allows to identify the most e_ective algorithms for decoding color barcodes in terms of their error rate and their total running times. Moreover, we are focusing on interference cancellation framework and data capacity for 2D color barcodes. This allows to optimize the data storage, addressing the need for high density barcodes[1].

b. *Objective*

In this paper to design color 2D barcode for mobile applications, we test must design an effective under pattern. To tailor our under pattern to mobile applications on smartphones, we have to identify some features:
_ A color 2D barcode whose data capacity can be exibly adjusted.
_ A color 2D barcode for applications that let a smartphone capture the barcode image for on-phone processing.
_ A color 2D barcode maximized for data capacity within a given symbol space. To robustly decode our color 2D barcode, we used reference color cells, which help correctly distinguish

each reproduced color cell by determining the value of each colored cell in the data area relative to the value of the reference color cell. Because the relative difference between the cell and reference colors is consistent, a reader can correctly retrieve the original data overcoming the challenge of unreliable color reproduction under different operating environments. Both Color Code and the HCCB use reference color cells[2].

c. *Paper Scope*

Today however, there are two technologies used in readers for barcode scanning: lasers and imagers. Imagers over several improvements over the traditional laser while also providing important new capabilities, such as being able to read 2D color barcodes. Images may have been used only in special cases in the past, but today, the advantages they provide over lasers can help improve almost any scanning application. Choosing the right scanning solution can be a confusing process. Many times, a particular scanner will work "for your particular scanning needs, but it may not be the most productive choice. Knowing the advantages of each scanning technology will help you choose a scanner that will provide Lasers have been used for barcode scanning.

d. *Hypothesis*

In our Designing of 2D color barcode we assume the creating bar
code is perfect and the all binaries values are have exact color. So, the output will be perfect. This is the 2D color barcode is easy to understand and user friendly. It having more security.

e. *Dependency*

The dependencies in 2D color barcodes are:
_ Marking Technology
_ Laser marking machines
_ Micro-percussion marking machines
_ Scribing marking technology
_ Mark and Read treadmark

f. *Strategy Plan to Solve Problem*

In this 2D color barcode to access relatively high quality imaging from digital cameras and phone cameras has changed the way in which consumers and retailers interact with their environment and products. Barcodes and other printed
marks containing information can be used to link interested parties to virtually any information of interest, often by re-directing their internet-enabled device to the appropriate webpage. With proper access privileges, the camera user can obtain information related to product security from track and trace to product provenance, authentication and forensics. In mobile applications. These variables include the choice and the optimization of the colors, the choice of error correcting and calibration codes, the authentication technique deployed, and the restoration approaches chosen. We show herein that the proper design of color based barcodes results in more than a doubling of payload density over default conditions, and so provides a more effective security solution and if desired, branding mark[5].

II. ALORITHM

a. *Recognition Algorithm:*

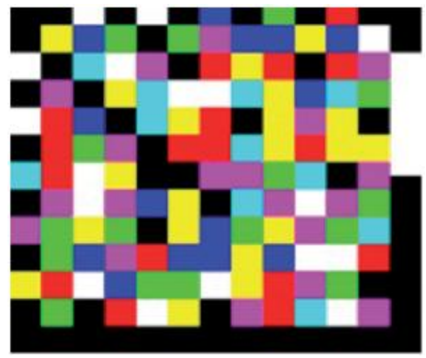

Fig. 1 The prototype under pattern

1. Thresholding and binarizing the captured image:

Thresholding converts the reconstructed colored image to a binaries image (that is, a black-and-white one), which facilitates the symbol's detection and correction. This process removes the effect of color, including the colors in the reference cells, leaving just the black-and-white checker borders. Previous work conducted thresholding in two different ways: using a modified adaptive thresholding method 2,3 and using an empirical thresholding value obtained from experiments.

2. Finding the L-shaped guide bar:

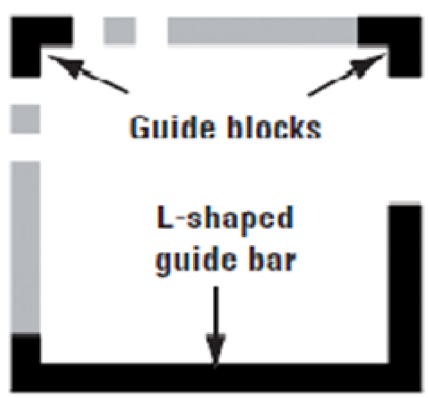

Fig. 2 The guide area.

The ratio of the longest bar to the second longest of the L-shaped guide bar is axed at 2:1, and the size of the smallest bar of the L-shaped guide bar is equivalent to two data cells. Once the algorithm ends a maximum continuous region of binarized "black" cells, it calculates the coordinates of the four corners and uses them to measure the bar sizes. Each bar's relative size and the four corners coordinates enable the calculation of the L-shaped guide bar's orientation.

3. Correcting the image orientation:

An angle's tangent is the ratio of the opposite side's length to the adjacent side's length. The algorithm can obtain the lengths of the opposite side h and the adjacent side w via the coordinates of both ends of the longest bar . So we can calculate the orientation angle q between the image's x-axis and the base of the longest bar as q = arctan(h/w). Correcting for q will correct the captured image's orientation error.

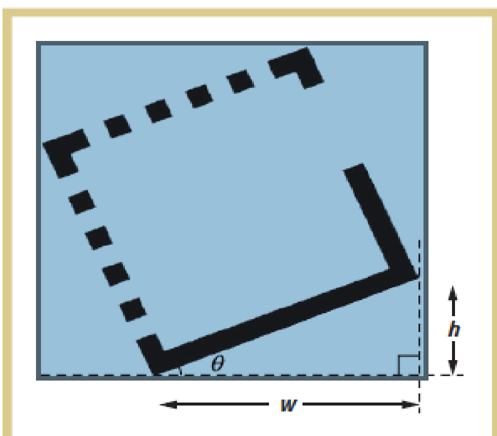

Fig. 3 The reference area.

4. Searching for the two guide blocks:

After we correct the entire image's orientation, the area for searching each guide block becomes narrower. Furthermore, we can now estimate the positions of the two guide blocks relative to that of the L-shaped guide bar. We use the guide block's properties (such as its size and shape) as criteria to determine whether the located region is the designated guide block. Each guide block is equivalent to the size of three data cells. Failure to locate any regions that satisfy the criteria within the search area indicates that the candidate L-shaped guide bar was a false positive. Consequently, the reading software searches for the second largest continuous region of binarized "black" cells as another candidate for the guide bar. The process repeats until the recog- nition algorithm ends all the under pattern's components; otherwise, it will terminate with an error stating that no barcode image was found.

5. Correcting symbol distortion:

Paperive mapping (also known as perspective transformation is a quadri laterals to quadrilaterals mapping that can be performed once the algorithm locates the four corresponding points.

III. DECODING ALGORITHM

1. Calculating the number of data cells:

The size of the checker borders or timing pattern's black-and-white cells cor responds to the size of data cells, so we can calculate cell size by measuring black-and-white cells of both the vertical and horizontal checker borders. Note that the color reference cells are read as white"because we are using the bi-narized image for these computations. We also use the timing patterns to calculate the center of each cell and modify it when the algorithm detects symbol distortion or changes in cell pitch.

2. Retrieving color values:

For this step, the algorithm applies a color-value sampling operation to the color image, starting by retrieving each color's value from the corresponding color reference cell.

3. Reading the values:

Based on the values of the color reference cells obtained in the previous step, the algorithm can detect data cell color. Then, it decodes the 2D barcode and retrieves the encoded data, simply by remapping each cell's color to its respective information. between our barcode recognition and detection algorithms.

CONCLUSION

The framework proposed in this paper provides an effective method for extending monochrome barcodes to color. Our color code constructions o_er three times the data rates of their monochrome counterparts, exploiting the spectral diversity provided by color printing and capture systems in conjunction with model-based interference cancellation that mitigates inter-channel coupling introduced by the physical characteristics of the devices. Although, bit error rates and therefore information capacities vary across the three resulting channels, the error rates are in ranges that are readily handled by the error correction coding options available for monochrome barcodes.

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