Color Code –The Replacement for Bar Code

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Abstract— In our day-today life we come across a lot of situations where coding is needed. Coding is a technique that reduces the space to store the data. It also makes it easier for future access. During coding, the data in one form is coded to another form which may be legible and sometimes not. This happens because the form of representing the data gets changed while coding.

The existing coding formats like barcode have been successful because of its application in several areas like health care and hospital settings, library services and coding of products by its manufacturer. There have been a lot advancement in sensor Technology which paves way to an efficient coding system. Color sensor Technology helps us to replace the existing Bar code system. In this paper, a new approach for coding is introduced by using color codes in place of bar codes. Data compression and encoding are done here to make color codes. Bar code scanner cannot read the code if it is crumpled or distorted and also the length increases the scanning time also increases accordingly. The color fading can be reduced by using colors of different intensities.

Keywords— Coding, Data Compression, Encoding, Color Code, Bar code, Color Sensor Technology

I. INTRODUCTION

Color is formed as a result of the interaction between the light, obstacle and the observer. Any color is formed by the combination three colors red, blue, green in a fixed amount. These three colors are called the primary colors. In the computer system any color is stored in the form of three numbers representing red, blue and green respectively.
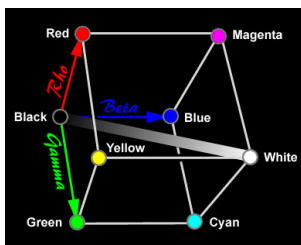

Fig 1 : 3D RGB Cube

The computer uses this kind of representation which is called RGB representation to store images in different formats like BMP, JPG etc. So any color can be represented using a three dimensional RGB cube as values of red, green and blue.

However, even though color plays a unique role of great importance in our daily life and as we shall soon see in quite a few industrial and scientific applications, the number of sensors dedicated to color sensing is surprisingly large[2].

Several improvements in the sensor technology has helped us to make the best use of the color sensors. The problem with the color is that it may fade away. So using the colors with good quality can retain the color code for a long time.

The existing technology is barcode system which has several applications such as Inventory Control, Work-In Process Tracking (WIP) Company Inventory, Shipping Electronic Data Interchange (EDI), Ware Housing, Health Care Applications and Library .

The idea of proposed system was arised from the demerits of barcode like the length of the barcode, its distortion. And several advantages of using the color code is that;

- It defines more numbers than barcode.
- Compactness
- Efficiency
- Security
- Reliability
- Less Time Consumption

The software tools used are the Visual Studio 2010 .Microsoft SQL Server 2008. And also with the help of Visual C# the software was built on the .NET Framework.

I. EXISTING SYSTEM

Bar coder readers decodes a bar code by scanning across the bar code and measuring the intensity of the light reflected back. The light variation is converted into digital signal. Due to barcode design, it does not matter we scan from the left to right or from the right to left.

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A barcode reader contains two parts. The first part is the scanner that scans the image and coverts into digital representation (01111000). It consists of a photo - resist (resistance depends on intensity of light) and a current to voltage converter. Output of the barcode reader depends on the intensity of reflected light. The black bars represent 1's and white spaces represent 0's. Length of bar does is not significant. The second part is the decoder which combines the binary digital signals into a series of characters. The decoded information is sent to the computer via keyboard or serial interfaces.

Fig 2: Reading a Bar code

Barcodes are ways of storing numbers so that they can be read rapidly. Numbers and letters are encoded as black and white lines of different thicknesses. The ratio of black to white identifies the number to a barcode reader. The code used to represent each number is designed so that the same number will be read, even if the barcode is upside down when it is read.

a) *Principles of bar code reading*

- Barcode reader shines a light on the barcode.
- Different reflections of light are reflected depending on whether it is a white or black line/segment/part/ratio/width.
- Barcode is decoded and the numbers are returned to the CPU in turn delivering its output to the required device.
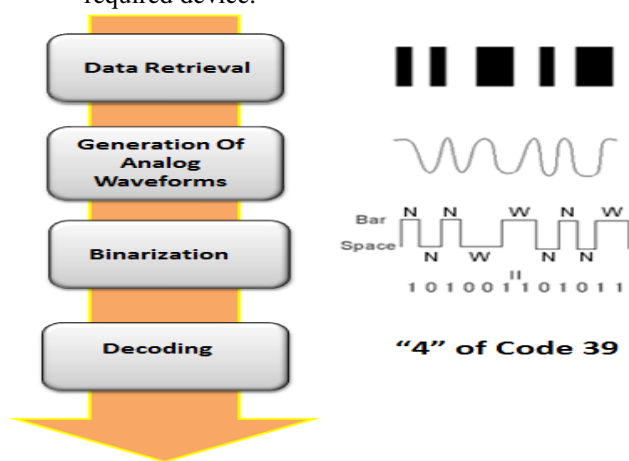

Fig 3: Barcode Reading Process

b) *Types of bar code scanner:*

i)   CCD method

- The CCD stands for Charge Coupled Device. It is a semiconductor device that is used to converts light signals into electric signals.
- There are no movable parts in this device and its impact resistance is excellent.

ii) Laser method

- A sensor(laser photo detector) captures the reflection to read a barcode when the laser light is shone on the label surface.
- It allows the reading od wide bar labels also.

iii) Pen method

- This is a hand held device which contains only a light source.
- The experienced person moves it from left to right.

c) *Disadvantages of Barcode system*

- As the number increases, size of barcode increases.
- Barcode reader cannot scan properly if the label is crumpled or distorted or label is tilted while feeding it to reader.
- Scanning time increases as its length increases

II.   PROPOSED SYSTEM

In the color code system which is a replacement over the existing barcode system, color codes are used. With the help of tools like visual studio 2010, Microsoft SQL Server 2008 the color coding system was built upon the Microsoft .Net Framework. C# Language which is an object oriented language was preferred because it is simple, easy, and user-friendly. Visual C# is used to create .NET application Web services.

Initially the user has to login and choose a particular color for a text using the dictionary module. Then the data to be compressed is entered and a corresponding color band is created. Usually a reference name is given for easy access of the data. The last step is the decompression where the earlier reference name is given to retrieve the data. With the color band the decompressed data is displayed.

Several modules that are used in this system are as follows:

a) *User Login Module*
b) *Color Code And Dictionary Creation Module*
c) *Data Compression And Color Band Creation Module*
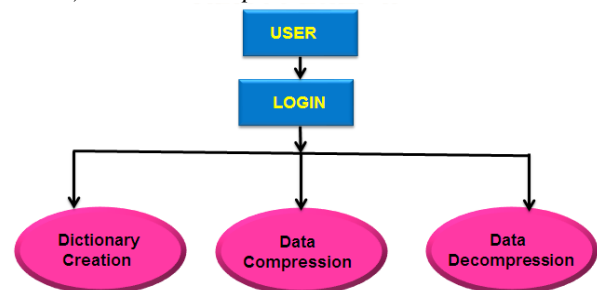d) *Data Decompression Module*

Fig 3: Block diagram of Proposed System

Deeper Into Each Modules

a) *User Login Module*

This module mainly aims to interact with the user. It asks the user to login using a password. After entering the password the user is now able to enter the data.
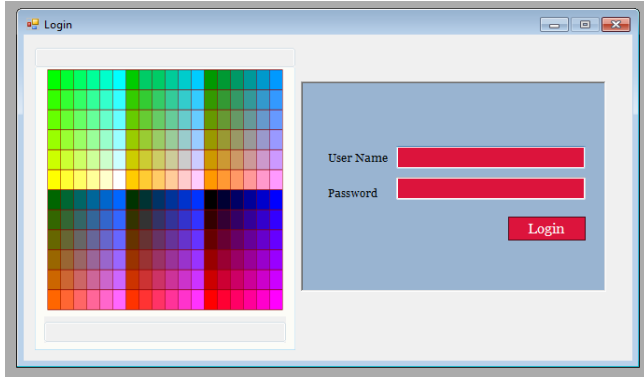

Fig 4: User Login Interface

b) *Color Code And Dictionary Creation Module*

The user, who is now logged on, can enter the data and a color for it.This is saved in the dictionary. Hence the name dictionary to this module. And the color code is also stored here.
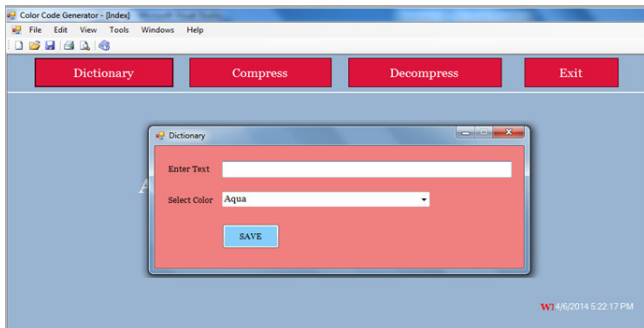

Fig 5: Color Selection and Dictionary Creation

Data Compression And Color Band Creation Module

This module deals with the compression of data and the color band creation. Using the reference name the data entered can be viewed as a color band.
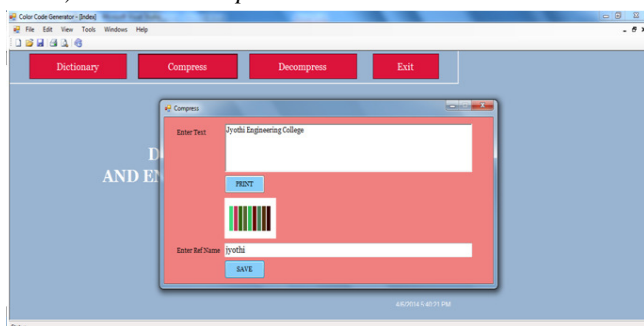
c) *Data Decompression Module*

Fig 6: ata Decompression Module

III. HARDWARE AND SOFTWARE REQUIREMENTS

Memory	1 GB RAM
Processor	P4 and above

Table 1: Hardware requirements

Software requirements
- Visual Studio 2010
- Windows XP and above
- Microsoft SQL Server 2008

IV.   SCOPE

In this approach, not all the colors are used efficiently. By using the remaining colors in the other 7 coordinates, we can use the whole cube very efficiently and even data compression can be achieved. The remaining seven sub cubes contain 256 * 256 * 1 56 * 7/8 = 14680064 colors.

V.   CONCLUSION AND FUTURE WORK

When similar paper were compared which uses several techniques for data compression like adaptive coding which does not need any prior estimation of probabilities [3], dynamic Markov coding which is not strongly biased towards byte-oriented data [4] and run-length encoding which is very easy to implement [5].

Color sensors have a wide range of applications. They can completely replace barcode readers. Using colors, large amount of data can be printed on small space and can be retrieved back effectively. Data entry into computer is very easy because same RGB concept is already used there. They are the future because there is no limitation number of colors and as technology advances, more number of colors can be defined more precisely from the same RGB cube. Data transferred by using colors is more secured. Data compression is done by maintaining a data base and sending templates which represent the word. Thus data compression using this technology is more efficient and error free.

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