Study of Visual Cryptography for Color Image using Color Models

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Abstract— **this paper shows the study of color visual cryptography. It provides a review on color models which is used in the concept of color visual cryptography.**

***Keywords*— Visual cryptography, Color visual cryptography, Color models, additive model, subtractive model**

I. Introduction

Visual cryptography, is an emerging cryptography technology, uses the characteristics of human vision to decrypt encrypted images. It needs neither cryptography knowledge nor complex computation. For security concerns, it also ensures that hackers cannot perceive any clues about a secret image from individual cover images. There have been many published studies of visual cryptography. Most of them, however, have concentrated on discussing black-and-white images, and just few of them have proposed methods for processing grey-level and color images. Based on previous study in binary image and grey level images this analysis gives a better color visual cryptography and it provides pleasant feel of shares and high visual quality to human eye using.

II. Page Style

In visual cryptography the secret information that is an image is split into shares such that the decryption can be performed by the human visual system by simply superimposing the shares. No computations are involved in the reconstruction of images. But this reconstruction process gives contrast loss in recovered image. This section provides an overview on a color visual cryptography which is simple and good. CVC includes two color models which are used according to the requirements.

A. *Color models*

The purpose of a color model is to facilitate the specification of colors in some standard generally accepted way. Principles colors include two models as RGB model and CMY color model.

Additive model

In RGB color model each color appears as a combination of red, green and blue. This model is called as additive color model and the color involved in this model are called as primary colors. The combination of red, green and blue makes it white. The primary colors can be used and added with each other to produce secondary colors.

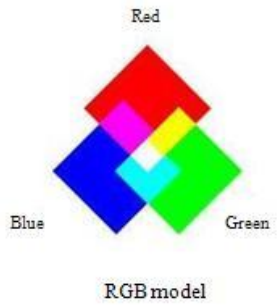

Fig. 1 Additive color model

Subtractive model

CMY color model is a subset of RGB model and it is primarily used in color print production. CMY color model is also known as CMYK model in which CMYK is an acronym for Cyan, Magenta and Yellow along with Black which is noted as K. CMYK is called as subtractive because cyan,magenta,yellow and black pigments or inks are applied to white surface to subtract some color from white surface tp create the final color. Subtracting all colors by combining the CMY at full saturation should render black.

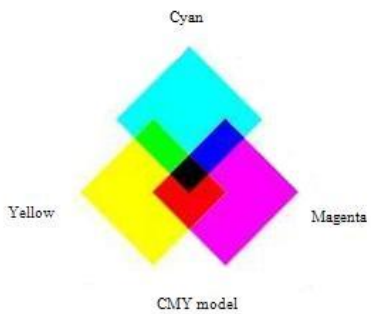

Fig. 2 Subtractive color models

B. *Color model for visual cryptography*

To create or produce any color through RGB color model all three RGB components need to be of equal pixel depth and pixel resolution in visual cryptography sharing images are used as decryption tool at the receiver side. In visual cryptography transparencies are final output and subtractive color models are to print colors on transparencies. So CMY color model is used in color visual cryptography [1]. However RGB is not very sufficient with dealing with real world images.

TABLE 1. RGB COLOR MODEL AND CMY COLOR MODEL

Criteria	RGB color model	CMY color model
Combination	Combination of red, green and blue color	Combination of cyan, magenta, yellow color
Color model	It is called as additive color model	It is called as subtractive color model
Colors	Colors involved are called as primary colors	Colors involved are called as secondary colors
Creation	Additive colors are created by mixing spectral light by varying combinations	Subtractive colors are seen when pigments in an object absorbs certain wavelength of white light
Color of combination	Combination of red, green and blue with full intensity produces white color	Combination of cyan, magenta and yellow produces black
Example	Television screens and computer monitors	Color printing production

III. CREATION OF SHARES USING CMY COLOR MODEL

In color visual cryptography shares are generated by division of pixels of an image. A color pixel of an image is divided into three color channels as cyan channel, magenta channel and yellow channel. In (2, 2) visual cryptography sharing scheme 2 shares of each color channel are created. Then share 1 of each channel and share 2 of channels are combined together. After combining final 2 sharers are developed. From these two final shares original content is reconstructed as shown in Fig. 3. Color pixels of an image are divided into cyan, magenta, and yellow.

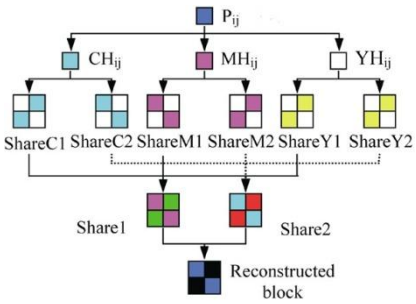

Fig.3 Color channel division and reconstruction [1]

A color image is divided into 3 color channels and they are cyan channel, magenta channel, yellow channel as shown in Fig. 4 and Fig.5.

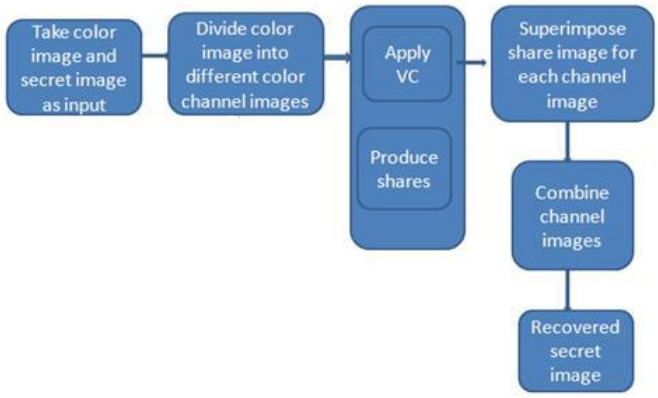

Fig.4 Block diagram for the process of CVC [2]

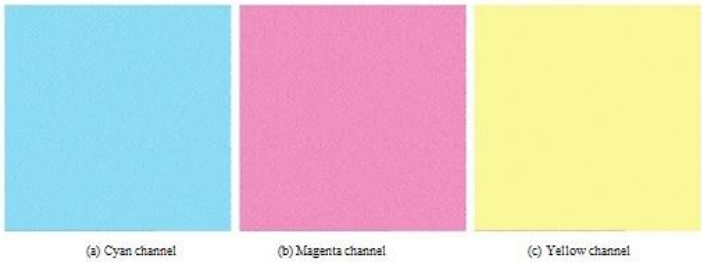

Fig.5 CMY color channels [1]

IV. CONCLUSION

This paper provides a detailed study on the basics of color visual cryptography. This paper also provides a review on color models needed for visual cryptography for color images and the basic process of CVC.

REFERNCES

[1] Young Chang Hou, "Visual Cryptography for Color Images", August 2002

[2] S. Shivasankri, Mrs. Victo Sudha George, "Implementation of Stenography within Visual Cryptography", ICCCE, April 2012