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A Survey on Automatic Colour Generation Techniques

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Abstract: ***Automation is becoming more important for small scale as well as large scale industries. As automation makes system user friendly and flexible, the effort has to be make in making computer program system user friendly to get connected or interface property for automation. Proposed work is new invention in automation system. Proposed system will generate various color images automatically on single television screen. This system uses AVR microcontroller and feedback to control adding of concentrates.***

Keywords: AVR Microcontroller

1. Introduction

Automation plays an important role in today's industry world as work becomes easier and system becomes user friendly. Proposed work is part of automation system. This system will generate various color images automatically on single television screen.

CNC (Computer Numerical Control) machines are available for various color generation but they are not affordable for small scale industries. Also CNC has large footprint so they cannot be install in small scale industries. CNC has lot of manual work so they are not very user friendly. CNC makes proper combination of red, green and blue colors to get multiple shades of particular color. CNC is far noisier and has more mechanical movements even though it is computer controlled.

Considering all the drawbacks of CNC system proposed system is designed. The system is based various color generations on single television screen. Using proportionate percentage of basic primary colors red, green and blue concentrate can make any color and any shades.

Basic of Color and Light- Light is a narrow range of electromagnetic energy, to which the human eye is sensitive. Generally light is described by its wavelength; it ranges from approximately 380nm to 780nm.

Materials can modify the light incident upon them in several ways. Light can be reflected from a surface. Light can be absorbed by, or transmitted through, a surface. In many cases, light is both absorbed by and reflected from a surface. The amount of absorption and reflection is often dependent on the wavelength, resulting in some wavelengths being absorbed and others reflected, to varying degrees.

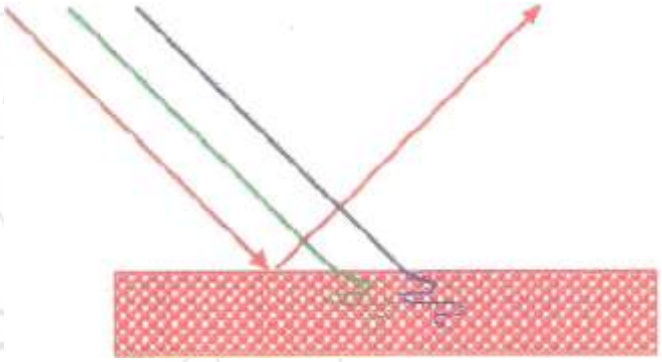

Figure 1: Reflected light from an object, perceived by the human eye, and is what gives an object its color

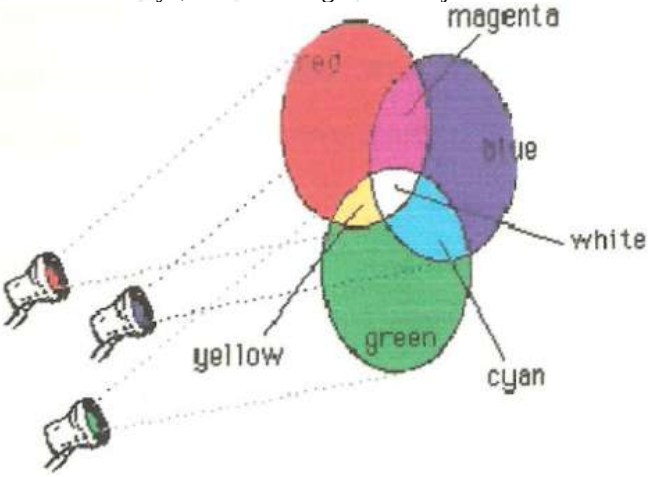

Figure 2: Production of Colour by Combining RGB

2. Literature Survey

2.1 ***John R. Smith and Shih-Fu Chang, Single Color Extraction and Image Query, 1995-*** To support color queries of image and video databases, authors introduced the method for automatic color extraction and indexing. This method identifies the regions inside images which contain colors from predetermined color sets. Searching through large number of color sets, a color index for the database is created in a manner similar to that for file inversion. As a result it allows very fast indexing of the image collection by the color contents of the images.

Also information about the identified regions, such as the color set, size, and location, enables a rich variety of queries that specify both color content and spatial relationships of regions. They presented the single color extraction and indexing method and contrast it to other color approaches. They examined single as well as multiple color extraction and image query over database of 3000 color images [3].

2.2 ***S. Muthu, F.J Schuurmans, M. D Pashley, "Red, green, and blue LED based white light generation: issues and control" 2002-*** They mentioned that the recent improvements in high-power light emitting diodes (LED) technology with 100+ lumens per LED chip and efficacy exceeding that of incandescent lamps brings the solid-state lighting close to a reality. An LED light source is made up of Red, Green and Blue (RGB) LEDs can provide a compact light source with unique features such as instant color variability.

However, the white light generation using many compact, discrete RGB light sources has many issues like uniform spatial light mixing and distribution, white color point maintenance and thermal management. Most important is, the white color point maintenance stringent requirement in many applications. They have presented solutions to these issues using electronic feedback control of the light output of the LEDs. They have shown both experimentally and theoretically that photodiodes with color filters can be used in feedback systems to directly control the white light. Improved color control is obtained with the addition of temperature feed forward. This type of feedback system has the advantage of not requiring an extensive and costly factory calibration [6].

2.3 ***Qu,x, Wong SC "Color control system for RGB LED light sources using junction temperature measurement" 2007-*** They proposed the efficiency of LED lights approaching that of fluorescent lamps. Due to compactness and lower heat dissipation LED light sources are finding more applications than conventional light bulbs. Also they have most important, real-time color changing capability. Challenging task is accurate control of colors for RGB LED lights; it includes optical color mixing, color light intensity control and color point maintenance due to device aging and LED junction temperature change. In this paper , authors presented a LED junction temperature measurement technique for a pulse width modulation (PWM) diode forward current controlled RGB LED lighting system. This technique can control the color effectively without the need for using expensive feedback systems involving light sensors. The implementation technique was outlined and verified by some experimental data. The system can be readily ported to a fully automatic computerized system for industrial implementation [1].

2.4 ***HB kerke, Sudeep D. Thepade, Color Traits Transfer to Grayscale Images, 2008-*** They proposed some novel techniques for squirting colors in grayscale images. There is no exact solution for coloring gray scale images. Authors tried to minimize the human efforts needed in manual coloring the grayscale images. There is need of human interaction only to find a reference color images, and then transferring of color traits from reference color image to grayscale image is done by proposed techniques. The color palette is prepared by pixel windows of some degrees taken from reference color image. After that the grayscale image is divided into pixel window with same degrees. The palette is searched for equivalent colour values for every window of grayscale image. These colour values could be used to colour grayscale window. In complete process the luminance values of reference colour image and target grayscale image are only matched and based on best possible match the respective chromaticity values of colour image are transferred to grayscale image. They used RGB colour space for palette preparation and then Kekre's LUV colour space. Kekre's LUV color space was comparatively better in results as compared to other [4].

2.5 ***Zhou J, Takasuka M, Automatic transfer function generation using contour tree controlled residue flow model and colour harmonics, 2009-*** Authors concluded that by assigning optical properties to various data features and scalar values, transfer functions facilitate the volumetric data visualization. Automation of transfer function specifications is a challenge in volume rendering. This paper presented an automating transfer function generations by utilizing topological attributes derived from the contour tree of a volume. The contour tree acts as a visual index to volume segments, and captures associated topological attributes involved in volumetric data. Topological attributes are used to control colour selection in a perceptual colour space and also to create harmonic colour transfer functions. The generated transfers functions can predict inclusion relationship between maximize opacity and structures and colour differences between them. It is more efficient automation of transfer function generation [2].

2.6 ***Xiao Pan, Yuanfeng Zhou, "Flooding based super pixels generation with color, compactness and smoothness constraints" 2015-*** Here, authors presented an efficient flooding based super pixel generation algorithm. As super pixel generation is widely used in image segmentation. For estimating pixels and seeds' similarity with Color, Compactness and Smoothness constraints, a new distance metric is defined. A seeds update strategy based on Lloyd's algorithm is adopted for optimizing seeds and super pixels' contour regions. Boundaries of super pixels generated by this algorithm can fit the original image boundaries better [5].

3. Conclusion

Considering all the drawbacks of previous systems new system is to be designed which will produce colours on television screen automatically. Proposed system will reduce human efforts and this will be beneficial for small scale as well as large scale industries.

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