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Improved 3D Display by Ghost Image Reduction Technique Using Verilog

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Abstract: ***In commercial 3D display system, the optical crosstalk is a major issue which produces ghost image. Crosstalk is a critical factor which determines the image quality of displays. Crosstalk is probably one of the most annoying distortions in 3D displays. In this paper we proposed a digital image processing method that could reduce the optical crosstalk in 3D displays. While comparing with the existing MZ-DCR the proposed ghost image reduction technique is an advanced technique. As in the MZ-DCR technique the angle is extended to 15 degree. But in our proposed the angle can be extended by more than 15 degree.***

Keywords: 3D Display, Crosstalk, Ghost Image Reduction, MZ-DCR Technique

1. Introduction

Image processing is the study of any algorithm that takes an image as input and returns an image as output. Image Processing systems are becoming popular due to easy availability of powerful personnel computers, large size memory devices, graphics software's etc. Three dimensional system is on constant development in recent years due to its demand in applications like entertainment. Due to the technological improvement the 3D display also need a quality improvement. The 3D system, including stereoscopic and auto-stereoscopic 3D system, can provide 3D images on a flat panel [1]. According to the method of 3D perception in commercial 3D technology, the most common method is to use binocular parallax [13]. Crosstalk is the most important issue in 3D images this reduces the quality of the 3D image due to this the crosstalk in the image need to be reduced to improve the quality of the image. Quality of the image depend on the amount of crosstalk pressent in the 3D image. Reducing the crosstalk is the major issue in the images this can be done by digital image processing. The principle advantage of Digital Image Processing methods is its versatility, repeatability and the preservation of original data precision. There are two types of display stereoscopic and autostereoscopy. Autostereoscopy is any method of displaying stereoscopic images without the use of special headgear or glasses on the part of the viewer. Because headgear is not required, it is also called "glasses-free 3D" or "glassesless 3D".

In this paper the method used is the Ghost Image Reduction Technique it is to remove the crosstalk from the 3D input image (pixel) by proposing a digital image processing method that could reduce the optical crosstalk in 3D displays and in our proposed the angle can be extended by more than 15 degree. This technology can be applied to stereoscopic display systems too and when the viewer views the image using the shutter glasses or polarized glasses the image quality is further improved. All the restrictions of 3D system have been overcome and it is a very effective software approach which does not require any extra devices to reduce the crosstalk. The advancements in the pixel structure of the panel also play an important role in applying this technique. Therefore, we proposed a Ghost Image Reduction Technique method to further reduce the crosstalk in 3D display.

2. Ghost Image Reduction Technique

The light leakage that comes from another view is the main reason causing the high crosstalk. Our goal is to counteract the optical crosstalk by modifying the output gray level of each pixel [1]. The Ghost Image Reduction Technique reduces the crosstalk from the image the image with the crostalk is taken and the image is scanned in a zig-zag manner and the error pixel value is shifted out from the image and the crosstalk can be reduced in the image.In normal viewing angle the image will be free of crosstalk and the 3D image will look similar in all viewing angles but due to the light leakage crosstalk occur in the image. The image processing is done in verilog and the pixel values are taken and the error value is changed by using the scanning process. The crosstalk can be reduced in almost every viewing angle it is highly related to the pixel of the original image. The higher score indicates that the output image is similar to the reference image. The original image at 0 degrees is taken as reference under each test. From these the proposed method has been proven to improve the image quality in every viewing angle.

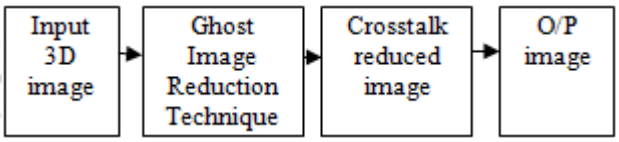

Figure 1: Basic Block Diagram

The pixel layout of this method is compared and proven to reduce crosstalk. The crosstalk image will create an ucomfortable feeling and due to this the crosstalk is necessary to be removed.

3. Result

The simulation result was obtained using the xilinx software. These results shown proves that the crosstalk in the image is reduced. The advancements in the pixel structure of the panel also play an important role in applying this technique. Hence by applying this technique the viewing angle has been improved to 15 degrees. The area for the Ghost Reduction Technique is reduced compared to the existing methods also

the gate delay is reduced. Area is the major constrain for the recent scenario and it is reduced using this technique.

Figure 2: Result of Ghost Image Reduction Technique

On the other hand, this method provide a software approach to eliminate the ghost phenomenon in 3D display. This method eliminate the crosstalk from the image.

4. Conclusion

A Ghost Image Reduction Technique method produce a perfect solution to improve the image quality. Both in stereoscopic and auto-stereoscopic display, there occur ghost phenomena on the image that will make the viewer feel uncomfortable and also unable to fuse the two images. To improve the crosstalk in different viewing angle,we use this method to improve the image quality.This method controls the image signal based on the structure of a 3D display system. This method successfully eliminate the ghost phenomenon under the normal viewing condition and in different viewing angle.

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