Metal Oxide Silicon Field Effect Transistor (MOSFET) technology based Automated White Balance

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Abstract

To match the brightness of the scene, the Auto Exposure Control (AEC) system of a digital radiography selects the optimum aperture size, gain setting, and exposure length. Although Metal Oxide Silicon Field Effect Transistor (MOSFET) technology has enabled techniques such as automated white balance and automatic exposure, sophisticated systems to quickly determine the right exposure when users change the scene are absent. The problem becomes more serious when sections of the recorded video frame are overexposed or underexposed. The suggested system includes a robust AEC approach for real-time video capture. The method dynamically picks suitable sensor operational modes to generate a more accurate measurement of scene brightness. The auto exposure system also includes devices that detect moving objects and fluorescent light flicker. The AWB technology is trustworthy and helps to improve the quality of recorded footage in a variety of conditions.

1. Introduction

In terms of visible overall flicker, analogue display technologies duplicate each frame in the same way, thereby doubling the frame rate. Whenever a video capture equipment receives forms one at a time instead of splitting up the entire frame after it has been recorded, the frame rate for motion is probably doubled, resulting in smoother, more life-like conception (albeit with halved detail) of rapidly moving parts of the image when viewed on an interlaced CRT display, but display of such a signal on a progressive scan display.

When viewing a dynamically systematic transmission or recorded signal, both the steady and transient sections of the image have the best spatial resolution. However, when displaying a natively interlaced signal, simple line doubling degrades overall spatial resolution, and artefacts like as flickering or "comb" effects in moving sections of the image will be seen unless specific signal processing is used to remove them.

Each entire frame's horizontal scan lines are regarded as though they were sequentially numbered and recorded as two fields: an odd field (upper field) for odd-numbered lines and an even field (lower field) for even-numbered lines. In terms of visible overall flicker, analogue display technologies duplicate each frame in the same way, thereby doubling the frame rate.

2. Literature survey

This research presents an auto-exposure approach that employs a mapping from the brightness histograms of five sub-areas in the image to an exposure value. A neural network is used to map the data. The histogram in each sub-area is used to compute the mean, variance, minimum, and maximum brightness for that sub-area. The same spatial information is generated for preceding frames in order to incorporate temporal fluctuations in brightness into the network.

This research shows how to apply a mapping from the brightness histograms of five sub-areas in a photo to an exposure value to create an auto-exposure approach. A neural network is used to do the mapping. The histogram in each sub-area is used to compute the mean, variance, minimum, and maximum brightness. The same spatial information is generated for preceding frames to integrate temporal fluctuations in brightness into the network.

Recognizing the collection, processing, and display of colour images involves knowledge of a variety of topics, including image creation, radiometry, colorimetry, psychophysics, and colour reproduction, which are not often addressed in engineering education. Engineers now work with colour imaging components on a daily basis, some more frequently than others, because to advancements in sensor, processor, and display technology. This publication serves as an introduction to colour imaging science for engineers and scientists.

This work proposes a robust automated white balance technique that estimates colour temperature by extracting grey colour values from photos. Under the canonical light source, a grey colour point is defined as the point where the R, G, and B components are equal. To estimate the colour temperature of the light source, a small colour departure of the grey colour point from grey under different colour temperatures is employed. The test results suggest that the proposed method has a good perceive effect and has the advantages of being simple to implement, low in complexity, and having a stable convergence.

3. Methodology

➢ Aspect Ratio

The size of video displays and video image components are described by aspect ratio. Because all major video formats are rectilinear, they may be defined by a width-to-height ratio. The aspect ratio for high-definition TVs is 16:9, or 1.78:1. A complete 35 mm film frame with soundtrack (also known as the Academy ratio) has an aspect ratio of 1.375:1. In normal life, ratios where the height is greater than the width are unusual, but they can be useful in computer systems because the screen is better suited to a vertical arrangement.

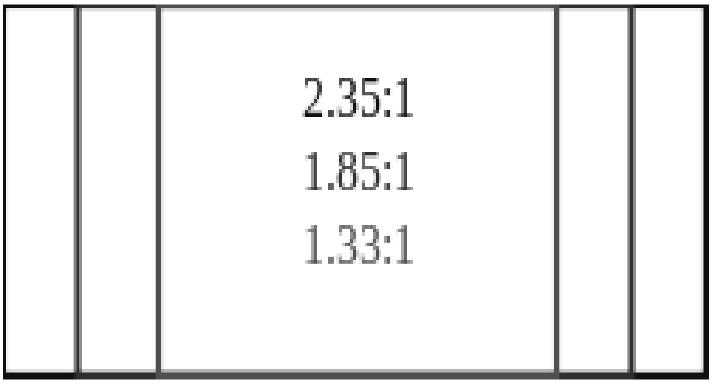


Figure 1. Aspect ratios of typical cinematography and traditional television

- **Color Space and Bits per Pixel**

The name of the colour model describes the video colour representation. YIQ was used in NTSC television. It is similar to the YUV system used in NTSC and PAL television, as well as the SECAM YDbDr scheme. The number of bits in a pixel determines the number of distinct colours that it may represent (bpp). In digital video, chroma subsampling is a common method of reducing the number of bits per pixel.

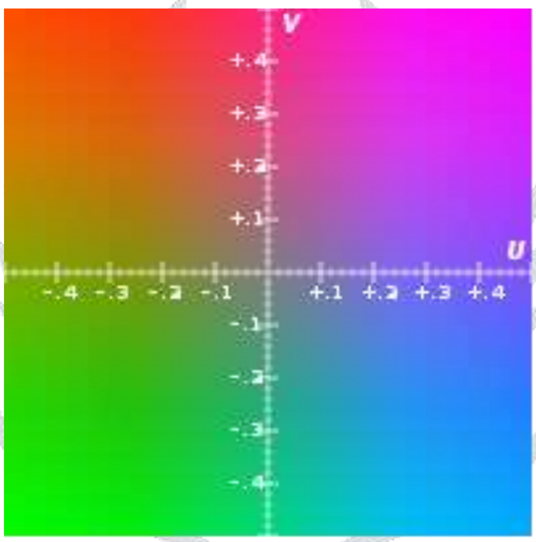


Figure 2. An example of a U-V colour plane

- **Screencast**

A screen cast is a digital recording of a computer's screen output, also known as a video screen capture that frequently includes voice commentary. The phrase screencast is linked to the term screenshot; although a screenshot is a snapshot of a computer screen, a screen cast is basically a video of the changes that a user sees on a computer screen over time, augmented by audio commentary.

Screencasts may be used to illustrate and explain programme functionalities. Making a screencast allows software engineers to showcase their work. Screencasts may also be used by educators to integrate technology into the classroom. On an interactive whiteboard, students may capture video and audio as they illustrate the right technique for solving an issue. Screencasts are also important tools for regular programme users:

They aid in the submission of bug reports in which screencasts replace possibly ambiguous written descriptions; they aid in demonstrating others how a certain operation is completed in a specific software environment.

4. Result and discussion

One of the most critical aspects of system design is input design. Input design is the process of planning and designing the input received in the system in order to obtain the essential information from the user while avoiding the information that is not required. The goal of input design is to provide the highest possible levels of accuracy while simultaneously ensuring that the input is accessible and understandable by the user.

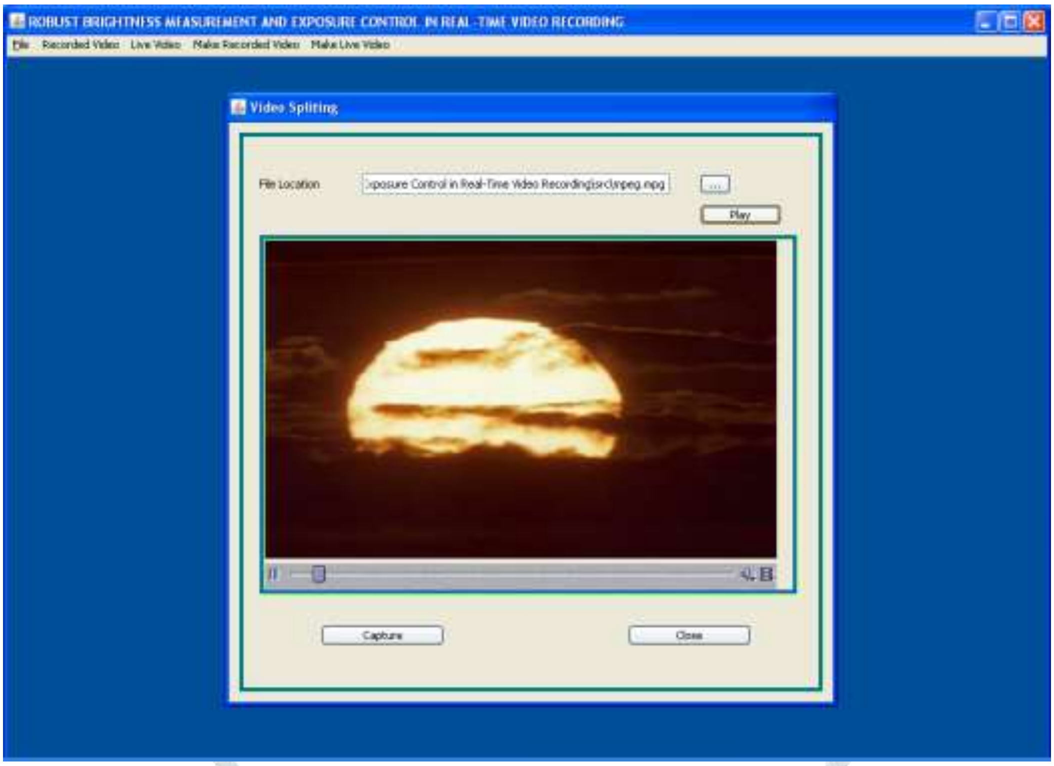
The input design is a component of the overall system design that necessitates close scrutiny. The output design is the user's most essential and direct source of information. The output screen displays the encoding time and file size for both the fractal and fast fractal techniques.

The PSNR value is calculated after comparing the two approaches. The output screen also shows the rebuilt image. Output from the computer system is necessary in order to convey the result of processing to the user and to give a permanent copy of these results for future reference. The sort of output format, frequency, and so on were all considered when creating the output.

The Implementation process is divided into four stages: Discovery, System Development, User Acceptance Testing, and Production Rollout. It's easy to become overwhelmed by sleek marketing presentations, especially when the sales team is discussing topics that most consumers don't fully comprehend. Showmanship obstructs genuine ability.

Unless the review team is comparing each vendor against the same set of needs and has a shared understanding of the importance of each grade, "likeability" might triumph over competency.

Fig.1. Playing the video



5. Conclusion

The precision of scene brightness assessment as well as the speed with which exposure adjustments are made determine the video quality of a real-time video recording system. A thorough Metal Oxide Silicon Field Effect Transistor (MOSFET) system has been supplied, with more accurate scene brightness estimates and high-speed exposure modification. The efficiency of brightness estimation has been substantially improved by adaptively selecting the sensor's sub - sampling levels and applying histogram analysis to further improve brightness measurement accuracy. As a consequence of a more exact evaluation of scene brightness, the speed and precision of exposure modification have been enhanced.

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