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AN HIGH EQUIPPED POWER CONSTRAINED ALGORITHM FOR OLEDS BASED ON SD-MSR FOR DISPLAY OF HIGH DEFINITION VIDEOS

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ABSTRACT:

The power constrained contrast enhancement algorithm is used for emissive displays and it is based on histogram equalization. However, with HE-based contrast enhancement there is an inherent risk of overstretching. To avoid this we presents a high equipped power constrained algorithm for OLEDs based on multi scale retinex. MSR plays main role in the proposed algorithm and it is based on of power controllable log operation fallowed by sub band wise gain control. The MSR is used for power reduction in display of images, the same approach can be used for high definition videos, and the algorithm provides enhanced video sequence, better perceptual video quality and power consistent ratio without flickering artifacts. This proposed algorithm gives the better visual quality than previous existed power constrained contrast enhancement algorithm for videos.

Keywords: pcce, multi scale retinex, OLED, power consumption.

I. INTRODUCTION:

In between the 20th century, with the advancement of TV telecast and data innovation electronic displays have become integrated part of the entertainment world. Data presentations are vital for human culture and we further expect that new display lead to new devices in future. Conventional displays broadly utilized today are CRT (Cathode ray tube), LCD (liquid crystal display), PDP (Plasma display panel) and a projection display. Among them CRT was the main display system for early 50% of the century, in spite of the fact that its cumbersome and substantial structure constrained developing screen zone of CRT under 40 inches in corner to corner size. After long time gap to create FPD (Flat board display), spot grid LCD came into the business sector in 1980s..the above mention displays requires more power consumption for display ,to avoid this we are presenting OLEDS.

II. OLED DISPLAY:

Organic light emitting diode (OLED) is an emerging visual technology, it provides much wider view picture and high image quality compare to conventional LCDs. The main difference between power characteristics in an OLED display and LCD is that OLED displays do not require external lighting power because its pixels are emissive once, and each pixel in an OLED display consists of three components for red, green and blue components respectively. Moreover, these components of a pixel have different luminance efficiencies. According to the result, the pixel color directly impact on its power consumption.

OLED displays and liquid crystal displays have a very similar organization, including a group of addressable pixels, LCD or OLED, control circuitry that generates the control and data signals for the panel based on display content, and interface to the graphics processing unit. In this paper, we address the power consumption of the display and focus on the

variance in power consumption introduced by the OLED panel when showing different content. Our power model take input from different places of the system and can be implemented. OLEDs are utilized to make advanced displays in gadgets, for example, TV screens, computer screens, versatile frameworks, cellular telephones and PDAs. The major area of advancement in the white OLED gadgets, for utilization in strong lighting applications. Various methods used in OLED are Single-Scale Retinex (SSR), Multi- Scale Retinex (MSR).

II.1. Single-Scale Retinex:

SSR is an individual from the class of focus/encompass capacities where the output is dictated by the contrast between the information worth (focus) and a normal of its neighborhood (encompass)

II.2.Multi -scale Retinex:

MSR appears to manage the cost of a worthy exchange of between a decent nearby element extent and a decent shading interpretation. The MSR output is characterized as a weighted sum of the outputs of a few SSRs.
On account of the tradeoff between element range pressure and shading version, we need to pick a decent scale c in the recipe of F(x, y) in SSR. Multiscale retinex, which is a mix of weighted diverse size of SSR, is a better solution.

II.3.Comparison with other image processing techniques:

Keeping in mind that our goal of investigating the benefits of the Retinex picture upgrades systems, we compare the retinex result and other picture improvement methods, including auto addition/counterbalance, Gama amendment, histogram leveling and homomorphic separating. Therefore, the various systems vigorously rely upon image data. For auto increase/balance, it could accomplish element range pressure however at the loss of points of interest because of immersion. For gama adjustment, it regards enhance pictures either excessively dim or too bright however it is a worldwide capacity connected to the photo, in this manner there is no subtle elements improvement included. For histogram and homomorphic sifting, they all failed for bi-modular pictures, which incorporates the data both dim and bright ranges. Yet, for retinex, it could accomplish satisfactory results for both pictures.

III.PCCE:

A power-constrained contrast enhancement algorithm using a sub-band decomposed MSR for OLED display. First, we designed a modified log function for dynamic power saving. Second we propose a coarse-to-fine power control mechanism based on SD-MSR, which jointly achieves contrast enhancement and dynamic range compression using an adaptive weighting strategy proper for an input image. Finally, we present a power control scheme for a constant power reduction ratio in video sequences by using temporal coherence in video sequences and a consistent power-saving ratio without flickering artifacts for video sequences.

IV. SD MSR:

In order to accomplish each image fusion and distinction enhancement at the same time, we propose a changed framework of the subband-decomposed multi scale retinex (SDMSR), This framework relies on a fusion strategy that reflects the multi scale characteristics of the SDMSR well. We tend to 1st apply 2 complementary intensity transfer functions to input images. so as to effectively utilize hidden info in each shadows and highlights within the fusion method .we tend to then decompose retinex outputs into nearly non overlapping spectral sub bands, The decomposed retinex outputs are measured by subband by subband. In the fusion method we apply space varying sub band gain to each subband decomposed retinex. so that the quality of the output image will be effectively increased

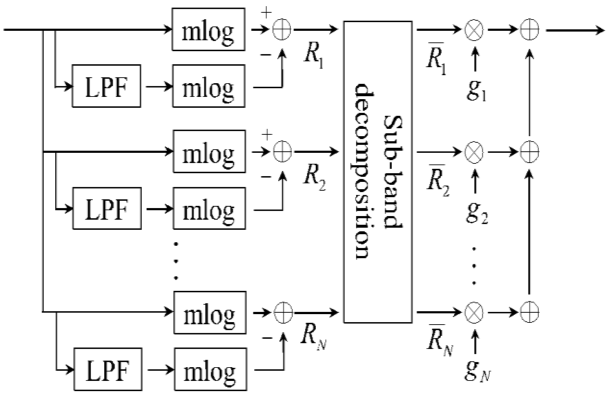


fig1: block diagram of SD-MSR

In addition to effectively managing artifacts and noise, we have a tendency to build the higher degree of improvement of combined details adjustable. From experiments with varied multi-sensor image pairs, the results clearly demonstrate the input images have poor quality the projected rule makes it possible to come up with a combined image with extremely increased distinction, whereas conserving visually significant data contained within the source pictures. A completely unique multi-scale Retinex technique supported by sub-band coefficient fusion for image enhancement. the hybrid intensity levels provides retinex outputs have different scales Then the retinex outputs are decomposed into non-overlapping spectral sub-bands However this retinex algorithm also applied to high definition videos, because video is a sequence of images.

V. PROPOSED ALGORITHM:

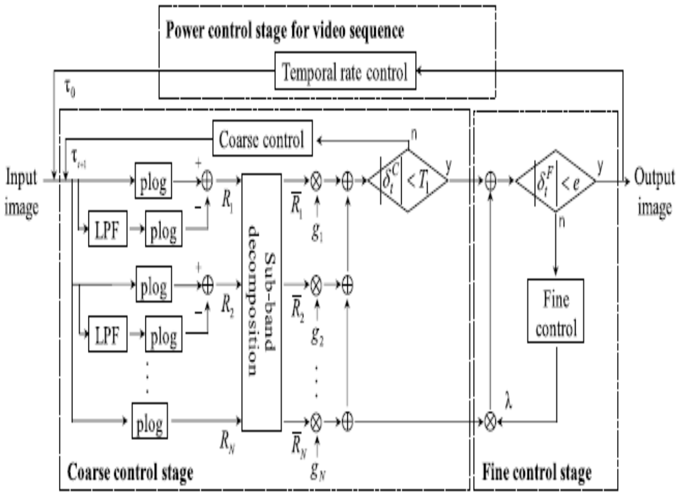


Fig 2: block diagram of proposed algorithm

The proposed algorithm consists of two stages: 1. Coarse Control Stage (CCS) and 2. Fine Control stage (FCS)

V.1. **Coarse Control Stage**:

The mlog of conventional SD-MSR plays a role in enhancing the contrasts of highlights and shadow regions. In other words, contrast in the dark region becomes high by increasing the intensity level of the pixels in the region, and contrast in the bright region also becomes high by decreasing the intensity level of the pixels in the region. So as to, the increase of the intensity values in the shadow region results in the increase in power consumption for the OLED display. So, for low power consumption as well as contrast enhancement, even in the shadow region, we redefine a so-called power-constrained log (plog) from them.

$$P_{OLED} = C + \sum_{i=1}^{K} \{ f_R(R_i) + f_G(G_i) + f_B(B_i) \}$$

where $f_R(R_i)$, $f_G(G_i)$, $f_B(B_i)$ indicate the power consumption of red, green, and blue devices of the pixel, respectively and i stand for the pixel index in an image. C is a constant to account for the static power contribution which is independent of the pixel values.

$$plog(I(x,y)) = \begin{cases} \dfrac{\tau log D log(\alpha I(x,y)+1)}{(D-1)\log(\alpha\tau+1)} & I(x,y) \le \tau \\ mlog(I(x,y)) & I(x,y) > \tau \end{cases}$$

Here, α *is* a sort of penalty parameter. Fig. 3 describes the *p*log graph according to α values. In Fig. 3, *p*log is equivalent to *m*log when α is 1. We can observe that *m*log tends to increase the contrast of extremely darker range within the dark interval below τ, and decrease the contrast of the middle range around τ. So *m*log works for images having extremely dark region

$$R^{MSR}(x, y) = \sum_{n=1}^{N} w_n \cdot R_n(x, y)$$

where

$$R_n(x, y) = \log I(x, y) - \log(F_n(x, y)^* I(x, y))$$

Here, $R_n(x, y)$ denotes a retinex output associated with the n^th scale for an input image I(x, y).the gain Wn = 1.and N is the number of scales. Fn (x, y) denotes a surround function and is
given by

$$F_n(x, y) = K_n e^{(x^2+y^2)/\sigma_n^2}$$

Where K_n is determined so that $F_n(x, y)$ can satisfy $\sum\sum F_n(x, y) = 1$. σ_n^2 denotes the variance of the Gaussian kernel at then-the sub-band. Under the condition $\sigma_n > \sigma_{n-1}$ every SSR.

Note that a small σ_n is suitable for enhancing fine details, whereas a large σ_n is suitable for improving tonality. Thus, it is important to select an appropriate value of σ_n in the MSR

V.2. **Fine Control Stage**:

Since p_t still cannot get close to P through the proposed CCS, we require additional power Control. Let δ_t^F denote the difference between the power reduction ratio at the t^th iteration of the fine control stage and P. Initially, δ_0^F is set to the final δ^c obtained from the CCS. If $\delta_t^F < e$, then FCS terminates as in Fig. 2, and the output image I is obtained by normalizing the final R from the previous stage.

$$m\log(I(x,y)) = \begin{cases} w_L \log(I(x,y)+1) & I(x,y) \le \tau \\ -w_H \log(D - I(x,y)) + \log D & I(x,y) > \tau \end{cases}$$

Where τ *is* a user-defined threshold and D denotes an image dynamic range. For example, D is 256 for an 8-bit image w_L and w_H denotes weighting parameters according to τ .they are represented as

$$w_L = \frac{\frac{\tau}{D-1}\log D}{\log(\tau+1)}, \quad w_H = \frac{(1-\frac{\tau}{D-1})\log D}{\log(D-\tau)}$$

the mlog function enhances the contrasts of dark regions as well as bright regions. so that we can enhance image details both in highlights and shadows.

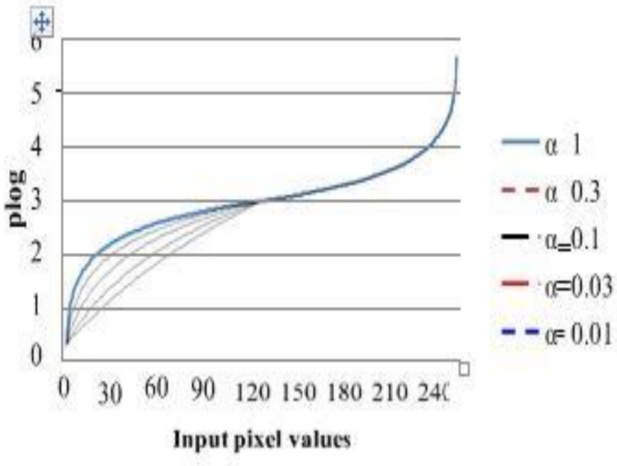


Fig3: The *p* log function according to α value. Here, τ *is125*

IV EXPERIMENTAL RESULTS:

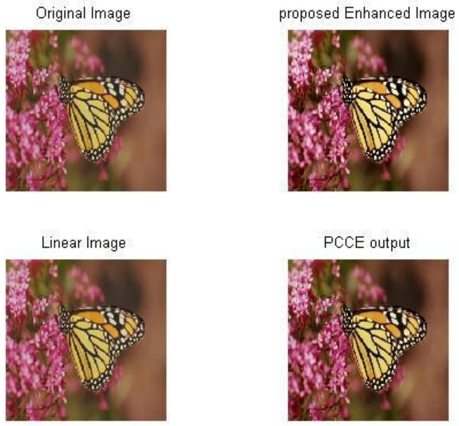
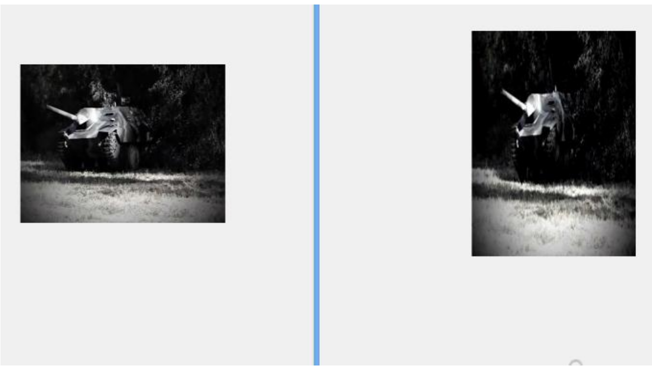


Fig 5: Applying images to algorithm

To evaluate the performance of the proposed algorithm, we used two images from Kodak Lossless True Colour Image Suite1 (caps and beach) and a high dynamic range (HDR) test image memorial. Also, we used six common intermediate format (CIF) video sequences: container (500 frames), football(90 frames), Paris (300 frames), foreman (300 frames), bus(500 frames), Stefan (90 frames) and five 720p sequences: big ship (60 frames), crew (60 frames), jets (60 frames), night(60 frames), raven (60 frames), and four 1080p sequences: crowd run (500 frames), park joy (60 frames), toys and calendar(60 frames) traffic (60 frames). We processed only the Luminance components in the experiments. More specifically, given a colour image, we converted it to the YUV colour space and then processed only the Y-component without modifying the U- and V-components.



Before After

Fig 6: Applying videos to algorithm

The above diagram shows the proposed algorithm applied to the videos. So that Experimental results show that the proposed algorithm provides better visual quality than previous methods, and a consistent power-saving ratio without flickering artifacts.
The projected formula is differentiated from previous methods in the following 3 aspects. First, we tend to control the target power level mechanically. Second, we tend to avoid the flickering development by keeping the facility levels of adjacent images constant for video sequences. Third, we tend to come through time period process of the projected formula on a all-purpose graphics process unit even for full HD video sequences

<u>Table</u>

The Comparison of flickering artifacts for different videos .here the units is 10^{-2}

Name	PCCE	proposed
bus	1.14	0.04
Paris	2.07	0.03
big ship	0.74	0.04
jets	2.95	0.06
Park joy	0.58	0.06
traffic	0.26	0.04
average	2.74	0.05
football	17.6	0.04
Stefan	2.24	0.05
crew	1.16	0.06
raven	3.32	0.07
Toys and col	0.78	0.05
Crowed run	0.08	0.04

Table shows that the proposed algorithm provides noticeably lower F values than the PCCE. Especially, the PCCE has an outstanding F value for football sequence. This indicates that the PCCE is likely to undergo flickering artifact for the sequence,

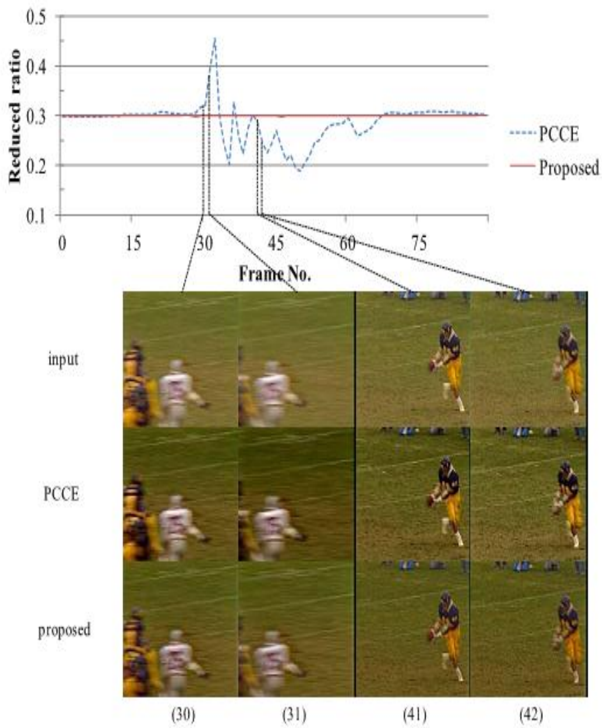


Fig 7: power reduction ratio for the football video sequence.

The power reduction ratios for the football video sequence when P is set to 30%. For this experiment, ρ for the PCCE is manually tuned to 0.3 according to the given P. Since the PCCE cannot keep the power reduction ratio consistently, it may face the so-called flickering artifact.

V CONCLUSION:

This paper proposes an SD-MSR based image processing algorithm for fine power control in OLED displays. We designed a power-constrained log function for effective power saving in dark regions.
Using the power constrained log function with SD-MSR, we proposed a coarse-to-fine power control mechanism for high definition videos. Finally, we presented a power control scheme for future power reduction ratio of high definition video sequences. Experimental results showed that the proposed algorithm provides better visual quality and more power saving than previous works. it provides better video display without flickering artifacts.

VI FUTURE SCOPE:

The proposed algorithm can be power saved up to 30% of the power constrained contrast algorithm. It can be applied to both high definition quality images and high definition videos. Even though we tried of our efforts to reduce the power consumption, the future studies may give better power saving perception ratio and run time than our proposed algorithm.

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