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Contrast Enhancement Technique using Sub-band Decomposition for OLED Display

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Abstract: Sub-band decomposition along with multiscale retinex is used for contrast enhancement. Initially the image is divided into its components of red green and blue and is processed differently to avoid overlapping of bands. So the image is decomposed and this is done for various bands using multiscale retinex where the log function is used to produce point by point ratio of image.

Keywords: Image enhancement, sub band decomposition, multiscale retinex.

I. INTRODUCTION

An OLED is a gadget which gives out light under appliance of an outside electrical energy. There are two main groups of OLED devices: those ready with small organic molecules and those ready with organic polymers. OLEDs have the outstanding characteristics of light in weight, elastic, visible and colour tune ability, which makes them an ideal up to date light source. Curiosity in OLEDs is explained by the diverse benefits opened by this technology: process in emissive mode (non-backlighting), a large viewing angle, a low operating energy (below 5V), light emission all through the observable (by modifying the chemical construction of material), elastic displays and cheap production costs. OLED displays are based on part devices containing natural electroluminescent substance (made of small molecules or polymers) that gives out light when encouraged by electricity. An OLED is a solid-state semiconductor device which is in solid state that is 100 to 500 nanometres broad and consists of a conducting film and an emissive film, all collectively sandwiched among two electrodes and deposited on a substrate. The conduction film is made of natural plastic molecules that transfer holes from the anode. The emissive layer is a film of natural compound that transfer electrons from the cathode and gives out light in reaction to an exciting current. The conduction in natural layer is motivated by delocalization of electrons caused by conjugation over all or part of the natural molecule. Hence, the conducting level in natural molecules can differ from that of an insulator to a conductor. The crossing point among the two films provides an capable site for the recombining of the injected hole–electron pair and output electroluminescence. Thus, OLEDs are double charge insertion devices, requiring the simultaneous contribution of both positive charge particles and negative charge particles to the electroluminescent material sandwiched among two electrodes. There are diverse types of OLED based on the construction.

1. Transparent OLED – They have all components which are transparent like anode, cathode and substrate.
2. Top emitting OLED – Substrate film is reflective or opaque
3. White OLED – gives out white light. These can be made in to large panes to make fluorescent lamps
4. Foldable OLED – Substrate layer is elastic and foldable Used in cell phones to avoid harm.
5. Active matrix OLED – They have all films but the anode film has a transistor collection that determines the pixel of the display.
6. Passive OLED – Has strips of cathode and anode. Outside circuitry determines the pixel in these devices.

II. RELATED WORK

There are many techniques invented for contrast enhancement along with power saving. Some of them are not able for power saving.. Some techniques are listed below: Comparison among other image processing techniques:

Having the goal of investigating the benefits of the Retinex picture upgrades system; compare the retinex method and other methods of picture improvement, including auto addition/counterbalance, Gama amendment, levelling of histogram and homomorphic separation. Therefore, the different system depends upon image data. For auto balance, it could achieve factor range pressure however at the failure of points of interest because of engagement.

A. Power constrained contrast enhancement

Chul Lee et. al. (2010) [2] proposed power constrained contrast enhancement algorithm in which the log modified histogram equalisation function was used which reduces overstretching. And a power consumption model was designed to achieve low power consumption.

B. Single scale retinex

D. J. Jobson et al. (1997) [3] proposed single scale retinex based on Land's retinex theory. SSR is an entity from the

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set of covered competencies where the output is ordered by the difference between the data worth and a normal of its region (encompass).

C. Multiscale retinex

G. A. Woodell et al. (1997) [4] proposed multi scale retinex method from single scale retinex. MSR appears to manage the charge of a valuable exchange of among a straight nearby part scope and a straight shading analysis. The MSR output consists of a weighted sum of the outputs of a few SSRs.

On relation of the substitution among element series pressure and shading part from SSR of F(x, y) is chosen. Multiscale retinex, which is a mix of weighted varying sizes of SSR, is a better solution.

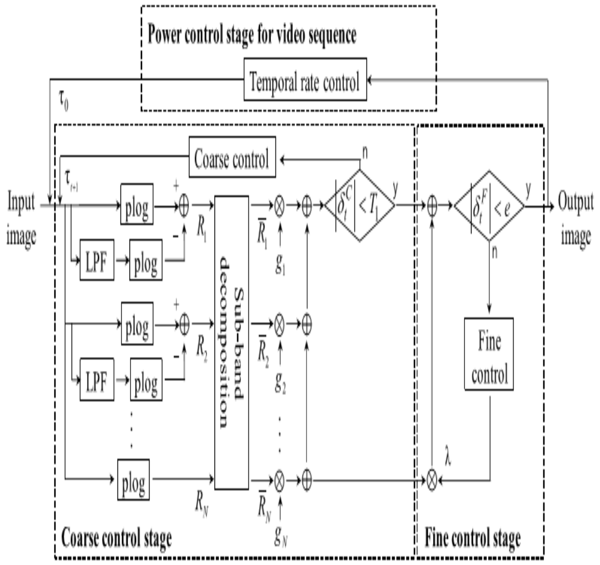

Fig 1 Block diagram of SD-MSR

image power which is not achieved by coarse control stage. MSR plays a role in improving the contrast of best part and dark regions. In other words, difference in the dark region becomes high by growing the strength level of the pixels in the region, and contrast in the intense region also becomes high by lessening the strength level of the pixels in the region. However, the increase of the intensity values in the dimness region results in the increase in power use for the OLED display. So, for less power consumption and contrast enhancement, even in the dark region, a power-constrained log (plog) from the m log is described. The filter is applied to each part before the power log for better contrast enhancement. And the same part is then provided to plog, and output of both is added before sub-band decomposition. In sub-band decomposition Y, C b, Cr components are filtered to avoid overlapping of bands and to enhance fine details. The plog used enhances the areas dark regions.

$$\mathrm{plog}\left(I(x,y)\right) = \begin{cases} \dfrac{\tau \log D \log(aI(x,y)+1)}{(D-1)\log(a\tau+1)} & I(x,y) \le \tau \\ m\log\left(I(x,y)\right) & I(x,y) > \tau \end{cases}$$

III. PROPOSED WORK

A power controlling algorithm for contrast enhancement for OLED displays is shown primarily based on SD-MSR. Fig. 1 describes the estimated formula that consists of three stages. The primary stage coarsely reduces the capacity of correlate in treating input image nearer to the desired target power with difference improvement, and the second stage finely controls the Fine control stage: This stage is applied to obtain the additional power. If the required power is not obtained then the image is passed through this stage. Power control stage is followed by fine control stage.

IV. RESULTS

The input image is given to low pass filter and plog and decomposition of image is done.

The various output of images are shown after the image undergoes sub-band decomposition and the output is displayed.

Input image given to system:


Fig.2 Input Image


Fig.3 Image after sub-band decomposition

Fig.4 output after combining R,Cb,Cr components

Fig.5 Image obtained after decomposition

V. CONCLUSION

Hence, by using subband decomposition the image is decomposed and hence some contrast is enhanced.

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REFERENCES

[1] Ling Chen, Hong and Huading Jia" On Scanning Linear Barcodes From Out-of-Focus Blurred Images: A Spatial Domain Dynamic Template Matching Approach" IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 23, NO. 6, JUNE 2014
[2] J. Massieu, "Autofocus barcode scanner and the like employing micro-fluidic lens," U.S. Patent 7 296 749, Nov. 20, 2007.
[3] S. Esedoglu, "Blind deconvolution of bar code signals," Inverse Problems, vol. 20, no. 1, pp. 121–135, Feb. 2004
[4] N. Dridi, Y. Delignon, W. Sawaya, and F. Septier, "Blind detection of severely blurred 1D barcode," in Proc. GLOBECOM, Dec. 2010, pp. 1.
[5] R. Choksi and Y. van Gennip, "Deblurring of one dimensional bar codes via total variation energy minimization," SIAM J. Imag. Sci., vol. 3, no. 4, pp. 735–764, 2010.
[6] E. Joseph and T. Pavlidis, "Bar code waveform recognition using peak locations," IEEE Trans. Pattern Anal. Mach. Intell., vol. 16, no. 6, pp. 630–640, Jun. 1994
[7] R. Shams and P. Sadeghi. Bar code recognition in highly distorted and low resolution images. In IEEE International Conf. Acoustics, Speech and Signal Processing, volume 1, pages I–737–I–740, Honolulu, HI, USA, 2007. IEEE Computer Society. ISBN 1-4244-0727-3.
[8] P. Hough. Method and means for recognizing complex patterns. U.S. Patent 3,069,654, Dec.1962.
[9] R.O.Duda and P. E. Hart. Use of the Hough transformation to detect lines and curves in pictures. Commun. ACM, 15(1):11–15, 1972.ISSN00010782.doi:http://doi.acm.org/10.1145/361237.361242
[10] J. F. Canny. A computational approach to edge detection. IEEE Trans. Pattern Analysis and Machine Intelligence, 8(6):679–698, 1986. ISSN 0162-8828.

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