Application of Mura Index Methods to L0 Grey State

Jaegeon You and Qian Jia
BOE Technology Group co., LTD. No.9 Dize Road, BDA, Beijing, 100176, China
Tel.: 86-10-8711-9651, E-mail: jgyou@boe.com.cn

Recently two groups have reported the Mura index calculation method of leveling on the screen in the FPD products [1, 2]. They suggested quantitative methods with human sensitivity of spatial frequency for over 20% brightness of full white pattens. This paper presents results of these application to 0% brightness of full white state in ADS LC mode. In dark state, L0 grey image was taken by conventional camera, RGB was transferred to XYZ color value [3], through noise filter, changed to opponent color and then through MTF(S-CIELAB) spatial filter [4], retransferred to XYZ and finally transferred to La*b*. Ygen was calculated through the luminance mura index and color mura index which are calculated from the bright(or color) area ratio, maximum bright(or color) and luminace (or color) edge area data processing [ref.1]. Index E was calculated through the color difference data processing [ref.2]. In Fig.1, the process flow of in this evaulations and reference level image were noticed. Here, level 1 is almost imperceptable, level 2, 3 are acceptable and not good, level 4, 5 are serious and very serious. To check feasibility and validity of these method, we prepared the wide range of mura image sample and the narrow range of the mura image sample at ADS LC mode. And then using matlab software, Mura index level are calculated and plotted in Fig.2. It seems that two method both have a linear proportional relations hip to reference human judgement level. Second, we applied these method to the image in 32 inch panel for over 60 samples of one process condition.

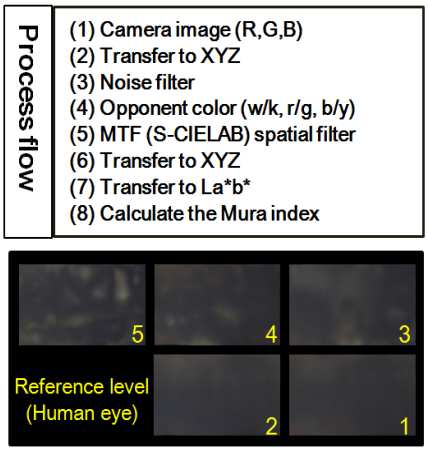

Fig.1 Process flow and reference image

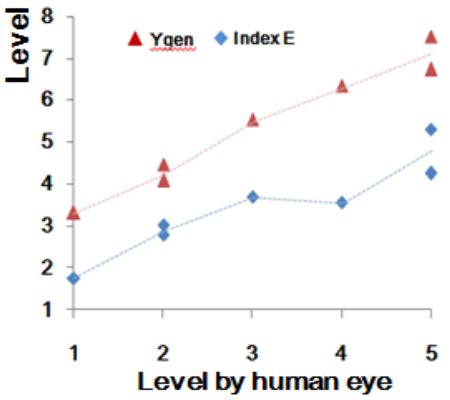

Fig. 2 Mura index of reference

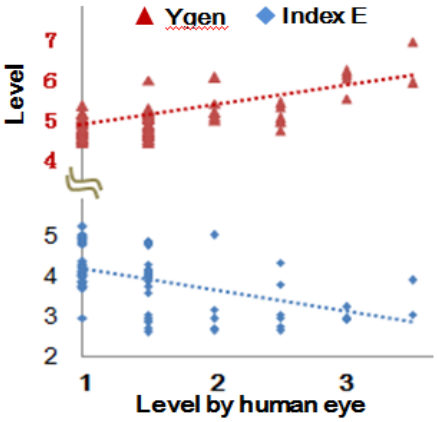

Fig.3 Mura index of real

To increase the precision of image level, half level was adopted (like 1.5, 2.5, 3.5) between integer numbers. In regard to human judgement level, Ygen level was positively linear proportional (with R^2=0.5), but the Index E level was negativly propertional (with R^2=0.25). From these results, for 0% brightness of full white range, Y gen's method was more effective than E index's method to realize quantitative evaluation.

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References

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