

High Dynamic Range Image Tone Mapping with Edge Preserved Dithering

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Problem

High dynamic range (HDR) image has been widely used in mobile phones and other devices for providing **more detail information** and **better view experience**.

HDR image tone mapping: **non-linearly map** the gray levels in HDR image to **satisfy the gray scale limitation** of display screen and **preserve more details** in the generated low dynamic range (LDR) image.

The **performance** of HDR image tone mapping is influenced by the gray scale of display screen.

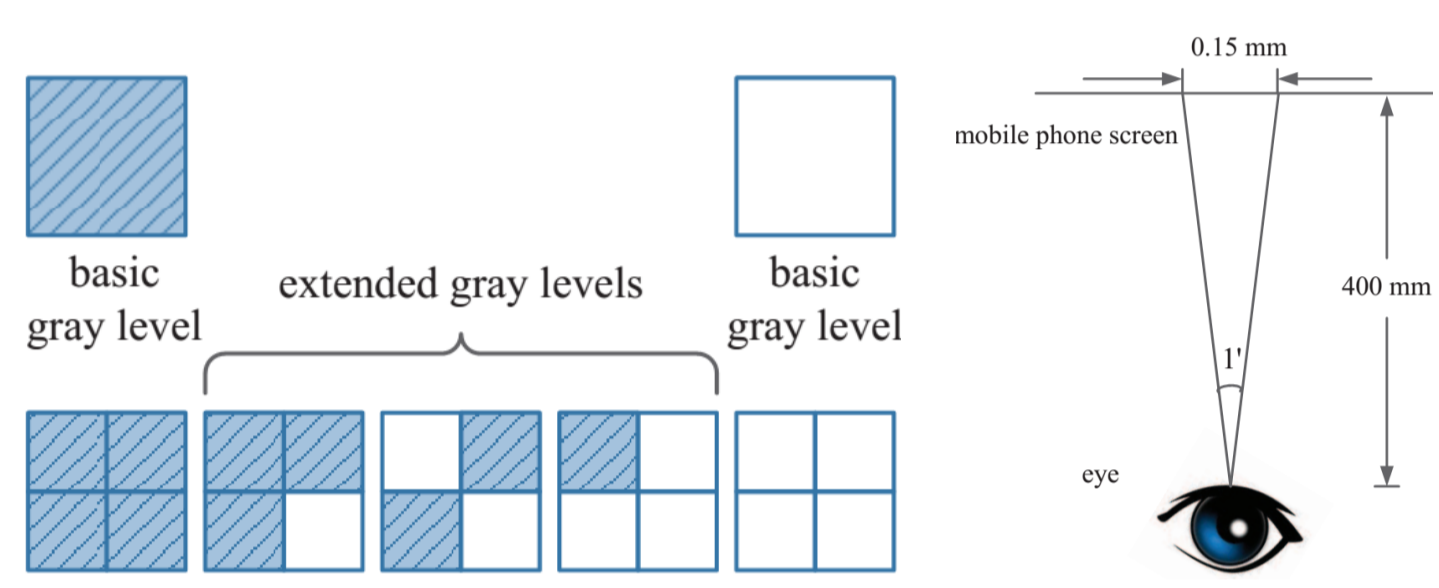
How to increase the gray scale of display screen for displaying HDR images?

Solution

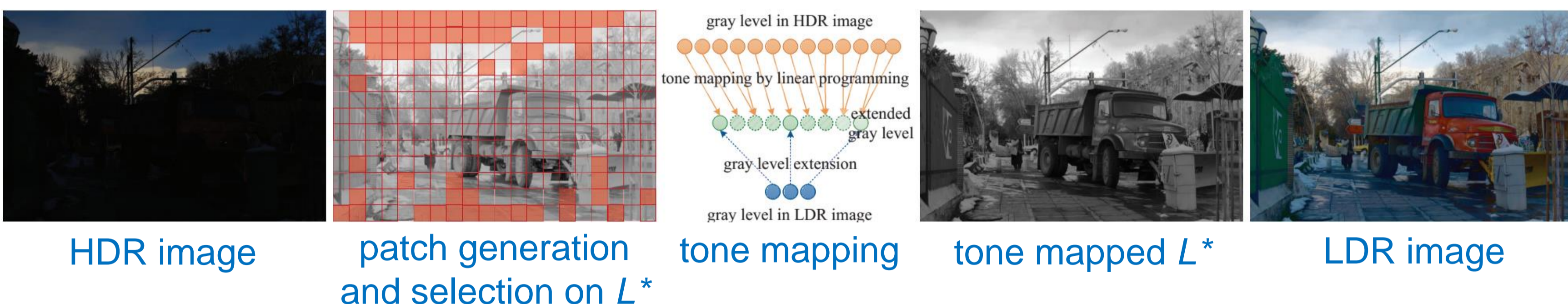
Basic idea: utilize **edge preserved dithering** to breakthrough the gray scale limitation of display screens.

Dithering: approximate the unavailable gray levels by combining a number of gray levels.

High resolution: screen resolutions of many mobile phones exceed the distinguishing ability of human eyes.



Overview



HDR image

patch generation and selection on L^*

tone mapping

tone mapped L^*

LDR image

Experiment

Dataset: duplicate-removed **Funt** et al HDR Dataset (107 images) and **HDRSID** Dataset (232 images)



User study

	Funt	HDRSID
Better	58	93
Similar	36	105
Worse	13	34

15 participants, compared to OCTM

Failure



linear CLAHE our

Conclusions

Contribution

- Propose a HDR image tone mapping approach using edge preserved dithering.
- Improve the gray level distribution of the generated LDR image to provide better view experience by avoiding contouring and retaining more details.

Future work

- Optimize tone mapping by further combing dithering.
- Extend the proposed method to HDR video tone mapping.

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