.

Energy-Aware Images - Abstract*

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In the context of climate change and worldwide energy crisis, reducing both the environmental impact and the energy consumption of the video chain is a requirement for any actor in the field. Each step, from production, encoding, transmission, to decoding and rendering on screens participates to the overall energy consumption, but it is commonly agreed that displays account for a large part of the energy consumption [1].
Modifying videos and images so that they consume less energy when displayed has been already proposed in the literature and devices, via e.g., reducing the overall luminance level. Most of these technologies are looking for a trade-off between the Quality of Experience (QoE) and the Energy Reduction of displays [2, 3, 4].
In this presentation, we propose a new method based on the proposition of Shin et al. [3] and Nugroho and Ruan [4]. Given an input image and an energy saving rate, we also directly compute a pixel-wise dimming map which, once applied on the image, will decrease the light level, while maximizing the Quality of Experience. Figure 1 presents the implementation in a context of video transmission.

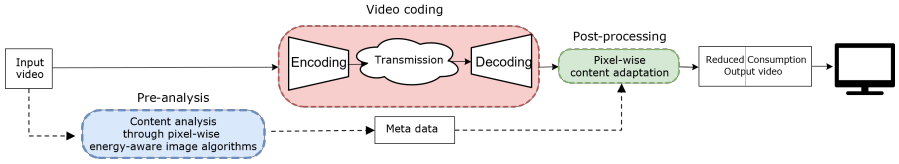

Figure 1: Using pixel-wise dimming map in a context of video transmission

The key contributions are (i) a powerful and shallow network with less than 5,000 trainable parameters that reduces the energy of an image while maintaining its QoE, (ii) a flexible approach that could be fitted in various use-cases, (iii) an effective implementation of the proposed method within a content-adaptive and pixel-wise framework described in a JVET and Green MPEG

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standardization contribution [5, 6, 7].

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