

# Subjective assessment LDR images generated from coded HDR images

16 de Julho de 2018

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## **1 Abstract**

JPEG-Xt, the new JPEG standard for HDR (High Dynamic Range) images encoding, keeps the legacy with the common JPEG decoders. That is achieved by encoding a LDR (Low Dynamic Range) version of the HDR image using a common JPEG encoder and encoding the residual HDR information in an enhancement layer that is made available in the JPEG metadata fields. In opposition to other HDR encoding, this JPEG standard is announced as a true option because of the ability to offer the LDR version to the common JPEG decoders. However, what are the advantages of using it, as the residual information represents a grow on bit rate? Currently there are two possibilities for visualizing HDR images:

1) in a HDR capable display, which requires the ability to display very high contrasts. These displays are very expensive and for that reason they are not easily available nowadays.

2) to display a LDR version of the image, which is the typical situation. In this case JPEG-Xt makes already that version available, but why should some one receive the HDR residual information of the enhancement layer if it is useless in this scenario?

In practice if no HDR display is available, the HDR residual information provided in the JPEG-Xt stream can be used to generate new LDR versions of the HDR image using different techniques. In fact, this is an useful application, as typically the LDR generation in the encoder side results

from an automatic procedure using a predefined TMO. It is well known that TMO algorithms tend to produce unnatural colors. Hence, if the LDR version of the HDR image is not satisfactory, the encoded HDR image can be used to generate a new LDR version, using a new TMO algorithm or just by adjusting the parametrization of the initial TMO.

Our previous study has this application on mind considering the three main profiles of JPEG-Xt. LDR images generated using a specific TMO applied to the original HDR image are compared with the TMO generated using the decoded HDR image using perceptual metrics. However, it is well known that the best quality assessment results from subjective assessment.

In the present work the subjective assessment of the generated LDR from coded HDR should be performed and correlation with objective results from our previous work should be computed.

## 2 Objectives

In this work is intended to study subjective assessment of the generated LDR from coded HDR images obtained with different TMO operators. Correlation with objective results will also be studied.

## 3 Task Description

**Task 1** Study the functioning of JPEG-Xt and the generation of different TMOs.

**Task 2** Design a subjective quality assessment experiment for the generated TMOs.

**Task 3** Perform the designed a subjective quality assessment experiment.

**Task 4** Statistical analysis of the subjective data.

**Task 5** Study the correlation between the MOS and the Objective metrics.

**Task 6** Analysis of results.

**Task 7** Writing.

## 4 Expected Results

1. Quality assessment of TMOs generated from coded HDR images;

2. Correlation with objective metrics.

## 5 Timeline

**Task 1-2** Set-Oct

**Task 3** Oct-Nov

**Task 4** Nov-Dec

**Task 5-6** Jan-Abril

**Task 7** May-June

## 6 References

Thomas Richter, On the standardization of the JPEG XT image compression, in Picture Coding Symposium (PCS), Dec. 2013, pp. 37-40.

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