Aarhus University

Research & Development Project

PERCEPTUAL IMAGE EVALUATION

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December 31, 2015

TABLE OF CONTENTS

1

INTRODUCTION

This report describes the process of a Research and Development project carried out at Aarhus University. The project is developed as a subproject of a Master Thesis which is carried out in in spring 2016. The purpose of the Master Thesis is to conduct a statistical comparison of subjective image quality evaluation with objective image quality metrics, e.g. MSE, PSNR, and SSIM.

The purpose of this Research and Development project is to analyze multiple subjective image quality evaluation assessment techniques. From this analysis one assessment technique is chosen to be carried out. This project leads to an implemented application which will be used in the Master Thesis described above.

All design and implementation choices made throughout this project is reasoned described in this report together with screen shots from the final implementation of the application.

ASSESSMENT TECHNIQUES

2.1 ACR

Absolute Category Rating

Rating scale: 5, 9 or 11 point system (Bad, Poor, Fair, Good, Excellent)

Images are presented one at a time and rated independently.

Method: Each image is presented for 10 seconds followed by a gray screen from where the observer gets to evaluate the image.
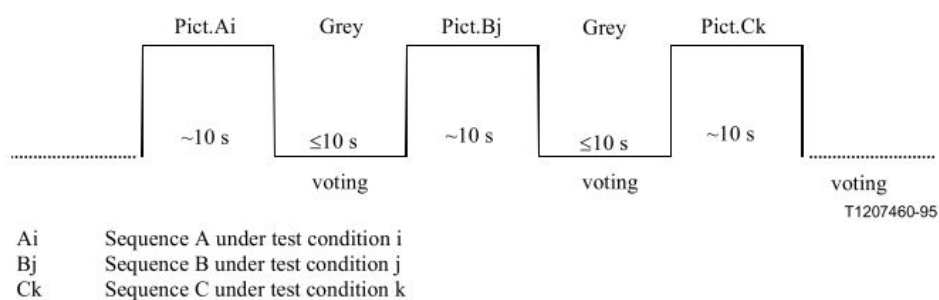

Ai   Sequence A under test condition i
Bj   Sequence B under test condition j
Ck   Sequence C under test condition k

Figure 2.1: ACR method

2.2 DCR

Degradation Category Rating

Rating scale: 5 point system (Very annoying, Annoying, Slightly annoying, Perceptible but not annoying, Imperceptible)

Images are presented in pairs and the first stimulus in each pair is always the source reference

Method: The original image is shown for 10 seconds followed by a pause (gray screen) for 2 seconds. The image for evaluation is then shown for 10 seconds followed by a gray screen and the observer has 10 second to evaluate the image. The pair of images
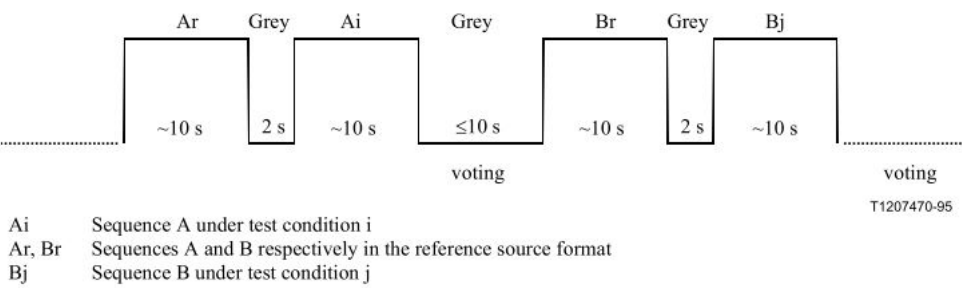
can be presented simultaneously. Annex C

Figure 2.2: DCR method

Comments: - Thus, when it is important to check the fidelity with respect to the source signal, DCR method should be used. [ITU]

2.3 SAMVIQ

Subjective assessment methodology for video quality

Rating scale: 0 - 100 (Bad, Poor, Fair, Good, Excellent)

A 10 or 15 seconds maximum visualization duration of a sequence is sufficient.

Method: The test is carried out scene after scene. Each scene has the known reference, one hidden reference and the number of images to be evaluated. From one scene to another, the sequence access is randomized to prevent the observers from attempting to vote in an identical way according to an established order.
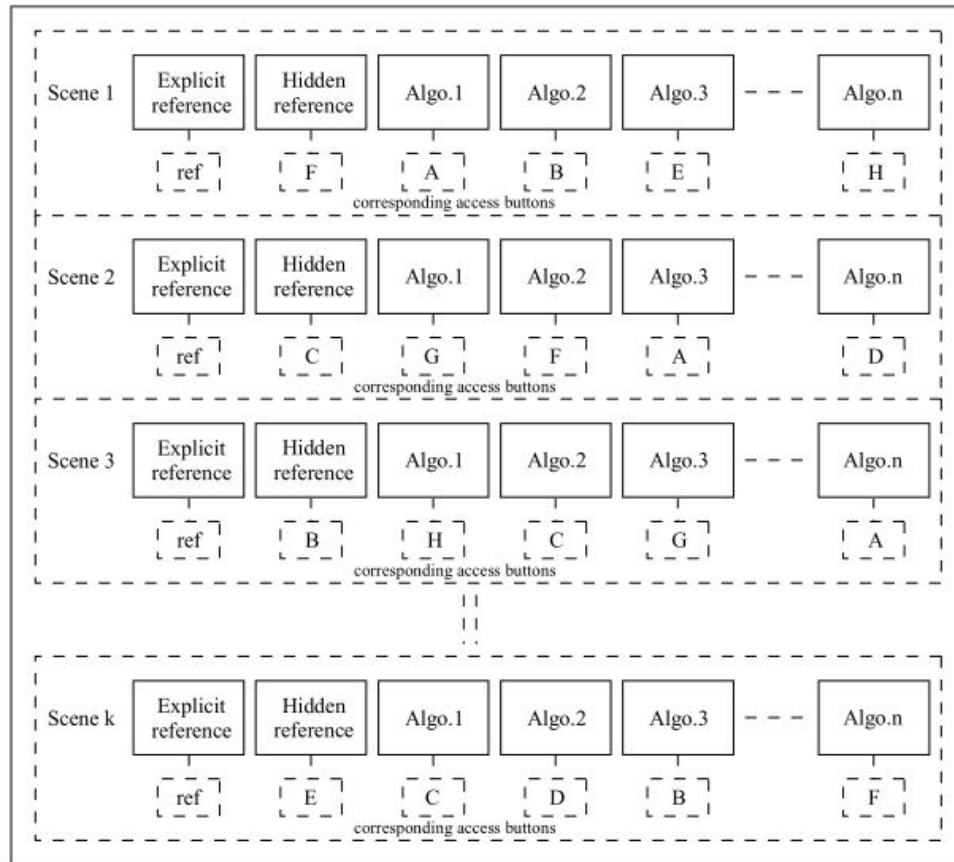
Figure 2.3: SAMVIQ method

DESIGN

3.1 Section heading

4

IMPLEMENTATION

4.1 Section heading

Bibliography