Subjective and Objective Quality Assessment of Tone-Mapped Images

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Outline

- HDR Image and applications
- Tone-Mapping
- Need for Tone-Mapping
- State of the art Objective Quality metrics
- Disadvantages of full reference and no reference metrics
- Dynamic range independent metrics
- Visual model
- Learning based
Tone-mapped images
Image selection

- Standard images
- Varying scene contents and illuminations
- Number of images
- Wide spread of dynamic range of the image set
- Time duration
- Questions to ask
- Tone-mapping operators
- Image resolution
Subjective evaluation

- Sorting and database
  - Number of subjects
  - Spread of dynamic range
  - Sorting into different dynamic range sets
  - Selection from each set
  - Tone-mapping operators input parameter
    - Ashikhmin [5], Banterle [6], Durand [8], Fattal [9], Ferwerda [10], Kim [11], Krawczy [12], Kuang [13], Lischinsky [14], Schlick [16], Drago [7], Ward [18], [21], Pattanaik [19], Reinhard [15],[20], Tumblin [22]

- Experimental setup
  - GUI
  - Time slots
  - Scale
  - Random ordering

- Removal of outliers
Objective quality assessment

- Full reference and no-reference
- FSIM [28]
- PSNR
- SBIQE [26]
- QAC [25]
- NIQE [27]
Results

FSIM

PSNR

QAC

SBIQE

NIQE
## Correlation scores

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<th>Algorithm</th>
<th>Subject1</th>
<th>Subject2</th>
<th>Subject3</th>
<th>Subject4</th>
<th>Subject5</th>
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Conclusions and future work

- Evaluation of State-of-the-art objective quality metrics
- Need for improvement of the objective quality assessment algorithms
- Some parameters from each tone-mapping operator can still be used
- Parameter selection
- Create a learning based visual model for full reference dynamic range independent tone-mapped image quality assessment
- No reference dynamic range independent quality metric
- Updating the database
- The database and subjective scores will soon be made available online at [31]
References


