

Face Quality Assessment



Motivation

- The recognition performance of face recognition systems is impacted by poor image quality;
- Numerous quality factors require actionable feedback to the capture subject, e.g., if the face image is unsharp or the pose of the face is not frontal;
- Robust methods for assessing the quality of the image can reduce the vulnerability of face recognition applications on morphing attacks.

Objectives

- Research technical measures for predictive face image quality estimation;
- Identify quality factors that are most relevant for an overall assessment or for actionable feedback. Contribute findings to international standard;
- Develop attack detection algorithms that can operate on both high- and low-quality reference and probe images.

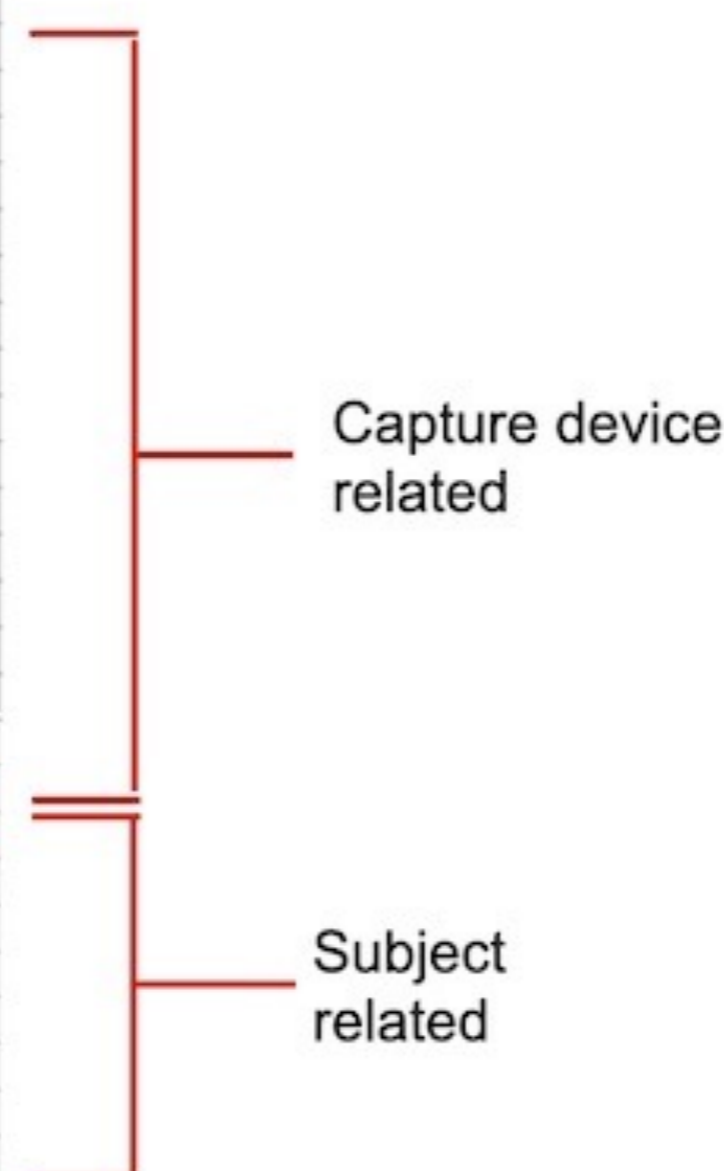
Approach

- Determine the factors / quality vector elements that are most relevant for operational requirements and actionable feedback to the operator and/or capture subject (i.e. pose variation, illumination, blur);
- Identify the facial regions of a facial image that are clear contributors towards a low face image quality measure (for bona fide, morphed, or occluded images);
- Prove whether morphing attack detection rate improve when using face quality estimation network in cascaded manner independent.



ISO/IEC 3rd WD 29794-5

#	Image quality aspect
1	Unified quality score
2	Background uniformity
3	Illumination uniformity
4	Illumination mean
5	Illumination variance
6	Illumination skewness
7	Illumination kurtosis
8	Illumination under-exposure
9	Illumination over-exposure
10	Dynamic Range
11	De-focus
12	Image sharpness
13	Motion blur
14	Edge Density
15	Compression
16	Unnatural colour and colour balance
17	Camera lens focal length
18	Camera subject distance
19	Eyes visible
20	Inter-eye distance
21	Horizontal position of the face
22	Vertical position of the face
23	Pose
24	Expression neutrality
25	Mouth closed
26	Eyes open



a) Compliant image b) Low contrast
source: ISO/IEC 39794-5:2019, Annex D
<https://www.iso.org/standard/72156.html>

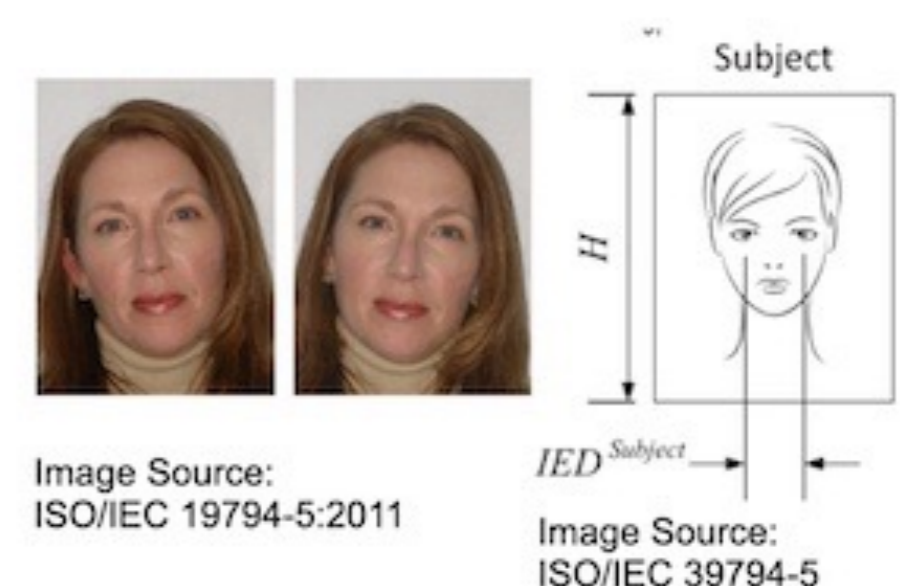


Image Source: ISO/IEC 19794-5:2011 IED_{Subject}
Image Source: ISO/IEC 39794-5

source: ISO/IEC 3rdWD 29794-5, Table 2
<https://www.iso.org/standard/81005.html>

Fig 1: Face Quality Limitation



Cristian Botezatu
cristian.botezatu@ntnu.no



Kiran Raja
kiran.raja@ntnu.no



Christoph Busch
christoph.busch@ntnu.no



Raghavendra Ramachandra
raghavendra.ramachandra@ntnu.no