

ICS 35.240.15

CCS L 71



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 33767.5-2018

**Information technology -- Biometric sample quality -- Part 5:
Face image data**

Issued on: June 7, 2018

Implemented on: January 1, 2019

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviations	1
5 Definition method of face image quality	2
6 Face image quality classification	2
7 Face image quality analysis	3
Appendix A (informative appendix) Symmetry analysis example	9
Reference	12

Foreword

GB/T 33767 "Quality of Information Technology Biometric Samples" is divided into the following parts.

---Part 1.Framework;

---Part 4.Fingerprint image data;

---Part 5.Face image data;

---Part 6.Iris image data.

This part is Part 5 of GB/T 33767.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the redrafting method to refer to ISO /IEC TR29794-5.2010 "Information Technology Biometric Sample Quality Part 5

Points. "Face Image Data" compiled, and the degree of consistency with ISO /IEC TR29794-5.2010 is not equivalent.

1 Scope

This part of GB/T 33767 specifies the definition, classification and analysis methods of face image quality indicators.

This section applies to the analysis of face image quality.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article

Pieces. For undated reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 33767.1 Information Technology Biometric Sample Quality Part 1.Framework (GB/T 33767.1-2017,

ISO /IEC 29794-1.2009, IDT)

ISO /IEC 19794-5 Information Technology Biometric Data Exchange Format Part 5.Face Image Data (Information

technology-Biometricdatainterchangeformats-Part 5.Faceimagedata)

ISO /IEC 19794-5.2005/Amd.1 Information Technology Biometric Data Exchange Format Part 5.Face Image Data

Modification 1.Face image data of conditionally taken photos (Informationtechnology-Biometricdatainterchangeformats-

Part 5.Faceimagedata-Amendment1.Conditionsfortakingphotographsforfaceimagedata)

3 Terms and definitions

The following terms and definitions defined in GB/T 33767.1 apply to this document.

3.1

Comparison score

A numerical value (or a set of values) obtained by comparison.

3.2

Face quality assessment algorithm facequalityassessmentalgorithm

The algorithm used to calculate the quality of a given face image sample.

3.3

Facialimage

Electronic image representation of human portraits.

4 Abbreviations

The following abbreviations apply to this document.

CCD. Charge-Coupled Device (Charge-CoupledDevice)

DCT. Discrete Cosine Transform (DiscreteCosineTransform)

EXIF. Exchangeable Image File (ExchangeableImageFile)

FQAA. Face Quality Assessment Algorithm (FaceQualityAssessmentAlgorithm)

7.1 Overview

Different factors should be considered when analyzing face image quality. These factors can be divided into.

- a) Image attributes, such as the size or resolution of the image;
- b) Image appearance characteristics, such as exposure or noise;
- c) Environmental characteristics, such as lighting or background;
- d) Features such as the consistency between the skin color displayed in the image and the subject's skin color;
- e) The subject's behavior.

Some of the above attributes and characteristics are difficult to evaluate and evaluate, such as the matching degree between the skin color displayed in the image and the subject's skin color.

See ISO /IEC 19794-5 for requirements of some attributes and characteristics such as eye distance (in pixels). The evaluation of these attributes and characteristics requires

More complex algorithms and technologies in computer vision and image understanding. In addition, there may be different processing methods, such as automatic detection

The position of the eyes in the face image is based on various principles. According to GB/T 33767.1, the regularized quality score can be obtained.

The FQAA algorithm can detect images without segmenting the face area (for example, when measuring the image size to evaluate the static of the acquisition process).

State features, such as compression rate, compression method, sensor resolution) or only analyze the face area (for example, estimate the pose of the subject). Locally

In the region, the local structure of the face is defined by the pixel value (original or processed); a single quality score may be merged from multiple local results.

Various face image quality evaluation algorithms can be developed for different environments, cameras, subjects and other factors, which are shown on different data sets.

Different performance.

7.2.1 Subject behavior

Common characteristics related to the subject's behavior include.

- Open your eyes;
- Open mouth;
- Various expressions, such as smiling or neutral;
- Head posture, such as facing directly or turning to any direction.

Similar to environmental attributes or features, the quantification of the above parameters requires recognition of background, face and face features.

In addition, the core algorithms (evaluating certain attributes) in the algorithm are required to be implemented on a computer, and the core algorithms can be obtained.

The quantitative value of the evaluation performance, in order to achieve the purpose of reducing the computational complexity. If conditions permit, you can select the most commonly used algorithm or

Read to reduce complexity.

7.2.2 Analysis based on the statistical difference between the left half of the face and the right half of the face

7.2.2.1 Illumination symmetry

Assuming a two-dimensional portrait image (see the image specified in ISO /IEC 19794-5.2005/Amd.1), it can be divided by left and right symmetry.

Analyze the quality of lighting and posture. The face area is divided into left and right areas based on the center line of the eyes (Figure 1). The following symmetry analysis is

Detect the difference between the corresponding areas on the left and right of the face. The difference value represents the symmetry of a certain local image attribute, such as the original pixel value or the local filtered image.

Prime value. The local image filter can use Gabor filter, local binary filter, sequential filter or any other suitable

Local filter. The difference between the left and right regions gives the light quality score (i.e. how symmetrical the light is) or the attitude quality score (i.e. the frontal attitude).

how). Most faces are symmetrical, but some people have obvious differences between the left and right parts of the face, such as marks, discoloration, etc.

different. The symmetry of quality analysis measures should consider these differences.