Open Source Face Image Quality (OFIQ) An Overview

Anna Stratmann, Federal Office for Information Security (BSI)
Face Image Quality Workshop, 7 November 2023
Outline

The Open Source Face Image Quality (OFIQ) implementation

Motivation for OFIQ

Project OFIQ
Facial images are widely used in public sector applications.

Quality assessment of facial images is important to ensure system performance.

Quality components affect recognition performance but can also arise from regulations.

A common approach to quality assessment is essential.

Assessment of fingerprint images by NFIQ2.2 is standard procedure. But currently we have no equivalent open source solution for facial images.

We need „NFIQ for Face“ → why?
Motivation for OFIQ: Quality equals Performance

• The quality of facial images has an impact on the recognition performance.
• In large scale databases, quality requirements are therefore immensely high.
• Good data quality is essential for overall system performance.
• But: What does “good” mean?
• The necessary quality level depends on the specific application scenario which can be quite diverse.
Motivation for OFIQ: Quality in diverse scenarios

• The scenarios in which facial images are used are very different.
  • All scenarios come with different requirements and needs.
  • There are many different vendors and solutions.
  • Even within one application scenario, different solutions may be used.
  • Biometric samples might be fed into different backend systems.
  • It is important to ensure interoperability and harmonize requirements.

• At enrolment stage, recognition algorithms might be unknown (and black box).

• A standardized quality assessment is important when the application landscape is diverse
Motivation for OFIQ: Quality versus transaction time

• Remember
  • Quality requirements depend on the system in question.
  • Aim: Reach the desired quality level in the minimum of time.
  • No aim: Achieve the maximum quality. Quality is not an end in itself.
  • It is advantageous to know the required quality level of the target system and to align to it.

• Producing "good" quality is "expensive" (time-consuming), especially in distributed systems.
• Different components may affect the quality of a facial image.
• OFIQ will focus on the essential quality components and one unified quality score
Motivation for OFIQ: Harmonization

• Facial image quality is not standardized yet.
  • Standardization and harmonization is key, especially in the view of (semantic) interoperability.
  • ISO/IEC 29794-5 will give us a common understanding of measuring facial image quality in a specific application scenario.

• Example (European) Border Control
  • Interoperability will connect EES, VIS, etc.
  • Biometric data will be shared and transported to other systems.
  • A common understanding of facial image quality is essential (semantic interoperability).
Motivation for OFIQ: Open Source

• We need a reference implementation of the ISO/IEC 29794-5 -> OFIQ
  • OFIQ will allow for alignment of all stakeholders (researchers, vendors, system architects, etc.)
  • Flexible software framework (usable for ABC gates and for Smartphones)
  • Contribution to ISO 29794-5
  • Open Source solution, which can be integrated in commercial systems (i.e. products)
Motivation for OFIQ: Summary

• Quality matters, especially in large-scale databases and with diverse application scenarios.
• Garbage in, garbage out! Good data quality is essential but what does “good” mean?
• Quality requirements depend on application context. A common approach is important.
• Quality is often a question of time. Specific components contribute differently to overall quality.
• Standardization and harmonization is essential for (semantic) interoperability.

• Reference implementation OFIQ (open source)
• Project by German Federal Office for Information Security (BSI)
Project OFIQ: Status

• Current project running January 2022 – Autumn 2024, for further information see:
  https://bsi.bund.de/EN/Themen/Unternehmen-und-Organisationen/Informationen-und-Empfehlungen/Freie-Software/OFIQ/OFIQ_node.html

• Open source implementation with public and transparent documentation:
  https://github.com/BSI-OFIQ/OFIQ-Project

• Incorporating public state of the art
  – see report: https://arxiv.org/abs/2211.08030
  – algorithms are selected and integrated, when fulfilling the criteria:
    a) detection accuracy as provided by the NIST FATE SIDD
    b) computational complexity
    c) appropriate license conditions

• Prototyping of quality measures: completed
  – Internal and NIST FATE SIDD benchmarking running
Project OFIQ: Outlook 2024 and beyond

• Establish procedures for OFIQ maintenance and support
  – gcc-compiler-updates, new (mobile) operating systems
  – error handling

• Deployment of OFIQ 1.0 with operational use cases in 2024/2025:
  – Entry-Exit-System (EES) enrolment at German airports
  – Passport Live Enrolment at passport agencies (starting in May 2025 in Germany)

• Launch of OFIQ 2.0 project (pending management approval) to address:
  – Further innovation of face image quality measures
  – Lightweight solutions – reducing transaction times
  – Investigate fairness of quality measures
Thank you for your attention!

Contact
Anna Stratmann
Section DI 25: Inspection Systems for Official Documents
anna.stratmann@bsi.bund.de

Federal Office for Information Security (BSI)
Godesberger Allee 185-189
53175 Bonn, Germany
www.bsi.bund.de