Security Evaluation of Biometric Systems in Common Criteria

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Outline

- Introduction
- Main Target
- AGD: Guidance Documents
- ATE: Tests
- Conclusions and Work Lines
Introduction (I)

- Guidelines are necessary for helping developers and evaluators to perform biometric evaluations

- Precedents:
  - BEM (Biometric Evaluation Methodology)
    - Previous version of CC
    - It refers to performance evaluation methodologies that were implemented before the development of current standards (ISO/IEC 19795)
  - PPs and STs
    - Security evaluation of biometric systems requires to meet specific error rates
      - Security policy
      - Refinement of the FIA_UAU component
    - This guidance refers to BEM and the same references that are included in it.
Introduction (II)

- It is essential for security evaluation of biometric systems to analyse the biometric system performance
- New guidelines shall be developed
  - Based on
    - BEM
    - ISO/IEC 19795 Biometric performance testing and reporting
  - Considerations
    - It will be conformant with current version of CC
Main Target

- Most relevant changes to BEM related to the following assurance requirements:
  - AGD: Guidance Documents
  - ATE: Tests
- Biometric performance evaluation that will be reproducible (ISO/IEC 19795 Parts 1 and 2)
  - Technological evaluation
    - Biometric algorithm
    - Database collection
  - Scenario evaluation
    - “End-to-end” biometric system
    - Test subjects
AGD: Guidance Documents (I)

- BEM
  - Biometric privacy
  - Environmental influences
  - Setting of thresholds

- Proposal for a new document
  - It should consider common activities for the installation and operation mode that are also relevant for performance testing

- AGD_PRE:
  - Environmental influences considering environmental factors (as BEM) and also the operation configuration
  - Biometric system placement
  - User’s interactions
AGD: Guidance Documents (II)

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AGD_OPE:

- User guides
  - Guidance for the capture process including how to present their biometric characteristic and interact with the biometric sensor
  - Feedback before, during and after the process
  - Recommendations to protect biometric data

- Administrator guides
  - How to perform enrolment function specifying quality requirements in detail
  - How to guide and train users for enrolment and verification/identification processes
ATE: Tests (I)

- **BEM**
  - Performance testing: FMR and FNMR
  - Appropriate and statistically representative data
  - Take care in configuring the equipment, verifying its correct functioning and consistency in collection procedures

- **Proposal for a new document**
  - ATE_COV:
    - Technology evaluations: biometric systems that not include biometric capture sensor
    - Scenario evaluations: biometric systems
    - Test size, user characteristics, the number of samples and transactions shall be according to the expected results and the confidence level to achieve
ATE: Tests (II)

● Proposal for a new document

➢ ATE_FUN:

  ▪ Check that test documentation includes the mandatory parts of the ISO/IEC 19795 for planning, executing and reporting biometric evaluations

  ▪ Check that test plan describes the scenarios for performing each test

    ✓ Technology evaluations: conditions of the database collection

    ✓ Scenario evaluations: user characteristic and how environmental conditions are controlled

  ▪ Check the test application:

    ✓ Data recording during the evaluation

    ✓ Methods to calculate statistics

  ▪ Check test procedures:

    ✓ Level of effort, decision policies, visits and test crew flow
Proposal for a new document

ATE_IND:

- Test subset shall include to obtain FMR and FNMR
- Elaborate test documentation that includes the mandatory parts of the ISO/IEC 19795 for planning and executing biometric evaluations
- Conduct testing
  - Scenario evaluations:
    - the appropriate test crew shall be recruitment according to user characteristics
    - user shall be trained and guided as it was specified in guidance documents
- Obtain statistics: performance rates shall be calculated including the corresponding uncertainty respectively
- Report test results considering the requirements of ISO/IEC 19795 standard
Conclusions and Future Works

● Conclusions
  ➢ A proposal to develop new guidelines for helping developers and evaluators to perform biometric security evaluations using CC has been explained.
  ➢ It has been based on BEM and ISO/IEC 19795 standards.
  ➢ It shows requirements for applying AGD and ATE assurance components

● Future Works
  ➢ Fulfil the proposal describing all relevant changes for the rest of assurance components
  ➢ Implement specific methodologies for potential vulnerabilities
THANK YOU
FOR YOUR ATTENTION

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