BIOMETRICS FOR SECURE AUTHENTICATION

BIOSECURE

Open Source Reference Systems for Biometric Verification of Identity

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Foreword

- A new methodology for:
  - conducting
  - reporting
  - comparing

  } experiments for biometric systems

- Based on:
  - open-source systems

- Objectives:
  - link between published works in biometrics
  - measure real progress achieved with new research algorithms

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Summary

- **Overview** of biometrics + terminology
- **Problem**:
  - How can we fairly compare the performance of two different biometric systems?
- **Solution**:
  - Use of an universal open-source evaluation framework
- **Conclusion**

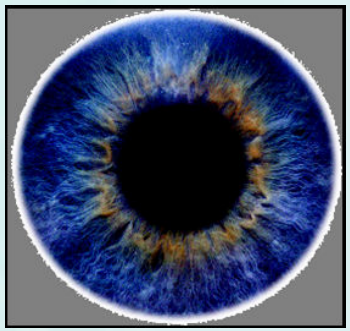
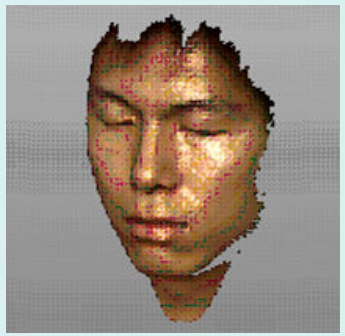
Overview (1)

def: ***Biometrics refers to technologies that measure and analyze human body characteristics for identification purposes***

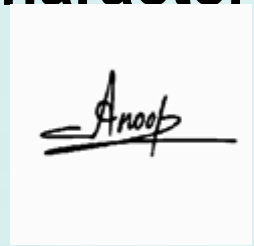
2 types of biometric characteristics:

- **Biological** (physiological) characteristics:




- **Behavioral** characteristics:

Overview (2)

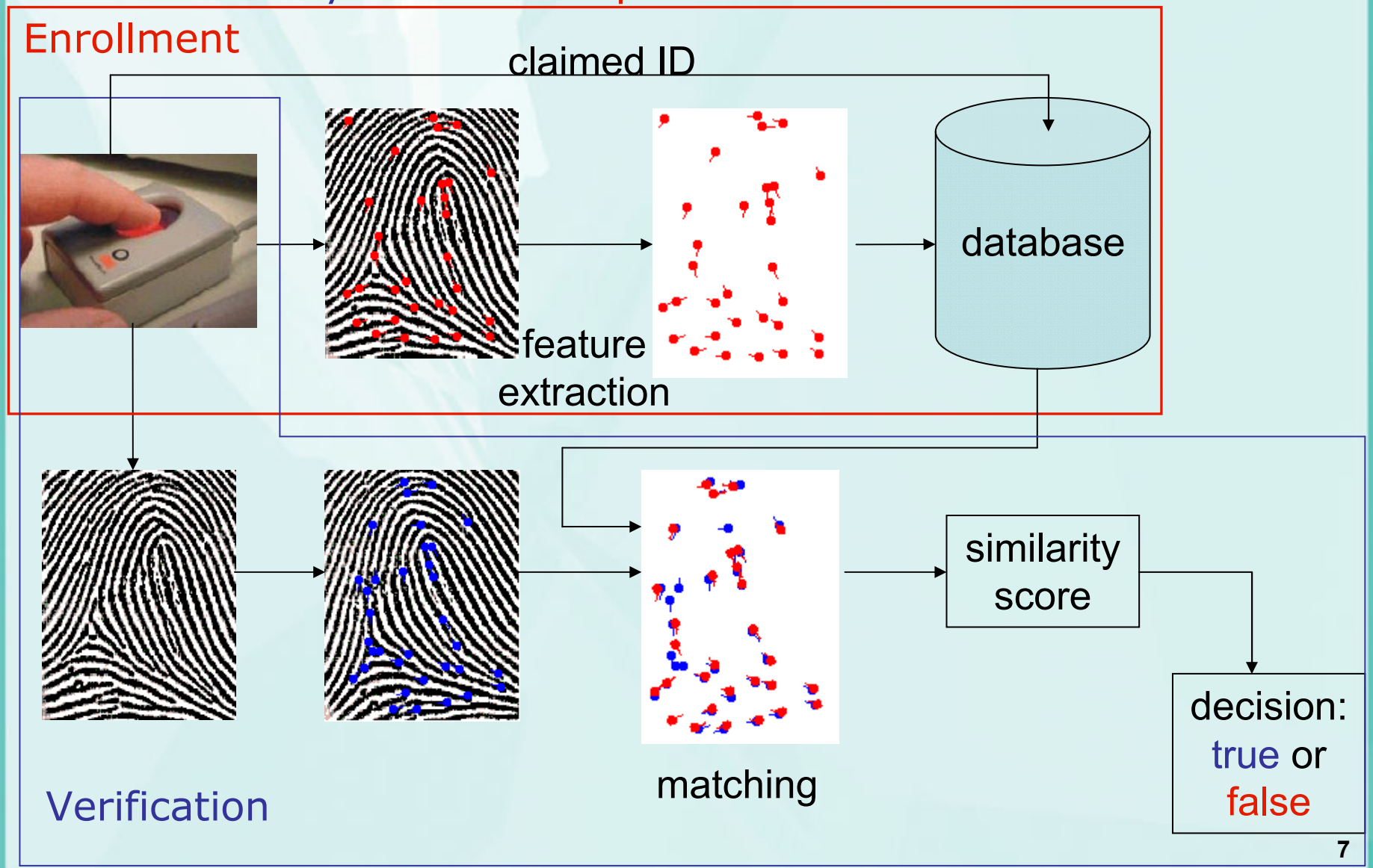
- The identification is necessary to assure security

Overview (3)

- People are identified by three basic means:
  - Something they have (identity document or token)
  - Something they know (password, PIN, name)
  - Something they are (human body)
- Biometrics is used to create a more reliable link between a physical person and corresponding digital identity
- Main Advantage of biometrics:
  - Biometrics can replace the ID cards or passwords which are often forgotten, lost or misappropriated

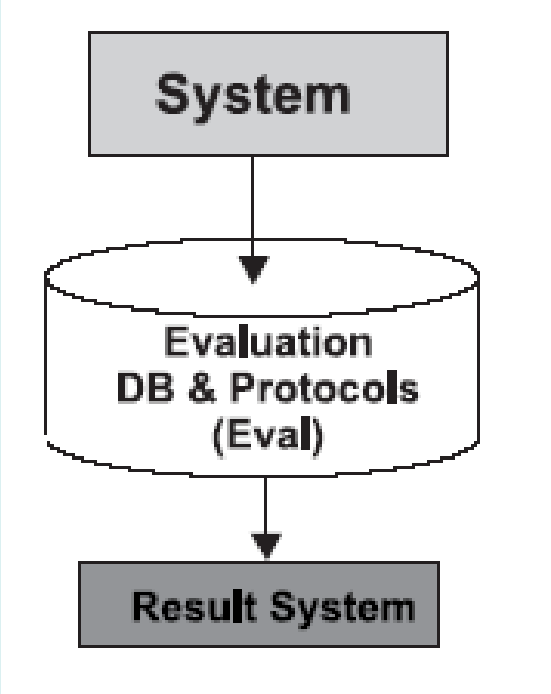
Terminology (1)

Verification System: Is this person who he claimed to be?



Terminology (2)

Evaluation:

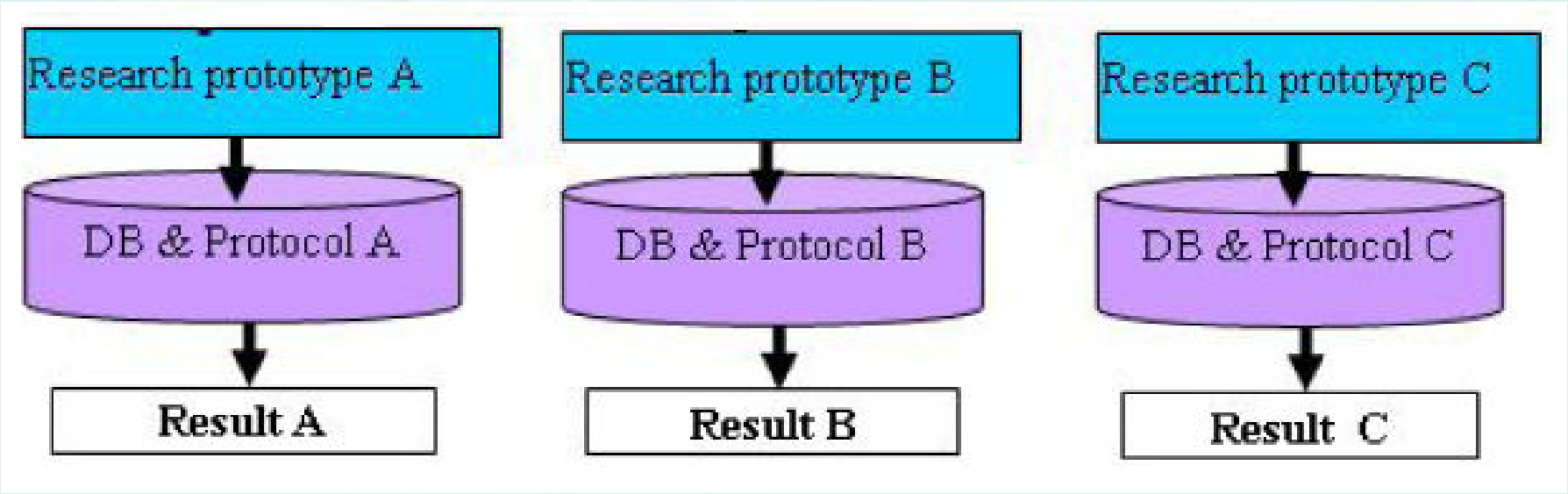


Flow diagram of a generic biometric experiment

- **Database** (DB):
  - Contains the biometric data
- Evaluation **protocol**:
  - How you test the system
  - Client and impostor tests
- **Result**:
  - FAR: False Accept Rate
  - FRR: False Rejection Rate

Problem

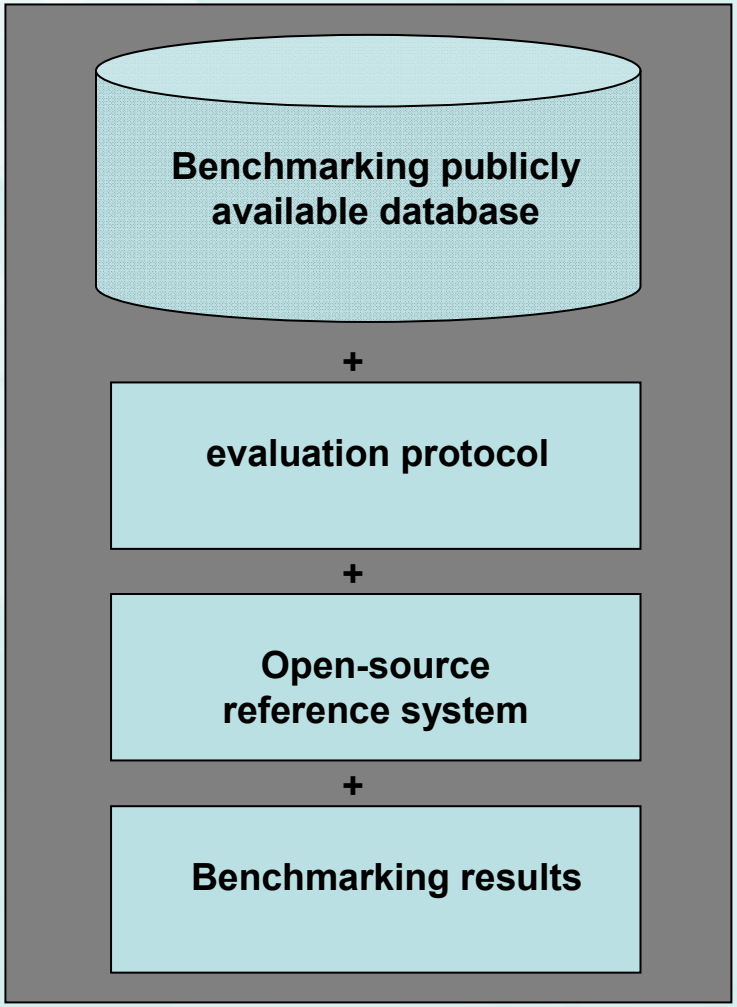
Suppose 3 universities have developed their own biometric verification system:



- **The reported results of the 3 biometric results are not comparable**

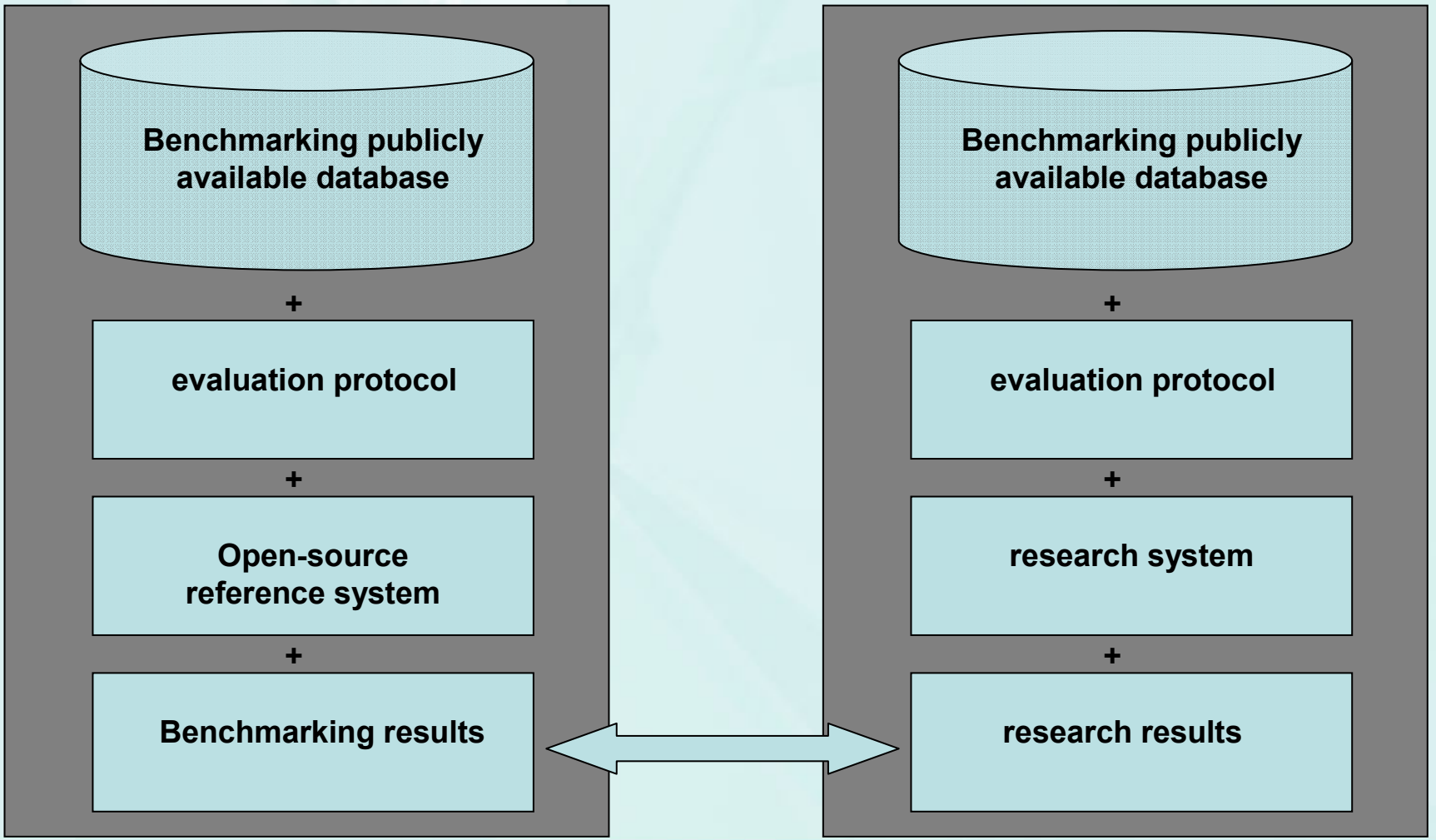
Solution (1)

A universal evaluation framework:



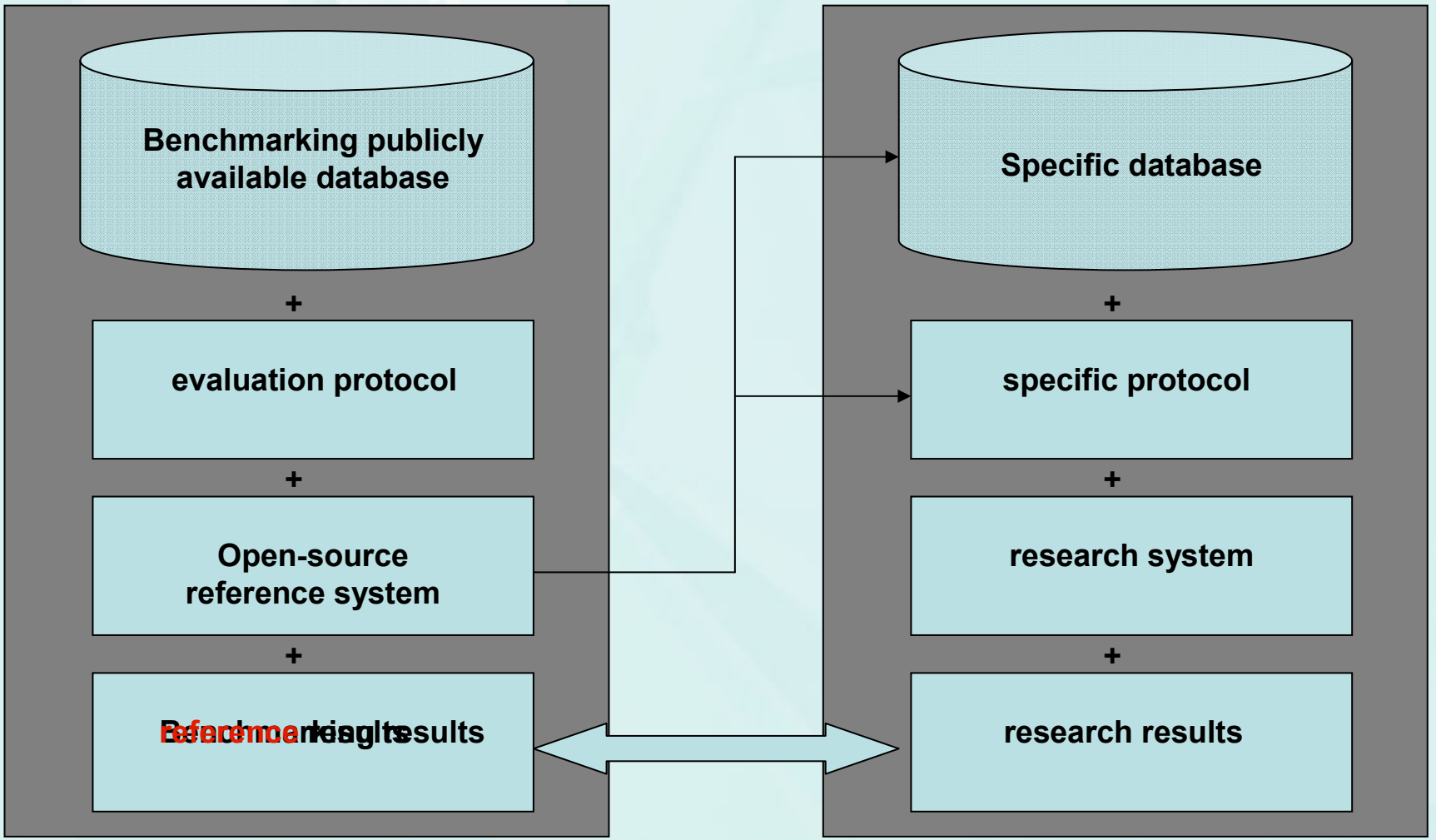
Solution (2)

1st Use: If someone publishes results using the benchmarking database and protocol, the benchmarking results can be used as a way of calibrating the performance



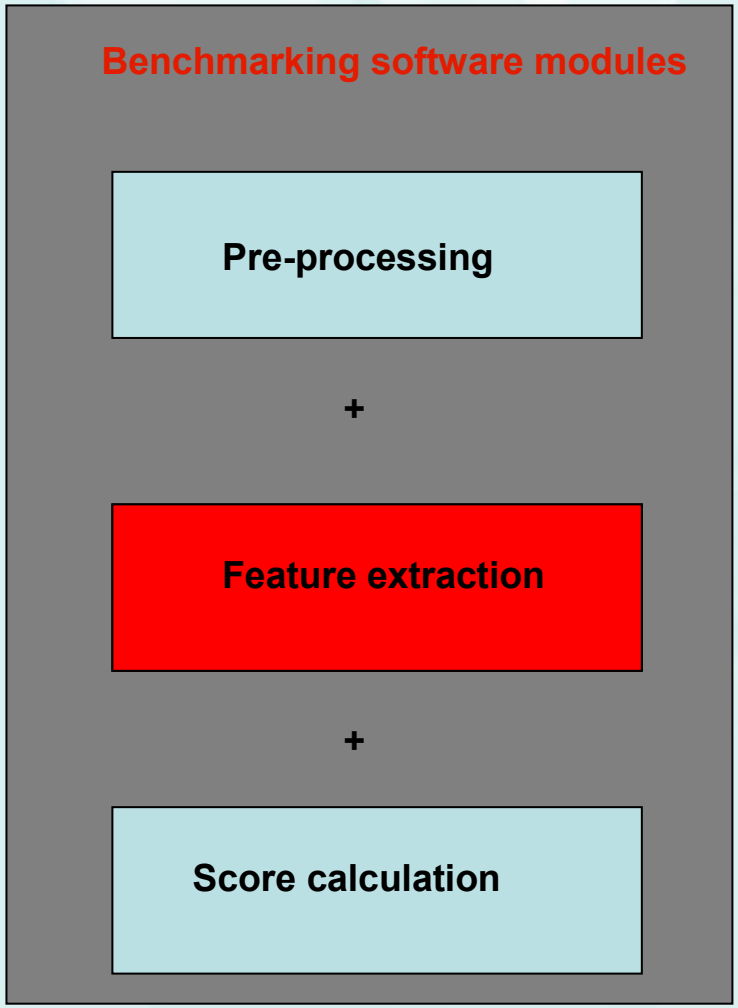
Solution (3)

2nd Use: If someone publishes results on a specific database according to a specific protocol, experiments using the reference system have to be added as a way of calibrating the difficulty of this particular task



Solution (4)

Open-source reference systems



- Assess the contribution of each module

Repository

- 8 biometric modalities:
  - 2D face
  - 3D face
  - fingerprint
  - hand
  - iris
  - signature
  - speech
  - talking-face
- download:

http://share.int-evry.fr/svnview-eph/

- repository:
  - Open-source systems
  - Documentation which
    - describes database
    - describes protocol
    - reports benchmarking results

Conclusion

- **New evaluation framework**:
  - Fair comparison of biometric systems
- **Open-source systems**:
  - Comparison point for performance calibration
  - Assess the contribution of each module
  - Time saving
- **Use for the BMEC 2007**:
  - http://biometrics.it-sudparis.eu/BMEC2007