Users-Centric Design: introducing remote usability evaluation in mobile implementations

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Agenda

1. Introduction to mobile biometrics
2. Usability and biometric interactions
3. Remote usability evaluation tools for mobile biometrics
4. Evaluation experimentation within the PIDaaS project
5. Conclusions

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Mobile biometrics

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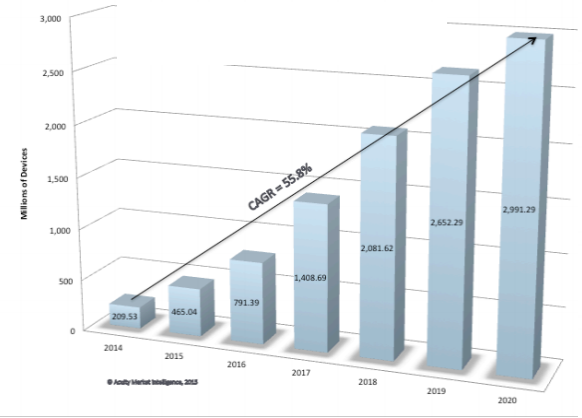
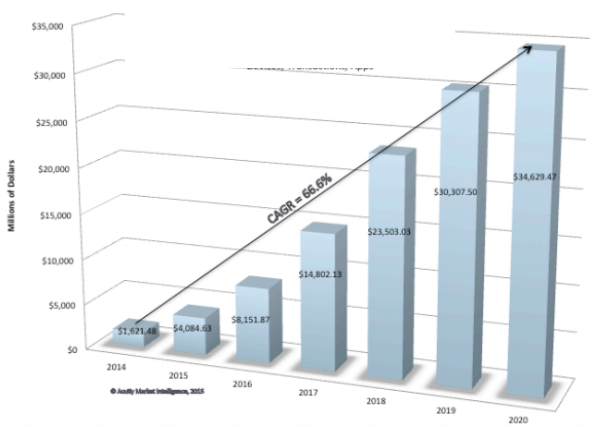
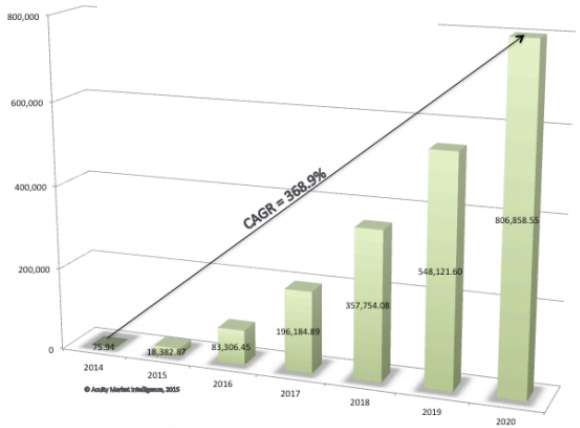
To the biometrics community:

Biometric smartphones are officially MAINSTREAM

Congratulations







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Mobile biometrics

FACTS:

- more than 200 new biometric smartphone models released last year

- 600 millions biometric smartphones currently in use (28% share of the global market)
- Smartphones as the defacto Personal Authentication Device
- 83.000.000.000 of biometric transactions forecasted for 2016

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Mobile biometrics: challenges

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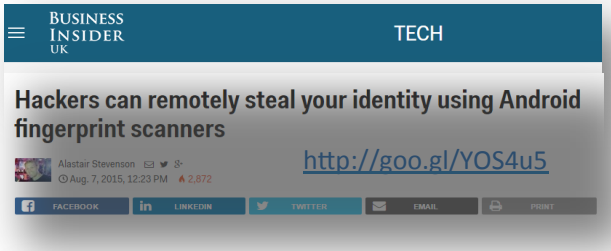
Presentations attacks (spoofing)

System security (hacking)



Usability

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Usability on mobile biometrics

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Usability:

"The **extent** to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use"

(ISO 9241-11)

Biometric interactions:

Biometric system performances are influenced by how humans interact with and use the biometric devices, which can led to potential security risks.

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Usability on mobile biometrics

Human beings interacting with:

- many biometrics smart device models
  - Different dimensions
  - Different sensors
  - Different positions
- many biometrics smart devices user interfaces
- in many environmental conditions
- and from many different group populations

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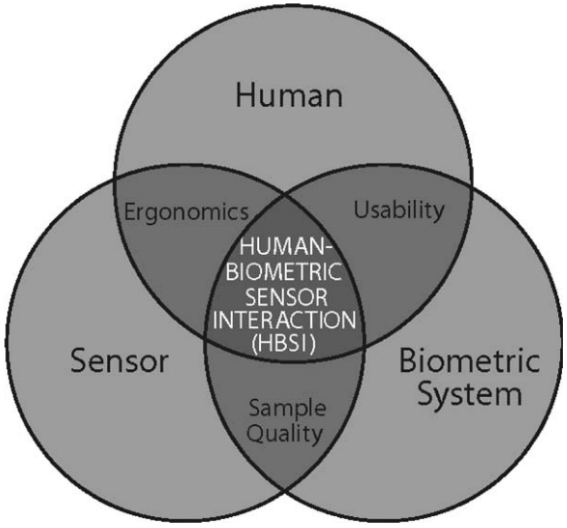
HBSI framework

- The **Human-Biometric-Sensor Interaction (HBSI)** framework has been designed to assess the usability and the influence of human interaction on biometric system performance.

- The HBSI framework allow to answer **usability questions** as:
  - How do users interact with biometric devices?
  - What are the most common errors or issues that users face?
  - How those errors impact on the biometric performance?
  - Why do users continually make these interaction errors and how do we prevent or avoid them from happening?
  - What level of training and experience is necessary to successfully use biometric devices?
  - How satisfied are the users with the system?



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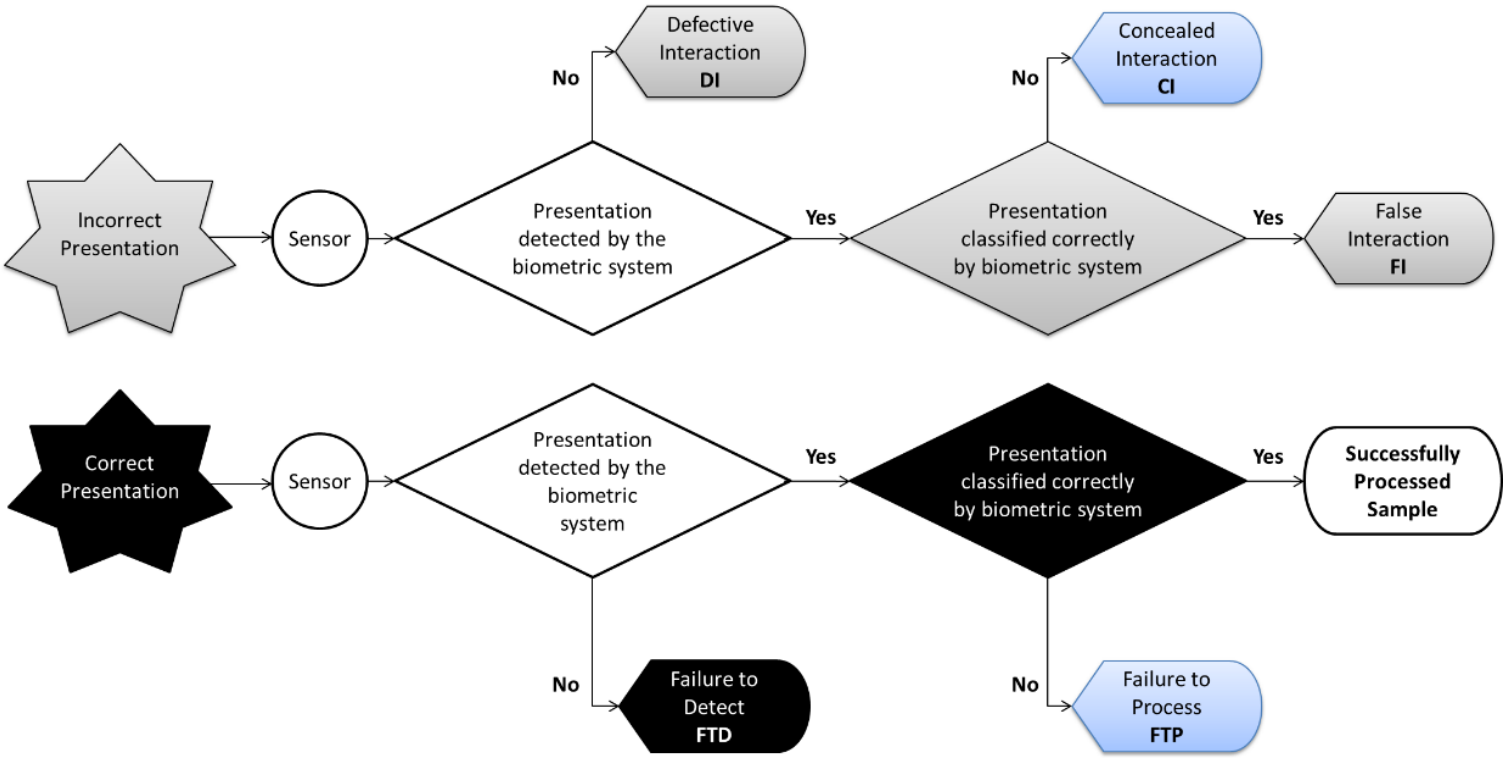
HBSI framework

HBSI presentation classification



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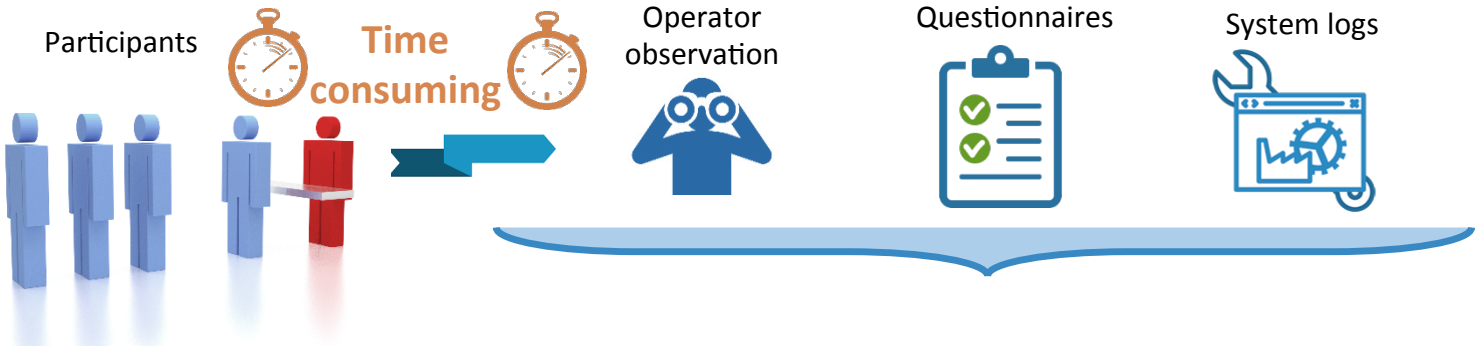
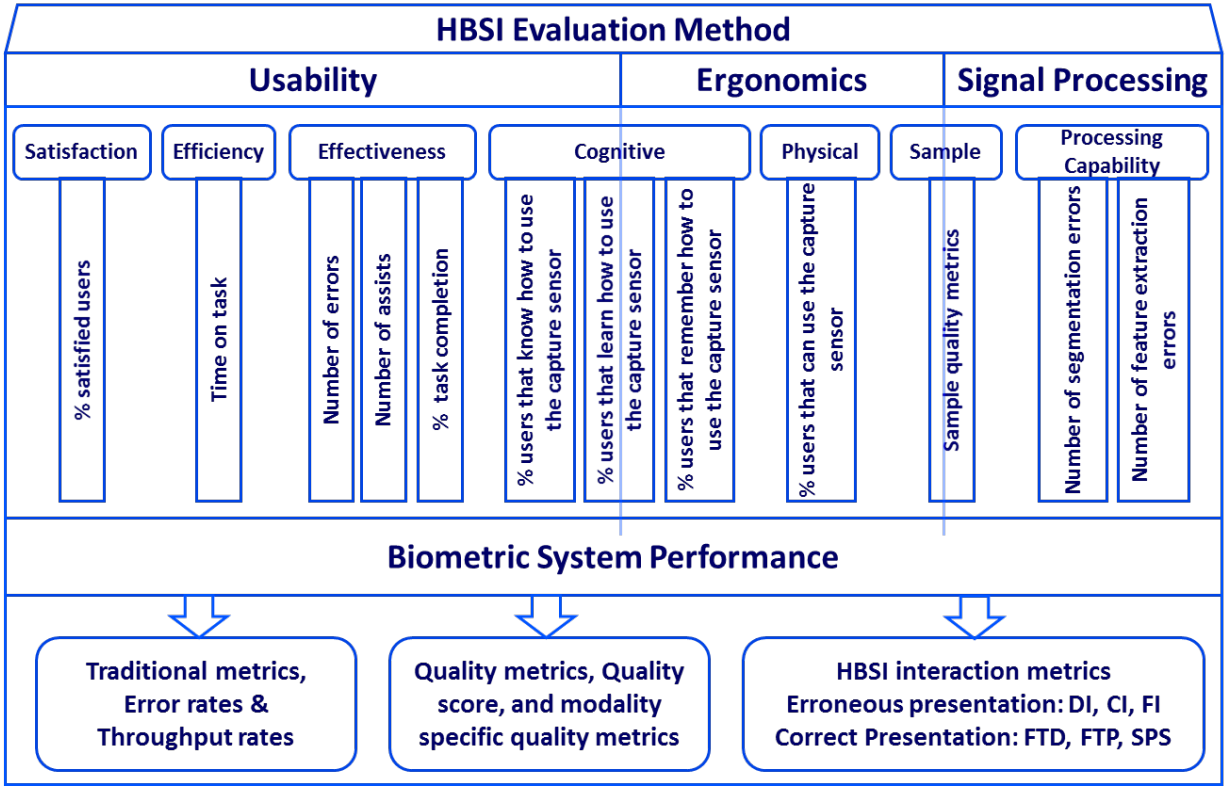
HBSI framework





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HBSI framework: moving forward

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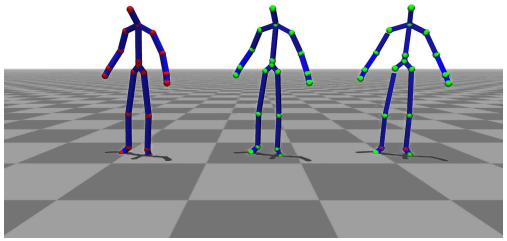
Semi automatic video record labelling:

- Inclusion of Kinect V2 sensors during the video recording for automatic labelling
- Real time HBSI interaction labelling

Limitations:

- Participants have still come to the lab
- tested under controlled environments
- Limited devices/conditions



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Mobile Biometrics Interaction Evaluation Framework

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Participants

Online questionnaires

Before the experiment:

- Demographics
- Previous experience
- Previous impressions
- Preferences

Mobile Analytics Tools

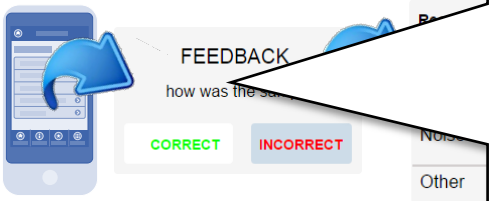
- How, what and when the user do within the app

Biometrics system log

- Biometrics samples
- Sample quality information
- Segmentation

- Correct/Incorrect presentations.
- Common problems

Participant's feedback



- HBSI presentation metrics:
  - DI, CI, FI, FTD, FTP, SPS

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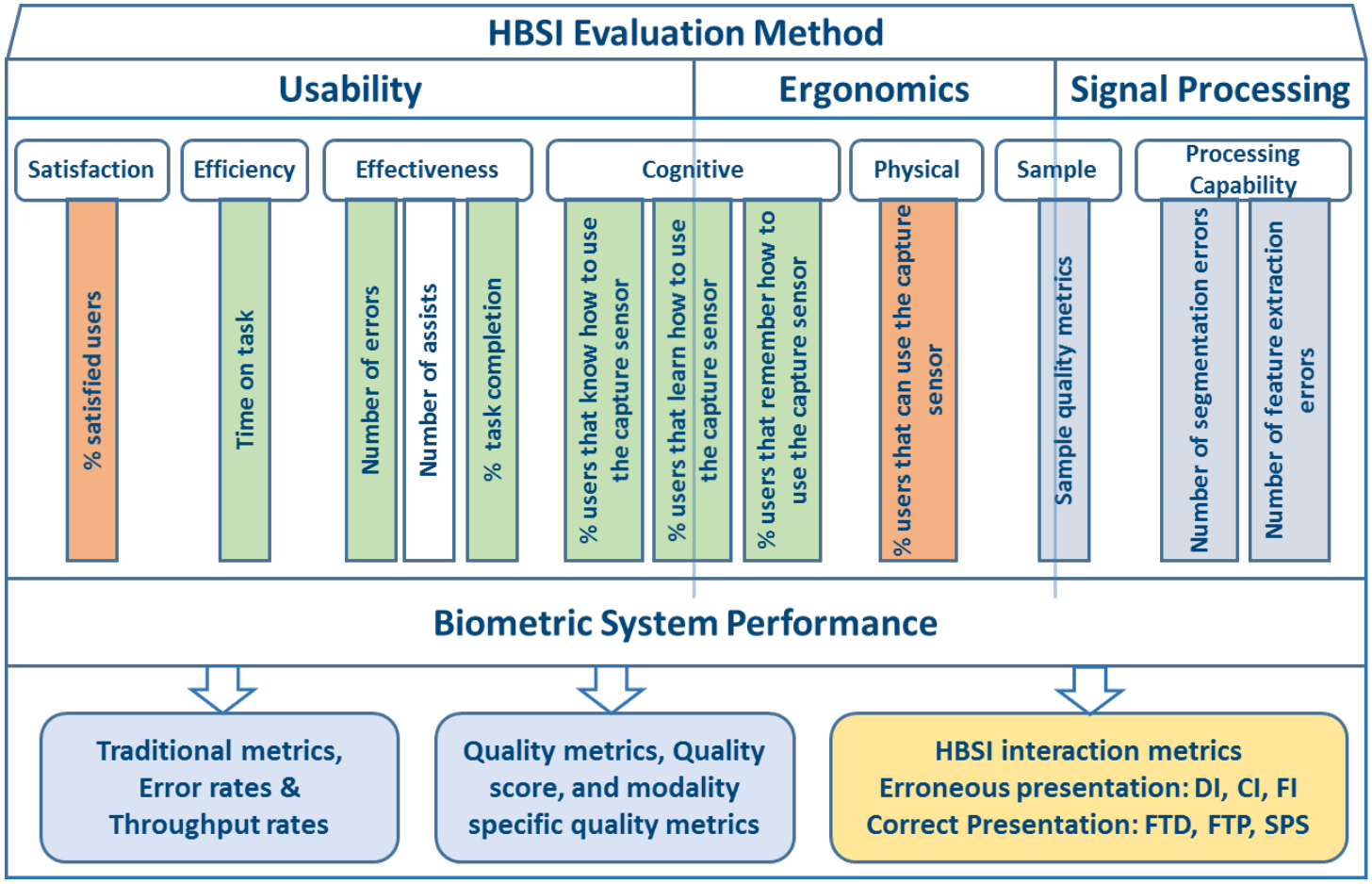

Online Questionnaires | Mobile Analytics Tools | Biometric System Logs

Participant's Feedback | Remote operator

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Mobile Biometrics Interaction Evaluation Framework

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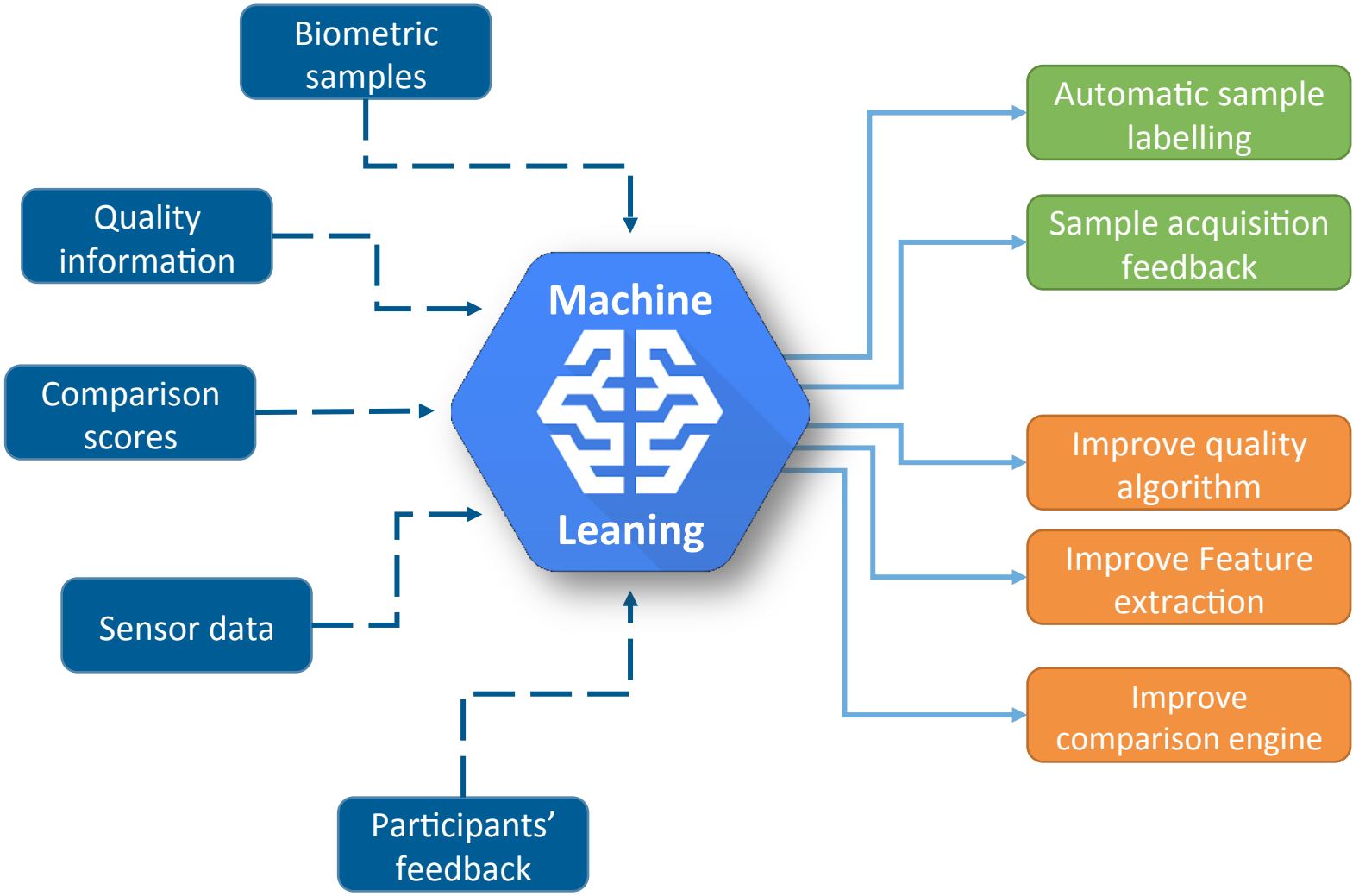

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Mobile Biometrics Interaction Evaluation Framework

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- **PIDaaS (Private Identity as a Service)** is a European Union Competitiveness and Innovation Framework Programme Project.
- Objective: Exploiting traditional biometric technologies and platforms for identity management to create an innovative **mobile service** based on **voice and face biometric** and **template protection schemes**.
- 8 partners in six member states:

RICOH bdigital HØGSKOLEN I GJØVIK University of Kent bantec group csi piemonte bros TicSalut Tecnologia, innovació i salut

- 30 month project – July 2014 to December 2016

- The University of Kent is evaluation the usability of the platform using the HBSI framework.

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PIDaaS Usability Evaluations

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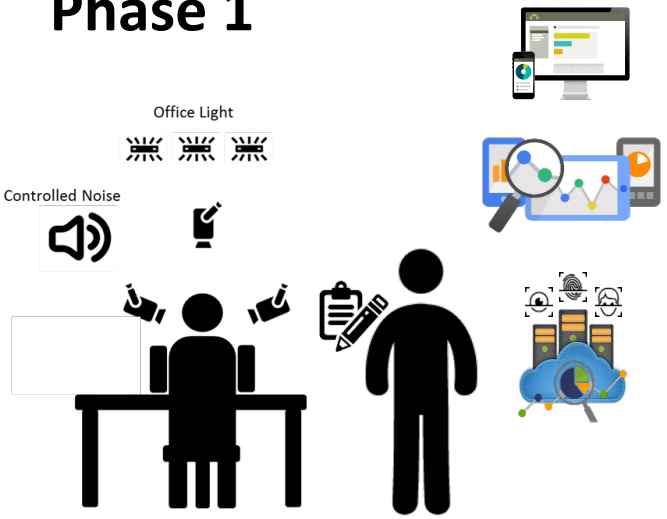
Phase 1



Phase 2

Phase 3

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Remote Evaluation Mobile Biometrics Interaction : Conclusions

- A remote HBSI evaluation framework has been proposed to tackle some of its current limitations.
  - Incorporate proactively the participants into the usability evaluation
  - Obtain realistic data of how the participants interact with the biometric implementations outside evaluation laboratories
  - Store all the data (surveys, mobile analytics, sensors, biometric system logs) in a structured format in order to automatize its analysis.
  - Use the data collected to improve user's feedback and biometrics algorithms

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Remote Evaluation Mobile Biometrics Interaction Framework

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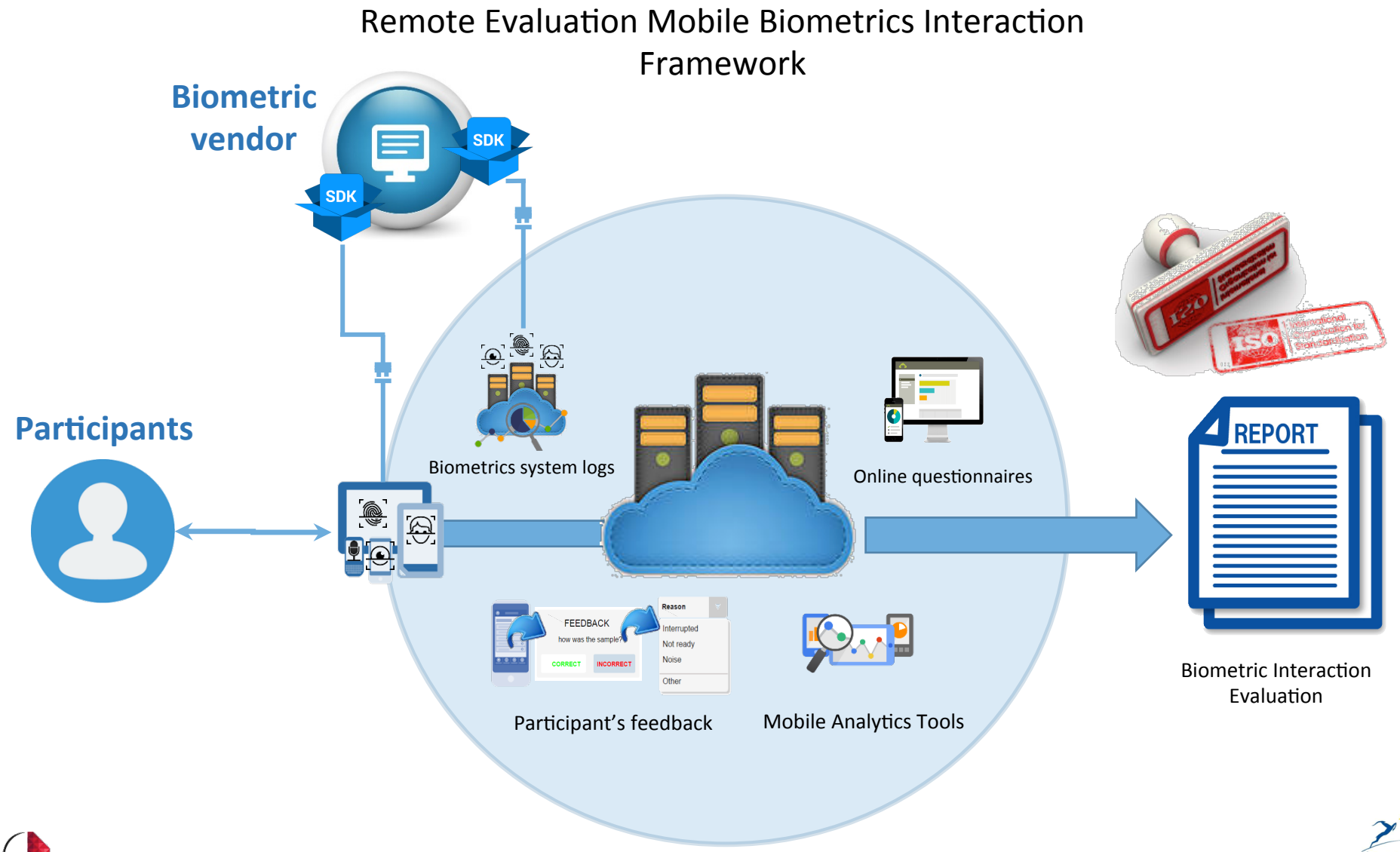

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Thanks for your attention

Any questions?

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