Project 9 : KINTEREST TV

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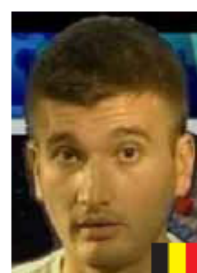
TEAM

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Project overview

We use **depth sensors** to build **explicit** and **implicit** interaction in a **real smart environment**

Depth sensor
   - Kinect / ASUS
(provide both RGB & depth information)

Real smart environment
   - Watching TV experience

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Project overview

We use **depth sensors** to build **explicit** and **implicit** interaction in a **real smart environment**
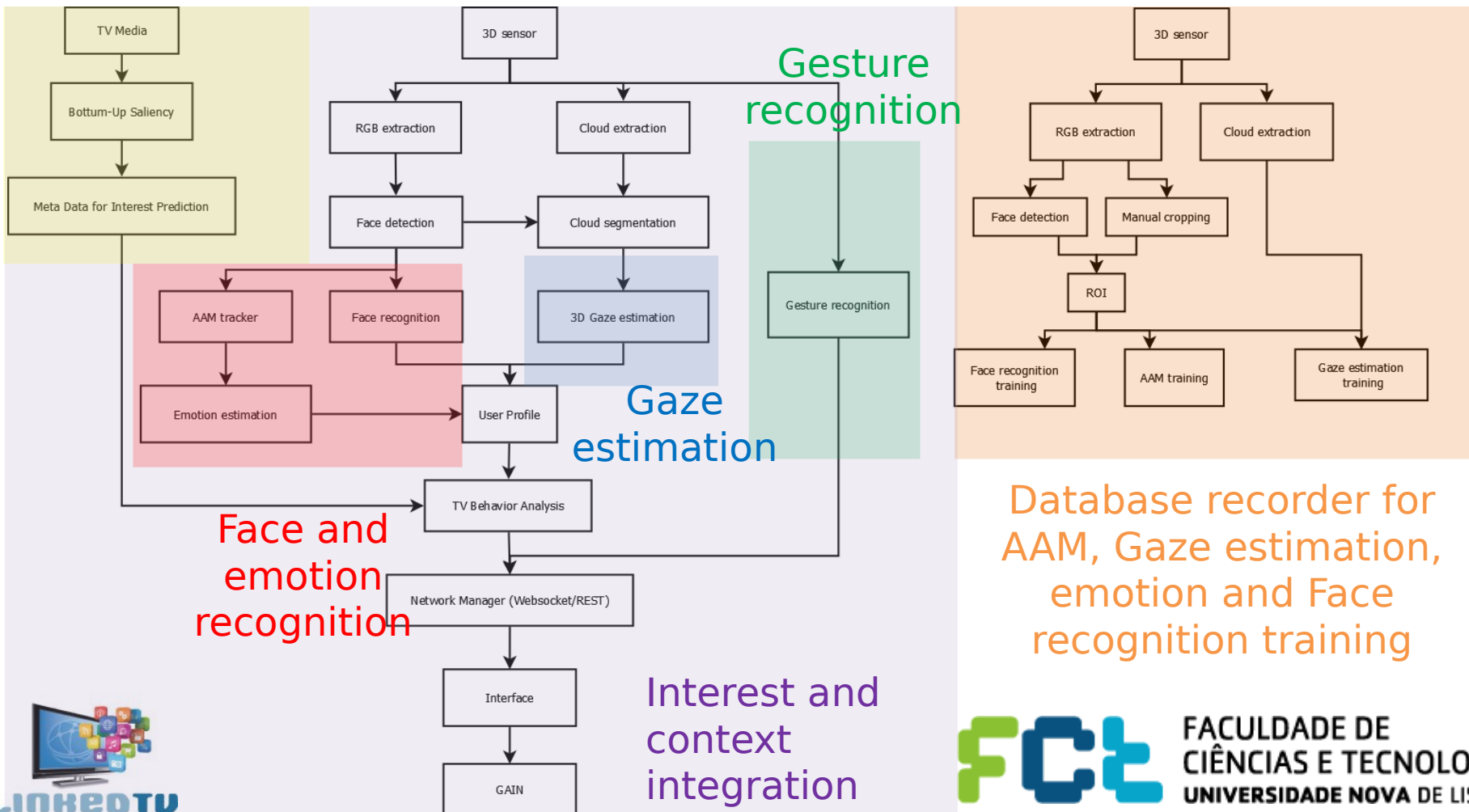
Explicit interaction
 - Hand-gesture interaction (man → machine)
 - Adaptive projection on table, wall (machine → man)

Implicit interaction
 - Viewer 3D head direction (interest)
 · Number and position of viewers (context)

Project overview

**Media analysis and attention mechanism**

TV Media

Bottum-Up Saliency

Meta Data for Interest Prediction

3D sensor

RGB extraction

Cloud extraction

Face detection

Cloud segmentation

AAM tracker

Face recognition

Emotion estimation

User Profile

TV Behavior Analysis

Network Manager (Websocket/REST)

Interface

GAIN

3D Gaze estimation

Gesture recognition

3D sensor

RGB extraction

Cloud extraction

Face detection

Manual cropping

ROI

Face recognition training

AAM training

Gaze estimation training

Gesture recognition

Gaze estimation

Face and emotion recognition

Interest and context integration

Database recorder for AAM, Gaze estimation, emotion and Face recognition training

LINKEDTV

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RGBD sensor-based explicit interaction

Full Body Interaction Framework (FUBI) is a framework for recognizing full body gestures and postures in real time

FUBI = 3D sensor -> Skeletons -> Gesture
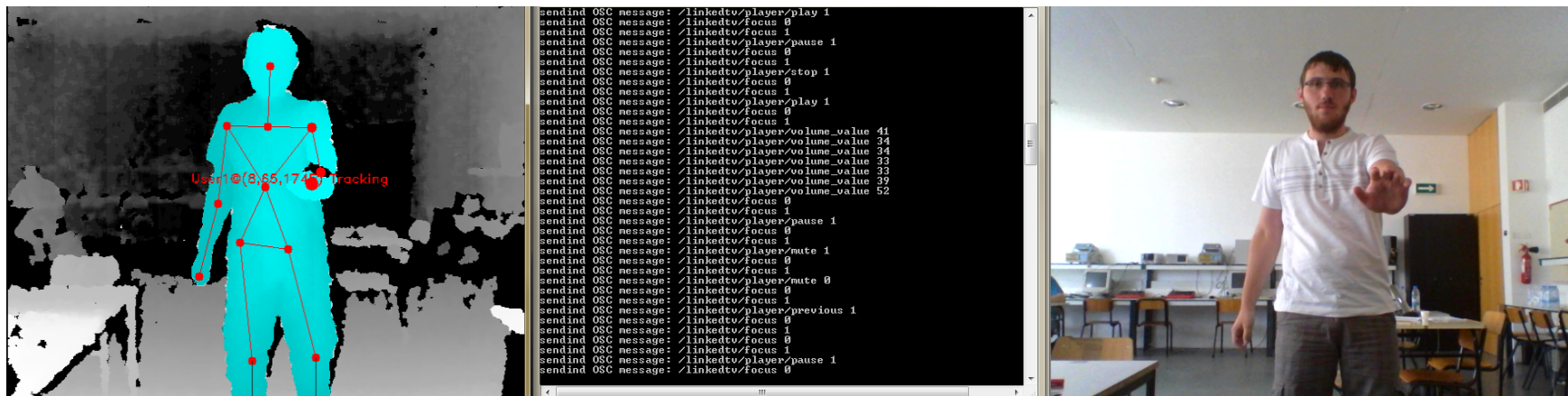
RGBD sensor-based explicit interaction

During the first 2 weeks, 12 gestures have been implemented :

-play/pause	-previous	-open menu
-stop	-next	-close menu
-lock/unlock	-volume	-video position
-mute	-(un)bookmark	-help

During week3, we will probably **need you to test the gestures !**

RGBD sensor-based explicit interaction

During week 3 an adaptive projection module will be setup and demonstrated :

- setup: projector+kinect
- automatic calibration
- choice of any plane (on table, wall, sofa...) and projection onto it
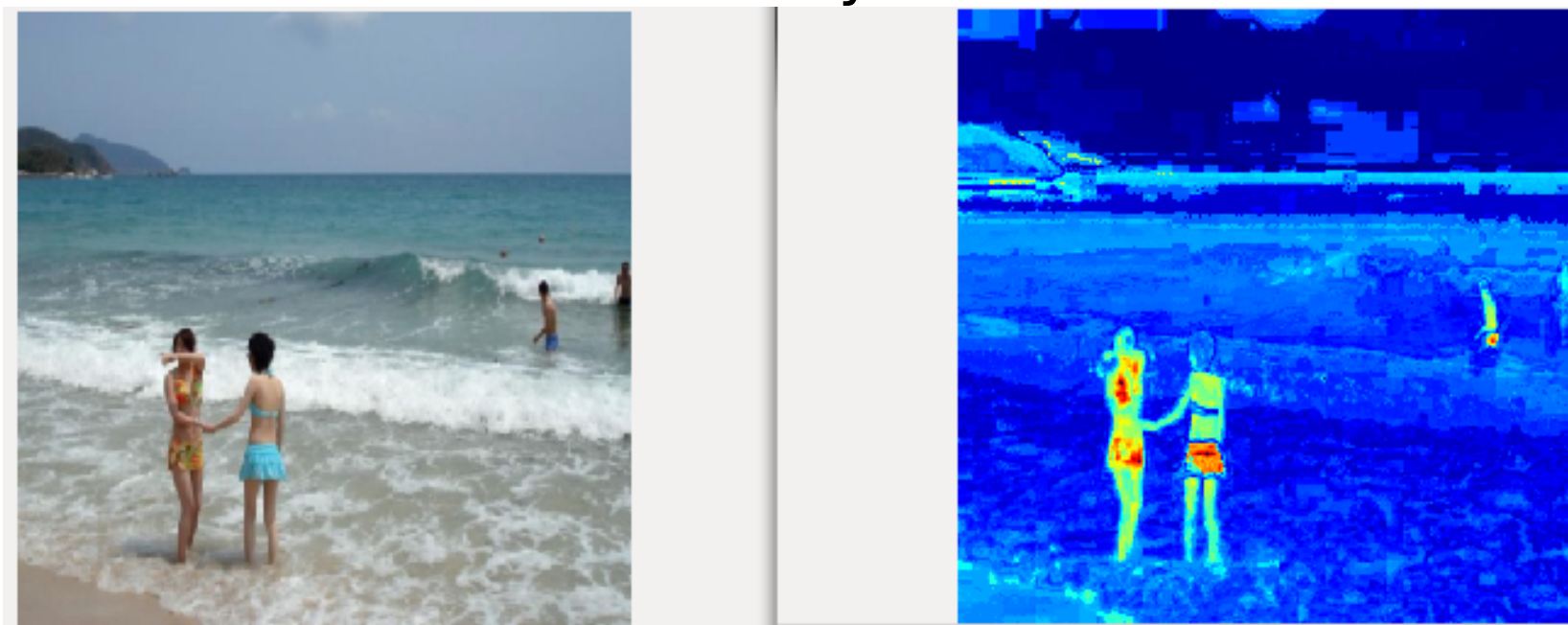
Implicit interaction : Workflow

- Attention module
- Database recorder for face models training
- Main workflow
  - Face detection, tracking and 2D/3D ROI segmentation
  - 2D: Face and emotion recognition
  - 3D: Gaze estimation

Attention module

Computational attention mechanism - Rare C++ library

Database recorder for models training

Face database for:
- Face model training (recognition)
- Gender model training
- AAM model (basic emotions)

During week3, we will probably **need you to enrich the database and test the face recognition system !**

Database recorder for models training

We have recorded a small database with the team for face recognition base on different methods: Eigen , fisher and LBPH.
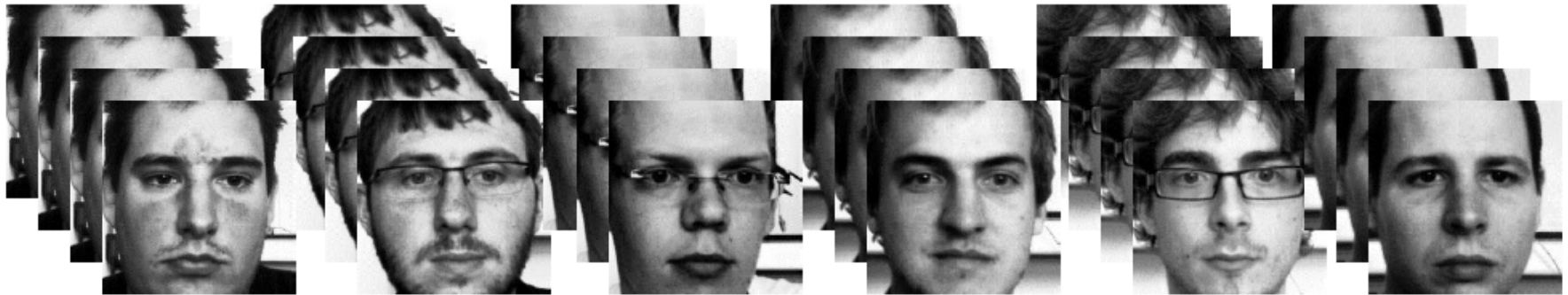
And with different expressions:
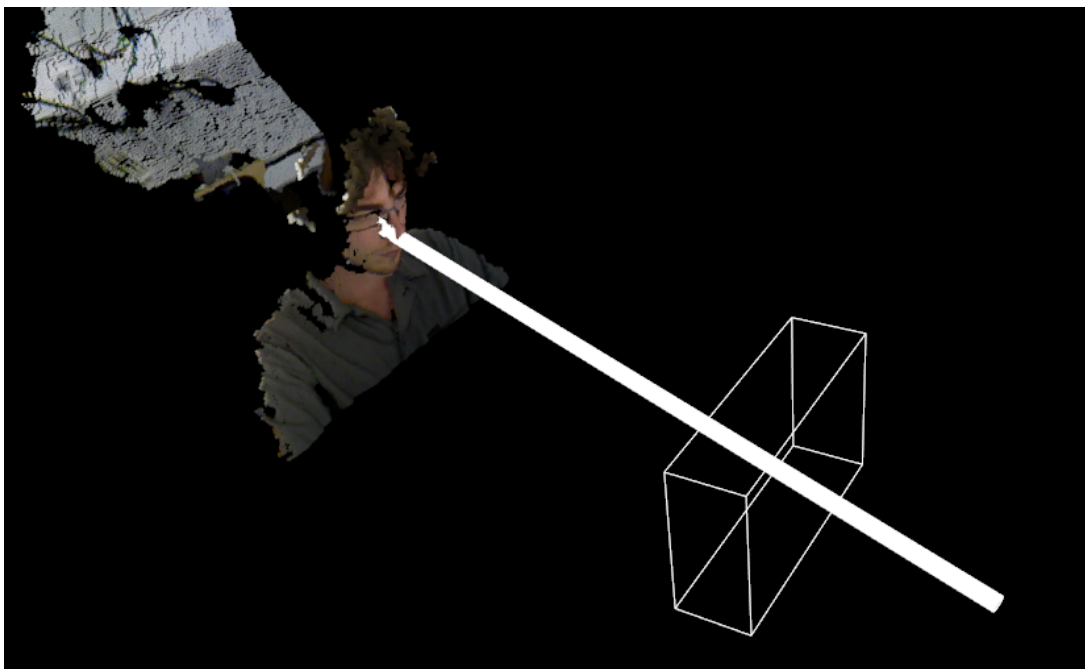

Neutral   Happy   Disgust

Interest extraction module

3D Cloud extraction → 3D Cloud segmentation using face detection → 3D head angle computation → Mapping on the TV screen
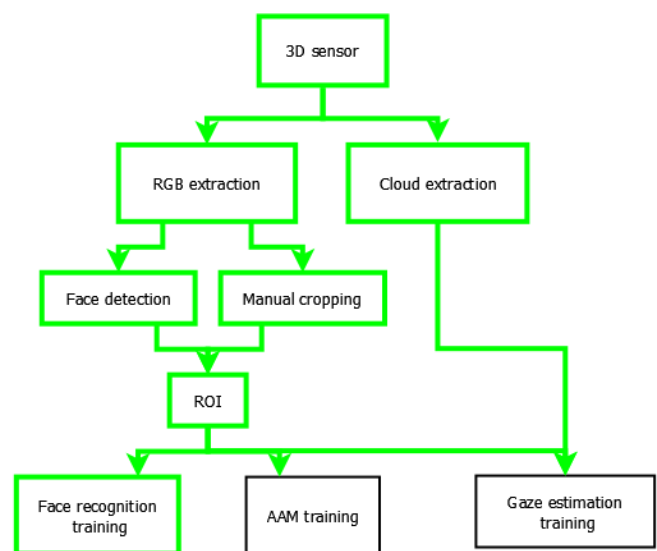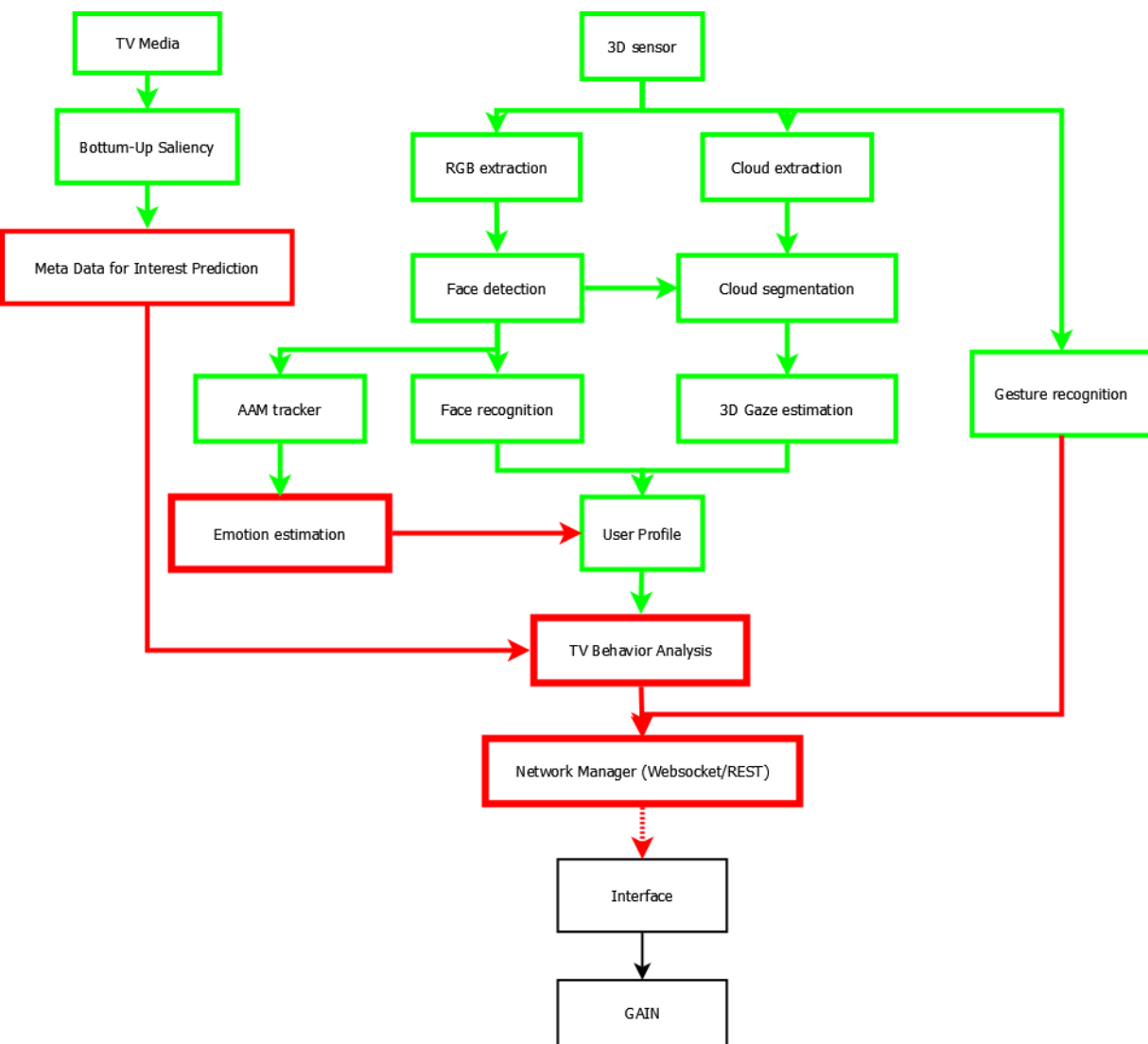

Julien

First 2 weeks

- New architecture and design pattern for modularity (MVC)
- Speed and stability improvement based on face detection
- Limit the cloud area that need to be processed
- Computational attention mechanism - Rare C++ library
- User profile based on face recognition using a fusion a 3 classification methods (Lbph , Fisher, Eigen)

Next 2 weeks

- Adaptive projection setup and first tests
- Integration to the GAIN module
- TESTS: gestures & face recognition (W3), whole system (W4)
- For the tests, **uncle Sam needs you** !!!!