**Introduction**

- **Context:**
  - Important growth of aged population in recent years
  - We need to provide tools to
    1. Extend their independent living
    2. Provide objective diagnosis of aged related dementia

- **Existing solutions:**
  Wearable sensors, smart-homes, video monitoring

- **Proposed approach:**
  Fuse inertial and video based events using a description based event recognition framework

**Overview**

1 IP camera Axis®
1 Kinect®
1 Inertial sensor MotionPod®

Detection
Classification
Tracking
Ontology

Event models
Detected events & people trajectories

First camera view
Second camera view

Inertial sensor actimetry
Trajectory information

**Experimentation**

- **Evaluation indices**
  - TP : True Positives
  - FP : False Positives
  - FN : False Negatives
  - Sensitivity
  - Precision
  - F Score

  \[ S = \frac{TP}{TP+FN} \]
  \[ P = \frac{TP}{TP+FP} \]
  \[ F = \frac{2SP}{S+P} \]

**Results for a single camera:**
- 29 participants, 15 min each
- Long term semi-guided activities
- Results for activities where the sitting posture is necessary (in red) are much worse than activities where just the standing posture is necessary

**Posture recognition in physical exercises:**
- 10 participants
- 5 minutes each
- Guided activities
- Fusing sensor information increases event detection performance

**Conclusion**

- The proposed multi-sensor approach improves performance
- Description based approach helps event modelling at user level
- Future work:
  - Use of sensor reliability measurement to improve results
  - Build activity profiles of healthy participants VS early to mild stage Alzheimer patients

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**COORDINATOR:** CHUN
**PARTENAIRES:** CHUN, INRIA, MICA, NCKU, LCS

**CONTACT:**
francois.bremond@inria.fr

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**DES STIC ET DES HOMMES**
A multi sensor approach for activity recognition of elderly patients
Sweethome project

CHUN Centre Hospitalier Universitaire de Nice
INRIA Institut National de Recherche en Informatique et Automatisme
MICA International Research Institute, Multimedia, Information, Communication and Applications
NCKU National Cheng Kung University and Hospital

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