FATE: Fall Detector for the Elder

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Outline

- Motivation
- Architecture of the FATE system
- Components of the FATE system
- Experimental protocol
- Conclusions

Motivation

- People aged 65 or over will become 28% of overall population in Europe in 2060
- Illness or weakness of the body of aged people can result in falls
- Main consequences of falls:
  - Fractures (causing 30% of deaths)
  - Long-lie syndrome
  - Fear of falling

The FATE project

- CIP-ICT-PSP project
- Timeline: 1/3/2012 – 28/2/2015
- Validate an innovative and efficient ICT-based solution focused on improving the elder's quality of life by an accurate detection of falls, both at home and outdoors
- Fall prevention system
- Able to measure the level of activity or the time a person lies in bed

The FATE consortium

NUI Galway
OÉ Gaillimh

Tunstall EMERGENCY RESPONSE

UPC

112 sem sistema d'emergències mèdiques

flowlab

TicSalut Tecnologia, innovació i salut

CLÍNIC BARCELONA Hospital Universitari

3 main pilots

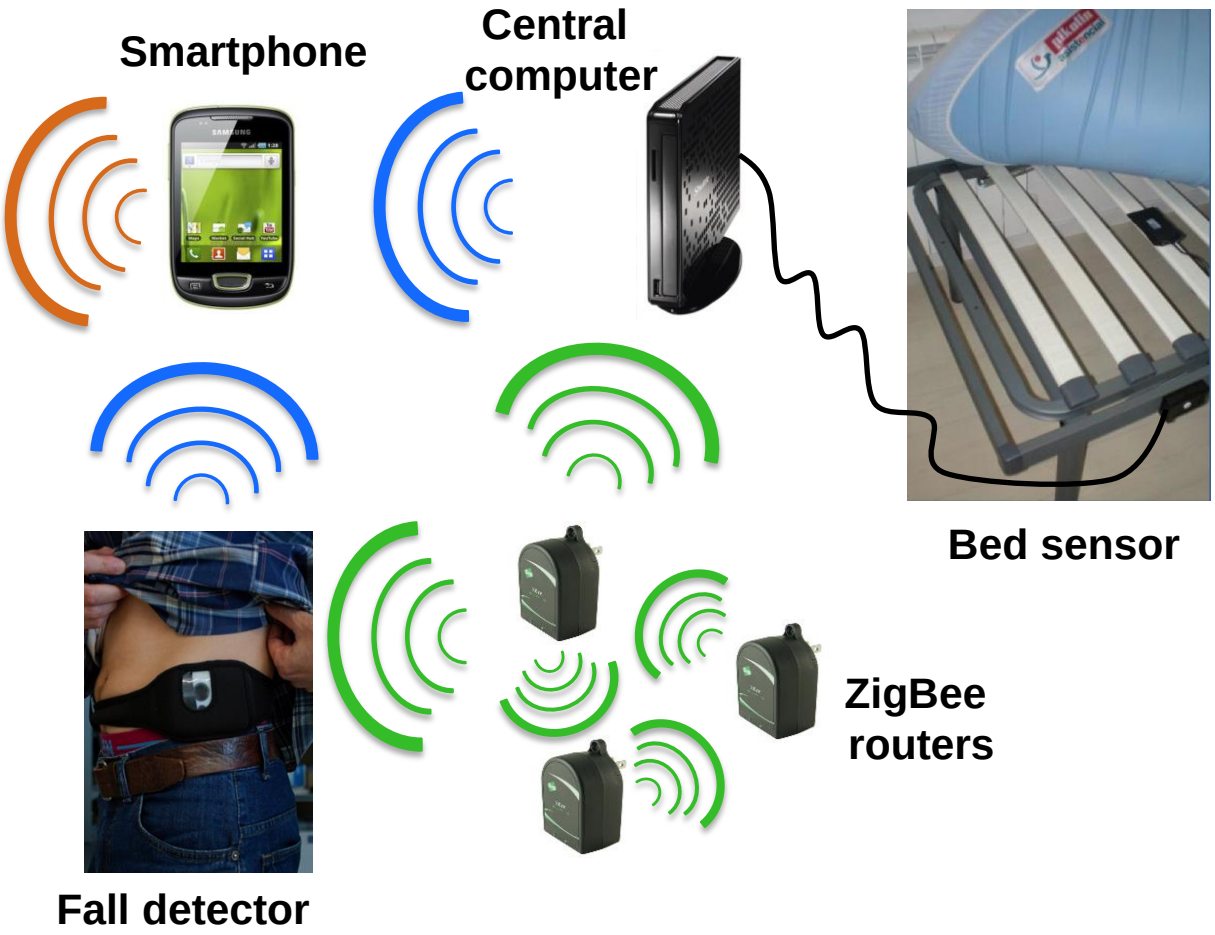
- Tech support
- Med support
- Call center

Ateknea Solutions

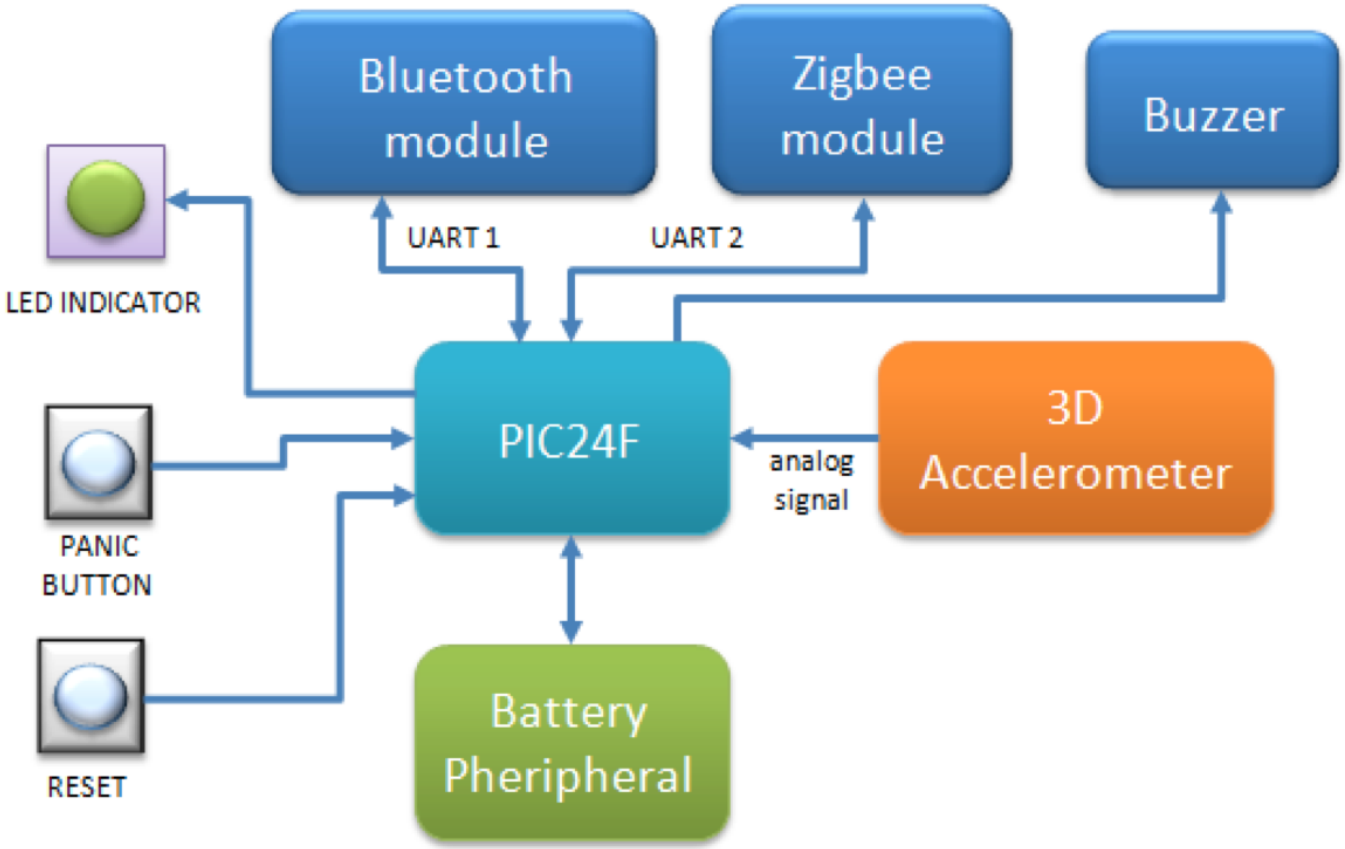
Cooperativa sociale COOSS MARCHE ONLUS

FONDAZIONE SANTA LUCIA

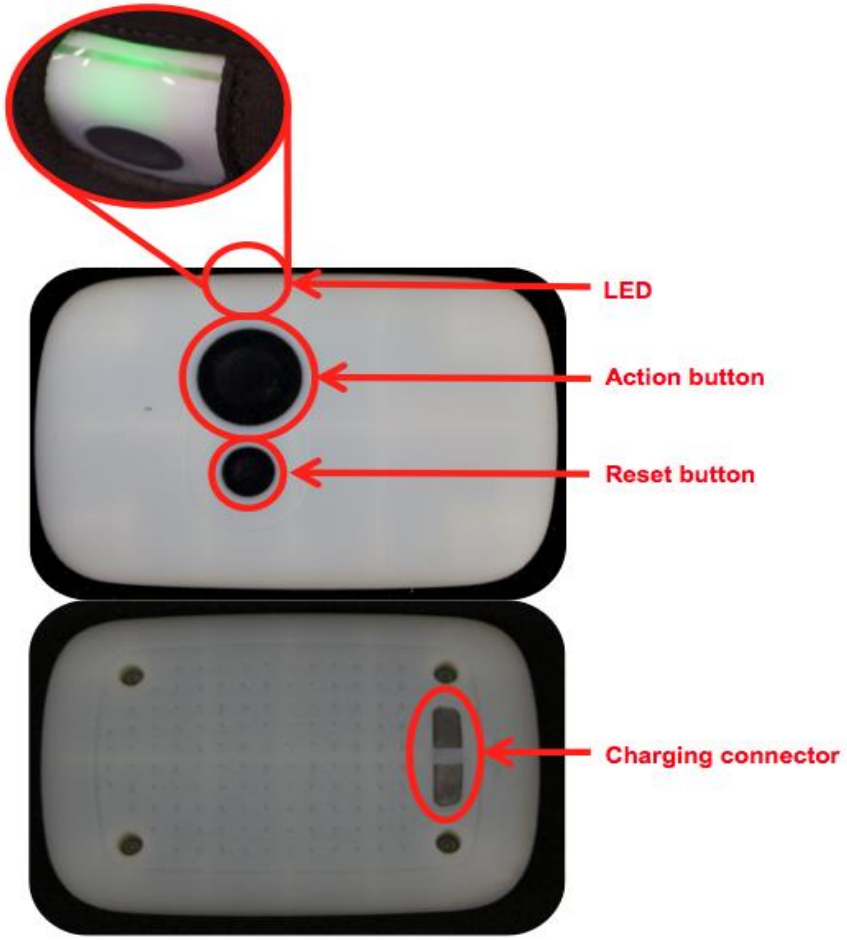
Architecture of the FATE system

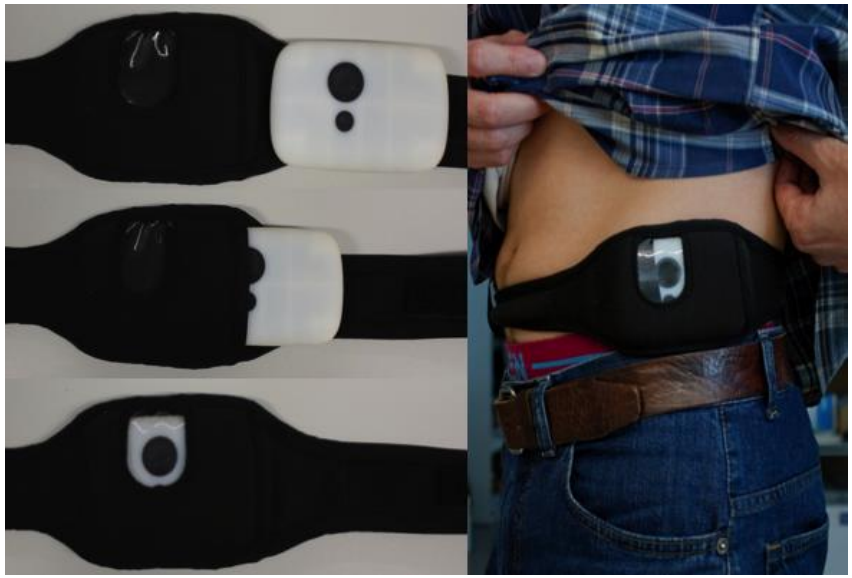


Internal organization of the fall detector



User interface of the fall sensor





Color coding of the sensor state

Courtesy time (5 minutes)

Solid: Sensor is fully charged

Blinking: Normal operation

Solid: Sensor is charging

Blinking: Sending data

With alarm sound: Fall or smartphone at home

Without alarm sound: Sensor battery is low

Components of the FATE system (I)

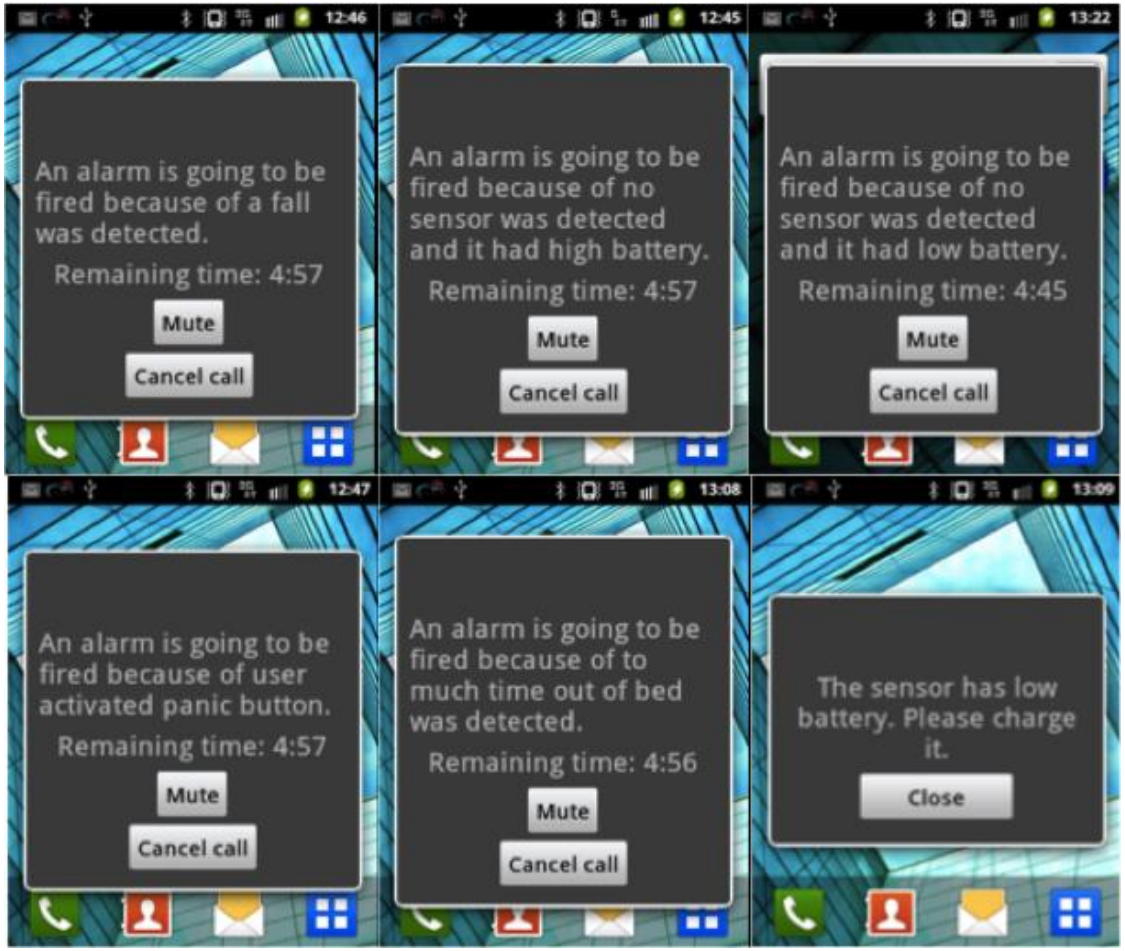
- **Bed presence sensor:**
  - Detects if the user has not been present in bed for a specified amount of time when not wearing the fall detector
- **Central computer:**
  - Coordinator of the ZigBee network
  - Relays to the smartphone the messages sent by the fall detector and the bed presence sensor
- **Wireless components:**
  - Bluetooth dongle (central computer)
  - ZigBee dongle (central computer)
  - ZigBee wall routers

Components of the FATE system (II)

- **Smartphone:**
  - Manages the messages sent by the fall detector and bed presence sensor
  - Generates alerts for the call centre

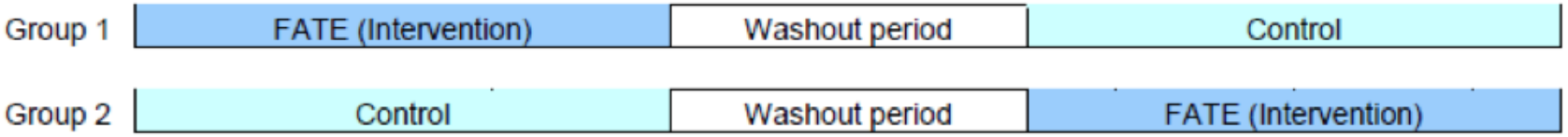
Alerts	Description
Fall detection	The fall detector detects a fall and a specified amount of time has expired without neither a user recovery or a cancellation through the application
Fall recovery	A fall has been detected but the fall detector found that the user was able to stand up afterwards
User panic	The user has pressed the panic button on the fall detector
No sensor/low batt	The smartphone and the central computer don't receive any communication from the fall detector for a specified amount of time, and the last message received indicated a low battery value
No sensor (fall?)	The smartphone and the central computer don't receive any communication from the fall detector for a specified amount of time, and the last message received indicated a correct battery value
Out of bed (fall?)	The user left bed during nighttime and didn't come back after a specified amount of time

Notifications to the user



Experimental protocol

- Scientific protocol designed to assess the FATE system in multiple domains, including user and stakeholder perspectives
- Participants will undergo an intervention period (6 months) and a control period (6 months) separated by a washout period (4 months)



The Washout period will permit to solve detected problems and to improve technological implementation before the second round period of the pilot.

Inclusion criteria

- Older than 64 years old
- At least 1 fall in the previous 6 months or alternatively a high enough risk of fall determined by the responsible of the local recruitment
- Ability to walk without human assistance indoors.
- Willing to participate in the study and wanting to co-operate in all its parts, accepting the performance regulations and procedures provided by the researchers
- A family member or relative available

Pilot implementation

- **Spain:**
  - 75 users in the area of Barcelona
- **Italy:**
  - 50 users in three municipalities located in a mountainous area of Marche region where some of the smallest are quite isolated from the others
  - 30 users in FSL Hospital (Rome) wearing fall detector and using i-Walker.
- **Ireland:**
  - 50 users in North Clare, Galway City and South Galway region.

Current status

- FATE system completely operative
- Emergency protocols developed by the emergency/care services at the three pilot sites
- Preliminary trials performed with actual users have been done before last summer.
- Deployment of the FATE system in the three pilot sites expected to be completed by next December 1st, 2013

Thank you for your attention !!

http://www.project-fate.eu