

# IoT, Know the Humans Around You

Mihai Lazarescu, Luciano Lavagno

mihai.lazarescu@polito.it, luciano.lavagno@polito.it

[http://www.det.polito.it/research/research\\_groups/electronics/ambient\\_sensing\\_and\\_processing](http://www.det.polito.it/research/research_groups/electronics/ambient_sensing_and_processing)

## Who We Are

- **Ambient Sensing and Processing** research group
  - *Politecnico di Torino, Electronics and Telecommunications dep.*
- **Past activities**
  - *Distributed environmental sensing* (start-up)
    - Wildfires, train integrity, sewage level, path passage, gasses, dam stability, ...
    - On-board processing, long term, low cost, low maintenance
- **Current research**
  - Localization, tracking, identification, vital signs of people indoors
    - Tag-less (no wearables), unobtrusive, privacy-aware, low cost
    - Ultralow power sensing, very low maintenance
  - Energy-efficient accelerated AI: from ultralow power (edge) to high-performance (cloud)

## Project idea

- **1) Track** humans, **2) Infer** routines and intents, **3) Flag** meaningful deviations
- **Domains:** *Assisted Living → Intelligent Environment → Security and Efficiency*
- **Monitoring:** unobtrusive, continuous, ubiquitous, long-term, very low cost
- **Tech:** human multimodal AI-enhanced sensing & Accel. AI-assisted analysis
  - Green sensors: distributed, low-power, low-cost (capacitive, infrared, acoustic, ...)
  - Green processing: ultralow power *AI on sensors* & energy-efficient accel. *AI on cloud*
- **Objectives/Broader vision:**
  - *The environment senses us, to assist* (better health, services, security, efficiency, ...)
    - In: healthcare, home, buildings, public spaces, transportation, yards, ...
  - *We sense the environment, to prevent* (forests, water, air, infrastructure, vehicles, ...)
    - In: health (hazards), safety (accidents), transportation, energy, logistics, ...

## Looking for

- Healthcare application providers
  - Assisted living, continuous monitoring, health hazards, ...
- System integrators for environmental sensing
  - Indoor human monitoring, infrastructures, transportation, logistics, energy, ...
- Technology providers to support advanced sensing and processing
  - Ultralow power/high performance computing devices, computing services, ...