

# Position statement

by a researcher at the intersection of AI and Robotics

addressing questions 1, 4, 2

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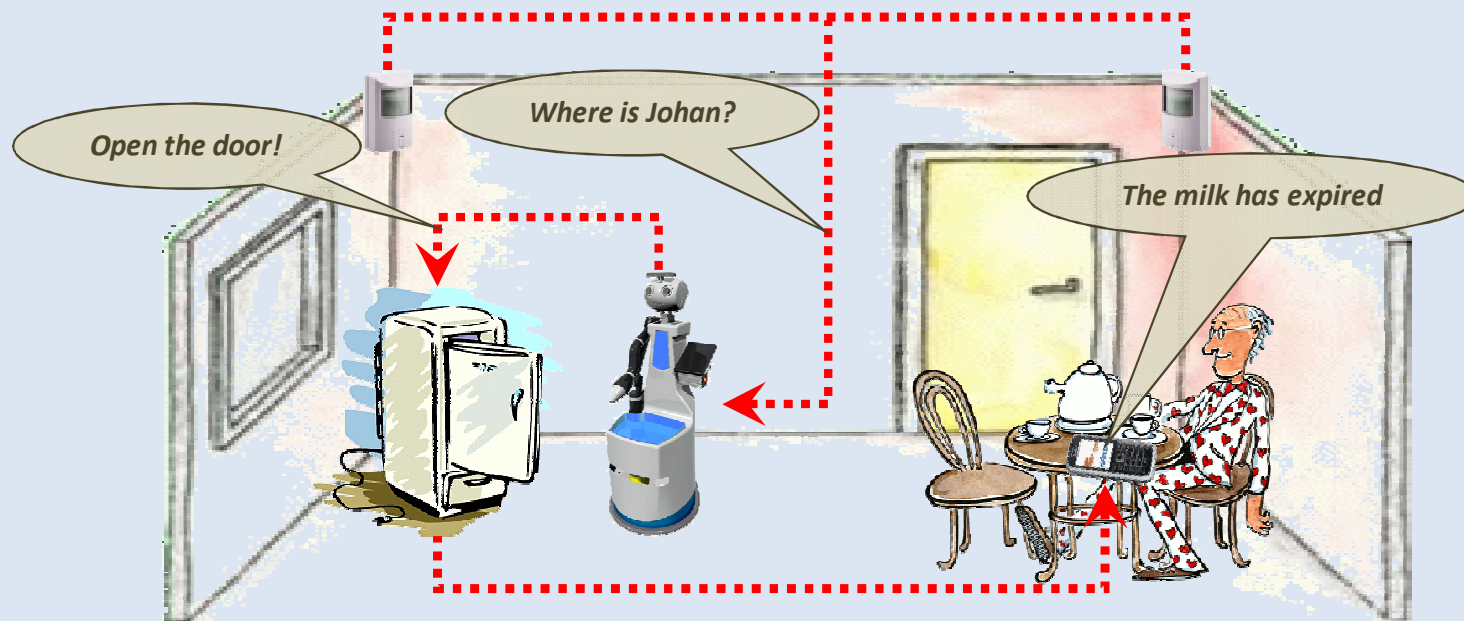
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COGNITIVE ROBOTIC SYSTEMS

# Q1 - What is the added value of integrating IoT and Robotics solutions in your experience?

- **“PEIS Ecology” (Physically Embedded Intelligent System)**
  - Extend the definition of “robotic system” to include all sort of devices
  - Devices arranged in ad-hoc coalitions to perform services and tasks



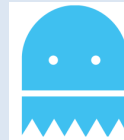
- **Added value: provide flexible, ubiquitous robotic services**

2004—2008  
Initial concept

2011—2014  
Add learning

2012—2015  
From home to town

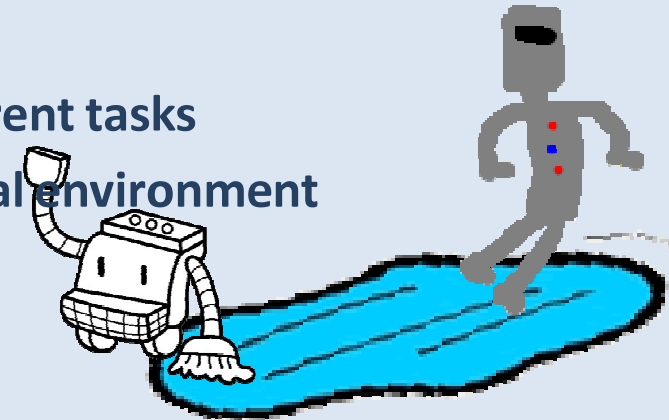
2013—2016  
Add social behavior



## Q4 - *What are the obstacles to build integrated IoT-Robotics-AI systems today?*

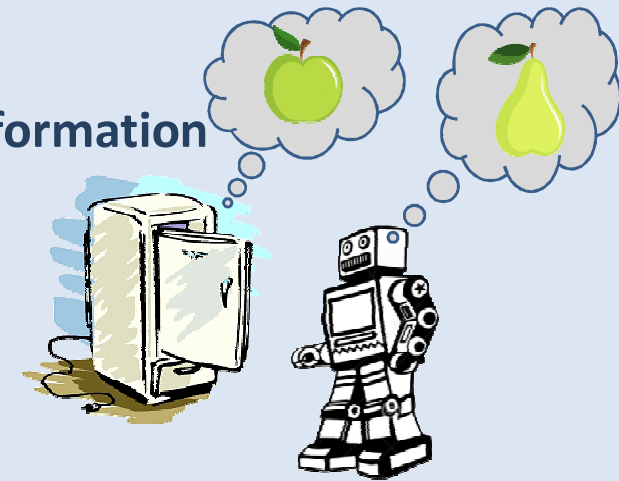
- **Technical: complexity**

- Must autonomously self-configure to address different tasks
- Deep interactions among devices that share physical environment



- **Technical: inter-operability**

- Different middleware for IoT and robotics
- Semantic inter-operability to exchange meaningful information



- **Cultural: separate communities**

- Different languages
- Lack of mutual awareness
- Lack of common venues



*Q2 - What AI and cognition enabler - if any - have you used in your experience?*

- **Planning, *provided it can deal with***

- multi-agent systems
- information gathering actions
- temporal reasoning
- resource reasoning

*Self-configuration for:*  
- *different tasks*  
- *different sets of devices*

- **Web service composition, *provided it can deal with***

- ontology / semantics
- processes

- **At the edge of what current AI technologies can do**

- need additional research to address the above challenges...
- ... in an integrated way ...
- ... plus scalability, safety, traceability



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