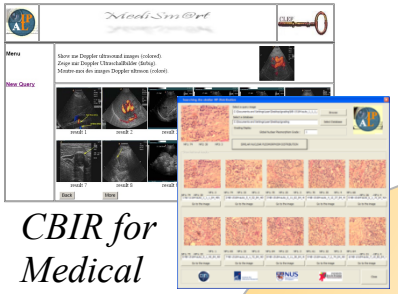
Quality of life of ageing people having mild dementia

Mounir Mokhtari,
Institut Mines Telecom/CNRS IPAL Singapore/
CNRS LIRMM

IPAL challenges



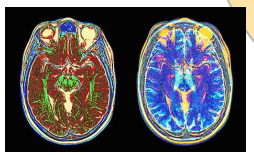
CBIR for Medical Image

Healthcare

Support

Pervasive Exploration of the Medial Image for Prognosis and Treatment Assistance

MIU
(Medical Image Understanding)



Medical Imaging

Impact

Hospital

Indoor

Wellness

AAL -Ambient Assistive Living and Mobile Information Access

PAWM
(Pervasive Access and Wellbeing Management)

Outdoor

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Cognitive decline

Process: Sequence of action

Process: Initiation/repetition

Memory: object function

Memory: Scene recognition

Memory: Photos

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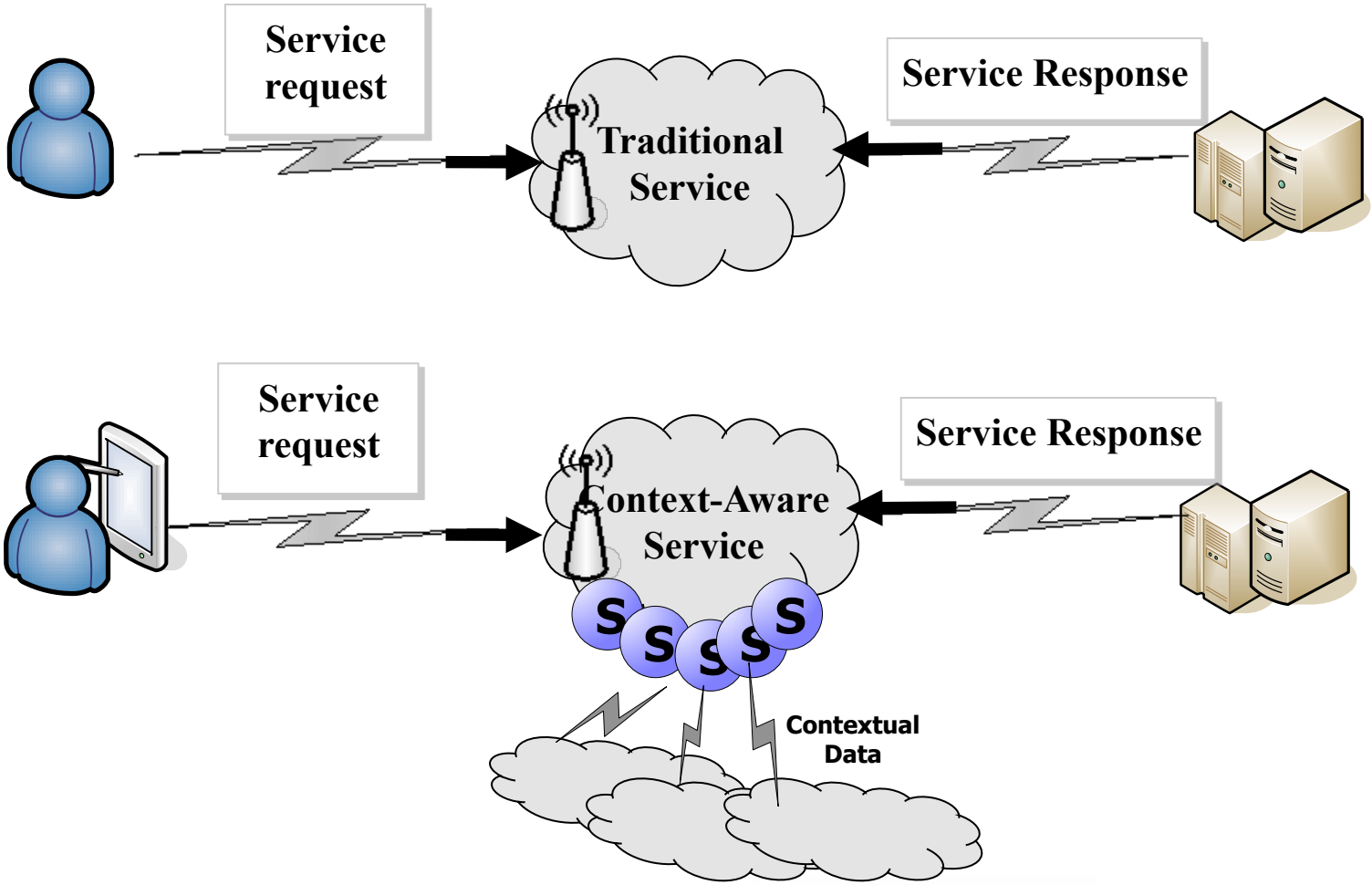
Pervasive Access and context awareness



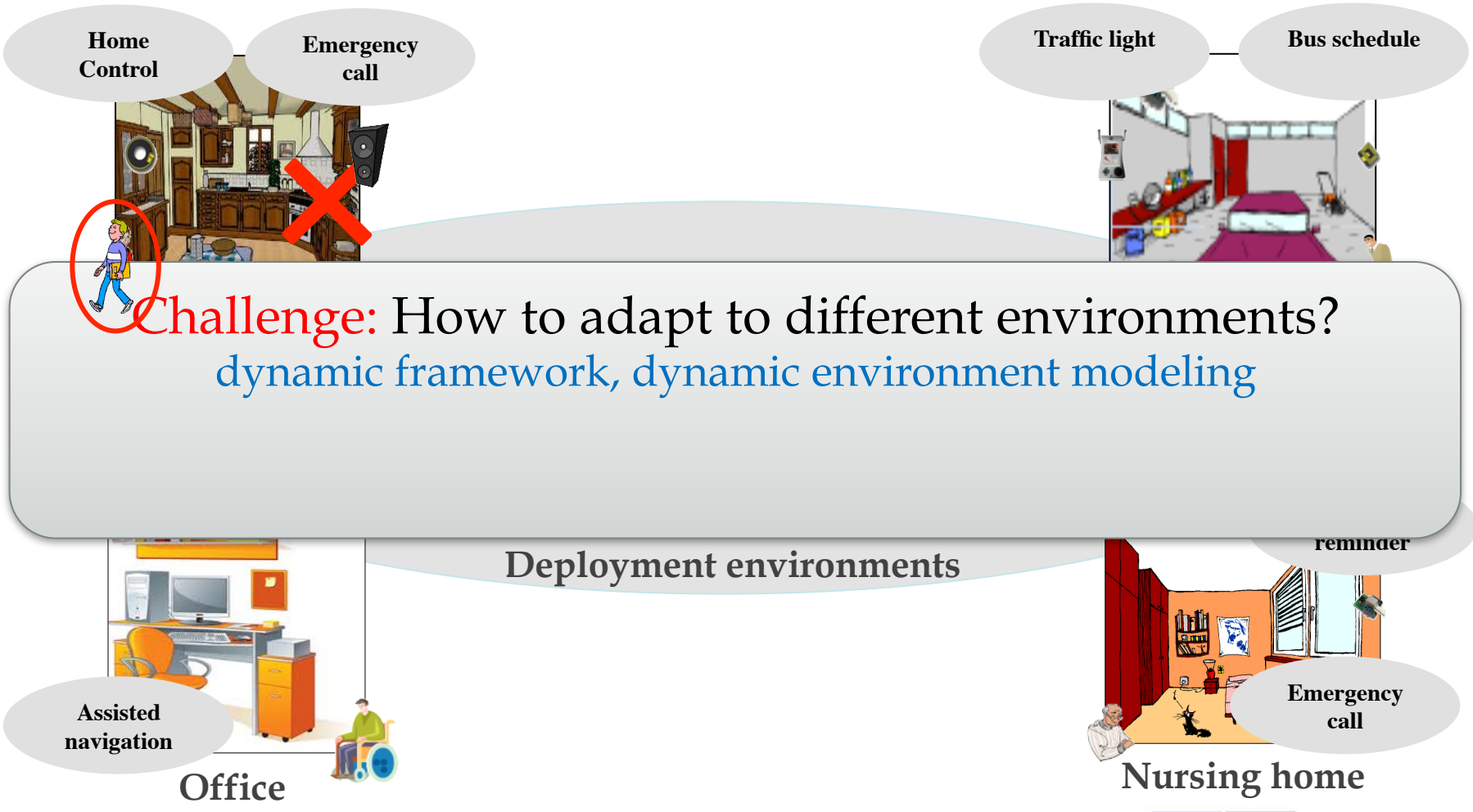
Similar Work

- Gator Tech Smart House (University of Florida, 2005, experimental laboratory, technical trial environment)
- NUADU Project (ITEA, 2006 , PI Philips NL, Activities monitoring, ageing with no dementia)
- COGKNOW Project (FP6, 2006, PI Telephonic, ageing with dementia, Reminders, daily activities support)

Orwat, C. et al. " Towards pervasive computing in health care – A literature review." BMC Medical Informatics and Decision Making 8 (1), 26, 2008.

	67 AAL systems
Prototype	84%
Clinical trials	9%
Regular operation	7%

Several issues and research thrusts

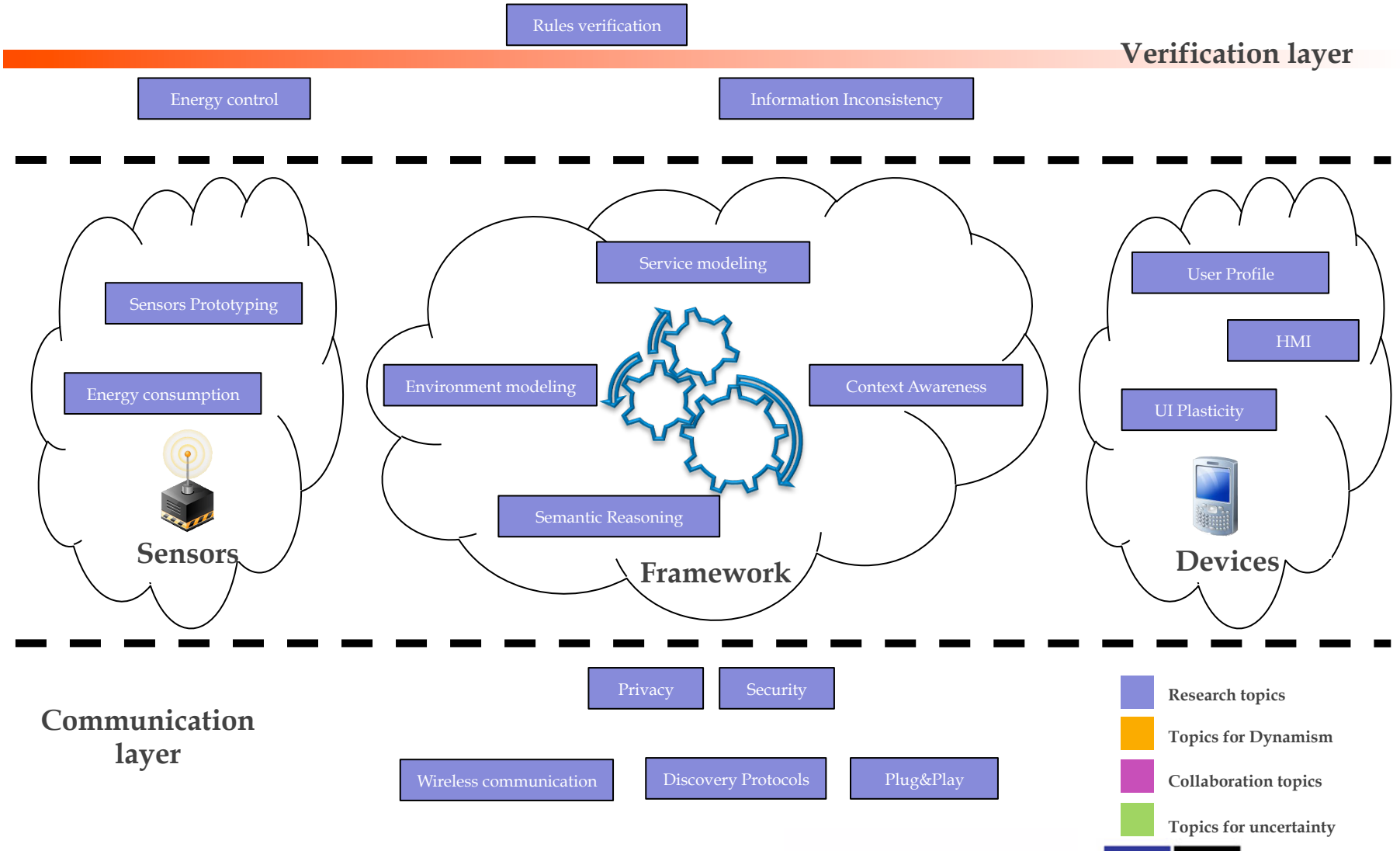


Several issues and research thrusts

Challenge: How to manage erroneous sensors events and imprecise human behavior?

Uncertainty measurement, uncertainty modeling, reasoning under uncertainty

Several issues and research thrusts



Related Approaches

Modular Approach

SOA
OSGi
Web services

- Independent, loosely coupled
- Break the logical into simpler tasks
- Environment description included in modules logic

- Separation of logic and representation
- Reusability and adaptability
- Need to be fed with environment information

Declarative Approach

Ontologies
Semantic web

Modular Approach

OSGi Frameworks

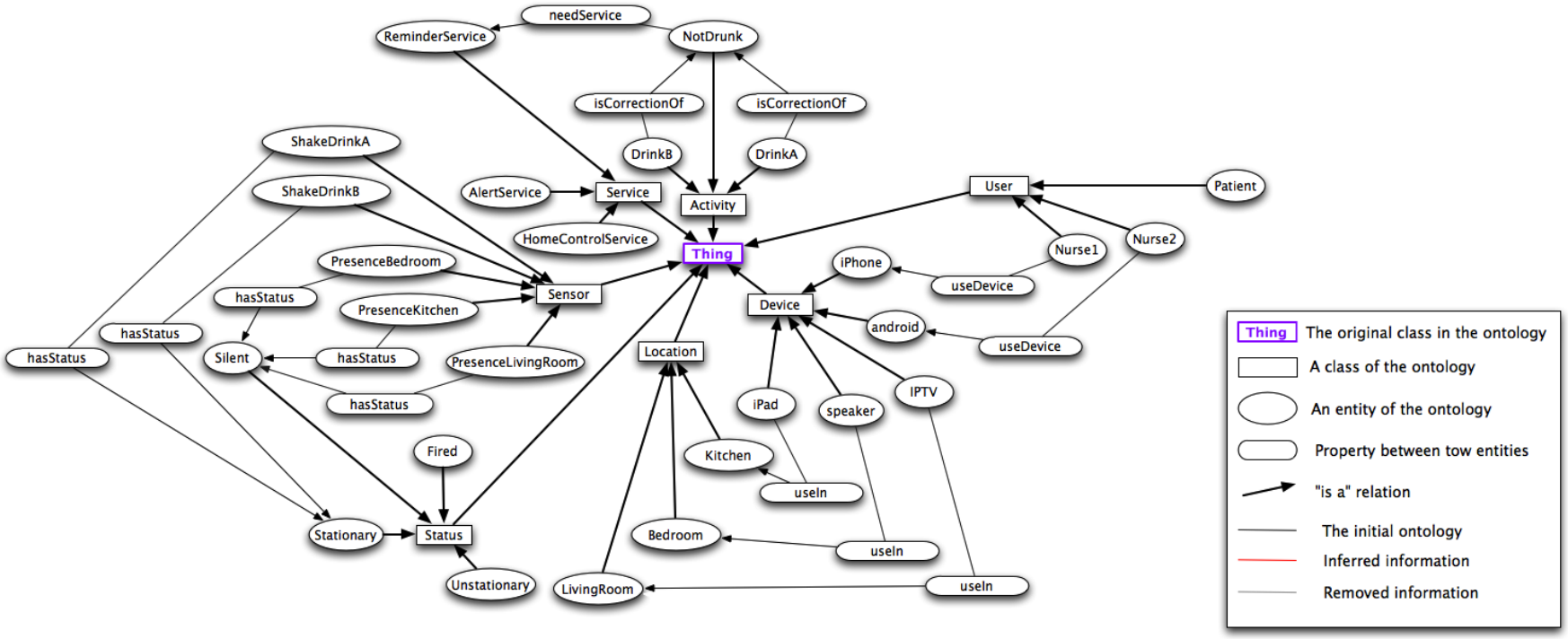
	R4 implementation	Light weight	Easy to use	Compact device integration
Concierge		x		x
Knopflerfish	x		x	
Equinox	**x**	x		
Apache Felix	x	x	x	x

Modular Approach

Distributed Modules Communication

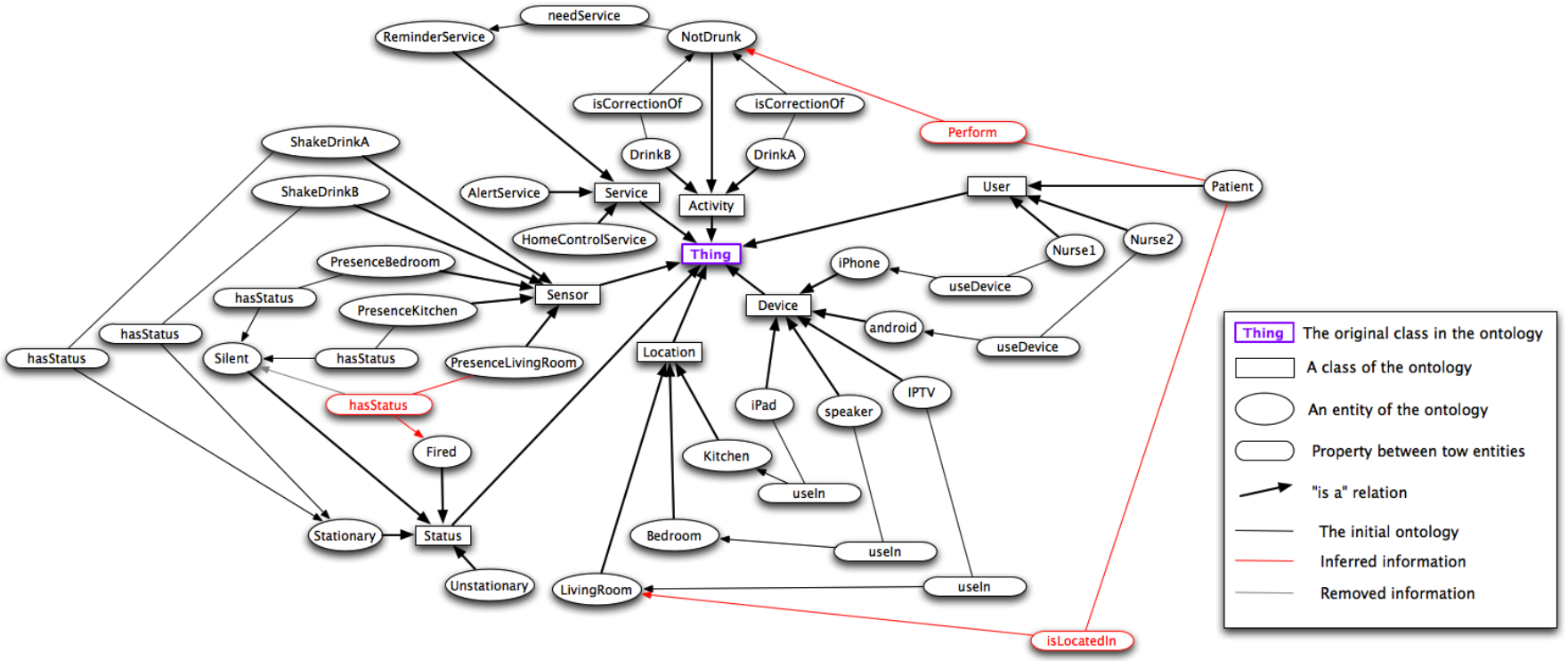
Declarative Approach

Declarative Approach

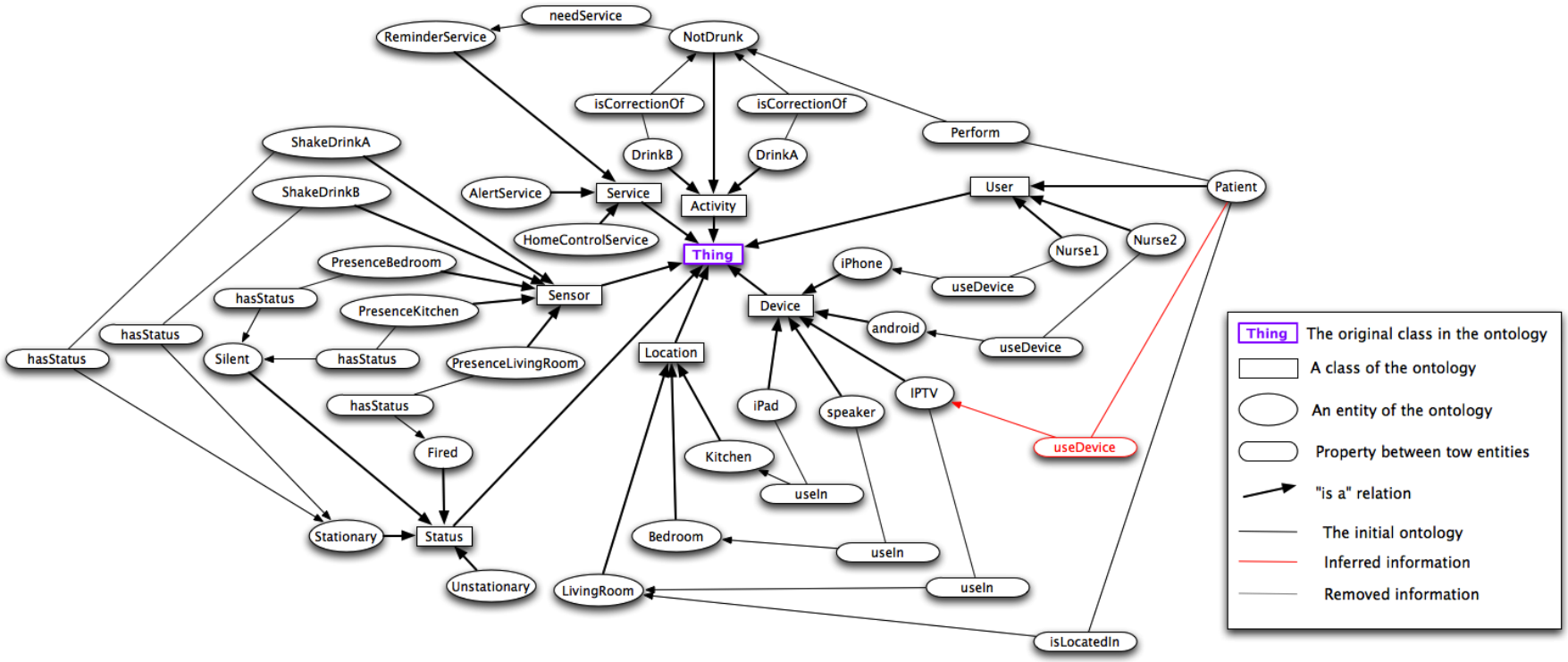


Declarative Approach

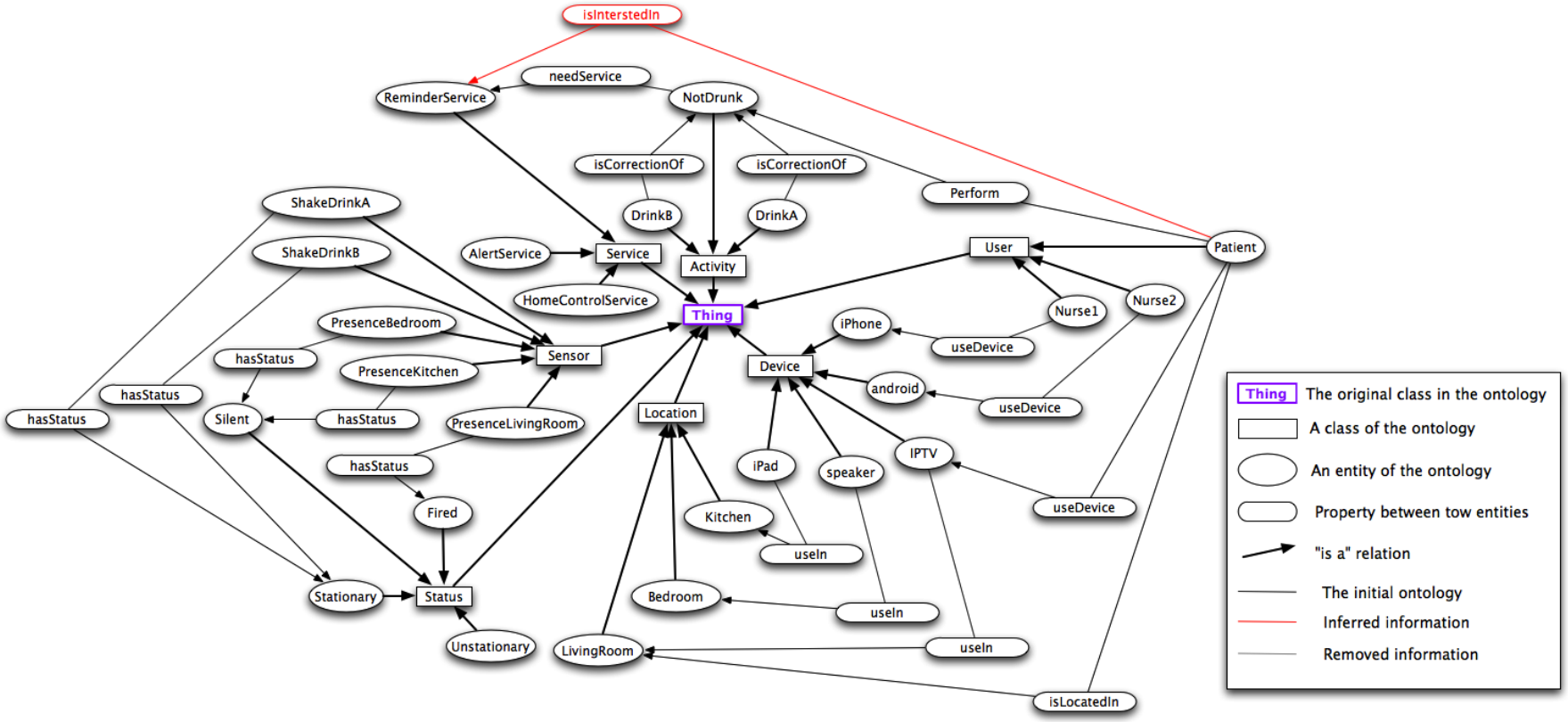
Declarative Approach



Declarative Approach



Declarative Approach



System Deployment

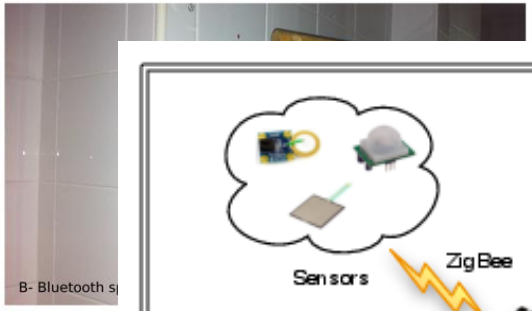
PeaceHeaven nursing home, Singapore (2012-2013)

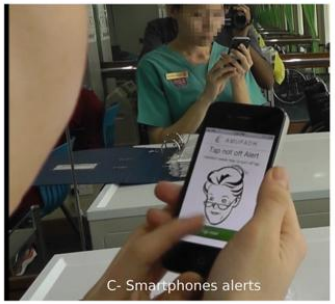
Patient	Age	Functional Status	Room nb
Patient 1	90	Needs minimal assistance	8
Patient 2	92	Needs moderate assistance	8
Patient 3	85	Needs moderate assistance	8
Patient 4	79	Needs minimal assistance	9
Patient 5	87	Needs moderate assistance	9
Patient 6	92	Needs moderate assistance	11
Patient 7	82	Needs moderate assistance	11
Patient 8	78	Needs moderate assistance	11

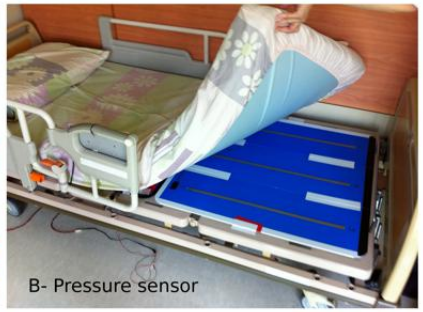
System Deployment

Assistive Service	Sensors involved	Interaction devices
Wandering at night	Motion sensor Mattress sensor	Smart-phones Nursing console
Toilet fall detection	Motion sensor Proximity sensor	Smart-phones Nursing console
Showering too long	Motion sensor Vibrator sensor	Speakers Smart-phones Nursing console
Leaving the washroom tap on	Proximity sensor Vibrator sensor	Speaker Smart-phones Nursing console

System Deployment



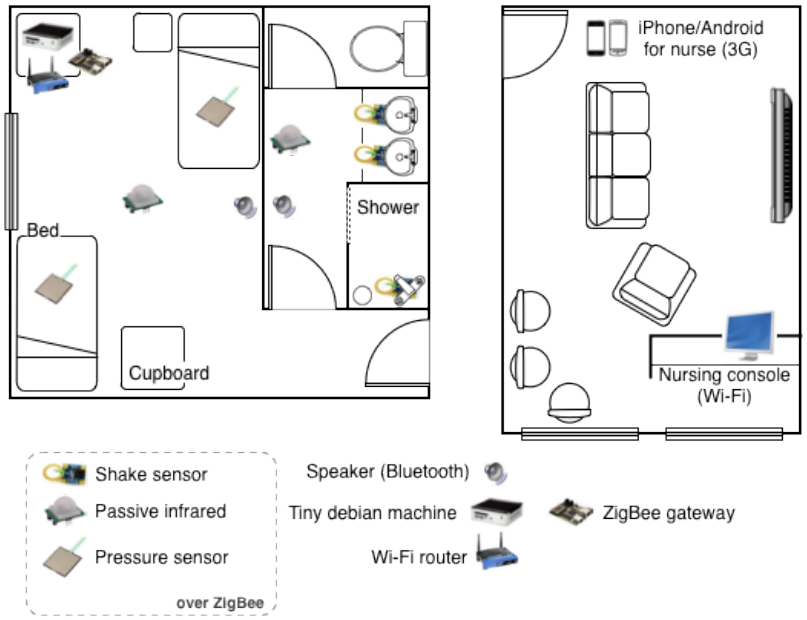


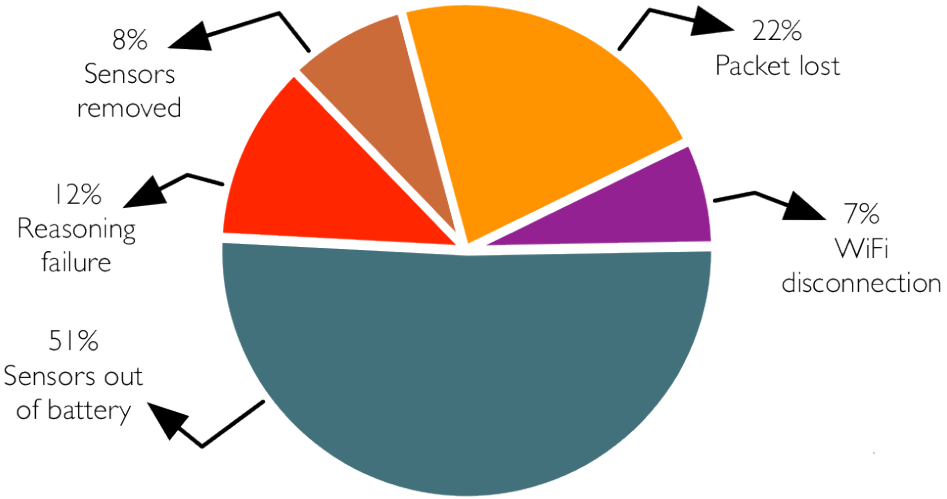


Problematic

Aleatory uncertainty

Results from hardware failures and communication problems.





CHAIRE QoL

2012 - 2016

Chaire Quality of Life

1. *Beyond traditional Human–Machine interaction (physical and cognitive limitation)*
2. *Exploring Cognitive therapy (serious games)*
3. *Large scale deployment (500 families in France, exploring Singapore)*
4. *Education program (undergraduate and post graduate programmes)*
5. *Short term industry transfer*

International Conference On Smart homes and health Telematics

Lecture Notes in Computer Science
LNCS LNAI LNBI

2003
The European Year of People with Disabilities

ICOST' 2003, Europe (Paris, France)
ICOST' 2004, Asia (Singapore)
ICOST' 2005, North America (Sherbrooke, Canada)
ICOST' 2006, Europe (Belfast, UK)
ICOST' 2007, Asia (Nara, Japan)
ICOST' 2008, North America (IOWA, USA)
ICOST' 2009, Europe (Paris, France)
ICOST'2010, Asia (Seoul, Korea)
ICOST'2011, North America (Montreal, Canada)
ICOST'2012, Europe (Florence, Italy)
ICOST'2013, Asia (Singapore)
ICOST'2014, North America (Denver, USA)

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