

# WEARAmI @ ÄNGEN 1 - REFERENCE MANUAL

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## PRELIMINARY INFO

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## OVERVIEW

The Human Activity Recognition (HAR) system deployed at Ången 1 in the context of project WearAml is an ecology of PEIS components devoted to the recognition of a-priori defined human actions. Actions of interest include accidents (falls) and health-related activities of daily living (to eat, to walk...).

Awareness of the occurrence of such actions:

- increases the chances of a fast response in case of emergency;
- provides user-related information to in-home assistance and service robots.

An introduction to the PEIS ecology principles can be found here:

[http://ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=4650962&tag=1](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4650962&tag=1)

The building blocks of the HAR system are:

- **physical sensing devices**, collecting raw data
- **low-level software components**, embedded in/univocally connected to the sensing devices, that extract relevant information from the raw data and make it available to other components as tuples in the PEIS tuple space
- **“glue logic” software components**, that transform the low-level components output according to the requirements of the higher level reasoners
- **High-level reasoners**, that analyze the sensory information to infer the status of the person.

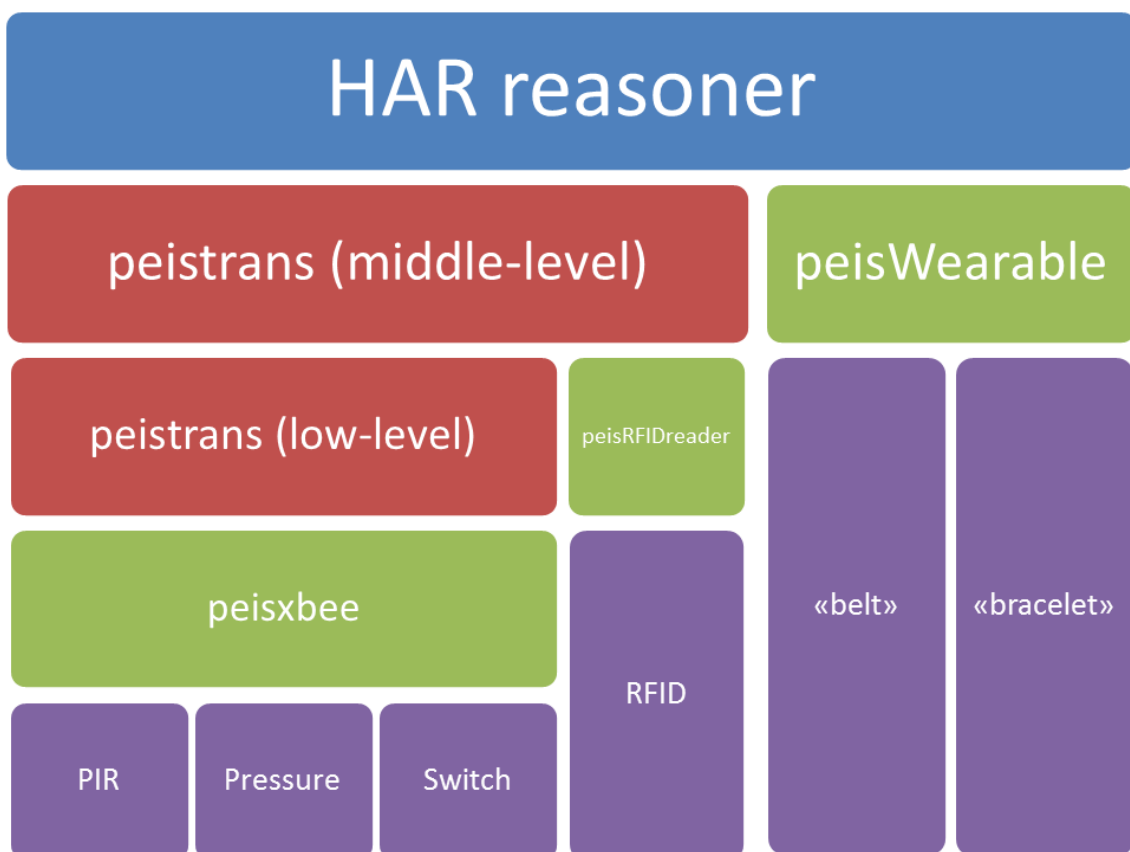







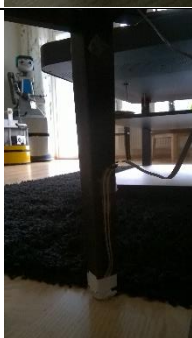


Figura 1. System architecture.

## PHYSICAL SENSING DEVICES



### PIR SENSORS

Device		Location	Storage	Reference person
PIR sensor		101.ad2 = livingroom.pir01 (TV)	Sensors deployed in the apartment. Batteries in the "tools and stuff" drawer in the bedroom wardrobe.	Jasmin
	N.A.	102.ad2 = livingroom.pir02 (sofa)		
		105.ad2 = kitchen.pir01 (microwave oven)		
	N.A.	107.ad2 = bathroom.pir01 (sink)		
XBee receiver		RobotEra pc (CADB15)	At location.	

## PRESSURE SENSORS

Device		Location	Storage	Reference person
Pressure sensor		106.ad4 = livingroom.chair01.pressure01 (Grey armchair usually placed close to the window)	Sensors deployed in the apartment. Batteries in the “tools and stuff” drawer in the bedroom wardrobe.	Jasmin
		103.ad4 = livingroom.chair01.pressure02 (Grey armchair usually placed close to the window)		
		109.ad4 = livingroom.chair02.pressure01 (Black and red chair usually placed next to the sofa)		
		104.ad4 = kitchen.chair01.pressure01 (Kitchen table chair on the center/windows side)		
		108.ad4 = kitchen.chair02.pressure01 (Kitchen table chair on the wall/fridge side)		
XBee receiver	Same of PIR sensors			

## SWITCH SENSORS

Device		Location	Storage	Reference person
Switch sensor		121.ad1 = kitchen.microwave01.switch01	Sensors deployed in the apartment. Batteries in the “tools and stuff” drawer in the bedroom wardrobe.	Jasmin
	N.A.	122.ad1 = kitchen.fridge01.switch01		
		123.ad1 = kitchen.cupboard01.switch01 (Cupboard above the stove set)		
XBee receiver	Same of PIR sensors			

## OVERVIEW OF THE SOFTWARE COMPONENTS

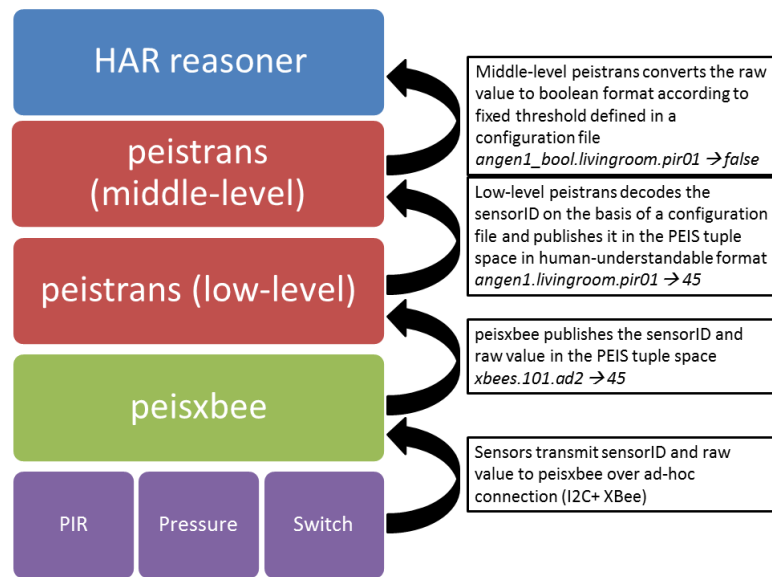


Figure 2. Dataflow for the PIR, pressure and switch sensory information.

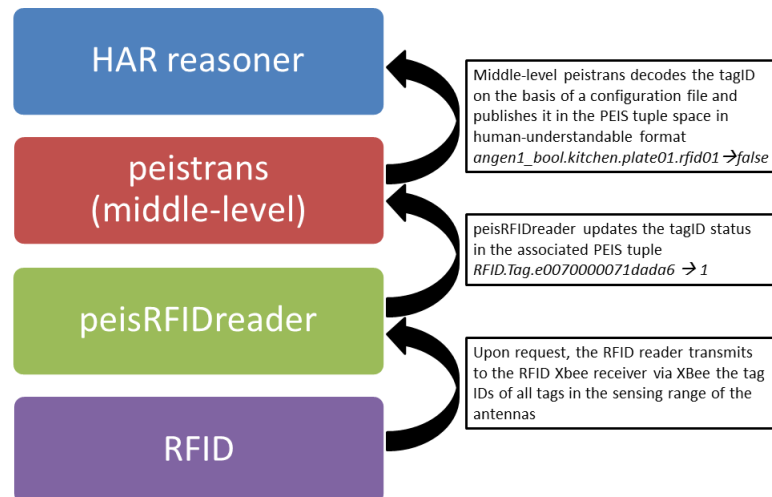


Figure 3. Dataflow for the RFID network information.

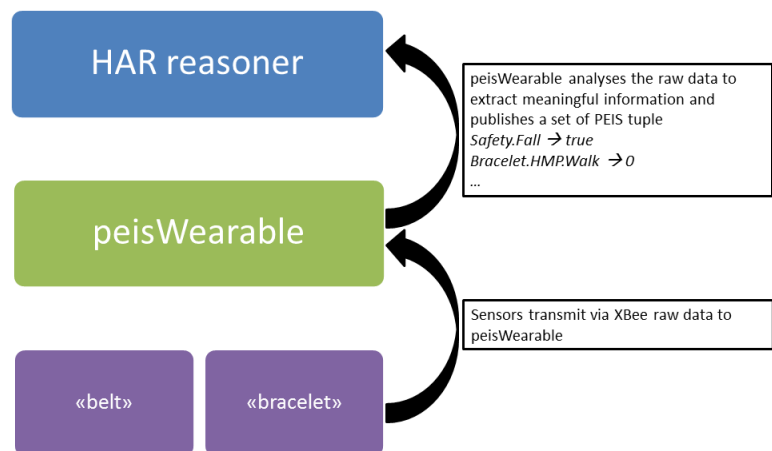


Figure 4. Dataflow for the wearable sensors information.

## LOW-LEVEL SOFTWARE COMPONENTS

### *PEISXBEE*

Working installation	Author	Documentation	Available at:
RobotEra PC	Jonas Ullberg	README.md file	bbbruno/WearAmI

### **Dependencies**

Any of {PIR;pressure;switch} sensor networks.

### **Run command**

`peisxbee` (on RobotEra PC only)

### **Table of published tuples**

Key	Value format	Description
xbees.[deviceID].[sensor_type] Example: Xbees.101.ad2	double	Sensor value registered by the sensor attached to the XBee end device.  Available sensor types are: ad0 → luminosity ad1 → switch ad2 → pir ad3 → temperature ad4 → pressure



## “GLUE-LOGIC” SOFTWARE COMPONENTS

### *PEISTRANS (1)*

Working installation	Author	Documentation	Available at:
RobotEra PC	Jonas Ullberg (configuration by Jasmin & Barbara)	README.md file	bbbruno/WearAmI

### Dependencies

peisxbee

### Run command

```
cd [path]/peistrans  
./peistrans ./configs/XBee_Angen.xml
```

### Table of published tuples

Key	Value format	Description
angen1.[room].[pirID] Example: angen1.livingroom.pir01	double	Sensor value registered by one PIR sensor.
angen1.[room].[object].[sensorID] Example: angen1.livingroom.chair01.pressure01	double	Sensor value registered by one luminosity/switch/temperature/pressure sensor.