Software Engineering for Autonomous Systems - Smarties

Idea:

We will implement an Autonomous System for a virtual smart home, which manages different Sensors and Effectors in order to make life easier, more comfortable and more economical for the inhabitants of a flat.

Proposed System:

Managed Resources:

Our managed House will have 3 rooms with sensors and effectors in each of them

- Sensors in each room: motion, temperature, oxygen
- Effectors in each room: light, shutter, window, heater
- Living room: Radio, TV
- Bedroom: Radio, Alarm
- Bathroom: humidity sensor, boiler
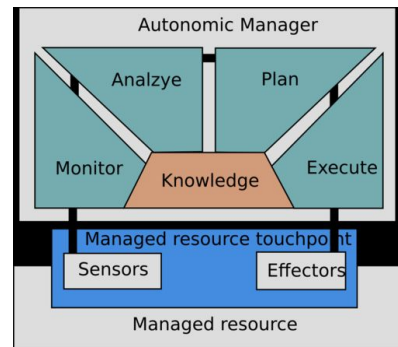
Monitor:

- The number of people that are present in the house
- room temperature at all time
- Status of windows around the house
- Oxygen in all rooms
- Status of all Effectors.

Analyze:

- Home in conditions specified for absence of Inhabitants?
- When are the Inhabitants usually at home?
- Is there the right amount of Oxygen in the rooms?
- When is warm water required?
- When are the Inhabitants usually sleeping?

Plan:

- Close Shutters during estimated absence of Inhabitants and during sleep
- Regulate temperature: lower during sleeping hours and absence, higher for estimated presence of Inhabitants

Execute:

- Turn on light if somebody is in the room and it is dark
- Regulate temperature: lower during sleeping hours and absence, higher for estimated presence of Inhabitants
- Open windows when Inhabitants are present and the oxygen concentration is not good
- Open bathroom windows in case the humidity is too high.

Knowledge:

- Rules set by the Inhabitants
- Presence of inhabitants in rooms
- State of lights, shutters, windows, heaters
- Temperature in rooms
- Oxygen concentration in rooms
- Usual presence of inhabitants
- Usual sleeping hours

Some ideas for the smart home

https://github.com/openhab/openhab1-addons/wiki/Samples-Item-Definitions

Items

Switch Garage_Gate
Number Humidity "Humidity [%.1f %%]"
Temperature

Rules
Leaving Home
        Presence ON/OFF

Coming Home
        Main Door OPEN/CLOSE

Bindings

Mysql
Mqtt