Descrição do problema

Smart Home

The Smart Home case study investigates an intelligent home, its configuration, the services necessary for its automation, and the technological platform for its realization. In the homes of European citizens you typically find a wide range of electrical and electronic devices: home equipment like lights, thermostats, electrical blinds, fire and glass break sensors, white goods like washing machines, dryers and dishwashers, entertainment equipment like TVs, radio and devices to play music or movies, and communication devices like (smart) phones and PCs. Sensors are devices that measure physical properties of the environment and make them available to Smart Home. Actuators activate devices whose state can be monitored and changed.

The goal of projects in the Smart Home domain is to network those devices and enable the home inhabitants to monitor and control their home from various user interfaces. An interface inside the house (remote control based) is provided to allow controlling of devices. The inhabitant, as well as service personnel, should be able to easily monitor, configure and control the devices installed in a house using the remote control inside the house or a mobile device. The state of all sensors should be visible on some monitor inside the house.

As an orientation, the basic key entities in this domain are: a house and its various floors, the various rooms in a floor and its controlled devices. Each house has installed a remote control GUI device. It should be possible to easily equip a freely designed home with all sensors and actuators ordered by a customer. The kinds of devices that should be supported are at least: lights, light switches, window openers, window sensors, blinds, glass break sensors, radiators and thermostats, door sensors and door openers, fire sensors.

The Smart Home system shall offer higher-level functionality in which several sensors and actuators are working together. These functions should be:

- **Energy control**. Lights can be turned on and off at certain times of the day. Blinds can be opened or shut also, when convenient. The inhabitant of the house can configure the air-conditioning (temperature) to be turned on and off at the desired times of the day (e.g. turning on the air-conditioning before arriving home or turning it off after leaving the house).

- **Climate control system**. Heating, thermostats, blinds and windows should be orchestrated to keep a preferred temperature in the rooms of the house. The system automatically opens the windows if the temperature in a room rises above a certain threshold and closes them if the temperature falls below a certain threshold. The outdoor temperature sensor adds the capability of measuring the outdoor temperature and taking it into account for smart climate control.

- **Security system**. Glass break sensors, door sensors and motion detectors should be used to detect if persons not allowed in the house try to enter. If the house detects intrusion, it should activate an alarm and the police should be called. The burglar detection feature should detect burglars from breaking into the house by providing different forms of alarm devices inhabitants can choose from. Users can install a siren, a bell, or a light, or a combination of the three. Also, the light simulation feature periodically turns on the lights in the house to simulate inhabitants being at home in case they are on holiday. This feature should deter burglars from breaking into the house, as it seems to be occupied.

- **Fire and smoke handling systems**. Fire and smoke detectors, sprinkler systems, window and door sensors and openers/closers, alarm devices and communication devices should work together to prevent foremost human damage in case of fire and smoke. Furthermore, the fires should be extinguished and the fire brigade should be called. The system should be intelligent enough to not start extinguishing fire if there are only a couple of people smoking in a room.