

Covering Assisted Living Key Areas based on Home Automation Sensors



- Introduction
- Assisted Living Key Areas
- Pilot Project in Kaiserslautern
- Basic Structure of the Solution
- Information Hierarchy and Processing
- Outlook

Development in many countries:

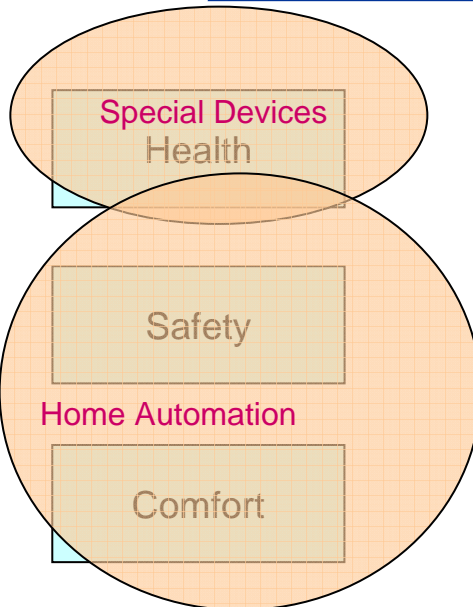
- People live longer
 - Less money available for care
- Birth rates decline
 - Less people have to care for more elderly
- More people will live alone
 - Assistance is needed
- More elderly-typical diseases (e.g. dementia)
 - Special assistance needed

Population pyramids for Germany



What does Assisted Living mean?

Concept of technical equipment to help people to live self-determined in their home as long as possible



- Downfall detection
- Reminding of medication
- Emergency detection & alarming

- Watching front door by camera
- Switching off critical loads
- Preventing water damage

- Electronic front door key
- Electric shutters
- Automatic lighting
- Dialing by photos

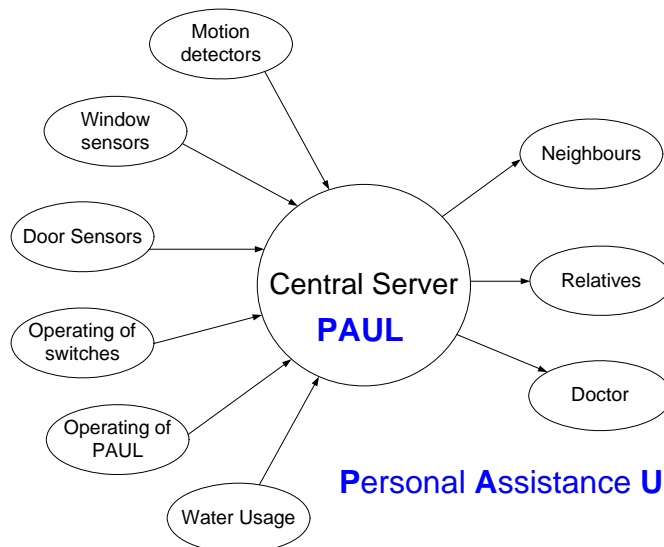
- Home Automation
 - Watching the inhabitant's activity
- Special Devices
 - Emergency-Call wristbands
 - Downfall detectors
 - Downfall detection mats





← last year

this year



Personal Assistance Unit for Living

Tasks of PAUL

HCI

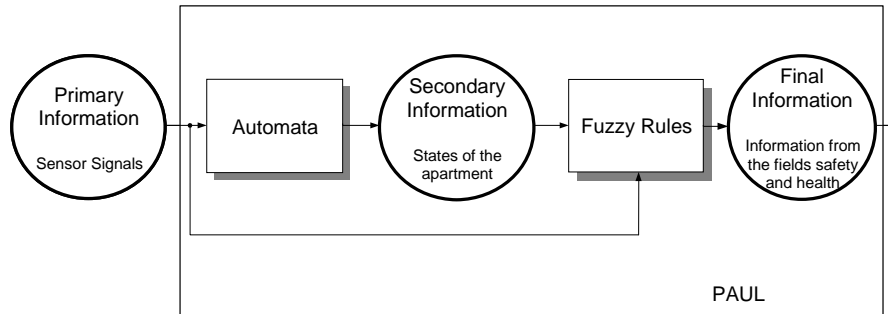


Central
Data
Collector

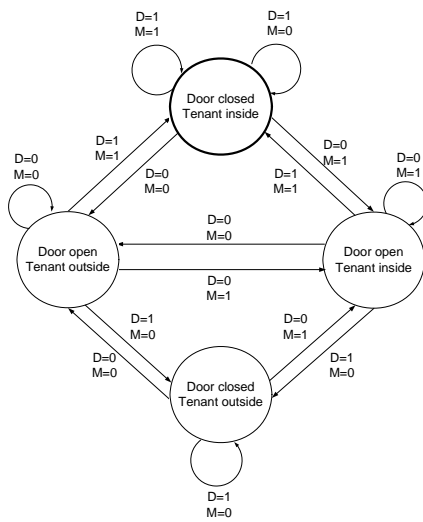
Intelligent
Monitoring
Unit

Alarm
Generator



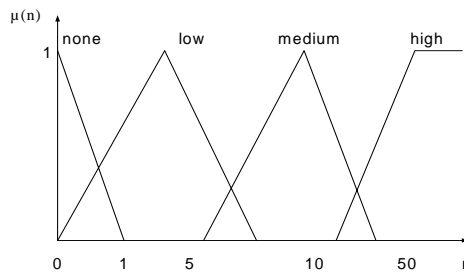


Automata

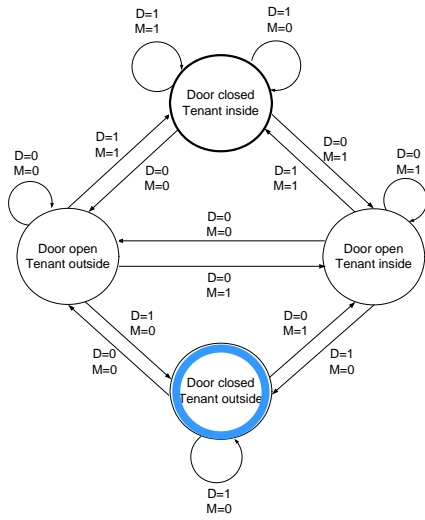


Fuzzy Rules

IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm medium priority

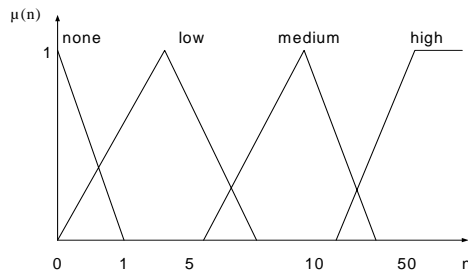


Automata

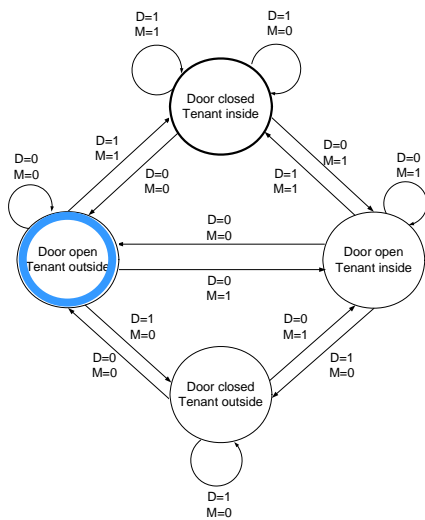


Fuzzy Rules

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Automata

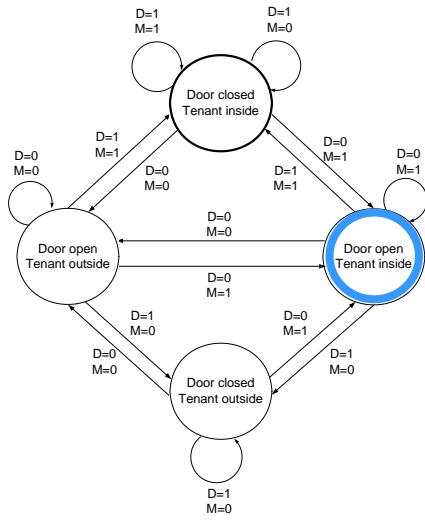


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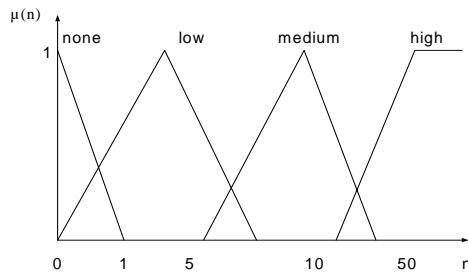


Automata

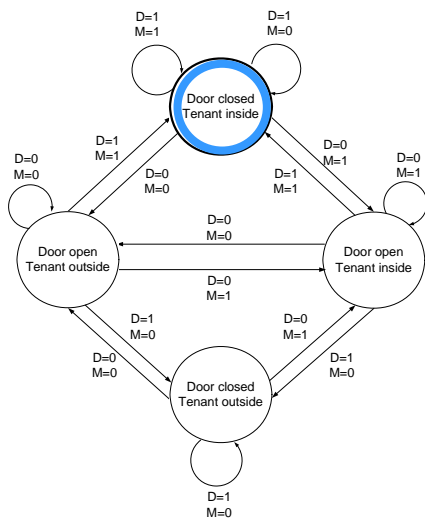


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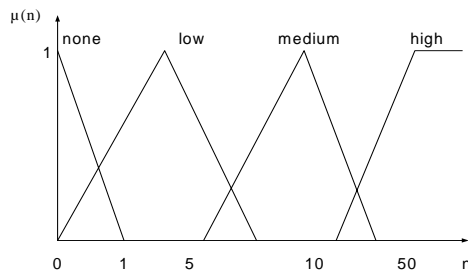


Automata



Fuzzy Rules

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Fuzzy Rules

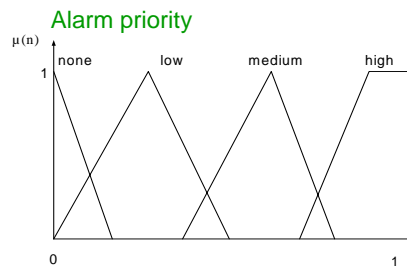
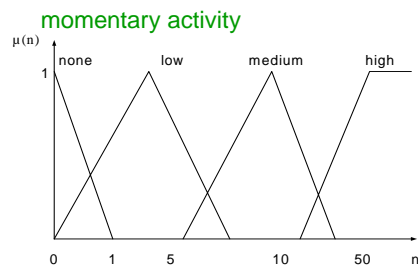
IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm medium priority

Three types of linguistic variables:

Type A Classical definition (>2 linguistic values, sensor driven)

Fuzzy Rules

IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm medium priority



Fuzzy Rules

IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm mean priority

Three types of linguistic variables:

Type A Classical definition (>2 linguistic values, sensor driven)

Type B Binary definition (results from automaton states)

Fuzzy Rules

IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm mean priority

Three types of linguistic variables:

Type A Classical definition (>2 linguistic values, sensor driven)

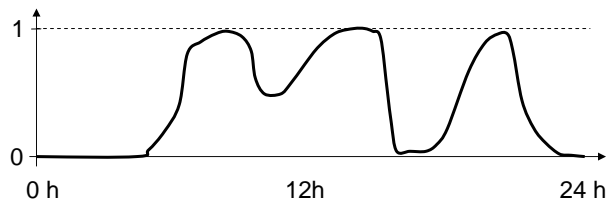
Type B Binary definition (results from automaton states)

Type C defined by identification (condensing the past sensor information)

Fuzzy Rules

IF Tenant inside AND expected activity high AND momentary activity low THEN Alarm mean priority

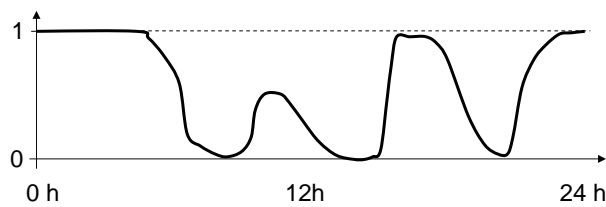
expected high activity



Fuzzy Rules

IF Tenant inside AND expected activity low AND THEN

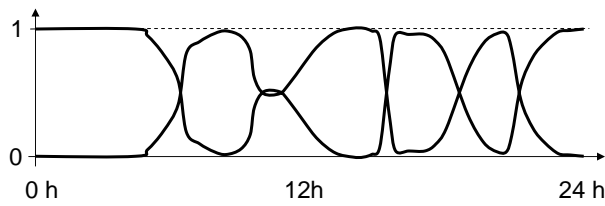
expected low activity



Fuzzy Rules

IF Tenant inside AND expected activity medium AND
THEN

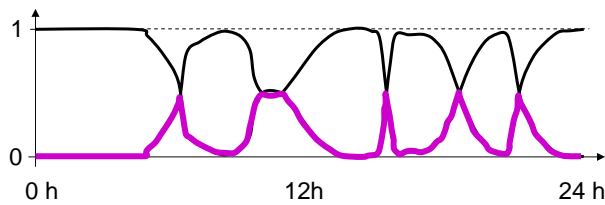
expected medium activity (high activity, low activity)



Fuzzy Rules

IF Tenant inside AND expected activity medium AND
THEN

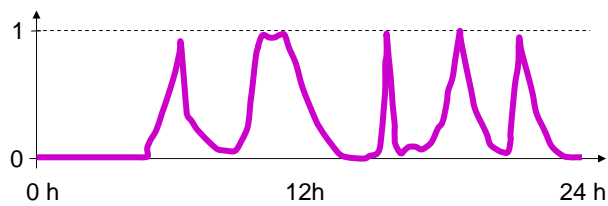
expected medium activity (not low AND not high, by minimum)



Fuzzy Rules

IF Tenant inside AND expected activity medium AND
THEN

expected medium activity (2 *(not low AND not high))



PAUL:

- more intuitive graphical user interface
- interface evaluation with elderly people
- development of the complete rule base
- identification of the activity profile
- minimization of false alarms

Thank you very much for
your attention

