

Highlights of MATCH Research at Stirling

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www.match-project.org.uk

Home System Architecture

- a flexible architecture for telecare and home automation:
 - based on industry-standard platform (OSGi)
 - service-oriented, so components are independent
 - support for existing commercial devices
 - extensible for new kinds of devices
- focus on services:
 - device capabilities exploited to serve the user
 - allows simple devices to be combined in smart ways
 - services shared and also built into higher-level ones

Home System Components

- a range of home care components:
 - user-friendly devices (tablets, phones, ‘buddies’, ...)
 - household activity (usage, occupancy, alarms, ...)
 - environmental monitoring (temperature, humidity, ...)
 - control of home appliances (TV, fridge, oven, ...)
 - choice of interactions (speech, gesture, ...)
 - communication (text, email, web, ...)
 - security, entertainment, medication, ...
- complements other interface work on MATCH:
 - speech input/output and dialogues
 - multimodal interfaces

Flexible Device Support

- self-describing components:
 - components define what they can do
 - allows automatic integration of new components
 - common services are shared among components
- input/output mapping:
 - raw inputs can be combined into higher-level inputs
 - higher-level outputs can be turned into raw outputs
 - this event logic is defined graphically

Novel Device Examples

- Microsoft Kinect:
 - user recognition and tracking
 - gestures to control home devices
- Nabaztag ‘Internet rabbit’:
 - synthesised speech output
 - tag reader (RFID)
 - communication via rabbit’s ears and lights
- Wii games controller:
 - sound, lights and tactile output
 - gestures to control home devices

Automated Care Management

- goals (objectives) for home care:
 - health, social, environmental, personal, security, ...
 - realised using library of rules
- policies (rules) for home care:
 - easy selection and customisation from library
 - automated home responses
 - normal conditions (e.g. user goes out)
 - abnormal conditions (e.g. medicine not taken)
 - integration with all kinds of devices

Future Work

- extensions:
 - combining techniques for goals and policies
 - learning rules for the home through observation
 - allowing for fuzzy real-world data
- applications:
 - specific conditions such as dementia
 - speech-based prompting and guidance
 - extended trials with end users

