Robots and Robotic Services for Ambient Assisted Living

December 3rd, 2013
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Robot has three functions

1. Sensation
   Seeing, hearing, been touched

2. Actuation
   Moving, gesturing, talking
delivering goods

3. Intelligent Control
   Communicating with other robots, sensor networks,
smartphones, etc.
Robotic services are systems, devices, and robots with three functions: sensation, actuation and control.

Life support research project in Ministry of Internal Affairs and Communications in Japan
ATR, NTT, Hitachi, Toshiba, and NEC in 2009-2013

Field Experimentations by ATR (2002-2013)

Science museum (2004-2005)
Station (2006)
Universal Citywalk (2008-2009)
FP6: DustBot (SSSA)
Tour guide (2010)
Day-care center (2009)

- Shopping support
- Active hearing
- Cloud Networking
- Health care
- Touring support
- Community building support

Tour guide (2010)
Shopping support service for elderly wheelchair users
(March, 2011)

Area 1: Home
Booking a wheelchair robot Using smartphone in advance
The wheelchair will say hello to the user

Area 2: West mall
Area 3: East mall
Secure shopping support

Networking

UNR–PF

Robot registry
User registry
Map registry

Teleoperator

Wandering Support and Watching of Falling out of Bed in Nursing Home (Before)

Facing problem:
- Lack of caregivers
- Physically hard work
- Elderly hesitate to contact caregivers and then tend to stay alone.

Wandering support with wheelchair
Watching of falling out of bed with floor sensors

Floor sensors
Wandering Support and Watching of Falling out of Bed in Nursing Home Using UNR-PF (After)

- Tele-monitoring by caregivers
- Depth sensors with KINECT
- Semi-autonomous wheelchair robots
- Recognition of elderly behaviors in the night
- Wandering support with wheelchair and UNR-PF
- Watching of falling out of bed with depth sensors

Three-layer Architecture in UNR-PF
An robot component may be used for several service applications

A service application may be available for several robot components (different wheelchairs)
Simulation Room for Nursing Home in Osaka Grand Front Building

- Patients with different nursing care levels
- Standardized Robotic Service Platform (UNR-PF) is utilized
- Easy to develop different service applications with UNR-PF

Innovation Center of Orix Living Co. at Osaka Grand Front Building.