Mobile Semantic Service Delivery

Assignment 1

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Topic: Context-aware smart home environment for the well-being of inhabitants.

Scenario:

- When arriving at home, the presence status on the phone is changed to “at home” automatically.

- Enable the phone user to customize communications methods based on presence status (e.g. reject all incoming calls when the presence status is “busy”).

- When the inhabitant falls down, a doctor is alerted.

- When the heart rate or blood pressure of the inhabitant is out of the normal state, a doctor is alerted.

- When nobody is detected to be present at home, all electronic appliances are shut down (unless the inhabitant set a rule for a specific device).

- When the inhabitant plays a movie on the television, the lights are turned off automatically, incoming call or messages are shown on the TV.

A Context-Aware Service Architecture for the Integration of Body Sensor Networks and Social Networks through the IP Multimedia Subsystem

- Context-aware service architecture.
- Integration of Body Sensor Networks (BSN) and social networks through the IP Multimedia Subsystem (IMS).
- Enables social network members to monitor real-time BSN data of other users.
- 4 layers: device, access, control, service.
- IMS Web 2.0 gateway (RESTful WS) in the service layer.

Interesting aspects:

- The use of BSNs for detecting physiological signals.
- IMS core network.
- Policies repository in the monitoring station (in the device layer).

Shortcomings:

- SIP signalling is considered not performance-friendly.

Context-Aware and Personalized Event Filtering for Low-Overhead Continuous Remote Health Monitoring

- Context-aware event-processing middleware (HARMONI).
- Personal gateway device between body-worn sensors using BAN and remote back-end infrastructure using WAN.
- Distributes processing of sensor streams (e.g. filtering, statistical summarization, feature extraction) both on mobile device and back-end to reduce bandwidth usage transmitting data to back-end server.

Interesting aspects:

- Spatio-temporal processing on the mobile device to reduce WAN bandwidth usage.
- Event engine (with rules) on the mobile device.
- Rules can be uploaded by the back-end server.

Shortcomings:

- Connectivity between mobile device and back-end server is essential.

Context-aware services for ambient assisted living: A case-study

- Ambient Home Care System (AHCS), supporting elderly to live independently at home.
- Based on Context Toolkit software, targeting both elderly at home (notifications in mobile device) and caregivers (remote monitoring).
- Layered architecture.
- Acquisition software platform performs data filtering, providing higher level context features by using a rule-based reasoning engine (if-then-else).

Interesting aspects:

- Using widgets that encapsulates each sensor specific acquisition and communication details.

Shortcomings:

- No standard way for exposing context information.

Context Aware Health Monitoring System

- Context-aware health monitoring system architecture for primary healthcare centres.
- Monitors and delivers patients' physiological readings to hospitals with alert mechanism (Via SMS).
- Patients visit the primary healthcare centres.
- Health parameters passed to a mobile phone via bluetooth, then transmitted via GPRS to the context-aware system.
- 3 subsystems: mobile application (Java ME), context-aware system, web interface (JSP/servlet).
- Context-aware subsystem: knowledge base (Jena), context interpreter (parsing XML data), inference engine (compare data), rule-base repository.

Interesting aspects:

- The context-aware system is an ontology-based middleware using publish/subscribe paradigm.

Shortcomings:

- Mobile application tight coupled with available monitoring devices.

SenSay: A Context-Aware Mobile Phone

- Context-aware mobile phone, modifies its behaviour based on its user's state and surroundings.
- Sensors: light, motion, microphone.
- Sensor box as central hub hooked in the waist.
- 4 states: uninterruptible, idle, active, normal (default).
- 3-tier architecture: sensor box, decision module, phone.

Interesting aspects:

- Supports the user on the go.

Shortcomings:

- Serial links are slow (between phone and laptop as well as between laptop and sensors).
- Bringing laptop everywhere is troublesome.