Towards autonomic multimodal interactions

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Outline

- Context
- Overall architecture
- Models
- Example
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Context

- Vision: pervasive computing
  - Communicating devices
  - Evolving environment
- Now
  - Heterogeneity: communication clusters
  - Dynamism: rarely handled
Context: input multimodality

- Interacting with computer systems through several devices
- Vision
  - The user freely chooses its input devices
  - Interaction is usable
- Now
  - Heterogeneity: devices are chosen among compatible devices
  - Scalability: interaction is designed for an application with few devices
Main problem

Interactions are not adaptable
Proposition

• Autonomic computing can help:
  - Observing environment, analysing, adapting
  - Observing usage, analysing, proposing
  - Taking in account a high level policy given by an user

• Model driven approach can help:
  - Clearly defining what information is needed
  - Abstraction of context
Outline

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Overall Architecture
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Discovery Manager

Autonomic Manager
Overall Architecture
Overall Architecture

- Discovery Manager
- Autonomic Manager
- Interaction Policy
- Models
Solved problems

• Heterogeneity: proxy pattern, models

• Dynamism: discovery manager

• Scalability: models
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Information

- Autonomic manager relies on external information
- Who provides information?
  - At design time
    - Interaction designers
    - Developpers
  - At run time
    - User
    - Discovery manager
Proxy models

- Discovery information
- Ports (tasks and sensors)
  - Code reference
  - Data direction
  - Data type
  - Identifier
Partial interaction models

• Objective: enabling the generation of usable interaction

• Mean: letting interaction designers to express their knowledge

  – By assembling components:
    • Declaration
    • Configuration
    • Port connections

  – For an interaction class
Partial interaction models

- Interaction class
- Components
  - Configuration
  - Ports
    - Connections
    - Meanings
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Example: proxy models

- Application
  - VLC
    - Play/pause, SetVolume...
- Devices
  - Wiimote
    - Abutton, Bbutton...
  - BD Remote Control
    - ZeroButton, PauseButton...
VLC partial interaction model

- "MediaPlayer" interaction class
  - Pause, Mute...

VLC Proxy
- play/pause
- setVolume
VLC partial interaction model

- "MediaPlayer" interaction class
  - Pause, Mute...
VLC partial interaction model

- "MediaPlayer" interaction class
  - Pause, Mute...

![Diagram of VLC partial interaction model]

- VLC Proxy
  - play/pause
  - setVolume

- Identity
- Constant Generator
  - constant
  - trigger
  - constant=0

[Diagram showing interactions between VLC Proxy, Identity, and Constant Generator]
VLC partial interaction model

- "MediaPlayer" interaction class
  - Pause, Mute...

VLC Proxy

play/pause

setVolume

Identity

out

in

Constant Generator

constant

trigger

constant=0

meaning=Pause

meaning=Mute

partial interaction model
Remote control partial interaction model

- "MediaPlayer" interaction class
Remote control partial interaction model

- "MediaPlayer" interaction class

partial interaction model
Remote control partial interaction model

- "MediaPlayer" interaction class

meaning=Pause

meaning=Mute

partial interaction model
Generated chain

VLC Proxy
- play/pause
- setVolume

Constant Generator
- out
- trigger

Remote Control Proxy
- pauseBtn
- zeroBtn

Wiimote Proxy
- ABtn
- BBtn

generated chain
Conclusion

- Pervasive environments => adaptable multimodal interaction

- Autonomic computing and model driven approach enable adaptation

- Our architecture gives a base for future work:
  - Collecting data in mediation chain
  - Analysing
  - Proposing adaptation to users
Questions