Augmenting Everyday Life with Sentient Artefacts

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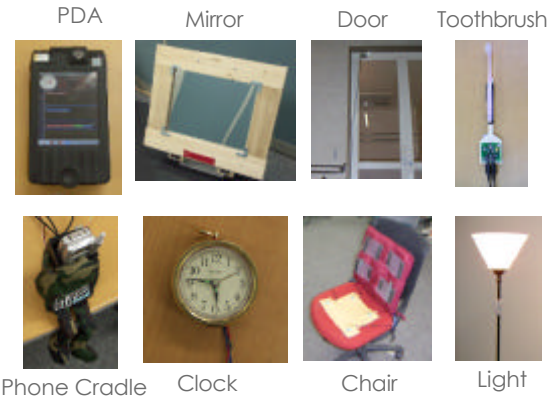
Our Approach towards Context

- Acquiring context through everyday artefacts
- Focusing on the environment
- Making the environment aware not the users
- Non enterprise application (cost and infrastructure constrain!!)
- Keeping it simple and conventional

Sentient Artefact: Sensor augmented everyday objects (like chair, bed, mirror, umbrella, comb, toothbrush, door etc) to acquire context and to provide value added services where and when applicable.

~~Mere artefacts without any noticeable features.~~

Example of sentient Artefacts



Anything of our everyday life can be a sentient artefact as long as we know what affordability we can have besides its primary roles.

Design Principles

- Natural Interaction
  - We don't want to give target users a100 page manual
  - Domain requires self explanatory interaction mechanism.
  - Unobtrusive (Pleasurably!!!)
  - Balance with mental model
- Preference reflection
- Just in time

Let's watch a simple scenario

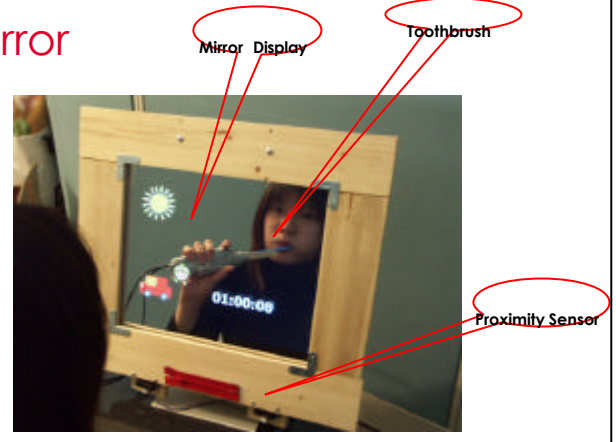
Scenario Movie

Implementation

	Scenario Functionality	Required Capability	Augmented Artefact Used
WASHROOM	Display useful information on the mirror	Detecting user's presence	Mirror augmented with proximity sensors
		Identifying user	Toothbrush as an authenticator of the user

AwareMirror

- Toothbrush
- Proximity Sensor
- Mirror
- 3 web services
  - Weather
  - Transport
  - Scheduler



Based on the use of the toothbrush we identified the user and related and effective information about him/her has been collected and presented to the user.

AwareMirror

- User can provide preference regarding artefacts participation.

- User can provide preferences regarding timing of display and mode of interaction.

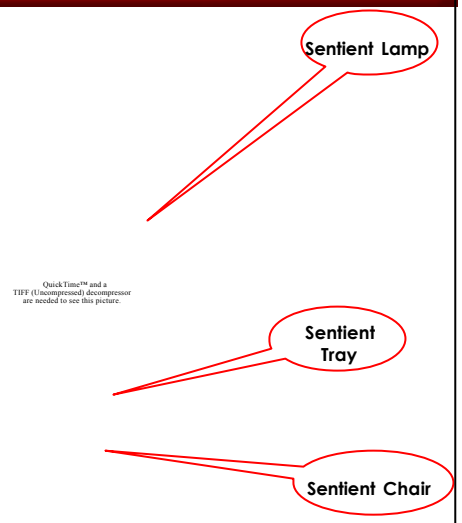
- For single user environment toothbrush can be omitted and proximity can serve as the trigger for display.

Implementation

	Scenario Functionality	Required Capability	Augmented Artefact Used
WORKSPACE	Suggesting user for a refreshment and providing just in time message	Detecting user's presence	Sentient chairs, state of use of chair as users location and activity Desk lamp with motion sensor
		Schedule/music extraction/play	Simple scheduler/media player
	Changing workspace environment	Capturing neighborhood brightness	Desk lamp with photo sensor

Smart Assistant

- Sentient Chair
- Sentient tray
- Sentient Lamp
- Media Player
- Scheduler
- Mail Agent



It monitors the users activity by capturing the states of chair, tray and lamp and offers refreshment break while serving important schedule information. It can also turn on/off light and play music automatically.

Smart Assistant

- User can provide preference regarding artefacts participation.

- Use can provide preference regarding timing of actuation and music to play.

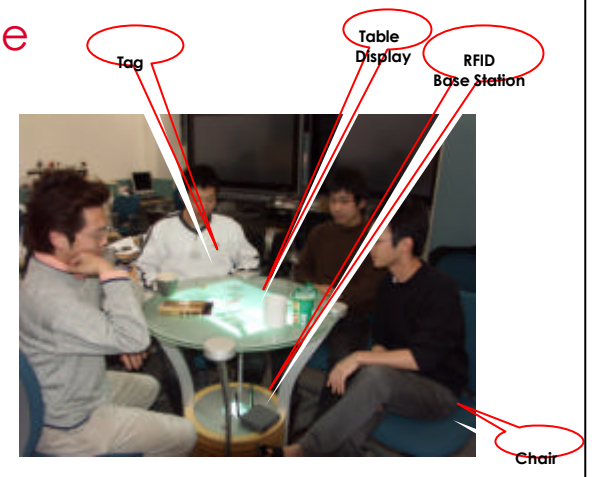
- The chatting agent can be replaced by sliding pane for notification.

Implementation

	Scenario Functionality	Required Capability	Augmented Artefact Used
COMMON SPACE	Display preferred news/information on the table display	Detecting user's presence	Chairs state of use as users presence Or Proximity sensor on the tables
		Identifying user's preference	Table augmented with RFID tag reader

Byte N Dine

- Table as Display
- Proximity Sensors
- RFID Base Station
- Sentient Chair
- Info Repository



When presence is identified, tags are extracted and preferred information is collected and shown in the table display.

Byte N Dine

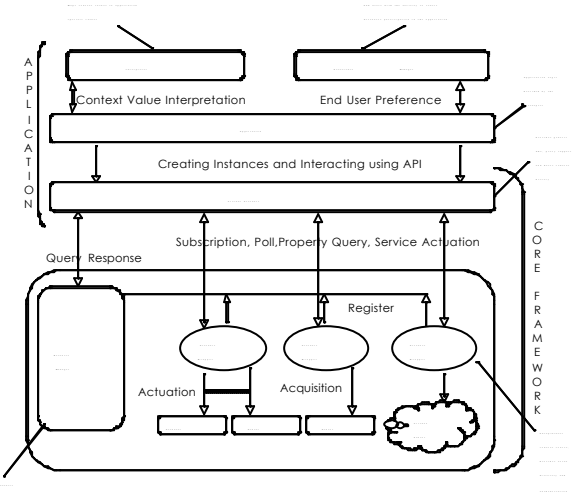
- No explicit preference mechanism.

- Support groups, maximum 4 category of information, so maximum support for 4 users.

- During deployment mutual exclusive support level should be mentioned. (if 2 persons are present one with tag one without, then what will be systems state!)

- Carrying tag is contradictory. (But we do carry cell phone!!)

Common Middleware: Prottoy



Kawsar et al. @ Mobiquitous 2005, EUC 2005

Evaluation

- All these applications are evaluated individually by about 15-20 people.
  - AwareMirror is also evaluated by a family for 2 days.

- However the integrated applications are only evaluated by the authors and their group mates.

Evaluation Result

Application	No of Participant	Liked	Not Liked	Additional Comments
AwareMirror	30	95%	5%	Mixed argument regarding privacy and presentation format
Smart Assistant	26	72%	28%	Does not like Chatting agent
Byte N Dine	10	70%	30%	Questioned about dining scenario

Issues and Lessons

1. Mental Model
   - Determining balance is very difficult.
   - Actuator selection needs maximum attention.

2 . Scenario dependent artefacts
   - Needs guideline for generalization.
   (if possible ever as the combination can be any number!!!)

3. Evaluation Technique
   - How to determine or at least predict acceptability

Questions!!!!

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