Human Interfaces in Information Systems laboratory
Research Topics

- Assistive Technologies and Accessibility
- Context-dependent User Interfaces
- Emotion-based User Interfaces
- End User Development
- Model-based User Interface Design
- Multimodal User Interfaces
- Tools for Accessibility and Usability Evaluation
**Beyond Responsive Design**

<table>
<thead>
<tr>
<th>Original App</th>
<th>Multimodal Augmented Apps</th>
</tr>
</thead>
</table>
| **Output:** Graphical Only **Input:** Graphical Only | **In-Car Scenario**  
Output: multimodal  
Input: vocal only |
|               | **Noisy/ Quiet Scenario**  
Output: multimodal  
Input: graphical only |
|               | **User Moving Scenario**  
Output: multimodal  
Input: multimodal |
General Adaptation Architecture

Developer (Design Time)

Authoring Environment

Adaptation Server

Context Information

Context Server

User Model
Device Model
Environment Model
Social Model

Logical UI description & Application Adaptation Rules

Adaptation Engine

Adaptation Rules

UI Generator

Client Device

Browser
Adaptive Rendering Plug-in
Context Delegates

Sensed Context

Users (Run Time)
Adaptive Multimodal Web User Interfaces for Smart Work Environments
(Ghiani et al. to appear in JAISE 2015)

- Fragile object
- Picking timeout
- Order visualization
- Traffic Jam
- Noisy environment
Neurosky includes the sensor that touches the forehead, the contact on the ear pad and a chip that process and elaborates all the collected brainwaves.
Multi-User Migration through Push and Pull

1- User1 accesses Booking.com and British Airways site

2 - User1 pushes selection of hotels to User2

3 - User2 pulls also British airways selection and then accesses weather forecast

4 - Partial migration of wheather forecast

Push and Pull of Web User Interfaces in Multi-Device Environments, Ghiani et al., AVI 2012
Frameworks for Cross-Device Interaction

• **Solution without Fixed Server**
  – It provides developers with an API for Web and Java applications to obtain more easily UIs that can be dynamically distributed and/or migrated in multi-device and multi-user environments.
  – The framework also allows dynamically creating multiple simultaneous sessions for applications used by groups of devices where the UI is distributed

• **Model-based Solution**
  – Model-based solution based on MARIA that can generate more accessible implementations
  – Customization tool that allows end users to dynamically define new distribution configurations that were not foreseen at design time

• **Various Security and Privacy Issues**
• **SmartWatches Integration**
## Adaptation to Stimulate Emotions

<table>
<thead>
<tr>
<th>Hate</th>
<th>Anxiety</th>
<th>Boredom</th>
</tr>
</thead>
</table>
| • confused layout  
  • difficult interaction and navigation | • stress factors  
  • blurred text and images/videos  
  • dynamic effects | • excessive information  
  • absence of dynamic effects  
  • absence of images or videos |

<table>
<thead>
<tr>
<th>Fun</th>
<th>Serenity</th>
<th>Love</th>
</tr>
</thead>
</table>
| • appealing graphics and aesthetics  
  • dynamic effects | • ordered layout  
  • reassuring elements  
  • easy interaction and | • appealing graphics & aesthetics  
  • reassuring elements |

![Hate Image](image1.png)  
![Anxiety Image](image2.png)  
![Boredom Image](image3.png)  
![Fun Image](image4.png)  
![Serenity Image](image5.png)  
![Love Image](image6.png)
End User Development for Internet of Things

set the nectar of all flowers to 0

Jigsaw Natural Lang. Lego Meccano Bricks Workflow
Tools for Evaluation

Usability
End User
Proxy
Logger
Log + Tasks
Evaluator
Backend
Application Web site

Accessibility

Mauve
Multiguideline Accessibility and Usability Validation Environment

Validate By URL | Validate By File | Validate By Direct Input
---|---|---
Enter the URI of a document you would like checked

Settings
Guideline Reference
Stanca Act (ITA)
Stanca Act (EN)
WCAG 2.0 Level of Conformance (AA)

Select User Agent for the request
Request document as:

Validate
Ambient Assisted Living Project PersonAAL
(2015-2018)
EIT ICT Labs
HI | Smart Retail

- Logging users’ movements within shop and products actually bought with dynamic update of user profile
- Adaptive multi-display (smartphone + public displays) user interfaces to provide advertisements, suggestions and guidance
- Possibility of moving interactive content from public display to personal smartphone through gestures
- Walking shopping list scenario
- Dynamic content management system
- Context reasoner for identifying most suitable adaptation rules