Migrating Web Applications through Declarative Models

G. Mori, Fabio Paternò, C. Santoro, A. Scorcia

http://giove.isti.cnr.it
ISTI-C.N.R.
HIIS Laboratory
Pisa, Italy
Why Migratory Interfaces?

- Our life is becoming a multi-device experience
- One of the main source of frustration is that we need to restart for each device change
- Need for continuous access to interactive services
- Application domains such as shopping, bids for online auctions, games, making reservations
Migration Types

- Total, Partial, Distributing, Aggregating, Multiple
Our Approach to Migration

- Device Discovery (client application)
- Migration Trigger and Target Identification
- Reverse Engineering/Semantic Redesign
- State extraction, adaptation and association
- Run-time Interface Generation and Activation
Semantic Descriptions for Interactive Systems

- Task and object
  - I want to select a work of art
- Abstract Interface – platform independent
  - Single selection object with high cardinality
- Concrete Interface – platform dependent
  - List Interaction object with X elements
- Interface Implementation
  - List object in Java or XHTML or ....
- TERESA XML
The Structure of the Abstract User Interface

- Language platform-independent
- Interactors (selection, navigator, activator, ...)
- Communication-oriented composition operators
- Connections among presentations
Composition operators

GROUPING

ORDERING

RELATION
Reverse Engineering

- Filtering out elements that cannot be reversed
- From XHTML/CSS to Concrete User Interface through recursive analysis of the DOM
- From Concrete to Abstract User Interface
- From Abstract User Interface to Task identifier
Support for task continuity

- Collection of the user interface state in the client side of source device through JavaScript inserted by the proxy server
- For each basic task also supported in the target device
  - Adapt and apply the state to the corresponding target final object

Select Menu type
- Select Menu type: Vegetable
- Task: SelectMenu value: Vegetable
- Your Selected Menu is Vegetable
Semantic Redesign

Logical UI-Desktop -> PARSER LUI -> TRANSFORM CUI -> CALCULATE COST -> SPLITTING CUI -> GENERATOR LUI -> Logical UI-Mobile

Migrating Web Applications through Declarative Models - UWA Workshop
Support for Desktop-to-Mobile Redesign

- Page splitting based on the cost of composition operators and interactors
- Connections: original ones + those derived from page splitting
- Images: resize depending on target device keeping the same aspect ratio
- Tables for converting terms and labels
From Desktop to Cell-phone

Download Software

Please fill in the form and then select the link that will appear on the bottom.

Name: 
LastName: 
Organization: 
E-Mail: 
City: 
Country: 
Purpose: 

☐ Research Project
☐ Application Designer
☐ Teaching
☐ Development

List Subscription:

- Yes
- No

Language:

- French
- English

System: 

Submit | Cancel
From Desktop to Cell-phone

Form - Part 1
Download Software
Please fill in the form and then select the link that will appear on the bottom
Submit Cancel
Form - Part 2

Name: [input box]
LastName: [input box]
Organization: [input box]
E-Mail: [input box]
next
home
City: [input box]
Country: [input box]
Purpose: [checkboxes]
Research Project
Application Designer
Teaching
Development
List Subscription: [radio buttons]
Yes
No
prev
Language: [checkboxes]
French
English
System: [combo box]
Win 2000
home
Example Migration (Video)

Welcome to the Esselunga online shopping site. The Esselunga site serves thousands of customers every week and offers a wide range of products at great discounts.

If you have any questions please email us at:
help@esselunga.com
Transformations

http://giove.isti.cnr.it/teresa.html
Conclusions and Future Work

- Migration between multiple devices can improve user experience at home and on the move
- Support for generation of new implementation languages from TERESA XML such as XForms, SMIL
- Extension of the approach to distributing migration