

Synthesizing Function-Rich Web Pages for Adaptive Hypermedia

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Context

High-level page synthesis for adaptive hypermedia has been the major focus of our activities in Adaptive Web group in IAS lab. Our new round of research and development includes adding required functionality to synthesized pages to enable users to have more interactivity with an adaptive website.

Motivation

- Many content, navigation, and presentation adaptations have simple reflections on the current view of the web pages and do not require complete page refresh.
- User's interaction with the website should be faster and more 'live' in some adaptations and operations.
- The current trend of industry is towards incorporating those capabilities into web services that were traditionally in the scope of application software.

Adaptation at Client Side

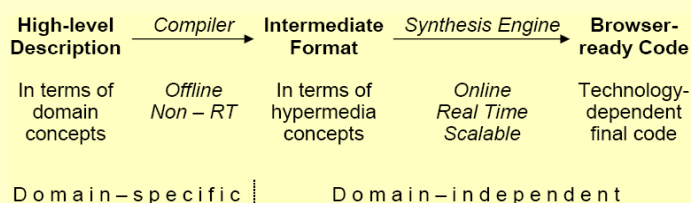
- Data exchange between the client (browser) and the server:
 - Synchronous: user submits forms to the server, after some processing, server returns a page or frame to the user.
 - Asynchronous: the client receives only that part of data that is needed; scripts embedded in the page will process the server's reply.
- In the latter case, the page structure and content will be modified by page scripts to reflect the result of the processing. Some results might also be sent to the server to update the state of the user and the application.
- Reduced server load, Reduced data interchange

Expected Results

- By adding required scripts to markup and styling information, we expect to get more interactive pages.
- By using asynchronous data interchange methods, users will find the synthesized pages more responsive.
- Clients will carry out some of the processing for adaptation, which means less load at server-side.
- Less data volume to be transferred because of less whole-page downloads.

Methodology

The Current Synthesis Process



New Requirements for Description and Libraries

All stages of synthesis will have add-ons:

- High-level Description: definitions for client-side events and actions linked to definitions of Data Model. No details of data exchange between the client and the server is required.
- Intermediate Format Vocabulary (IFV): ontology of user actions, data exchange with the server, new properties for existing components to link with scripts in the script libraries.
- Technology-dependent Code: tagged libraries of language-specific (like JavaScript) functions. Virtually all functions are categorized by multiple criteria and then parameterized.

Intermediate Format and Script Libraries

- Each concept in IFV which requires inclusion of some functionality into the page has a one to one or one to many relationship with technology-specific functions in the libraries.
- Functions that present the same functionality should be different in signature. Type and number of parameters form the signature of a function.
- Parameters of a library function are for customization, not to pass values.



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