

A Model-Driven Home Heating Control System

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ABSTRACT

This paper presents MDP, a Model-Driven approach for Plastifying interactive systems at run time. An interactive system is described at different levels of abstraction by a set of models that are linked together through a set of mappings. Models and mappings are dynamic, i.e. embedded at run time. Plasticity is a transformation of these models and/or mappings. It can be specified by directly manipulating either the UI or its model as exemplified on a Model-Driven Home Heating Control System (MDH2CS).

Keywords

Plasticity of User Interfaces, Model-Driven Engineering, Distribution of User Interfaces.

1. DESCRIPTION OF MDP

As promoted in traditional model-based approaches, an interactive system can be produced step by step starting from abstract descriptions (tasks and concepts level) until reaching the final level (Final User Interface (FUI) [1]) corresponding to the running code. One intermediate level (called Concrete User Interface (CUI) [1]) describes the UI in terms of interactors (e.g., labels, buttons, links). Figure 1 shows the final UI of a Home Heating Control System (H2CS). The user selects either the 'living room' or the 'kitchen' link to see and maybe modify the temperature of the selected room.



Figure 1. The Final UI of H2CS.

The CUI is an abstraction of the FUI expressing the fact that the UI is made of an unique window split into two panels: one for navigating between rooms and selecting one of them, the other one for displaying and maybe modifying the temperature of the

selected room. This CUI can be modeled and displayed (Figure 2) as a scene graph. In Figure 2, the graph is not limited to the MDH2CS's UI: it models all of the desktop including a tool glass for transforming the interactive system and a global view for browsing the desktop.

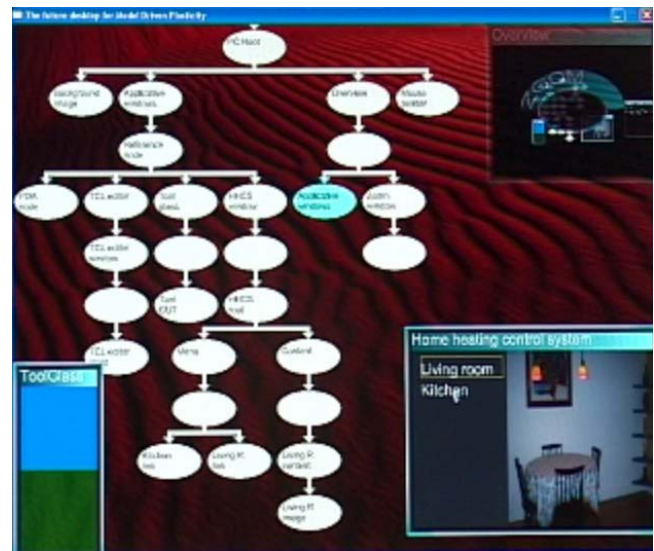


Figure 2. In white, the model of the interactive system (a scene graph). Three of the nodes correspond to the UI (bottom right), tool glass (bottom left) and overview (top right).

Actually the tool glass is limited to the delete operation. When clicking on the green button, the user deletes the underlying object. This object can be either a node of the graph (the corresponding components of the UI automatically disappear) or a component of the UI (the corresponding nodes of the graph disappear). As a result, by manipulating either the UI or its model, the user transforms the interactive system at run time. In the video, he first deletes the "Kitchen" link, then the navigation panel, the kitchen image, the H2CS's FUI, the overview, the desktop background image and finally the tool glass itself.

One perspective of the work is to go one step further by implementing the mappings between models. Thus, the user could add or suppress tasks dynamically according to the context of use.

2. ISSUES TO BE DISCUSSED

This demonstration raises many issues that could be discussed during the workshop. Among them:

- The meta-UI for making observable and modifying both the model and its UI,
- A taxonomy of models and transformations,
- The cost of transformations.

3. ACKNOWLEDGMENTS

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4. REFERENCES

- [1] <http://giove.isti.cnr.it/cameleon.html>.