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Synchronizing model refactoring for web applications

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Software engineering community is interested in models for developing software systems and developing web applications. Many approaches for developing web applications have been pursued, each usually contains three or four models. For example, in WebML approach, there are three models, namely content model, navigation model and presentation; in UWE approach, there are four models, namely content model, navigation model, presentation model and process model. One of the most feasible techniques is the web model refactoring technique since it supports us to restructure the model in order to improve some quality attributes of the model with preserving the behavior. However, when model refactoring is implemented, it usually causes inconsistent in the system. In order to make the system consistent, model synchronization is necessitated. In this study, model synchronization is realized by operational transformation rules and explicit correspondences at model level.

Firstly, UWE approach is investigated by examining content model, navigation model and their relationship. The “ same name ” and “ valid index ” are the key relationships that are defined. Because correspondences specify the relationships between the elements in different models, strings can be used to store their information and strings are used for representing explicit correspondences.

Secondly, the operations which change the models such as adding, deleting, renaming elements and checking the accurate relationship for “ valid

index "are examined. Then operational transformation and checking" valid index " rules which maintain the consistency of the system are constructed.

Finally, a tool named " synchronization " for synchronizing is built on Java and plugged in Magic Draw UML. The tool with four menus, namely " Renaming rule ", " Adding rule ", " Deleting rule ", and " Checking valid index rule " are proposed to illustrate these operational transformation and checking rules of the thesis.

In conclusion, the thesis has examined some primary relationships between content model and navigation model of UWE approach. Then the technique of representing explicit correspondences at model level is proposed. Rules for maintaining consistency of web systems are constructed and an automatically plug-in tool is built for implementing the rules.