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A framework for an integrated unified modeling language

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Motivation

- The unified modeling language (UML) is one of the most commonly used modeling languages in the software industry.
- Although UML is applicable to different types of systems, domains, methods, and processes, it cannot express certain problem domain needs.
- Therefore, many extensions to UML have been proposed.

Objective

- We propose a framework for integrating the UML extensions and then use the framework to propose an integrated unified modeling language-graphical (iUML-g) form.
- iUML-g integrates the existing UML extensions into one integrated form.
- This includes an integrated diagram for UML class, sequence, and use case diagrams.

Integration process

1. **Creation of a library:** Create a library for the graphical symbols.
2. **Case A (Combination):** For each type of UML diagram, combine possible graphical symbols that cause no graphical conflicts, but make sure that the final symbol still represents its intended goal.
3. **Case B (Conflict):** In case of a graphical conflict, insert each graphical symbol on its own into the library.

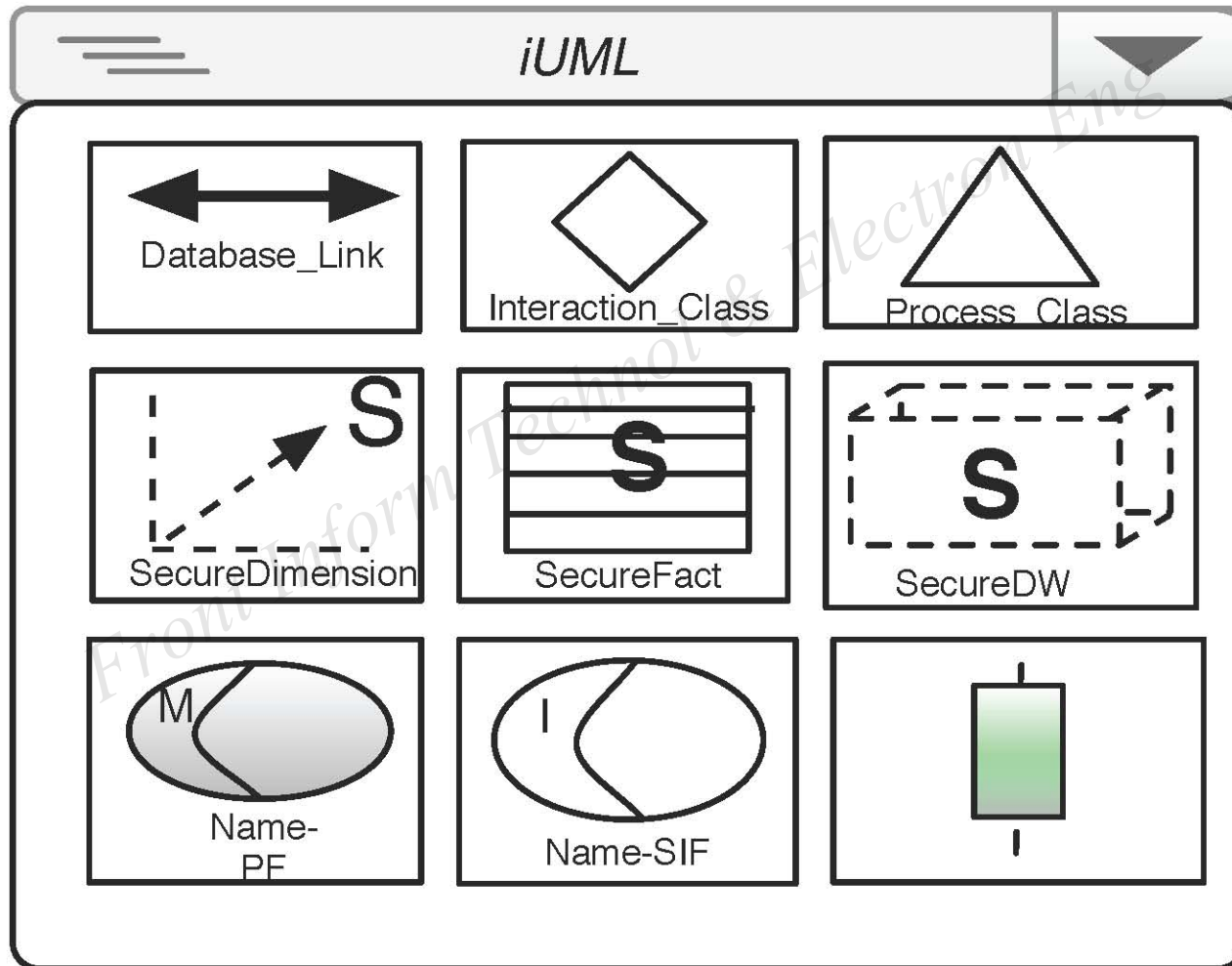
Inclusion criteria

- UML lightweight extensions
- Extensions that provide graphical notation/icons for the notation;
- UML class, sequence, and use case diagram extensions only;
- UML domain-specific extensions that can be combined with other same domain-specific extensions;
- UML domain-specific extensions that can be combined with the other different domain-specific extensions;
- When two UML extensions focus on one particular area and on one type of UML diagram, combine them together or choose the more general one.

Exclusion criteria

- UML activity, component, state chart, interaction diagrams;
- UML heavyweight extensions that manipulate the UML meta-model by editing or deleting UML packages;
- Theoretical and algorithmic UML extensions;
- Profiles.

iUML-g sample symbol sheet



Conclusions

- We proposed a framework to integrate the available UML extension.
- We used the framework to propose an integrated UML-graphical form.
- The process was verified by using a case study in which we modeled a system that uses different domains but which UML is unable to model.