Design Patterns across the Modeling Process

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Abstract. Modeling has always served as a descriptive means for documenting design patterns. For example, the Gang of Four (GoF) [1] book used a pre-UML graphical notation for describing the participants and their collaborations across design patterns. However, numerous researchers are also understanding the complimentary role that design patterns can offer to the modeling process. As observed by the PAME Call for Papers, design patterns can be found across many topics related to model-driven engineering. In this talk, we will survey some of the works used in applying patterns to the earliest phases of modeling that are related to metamodel creation [2, 3], which help to document best practices of modeling language definition. We will also consider the potential benefits of documenting frequently observed patterns in model transformations [4, 5]. There is also great opportunity to catalog various patterns that emerge in refactoring and evolution of modeling assets in the presence of change requests [6, 7, 8]. The talk outlines some of my own work with colleagues in these areas, as well as a summary of work done by others.

References

1. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software*, Addison-Wesley, 1994.
2. Hyun Cho and Jeff Gray, "Design Patterns for Metamodels," *11th Workshop on Domain-Specific Modeling (DSM)*, held at *SPLASH 2011*, Portland, OR, October 2011, pp. 25-32.
3. Ana Pescador, Antonio Garmendia, Esther Guerra, Jesús Sánchez Cuadrado, and Juan de Lara, "Pattern-based Development of Domain-specific Modelling Languages," *Model Driven Engineering Languages and Systems (MODELS)*, October 2015, Ottawa, Canada, pp. 166-175.
4. Kevin Lano, Shekoufeh Kolahdouz Rahimi, Iman Poernomo, Jeffrey Terrell, Steffen Zschaler, "Correct-by-construction Synthesis of Model Transformations using Transformation Patterns," *Software and System Modeling*, Volume 13, Number 2, June 2014, pp. 873-907.
5. Huseyin Ergin, Eugene Syriani, and Jeff Gray, "Design Pattern Oriented Development of Model Transformations," *Computer Languages, Systems & Structures*, Volume 46, November 2016, pp. 106-139.
6. Robert B. France, Sudipto Ghosh, Eunjee Song, and Dae-Kyoo Kim, "A Metamodeling Approach to Pattern-Based Model Refactoring," *IEEE Software*, Volume 20, Number 5, September/October 2003, pp. 52-58.
7. Richard F. Paige, Nicholas Drivalos Matragkas, Louis M. Rose, "Evolving Models in Model-Driven Engineering: State-of-the-art and Future Challenges," *Journal of Systems and Software*, Volume 111, 2016, pp. 272-280.
8. Metamodel Refactoring Catalog, http://www.metamodelrefactoring.org/