Softw Syst Model
DOI 10.1007/s10270-017-0628-3

REGULAR PAPER

An integrated metamodel-based approach to software model refactoring

Mohammed Misbhauddin[1] · **Mohammad Alshayeb**[2]

Received: 18 June 2016 / Revised: 9 October 2017 / Accepted: 15 October 2017

Abstract Software refactoring is the process of changing a software system in a manner that does not alter its external behavior and yet improving its internal structure. Model-driven architecture and the popularity of the UML enabled the application of refactoring at model level, which was earlier applied to software code. In this paper, we propose a multi-view integrated approach to model-driven refactoring using UML models. We selected a single model from each UML view at metamodel level to construct an integrated metamodel. We selected class diagram to represent the structural view, sequence diagram to represent the behavioral view and use case diagram to represent the functional view. We validated the proposed approach by comparing integrated refactoring approach with refactoring applied to models individually in terms of quality improvement through UML model metrics. Our results indicate that more bad smell instances can be detected using the integrated approach rather than the individual refactoring approach.

Keywords Refactoring · Metamodel · UML · Model refactoring

Communicated by Professor Daniel Amyot.

✉ Mohammad Alshayeb
alshayeb@kfupm.edu.sa

Mohammed Misbhauddin
mmisbhauddin@kfu.edu.sa

[1] Information Systems Department, King Faisal University, Al-Ahsa 31982, Saudi Arabia

[2] Information and Computer Science Department, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia

Published online: 28 October 2017