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An exploratory case study of aspect-oriented metrics for fault proneness, content and fixing effort prediction

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Abstract

Purpose – The purpose of this paper is to investigate the relationships between some aspect-oriented metrics and aspect fault proneness, content and fixing effort.

Design/methodology/approach – An exploratory case study was conducted using an open source aspect-oriented software consisting of 76 aspects, and 13 aspect-oriented metrics were investigated that measure different structural properties of an aspect: size, coupling, cohesion, and inheritance. In addition, different prediction models for aspect fault proneness, content and fixing effort were built using different combinations of metrics' categories.

Findings – The results obtained from this study indicate statistically significant correlation between most of the size metrics and aspect fault proneness, content and fixing effort. The cohesion metric was also found to be significantly correlated with the same. Moreover, it was observed that the best accuracy in aspect fault proneness, content and fixing effort prediction can be achieved as a function of some size metrics.

Originality/value – Fault prediction helps software developers to focus their quality assurance activities and to allocate the needed resources for these activities more effectively and efficiently; thus improving software reliability. In literature, some aspect-oriented metrics have been evaluated for aspect fault proneness prediction, but not for other fault-related prediction problems such as aspect fault content and fixing effort.

Keywords Computer software, Quality control, Predictor-corrector methods, Software metrics, Fault prediction, Aspect-oriented software

Paper type Case study

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