

CHAPTER IX

CONCLUSION AND FUTURE WORK

This chapter concludes the research work and presents some directions for the future work.

9.1 Conclusion

This work presents an application of design principles to construct an aspect-oriented software maintainability metric suit. Proposed metrics are mainly aimed to support evaluating the aspect-oriented software maintainability. However, they can be applied to assess maintainability of the object-oriented software as well because of the similar structures of aspect-oriented software and object-oriented software. Both novel FS quality model and popular FCM quality models are applied to form the metrics and their suggested weight values respectively. Firstly, the design principles which are object-oriented design heuristics, bad smells for object-oriented system refactorings, bad smells for aspect-oriented system refactorings, and proposed aspect-oriented design guidelines are gathered and are described the concrete ways to check their violations. Secondly, the effects of each principle on a set of metrics are assumed and are investigated the metric results to validate the relationships between design principles and maintainability. Finally, 27 design principles with their violation check definitions are selected and are combined to form the maintainability metrics. These metrics are used to assess fifty software samples and the well-known case study, GoF design patterns developed in Java and AspectJ. The results show that the design principle violation check definitions can reveal many flaws and the metrics can be used to evaluate and to compare maintainability of aspect-oriented systems and object-oriented systems.

9.2 Future Work

For future research, this work can be extended by validating design principles for maintainability with more samples, defining more concrete definitions to check violations of sorted out design principles, fully testing behavioral changes for the systems applying design principles, defining safety pre-conditions for correcting violations which create no negative side-effects, investigating all side-effects from various choices of corrections, and constructing an automatic tool to collect the maintainability metrics.