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一种基于测试需求约简的测试用例集优化方法

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Abstract

Test suite optimization aims at satisfying all testing objectives with the least number of test cases. According to the given testing objectives, the reduced testing requirement set can improve the effectiveness and efficiency of test suite optimization. This paper proposes a testing requirement reduction model that can describe the interrelations among the testing requirements in detail. Based on the model, this paper presents a testing requirement reduction method to generate the reduced testing requirement set, which is the basis of test suite generation, reduction and optimization. The experimental results show that the method is helpful to generate the smaller test suite and it contributes to the systematic, reasonable and effective testing.

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摘要

测试用例集优化的目标是用尽可能少的测试用例充分满足给定的测试目标. 针对给定的测试目标, 获得精简的测试需求集有助于提高测试用例集优化的效率和效果. 从测试需求约简的角度考虑测试用例集优化, 首先给出可以精确描述测试需求间相互关系的测试需求约简模型; 基于此模型, 提出一种测试需求约简方法, 可以获得精简测试需求集, 作为测试用例集生成和约简的基础, 从而实现测试用例集优化. 实验结果表明, 测试需求约简有助于获得规模较小的测试用例集, 实现系统、科学、有效的测试.

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References:

- [1] Harrold MJ, Gupta R, Soffa ML. A methodology for controlling the size of a test suite. *ACM Trans. on Software Engineering and Methodology*, 1993,2(3):270-285.
- [2] Chen TY, Lau MF. A new heuristic for test suite reduction. *Information and Software Technology*, 1998,40(5/6):347-354.
- [3] Chen TY, Lau MF. On the divide-and-conquer approach towards test suite reduction. *Information Sciences*, 2003,152(1):89-119.

- [4] Lee JG, Chung CG. An optimal representative set selection method. *Information and Software Technology*, 2000,42(1):17-25.
- [5] Marre M, Bertolino A. Using spanning sets for coverage testing. *IEEE Trans. on Software Engineering*, 2003,29(11):974-984.
- [6] Nie CH, Xu BW. A minimal test suite generation method. *Chinese Journal of Computers*, 2003,26(12):1690-1696 (in Chinese with English abstract).
- [7] Nie CH, Xu BW. An algorithm for automatically generating black-box test cases based interface parameters. *Chinese Journal of Computers*, 2004,27(3):382-388 (in Chinese with English abstract).
- [8] Xu BW, Nie CH, Shi L, Chen HW. A software failure debugging method based on combinatorial design approach for testing. *Chinese Journal of Computers*, 2006,29(1):124-131 (in Chinese with English abstract).
- [9] Zhang XF, Xu BW, Nie CH, Shi L, He YX. A requirements-driven test suite generation strategy. In: Tsai WT, ed. *Proc. of the 9th IASTED Int'l Conf. on Software Engineering and Applications*. Phoenix: ACTA Press, 2005. 224-227.
- [10] Jin Z. Ontology-Based requirements elicitation. *Chinese Journal of Computers*, 2000,23(5):486-492 (in Chinese with English abstract).
- [11] James AJ, Harrold MJ. Test-Suite reduction and prioritization for modified condition/decision coverage. *IEEE Trans. on Software Engineering*, 2003,3(29):195-209.
- [12] Harman M, Hu L, Hierons R, Wegener J, Sthamer H, Baresel A, Roper M. Testability transformation. *IEEE Trans. on Software Engineering*, 2004,30(1):3-16.

附中文参考文献:

- [6] 聂长海,徐宝文.一种最小测试用例集生成方法. *计算机学报*,2003,26(12):1690-1696.
- [7] 聂长海,徐宝文.基于接口参数的黑箱测试用例自动生成算法. *计算机学报*,2004,27(3):382-388.
- [8] 徐宝文,聂长海,史亮,陈火旺.一种基于组合测试的软件故障调试方法. *计算机学报*,2006,29(1):124-131.
- [10] 金芝.基于本体的需求自动获取. *计算机学报*,2000,23(5):486-492.