Software Engineering Seminar (WS 2016/17)

SAT based Fault Tree Analysis

Description

Fault tree analysis is a common technique to perform a safety analysis for complex critical systems. Fault trees are probabilistic models which require both quantitative and qualitative analysis. There existing many more assertive techniques from each other which use Binary decision diagrams and variations, tech..etc. In this seminar topic, the student is expected to apply SAT solvers (Z3,..etc) to apply qualitative analysis, which proposes to calculate minimal cut set of the critical system), and implement the quantitative analysis on top of that. Both positive and negative performance results are valuable during the performance analysis since SAT solvers were not applied before. Depending on the outcomes and the student performance, the topic is a good candidate for an extension to a M.Sc topic.

Prerequisites

A basic knowledge of Software Engineering I/II and Mathematical background

References

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[3] S. Kanmani, V. Rhymend Uthariaraj, V. Sankaranarayanan, and P. Thambidurai. Object-oriented software fault prediction using neural networks. *Information and Software Technology*, 49(5):483 – 492, 2007.

[4] TaghiM. Khoshgoftaar and Naeem Seliya. Fault prediction modeling for software quality estimation: Comparing commonly used techniques. *Empirical Software Engineering*, 8(3):255–283, 2003.

[5] Susan A. Sherer. Software fault prediction. *Journal of Systems and Software*, 29(2):97 – 105, 1995.

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