Software Engineering Seminar

Automated Repair with Genetic Algorithms

– GenProg –

Description

Automated program repair is able to simplify the work of a software developer by a large amount. Current approaches are admittedly far from being sophisticated, though. A comparably large branch of approaches uses genetic algorithms to generate viable bug fixes/patches for previously located errors in a software project. The general idea is to mutate the buggy program in a way that solves the problem – generally a failing test case.

The aim of this topic is to examine the tool GenProg which uses genetic algorithms to repair bugs automatically, using rather simple mutations.

References

[1] Claire Le Goues, Michael Dewey-Vogt, Stephanie Forrest, and Westley Weimer. A systematic study of automated program repair: Fixing 55 out of 105 bugs for $8 each. *Proceedings - International Conference on Software Engineering*, pages 3–13, 2012.

[2] Claire Le Goues, ThanhVu Nguyen, Stephanie Forrest, and Westley Weimer. GenProg: A generic method for automatic software repair. *IEEE Transactions on Software Engineering*, 38(1):54–72, 2012.

[3] Yuhua Qi, Xiaoguang Mao, Yan Lei, Ziying Dai, and Chengsong Wang. The strength of random search on automated program repair. *Proceedings of the 36th International Conference on Software Engineering - ICSE 2014*, pages 254–265, 2014.

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