Master Thesis Topic

Adaptive Genetic Algorithms in Search-Based Software Engineering

Motivation and Background

Search based software engineering, especially the use of genetic algorithms is currently an important solution to many software engineering problems, eg. architecture optimization [1]. However despite their general applicability, genetic algorithms have to be parameterized in order to produce results with high quality. Different parameter values may be optimal for different problems [2]. Therefore an interesting solution is to apply self-tuning adaptive optimization strategies [3] for software engineering problems.

Goals

The goal of this project is to evaluate (based on simulations and realistic examples) adaptive self-tuning genetic algorithms in the context of one or morespecific software engineering problem(s).

Description of the Task

The project aims to apply adaptive GAs for a specific software engineering problem. The specific tasks are:

- Understand the current approaches in SBSE and adaptive genetic algorithms
- Select one or more specific software engineering problem(s)
- Perform an experimental evaluation of adaptive self-tuning genetic algorithms for this problem

Research Type

Theoretical Aspects:	****☆
Industrial Relevance:	***☆☆
Implementation	****☆☆

Prerequisite

The student should be enrolled in the bachelor/master of software engineering/informatics program, and has completed the required course modules to start a bachelor/master thesis.

Skills required

Programming skills in Java or C++, Understanding of, or willingness to learn, the software engineering and statistical foundations needed for the project.

References

[1] A. Aleti, S. Björnander, L. Grunske, and I. Meedeniya. Archeopterix: An extendable tool for architecture optimization of aadl models. In MOMPES, pages 61-71, 2009.

[2] Gordon Fraser and Andrea Arcuri. Whole test suite generation. IEEE Transactions on Software Engineering, 39(2):276-291, 2013.

[3] Aldeida Aleti and Irene Moser. Entropy-based adaptive range parameter control for evolutionary algorithms. In Proceeding of the fifteenth annual conference on Genetic and evolutionary computation conference, GECCO '13, pages 1501-1508. ACM, 2013.

Contacts

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Application

Please contact me during my office hours or send me an email with the title: “[ThesisProject]-SBSE4AGA” to se-career@informatik.hu-berlin.de