Bachelor/Master Thesis Topic

Search-Space Classification for Requirement Prioritization and Release Planning Problems

Motivation and Background

As the complexity of software increases, designing and developing new software systems becomes more challenging. To handle this complexity, there is a trend to partially automate software development tasks supported by optimization methods. This area is known as Search Based Software Engineering (SBSE) [Har07a].

The next release problem (NRP) [BRW01] is a common search based software engineering problem, which uses search strategies to identify the optimal set of requirements that should be implemented in the next software release [vdABDV08, PMdOB15, VOHB15, ZHO+14]. The problem can be also extended to identify which bugs should be fixed and what feature requests should be handled next [XJRL12]. The NRP is usually solved with evolutionary algorithms and comprehensive survey of the used SBSE strategies is provided by Pitangueira et al. [PMdOB15]. The performance of the different algorithms have also been empirically compared [ZHO+14] and based on the results clear points for improvement have been identified. As a result, the creation of hybrid- and optimized search strategies is identified as a future research direction.

Goals

The goal of this project is to analyses the search space for common requirement prioritization and release planning problems.

Description of the Task

- Understand the current problems in requirement prioritization and release planning
- Run and analyses experiments in the area of requirement prioritization and release planning
- Provide information/characterization about the search spaces in this area

Research Type

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

Prerequisite

The student should be enrolled in the bachelor/master of computer science 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 software analysis foundations needed for the project.

Contacts

Lars Grunske, Humboldt-Universität zu Berlin, Institut für Informatik, Lehrstuhl Software Engineering, Unter den Linden 6, 10099 Berlin, Germany

Application

Please contact me during my office hours or send me an email with the title: "[ThesisProject]-SC4SBSE-Req" to se-career@informatik.hu-berlin.de

References

[BRW01] Anthony J. Bagnall, Victor J. Rayward-Smith, and Ian Whittley. The next release problem. Information & Software Technology, 43(14):883–890, 2001.

[Har07a] Mark Harman. The current state and future of search based software engineering. In International Conference on Software Engineering, ISCE 2007, Workshop on the Future of Software Engineering, FOSE 2007, pages 342–357, 2007.

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[XJRL12] Jifeng Xuan, He Jiang, Zhilei Ren, and Zhongxuan Luo. Solving the large scale next release problem with a backbone-based multilevel algorithm. IEEE Trans. Software Eng, 38(5):1195–1212, 2012.

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