Bachelor Thesis Topic
Enriched Tool Support for <u>Pro</u>babilistic <u>Spec</u>ification <u>Mi</u>ning (ProSpecMi)

Motivation and Background

The benefits of specifications (state machines, etc.) for program understanding, quality assurance and systematic software development purposes have been widely acknowledged in software engineering practice and research. However, the majority of software development projects do not provide formal specifications in addition to the program code and informal documentations. To overcome this gap researcher have adapted machine learning algorithms to automatically infer formal specifications from common system executions (execution traces or realistic test cases) and have coined the term specification mining for these activities.

Goals

Goal of the thesis is to enrich an existing tool environment like LearnLib [RSBM09] by introducing or expanding algorithms that learn a probabilistic specification. The most current algorithms generally support this probabilistic learning, however the accuracy is generally not know and for later use the probabilities are ignored.

Description of the Task

Instead of mining a deterministic specification, as the current approaches do, the research project will use and extend existing packages to learn a probabilistic specifications. Based on the information advantage gained by probabilistic specification compared to deterministic specification, future software development task, like testing and bug isolation will be likely be improved.

Research Type

Theoretical Aspects:	★★✩✩✩
Industrial Relevance:	★★✩✩✩
Implementation	★★★★✩

Prerequisite

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

Skills required

Programming skills in Java or C++, Understanding of Graph Mining and Automata Learning Algorithms

Literatur

[RSBM09] Harald Raffelt, Bernhard Steffen, Therese Berg, and Tiziana Margaria. LearnLib: a framework for extrapolating behavioral models. International Journal on Software Tools for Technology Transfer (STTT), 11(5):393–407, 2009.

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Application

Please contact me during my office hours or write an email with the title: "[Ensure]-ProSpecMi" to se-career@informatik.hu-berlin.de