Quality-driven Multi-objective Optimization of Software Architecture Design: Method, Tool, and Application
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Propositions belonging to the Ph.D. dissertation:

Quality-driven Multi-objective Optimization of Software Architecture Design: Method, Tool, and Application

by Ramin Etemaadi

1. A human architect normally uses previous architectures as a starting point for new architectures, which might prevent revolutionary ideas. A software architecture multi-objective optimization tool would be able to lead the architect into revolutionary architectural solutions. [This dissertation]

2. The novel approach presented in this thesis can improve the process of designing a set of software architectures for a range of products in a software product line (SPL) by finding a set of similar optimal solutions that are applicable to range of products. [This dissertation]

3. Problem-specific search operators are good means to reach optimal solutions faster. However, in order to prevent getting trapped in suboptimal solutions, randomness should always be included in the optimization, especially in the offspring mating process. [This dissertation]

4. Introducing new degrees of freedom for automated software architecture optimization enlarges the search space, and hence gives the evolutionary algorithms the possibility of finding better solutions. [This dissertation]

5. Abstraction is an important aspect of software architecture. Software abstraction also makes the optimization of software architecture possible. However, the challenge is to identify a fine line for the right level of abstraction. At the same time that we do not want to ignore or throw away too much detail, we must not keep so much detail such that important issues become obscured.

6. It is often more difficult to state an optimization problem than to solve it.

7. AQOSA has become possible because of open source phenomenon. It has been developed by Eclipse, it uses EMF for the modelling and it relies on Opt4J for its optimization algorithms. If we dig deeper at what can accelerate the research in computer science, we will find open source at the core. Open Source is empowering the computer science research and should be encouraged more.

8. A common difficulty in software engineering research is to find case studies that are relevant, suitable and convincing.