SQuAT-Vis: Visualization and Interaction in Software Architecture Optimization*

11th Symposium on Software Performance 2020 (SSP 2020) – Extended Abstract

Sebastian Frank, André van Hoorn
**Software Architecture Optimization (SAO) - Context & Use Cases**

**Motivation**
- I want to optimize my software architecture

**Method**
- Initial Candidate
  - Architecture
  - Goals
- Proposed Candidate(s)
  - Architecture
  - Responses

**Concept / Tool Demo**
- Generate New Architecture(s)
- Evaluate Quality
- Stop?

**Evaluation**
- Based on:

**Summary / Future Work**
- Candidate Selection
- Stopping Criteria
- Implement Candidate
- Explain Results

*Santiago*

Software Architect
Investigating SAO Results is difficult

Investigate suitable visualization and interaction techniques to support architects in (interactive) SAO and develop a tool implementing these techniques.
Research Method and Process

**Domain Analysis**
- 4 Use Cases
- SAO Approaches

**Design**
- Prototyping
- 3 Views

**Implementation**
- GlassFish Server
- Javascript + D3.js

**Evaluation**
- Expert User Study
- Scalability Study
Groups & Tags

Candidate Groups

Current | Marked | Selected | Comparison

Candidate Tags

Initial | Pareto | Suggested
Tool Demo
## Evaluation: Use Cases

<table>
<thead>
<tr>
<th>Case Study</th>
<th>ST+</th>
<th>CoCoME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate Selection</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Stopping Criteria</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Implement Candidate</td>
<td>(✔️)</td>
<td>(✔️)</td>
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<tr>
<td>Explain Results</td>
<td>(✔️)</td>
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<tr>
<td>Stop</td>
<td>✔️</td>
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<td>✔️</td>
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<td>✔️</td>
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</tbody>
</table>

### Experts

- **Expert 1**
  - Candidate Selection: ✔️
  - Stopping Criteria: ✔️
  - Implement Candidate: ✔️
  - Explain Results: ✔️

- **Expert 2**
  - Candidate Selection: ✔️
  - Stopping Criteria: ✔️
  - Implement Candidate: ✔️
  - Explain Results: ✔️

- **Expert 3**
  - Candidate Selection: ✔️
  - Stopping Criteria: ✔️
  - Implement Candidate: ✔️
  - Explain Results: ✔️
I want to optimize my software architecture

Proposed Candidate(s)

Architecture
Responses

Software Architecture Optimization Approach

Generate New Architecture(s)
Evaluate Quality
Stop?

Initial Candidate

Architecture
Goals

Candidate Selection
Stopping Criteria

Visualization Tool

Visualization & Future Work

Motivation
Method
Concept / Tool Demo
Evaluation
Summary / Future Work

Improve/Add Views
Scalability
„Tool Integration“

Santiago
Software Architect

Candidate Selection
Stopping Criteria

Implement Candidate
Explain Results

Textual Data

Motivation
Method
Concept / Tool Demo
Evaluation
Summary / Future Work

SSP 2020
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