Optimization Approaches for Self-Adaptive Systems

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Content of the abstract:

- Motivating Self-Adaptive Systems and their need for optimization.
- Motivating the need for a classification of optimization approaches for Self-Adaptive Systems.
- The scope and goal of this paper.

1 Introduction

- What are Self-Adaptive Systems?
- Why are Self-Adaptive Systems useful?
- What are the limits of classical Self-Adaptive Systems?
- The need for optimizing Self-Adaptive Systems.

Literature for this section:

- "The vision of autonomic computing" [6]
- "An Introduction to Self-adaptive Systems: A Contemporary Software Engineering Perspective" [15]
- "Software Engineering for Self-Adaptive Systems: A Research Roadmap" [2]
- "Software Engineering for Self-Adaptive Systems: A Second Research Roadmap" [9]
- "Claims and supporting evidence for self-adaptive systems: A literature study" [16]
- "Self-Adaptive Software: Landscape and Research Challenges" [11]

2 Classification of Self-Adaptive Systems

- How Self-Adaptive Systems are classified.
- Which parts of Self-Adaptive Systems can be optimized or are important for optimization.
- An overview of current optimization approaches for Self-Adaptive Systems.

Literature for this section:

- "A survey on engineering approaches for self-adaptive systems" [7]
- "Towards a Taxonomy for the Evaluation of Self-* Software" [10]
- "Dissecting Self-* Properties" [1]
- "Self-Adaptive Software: Landscape and Research Challenges" [11]
- "The Application of Machine Learning in Self-Adaptive Systems: A Systematic Literature Review" [12]
- "Comparison of Approaches for Self-Improvement in Self-Adaptive Systems" [8]

3 Proposal for classification of optimization approaches

- Deriving a classification for optimization approaches for Self-Adaptive Systems.
- Proposing a classification for optimization approaches for Self-Adaptive Systems.

Literature for this section:

- "The Application of Machine Learning in Self-Adaptive Systems: A Systematic Literature Review" [12]

4 Classifying existing optimization approaches

- Classifying a selection of existing optimization approaches using the proposed classification.

Literature for this section:

- "FUSION: a framework for engineering self-tuning self-adaptive software systems" [4]
- "A multi-agent systems approach to autonomic computing" [14]
- "Learning revised models for planning in adaptive systems" [13]
- "Using a multi-agent system and artificial intelligence for monitoring and improving the cloud performance and security" [5]
- "FIoT: An agent-based framework for self-adaptive and self-organizing applications based on the Internet of Things" [3]

5 Conclusion

- Recommending future research directions:
  - Applying the proposed classification to more existing optimization approaches.
  - Possible directions for new optimization approaches.
- What are the limitations of this paper?

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