Report: A formal approach for run-time verification of web applications using scope-extended LTL

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1 Introduction

In this short report it is summarized the paper "A formal approach for run-time verification of web applications using scope-extended LTL".

The paper proposes a communicating-automata-based model to formally verify single page and multi page web applications. The authors propose an "In" operator for LTL in order to simplify LTL. This doesn't add expressiveness, but makes LTL formulas in this specific domain more succint.

The proposed approach is dynamic and black-box, also known as run-time verification. This is so that the approach is not dependant on the source code being accessible, and assumes only the request-response flow is observable.

2 Automata-based modeling of web applications

Disclaimer: this is not an exaustive testing like traditional model checking, but should be considered as "passive testing".

2.1 Modeling approach

The monitoring approach proposed contains three main components or modules—monitoring module, analysis module and model checking module. The monitoring module intercepts HTTP requests and responses of the WAUT. The analysis module generates a Promela model taking as input the intercepted traces. Finally, the model checking module verifies user-defined properties against the model generated by the analysis module and produces a counterexample. It uses the Spin model checker.

2.2 Single window browsing

2.3 Multiple window browsing

3 LTL and the "In" operator

In order to represent more succintly LTL formulas in the domain of web applications, the authors extend the LTL syntax with the **In** operator.

4 Results

References

[1] May Haydar et al. "A formal approach for run-time verification of web applications using scope-extended LTL". In: *Information and Software Technology* 55.12 (2013), pp. 2191–2208. ISSN: 0950-5849. DOI: https://doi.org/10.1016/j.infsof.2013.07.013. URL: https://www.sciencedirect.com/science/article/pii/S0950584913001596.