



ICWE - 2020

Automatic Model Completion for Web Applications

Ruilian Zhao, Chen Chen, Weiwei Wang*, Junxia Guo



Motivation

- In model-based testing (MBT), the model is the foundation, and the integrity of the model has a significant impact on the test effectiveness.



Motivation

- In model-based testing (MBT), the model is the foundation, **and the integrity of the model** has a significant impact on the test effectiveness.
- Static/dynamic analysis techniques are widely used to construct models for web applications. However, few studies focus on the construction of complete models by using static and dynamic analysis techniques.



Motivation

- In model-based testing (MBT), the model is the foundation, **and the integrity of the model** has a significant impact on the test effectiveness.
- Static/dynamic analysis techniques are widely used to construct models for web applications. However, few studies focus on the construction of complete models by using static and dynamic analysis techniques.
- Extended Finite State Machine (EFSM) is considered more suitable to represent modern web applications.



Contribution

- We define an integrity criterion to evaluate completeness of EFSM model of web applications.



Contribution

- We define an integrity criterion to evaluate completeness of EFSM model of web applications.
- We propose an automatic model completion method based on static analysis and dynamic execution for EFSM models of web applications.
 - Feasible transition sequence generation for target transition.
 - Model completion based on feasible transition sequence.



Contribution

- We define an integrity criterion to evaluate completeness of EFSM model of web applications.
- We propose an automatic model completion method based on static analysis and dynamic execution for EFSM models of web applications.
 - Feasible transition sequence generation for target transition.
 - Model completion based on feasible transition sequence.
- We design priority rules to guide the selection of candidates, improving the efficiency of the lookahead search.



Contribution

- We conduct a series of experiments on five open source web applications to validate the effectiveness of our method, and further analyze the impact of different priority rules on feasible sequences generation and model completion.



Contribution

- We conduct a series of experiments on five open source web applications to validate the effectiveness of our method, and further analyze the impact of different priority rules on feasible sequences generation and model completion.
- The experiment results show that our method can complete the model of web applications, and the priority rules provide effective guidance in transition sequence generation. The model's integrity improved by 22.68% on average.





Thanks

