Abstract

Software systems require the validation of design features through regression testing. Two primary challenges in system validation are ensuring that test suites reflect actual system usage, and managing the test suite size to keep testing costs low while keeping testing results meaningful. To create a test environment that is close to actual system usage, we propose using Markov chains to create system behavioral models from available system usage data. Knowing that certain factors are not captured in system usage, we will use the Markov Modulated Markov Process to model hidden processes. The models are used to create test plans that employ a unique, likelihood-based, test prioritization scheme. The proposed methodology not only provides a stochastic modeling framework for software systems, but also considerably improves the coverage factor of generated test suites. This paper also presents a
real-world web application case study to demonstrate the capabilities of the proposed system validation methodology.

References


Index Terms
Keywords
System Validation; State Transition Diagram  Model-based Testing; Markov Chains