International Journal on New Computer Architectures and Their Applications (IJNCAA) 1(4): 844-860
The Society of Digital Information and Wireless Communications, 2011 (ISSN: 2220-9085)

Model-based Web Components Testing: Prioritization Using MIDS and Centrality Measures

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ABSTRACT

Web applications testing and verification is becoming a highly challenging task. A number of model-based approaches has been proposed to deal with such a challenge. However, there is no criteria that could be used to aid practitioners in selecting appropriate approaches suitable for their particular effort. In this paper we present a set of attributes to serve as criteria for classifying and comparing these approaches and provide such aid to practitioners. The set of attributes is also meant to guide researchers interested in proposing new model-based Web application testing and verification approaches. The paper discusses a number of representative approaches against the criteria. Analysis of the discussion highlights some open issues for future research. In response to one of the issues, we present an approach for prioritizing components for testing to maximize confidence given a limited number of test cases to be executed. Some initial results are reported in the paper.

KEYWORDS

Web applications, model-based testing, testing prioritization, Web verification.

1 INTRODUCTION

Web applications are becoming more complex. As more and more services and information are made available over the Internet and intranets, Web sites have become extraordinarily complex, while their correctness is often crucial to the success of businesses and organizations. Although traditional software testing is already a notoriously hard, time-consuming and expensive process, Web-site testing presents even greater challenges. Complexity arises due to several factors, such as a larger number of hyperlinks, more complex interaction, frequently changing Web pages, and increased use of distributed servers. Moreover, the environment of Web applications is more complex than that of typical monolithic or client-server applications – Web applications interact with many components, such as CGI scripts, browsers, backend databases, proxy servers, etc., which may increase the risk of interoperability issues. Furthermore, many Web applications have a large number of users with no training on how to use the application – they are likely to exercise it in unpredictable ways. Therefore, Web sites that are critical to business operations of an organization should be tested thoroughly and frequently 9.
Modeling helps to manage the complexity of these systems. Several