

WebVizOr: A Fault Detection Visualization Tool for Web Applications

Holly Esquivel

Barbara Hazelwood

Sara Sprenkle and Lori Pollock



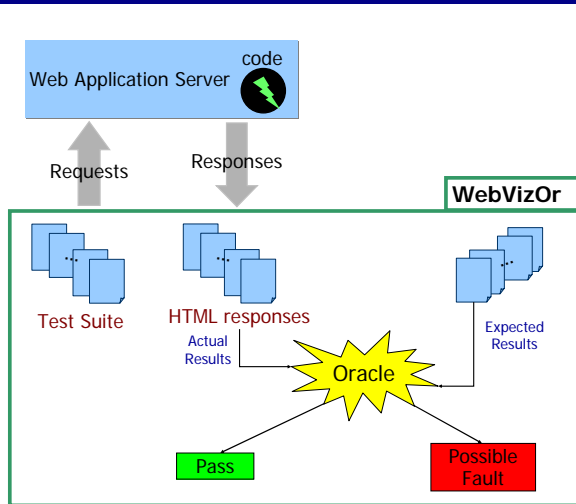
Department of Computer Science & Information Systems
<http://www.cis.udel.edu/~hiper>

Goal: Illustrate and evaluate the uses of WebVizOr, a new tool to aid web application testing

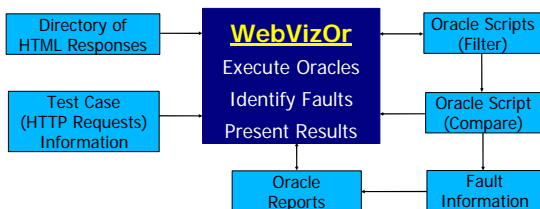
Motivation

- Test web applications for correctness
- Problem: *Difficult to analyze results of large test suites*
- Our Contribution:
 - *Visualization tool that enables navigation of test suite results*
 - *Integration of various test oracles that identify possible faults in web applications*

General Web Application Testing Process



WebVizOr Architecture



Tool Features

Visualize Oracle Comparator Results

Highlighted differences in filtered responses allow the user to quickly monitor

- HTML tag change
- Page content change

Single Suite Version:

- View results of test suite execution (responses) in rendered or raw HTML form

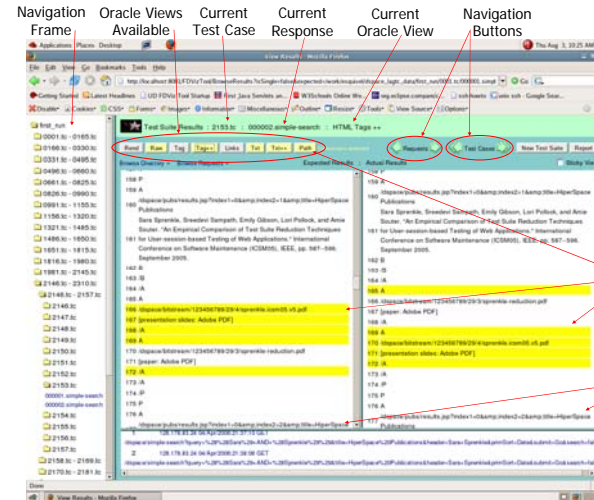


Figure 1: A screen snapshot of WebVizOr presenting the results of executing the same test suite on two versions of a web application.

View Saved HTML Responses

Dual Suite Version:

- View results of two sets of test suite executions (responses) side by side
- Utilize oracles to compare, view, and detect potential faults in responses

Test Suite Fault Report

WebVizOr's fault report allows the user to

- View suite's results
- Jump to and view a test case or response
- View an oracle's results on the suite or a test case

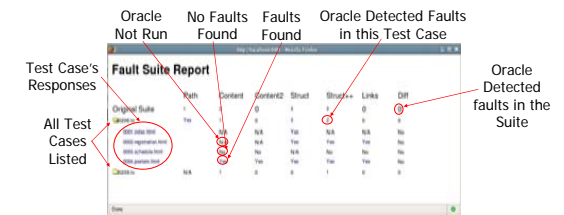


Figure 2: A screen snapshot of WebVizOr's fault report.

View Detailed Test Case Info

Test case details allow user to

- View complete HTTP request
- Determine if error in response corresponds with request parameters
- Jump to and view associated response

Summary of Evaluation

Ease of Navigation:

- Navigate to any response in 4 clicks or less
- Go directly to responses listed in fault report

Extensibility:

- Update a single configuration file to integrate new oracles

Subject Web Applications:

Application	Description	# Test Cases	Total # Requests	Avg. Case Size
Masplas	Regional Workshop Registration and Management	169	1,107	6.6 requests
DSPACE	Digital Publications Library	1,800	22,129	12.2 requests

Time and Space Costs:

Usage	Initialization Time	Generated HTML Files	Filtered Text Files	Comparison Files
View Single Application Version	Masplas	1 sec	2	0
	DSPACE	5-15 sec		
Compare Dual Application Versions	Masplas	5 sec	2 per oracle	1 per oracle
	DSPACE	22 sec		

Oracle Integration:

- Integrated seven oracles
- Created fault report for easy access to oracle results

Portability:

- Under investigation

Uses in Industry and Research

Real-world web application testing: Regression Testing

- Useful during maintenance or before release of a new application version

Oracle Development:

- Use of the tool within our group has already led to the development of two new oracles

Future Work

Evaluate Oracles

- Some oracles are better at catching certain faults
- Quantitative and qualitative analysis of oracles' false positives and false negatives
- Develop New Oracles
 - Use analysis to create more accurate oracles