WebVizOr: A Fault Detection Visualization Tool for Web Applications

General 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

Tool Features

- Visualized Oracle Comparator Results:
  - Highlighted differences in filtered responses
  - Allow the user to quickly monitor
  - HTML tag change
  - Page content change

- View Saved HTML Responses:
  - Single Suite Version:
    - View results of test suite execution (responses) in rendered or raw HTML form
  - 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

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

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

Portability:
- Under investigation

Subject Web Applications:

- Application Description: Regional Workshop Registration and Management
  - # Test Cases: 169
  - Total # Responses: 1,107
  - Avg. Case Size: 6.6 requests

- Application Description: Digital Publications Library
  - # Test Cases: 1,800
  - Avg. Case Size: 22,129
  - # Responses: 12.2 requests

Time and Space Costs:

- Usage
  - Test Single Application Version
    - Initialization Time: 1 sec
    - Generated HTML Files: 2
    - Filtered Test Files: 2
    - Comparison Files: 2
  - Compare Dual Application Versions
    - Initialization Time: 4-13 sec
    - Generated HTML Files: 2 per oracle
    - Filtered Test Files: 2 per oracle
    - Comparison Files: 1 per oracle

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’ true positives and false negatives
- Develop New Oracles
  - Use analysts to create more accurate oracles

O ur work w as funded by CRA–W Dis tributed Mentor Project