Cost-effective Techniques for User-session-based Testing of Web Applications
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User-session-based Testing

Web Applications
- Client (HTML)
- Server (Java)
- Database (MySql)

Users -> Access Application -> Beta Web Application (v.0.9) Deployment

Example user session
register.jsp?name=sree&pass=phd
shop.jsp?book_id=1&book_cat=java

User sessions

Record field data
Test v.1.0 with a test suite of user sessions

Problem:
Reduce cost of maintaining and executing large test suites of user sessions

Subject Applications

Cluster User Sessions

Concept Analysis Input: User Session Data
A user session is a sequence of URLs and name-value pairs.
user session (i.e., IP address) = <url1, url2, url3, url4, url5>

Object
attribute

attributes (URLs)

relation table:

objects (user sessions)

Concept Analysis Output: Concept Lattice

Updated Lattice

PCM Reduced Test Suite

Initial user-session data set

Apply Concept Analysis

Updated Lattice

Concept Analysis

Additional User Sessions

Incremental Concept Analysis

Updated Reduced Suite

Incremental Concept Analysis

Updated Reduced Suite

Evaluation Metrics
- Reduced test suite’s effectiveness wrt size of test suite, program code covered and faults detected
- Effectiveness of concept-based technique wrt program-requirement-based reduction techniques
- Effectiveness of test criteria wrt reduced suite effectiveness

Results for Concept-based Reduction
- less time and space than prog-req-based reduction techniques
- achieves 70 – 80% reduction in size
- little to no loss in program coverage and fault detection effectiveness