Fault-Based Combinatorial Testing of Web Services

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Background
- Internet houses diverse applications (i.e., banking, networking, etc.), commonly implemented as web services
- We propose fault-based combinatorial testing and compare its fault-detection capability to current web service testing techniques.

Problem
- Web services can be very complex in structure
- Difficulty in quality assurance

Proposed Solution:
- Knowledge-based web service testing
- Using known information in strategic ways to test software

Web Services & Applications

Web Application Example

- Web services defined as server component in client-server relationship
- Client-server relationship could be described using web based mail services (ex. Yahoo)
- Client (user) communicates with server (Yahoo)
- Web application is accessed via web browser over network
- Commonly implemented in languages such as HTML & Java
- Software components of web services
- Receive input from client & produce output

- Web services built on SOAP (Simple Object Access Protocol)
- SOAP is communication protocol that allows transfer of data in XML over the Internet
- SOAP allows different applications on different operating systems with different languages to communicate
- Inputs & outputs of each application w/in a web service are wrapped through the SOAP protocol into input and output messages

Web Service Emulation: iTrust

- iTrust is a medical application that allows patients to keep up with their medical history and records
- Through SOAP, WSDL, & UDDI specifications, iTrust is wrapped
- Enables iTrust to emulate a web service
- Testing framework is a network where we emulate the Internet
- In center hub, Traffic machines generate random network traffic
- Requester is client that will be accessing iTrust
- Monitor observes & collects information on traffic coming to and from Requester
- iTrust machine is location where iTrust is deployed as web service

Anticipated Contributions
- Web services can grow & be very complex, making it difficult to assure quality
- Web service testing is required
- Combinatorial testing techniques proven to be efficient in testing software
- Combining fault-based & combinatorial testing techniques, assessing & evaluating web services may be better

References