Web TANGO: Towards Automated Comparison of Information-centric Web Site Designs

Current Status of the Web

Research Problem
• 90% of sites provide inadequate usability
• Most problems due to poor information architectures
• 196 million new sites in 5 years

Proposed Solution

Web TANGO Methodology
Assess usability of a Web site’s information architecture:
• Approximate people’s information-seeking behavior (Monte Carlo simulation)
• Output quantitative usability metrics (e.g., number of errors & navigation time)

Goal: automated support for comparing design alternatives (existing and new sites)

Web TANGO Usage Scenario
• Represent design in TANGO (site model)
• Specify server parameters (server model)
• Specify user characteristics (user models)
• Specify starting pages (tasks)
• Run simulator to produce results
• Compare results & select best design

Survey of Automated Web Methods

We developed a taxonomy for classifying automated evaluation methods and conducted an extensive survey of 50 methods.

Taxonomy of Automated Usability Evaluation
Our taxonomy consists of an automation type and a testing level.

Automation Types
• Non Automatic - no level of automation
• Automatic Capture - capture interface usage
• Automatic Analysis - identify usability problems
• Automatic Critique - identify usability problems and solutions

Testing Levels
• Minimal Effort - no testing or modeling required
• Informal Use - requires normal interface usage
• Model Development - requires an interface and/or user model
• Formal Study - requires structured formal testing (i.e., structured tasks)

Survey Findings
We surveyed 50 methods that fall into the following categories: testing, inspection, inquiry, analytical modeling and simulation.

• Automation is greatly underexplored (only 26% of methods surveyed)
• 85% of methods require formal studies or informal use

Analytical modeling and simulation are two promising areas for future automated usability evaluation methods for Web sites.

Web TANGO Architecture

Models
Site – node for each page (metadata, links, page complexity)
Server – latency and load
User – Personal and Computer Characteristics
Personal - memory size, reading speed, probabilities for non-intrinsic characteristics (e.g., read a page, complete task, make an error)
Computer – transfer speed

Information Seeking Task(s)
Target pages in site and keywords

Monte Carlo Simulator
For each trial:
Choose links based on probability function(s)
Functions incorporate user models & metadata analysis (information retrieval principles)
Predict metrics (e.g. loading, reading & thinking time) at each page
Report quantitative usability measures (e.g. navigation time, number of errors, memory load)
Report simulated navigation paths
Results averaged over all trails

Future Work
Web TANGO is a work in progress. Future work entails:
• Conducting an online study to correlate page composition (e.g., number of words, links, graphics, fonts, reading complexity, etc.) with perceived page complexity.
• Developing several user models based on observed usage.
• Developing navigation prediction algorithms.
• Implementing the simulator.
• Validating simulator results with user studies.

Our evaluation testbed is a healthcare intranet that enables clinicians to access a wide range of information resources.

More info - http://www.cs.berkeley.edu/~ivory/research/web