Pushing the boundaries of User Experience Test Automation

@QA&TEST 2011

JULIAN HARTY 27th October 2011



To automatically detect (some) issues that may adversely affect the User Experience



So what are the business problems?

- Quality-In-Use:
 - -UX, Cross-browser & Accessibility issues on live site
- Engineering Productivity:
 - Time taken from feature-complete to live site
- Quality Engineering:
 - Over-reliance on manual testing
 - Existing test-automation under-performing



And some UX Test Automation problems...

- Minimal existing work in Industry

 Existing tools tend to test static aspects
- Academic work appears to be unsuitable
- How to automatically measure and test UX at all!



Dynamic, based on using the system

Accessibility Findability Credibility Holistic Usability Desirability Usefulness Includes Perceptions

• We focus on the Human + Computer Interactions



- When I navigate by tabbing I should return to where I started in a reasonable number of key-presses
- 2. Flow should be consistent through web-forms
- 3. Look-alike & work-alike across web browsers
- 4. I should <u>not</u> be able to bypass the security of the site from links in the UI

* Fallible, but useful, guide/approach/practice



Equivalence of input paths



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A real example: Information for Speakers

Mouseover; click = 2 steps

13 Tabs + 22 Tabs **= 35 steps**



epY

Automated exploration and discovery*

- Automating heuristic tests
 - -Web accessibility testing
 - -Fighting layout bugs
 - -BiDi checker
- Using Crawling tools

-Crawljax

* We're working on complementary work on interactive exploration and discovery



- Fully automated execution, human inspection
- Interactive testing, aided by tools



The moving parts...





DEMO



Sample screenshots

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| | Generated | on: 12 May 2011 05:2 | 9:22 UTC+1 | | | | | | |

http://www.google.co.in

http://adsense.google.com



Another example: QA&Test Registration

Invisible elements

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| -The Impact of Automation on Development | | | | | |
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And what about Static Analysis?

- Don't overlook the value of static analysis (but don't rely on it either...)
- Find ways to filter the reported results

 We've created automated Accessibility Tests, which check the contents of pages using WCAG guidelines.



Problems detected:

```
{"testName":"checkLinkTextNotReplicated","description":
"Check that there are not two links with the sametext but different href"
,"severity":"error","elementCode":"
<a href=\"../index.php\">\n</a>
```

<div class=\"enlace_hidden\"> \n </div>"}

{"testName":"checkLinkTextNotReplicated","description":

"Check that there are not two links with the sametext but different href", "severity":"error", "elementCode":

"PROGRAMME"}

{"testName":"checkLinkTextNotReplicated","description":"Check that there
are not two links with the sametext but different href"
,"severity":"error","elementCode":

"Programme"}

{"testName":"checkHeadingHasText","description":
"Check that heading elements have text","severity":"error","elementCode":
"<h2></h2>"}



"Sure, Accessibility is important: file it with the rest of the things we should do..."

What *should* be done seldom gets done...



3 Improvements for the price of 1

Accessibility + Testability

- -Both need to interpret the contents in the browser
- Improving one often improves the other
- Accessibility + SEO*
 - Both find value in descriptive labels



[*] SEO: Search Engine Optimization

- Improved Accessibility: Users are happier
- Improved Testability: We're happier
- Improved SEO: Business is happier

Beware of (over-)trusting test automation

- Automation as servant, not master, of our software delivery
 - Inaccurate results
 - "Beware of Automation Bias" by M.L. Cumming^[1]
- Automated tests and checks miss more than they find
- Make behavior easier to assess
 - Screenshots and contents of DOM to verify after tests ran
 - Automated video recordings

[1] http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.2634&rep=rep1&type=pdf



What we think we're testing...



What our automated test actually interacts with...





(Some of the) things our automated tests may miss...



Beware of poor-quality automated 'tests'

- AssertTrue(true);
- No/Inadequate/Too many Asserts
- Poor code design
- Falsehoods (False positives / negatives)
- Focus on:
 - Improving the quality of your automated tests
 - Finding ways to improve the quality, & testability, of the code being tested



Increasing the signal-to-noise of test results

- Suppress unwanted 'warnings'
 - -C.f. static analysis tools
- Increase potency of tests
- Consider dumping ineffective tests



Further reading and research

The opensource project http://code.google.com/p/web-accessibility-testing

Finding Usability Bugs with Automated Tests http://queue.acm.org/detail.cfm?id=1925091 Fighting Layout Bugs http://code.google.com/p/fighting-layout-bugs/ Experiences Using Static Analysis to Find Bugs http://www.google.com/research/pubs/pub34339.html My blog http://blog.bettersoftwaretesting.com/ "Beware of Automation Bias" by M.L. Cummings http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.2634&rep=rep1&type=pdf

Designing and Engineering Time by Steven Stow ISBN 978-0-321-50918-5



Questions now?

Questions later...

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