VERSION CONTROL YOUR UI

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YOU CAN AND SHOULD AUTOMATE YOUR VISUAL TESTS!

NOT JUST FOR INCREASED TEST COVERAGE
AGENDA

- Why automated visual testing?
- Tools & Technology
- Where does it fit?
- UI version control
- Collaboration
- Q & A
WHAT IS VISUAL TESTING?

A quality assurance activity aimed to verify that a Graphical User Interface appears correctly to users.
web endpoint status
You have not configured a web endpoint for monitoring. Configure one to get started.

CONFIGURE WEB ENDPOINT MONITORING

autoscale status
You need to configure the autoscale service.
Autoscale can save you up to 33%.

CONFIGURE AUTOSCALE
AUTOSCALE OPERATION LOGS

usage overview

*NEW*
CONNECT  RESTART  SHUTDOWN  ATTACH  DETACH DISK  CAPTURE  DELETE
Jonah Kowall followed you

Peter Florijn @peterflorijn 24m
Test automation journal is out! paper.li/peterflorijn/1... Stories via @ashwinasd @ek121268 @ABTasty

appback.com liked your Tweet
Check out "Protractor setup for Hybrid app" on community.perfectomobile.com/posts/1086885...

Geran added you to list Apps
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Maritza Velez followed you
8 hours
TechBeacon @TechBeaconCom 9h
World leaders to join Paris march for unity

India will focus on “entirely new industries” – including solar technology, LED lighting, small cars, medical appliances and weapons – rather than... Obama to unveil cyber security plans Barack Obama next week will unveil plans to improve cyber security and protect consumers from identity theft, as the administration continues to grapple...
WHY AUTOMATE?

The test matrix is too big to cover manually

- Web browsers
- Devices
- Operating systems
- Screen resolutions
- Responsive design
- L10n
- 3rd Party upgrades
WHY AUTOMATE?

Mobile apps quality is critical

- Harder to roll back changes
  - Can’t push daily
  - Updates take battery and data
- Higher quality bar
WHY AUTOMATE?

Release cycles keep getting shorter
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HOW DOES IT WORK?

1. Drive the AUT and take screenshots
2. Compare screenshots with baseline images
3. Report differences
4. Update the baseline

Applitools Eyes: Automating visual software testing
DEMO

WebDriverCSS
HOW DOES IT WORK?

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ONE DOES NOT SIMPLY

DO BITMAP COMPARISON
To login please enter the following information:
To login please enter the following information:
account

Upgrade account

Search
AND MORE...

- 1 pixel offsets in element positioning
- Dynamic content
- Moving elements
- Images of different size
- Performance
COMPARES IDENTICAL IMAGES

GETS A MISMATCH
IMAGE COMPARISON ENGINES
ImageMagick

- A powerful command line tool for image processing.
- Fuzzing is used to eliminate slight color differences.
- An error ratio is usually used to determine a match.

```
$ compare -metric AE -fuzz 5% img1.png img2.png diff.png
2246
```
THE JAVASCRIPT ENGINES

- **Resemble.js**
  Pixel by pixel + error ratio + anti-aliasing

- **Blink-Diff**
  Pixel by pixel + error ratio + anti-aliasing + perceptual color distance computation
  [https://github.com/yahoo/blink-diff](https://github.com/yahoo/blink-diff)

- **Looks-Same**
  Pixel by pixel + perceptual color distance computation + ignore Caret
  [https://github.com/gemini-testing/looks-same](https://github.com/gemini-testing/looks-same)
APPLITOOLS EYES

- Handles anti-aliasing, pixel offsets, color similarity, and image scaling
- Dynamic and moving content
- Compare images of different sizes
- No error ratio configuration required
- Validates full UI pages
- Fast!
- Supports layout / structure matching
DEMO

VISUAL LAYOUT MATCHING
HOW DOES IT WORK?

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QUICK FEEDBACK TOOLS

MOTIVATION

- Get fast feedback on code changes
- Run tests locally in the background

CONS

- Partial coverage
  - Chrome, IE?
  - Limited navigation
- Tests stale browser versions

SETUP

- Render screenshots with a headless browser
  - PhantomJS, SlimerJS
- Configuration file driven tests
VISUAL COVERAGE TOOLS

MOTIVATION

- Verify that the app / site looks right in all real execution environments
- Test as many UI states as possible
- Execute many tests in parallel

CONS

- Requires test infrastructure
- Implement and maintain test code

SETUP

- Render screenshots using real browsers on a variety of operating systems and devices in parallel
  - WebDriver, Grid
- Code driven tests
  - WebDriver, DSL
# SAMPLE TOOLS

## CODE / SCRIPT

- **Needle** (Python WD)
- **WebDriverCss** (JS WebDriverIO)
- **Gemini** (JS DSL)
- **Selenium Visual Diff** (Java WD)
- **VisualCeption** (PHP CodeCeption)
- **Pix-Diff** (JS Protractor)
- **Shoov** (JS WebDriverIO)
- **Vizregress** (.NET WD)
- **Rspec Page Regression** (Capibara)
- **Applitools Eyes** (All WD + Appium)
- **PhantomCSS** (JS CasperJS)
- **Specter** (JS DSL)
- **FBSnapshotTestCase** (XCTest)
  - Fighting Layout Bugs (Java WebDriver)
  - Huxley (Record Playback)

## CONFIGURATION

- **Viff**
- **CSS Visual Test**
- **GreenOnion**
- **Wraith-Selenium**
- **Wraith**
- **Dpdxt**
- **Grunt PhotoBox**
- **Grunt-Vigo**
- **Snap And Compare**
- **BackstopJS**
- **CSSCritic**
- **Kobold**
- **DiffCop**
- **SUCCSS**
SCREENSHOTS

- Full page?
- Regions?
- Frames?
- Device pixel ratio?
- Rotation?
- Viewport size?
- Page preparation?
- Page stabilization?

"SCREENSHOT", YOU KEEP USING THAT WORD

I DON'T THINK IT MEANS WHAT YOU THINK IT MEANS
HOW DOES IT WORK?

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REPORT DIFFERENCES

As files on the file system

WebDriverCSS
# REPORT DIFFERENCES

## As a gallery

Result for Test org.kreyssel.selenium.visualdiff.it.AmazonIT

<table>
<thead>
<tr>
<th>Test Class</th>
<th>Total Screenshots</th>
<th>Equal</th>
<th>Different</th>
<th>Added</th>
<th>Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>startPage</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>searchBooks</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Test Method startPage

Screenshot ID 1

![Screenshot](image.png)
HOW DOES IT WORK?

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UPDATE THE BASELINE
DEMO
AUTOMATED MAINTENANCE
AGENDA

- Why automated visual testing?
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- *Where does it fit?*
- UI version control
- Collaboration
- Q & A
WHERE DOES IT FIT?

Visual testing of frontend components by frontend developers

- Components
- Code review
- Developers
- Designers
WHERE DOES IT FIT?

Full or partial validation of application screens
All team members can review and maintain
A collaboration tool

- Pages
- Page sections
- Developers
- Designers
- QA
- Others
WHERE DOES IT FIT?

Validate your staging deployment using your production deployment as a baseline
WHERE DOES IT FIT?

- No missing resources in production
- No corruption due to 3rd party data
- No corruption due to browser / OS upgrades
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UI VERSION CONTROL

- Keep the CI tests green
- Multiple app versions
- Revert to previous baselines
- Regulatory compliance
- A visual change log (documentation)
PRIVATE BASELINES

The modified baseline is private to the branch.

The modified baseline is applied to master together with the modified code.
CONFLICT DETECTION

A baseline conflict (aborts push)
CONFLICT RESOLUTION

Rerunning a test resets the conflicting state with the parent baseline.
DEMO
UI VERSION CONTROL
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FEEDBACK LOOPS

Agile is all about shortening feedback loops!

- Lightweight requirements
  *Quick to create and change*
- Collaborative development
  *Static code analysis, code reviews, pair programming, scrums*
- Continuous testing
  *Unit, integration, acceptance, exploratory*
- Frequent releases
  *Customer and team feedback on the *done* product, reviews*
ALL UI *CHANGES* ARE AUTOMATICALLY DOCUMENTED AND REPORTED
+
IMMEDIATELY ACCESSIBLE TO THE TEAM AND THE CUSTOMER
=
CONTINUOUS SHORTER FEEDBACK LOOPS
QUESTIONS?

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