

Visual Automation with Geist

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> > > Outline

#! What is visual automation?

#! Why use it?

#! How is it done?

#! Examples

> > > What is automation?

< Using a computer to control software />

#! Good for highly repetitive tasks

#! Can be used at scale for load and performance testing

#! Approach used depends on type of software, e.g. web applications tested using Selenium

#! Requires *hooks*, must be supported by application under test

> > > What is visual automation?

```
< Some applications do not enable  
programmatic interaction, so automate based  
on visual properties />
```

```
#! Template matching
```

```
#! Colour
```

```
#! OCR
```

```
#! Shape of objects
```

```
#! Position of any of the above related to  
something else
```

> > > Why use Geist?

< If screen is our only hook, must automate based on what it looks like />

e.g. Citrix applications, Flash/Flex applications, HTML5 applications which frequently manipulate DOM

For complex testing, off the shelf solutions may not be suitable, open source libraries give the user the freedom to add or change functionality as required

> > > How is it done?

<Convolution />

Way of mathematically finding out which
areas of an image are similar to a template

> > > Calculating convolution
directly

$$I = \begin{pmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad T = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$$
$$R = \begin{pmatrix} 1 & 1 & 2 & 1 \\ 2 & 3 & 2 & 2 \\ 3 & 3 & 2 & 1 \\ 1 & 2 & 2 & 2 \end{pmatrix}$$

Take a sub image at each position (x,y) in image I , compare each pixel value with the value in the template

> > > OCR

< Use machine learning to classify letters
by their statistical properties />

#! Find text on screen

#! Split words into letters- e.g. by
looking for minima in the vertical plane

#! Train classifier on letters- record the
properties of each letter

#! Classify new letters by comparing their
characteristics to those stored

> > > Example: Virtual desktop applications

< Test applications over RDP or Citrix />

#! Applications which are run on another computer, which must be logged into

#! Not testable with other tools, so need hooks or visual automation

#! For legacy applications which are difficult to support, adding automation hooks may not be an option

> > > Example: Flash applications

- #! Rich internet applications, run using Flash player in the browser

- #! Can't use Selenium as don't have standard HTML elements

- #! Protocol based automation may be more suitable- if we know the protocol or its easy to backwards engineer

< Questions? />

Thanks for listening