Automated Usability testing

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Usability testing/evaluation

- Performance measurement
  - Low hit rate
- Heuristic evaluation
  - Easy, cheap
  - 50% of actual problem
- Formal user testing
  - Highest hit rate of real usability
  - Time consuming, labor intensive
  - Towards the end of the development process

Functional requirements

- GUI evaluation
- Navigational burden
  - Form Layout
  - Use interaction sequences
- Pattern and templates
- GUI description
- Recording user interaction sequences
- User behavior and comments
- Task definitions
- Results presentation

Related work

- Morae
- Web based testing tool
- Watchfire Bobby (WebXACT)
- HUI Analyzer

Morae

- Commercial usability testing tool
- Consists of four modules
  - Recorder
  - Remote viewer
  - Manager Analysis
  - Manager presentation

Morae

- Successfully automates
- Significantly reduces the cost
- Making and manipulation of recordings

- Testers responsible for the bulk of the analysis and interpretation of data
- Used at the end

Web based user testing tool

- software installed on user's computer
- Transmission of results to a center server for analysis
- Generates reports comply with Common Industry Format

- Download the required software online
- Does not capture user behavior
- Require tester to perform the bulk of the evaluation

Watchfire Bobby (WebXACT)

- Web accessibility testing tool
- Traverses a website and checks if each page meets various accessibility requirements
- Results are presented in tabular form

Watchfire Bobby (WebXACT)

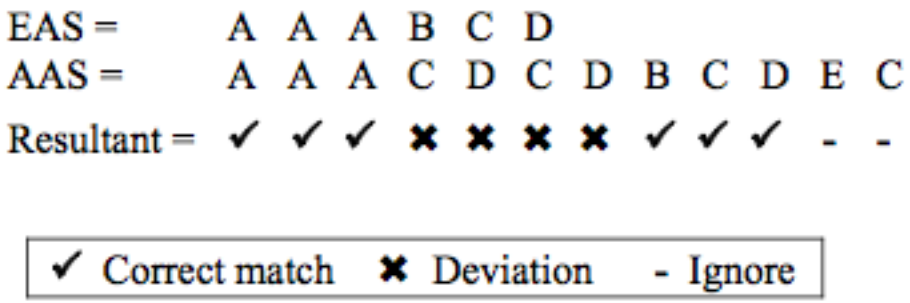
- Lightweight
- Quick to use
- Could be easily incorporated into earlier stages of the development
- Focuses on quantitative and other static data and no attention paid to how the website's interface is actually used

HUI Analyzer

- Handheld User Interface Analyzer
- Accepts three inputs:
  - The compiled assembly for the GUI Software
  - Expected Action Sequence (EAS)
  - Actual Action Sequence (AAS)

HUI Analyzer

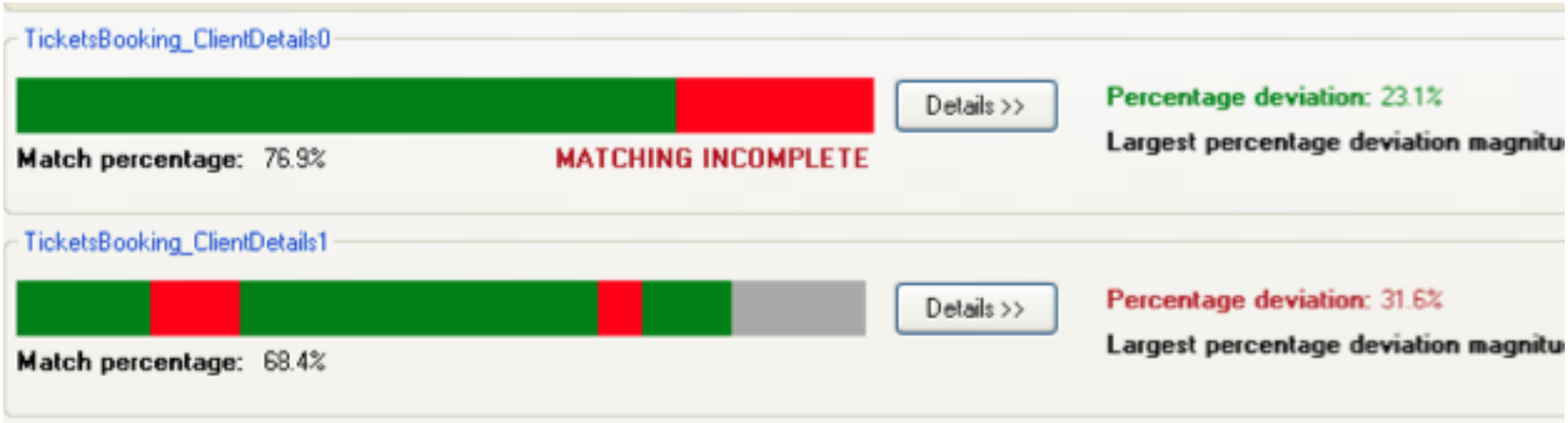
- Comparison analysis



- How user interprets the interface and what kind of errors the user makes

HUI Analyzer

- Comparison analysis



HUI Analyzer

- Assertions analysis
  - Assertions use a predefined set of usability metrics as thresholds for certain aspects of usability

Table 1 Form assertions

Total number of buttons	4
Total number of text input controls	2
Button height	40
Button width	80
Font types count	2
Font size	10
Selection controls per group/container count	5
ListBox item count	5
ListView item count	5
Menu items count	5
Menu depth	3
Percentage of free space	20%
Number of background colors used	2

Table 2 Action sequence assertions

Number of clicks	15
Amount of scrolling	10
Number of help entities activated	3
Number of context menus activated	2
Amount of resizing	2
Number of text inputs	5

Table 3 Comparison assertions

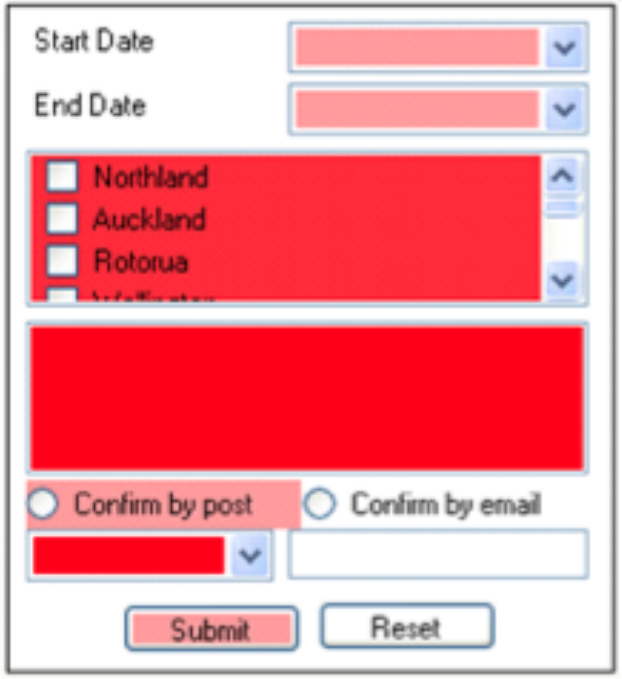
Percentage deviation	20%
Percentage of incomplete comparisons (within an EAS suite)	10%
Largest percentage deviation magnitude	10%
Average percentage deviation	10%
Average largest percentage deviation magnitude	10%
Maximum time taken to complete an EAS	N/A
Repeating pattern frequency	5
Repeating pattern magnitude	5
Average repeating pattern gap	5

Control	Assertion Type	Maximum Value	Minimum Value	Actual Value
button_reset	Button width	100	5	72
button_reset	Font size	24	8	8
button_reset	Button height	100	5	20
button_submit	Font size	24	8	8
button_submit	Button height	100	5	20
button_submit	Button width	100	5	72
comboBox_endDate	Font size	24	8	8
comboBox_endDate	ComboBox item count	20	-	93
comboBox_personalDetails	ComboBox item count	20	-	9
comboBox_personalDetails	Font size	24	8	8
comboBox_startDate	ComboBox item count	20	-	94
comboBox_startDate	Font size	24	8	8
fontTypes	Font types count	1	-	1
listView_events	Font size	24	8	8
listView_events	ListView item count	20	-	0
listView_location	ListView item count	20	-	14
listView_location	Font size	24	8	8
MainMenu	Menu items count	15	-	0
panel1	Font size	24	8	8
panel1_System.Windows.Forms.Radi...	Selection controls per group/container count	3	-	2
radioButton1	Font size	24	8	8
radioButton2	Font size	24	8	8
textBox_personalDetails	Font size	24	8	8
TicketsBooking_ClientDetails	Total number of text input controls	3	-	1
TicketsBooking_ClientDetails	Percentage white space	70	25	23
TicketsBooking_ClientDetails	Total number of buttons	1	-	2

Figure 2 Assertion processing output

HUI Analyzer

- Hotspot analysis
  - The frequency of use for each component



Tool effectiveness

M = Morae

WB = Web based tool

WX = WebXACT

H = HUIA framework

✓ = Achieved

o = Achieved to some extent

× = Not achieved

Criteria	M	WB	WX	H
GUI description input	×	×	o	✓
User actions input (recorder)	✓	✓	×	✓
User behaviour and comments input	✓	×	×	×
Task definitions input	×	×	×	×
GUI evaluation	×	×	✓	✓
Navigational burden analysis: form layout	×	×	×	O
Navigational burden analysis: user actions	×	×		O
User behaviour and comments analysis	O	O	×	×
Patterns and templates	×	×	×	×
Results presentation	✓	✓	o	✓

Table 2: Effectiveness of existing tools

Conclusions

- An automated usability testing tool should capture a range of inputs, perform analyses on different aspects of usability, present results clearly

- None of the existing tools discussed meet all the requirements
- HUIA addresses most requirements
- Should be applied for more general GUIs.

Questions?

Thanks!

References

- Automated Usability Testing Using HUI Analyzer, Simon Baker et al. 19th. Australian Conference on Software Engineering, 2008.
- Automated Usability Testing Framework, Fiora T. W. Au et al. Proc. 9th. Australasian User Interface Conference(AUIC2008), Wollongong,Australia,2008.