Sketch Tools

L3 Advanced HCI

Agenda

- What is the problem with computer-based design tools?
- Why a toolkit?
- Framework
- Implementation
- Does it work?
- What next?



What is the problem with computer design tools?

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vita

lints

contact into

Normal Frances / No Frances / updated

- Hand drawing a design is a form of back talk
- Our short term memory is too limited for us to hold complex design in our heads
- We tend to iterate around the design and design ideas
- Sometimes starting again
 This is a very rapid process!
- Computer based tools are too constraining
 - Attention should be on the big picture
 - But it gets diverted to the detail
- Designers (nearly) always user a pen and paper/whiteboard first.
- This is independent of the discipline!

Other domains

- We know this for sure for designing things like User interfaces
- We don't know if it is true for more abstract models such as uml models
- What about planning an
 - Essay
 - Algorithm
- What do you do?

Why is this so?

- The psychologist don't really know.
- There is a different brain process going on when we are using a pen
- I have wondered whether it is something to do with digital/analogy
- I also wondered whether the 'natives' ie your generation would overcome this
 - It seems not

Comparing formal and informal presentations

- These two designs are the same (bad) solutions to a problem
 - Sketch 8.6 changes
 - VB Form 6.5 changes

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So what happens if you partly tidy?



What happened?

- Number of changes
 - Enjoyment



But

- Computers are much better for
 - Editing
 - Archiving
 - Versioning
 - Remote collaboration

And

- Interpreted sketches can be
 - Animated/Executed
 - Beautified
 - Translated

Framework

- Sketch spaces
 - Generic (paper like)
 - Flexible
- Recognition
 - Smart
 - Trainable
 - Overridable
- Extensible
 - For domain specifics

Why a toolkit?

- There are quite a number of sketch tools around
 including Freeform
- There is a lot of commonality
- Progress at exploring the more interesting issues is slow because of the effort required to get to first base.
- Cross-domain studies better if the variables are more controlled

Framework - Sketch pages

- One big page or lots of little ones?
- Usual computer editing (copy, paste, undo redo)!
- Flexible arrangement
- Connections between parts of pages and pages





Framework - Recognition

- Drawing and handwriting modeless
- Not very many basic shapes
- Syntax of specific diagram components
- Discernable relationships between shapes



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• Semantics of diagram notation

Framework - Extensibility

- Semantics
- Translation



• Execution

Implementation

- Environment
- User interface
- Recognition
- Extensibility

InkKit Architecture Sketching Portfolio Object Drawing Platform Persistence Recognition Division Basic Shape Component Recognition Recognition Domain 1 Domain 2 Interpreter Example Example Interpreter Components Components Output Output Output Output Module Module Module Module

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Implementation - environment

- Tablet PC
 - Nice hardware interface (though rather small)
 - OS support for inking and character recognition





Implementation – User Interface

• Pages

• Portfolio



Implementation – recognition



Implementation – Extensibility

• Interpreter

- ~ 200 300 lines
- Basic info about diagram (has connectors)
- defines all the components names and containment (parent/child)
- Domain specific rules like fill list box
- Examples
- Translator
 - ~ 300+ lines
 - Takes recognized sketch
 - Generates output data
- Other
 - execution



Does it work? - Demo





Organization Chart Contents Person "boss" is a superior of "Lackey" is a superior of "Minion" has no superiors Person "Lackey" has no inferiors is an inferior of "boss" Person "Minion" is a superior of "Worm" is a superior of "Molecule" is an inferior of "boss" Person "Worm" has no inferiors is an inferior of "Minion" Person "Molecule" has no inferiors is an inferior of "Minion" Person "Nobody" has no inferiors has no superiors

Student add-ins



Lines of Code

Domain	Interpreter	То	Output
Venn Diagram	102	Powerpoint	293
UML Class Diagram	264	Java	830
UML Activity Diagram	281	Visio	
Hierarchical Visual Modeling	275	HTML	255
Music	459	Lilypond	510

Other sketch tools



What next?

- Recognition engine
 - Permanent work-in-progress
 - Currently working on the divider
- Comparative studies
 - Idea creation in IMM vrs Mindmanager
 - Graph construction process with sketch/widgets
 - Multiple types of models in inkkit
 - Effects of animation/execution