New Clothes for Pd

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Motivation

• What's new in Pd?

• Pd-0.43 OUT NOW!

• main feature: GUI rewrite
  - lead by Hans-Christoph Steiner
  - work in progress
Outline

• Pd and it's GUI
• Refactoring the User Interface
  - Byproducts
• What's left?
  - (much...)

IOhannes zmölnig: New Clothes for Pd
Pd and it's GUI

• „Client ↔ Server Model“
  - Server: Pd-core
    - DSP-engine
    - implemented in C
  - Client: Pd-GUI
    - Visual representation
    - implemented in Tcl/Tk
  - Communication:
    - TCP/IP socket
Client↔Server: Pros and Cons

- **Pros**
  - separation between realtime critical process and representation
  - run Pd-core on headless system
  - run Pd-core and Pd-GUI on separate hosts (or CPUs)

- **Cons**
  - efficient implementation of Model / View/Controller design
    - duplication of data on both sides
    - keeping the system interactive/responsive „enough“
  - bottleneck: network
    - e.g. large data (arrays)
Client↔Server: Is it True?

- Pd-GUI
  - ,,slave“ rather than ,,client“
- Pd-Core
  - handles User Interaction
    - keypress/mouse
    - object selection
    - ...

Client ↔ Server: Language havoc

• Pd-GUI → Pd-Core
  - FUDI-messages:
    „.x9bfdb08 motion 358.0 177.0 0;“
    <receiver> motion <x> <y> <state>;

• Pd-Core → Pd-GUI
  - Tcl/Tk-code:
    - pdtk_post {fups}
      - .x8893af8.c create rectangle 331 176 338 177 -tags [list .x8893af8.t8895a70o0 outlet]
Client ↔ Server: Is It?

- **Communication**
  - ASCII
    - easier readability („keep it stupid“)
    - asymmetric (FUDI vs Tcl-code)

- **Performance**
  - asymmetric
    - Core does all the work
    - GUI only does the „drawing“
    - realtime task handles low-priority events
  - no good use of multi-cores

- **Reasons**
  - generating code is easier than parsing
  - coding efficiency: C is nicer than Tcl :-)
DesireData

• Bouchard [2005-]
  - Model-View design
  - desireable
How to Fix the Problem

• [Bouchard 2005]: DesireData
• changing the Core ↔ GUI communication
  - large pieces of code are affected
• Pd's development model
  - single Core Maintainer
  - small incremental changes!
Roadmap

• refactoring the GUI
• abstracting the Core↔GUI communication
• move logic from Core to GUI
Refactoring the GUI

• completely rewrite Tcl/Tk side
• maintaining 100% compatibility to Pd-core
• organize code
  - monolithic file → multiple files
  - namespaces
• documentation
Byproduct: i18n

- internationalisation of menus
  - msgcat
- internationalisation of patches
  - UTF-8 support
Byproduct: interactive Pd-console

- filtering information
  - levels of verbosity
- finding errors
  - which object created a given error message
- Tcl-prompt
  - simpler debugging...
Byproduct: Plugins

• „gui-plugins“
  - what „externals“ are to the Pd-CORE
  - extend the GUI functionality of Pd
    - skinning
    - usability tweaks
    - monkey patching tcl-code

• drawback
  - no stable API
Plugins-examples: easy access

• buttonbar
  - select objects from a graphical button bar
    - (HC Steiner, J Clayton, S Yuditskaya)

• autocompletion
  - tab-completion for objects
    - (Yvan Volochine)
Plugins-examples: performance

• fullscreen
  - (András Murányi)

• KIOSK-mode
  - getting rid of the IDE
TODO: Separating Core and GUI

• getting rid of Tcl/Tk on the wire
  - small well-defined communication protocol
  - implement GUI in other languages than Tcl/Tk

• move logic to GUI side
  - better utilization of multiple cores (obviously)
Communication

• easily parsable
• symmetric
  - FUDI
• re-use Pd-messages for patchbuilding
  - \#X obj 66 48 adc~ 1 2;
  - create <objID> <winID> obj <x> <y> <name> <args>;
  - \#X connect 2 1 12 3;
  - connect <objAID> <outID> <objBID> <inID>;
Editing Logic

• move editing logic onto GUI
• no more keyboard/mouse handling in Pd-CORE
Conclusions

• Pd's GUI still stuck in the early 90s
• First Step
  - Refactoring
  - few visible changes
  - user extendible
• TODO
  - clean separation between Core/GUI
  - implement a new GUI in a modern toolkit
    - (if you like)
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