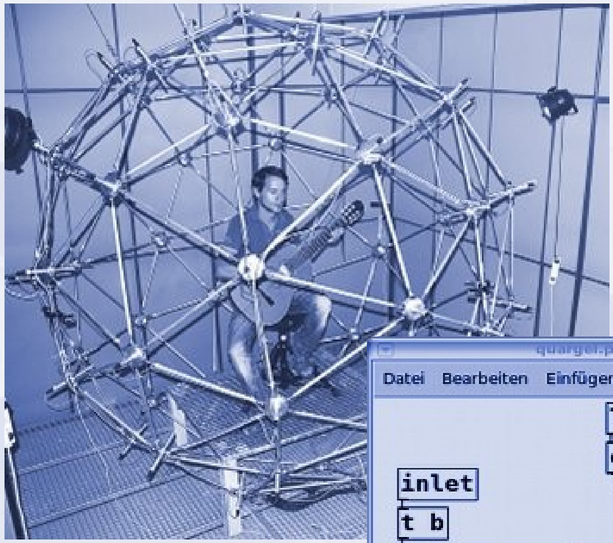
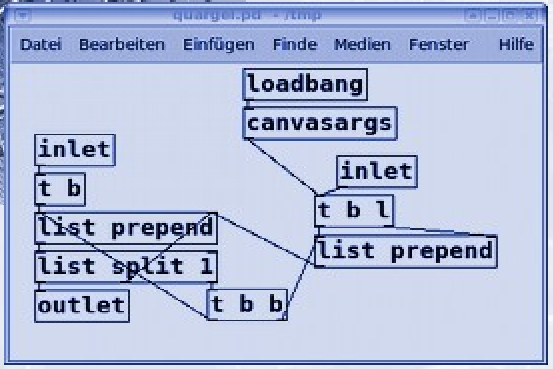
New Clothes for Pd

IOhannes m zmölnig





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...)

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)

Acknowledgements

Hans Christoph Steiner

The End

Pd-0.43 entered Debian!

2011/05/03

Thanks!