Finger Painting with Planets (and Python)

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What is it?

- Installation for people to play with
- Generates music and graphics simultaneously
- Controller with buttons, knobs, LCD, multitouch pad
- Fingers on pad trigger music or graphics
- Graphics motion is simulated gravitational attraction
- Collisions of planets trigger music
- Musical keyboard controls (only) selection of notes

Appearances

- Yuri's Night 2008

- Maker Faire 2008

- Night Light at Climate Theater

- Anon Salon at Climate Theater

- SubZERO street fair, ZERO1 Festival

User interface was adjusted/simplified each time

Big Pieces

- KeyKit – input and realtime processing
- Plogue Bidule – VST host for sounds
- Salvation – Freeframe host for visuals
- Planets – Freeframe plugin
- Cairo – drawing on bitmap (from Python)
- Chipmunk – Physics simulation (from Python)
- OpenCV – raster manipulation (from C)
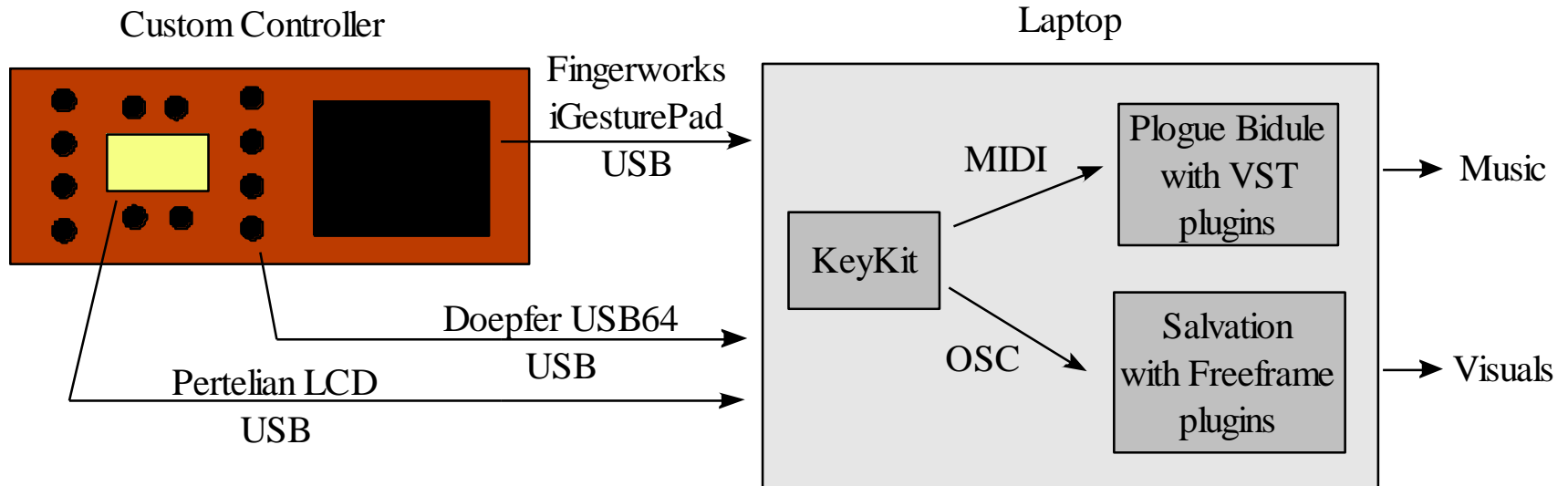- OSC – communication between KeyKit and Planets

A Mashup without the Web

- Re-using and combining large pieces of software
- Explosion of large pieces of freely available code
- Protocols and mechanisms are relatively standardized
- Good separation of functionality
- APIs are now front and center
- Ease of integration is getting better
- Requires care in selection, one bad apple...

Multiple Languages

- Once avoided, now embraced

- Library availability

- Device I/O availability

- Robustness

- Ease of Development

- Familiarity

Finger Painting with Planets

Custom Controller

Laptop

Fingerworks
iGesturePad
USB

Doepfer USB64
USB

Pertelian LCD
USB

KeyKit

MIDI

OSC

Plogue Bidule
with VST
plugins

Salvation
with Freeframe
plugins

Music

Visuals

Code Pieces

- Languages
  - KeyKit
  - C/C++
  - Python (and Pyrex)
- Toolkits
  - Chipmunk
  - OpenCV
  - Cairo

Interface Pieces

- Standards
  - MIDI
  - Freeframe
  - OSC
- Hardware
  - Fingerworks iGesture multitouch pad (USB)
  - Doepfer USB64 MIDI control board (USB)
  - Pertelian LCD (USB)

Application Pieces

- Applications
  - KeyKit
  - Salvation
  - Plogue Bidule
- Plugins
  - VST soft synths
  - Freeframe video processors
  - Planets plugin

My Pieces

- Decisions on what software and protocols to use
- KeyKit code for input processing and LCD control
- "Planets" Freeframe plugin code (C and Python)
  - OpenCV for bitmap formatting/fading (from C)
  - OSC for 2-way communication with KeyKit (from C)
  - Chipmunk for physics (from Python)
  - Cairo for 2d graphics (from Python)

In Hindsight, the Good Things

- Python integration in low-level code works well

- Bitmap manipulation with multiple toolkits can work

- OSC is a simple and lightweight transport format

- Local sockets for inter-app API invocation good for:
  - Flexibility in choice of languages and applications
  - Portability
  - Firewalling
  - Robustness
  - Separating device I/O from graphics/audio output

In Hindsight, the Bad Things

- Devices and drivers are the weak link
    - Requires speedy way of resetting/restoring things.

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