Digital Instrument Building
and
The Laptop Orchestra

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For the US Frontiers of Engineering Symposium, September 2010
The danger of the piano, and its glory, is that the pianist can feel the music with his whole body without having to listen to it.

Pianists do not devote their lives to their instrument simply because they like music….. There has to be a genuine love of the mechanics and difficulties of playing, a physical need for the contact with the keyboard…. This inexplicable and almost fetishistic need… is, indeed, conveyed to the audience and becomes necessarily part of the music.

The traditional construction of the keyboard—its arrangements of black and white keys—has had a largely unrecognized influence on the history of harmony, not completely benign, because of most composers' dependence on the piano for inspiration.... Playing a melody in C-major feels very different under the hand from playing it in F-sharp major.

The Myths of *Fanitullen*
and the
“Possessed” Fiddle

*Devil at the Keyboard*
(tribute to Thelonius Monk)

Willem de Kooning
1976
“The bass doesn't appeal to me. I am the bass.” Edgar Meyer.
Player \rightarrow physical \ input \rightarrow Instrument

Player \rightarrow sonic \ output \rightarrow Instrument
Sensor Inputs, Features Extracted

N features

Mapping Layer

M parameters

Synthesis/Signal Processing
The Wekinator

• created by Rebecca Fiebrink, Princeton CS
• enables rapid and interactive application of various machine learning algorithms to digital musical instrument building
Wekinated Drum Machine Demo
The Wekinator

- N => M mapping problem
- Golf Controller => Blotar Physical Model example
Wekinated Blotar Demo
The Wekinator

• play-along learning
• iterative, intuitive… fun!
• goal oriented, but goal may not be predetermined.
In Action:
Clapping Machine Music Variations

• Two tether-blotars, after extensive revision
• Six other laptopists on other instruments
• Two violins, in this case
• An excerpt:
A laptop orchestra?
PLOrk: The Princeton Laptop Orchestra
Why?

• musically and socially charged context for exploring digital music making and instrument building
  – out of the isolated studio!
• “laboratory” for both music and engineering subject
BoSSA Nova?

- completely wireless:
  - embedded CPU, amplification, power
- “contravielle” acoustic-like speaker system
- friction?