Inkstrument: Interactive Musical Instrument with Conductive Ink

Jockey Club Project IDEA Inclusive Digital and Experimental Art

賽馬會科藝共融計劃

Workshop Overview

1

7 Comprehensive Lessons

Each lesson runs 1.5-2 hours, covering conductive ink basics through to building a custom instrument.

2

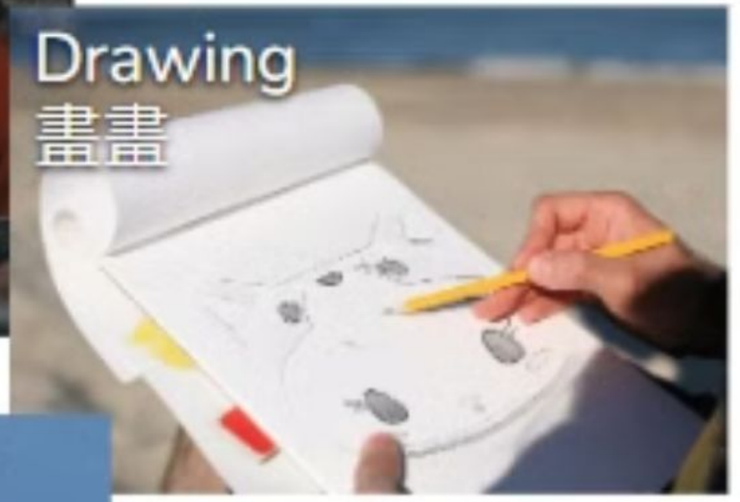
Target Students

Designed for secondary school students, with no prior electronics experience required.

3

Key Learning Outcomes

Conductive ink applications, sound design, Arduino programming, and complete a musical instrument that responds to touch.



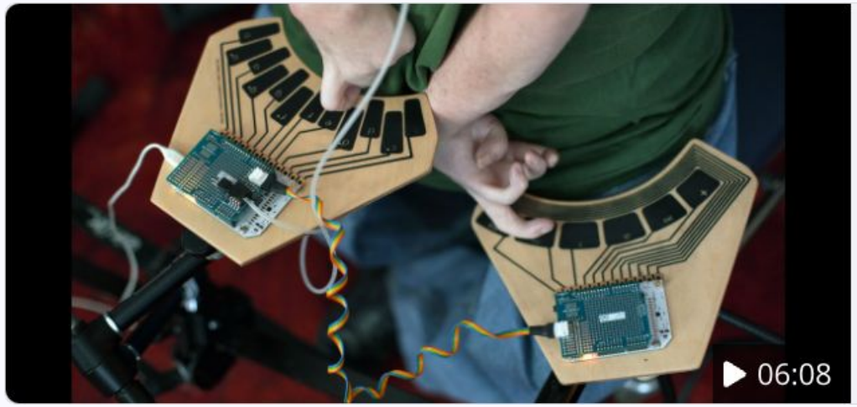
Abstract
抽象

Be Patient
耐性

Observation
觀察力

Curiosity
好奇

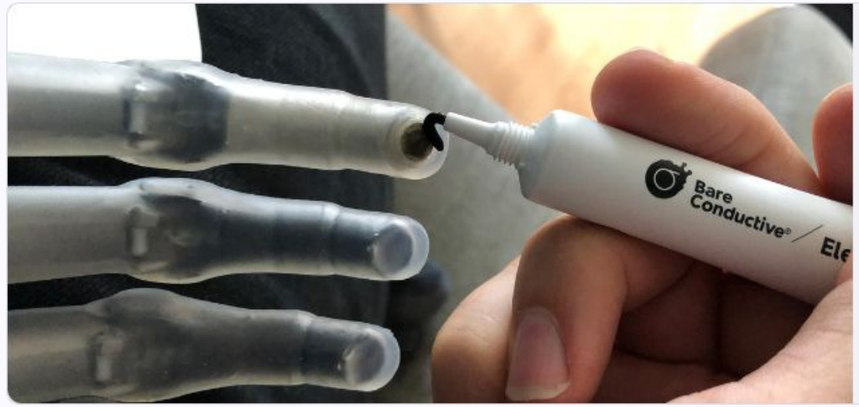
Frustration
沮喪



YouTube

Touch Chord - A Touch Sensitive Breath Controlled Instrument

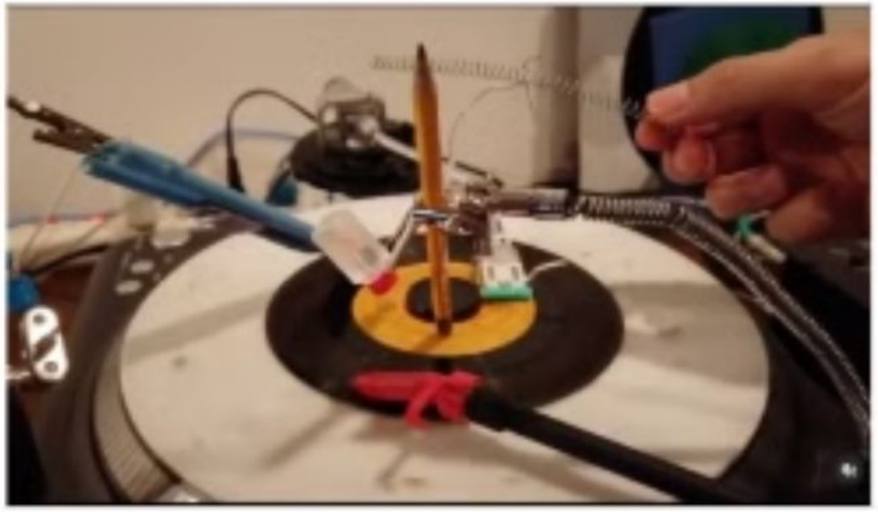
Read the full story: http://bit.ly/1Gg7gQ7 Designer Musician Vahakn Matossian from Human Instruments teams up with Bare Conductive to develop a new musical...



Bare Conductive

Making a Bionic Hand Touchscreen Friendly

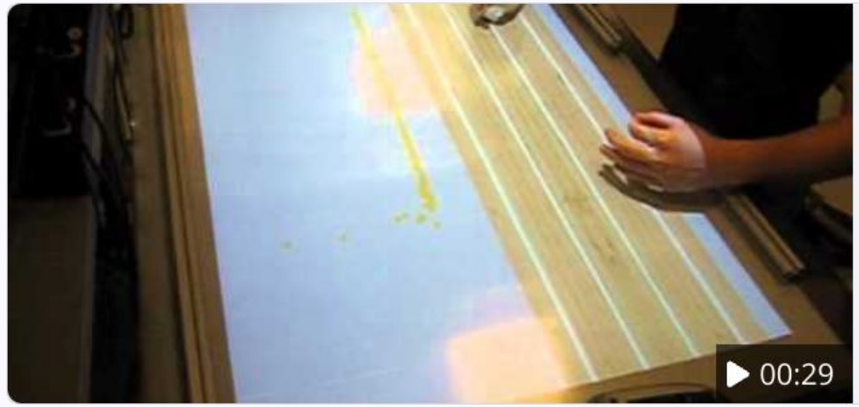
Stephen Lowry shows us how he used Electric Paint to make is bebionic3 bionic hand touch screen friendly, allowing him to use his smart phone and other devices.



YouTube

Demystifying Conducting: The Connection Between Gesture and Musi...

Alan Gilbert, music director of the New York Philharmonic, demonstrates and discusses the role of a conductor. Subscribe to the Times Video newsletter for free...



YouTube

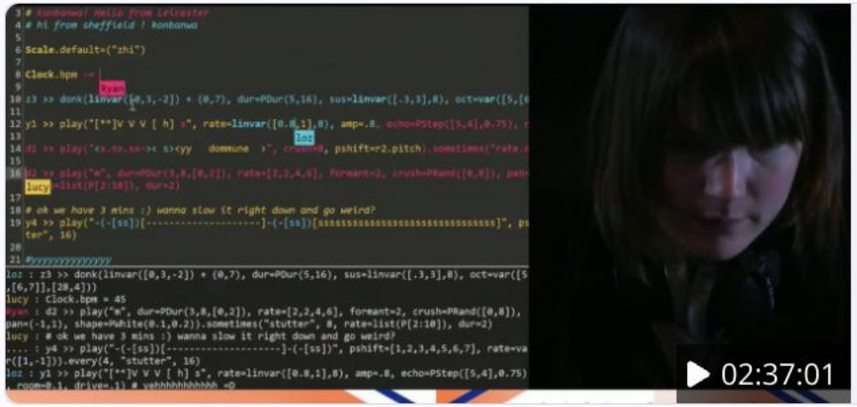
Gesture Based Music

In this demonstration, a ceiling mounted projector displays an image downward onto a partially retro-reflective screen material. This enables a camera, also...

YouTube

Live-Coding – programming masterly music | Juan Romero & Patrick ...

Benoît and the Mandelbrots see the laptop as their main instrument; they are mainly dedicated to live coding, the process of writing software in real time. They...

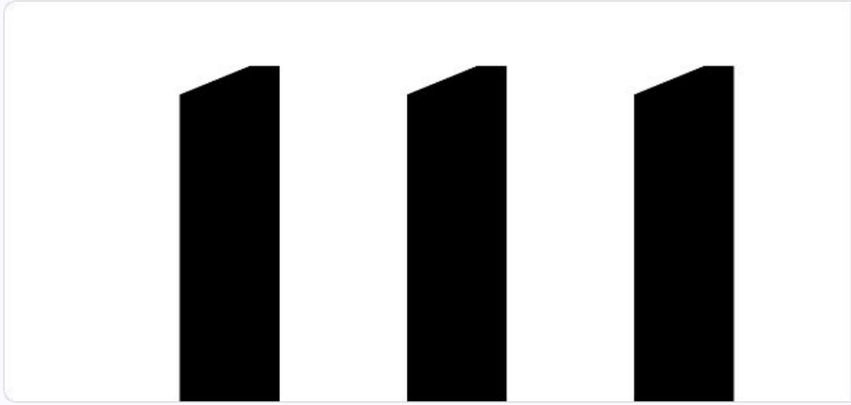


YouTube

DOMMUNE Tokyo - live coding performances - algorave tokyo x yorks...

DOMMUNE - Tokyo x Yorkshire exchange transmission

http://www.dommune.com/reserve/2018/1114/ With thanks to Great Britain...



instrumentinventors.org

Homepage - instrumentinventors.org

iii is an artist run, community platform supporting new interdisciplinary practices linking performance, technology and the human senses

Demo: Adafruit Circuit Playground with Accelerometer

In this demonstration, we'll explore how physical movement translates into sound using the Adafruit Circuit Playground's built-in accelerometer.

What is an Accelerometer?

A sensor that detects changes in velocity and orientation along different axes (X, Y, Z), allowing our instrument to respond to tilting, shaking, and rotation.

Movement-to-Sound Conversion

As we tilt, shake, or rotate the Adafruit board, the accelerometer data directly modifies sound frequency (Hz), creating higher pitches with faster movements and lower pitches with slower movements.

Demo 1 (Processing)

Sound Generation

An oscillator with ADSR envelope (Attack, Decay, Sustain, Release) creates sounds that dynamically respond to movement, demonstrating how electronic instruments produce and shape tones.

Motion Tracking

An accelerometer captures physical movements along X, Y, and Z axes.

Visual Feedback

Using Processing IDE to create real-time visualizations of the accelerometer data, showing the connection between movement and sound generation.

Audio Processing

Pure Data (PD) handles the audio signal chain, demonstrating how open-source tools can create sophisticated sound processing systems.

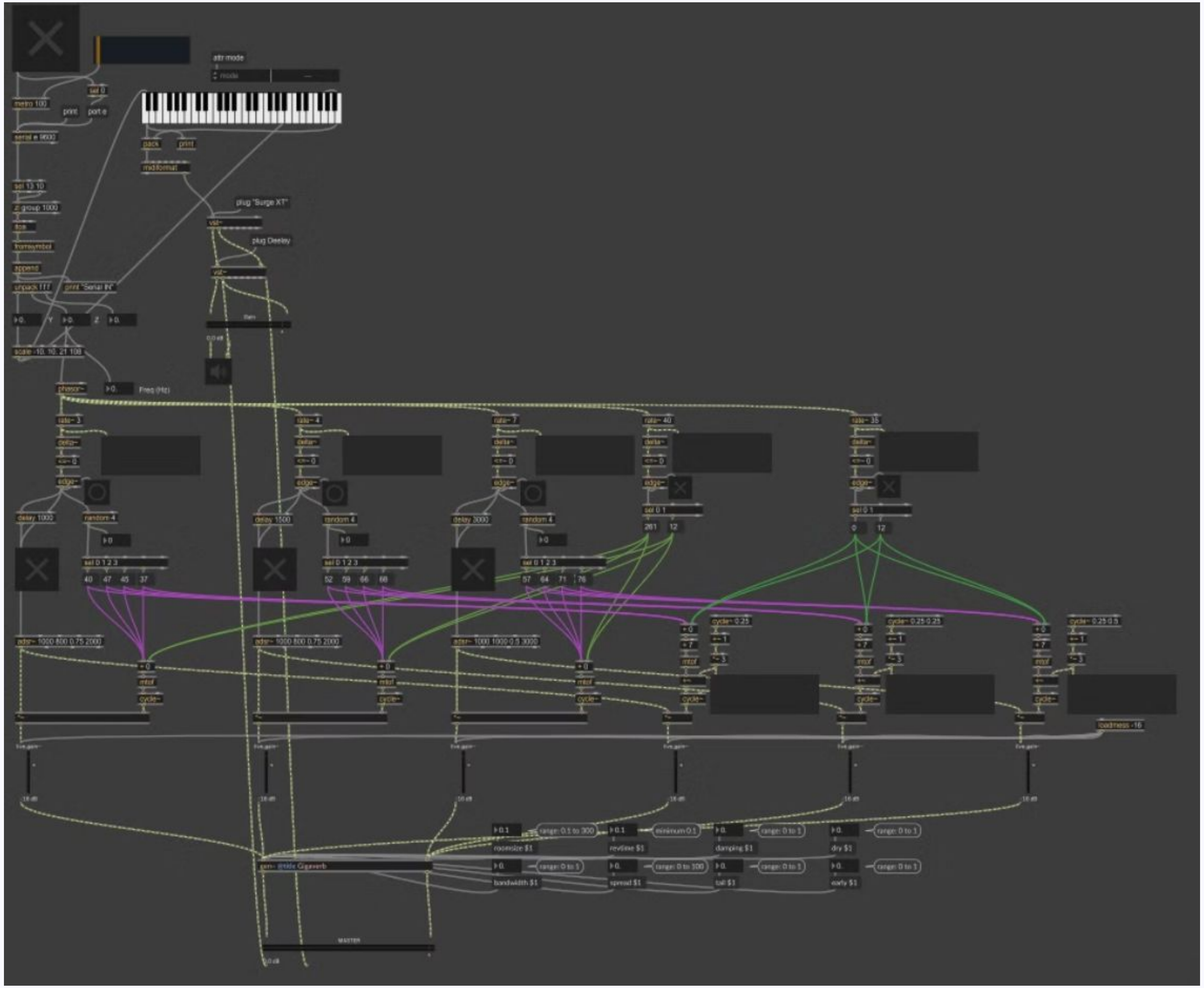

C
C#
D
D#
E
F
F#
G
G#
A
A#
B
PLAY
RESET
Scale: C Pentatonic - C4
No accelerometer connected
DRY
WET
1.00
TIMBRE
0.50
DRY / WET
50% Dry / 50% Wet
97.00
BPM
2.00
OCTAVE
ENVELOPE SETTINGS
5.0E
ATTACK
2.0E
DECAY
0.70
SUSTAIN
3.0E
RELEASE
0.04
PORTAMENTO
REVERB SETTINGS
50.00
REVERB VOLUME
5000.00
REVERB CROSSOVER
ENVELOPE VISUALIZATION
A
S
R

Demo 2 (Max/MSP)

In this demonstration, we'll explore how Max/MSP can transform physical movement into musical parameters.

We're using the powerful free VST synthesizer Surge XT as our sound source, paired with the Deelay effect plugin for time-based audio manipulation. The X-axis movement data (ranging from -10 to 10) is mapped to MIDI notes using the kslider object, which are then sent directly to the Surge XT synthesizer.

Simultaneously, Y-axis movement data feeds into a phasor~ object, creating cyclical patterns that control our note generator. This creates a dynamic relationship between physical gestures and musical output, similar to what we'll achieve with our conductive ink instruments.


attr mode
plug "Surge XT"
plug Deelay
Freq (Hz)
roomsize $1
revtime $1
damping $1
dry $1
bandwidth $1
spread $1
tail $1
early $1
MASTER

Text vs. Node-Based Creative Coding in the AI Era

As we will develop our conductive ink instruments, we'll use text-based coding (like Arduino) to translate physical inputs into sound.

Text-Based Coding

- Offers precise control through written commands
- Essential for understanding core programming concepts
- Skills remain relevant even as AI tools like GitHub Copilot assist with code generation

Node-Based Programming

- Visual approach that connects functional blocks with "wires"
- Intuitive for sound design and signal processing
- Encourages experimentation and rapid prototyping

Understanding both paradigms gives you versatility in expressing your creative ideas and prepares you to work with both traditional coding and emerging AI-augmented tools.