

# **Musical Instrument Building** *with I-CubeX*

by Axel Mulder

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1. What is I-CubeX ?
2. What is Live ?
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Sensors & Interface, Software and Support

<http://ICubeX.com>

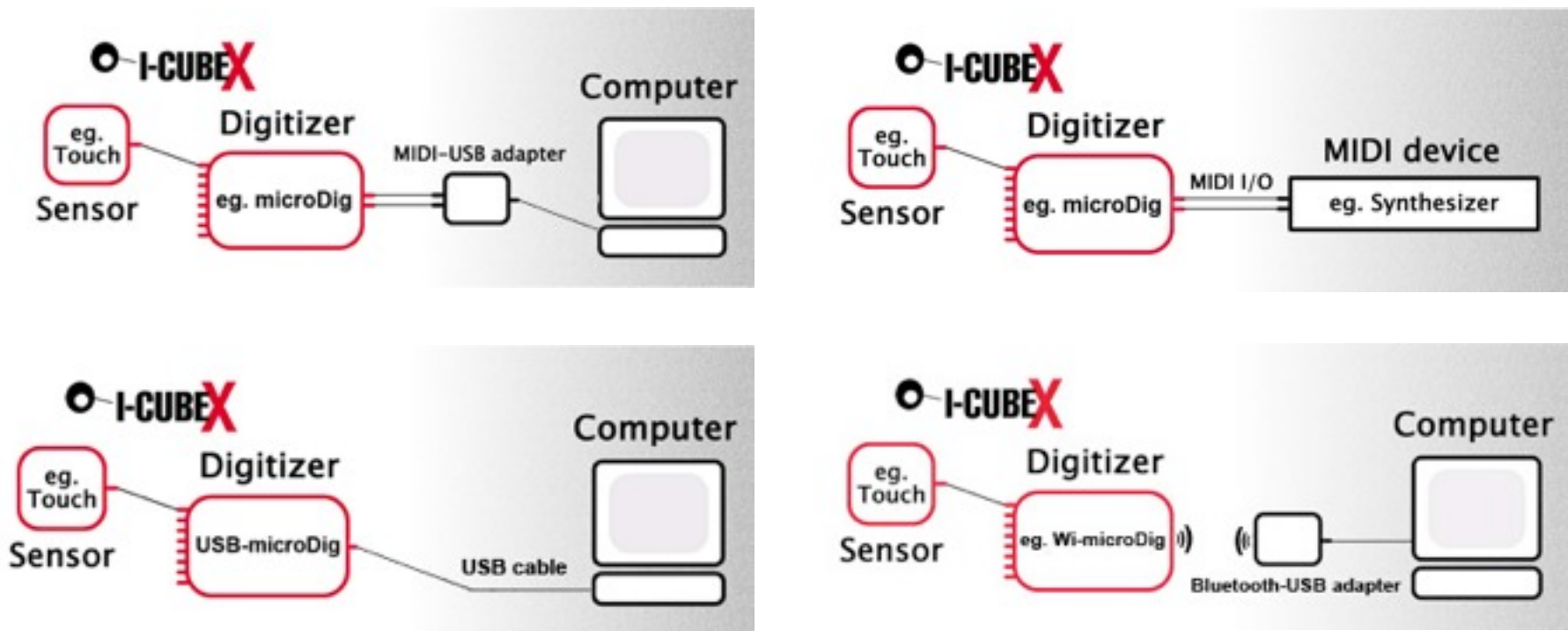


# Sensor technologies

- Piezo-resistance (FSR, strain gauge)
- Piezo-electricity (also PIR)
- Ultrasound TOF
- RF TOF (radar)
- Bio-potentials (EMG, EEG, EOG)
- Hall effect
- Electro-magnetic field (capacitance, inductance)
- Electro-optical (camera, LED)
- Microwave radiation

# I-CubeX basics

Let me show you that live ...



See also <http://icubex.com/about>

# Interfaces

- Wi-microDig: wireless
- USB-microDig: USB
- microDig: MIDI
- Digitizer: MIDI, hi-res

# microDig

## MIDI sensor interface



8 inputs, 10 bit resolution, 1562 Hz sample rate (max), I<sup>2</sup>C capable

# USB-microDig

USB sensor interface



8 inputs, 10 bit resolution, 6250 Hz sample rate (max), I<sup>2</sup>C capable



# Wi-microDig

## Wireless sensor interface



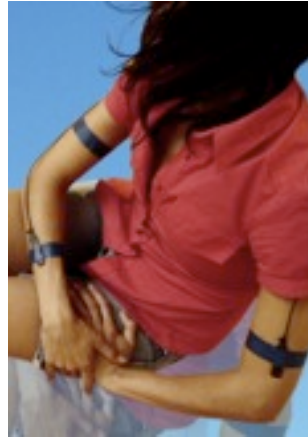
8 inputs, 10 bit resolution, 5760 Hz sample rate (max)

100 meter range (Bluetooth class 1), I<sup>2</sup>C capable

# I-CubeX applications



Music



Dance



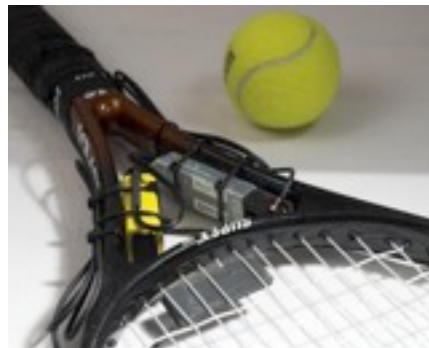
Installation Art



Exhibit Design



Game Dev



Biomechanics

*need picture !*

Behaviour Research

# I-CubeX origins

PhD goal

Enable creation of musical instruments that can be adapted to motor skills a performer may ..

.. **already have** eg. cellist changing to trumpet

.. **prefer** eg. novice prefers cellist gestures, but trumpet sound

.. **be limited to** eg. dwarf wanting to play upright base

>> Virtual Musical Instruments

PhD “experiment”: SoundSculpting

# *Sound Sculpting*

*Axel Mulder*

*Sidney Fels*

*Kenji Mase*

ATR MIC Research

# What is Live ?

- Made by Ableton, Germany
- Sequencer
- Sampler
- Tracks: MIDI, audio
- Extendable: VST, Max for Live
- Controllable: MIDI, keyboard

# I-CubeX + Live demo

- Touch, Spin2D (sensors)
- USB-microDig (digitizer)
- Dig4Live (Max for Live device)
- Pan flute + Resonator (sound model)

>> eDidgeridu