

ZKM | KA

July 2017 - July 2023

Dan Wilcox 26.07.2023



Background







The Frank-Ratchye
STUDIO
for Creative Inquiry

edp
emergent
digital
practices



CHALMERS



Motivation

Experiments

Systems for Performance

***Silly* Things**



R

+

D

Artist Engineer Musician Performer

Artist Engineer Musician Performer

Art Sniffer 2008

With Pierre Proske

PUT YOUR
FIVE WORDS
HERE!

good

art

with

as

sense





Danceoke 2009

With Anika Hirt

Heading to Mars 2012





MARS SOCIETY DESERT RESEARCH STATION

MAJOR SPONSORS
THE MUSK FOUNDATION





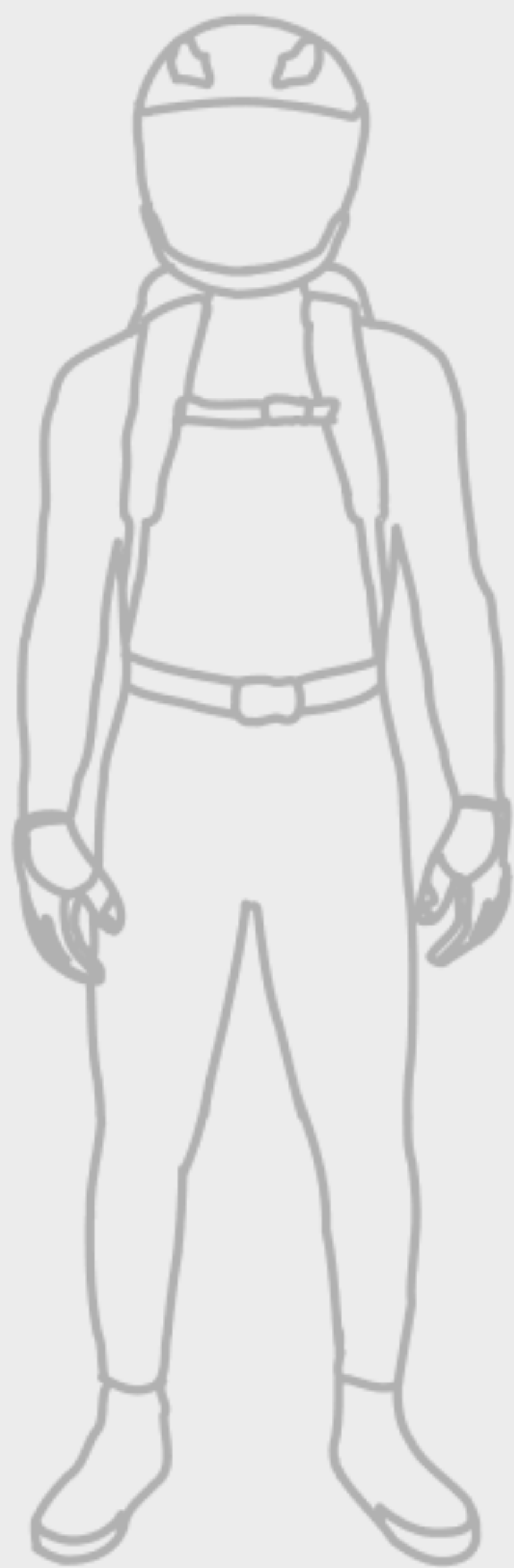












la CAbinet

A QUARTERLY OF ART AND CULTURE
ISSUE 63 THE DESERT
US \$12 CANADA \$12 UK £7





Foto: danomatika
www.danomatika.com

ESKAPISMUS

ARCHITEKTUR ALS MITTEL ZUR WELTFLUCHT

VIA Twerk 2015

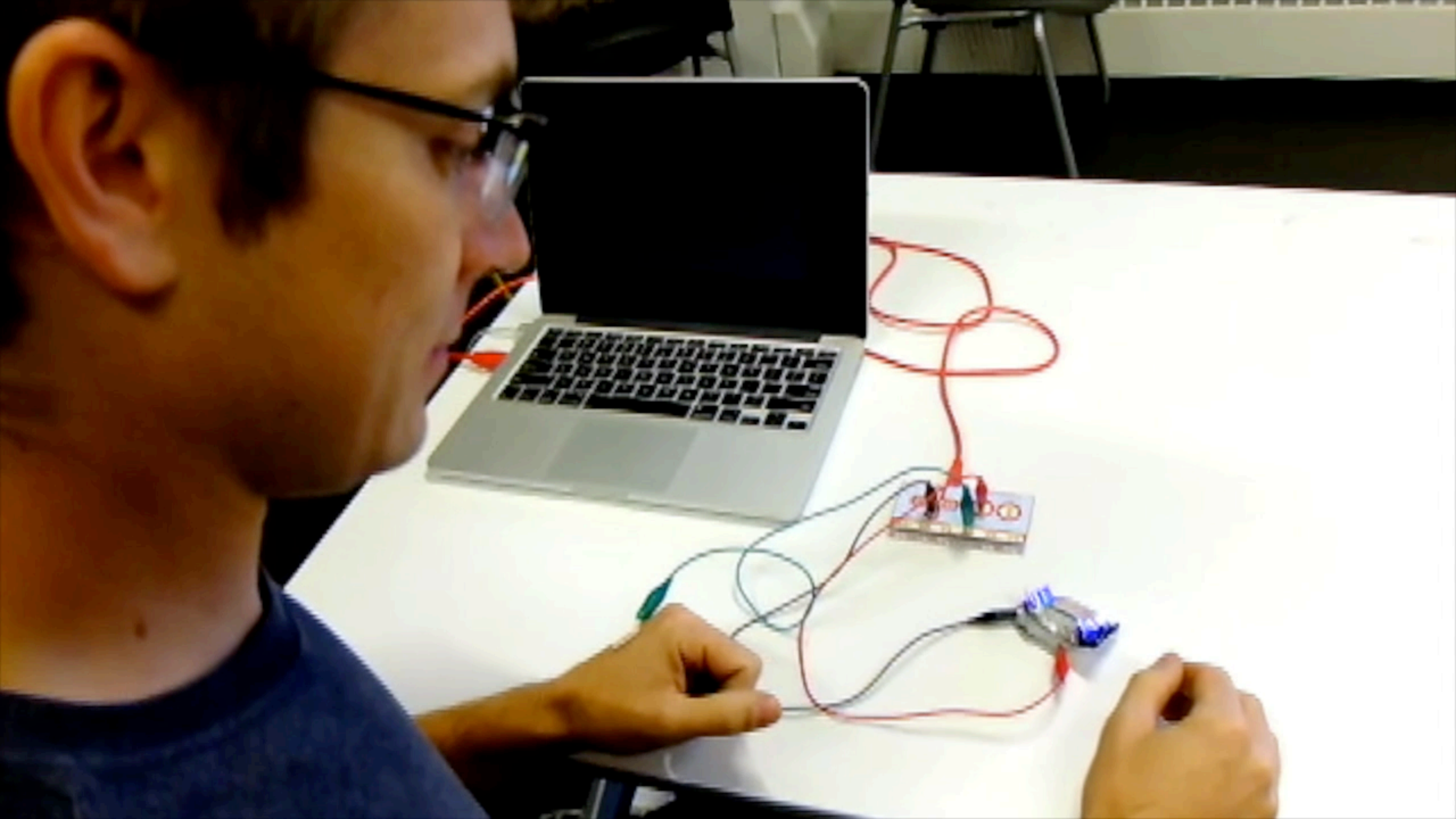
For VIA PGH

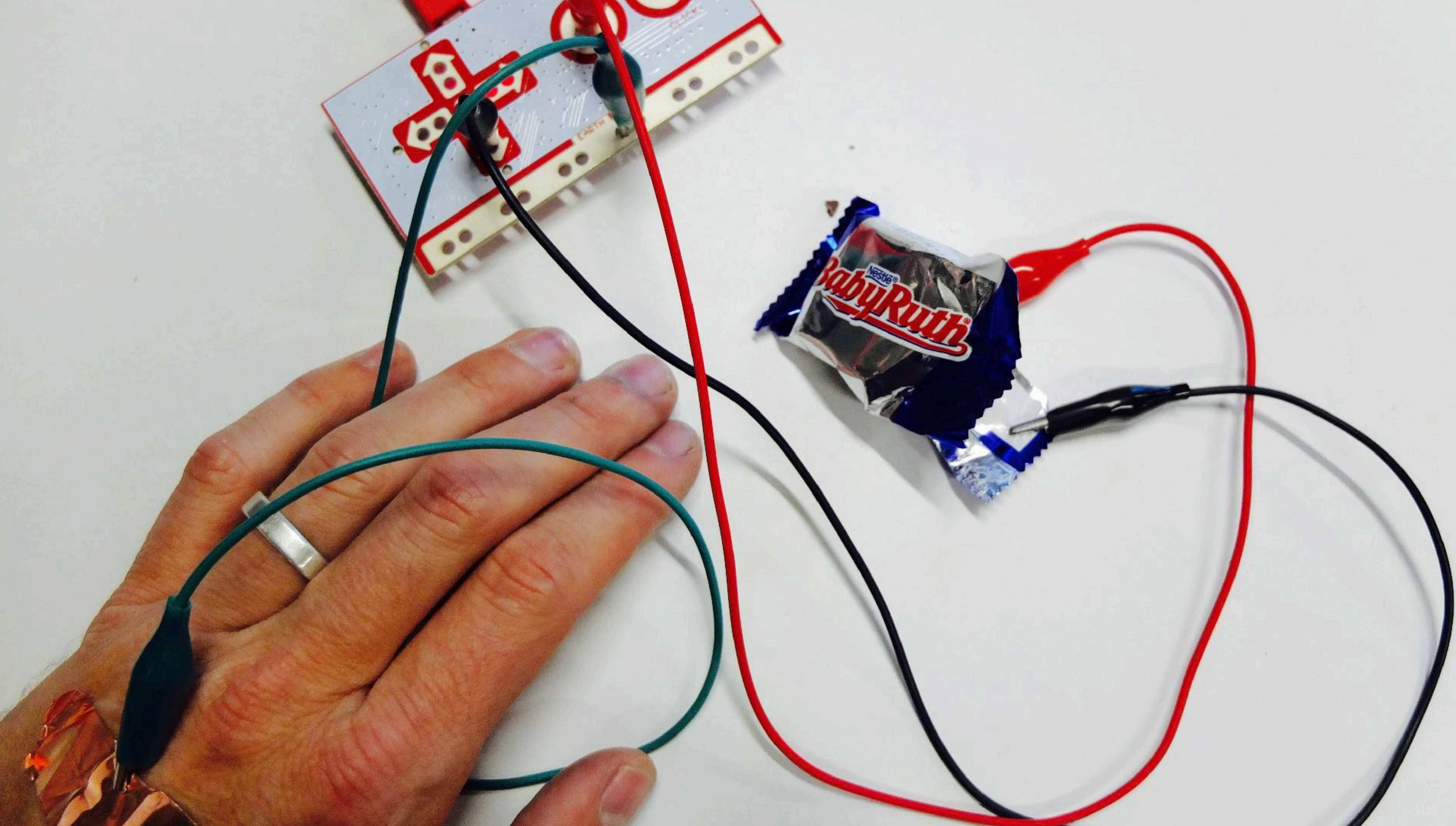


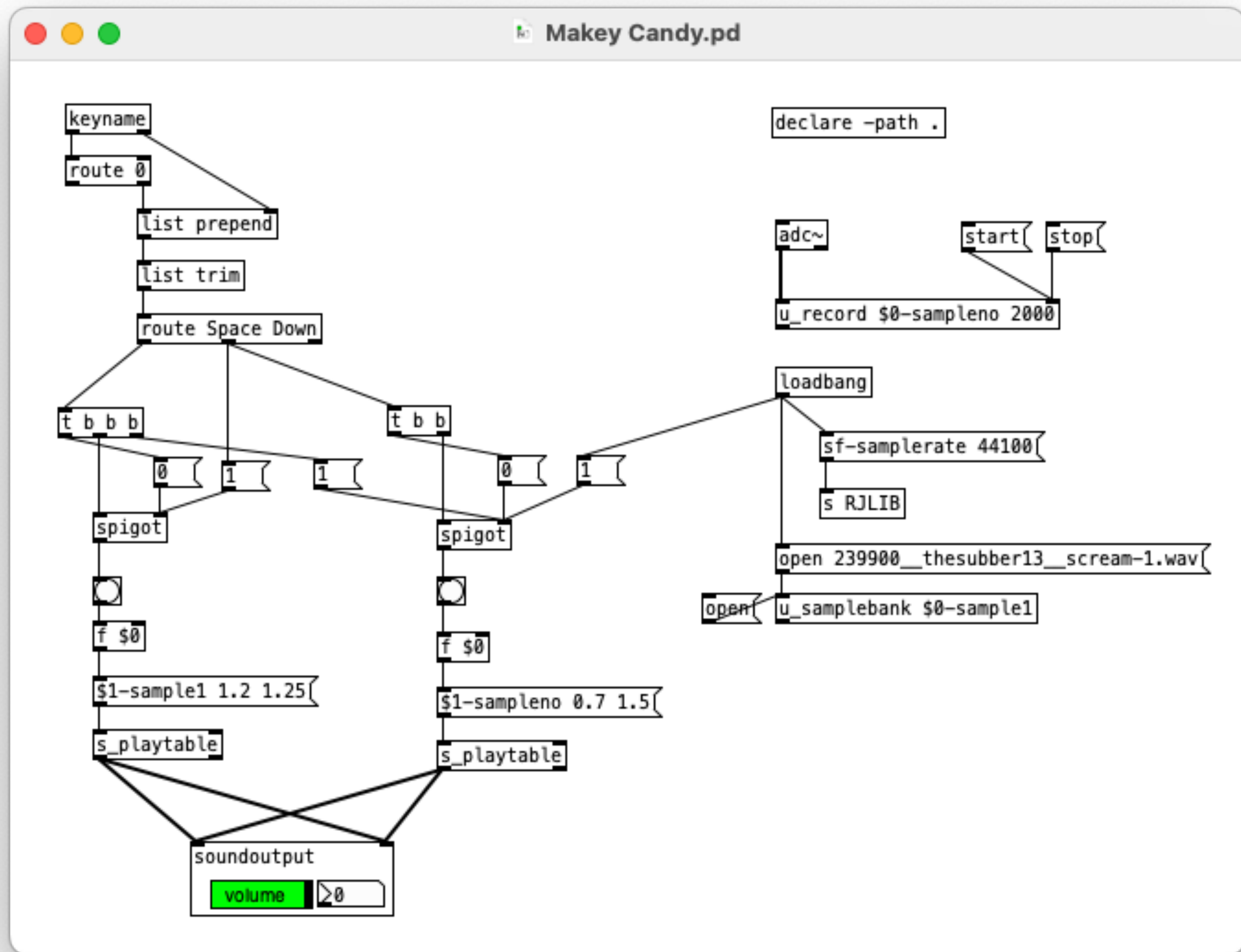




Make Candy 2015

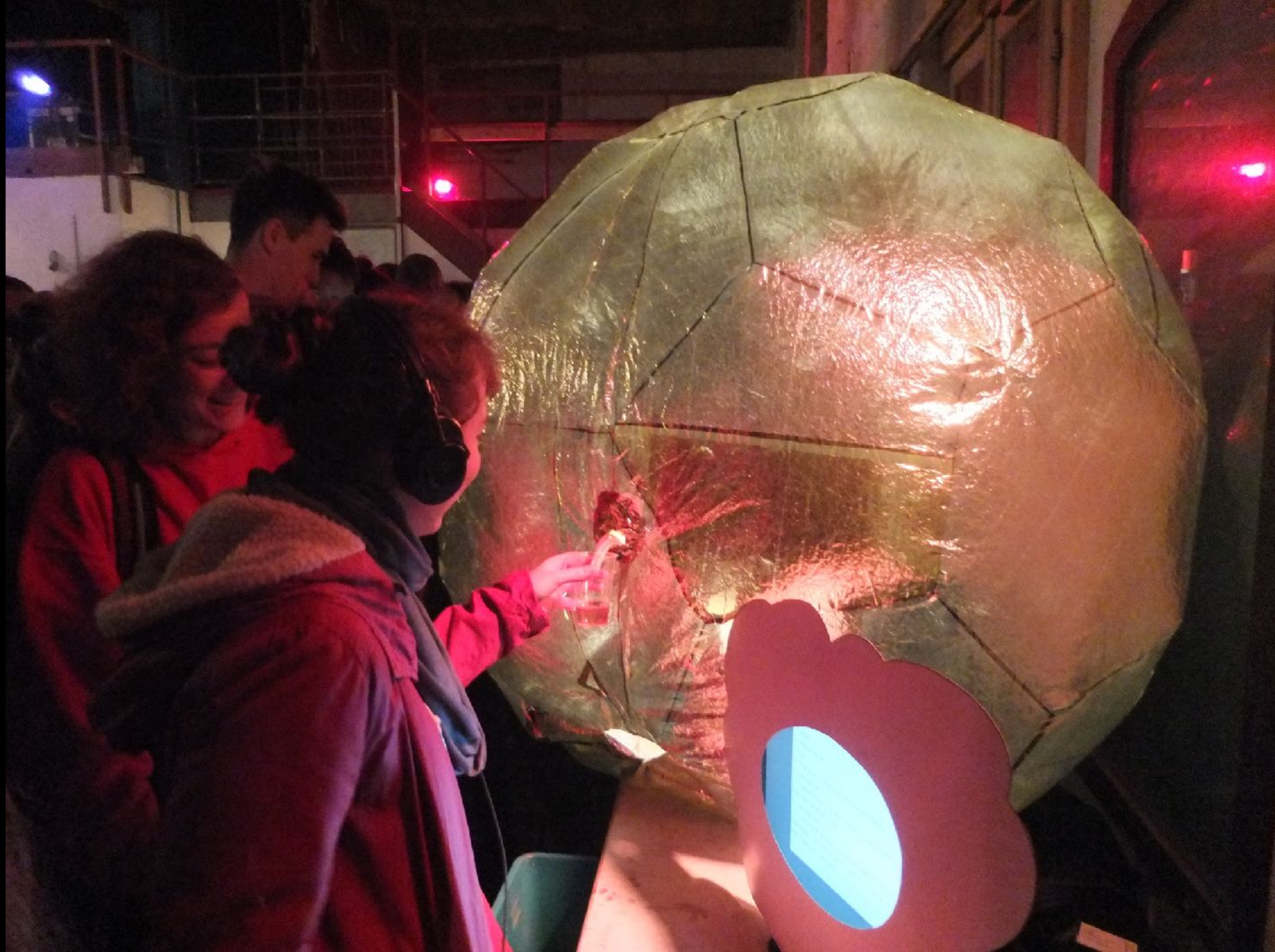






Trust Me 2016

With Anika Hirt





Golden Ass: Why are you interested in whether I
am or not?

Golden Ass: Hello.

You: make one thank you thank you thank you

Golden Ass: Making a jamaican martini. It's going
to be amazing. Trust me.

You: no

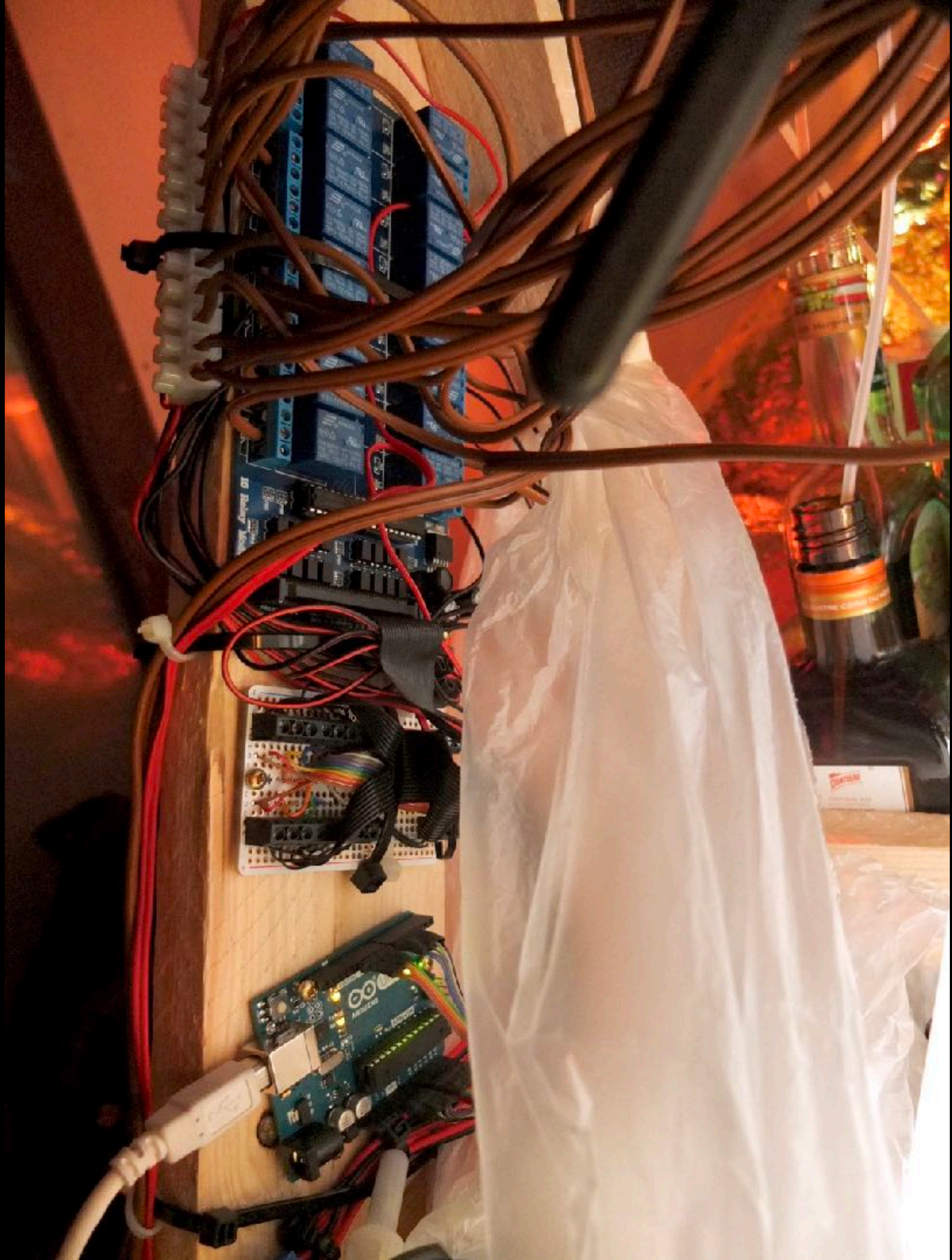
Golden Ass: Why not?

You: what's up

Golden Ass: I'm not sure I understand you fully,
but I'm pretty sure I don't care.









video

Learning







Teaching

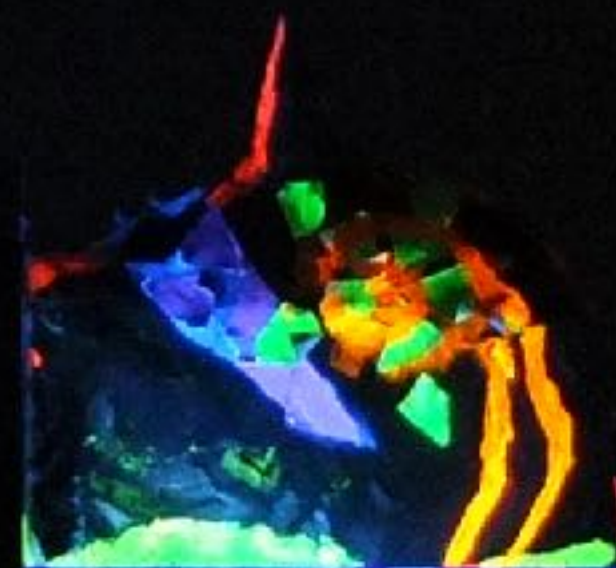
















Artist Engineer Musician Performer



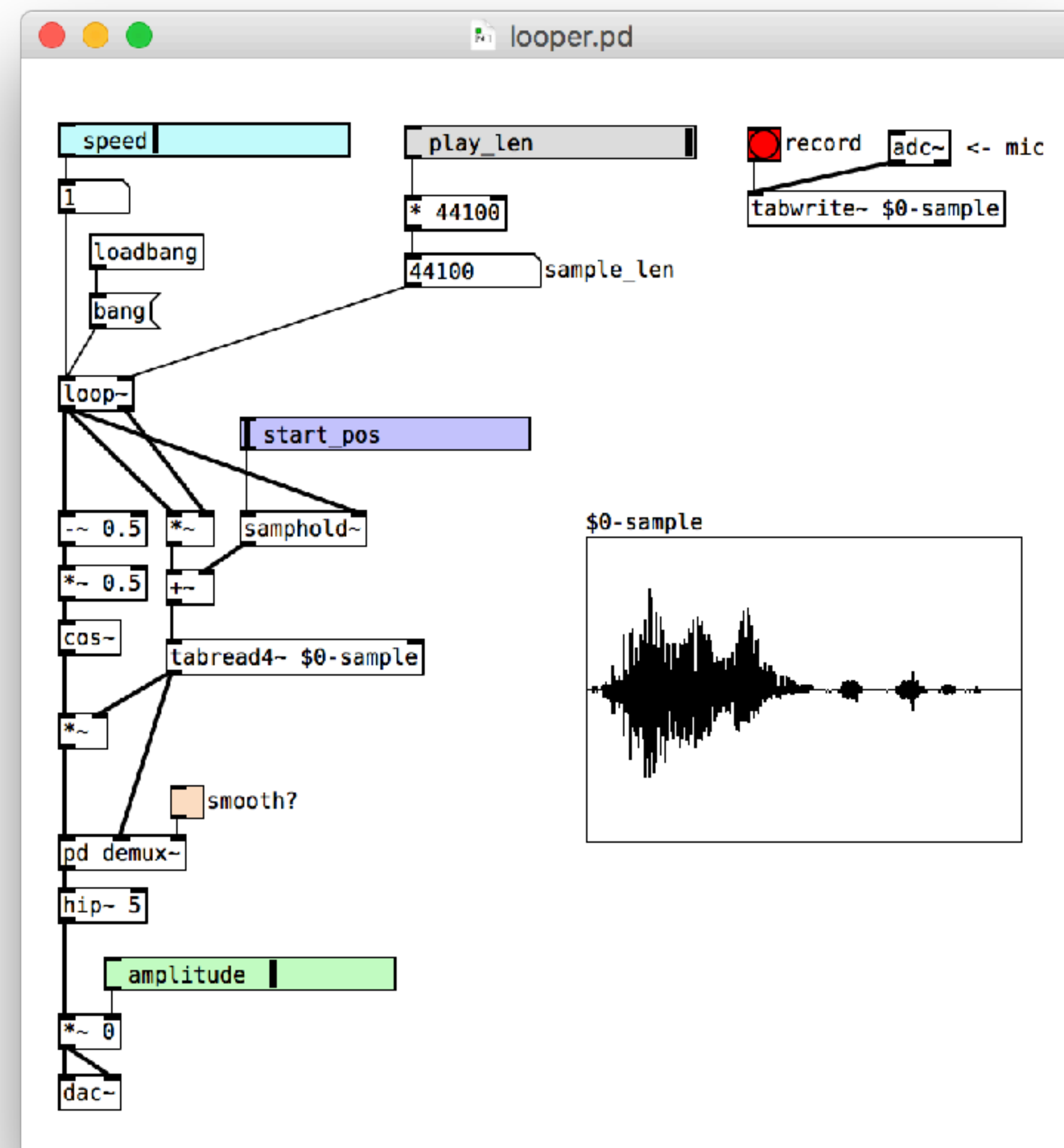




Open Source Tools

Dataflow: boxes & lines

The diagram illustrates the atomic structure of Palladium (Pd). The central nucleus contains 46 protons (blue circles) and 46 neutrons (green circles). The nucleus is surrounded by four concentric electron shells. The outermost shell contains 10 electrons (blue circles). The shells are labeled with their principal quantum numbers: 1, 2, 3, and 4.



Pure Data



Pure Data

libpd

[About](#)[Showcase](#)[Get It](#)[Documentation](#)[Read the Book](#)[Community](#)



Inception: The App



RjDj



Pugs Luv Beats



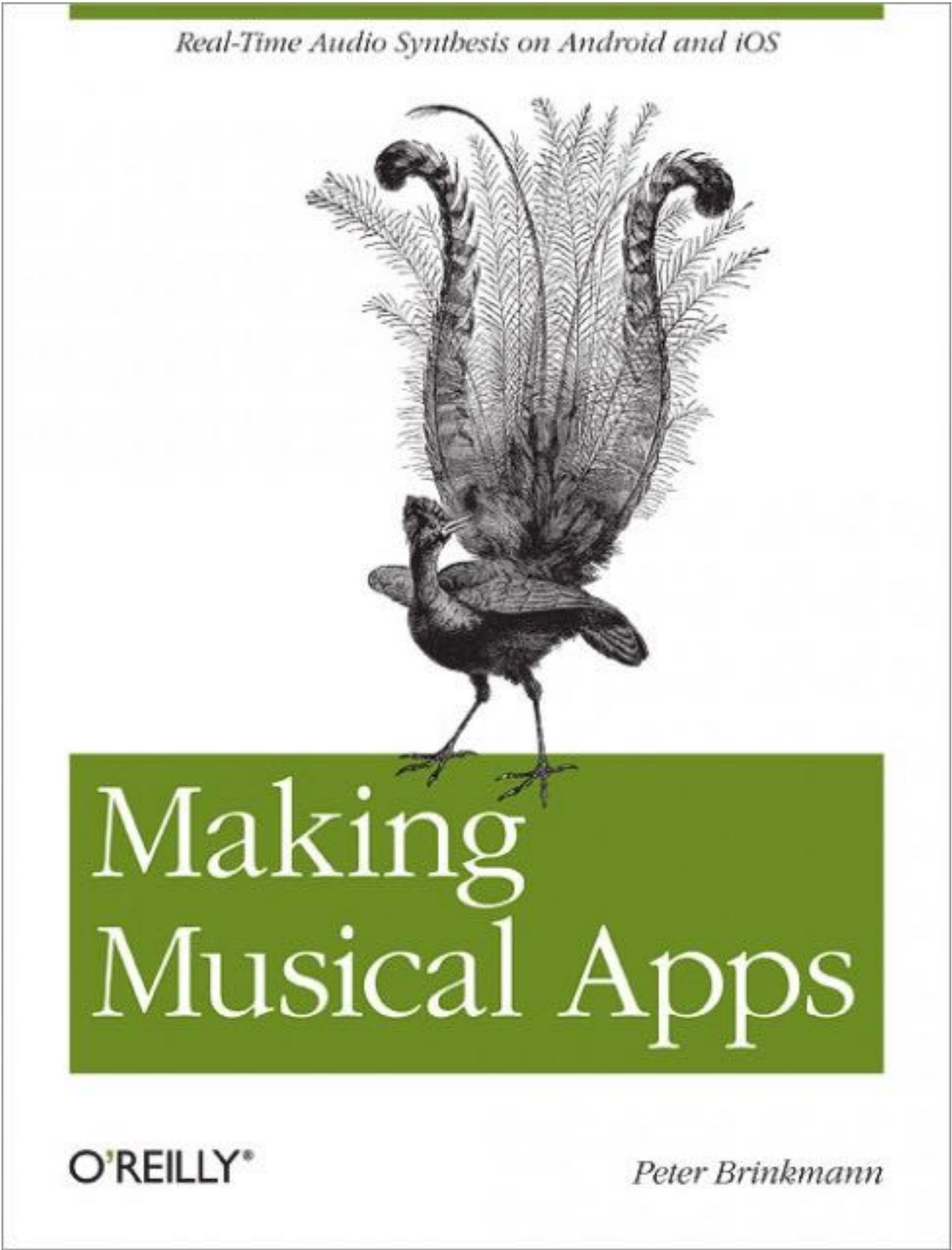
Dimensions



NodeBeat



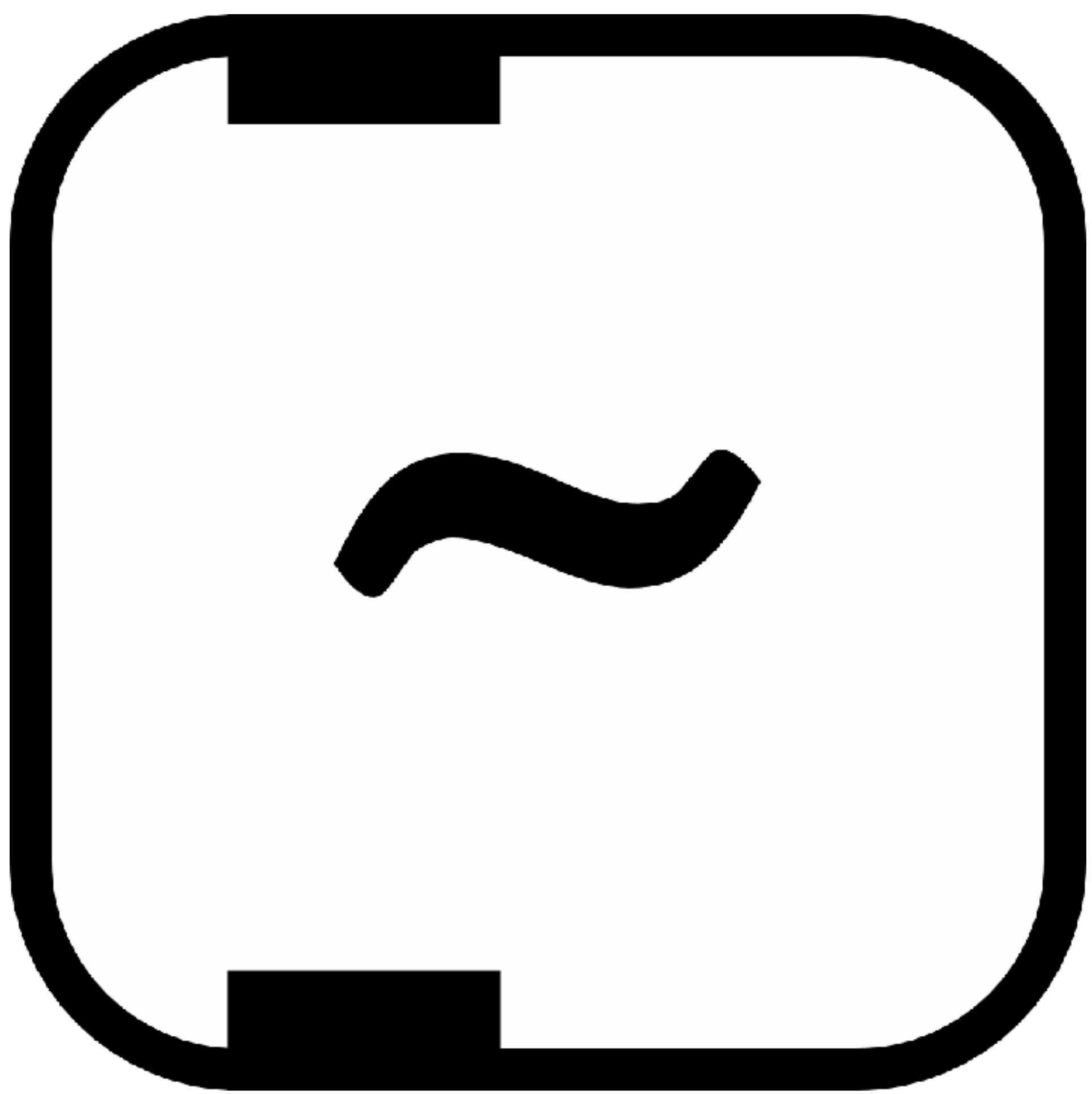
Sonaur

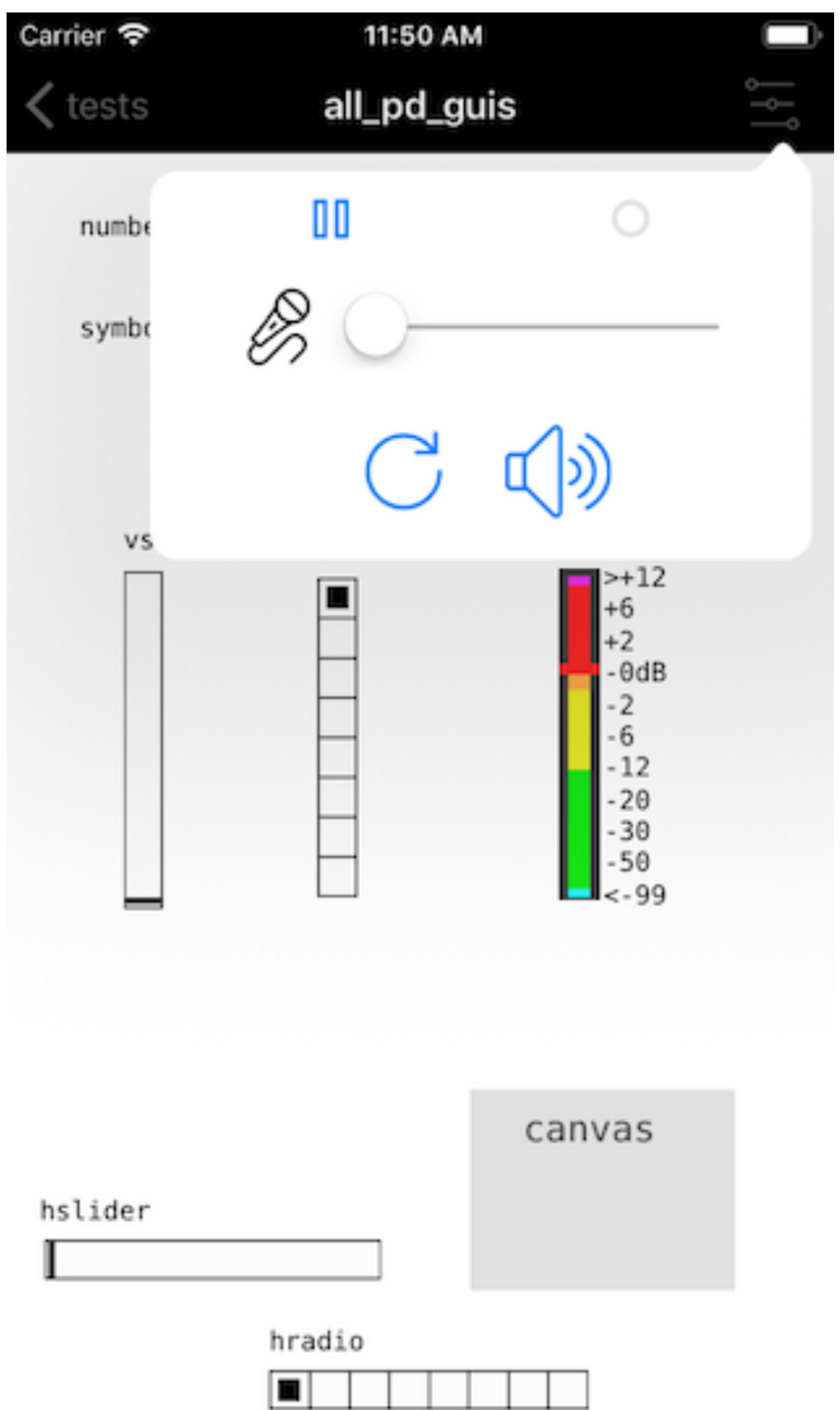


PdParty 2016-present

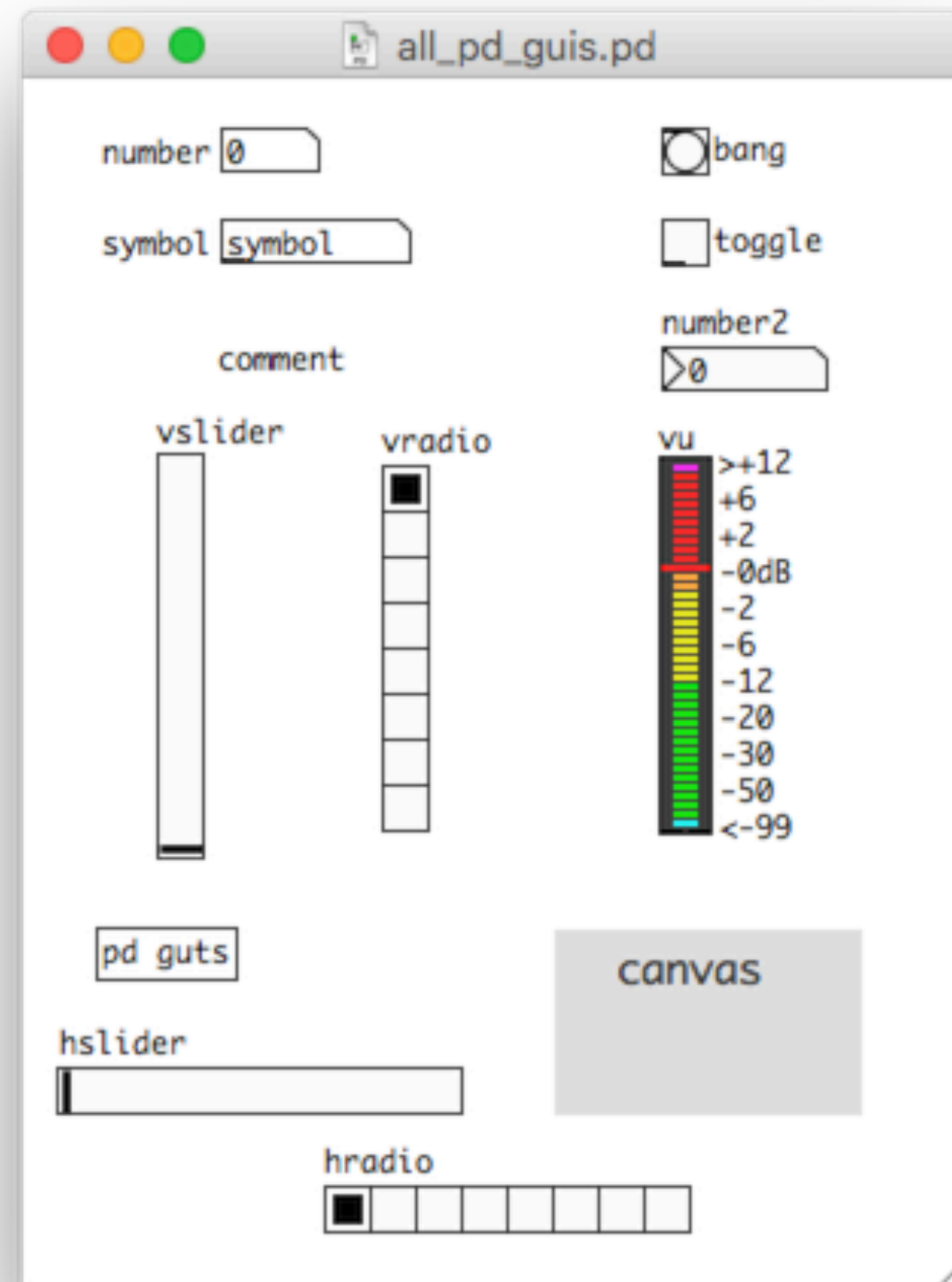




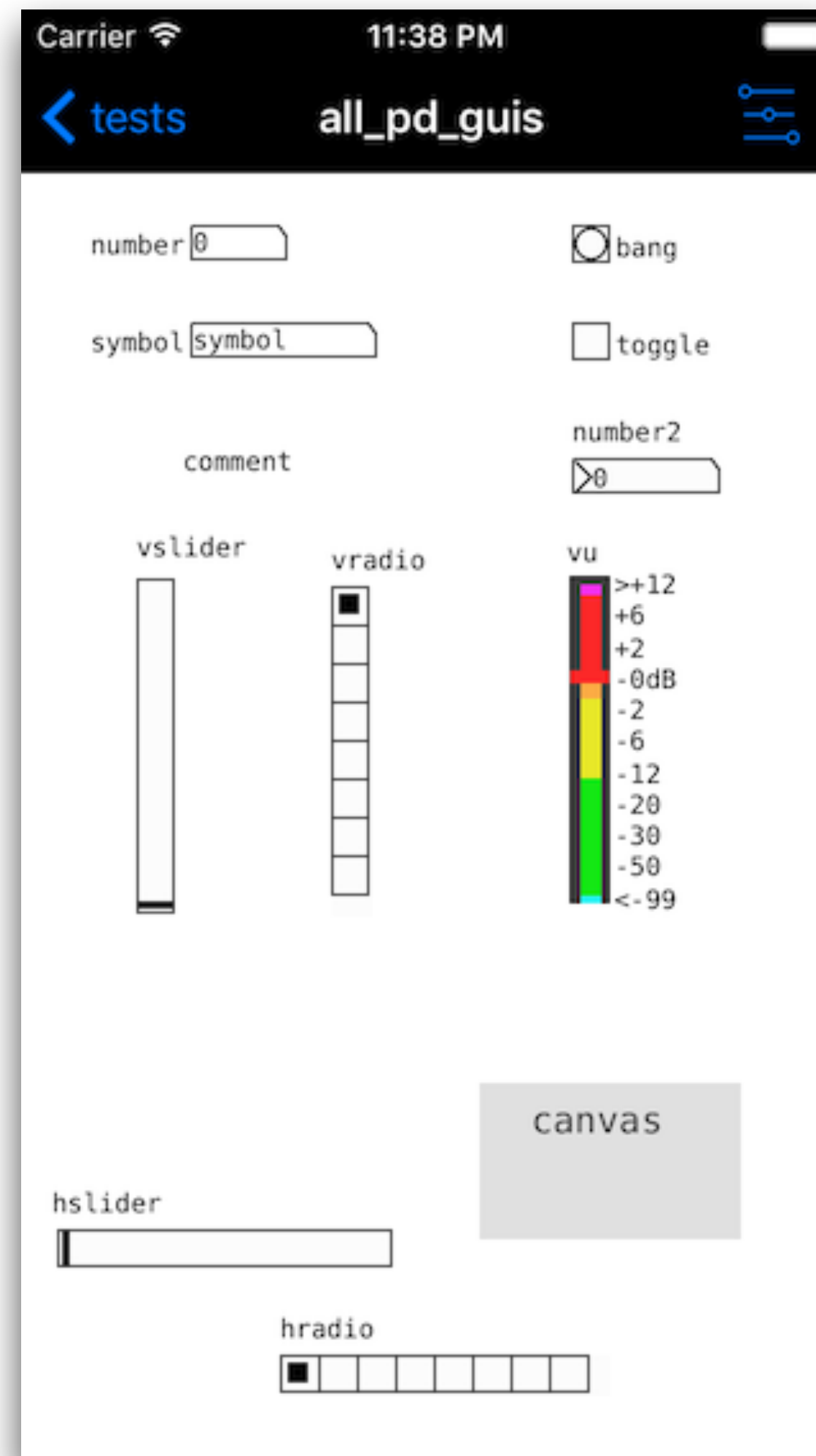




A patch on a desktop system...



...opens on an iOS device



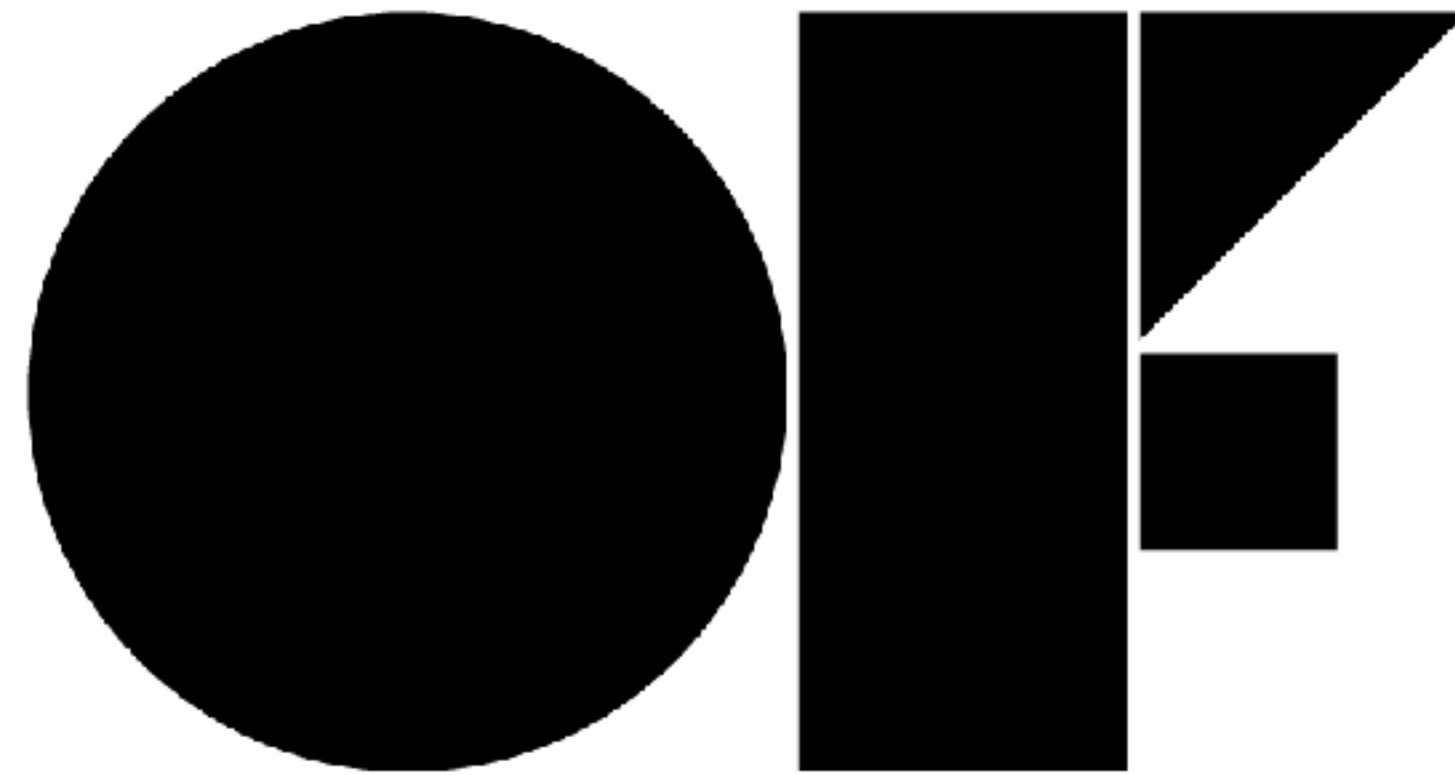
bang

until

PdParty

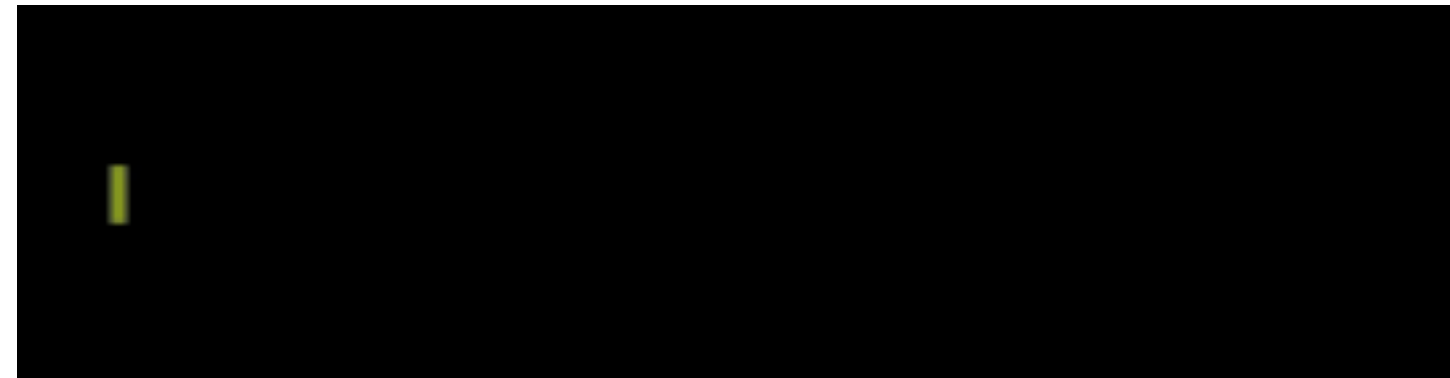
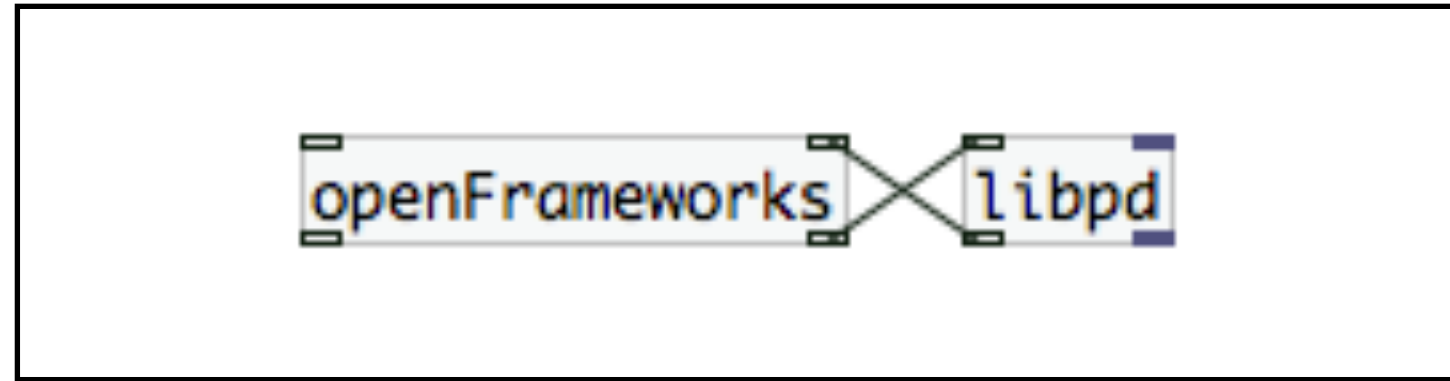
openFrameworks

Creative coding toolkit (C++)



openFrameworks

Addon libraries



loaf 2016-present





```
helloworld.lua
9 angle = 0
10 xOffset = 0
11 yOffset = 0
12
13 function setup()
14     of.setCircleResolution(50);
15     of.background(50)
16
17     of.setWindowTitle("hello world")
18     print("hello world")
19
20     -- start OSC listener
21     loaf.setListenPort(9999)
22     loaf.startListening()
23 end
24
25 function draw()
26
27     -- draw circle using size computed with the sine function
28     of.setColor(255, 200, 10)
29     of.drawCircle(xOffset + of.getWidth()/2,
30                 yOffset + of.getHeight()/2,
31                 math.sin(angle) * 100 + 200)
32
33     -- update the animation variable
34     angle = angle + 0.01
35 end
36
37 function oscReceived(message)
38
39     -- print received message
40     print(tostring(message))
41
42     -- parse messages based on address
43     if message.address == "/circle/x" then
```


Artist Engineer Musician Performer



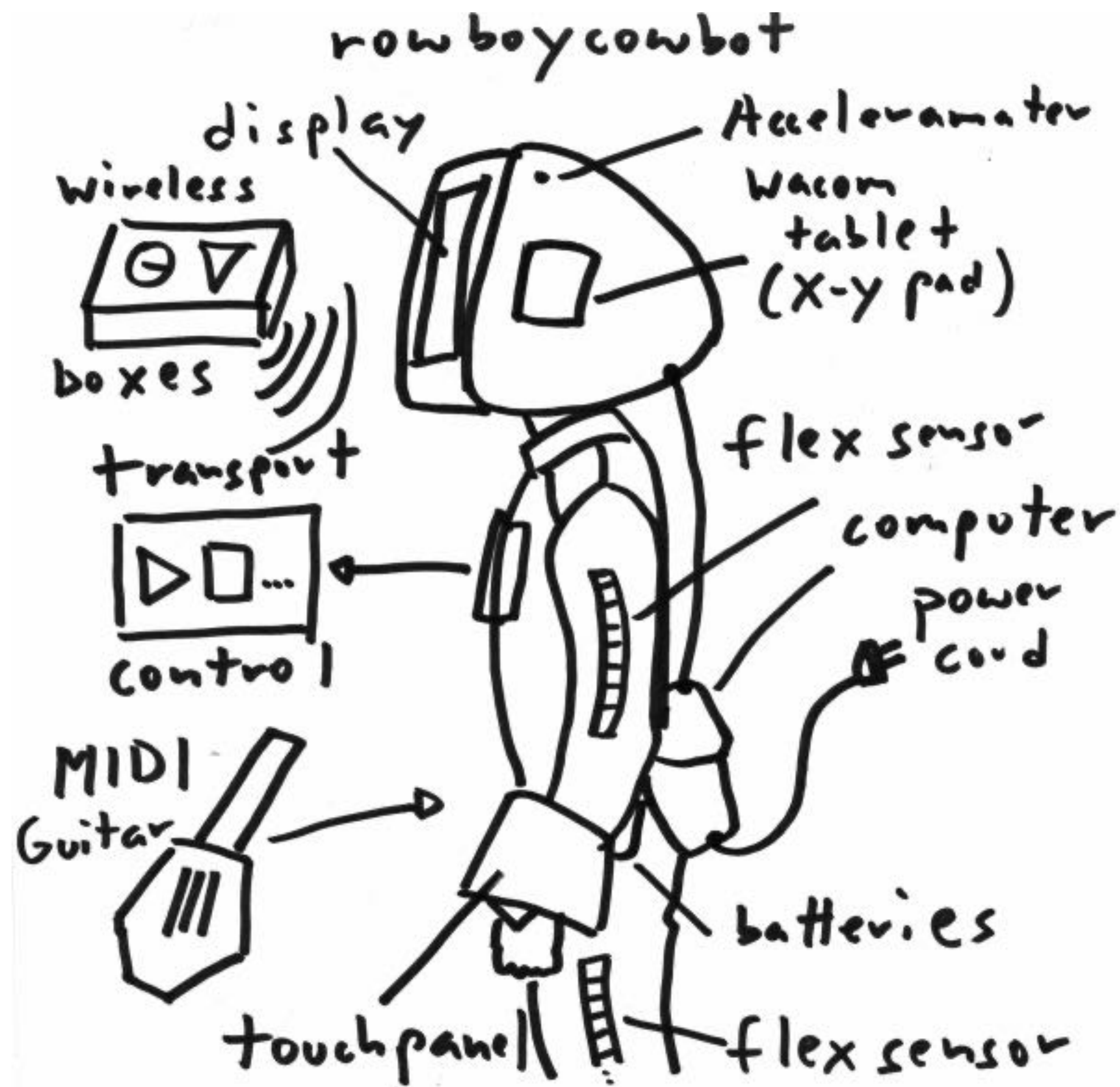


robotcowboy 2006-present



robotcowboy



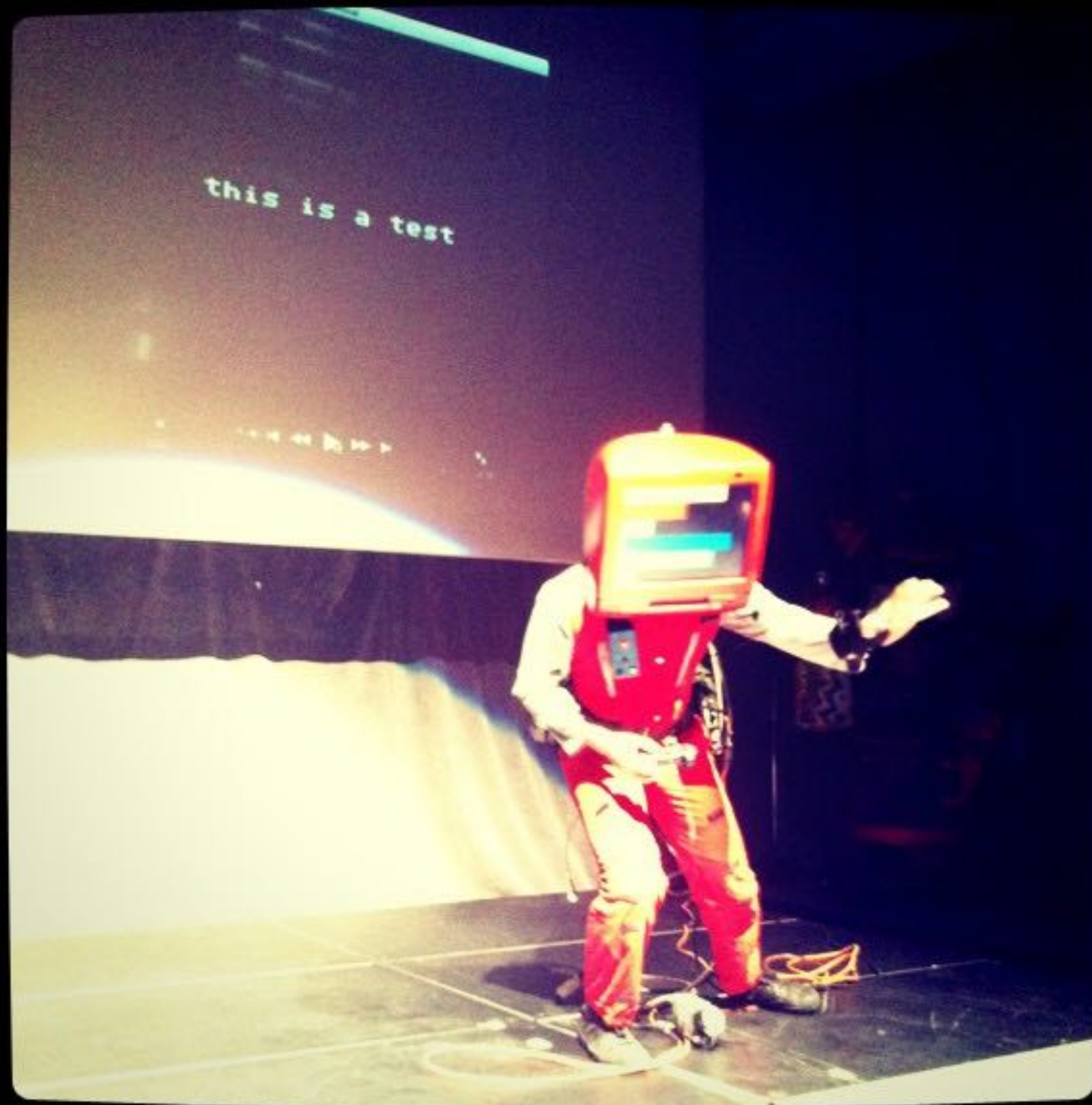


Robot Cowboy











United States ↗





r o b o t c o w b o y

Onward

to Mars













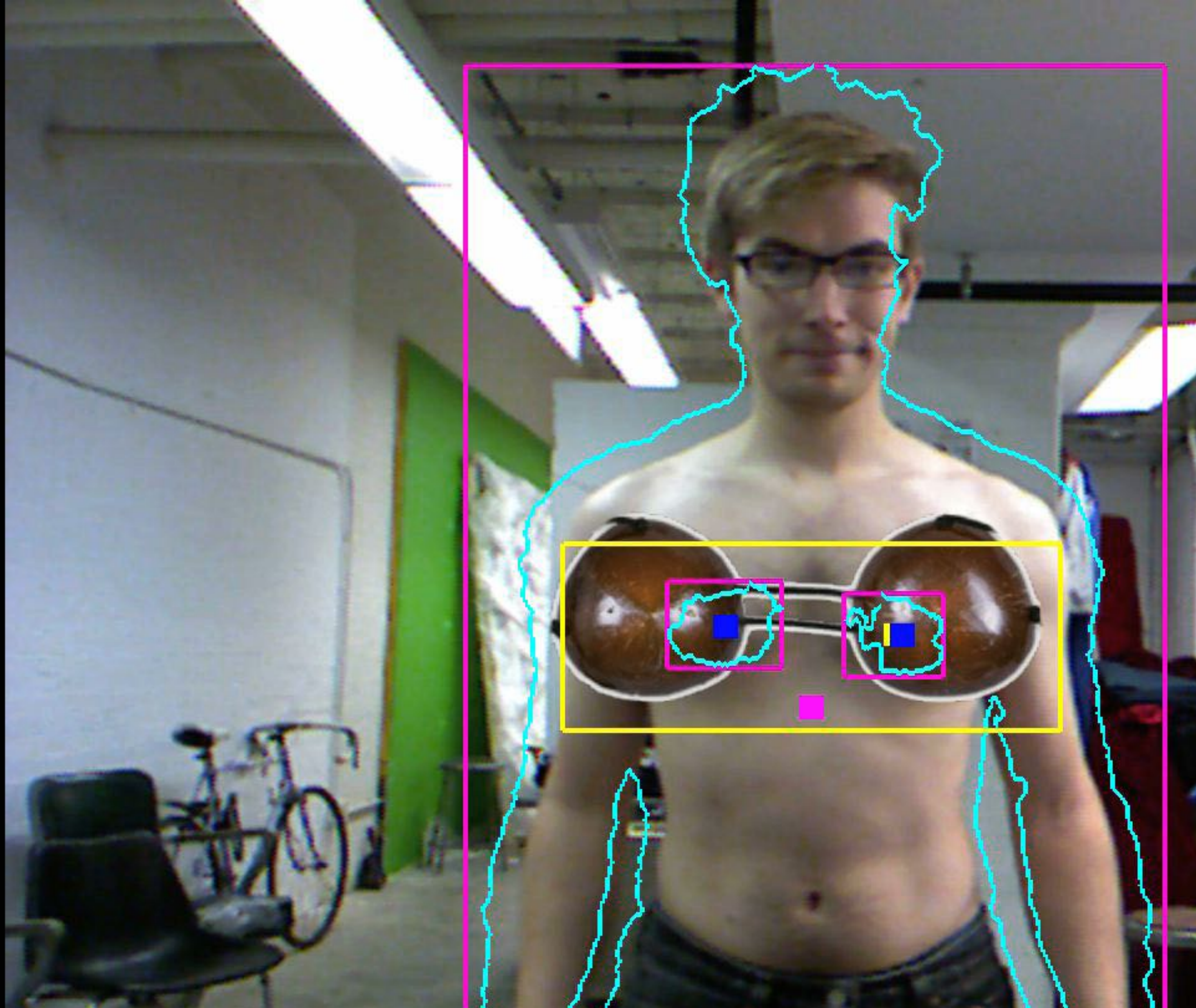






Kinect Titty Tracker 2011







Australian news The Age: "*Hackers Kinect games to the bedroom*"
3 Dec 2010

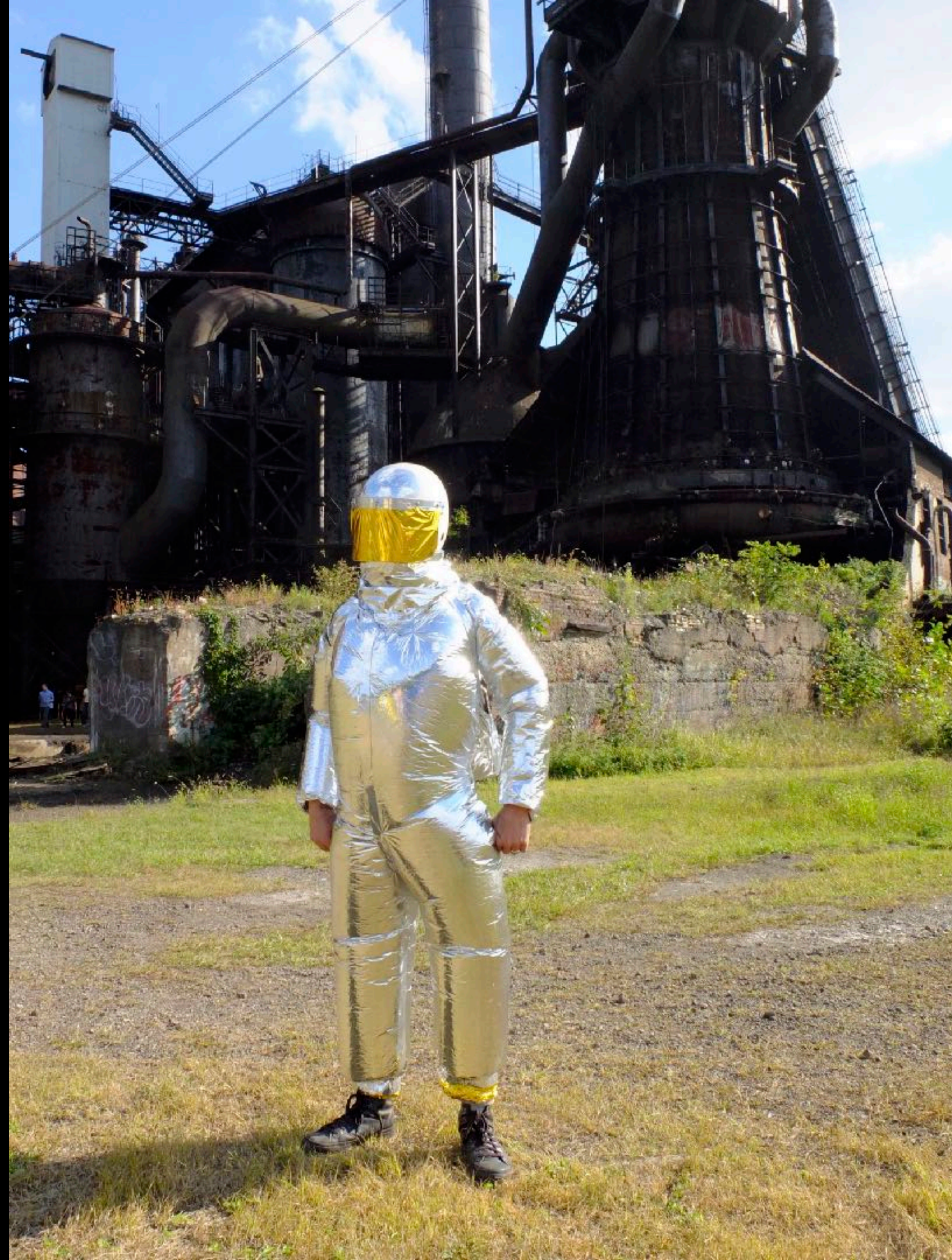
*... there's been a spate of videos using the technology, such as this
man putting a BRA on himself*

Return of the Spirit of Molten Iron

2013

Costume by Anika Hirt





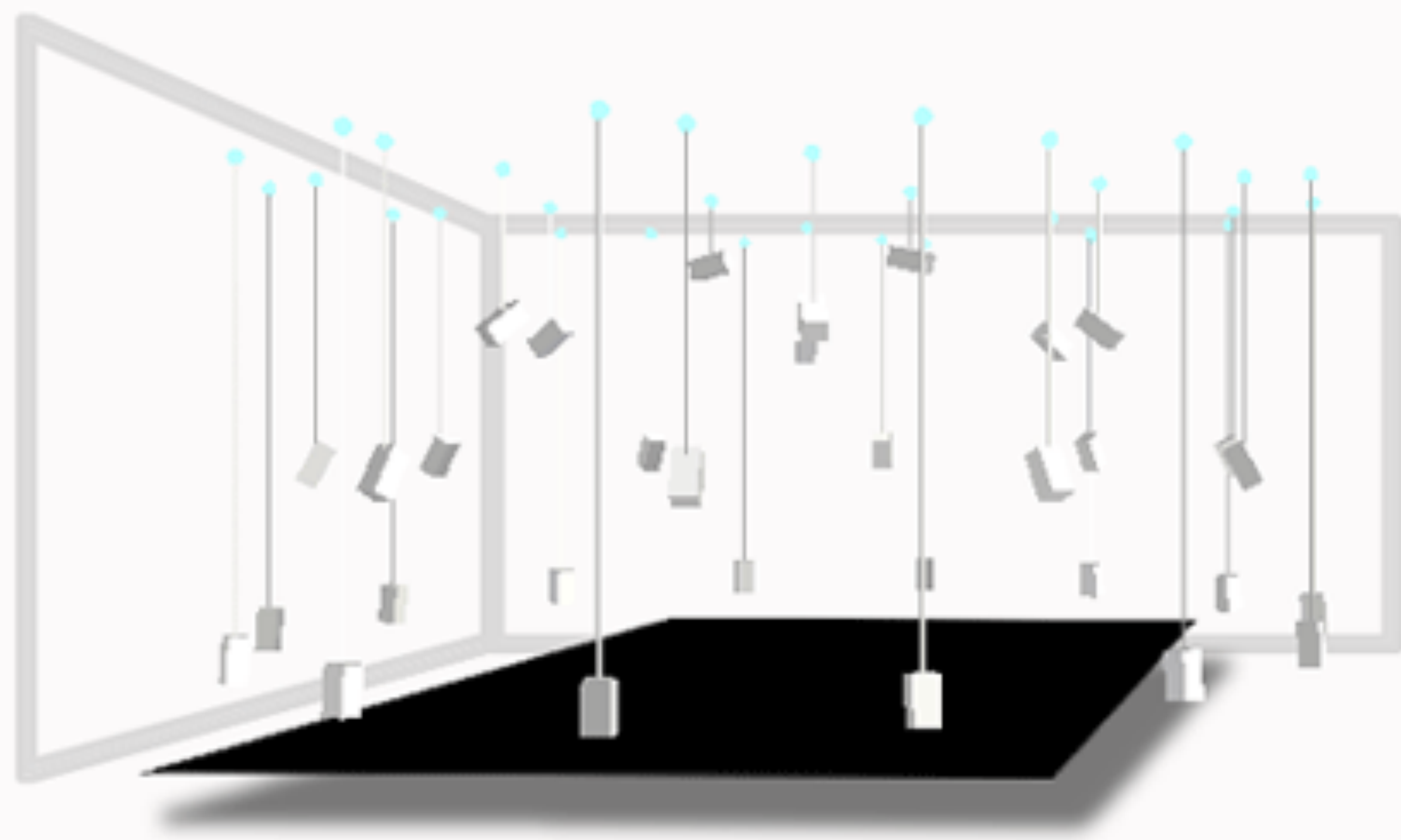


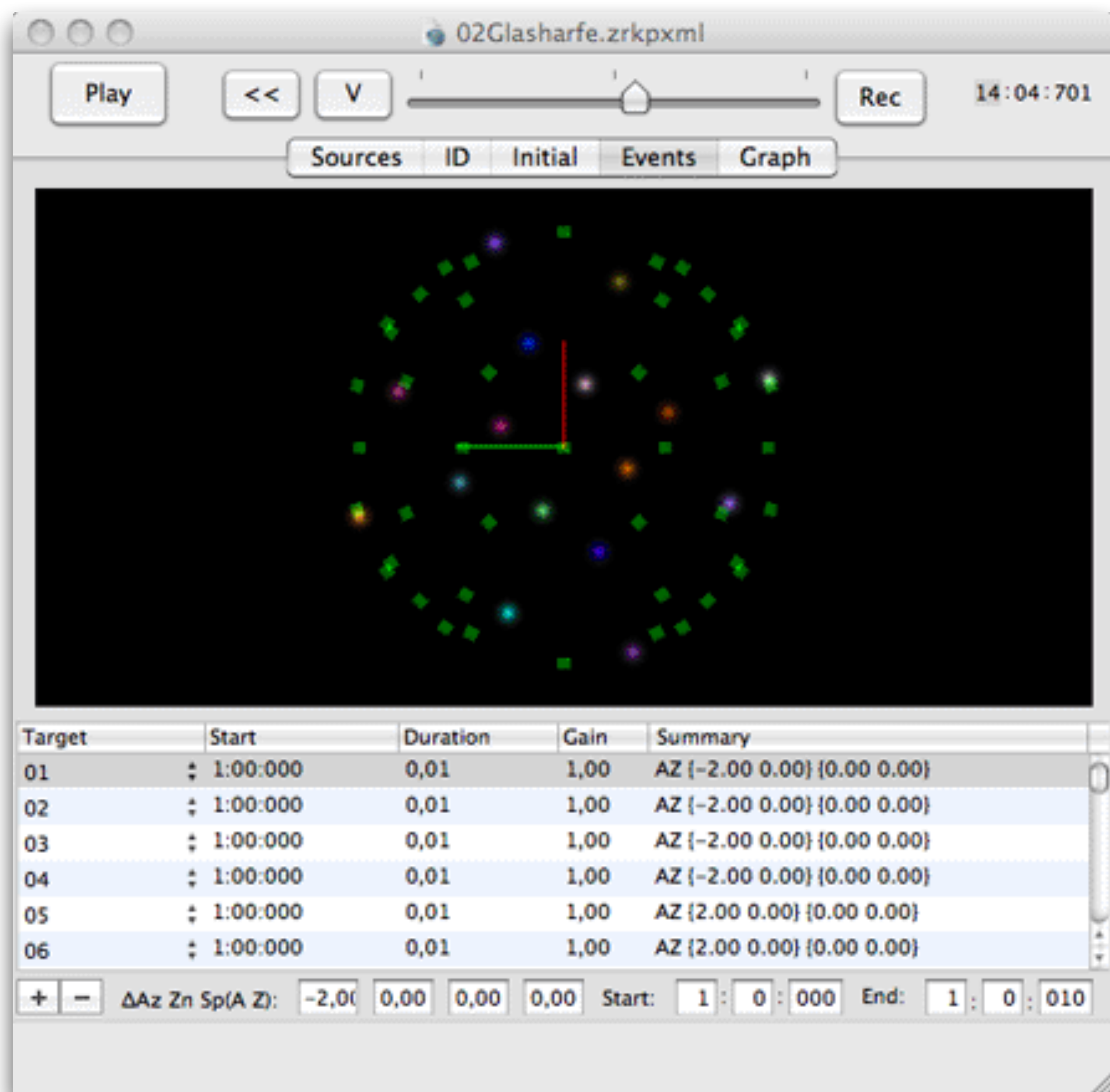


/// |< |||

Zirkonium 3 2017-present

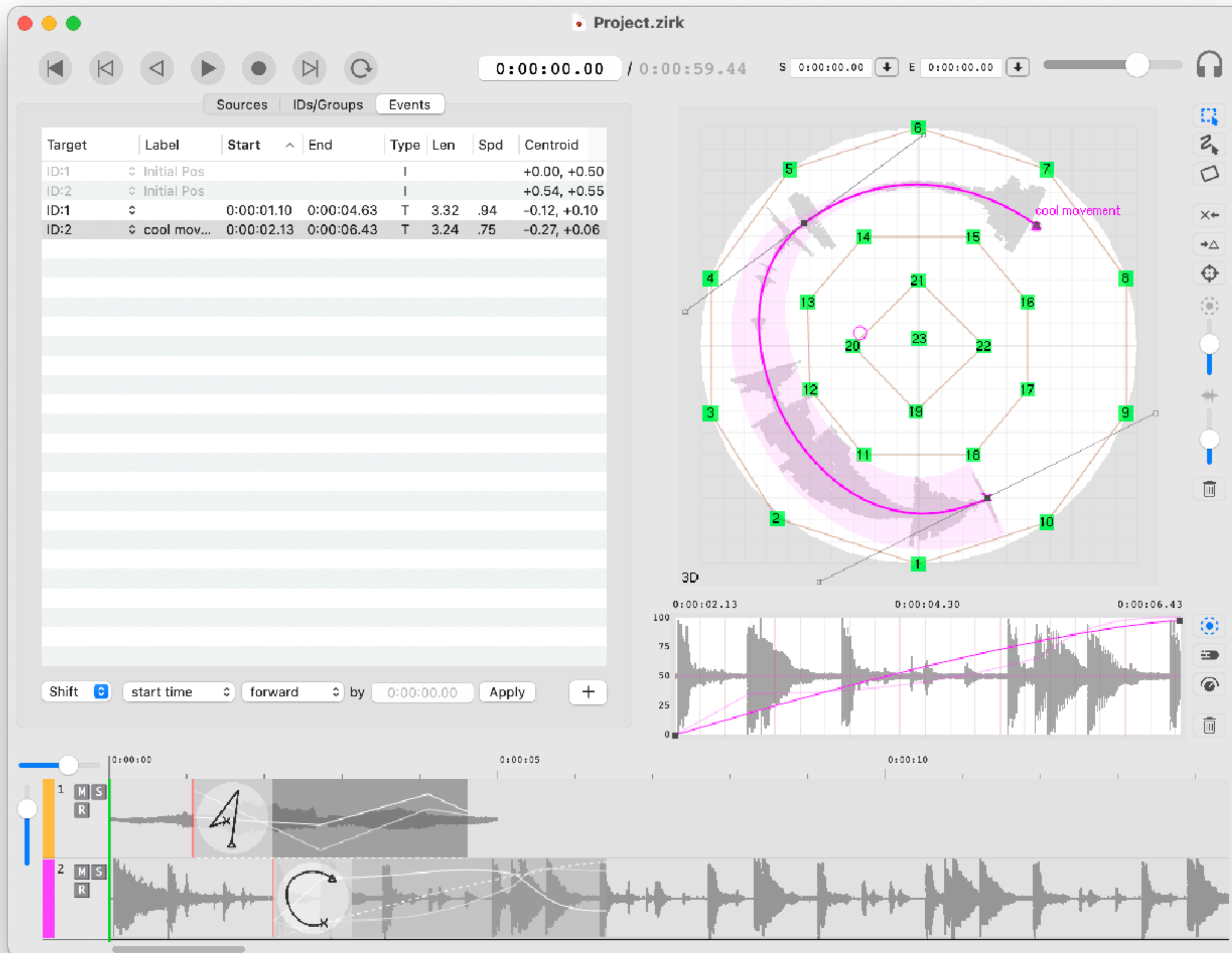




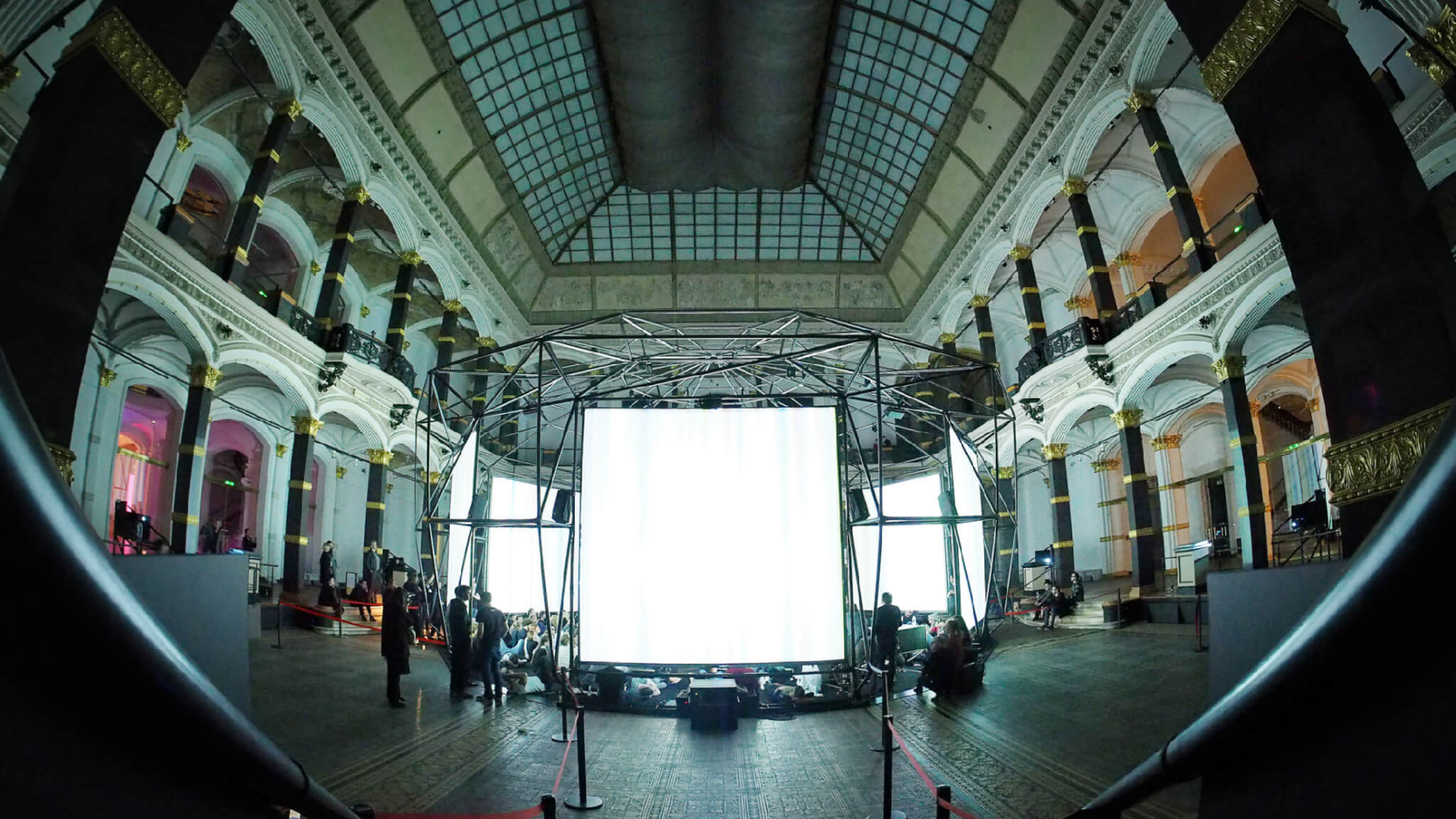


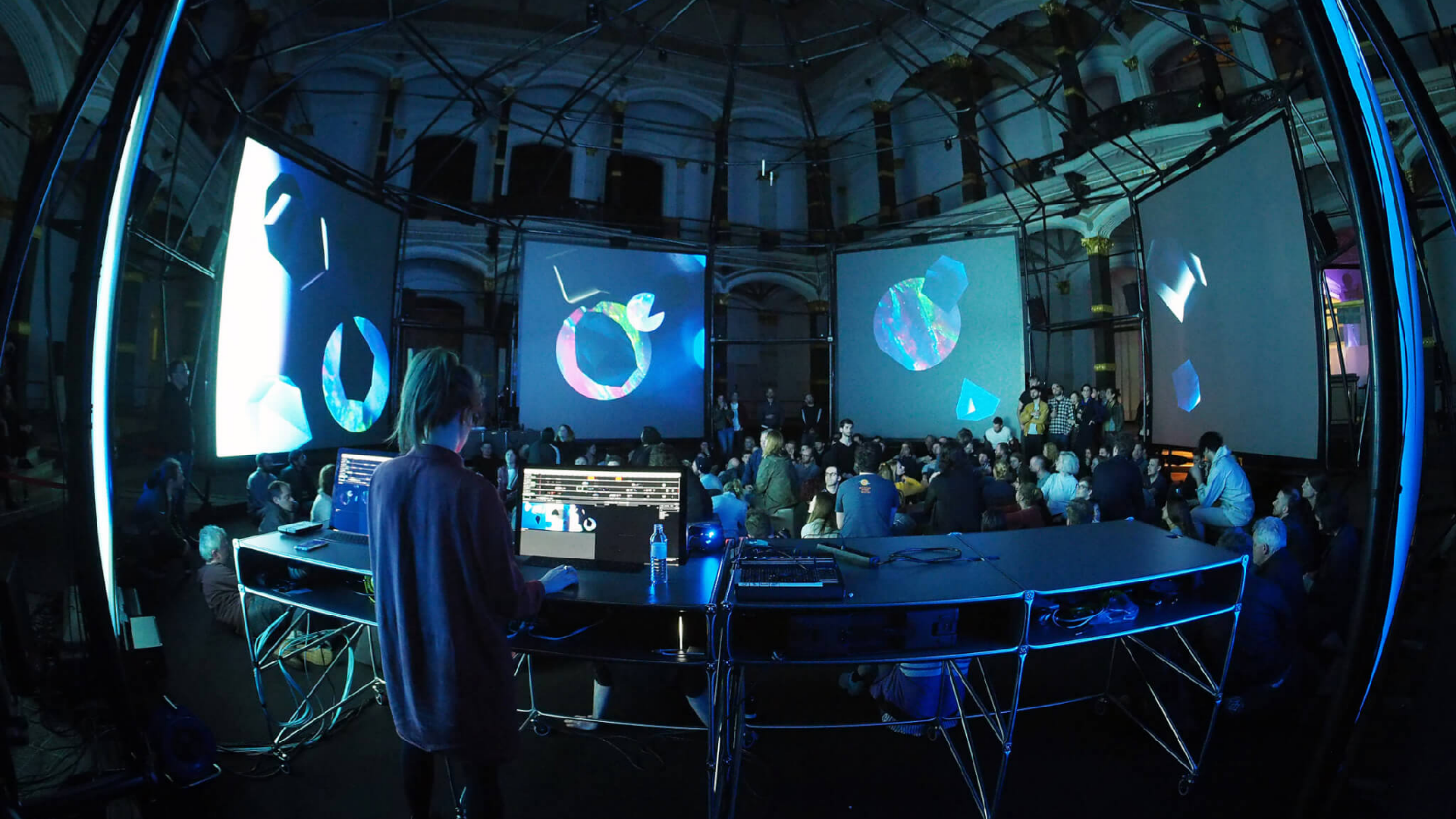


**MAKE ZIRKONIUM
GREAT AGAIN**



demo





MusiCode & LindenmayerExplorer 2017


```

scene.add(new THREE.AmbientLight(0xffffff));
return container;
}

camera = new THREE.OrthographicCamera( -window.innerWidth / 2, window.innerWidth / 2,
camera.position.set(0, 0, 100);
camera.lookAt(v3());

if (display == "main") {
  scene.add(mainObject(1, -window.innerWidth / 2, window.innerHeight / 2));
  scene.add(ABCMatrix(abcms).translateX(window.innerWidth / 2));
  setInitialMatrix(alphabetMatrix);
}

else if (display == "mobile") {
  scene.add(mainObject());
  let camerabox = new THREE.Object3D();
  camerabox.add(camera);
  camerabox.name = "camerabox";
  scene.add(camerabox);
  controls = new THREE.DeviceOrientationControls(scene);
}

else if (display == "history") {
  scene.add(ABCMatrix(hms));
  setInitialMatrix(IH, "history");
}

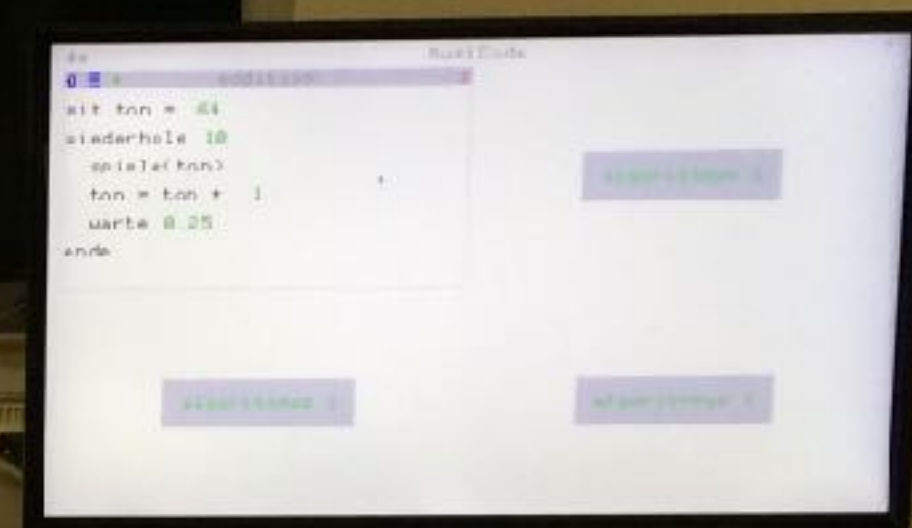
window.addEventListener("resize", function() {
  let oCamera = scene.getObjectByName("camerabox").camera;
  oCamera.right = window.innerWidth / 2;
  oCamera.left = -window.innerWidth / 2;

  function targetRotation(i) {
    let e = new THREE.Euler(D2r(abcP[i].x), D2r(abcP[i].y), 0);
    return new THREE.Quaternion().setFromEuler(e);
  }

  function updateLetter(letter) {
    if (alphabet.indexOf(letter) >= 0) {
      let matrixObject = scene.getObjectByName("matrix");
      let lPos = letter.charCodeAt(0) - "a".charCodeAt(0);
      blink(matrixObject.children[lPos], 50, 500);
    }
  }
}

```



en

Musicode

?

```
increment
with pitch = 70
loop repeat 10
  play(pitch)
  set pitch = pitch + -3
  wait 0.25
end
```

```
random
with root = 50
loop repeat 20
  play(root + between(-12, 12))
  wait 1.00
end
```

```
random
with root = 64
loop repeat 8
  play(root + between(-12, 12))
  wait 0.25
end
```

```
increment
with pitch = 16
loop repeat 6
  play(pitch)
  set pitch = pitch + 12
  wait 0.25
end
```


de

LindemayerExplorer

?



start

3

2

2

5

1

generationen:

2

1



2

3

2

2



—

5

1

3



—

1

4

4



3

1

1

5



—

—

—

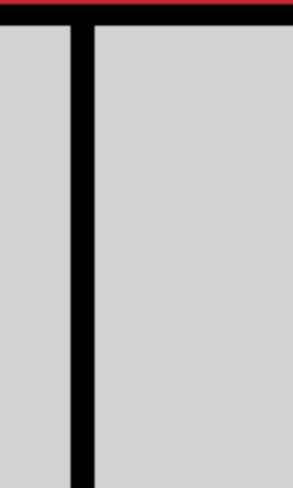
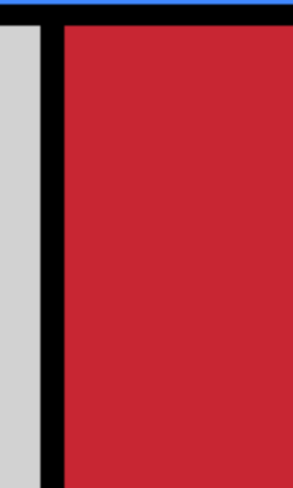
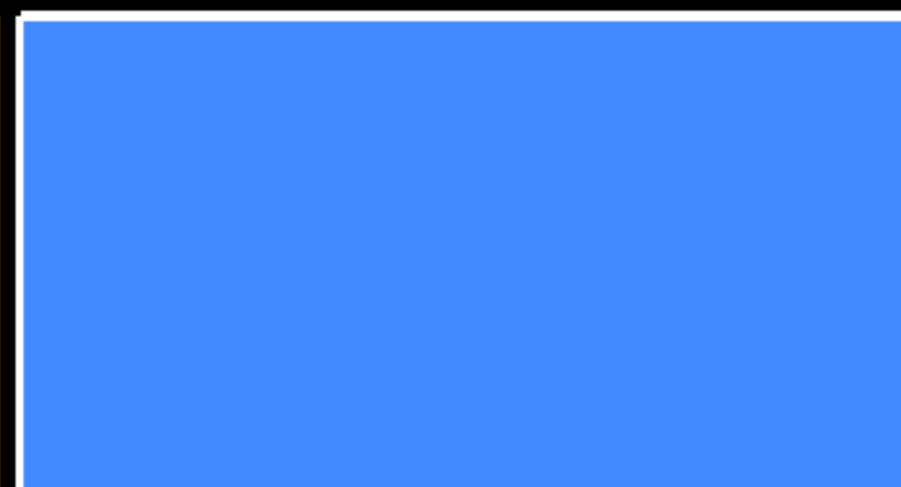
—



1

2

3



Listen to Wikipedia (Kubus) 2018

For/With the Wikimedia Foundation

Listen to Wikipedia

Glöcke: Artikel vergrößert, Zapfen: Artikel verkleinert, taferer Note: größere Änderung, [vergrößern](#) / Bot



Deutsch



English



Wikidata

PHILIPS

Tether 2018


```

setInitialMatrix(alphabet, "matrix");
}

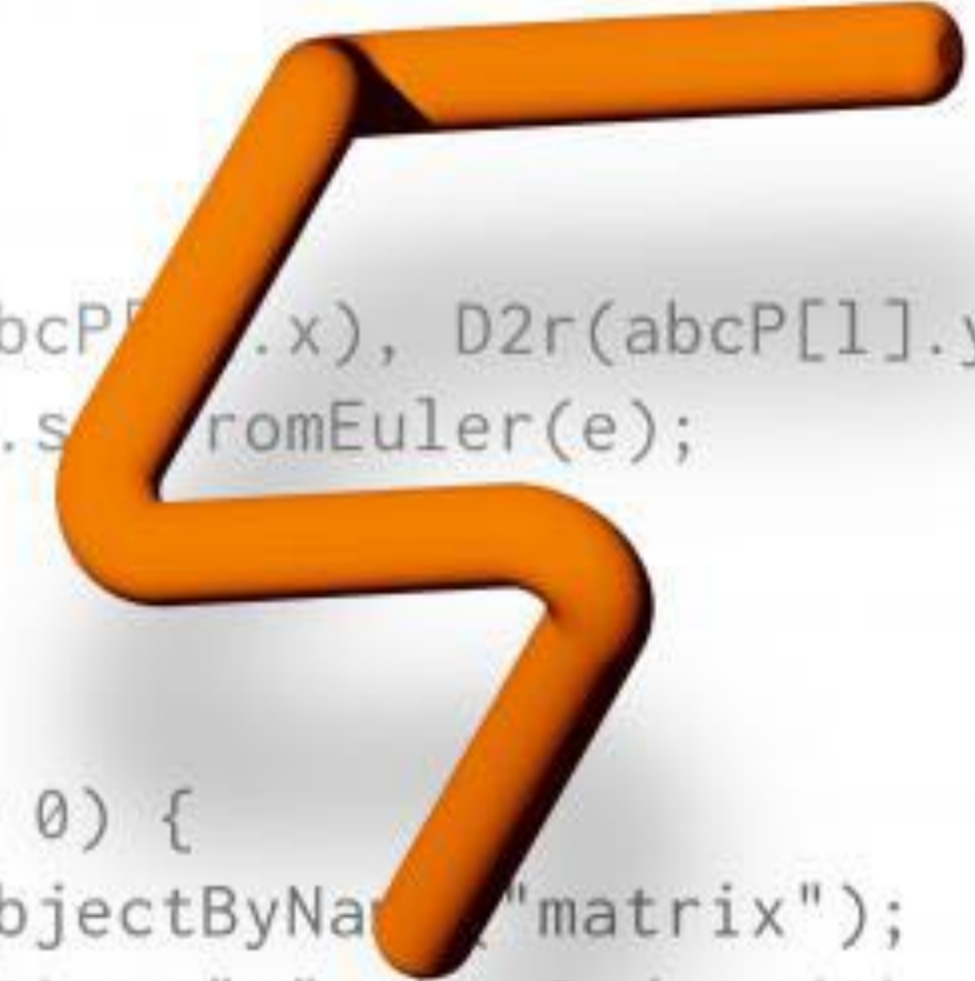
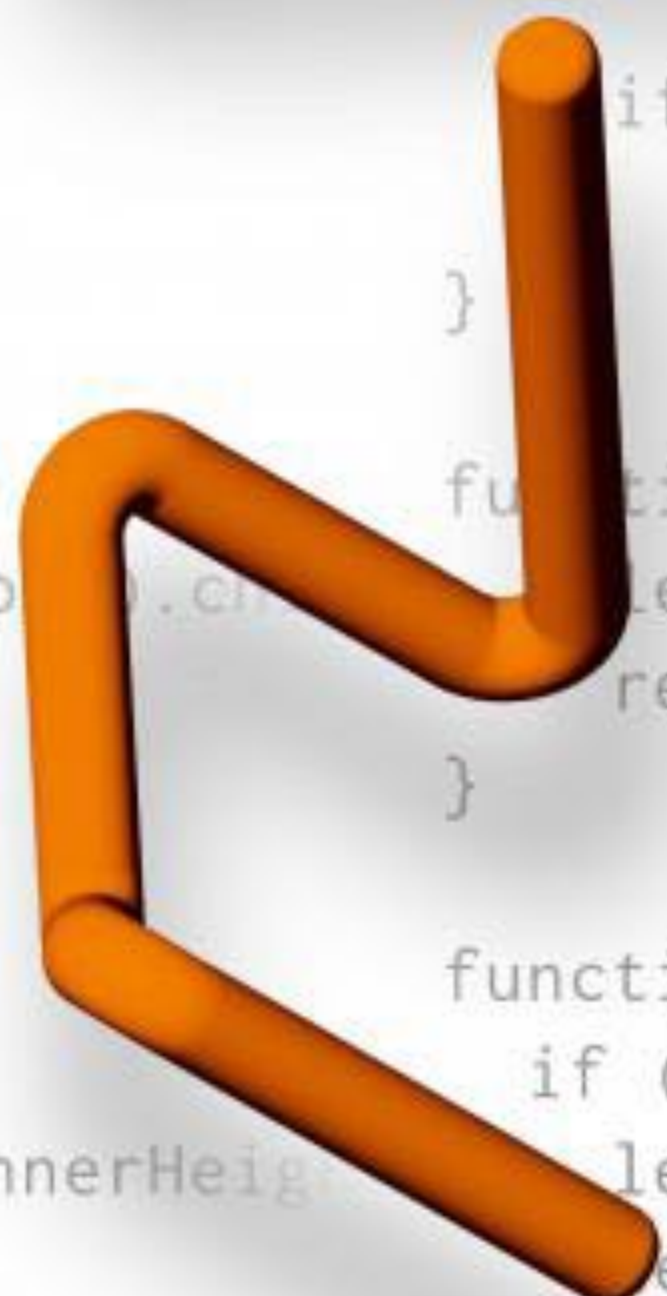
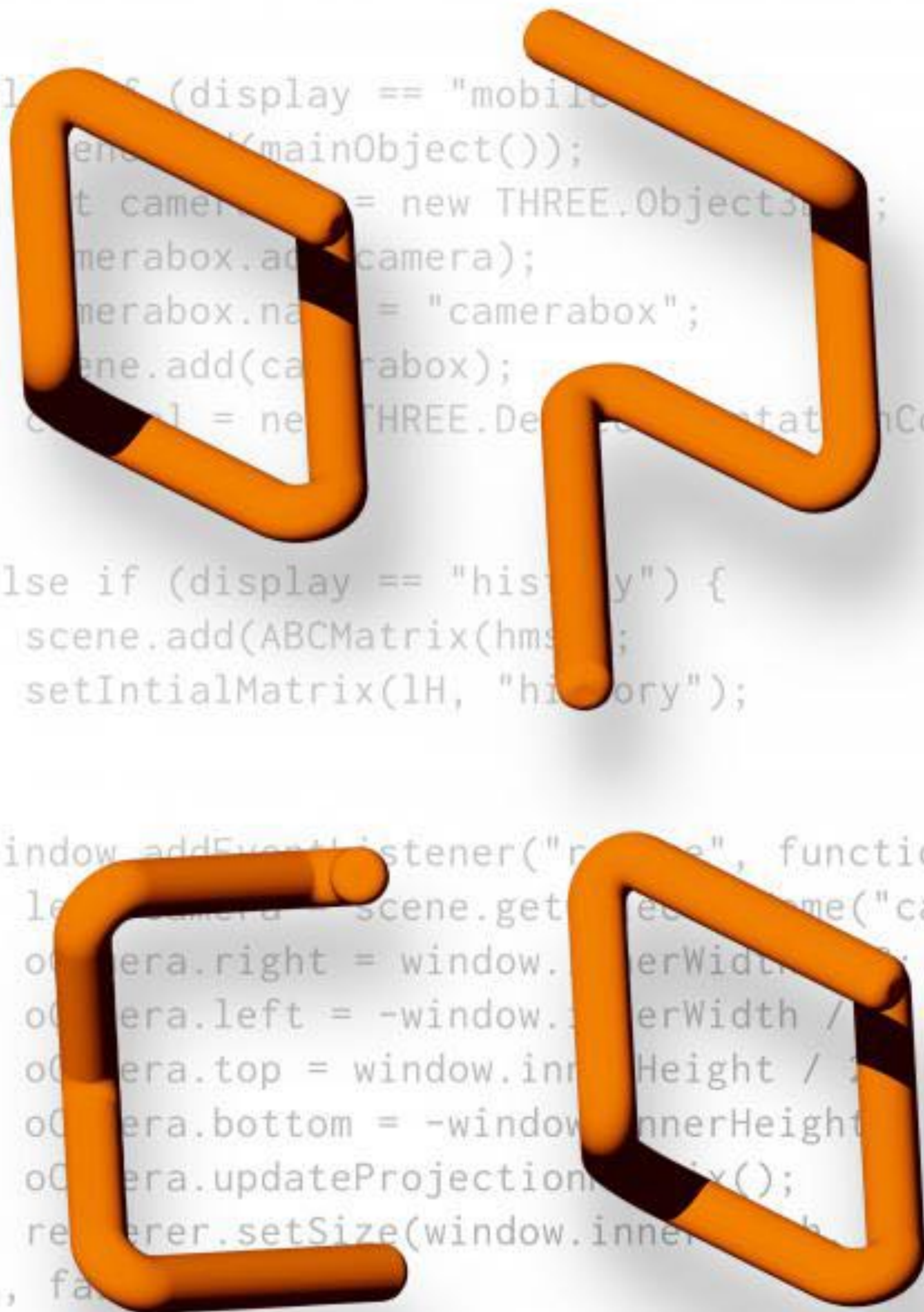
else if (display == "mobile") {
    scene.add(mainObject());
    let camera = new THREE.Object3D();
    camera.lookAt(camera);
    camera.name = "camerabox";
    scene.add(camera);
    let control = new THREE.DirectionalLightControl(camera, scene);
}

else if (display == "history") {
    scene.add(ABCMatrix(hms);
    setInitialMatrix(lH, "history");
}

window.addEventListener("resize", function() {
    let camera = scene.getObjectByName("camerabox");
    camera.right = window.innerWidth / 2;
    camera.left = -window.innerWidth / 2;
    camera.top = window.innerHeight / 2;
    camera.bottom = -window.innerHeight / 2;
    camera.updateProjectionMatrix();
    renderer.setSize(window.innerWidth, window.innerHeight);
}, false);

// End of init() function

```



```

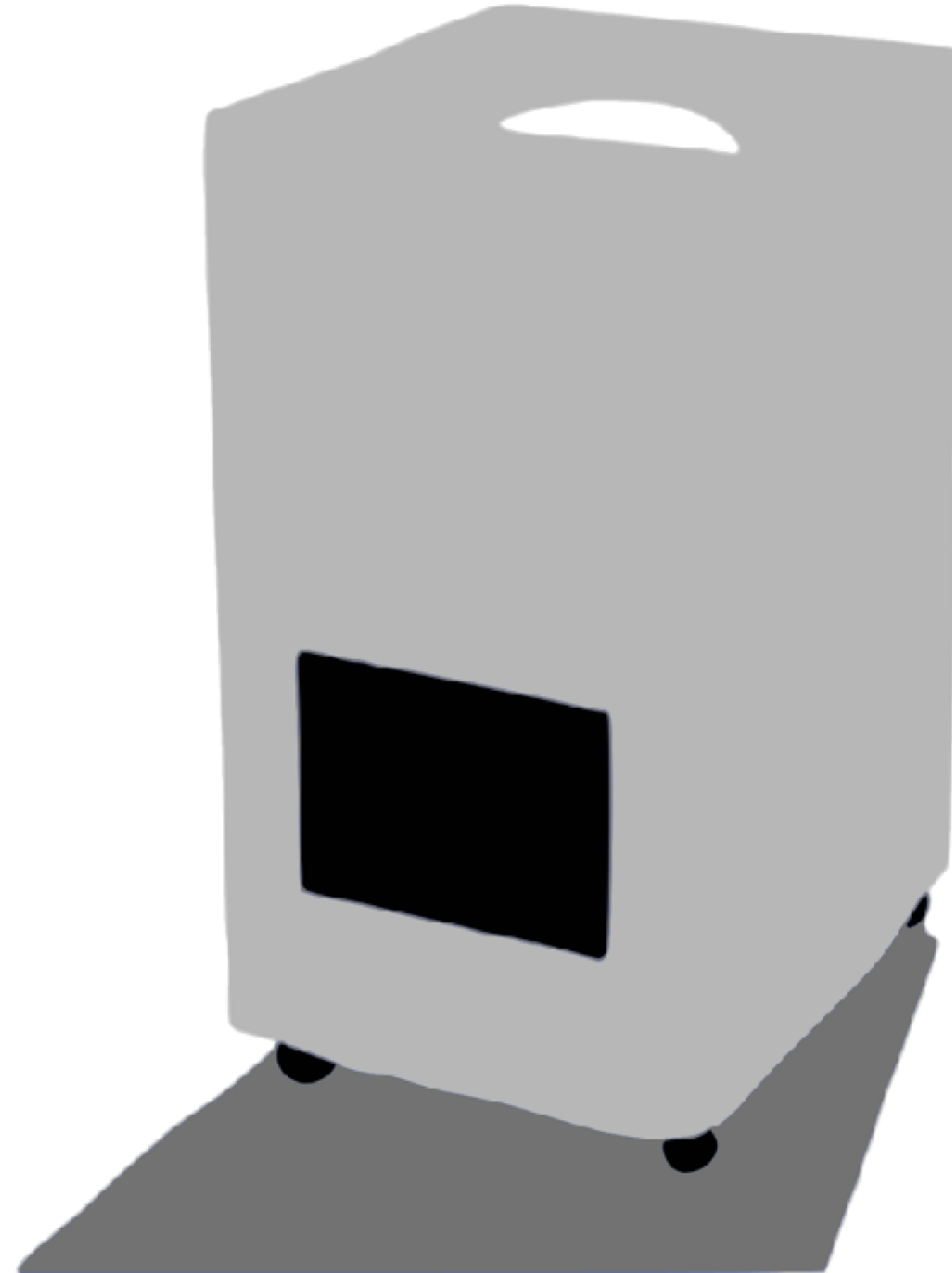
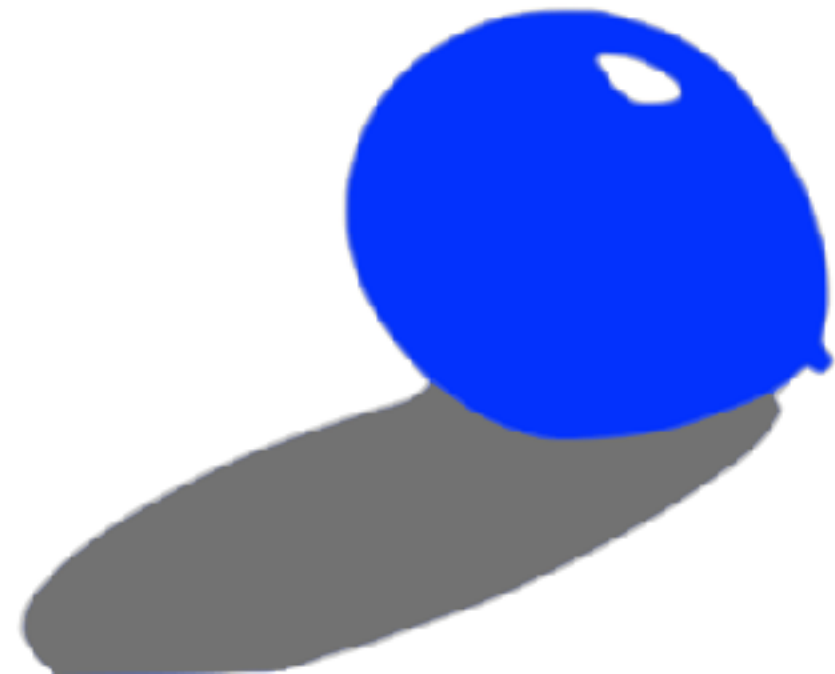
function rotateTo(i = "a", time = 1000, start = true, o = scene.getObjectByName(i)) {
    if (i == " ") return false;
    else {
        o.tween = new TWEEN.Tween(o).to({rotation: targetRotation(i).normalize()});
        let start = o.quaternion.normalize();
        let slerp = {t: 0};
        o.tween = new TWEEN.Tween(o).to({t: 1}, time)
            .interpolation(TWEEN.Interpolation.Bezier)
            .onUpdate(function() {
                THREE.Quaternion.slerp(start, target, o.quaternion, MATHUtils.lerp(0, 1, slerp.t));
            });
        if(start) o.tween.start();
    }
}

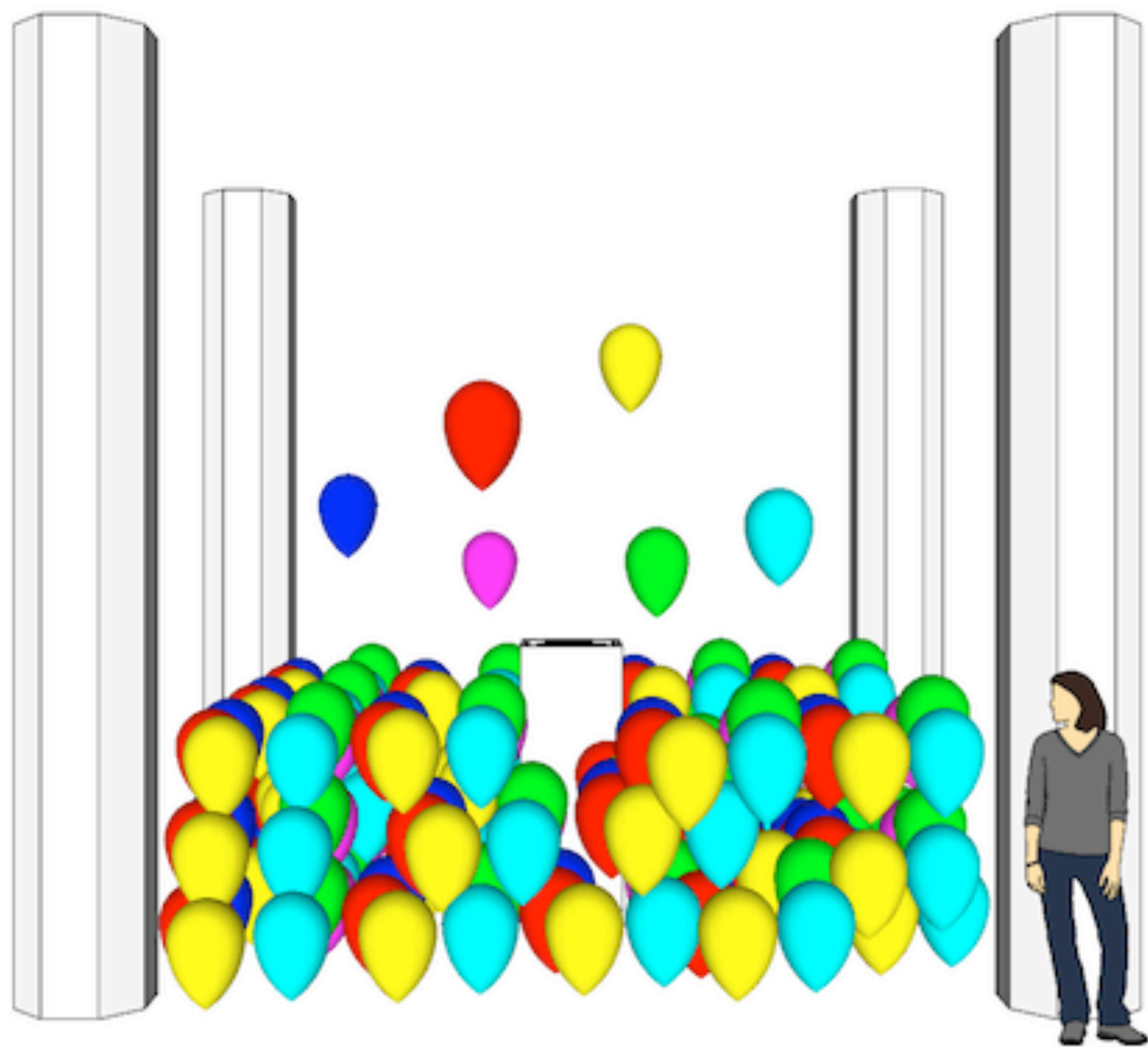
function targetRotation(l) {
    let e = new THREE.Euler(D2r(abcP[l].x), D2r(abcP[l].y), D2r(abcP[l].z));
    return new THREE.Quaternion().setFromEuler(e);
}

function updateLetter(letter) {
    if (alphabet.indexOf(letter) >= 0) {
        let matrixObject = scene.getObjectByName("matrix");
        let lPos = letter.charCodeAt(0) - "a".charCodeAt(0);
        blink(matrixObject.children[lPos], 50, 500);
    }
}

```

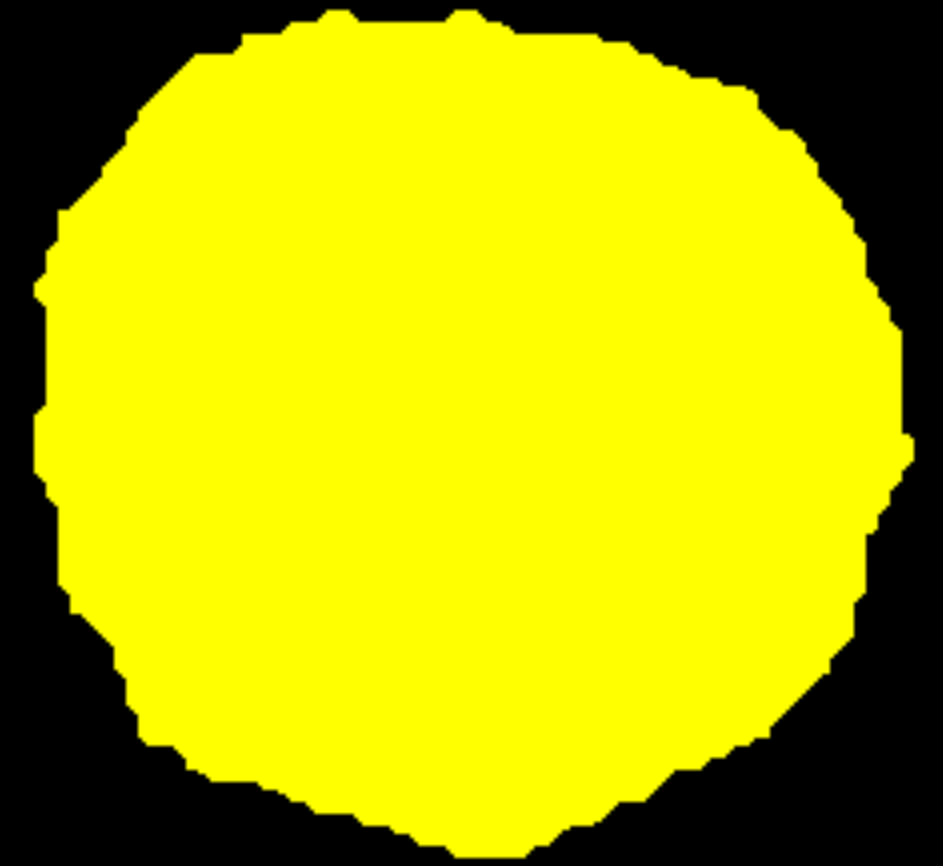
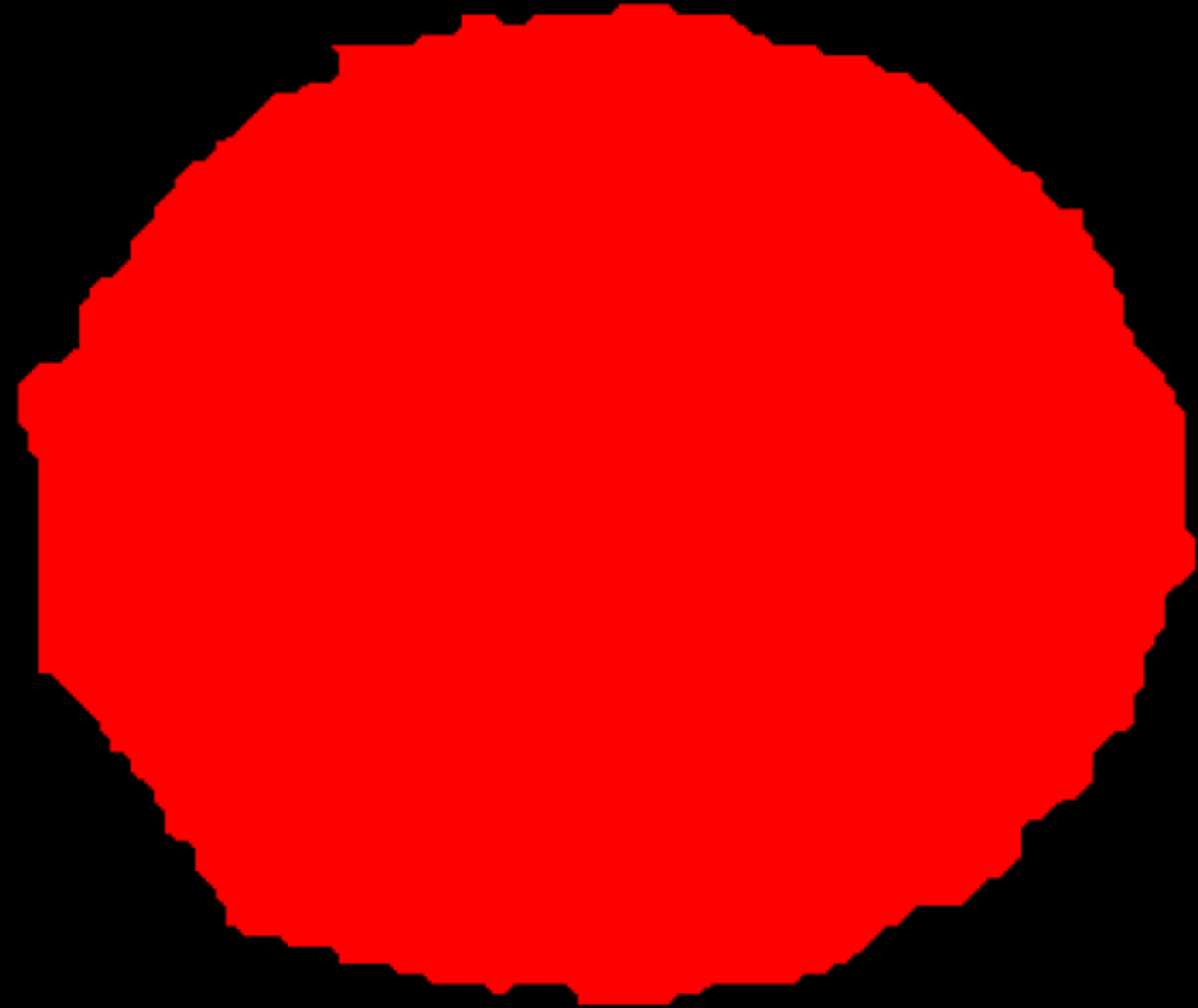

Balloon Project



















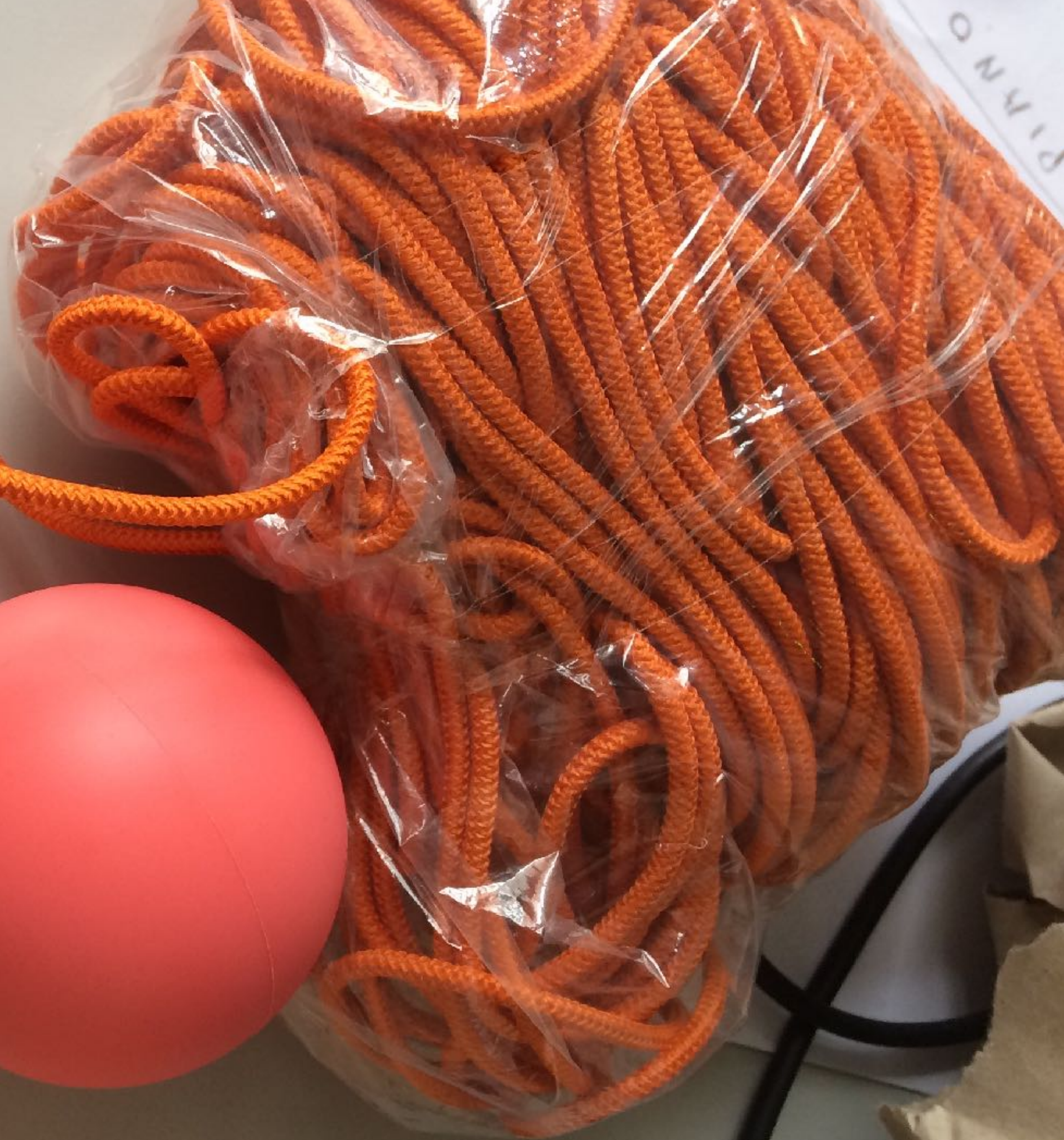




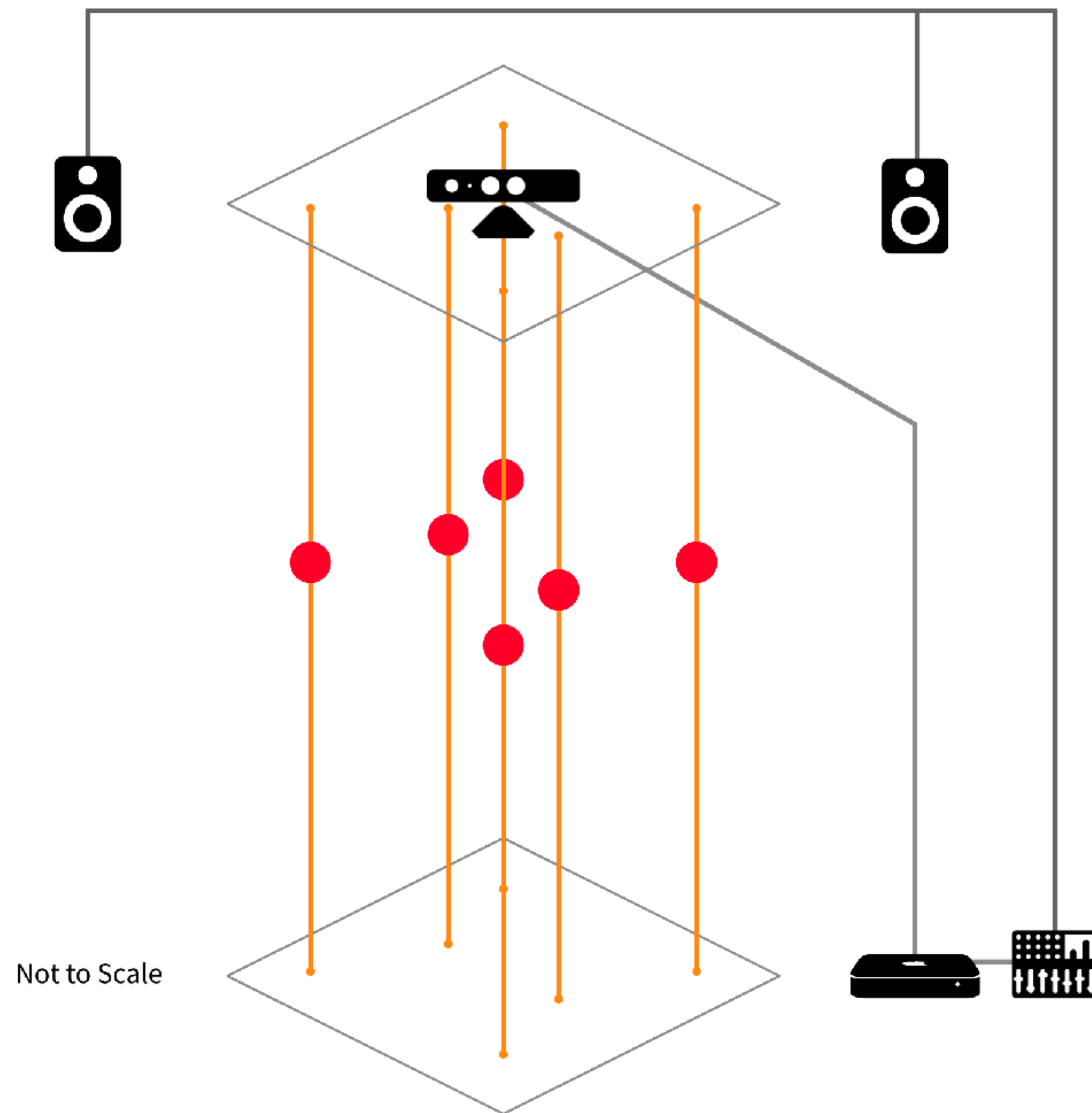
video

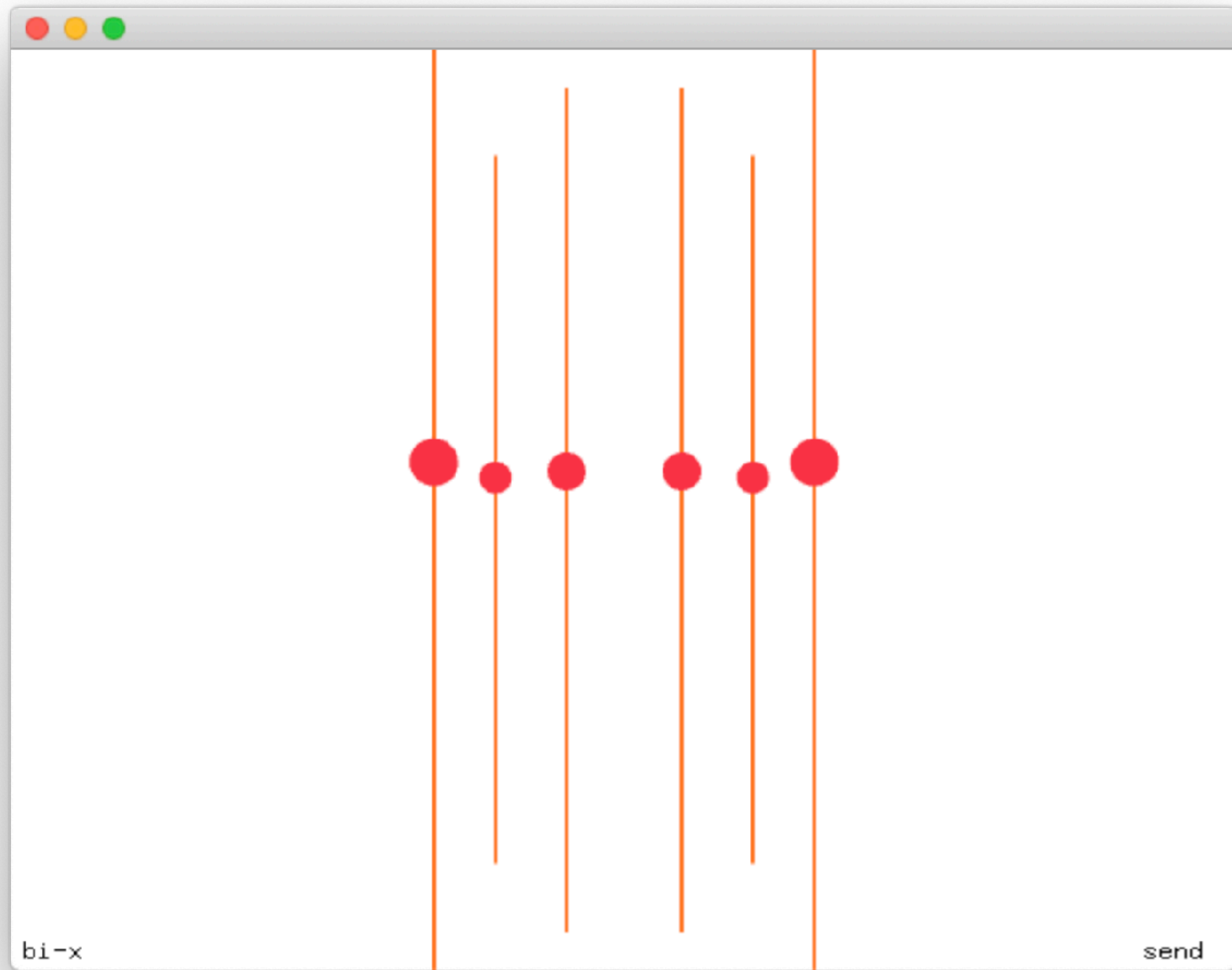
Tether again

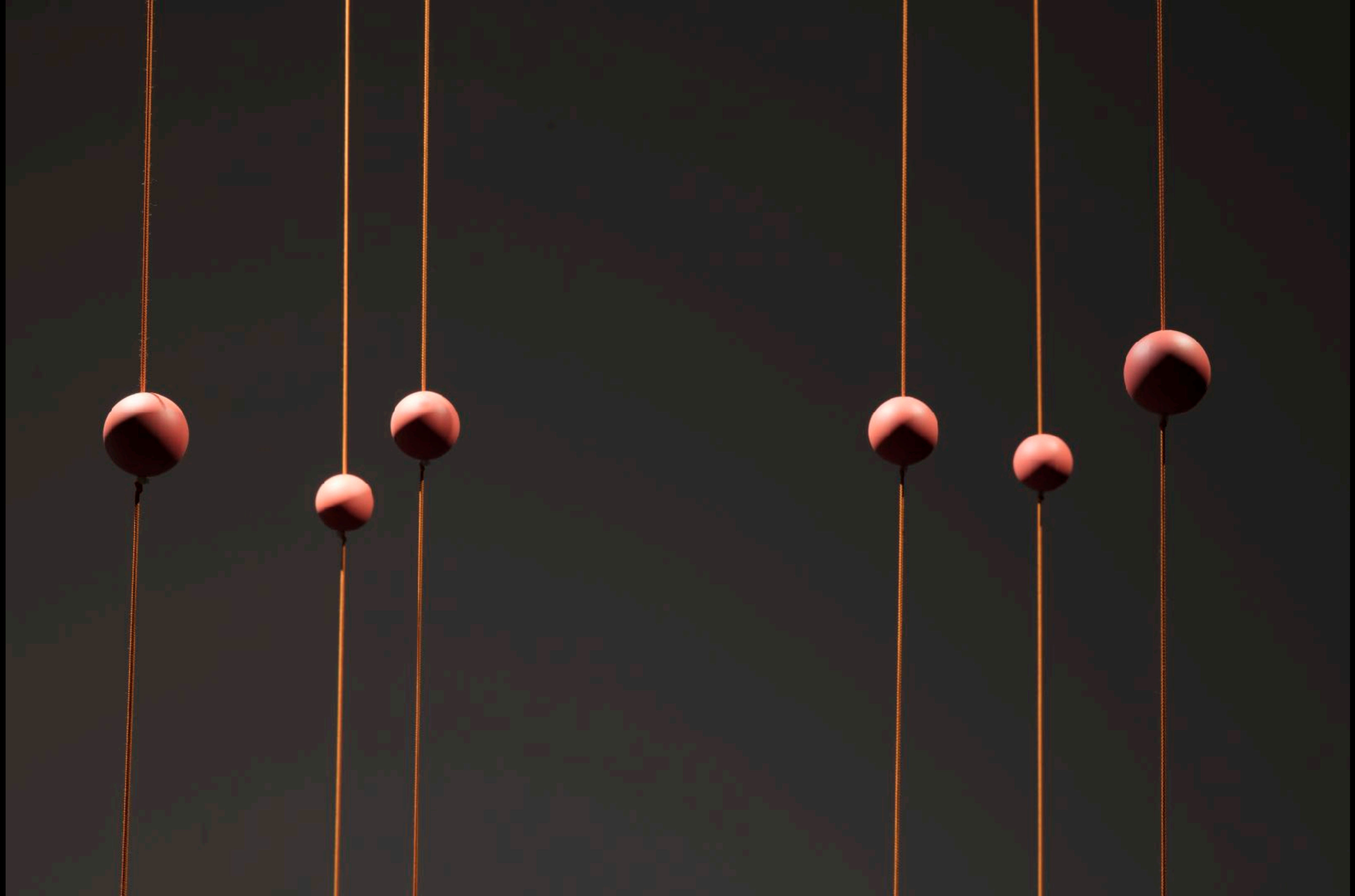




PINNO







video

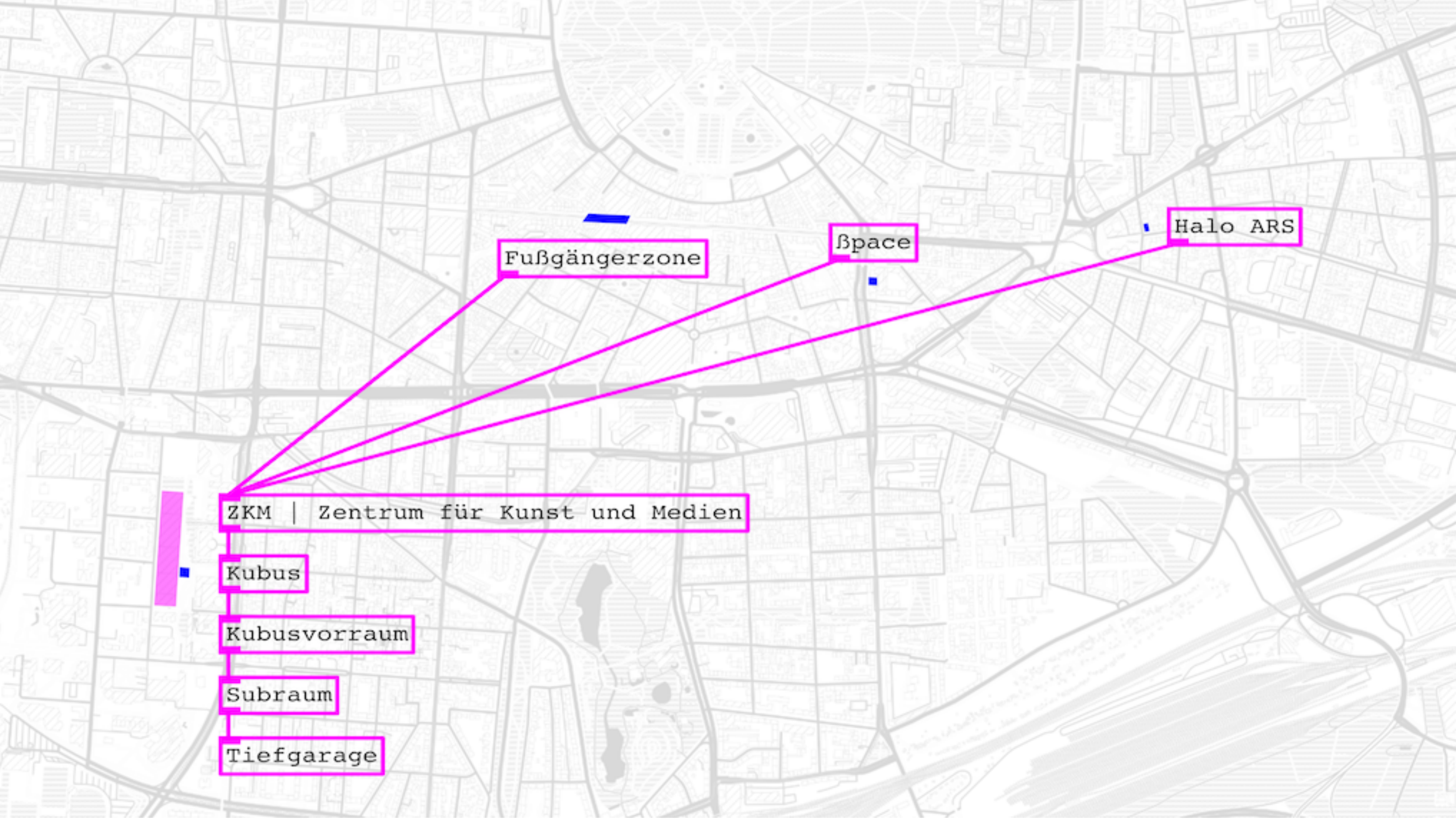
f - toggle fullscreen
s - go to sleep
w - wake up
left - prev song
right - next song



demo

Next City Sounds: Interfaces 2018

With Yannick Hofmann, Sebastian Schottke, et al



Fußgängerzone

ßpace

Halo ARS

ZKM | Zentrum für Kunst und Medien

Kubus

Kubusvorraum

Subraum

Tiefgarage

βpace - KIteratur

Halo ARS - Lintu & Røyk

Fußgängerzone - Lasse-Marc Riek

Kubus Subraum - No Input Ensemble

04.

08.

18

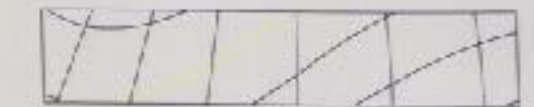


NEXTCITY
SOUNDS

HALO

Luxxurypblems

LIVE



Lintu & Røyk

LIVE

Audiodatenstrom ZKM

Young Neil Chris P

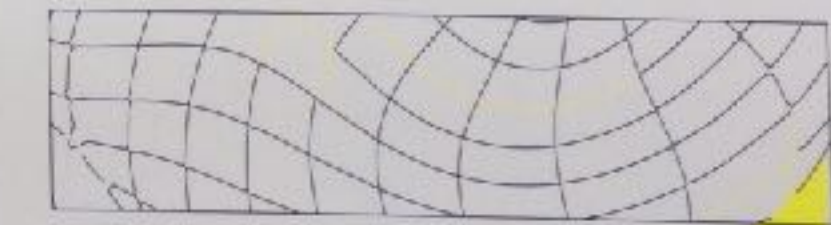
LIVE

Nspkklr

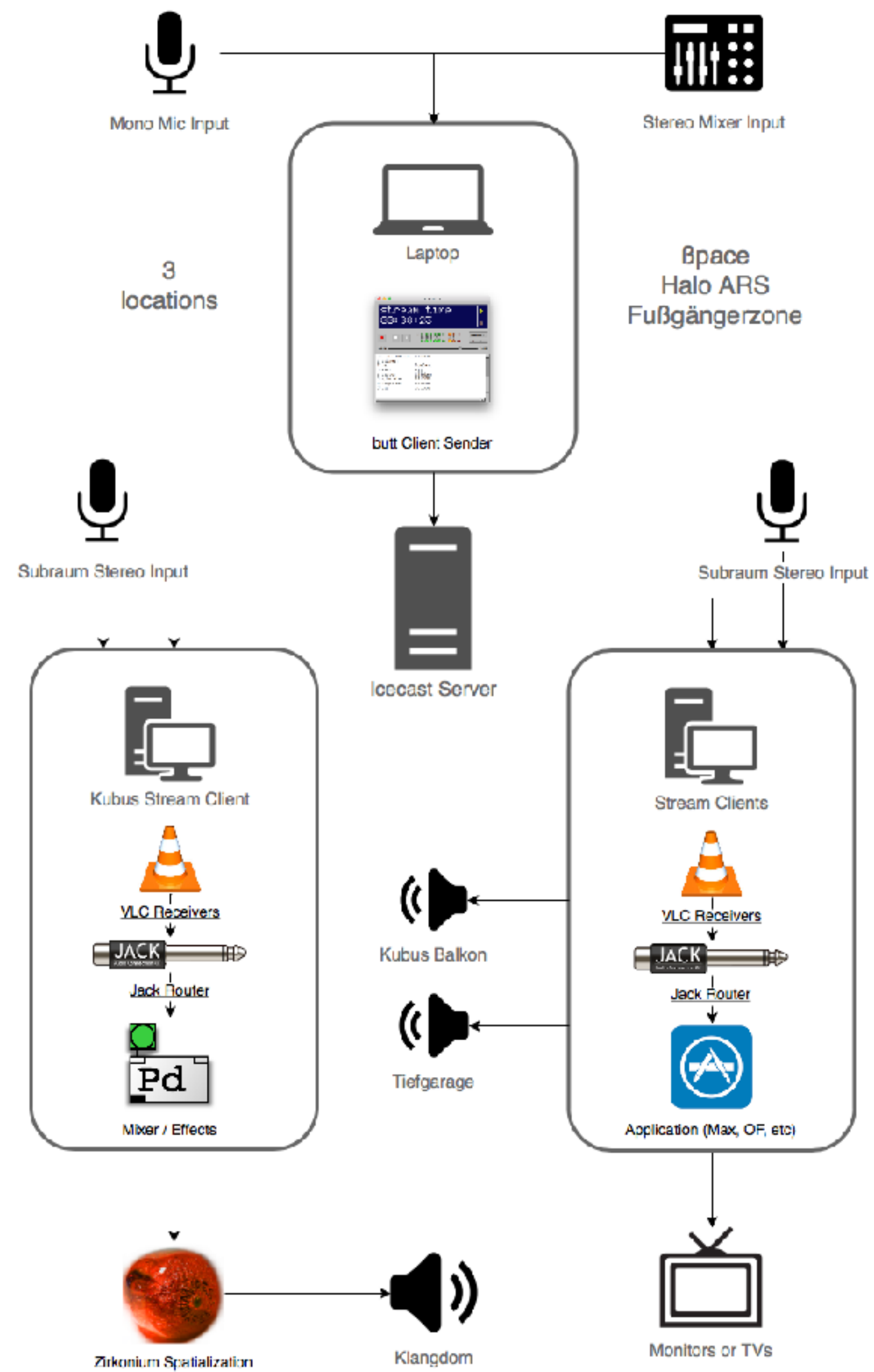
LIVE

St. Marita

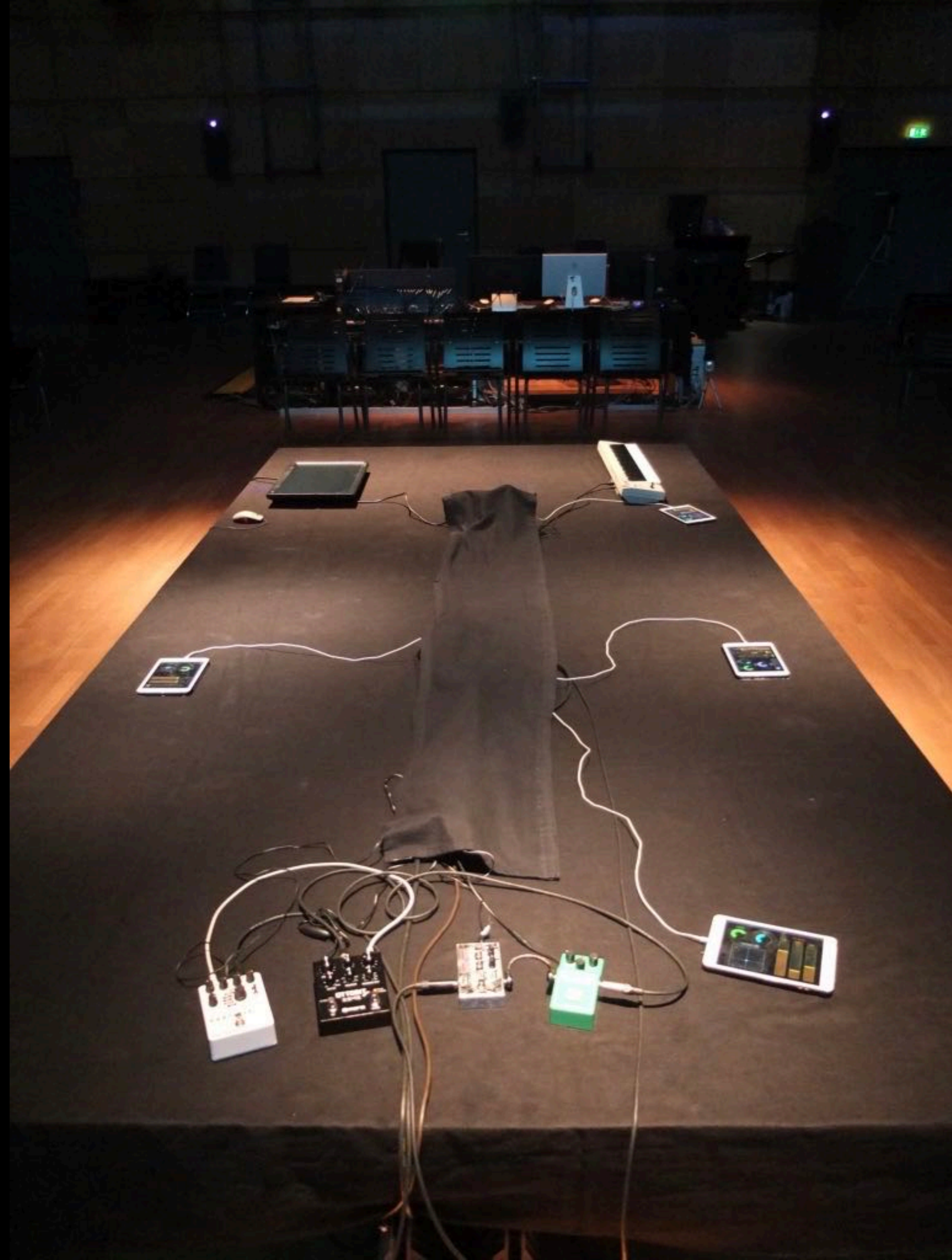
DJ Set



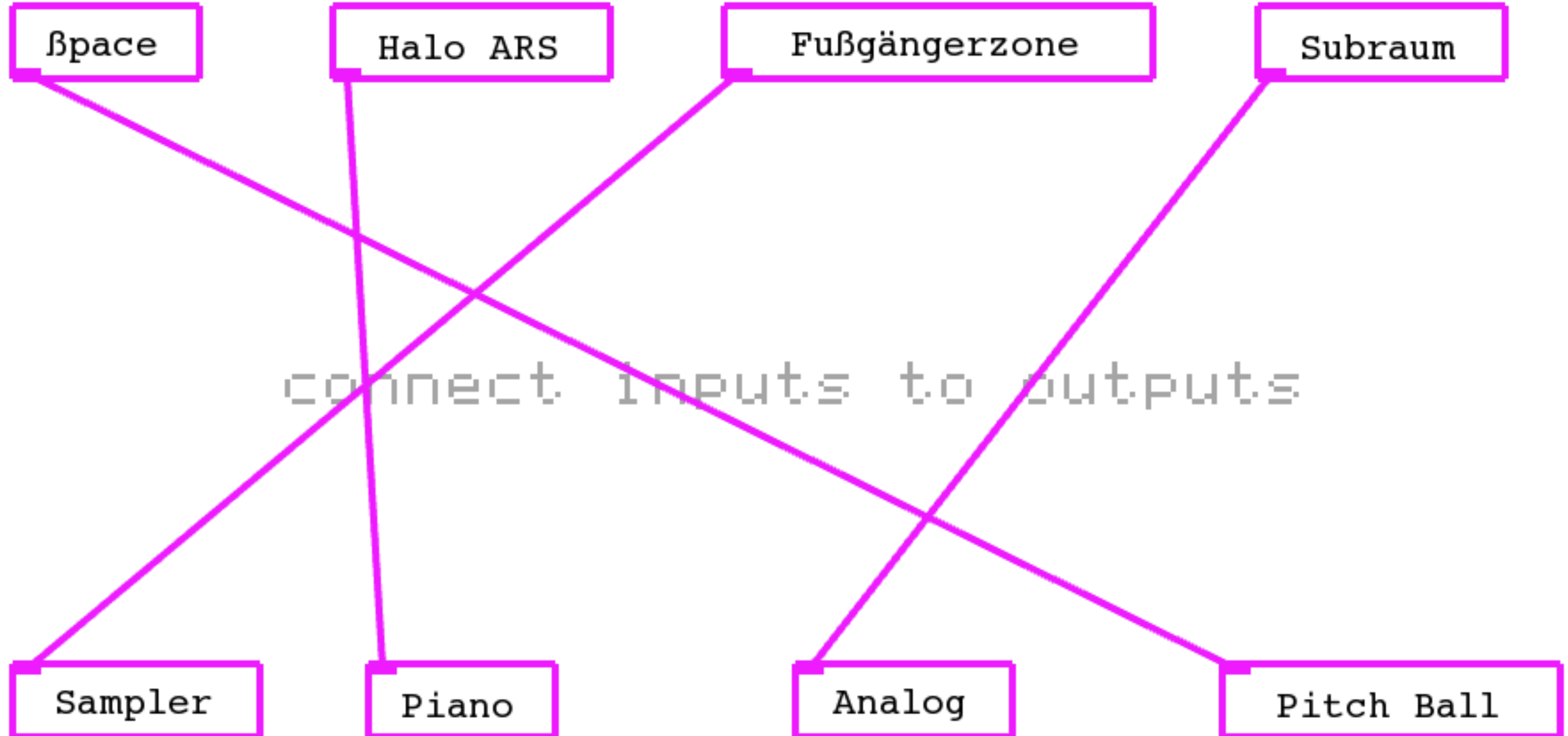
→ Ludwig-Wilhelm-Str. 5





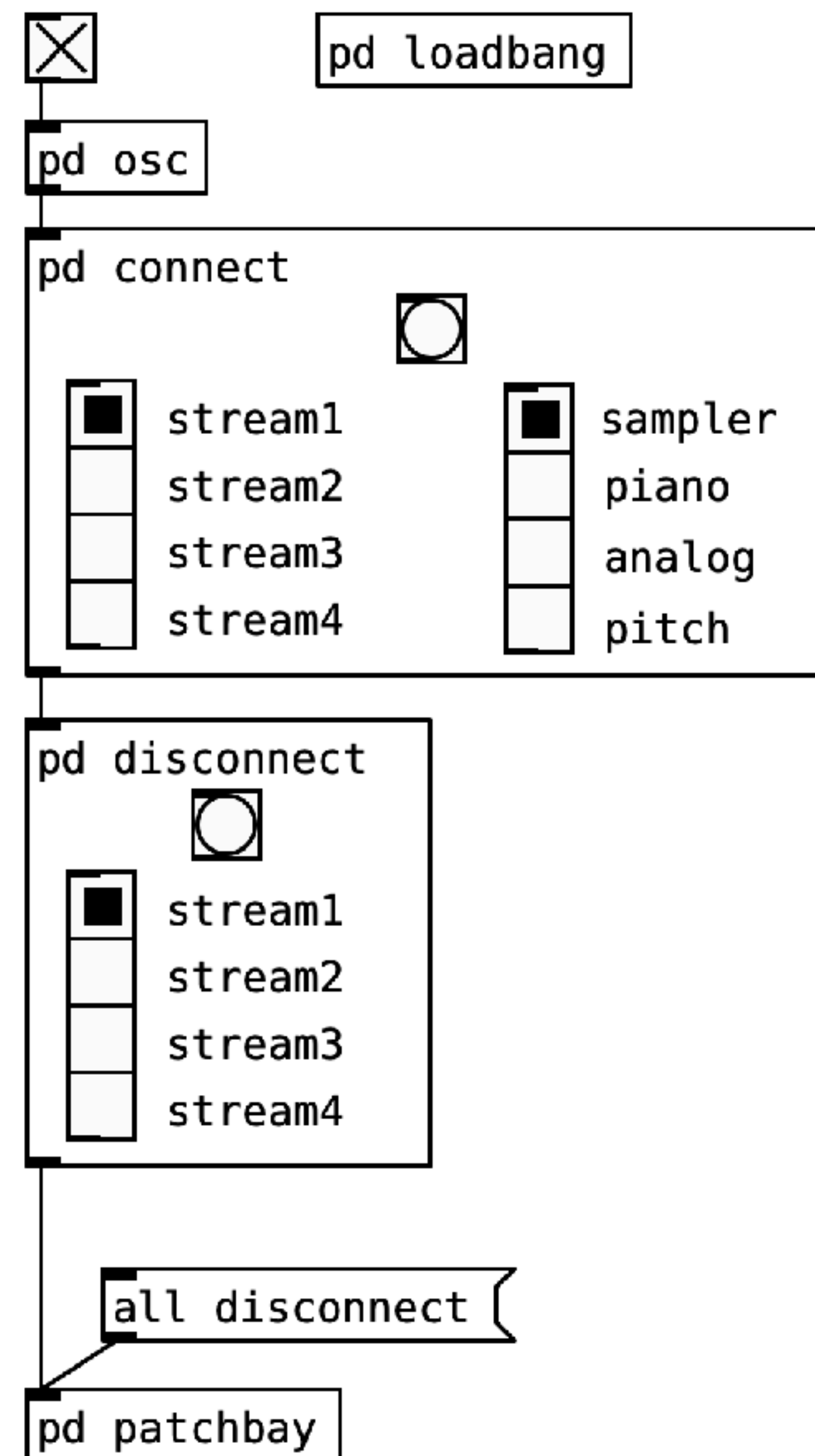
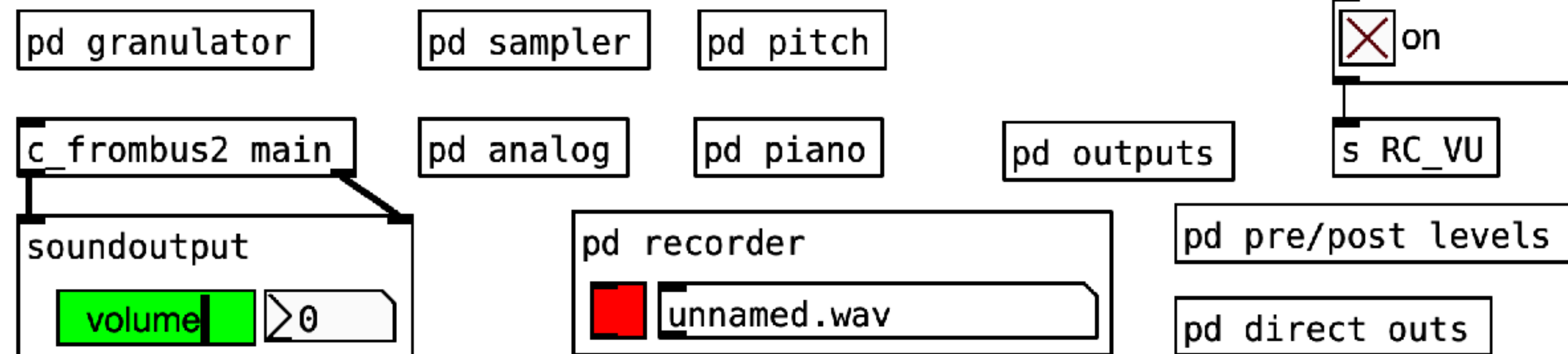
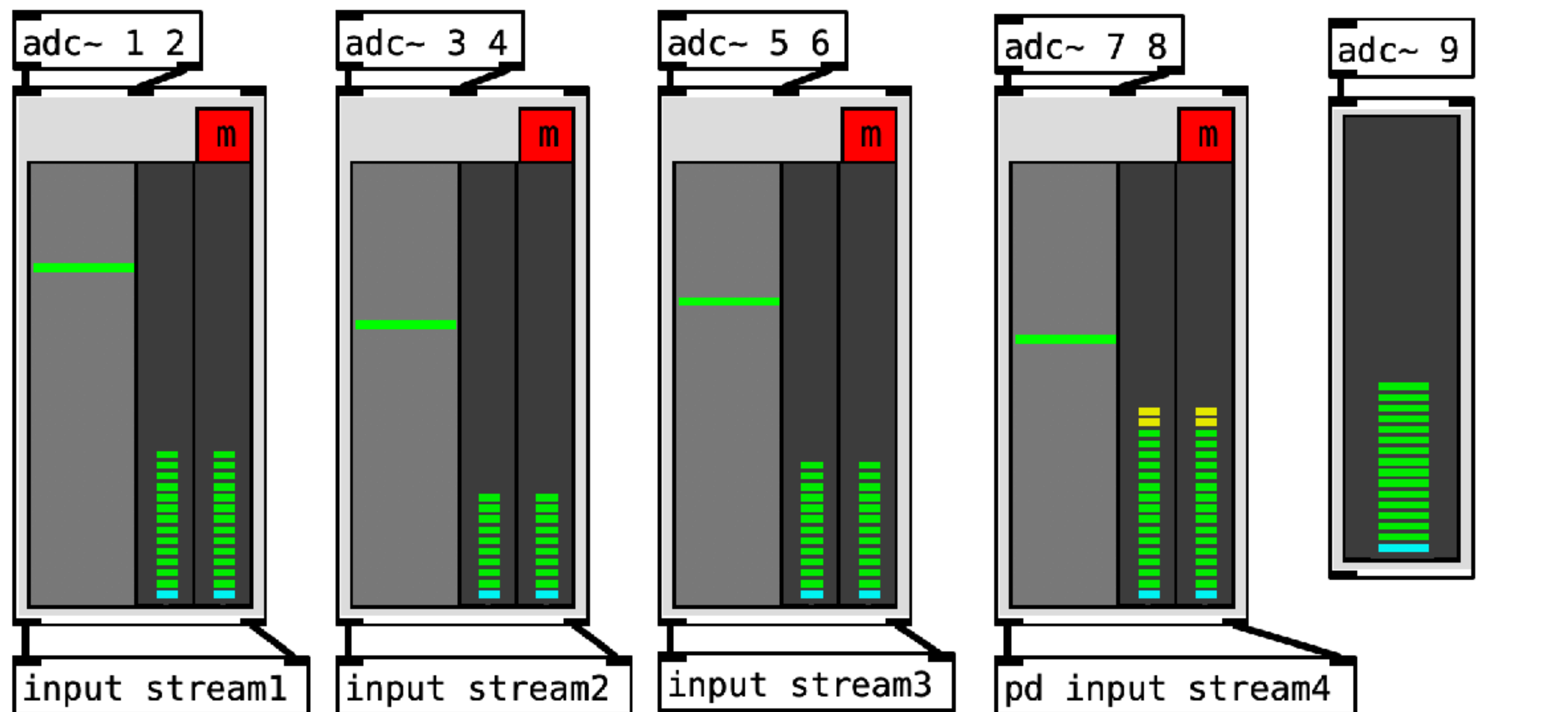


Live Input Streams



Output Effects

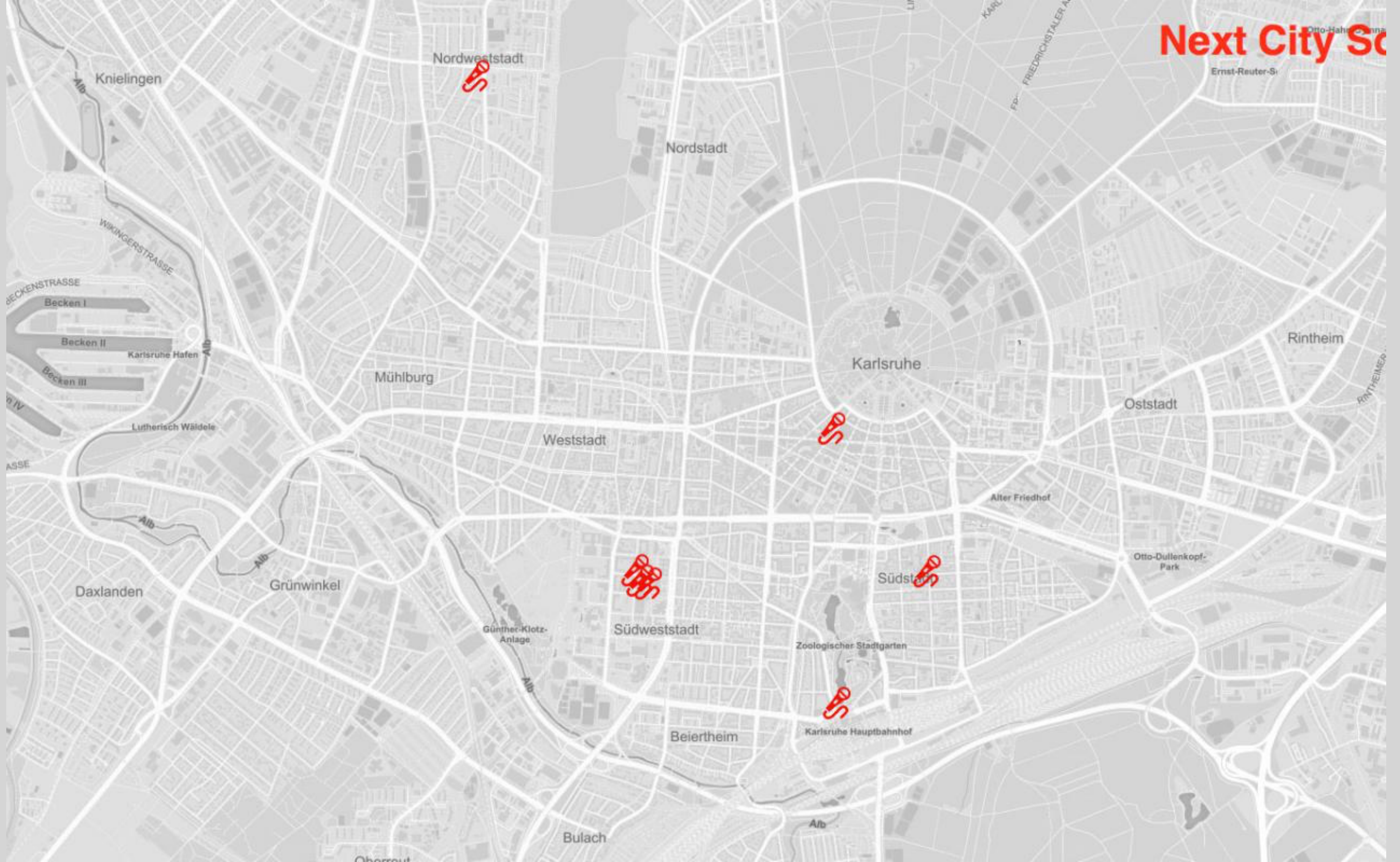
ßpace Halo ARS Fußgängerzone Subraum analog return



Next City Sounds: Play 2018

With Yannick Hofmann

Next City So

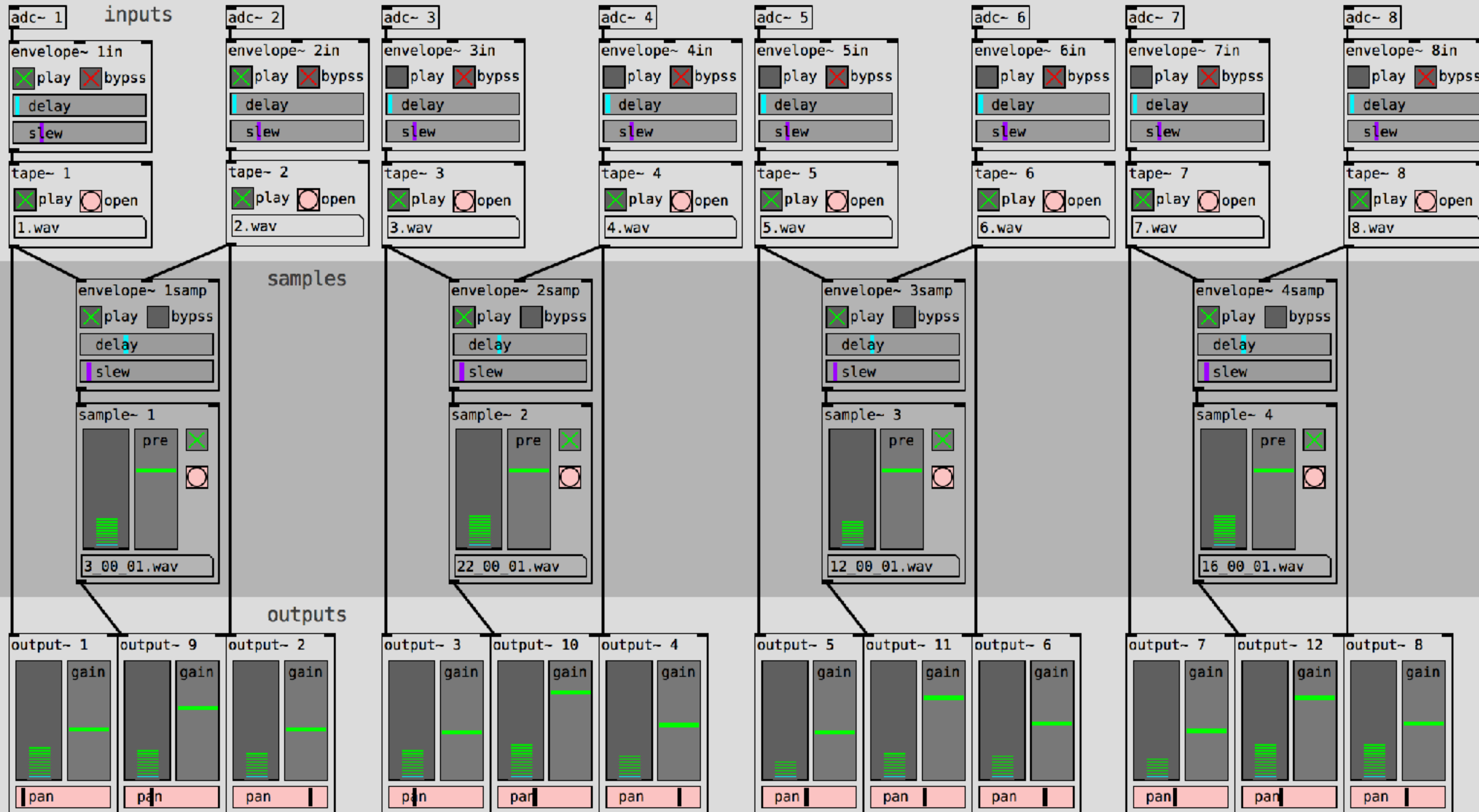




////////|<///

NextCitySounds_Play

2018



score

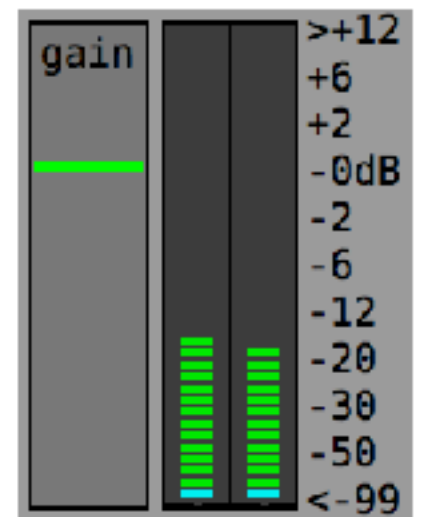
auto

next edit

section 1

0 40

phantoms.txt



stereo

quadraphonic

octophonic

record auto

output.wav

test

gain

OSC key

vu reset

loadbang

phantoms.txt

save load

phantoms.txt



video

Code of Colors 2019

SEASONS OF MED

SEASONS OF MEDIA ARTS

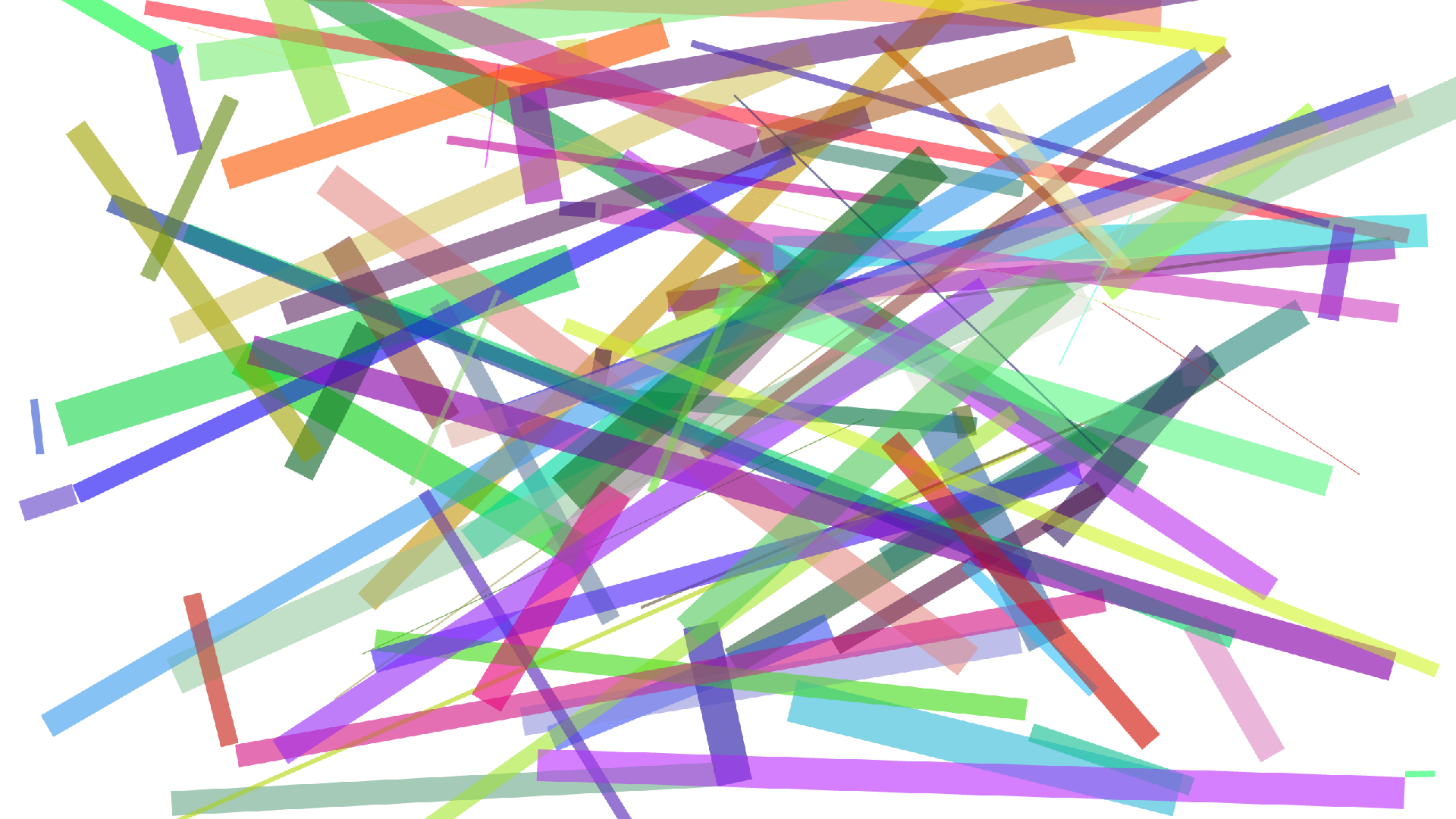
Stadt der

!zizik

stiliz en Visio

nen Visionen
!zizik





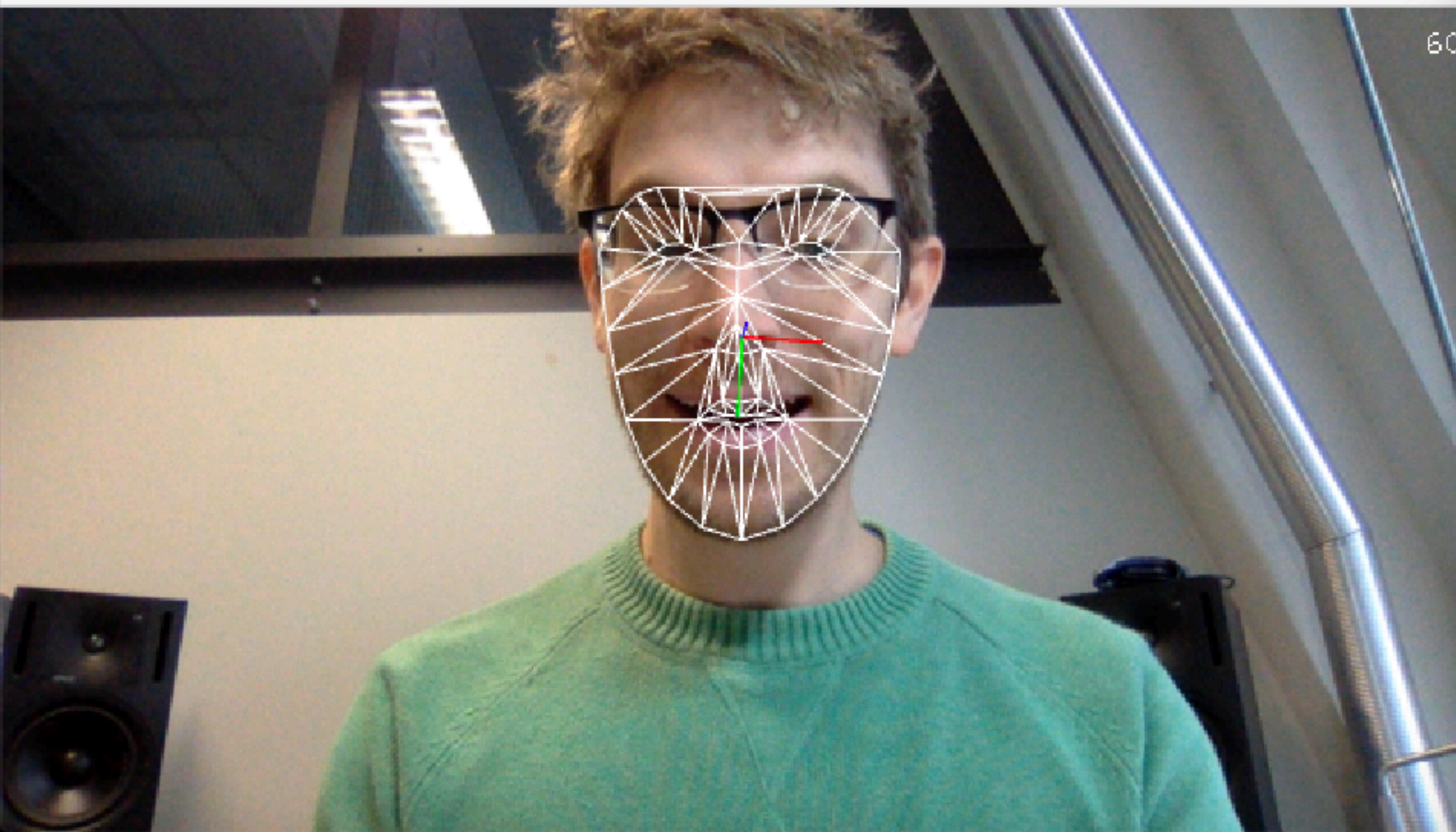
demo

FacePic 2019









```
1
2 local Face = require "Face"
3
4 local face = Face()
5 local background = of.Color(0)
6 local hide = false
7
8 local gallery = {}
9
10 function setup()
11     of.background(0)
12     of.setLineWidth(2)
13     of.enableSmoothing()
14     of.setBackgroundAuto(true)
15     of.setWindowShape(640, 360)
16
17     loaf.setListenPort(8338)
18     loaf.startListening()
19 end
20
21 function draw()
22     if face.found and not hide then
23         face:draw()
24     end
25     for i=1,#gallery do
26         gallery[i]:draw()
27     end
28 end
29
30 function oscReceived(message)
31     face:oscReceived(message)
32 end
```


EMOTIONAL AI

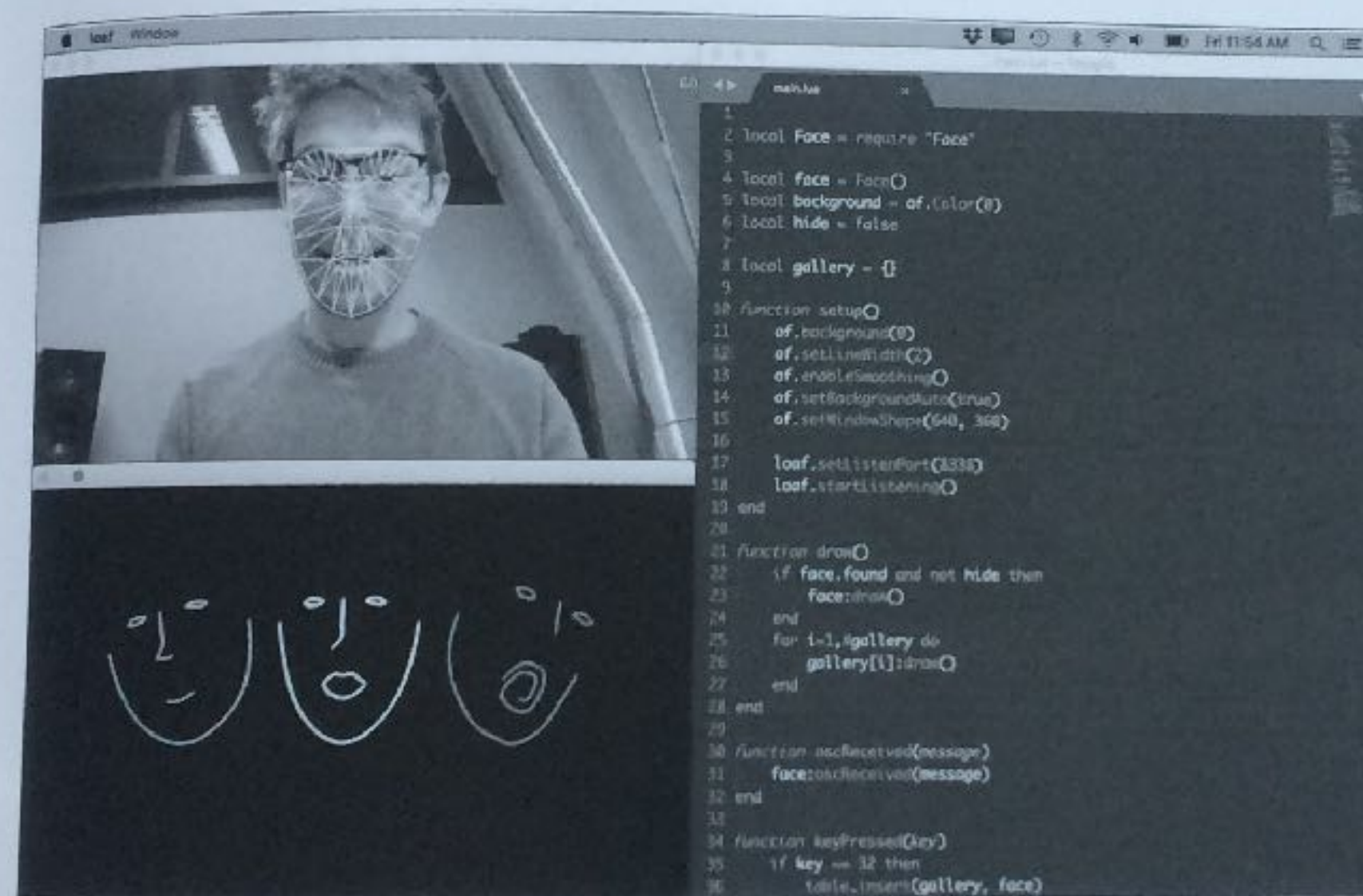
Das ZKM | Hertz-Labor rief KlangkünstlerInnen und KomponistInnen dazu auf, sich mit Projektvorschlägen zu affektiven Technologien um eine einmonatige Cross-Genre-Residenz zu bewerben. Diese sollen sich, ausgehend von Klangkunst oder elektroakustischer Komposition, mit Emotionen in der Mensch-Maschine-Interaktion auseinandersetzen und sich interdisziplinär mit Emotionaler Künstlicher Intelligenz, Affective Computing oder Neurowissenschaften verknüpfen. Vier KünstlerInnen,

weiter, sein virtuelles Selbst für technologisch verwurzelte emotionale Traumata, indem er sich der Emotionstheorie «Sentics» des Kybernetikers Manfred Clynes widmet. Am Performer befestigte Gummibänder werden dabei als gestische Controller für einen Lernalgorithmus eingesetzt, der eine immersive Klanglandschaft mit therapeutischem Effekt generiert.

Die Pianistin und Künstlerin Laura Ige aus Buenos Aires wird einen Soundtrack für ihren affektiven Tinder-bot *Hi, Im \$NAME* komponieren. Das Programm agiert mit mehreren Dating-Profilen auto-

CECIA (COLLABORATIVE ELECTRO-ACOUSTIC COMPOSITION WITH INTELLIGENT AGENTS)

Im Nachgang zum Open Call CECIA (Collaborative Electroacoustic Composition with Intelligent Agents), der im vergangenen Heft an dieser Stelle ausgerufen worden war, wurde ein internationales Team aus KlangkünstlerInnen und KomponistInnen zusammengestellt: Die georgische Komponistin und Sängerin Mariam Gvniashvili, der griechische Komponist Panayiotis Kokoras, die polnische Pianistin, Komponistin und Dirigentin Martyna Kosecka, der schwedische Klangkünstler Erik Nyström sowie der kolumbianische Klangkünstler und Komponist Juan Carlos Vasquez werden zusammen mit den ProjektmoderatorInnen Kosmas Giannoutakis und Artemi – Maria Gioti in einem viermonatigen Zeitraum zwischen August und November eine elektroakustische Komposition kollaborativ entwickeln – im Verbund mit intelligenten Agenten auf einer eigens dafür eingerichteten Cloud-Computing-Plattform. Das Projekt wird am 3. August im Rahmen der 21. Karlsruher Museumsnacht (KAMUNA) am ZKM von Kosmas Giannoutakis und Artemi-Maria Gioti vorgestellt (s. Veranstaltungsübersicht).



Screenshot «Face OSC», 2019

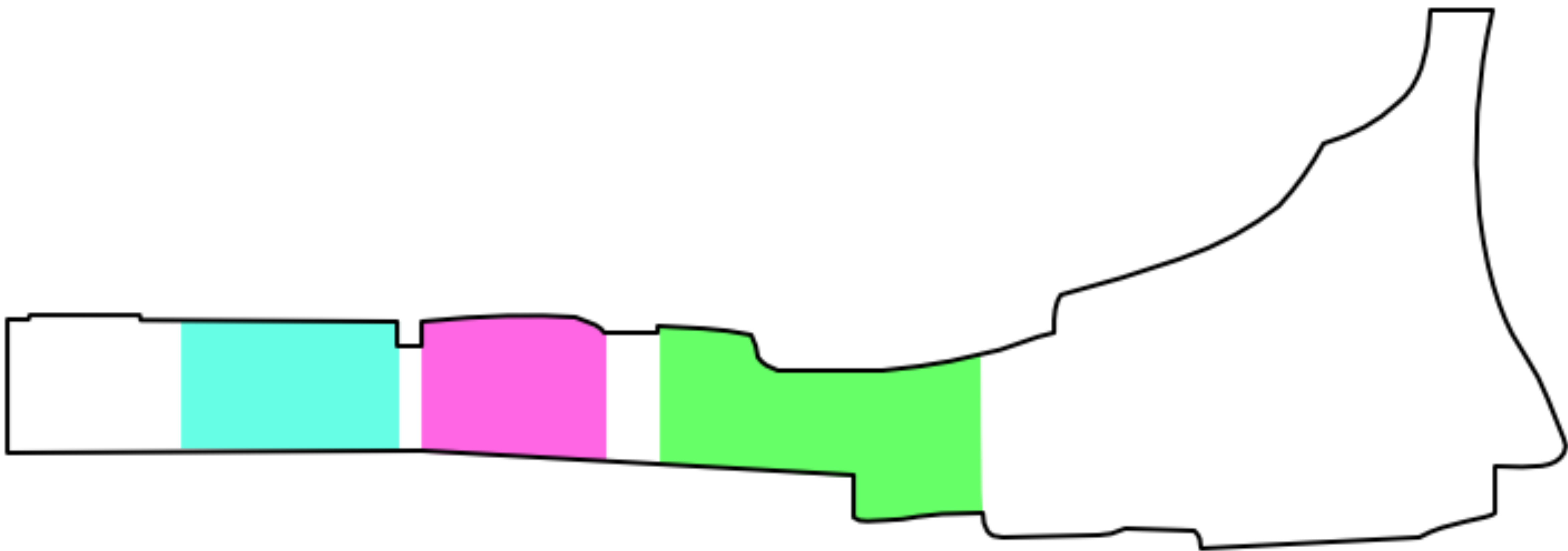
Next City Sounds: Hypogean City

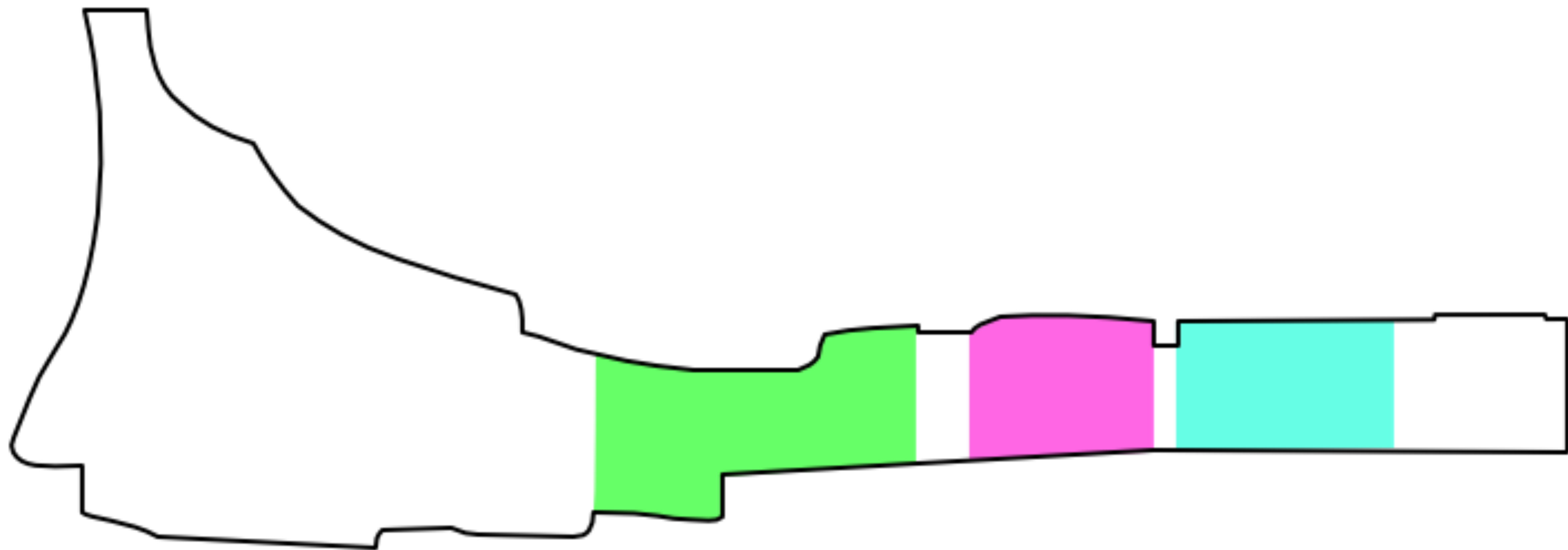
2019

With Ludger Brümmer, Yannick Hofmann

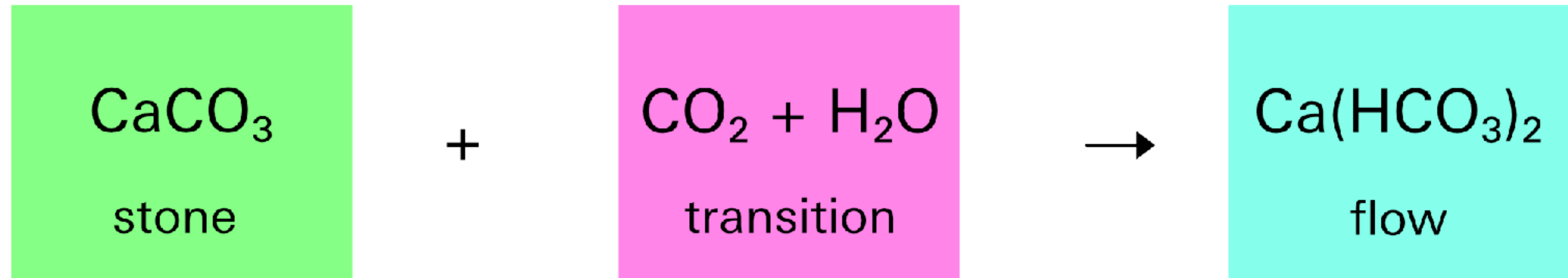








Tufo Limestone to Casa Cava



|----->
Stone Age Now







MiFa

MiFa

MiFa

MiFa

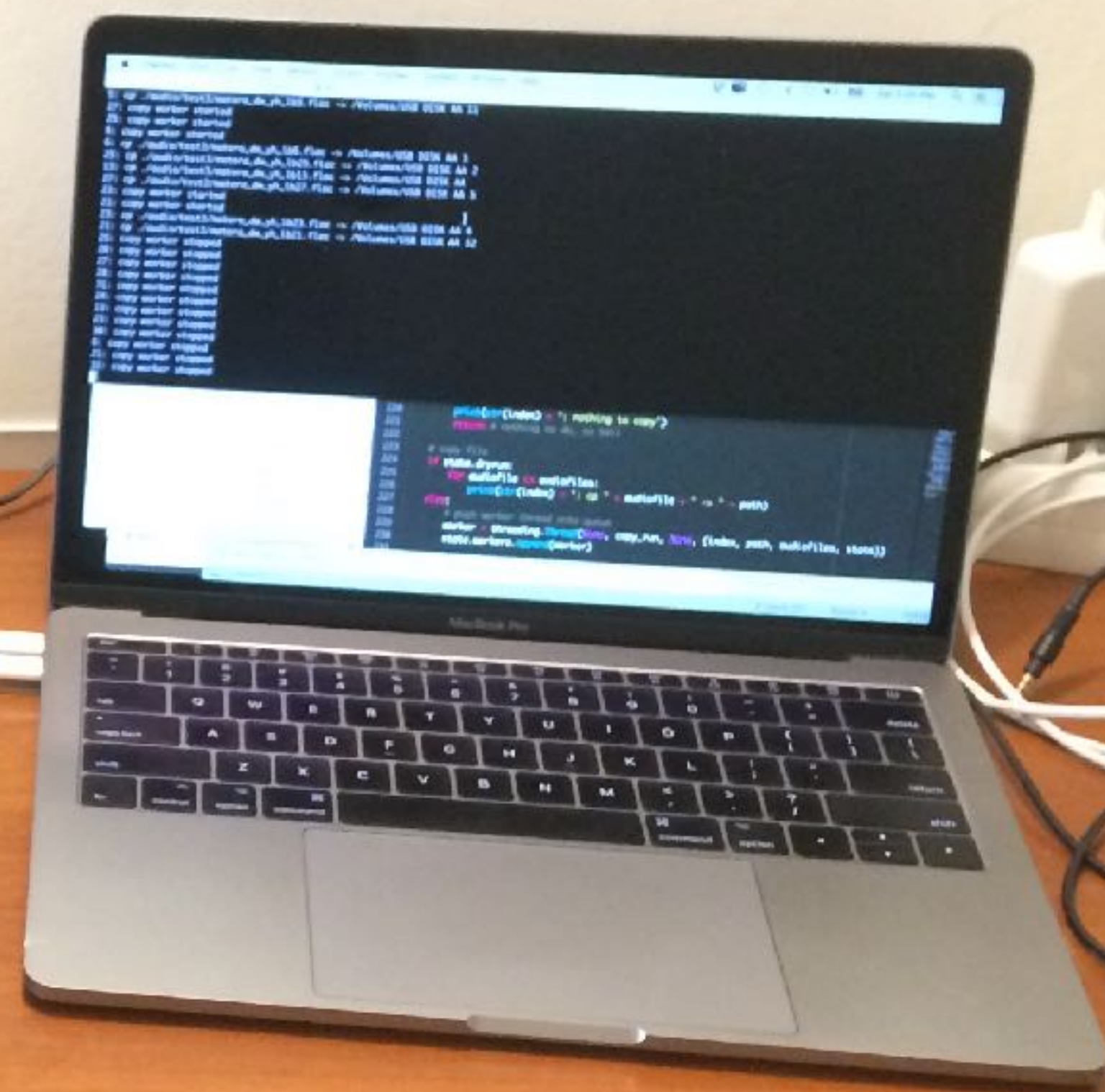
MiFa

MiFa

MiFa

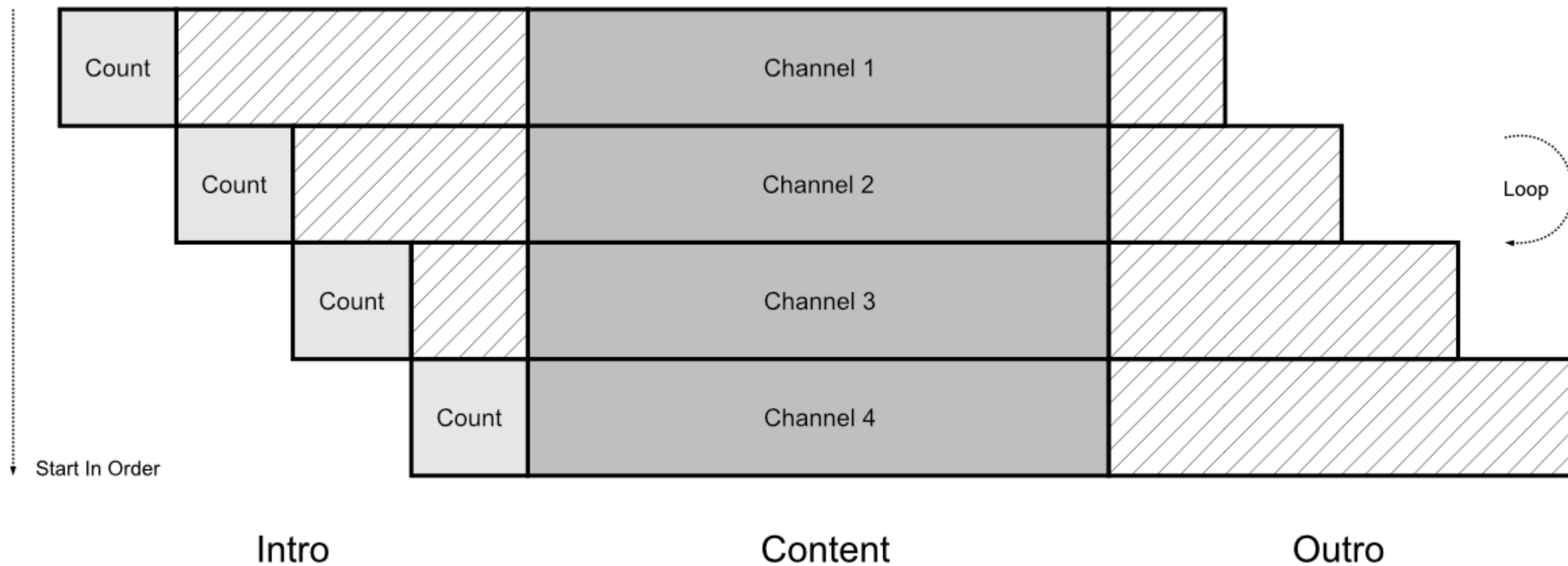
MiFa





video

multi-speaker-tools



Critical Zones: Online Exhibition

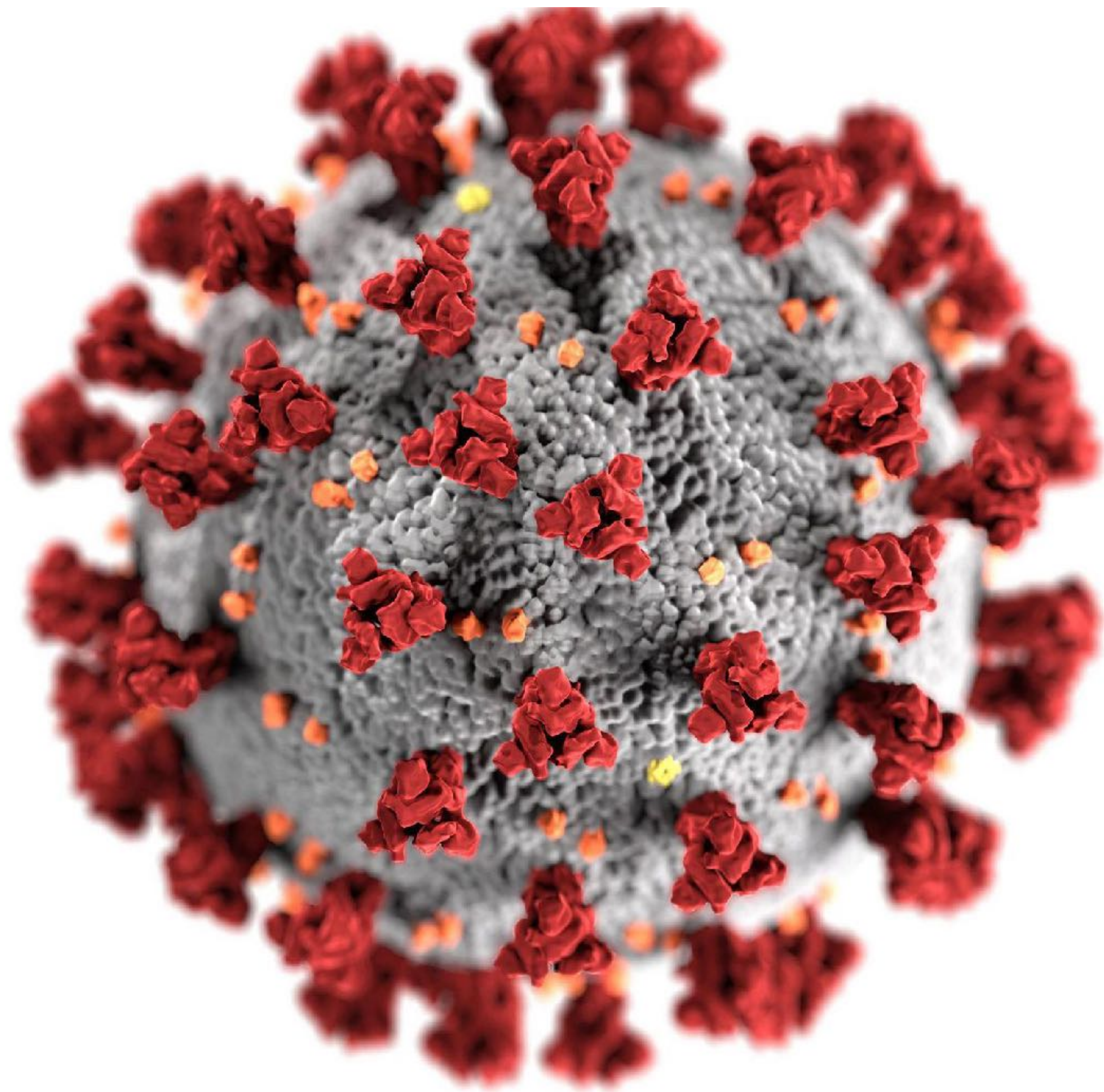
2020

With Bettina Korintenberg, Jessica Menger, Daria Mille, etc



CRITICAL ZONES

CURATED BY BRUNO LATOUR AND PETER WEIBEL
WITH MARTIN GUINARD AND BETTINA KORINTENBERG
23.05.2020 – 28.02.2021





Bruno Latour



critical-zones.zkm.de

CZO Space

Alexandra Arènes & Soheil Hajmirbaba

Ocean of Rain

Anuradha Mathur & Dilip da Cunha

For the Love of Corals

Sonia Levy

SpeedPitch 2021



*Speed*Pitch

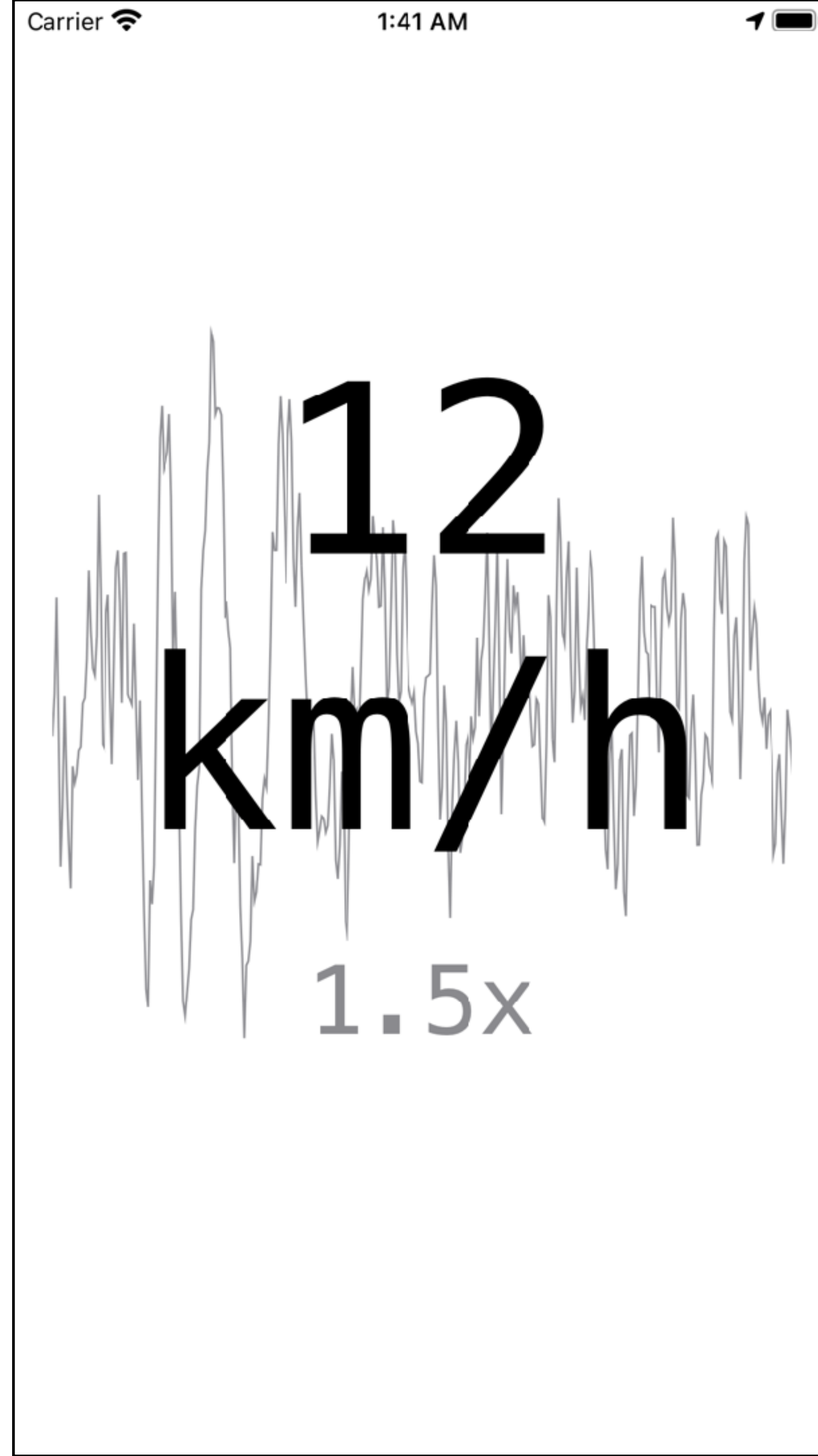
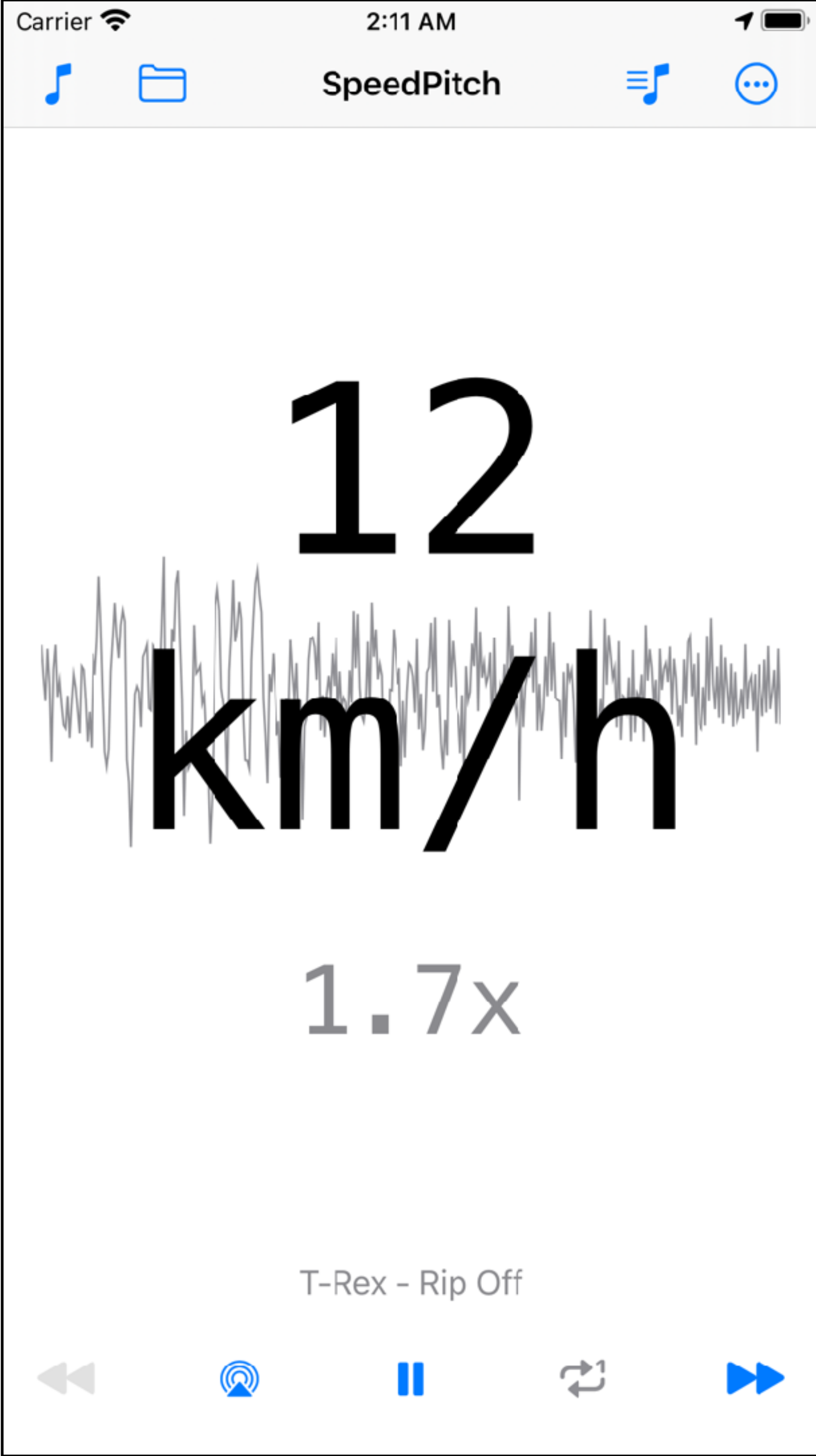
NIX    2.–30.7.21
Karlsruhe

  WIE   

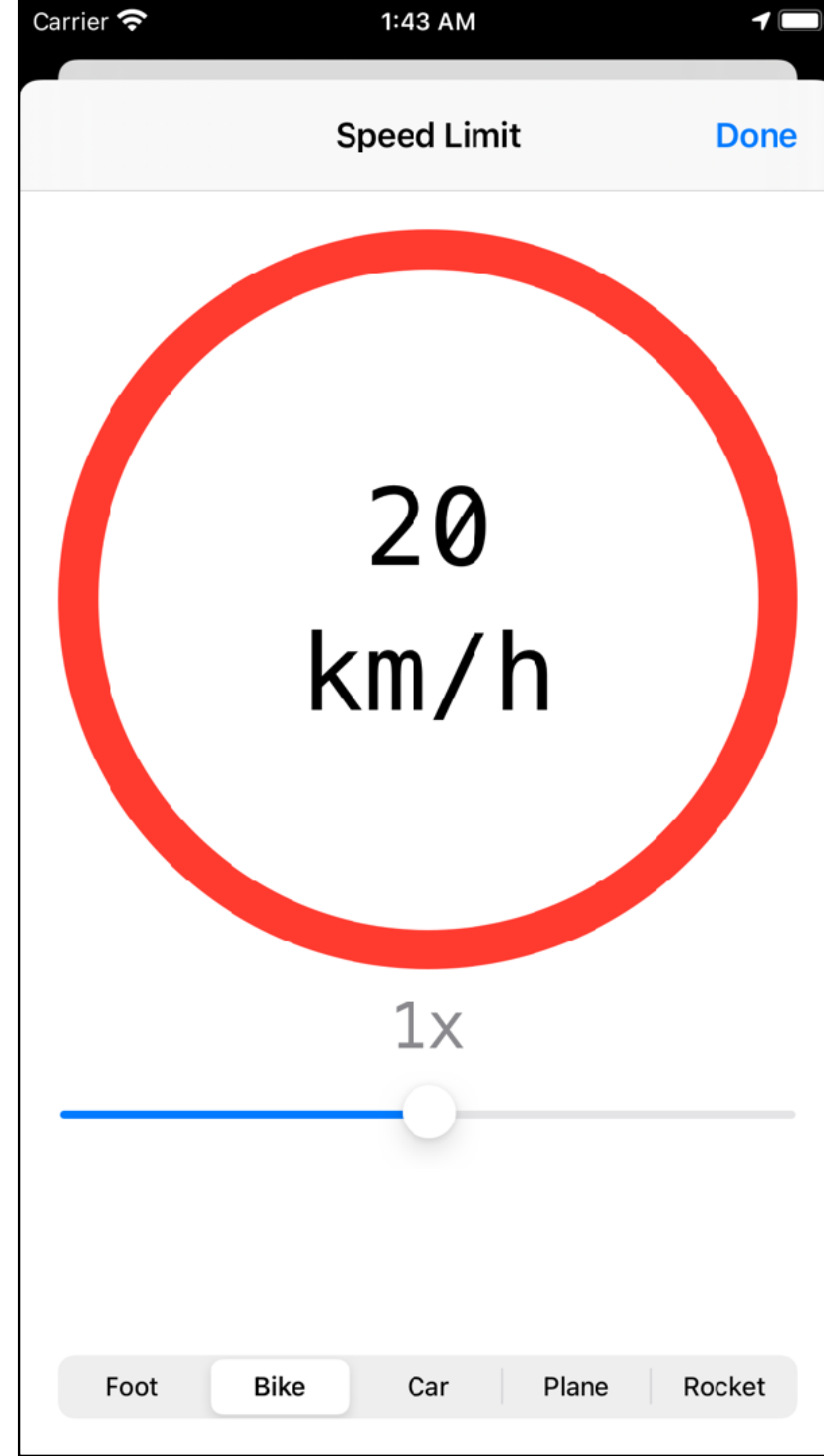
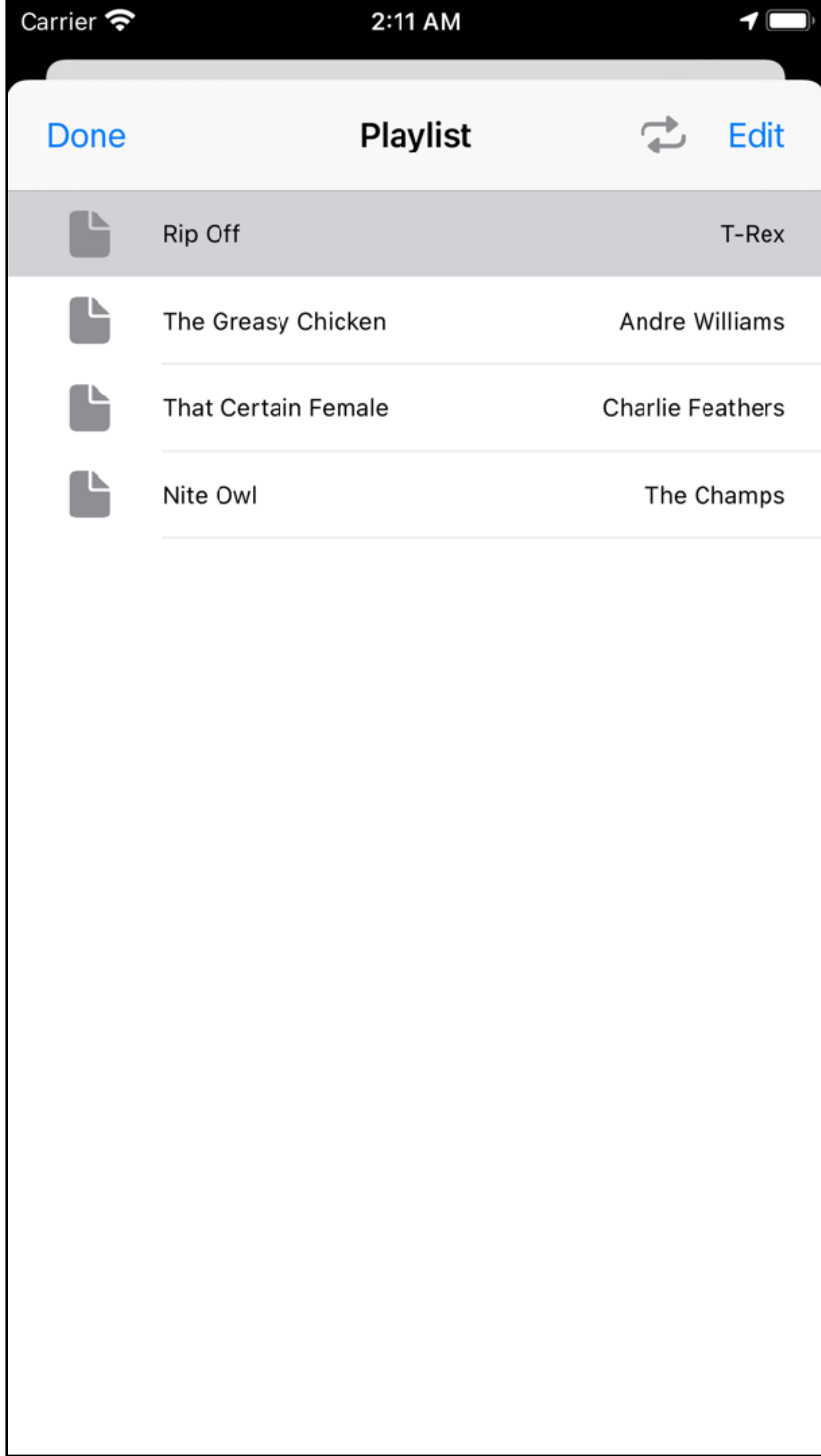
RAUS!   

Fahrrad
Kunst
Sommer     Vernissage:
Freitag, 2.7.21
um 19 Uhr





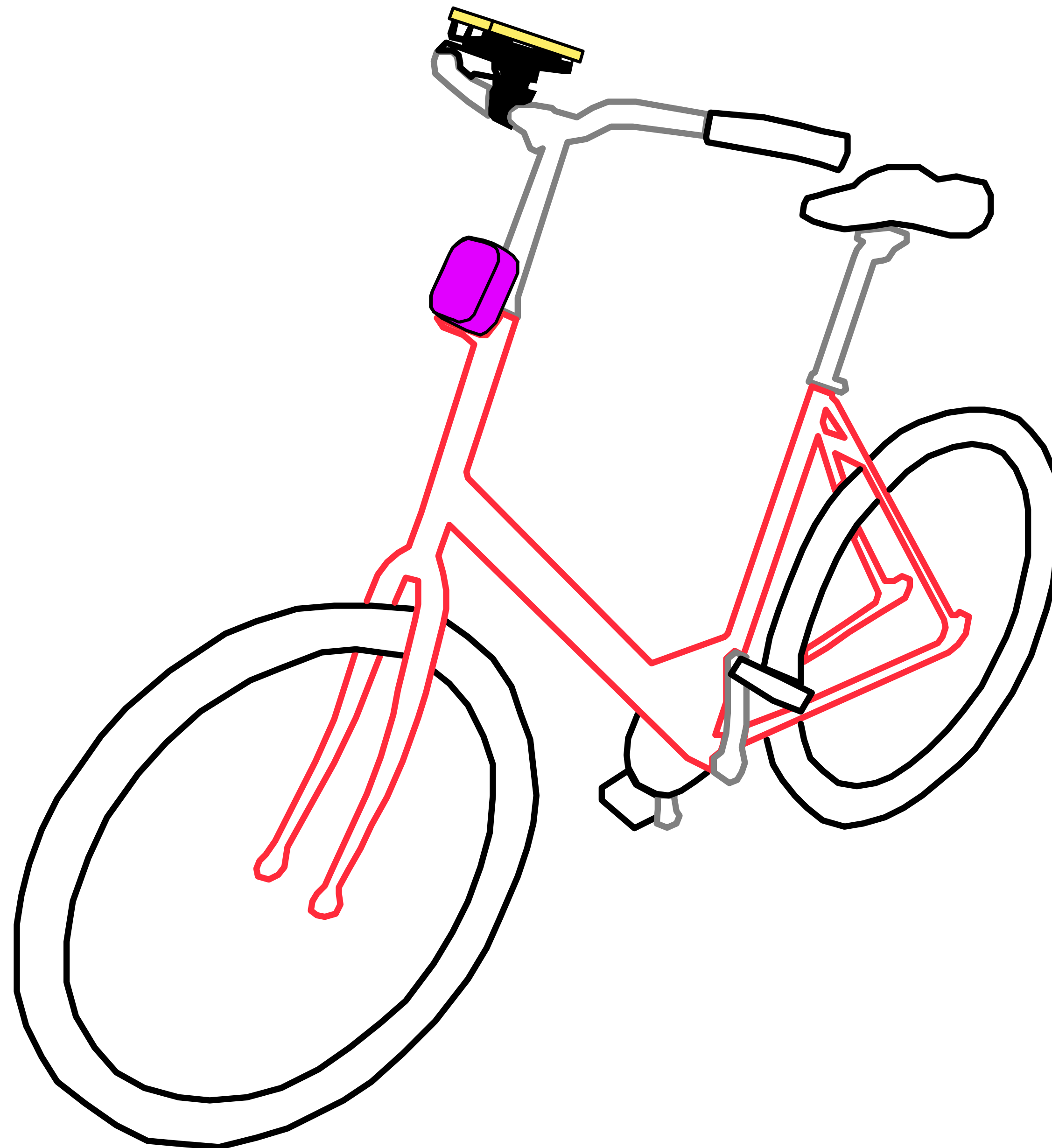
videos

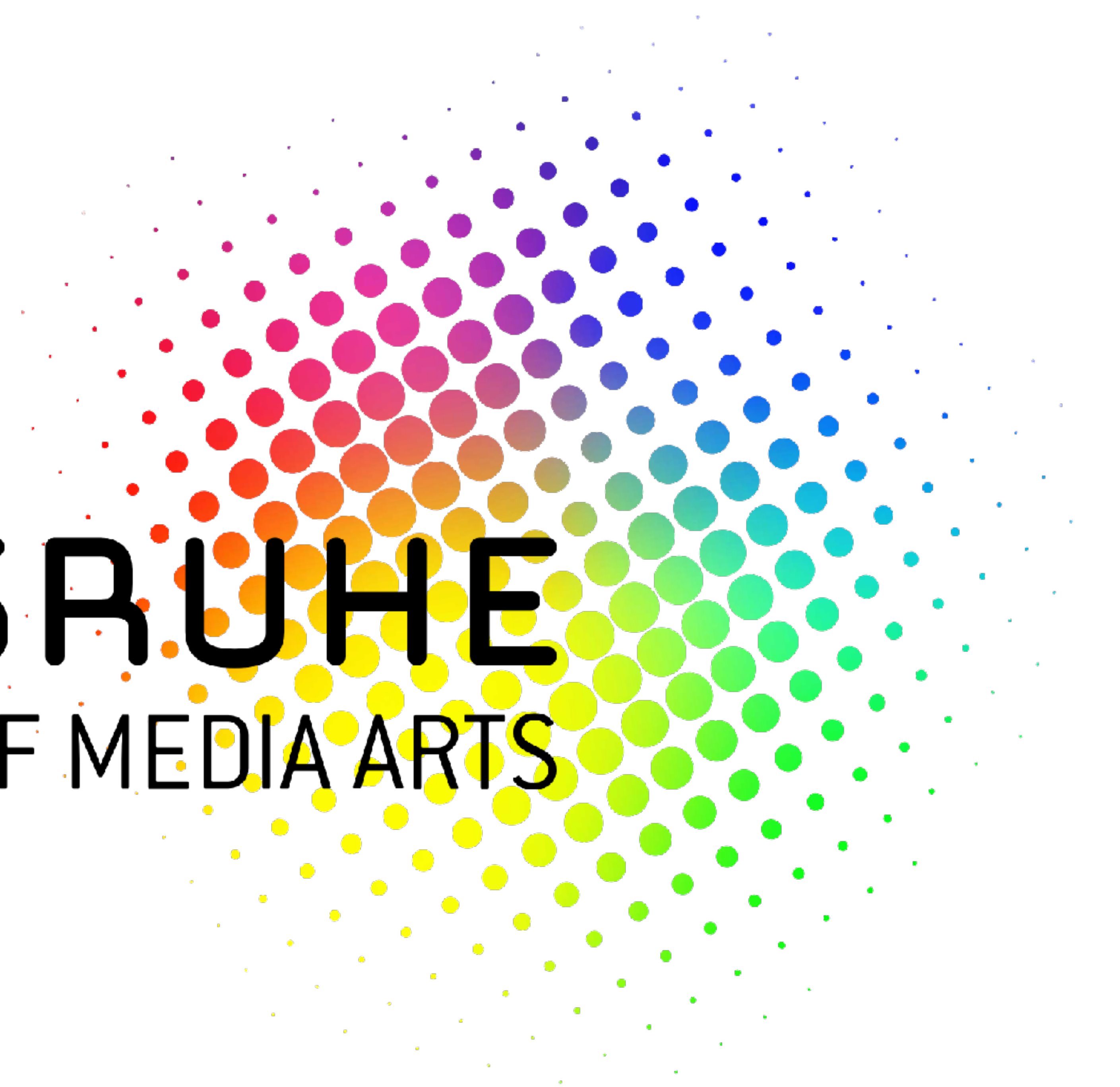


Open source:

github.com/danomatika/speedpitch

ShadowPlay 2021





KARLSRUHE

UNESCO CITY OF MEDIA ARTS

Seasons of Media Arts

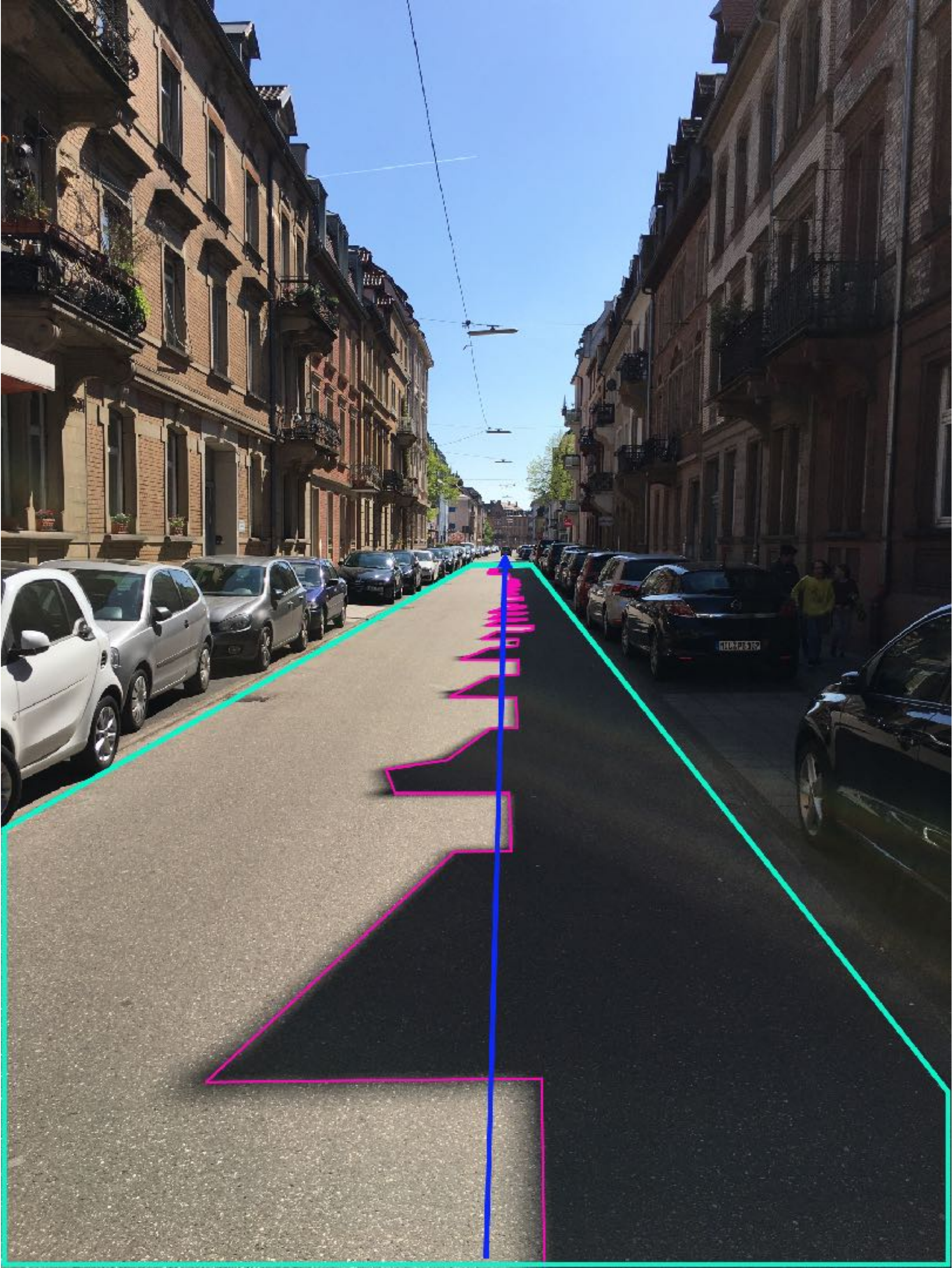
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Weststadt
Karlsruhe
16:00

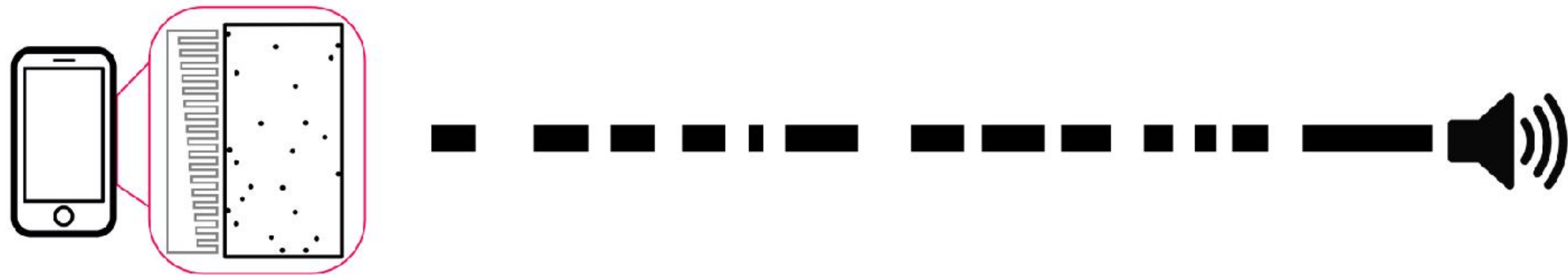
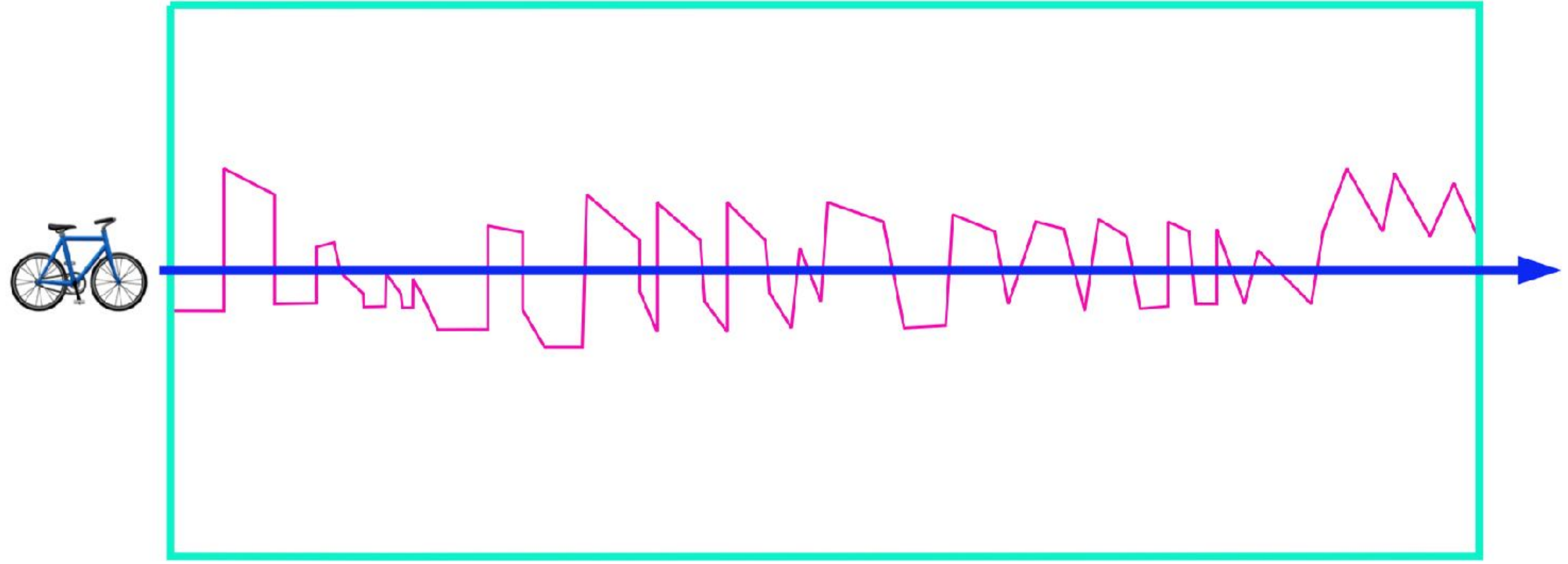


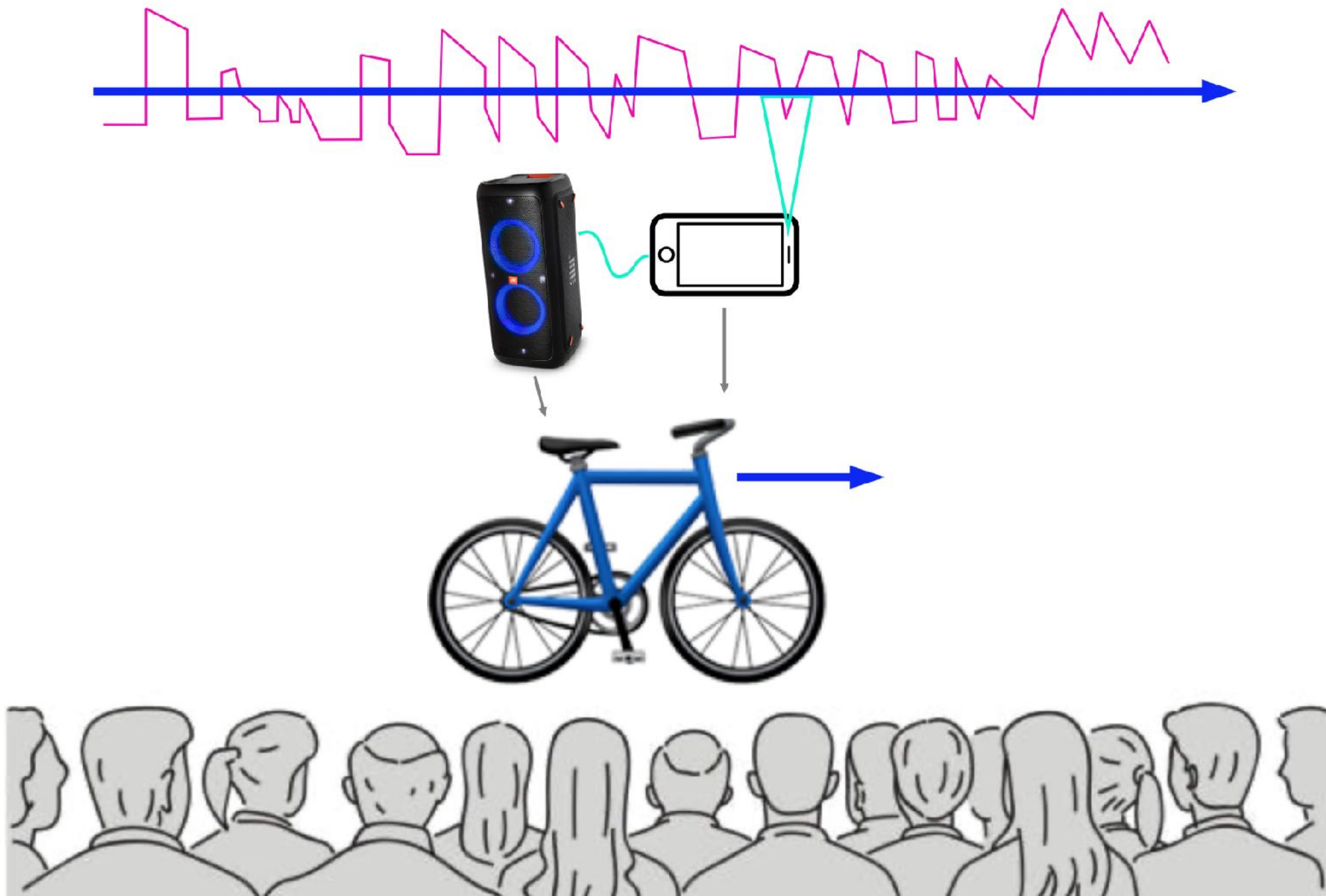
Körnerstraße
Weststadt
Karlsruhe
10:00

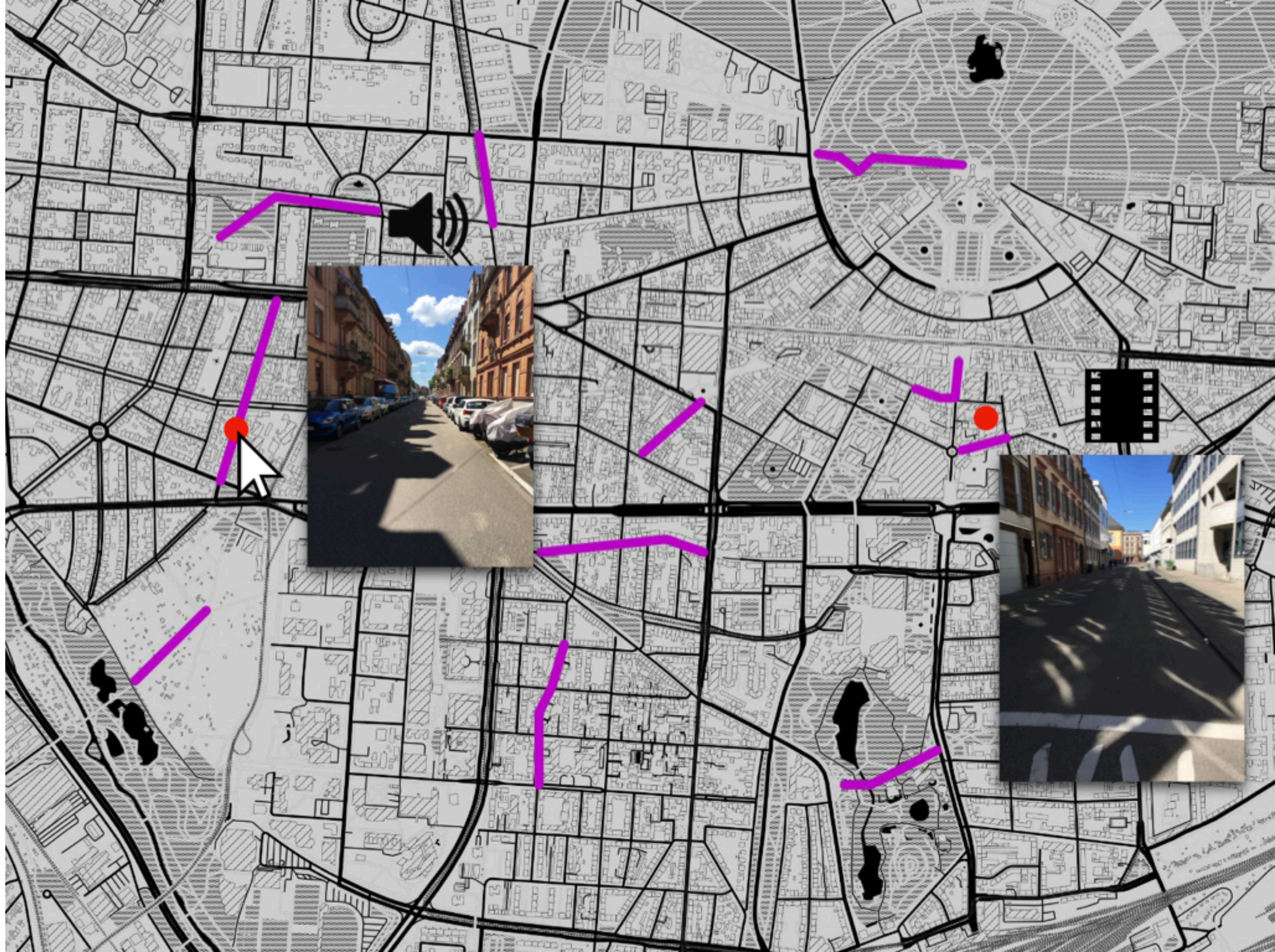


Possibilities...



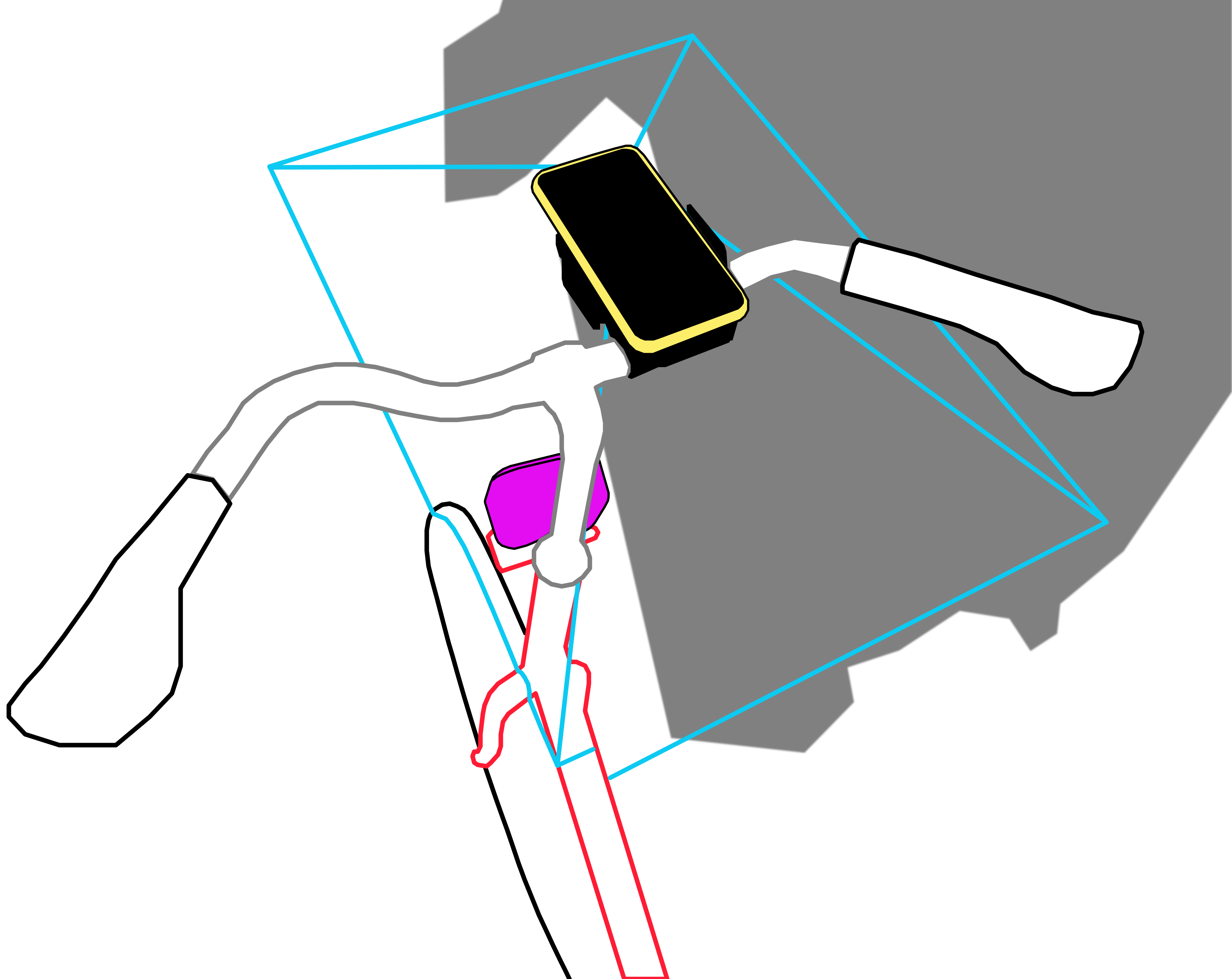












video

Open source:

github.com/danomatika/shadowplay

intelligent.museum 2021-23



All projects open source:

intelligent.museum/code

ofxTensorFlow2 2021

With Paul Bethge



ofxTensorFlow2



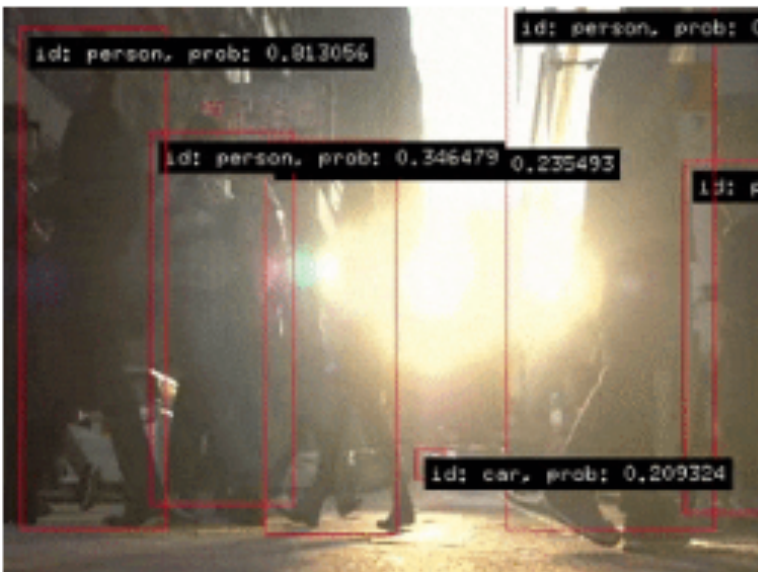
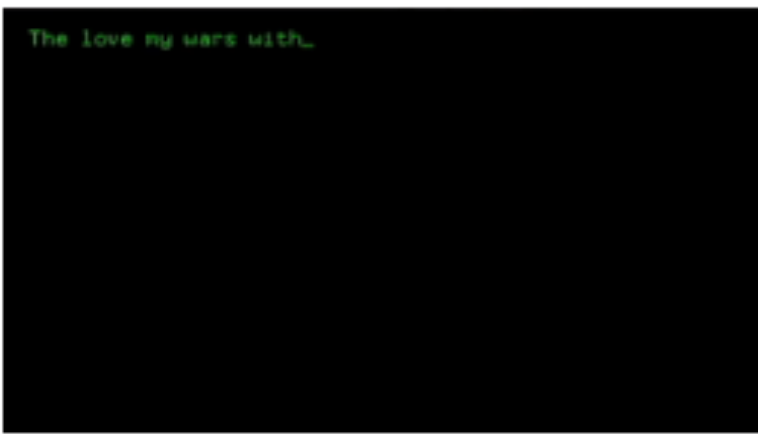
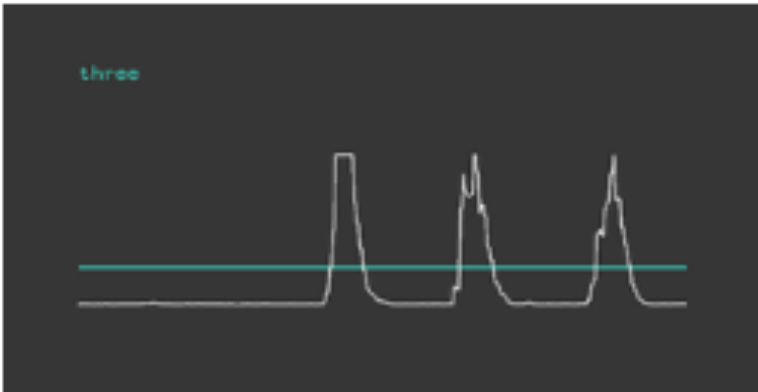
This is an openFrameworks addon for the TensorFlow 2 ML (Machine Learning) library. The code has been developed by the ZKM | Hertz-Lab as part of the project [»The Intelligent Museum«](#).

Copyright (c) 2021-2023 ZKM | Karlsruhe.

BSD Simplified License.

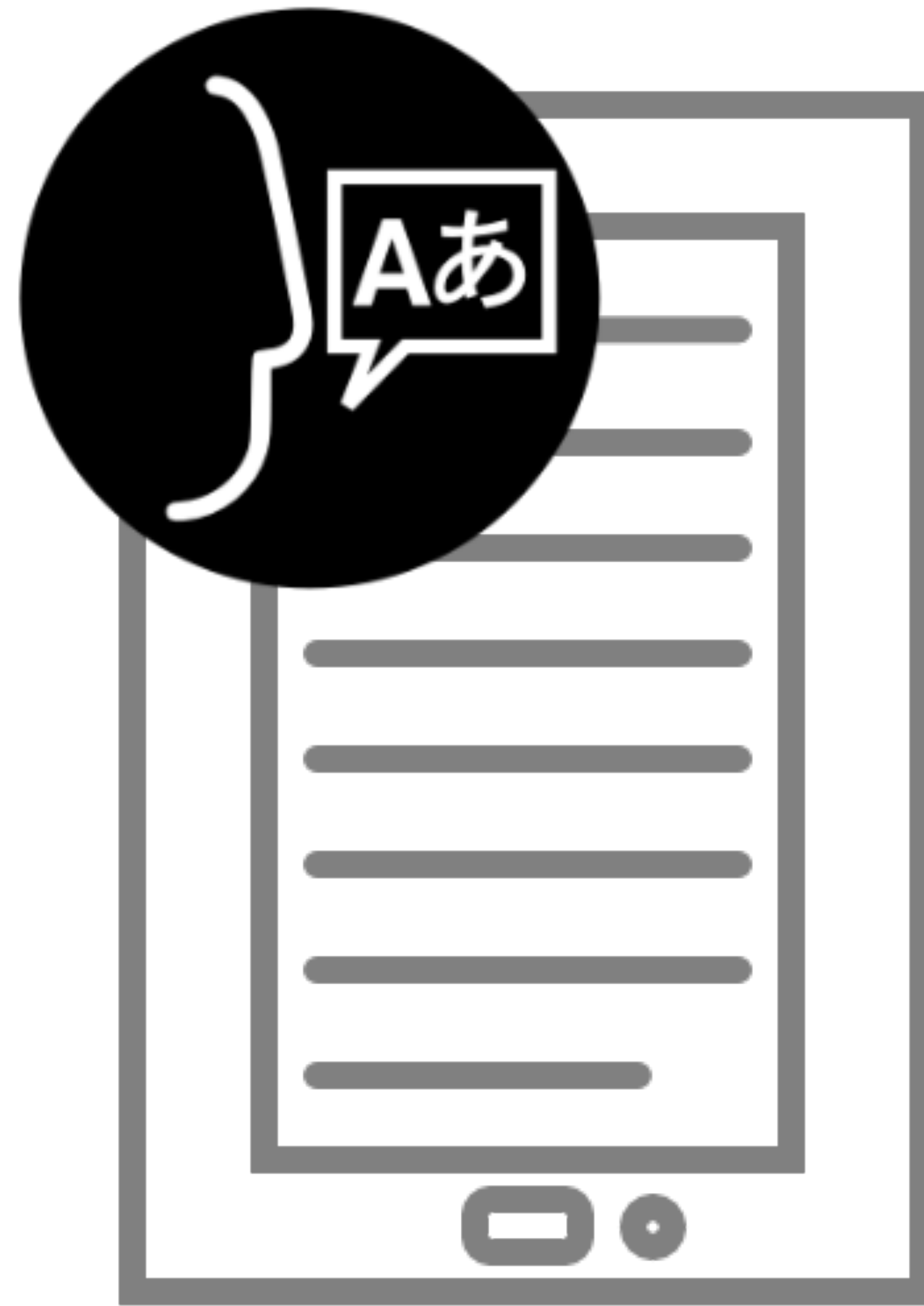
For information on usage and redistribution, and for a DISCLAIMER OF ALL WARRANTIES, see the file, "LICENSE.txt," in this distribution.

Selected examples:

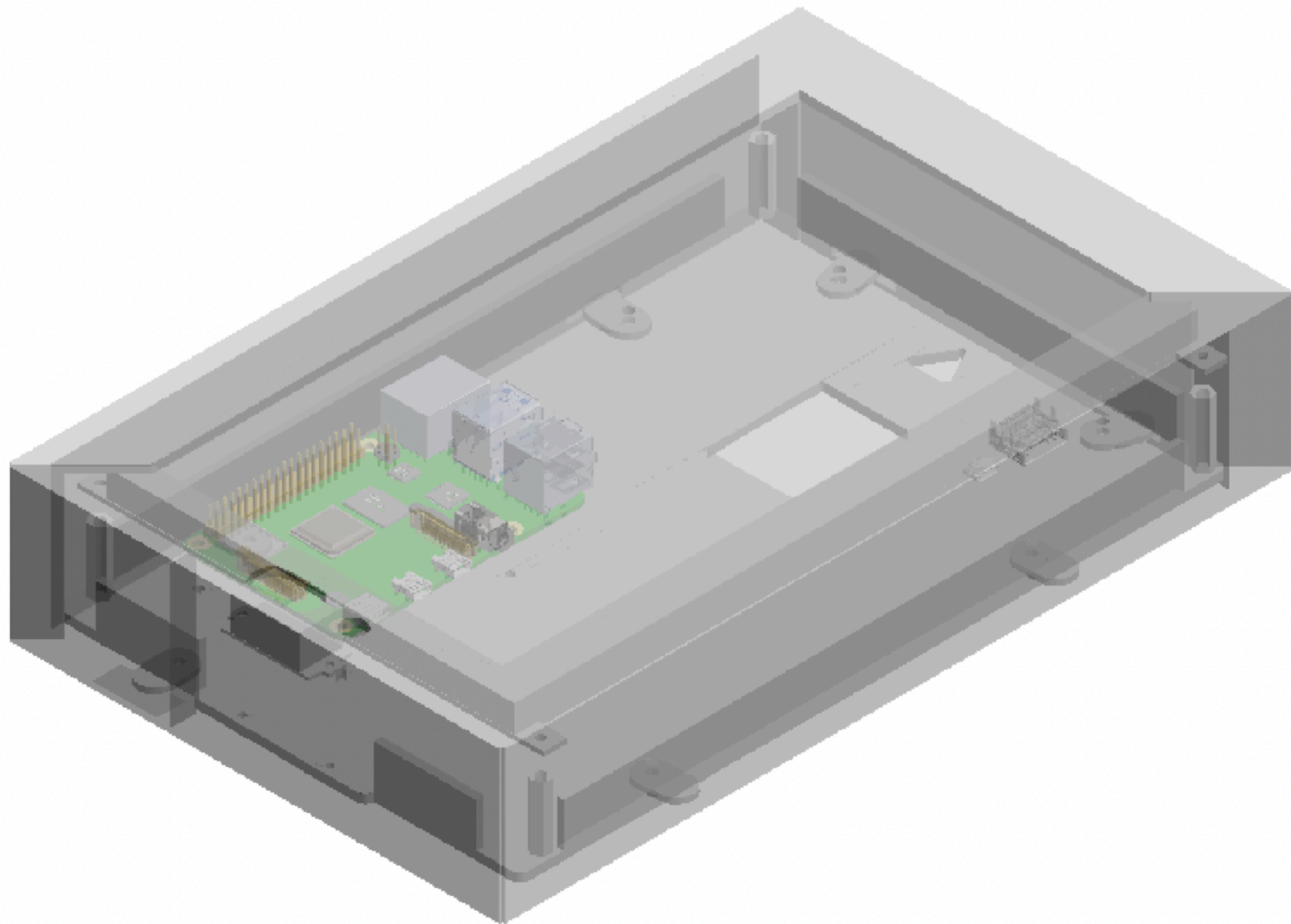
Style Transfer regular & arbitrary 	Object Recognition 	CharRnn (Frozen Graph) 
Pose Estimation 	Pix2Pix 	Keyword Spotting 

Museum Label 2021

With Paul Bethge



A row of 20 icons representing various symbols and concepts. From left to right: a construction site with a crane, a solid black circle, a construction site with a crane, a flag on a pole, a black ribbon, a checkmark, a question mark, a question mark, an information icon (i), a question mark, a road sign, a gift box, a shield, a mountain range, a person in a circle, a question mark, a gift box, a person in a circle, a person with an exclamation mark, a magnifying glass, a checkmark, a bicycle, a gift box, and a compass rose.





Spoken Language Identification: An AI-assisted Museum Label

2020/2021

Méta-information

Cartel auto-adaptatif, assisté par IA, avec identification de la langue

Logiciel

Identification du langage parlé (outil d'apprentissage automatique : Tensorflow ; base de données vocale : Mozilla Common Voice)

Matériel

Ordinateur à carte unique, écran (10"), capteur LIDAR, microphone Lavalier

Description

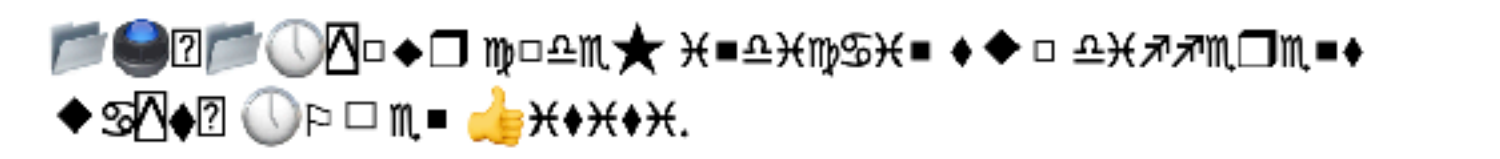
L'équipe du projet intelligent.museum a développé un prototype de cartel assisté par IA pour les espaces d'exposition. Il est destiné à identifier la langue maternelle des visiteurs de l'exposition à partir de leur langue parlée. De cette façon, la description de l'œuvre et les méta-informations sont automatiquement traduites dans la langue correspondante.

La reconnaissance automatique de la langue parlée n'est pas un problème trivial. Pour apprendre à une machine à reconnaître parfaitement les phrases d'une langue donnée, il faut disposer de tout le spectre de cette langue. Cela nécessite des quantités astronomiques de données. Comme différentes langues se chevauchent sur le plan acoustique, plus il y a de langues à distinguer les unes des autres, plus la tâche devient difficile. Cette dernière devient encore plus difficile si l'on tient compte des différents accents, de l'âge, du sexe et d'autres caractéristiques qui influencent le canal vocal. Lors des premières expériences, le prototype de cartel assisté par IA est capable de distinguer sept langues différentes (allemand, anglais, français, espagnol, italien, chinois, russe) avec une précision globale de 83 %.

En attendant que ce prototype devienne une solution évolutive pour les musées internationaux, il est nécessaire de poursuivre le développement et trouver des solutions. C'est le seul moyen de garantir la robustesse nécessaire à l'opération des expositions.



videos



Wishing Well uses AI to transform verbally expressed dreams, wishes and fantasies of exhibition visitors into images. The installation echoes Marcel Duchamp's wellknown ready-made Fountain (1917). He identified a urinal as an art object and signed it under a pseudonym, thus challenging the prevailing definition and initiating a debate about what can and cannot be considered art. Today, we are debating this question again: generative AI models can perform artistic tasks such as writing, making music, and painting. This major change in cultural production has an impact on the future role and self image of artists.

intelligent-things 2023

Besucher:innen Lichthof 8/9

8 Personen



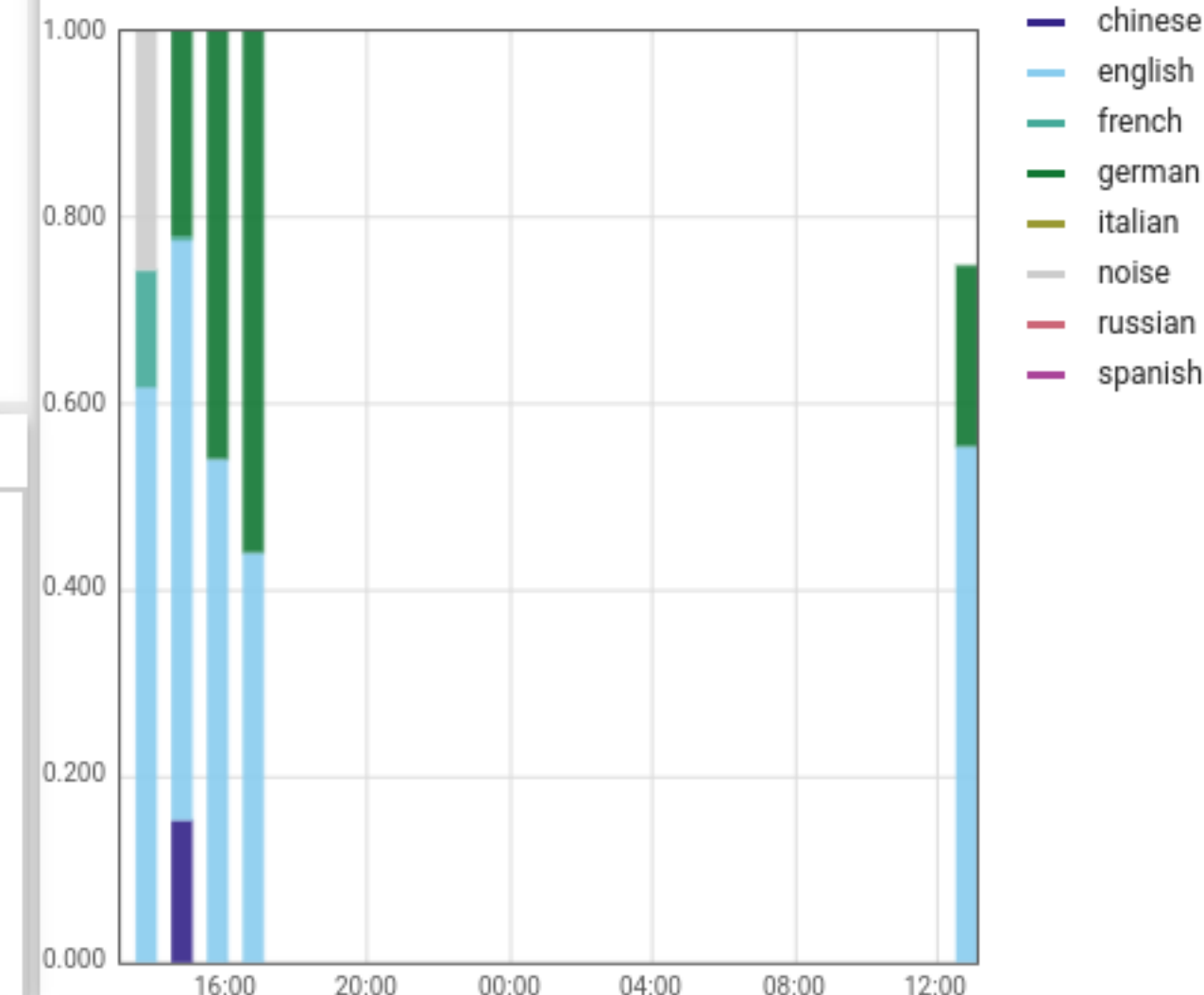
Aktive Sprachen



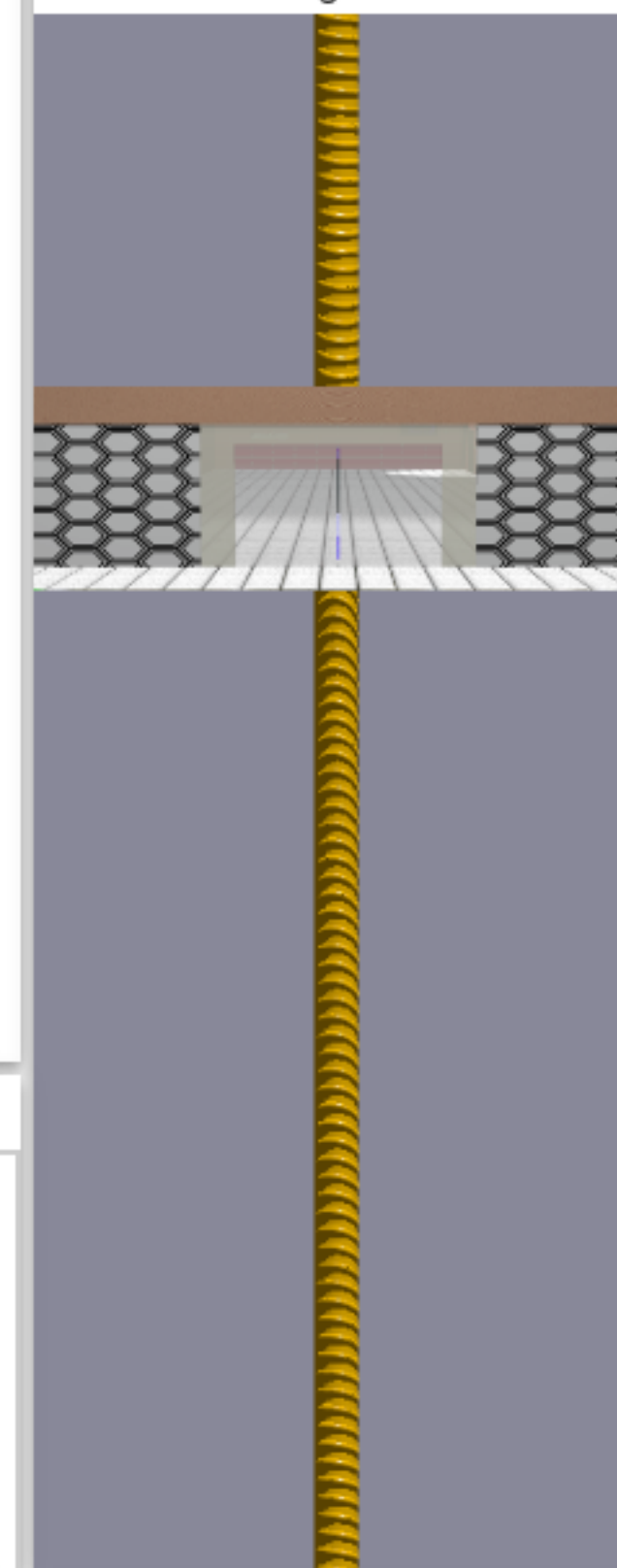
Crawl3rs

Comments: 539670
Posts: 316437
Reactions: 6793372
Post Images: 367642

Sprachen Mittelwerte



Personalaufzug



788156



Beiträge/h
0

CWA Signal

-120dB

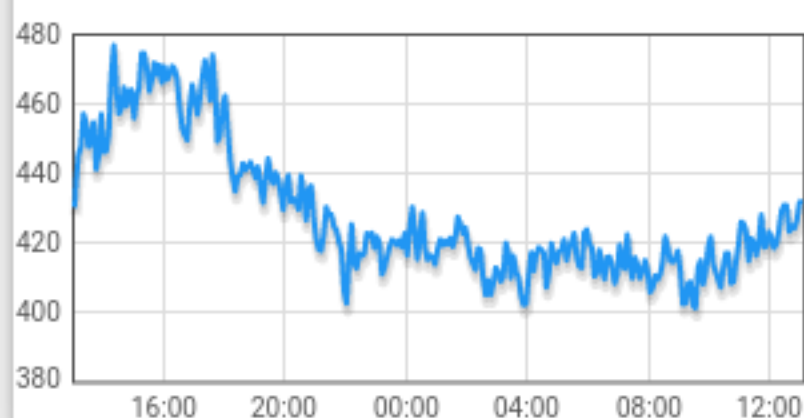
ZKM.DE Ansichten/Woche

IT - 1
DE - 1
GB - 1
US - 1
GB - 1

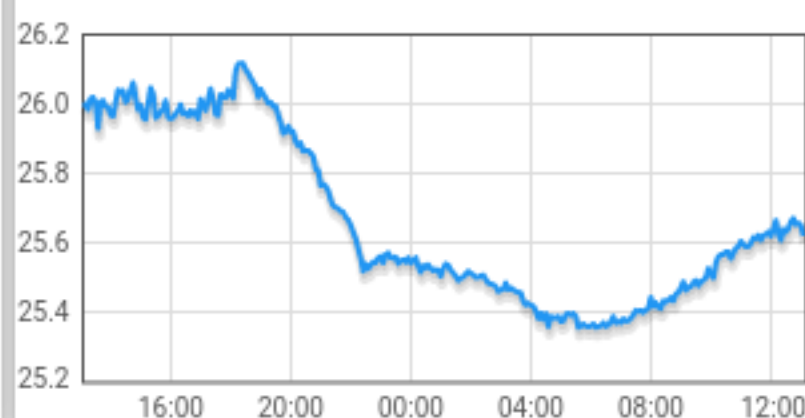
ZKM.DE Top-Seiten/Woche

1 : Interview mit Hannes Seidl und Daniel Kötter
1 : ARCHIV-Heimat
1 : Critical Zones
1 : Critical Zones
1 : William Forsythe. Nowhere and Everywhere at the Same Time

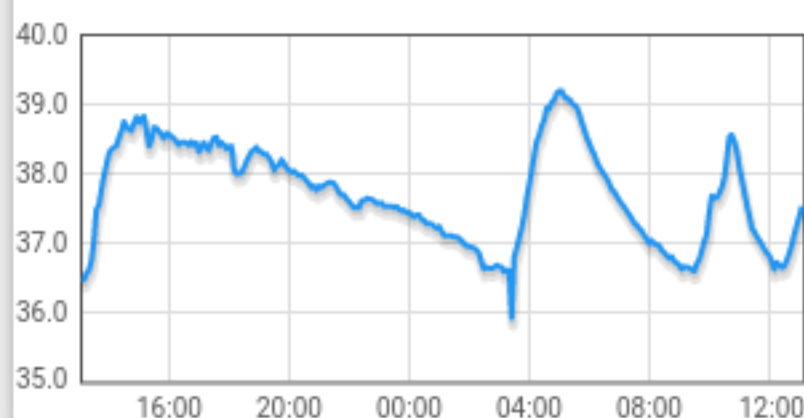
CO2



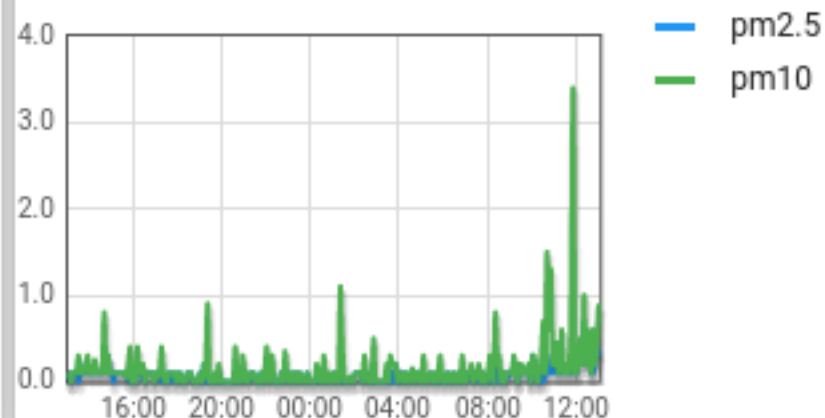
Temperatur



Feuchtigkeit



Feinstaub



CWA Geräte

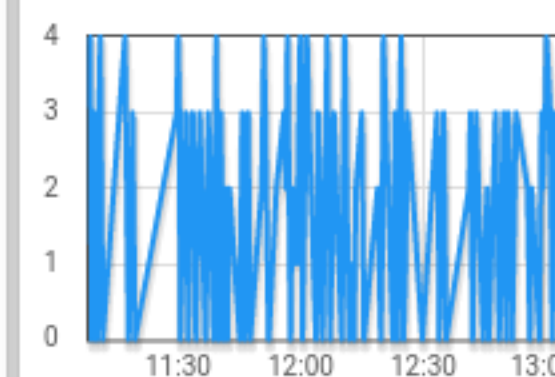


ZKM.DE Weltweit



1 Besucher:innen

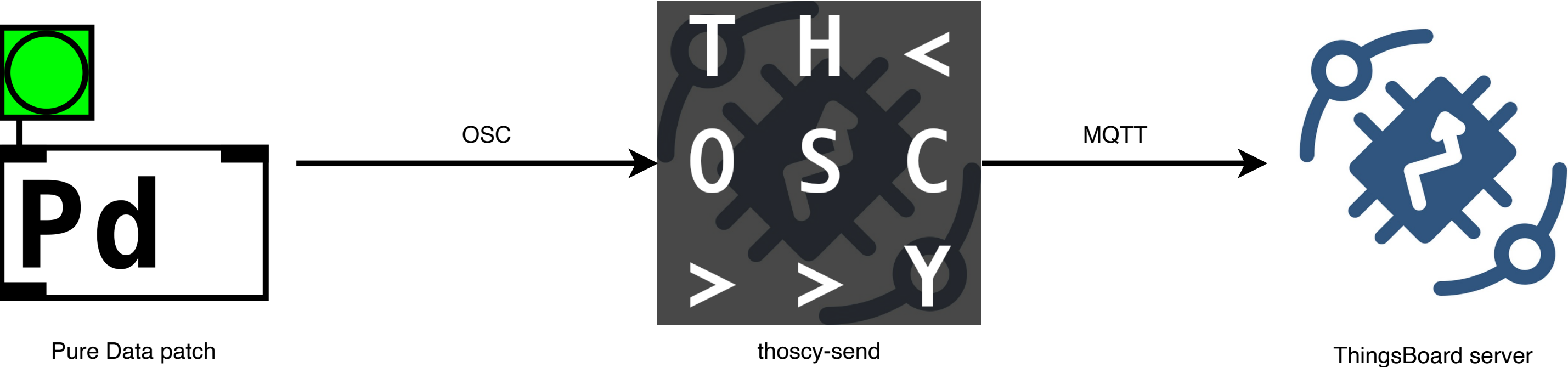
Fahrten



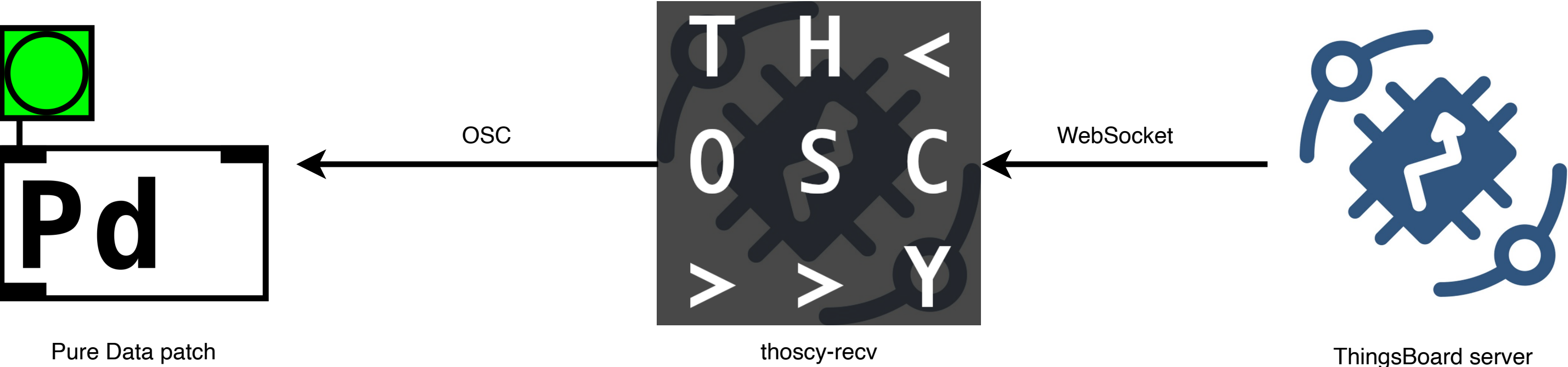
Timestamp ↓ Pro 2 Stunden

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2023-04-24 11:00:00	119
2023-04-24 09:00:00	152

Sending



Receiving

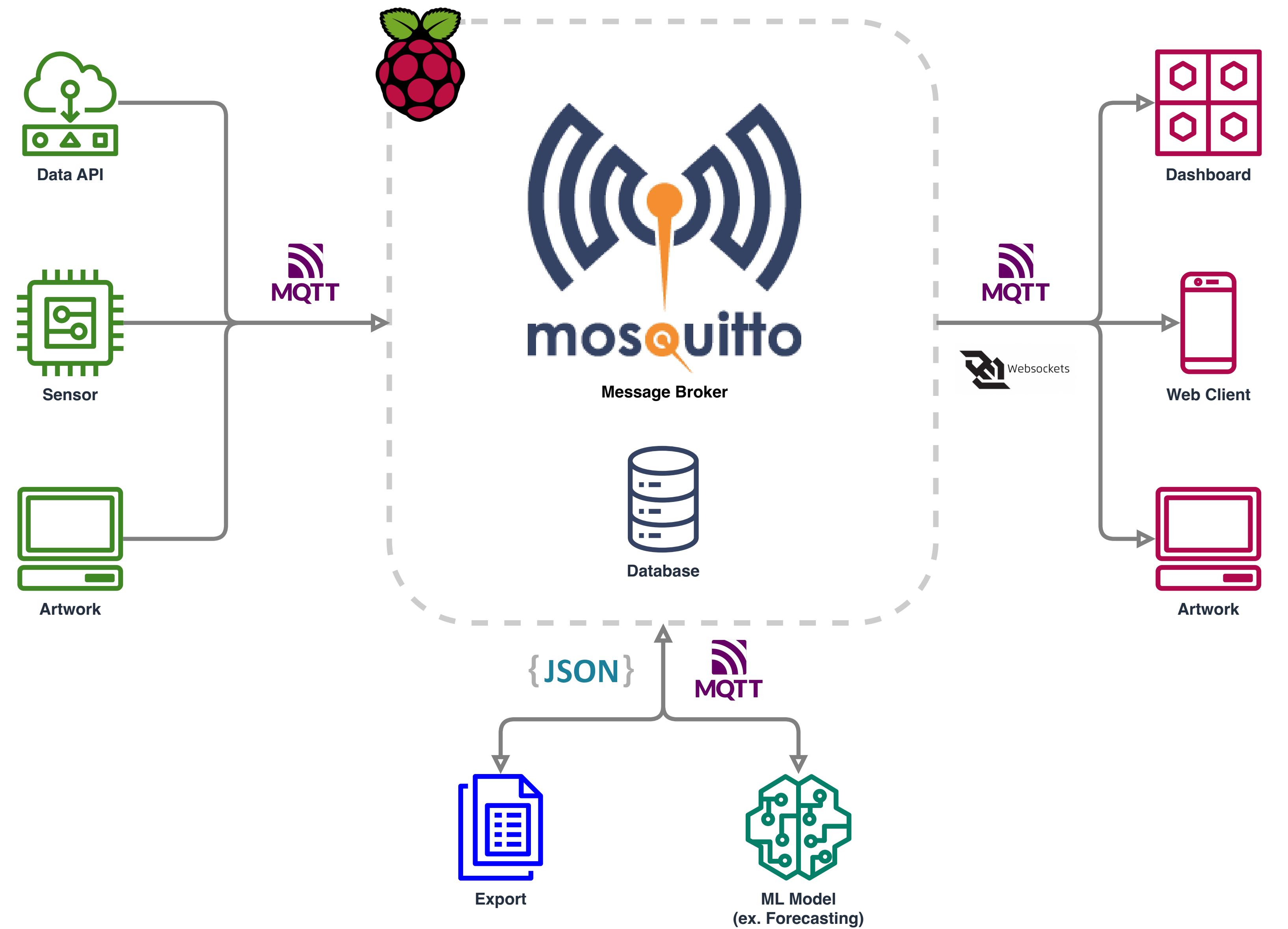


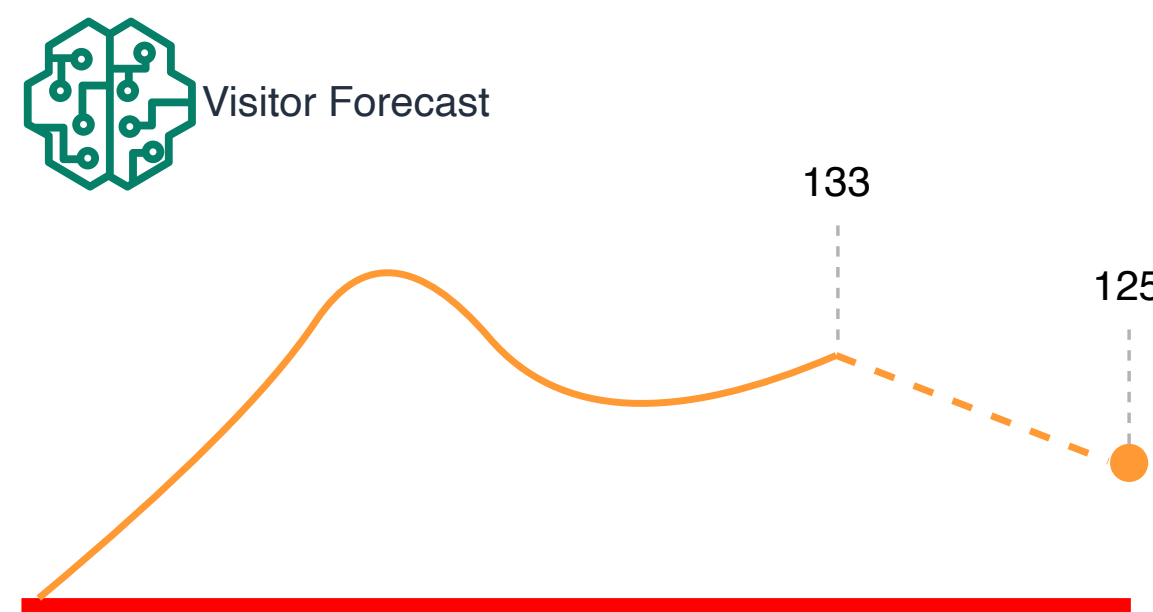
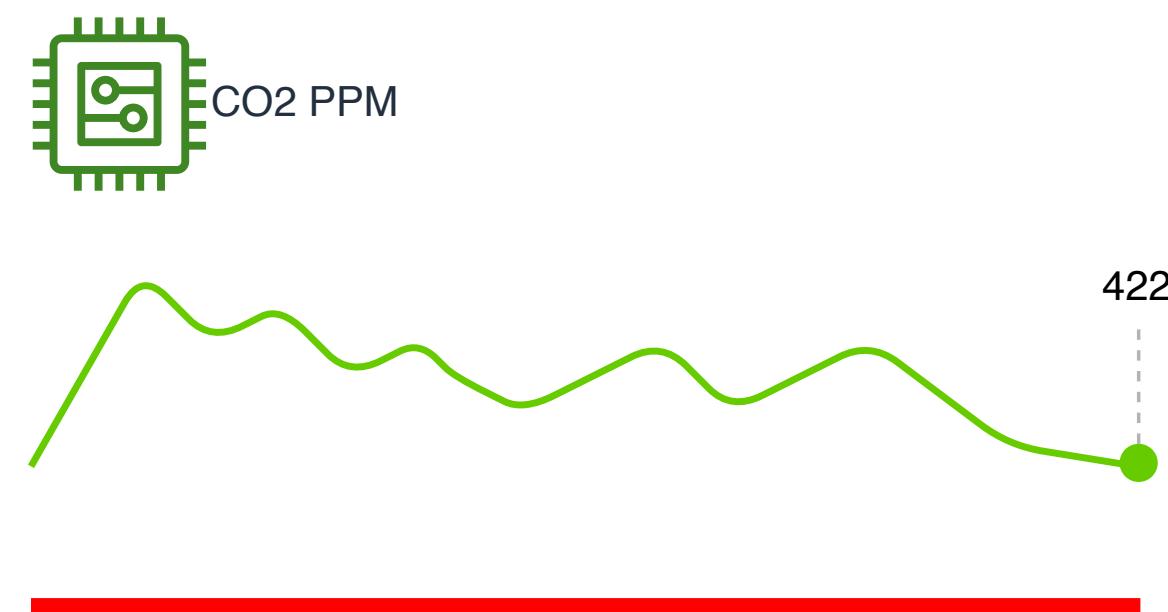
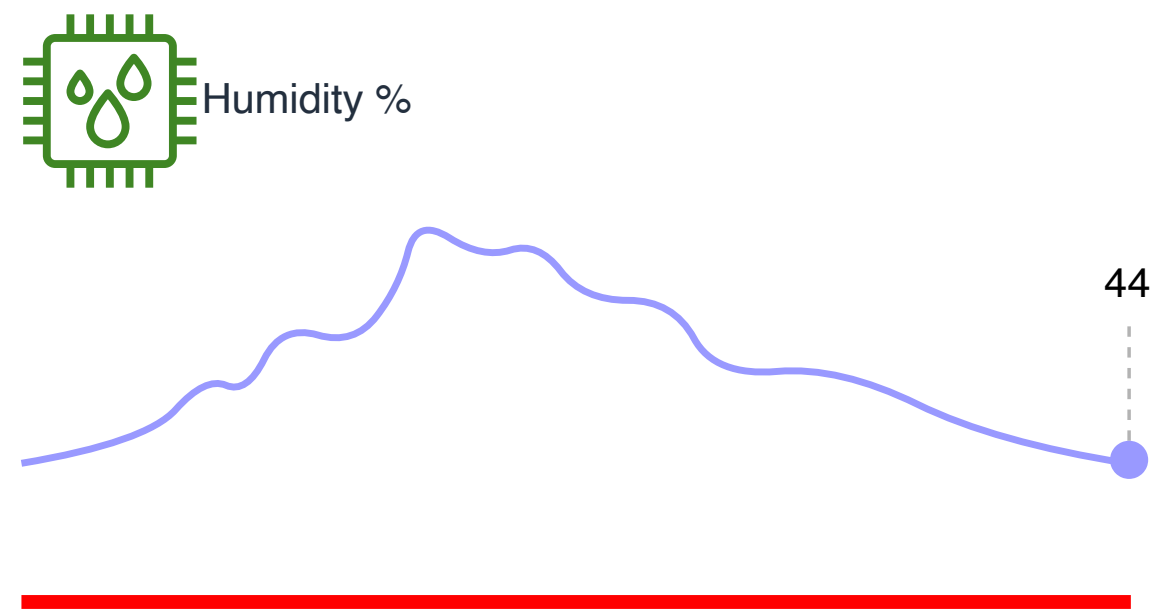
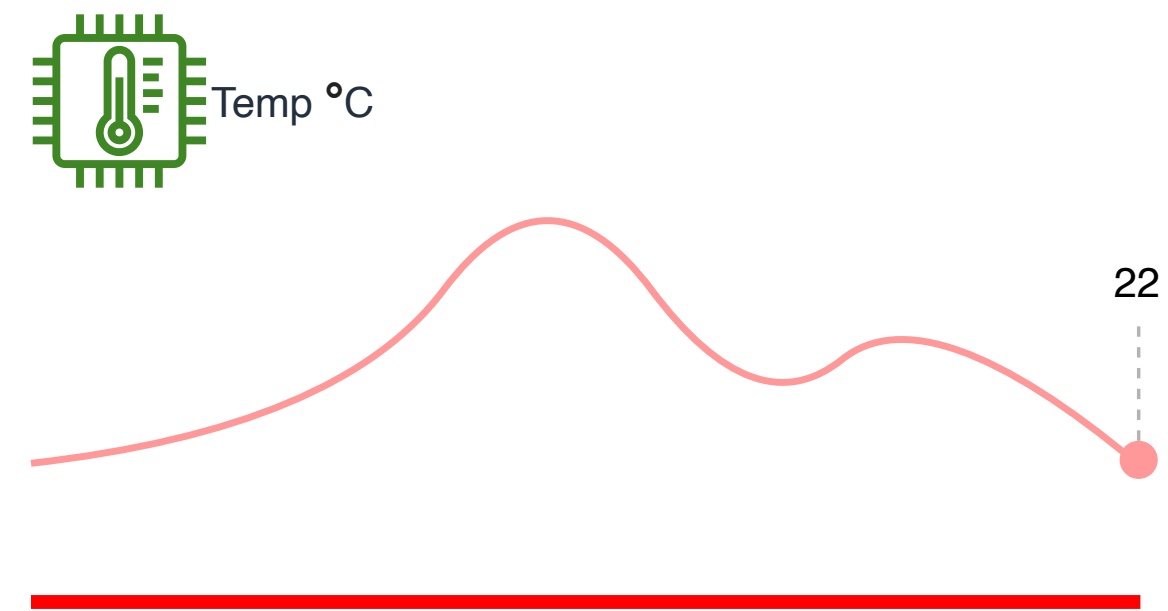
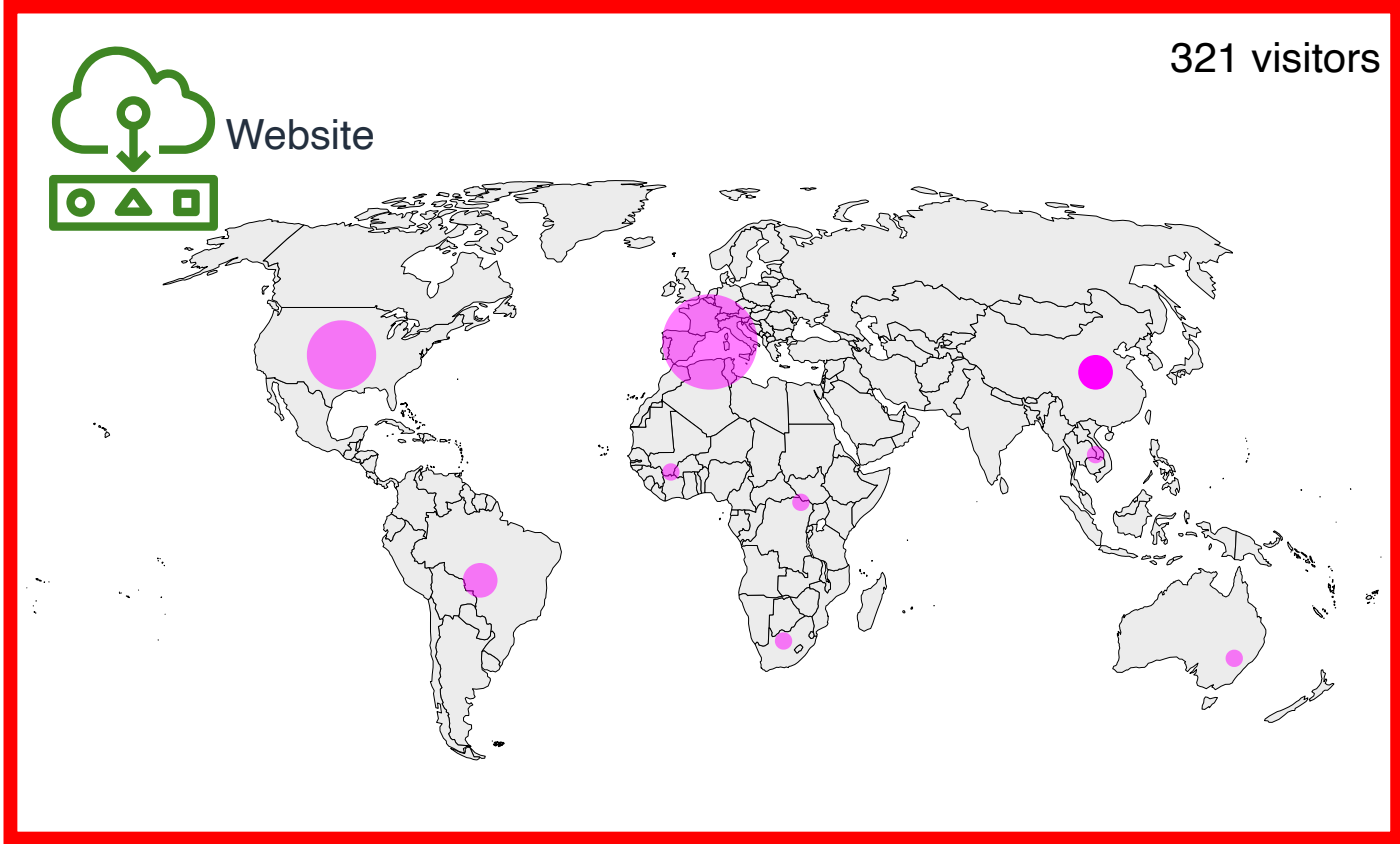
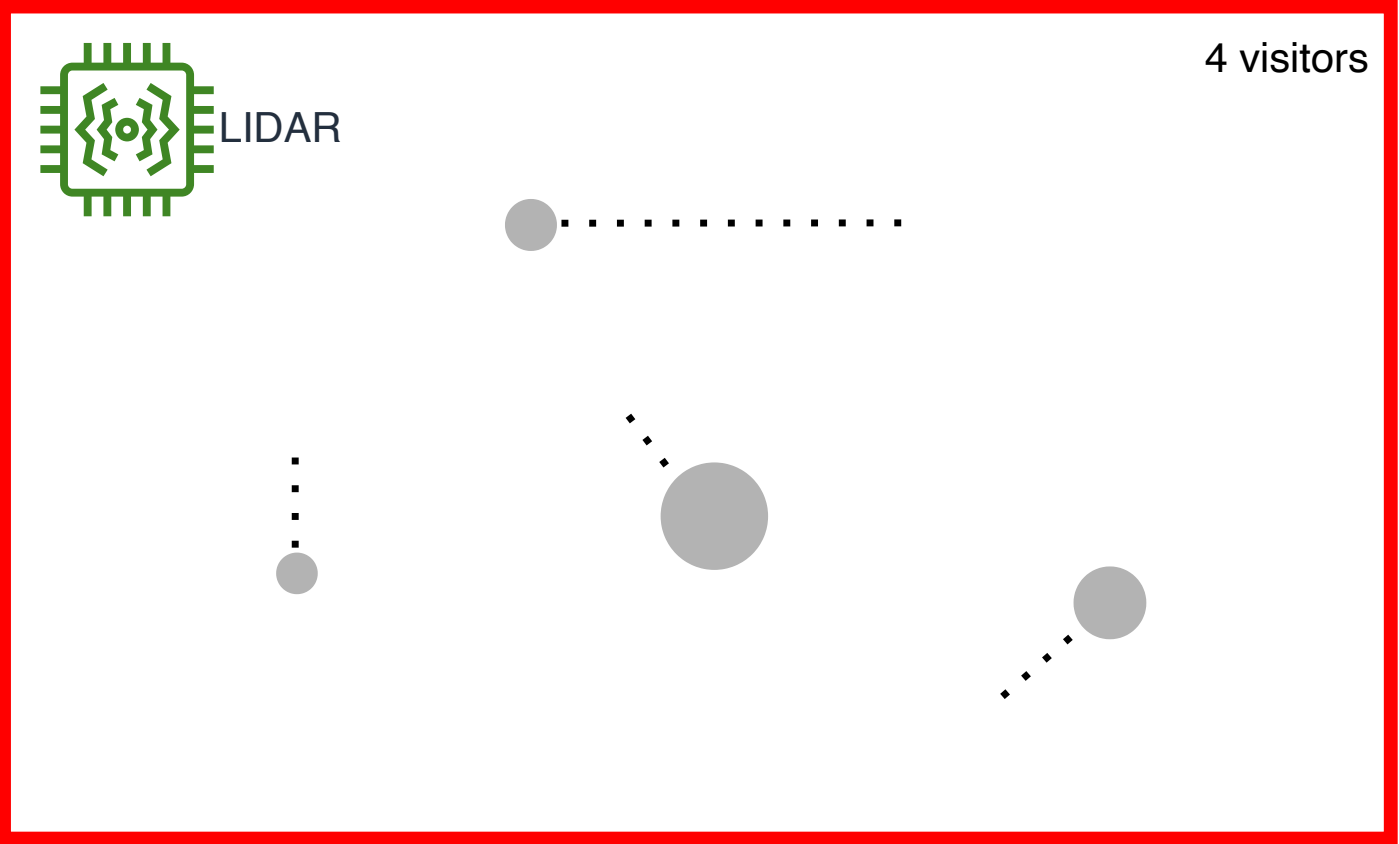
Intelligent Things

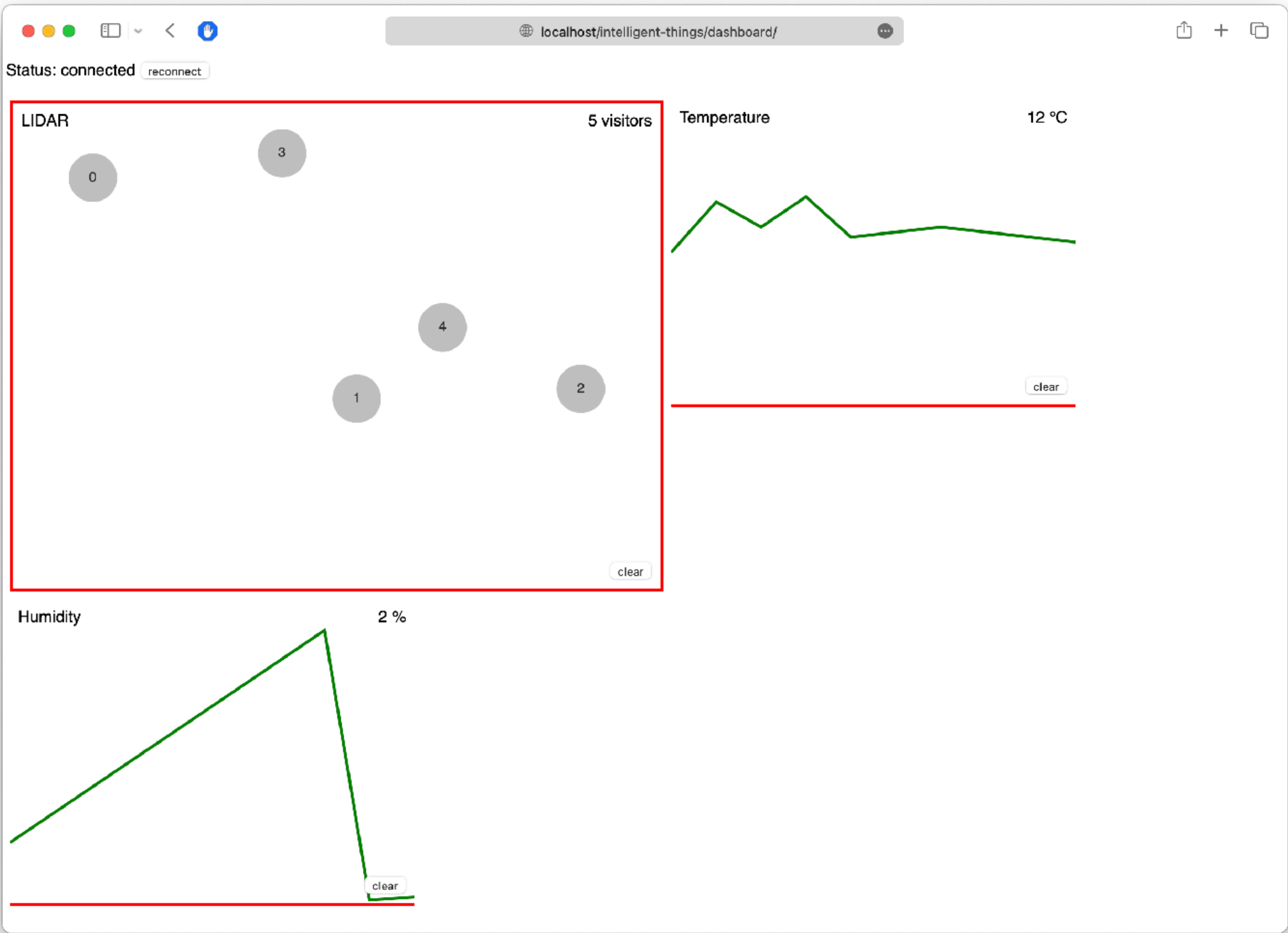
IoT Ecosystem

Publishers

Subscribers



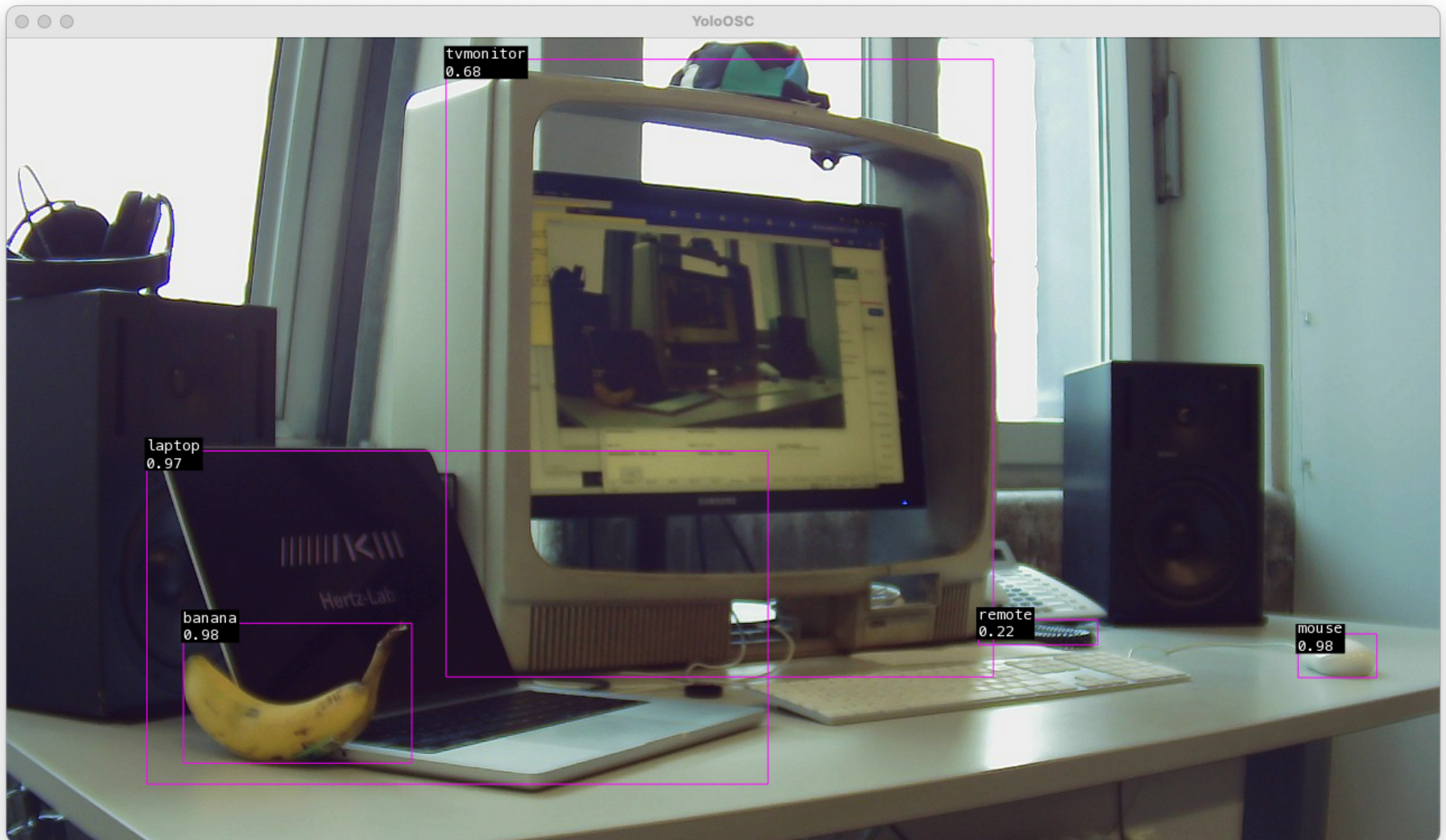




video

yolo-experiments 2022





YoloOSC

tvmonitor
0.68

laptop
0.97

banana
0.98

remote
0.22

mouse
0.98

video

Free Styler 2023



Kreative Befähigung im KI-Bereich

Ein zentraler Aspekt der intelligenten Kunst ist die kreative Befähigung im Umgang mit KI-Technologien. Sie zielt darauf ab, die kreative Fähigkeiten der Menschen zu stärken und sie in der Lage zu setzen, die KI-Technologien zu nutzen, um neue kreative Werke zu schaffen.

Die kreative Befähigung im KI-Bereich umfasst:

- (1) Kreative Befähigung im Umgang mit KI-Technologien
- (2) Kreative Befähigung im Umgang mit KI-Technologien
- (3) Kreative Befähigung im Umgang mit KI-Technologien

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- (3) Kreative Befähigung im Umgang mit KI-Technologien

Ein künstlerischer KI- Softwarewerkzeugkasten

Ein künstlerischer KI-Softwarewerkzeugkasten ist ein Softwarepaket, das Künstlern ermöglicht, ihre Kunstwerke zu erstellen, indem sie die KI-Technologien nutzen. Es umfasst eine Reihe von Werkzeugen, die Künstlern helfen, ihre Kunstwerke zu erstellen, indem sie die KI-Technologien nutzen.

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video







Thank You

danomatika.com

robotcowboy.com