



**Dan Wilcox**  
**[danomatika.com](http://danomatika.com)**



# ***SpeedPitch* & ShadowPlay**

**Two open source mobile-device apps for bicycles**

**Dan Wilcox, 1 Jun 2024, GPN 22**



Dan Wilcox

Artist

Engineer

Musician

Performer

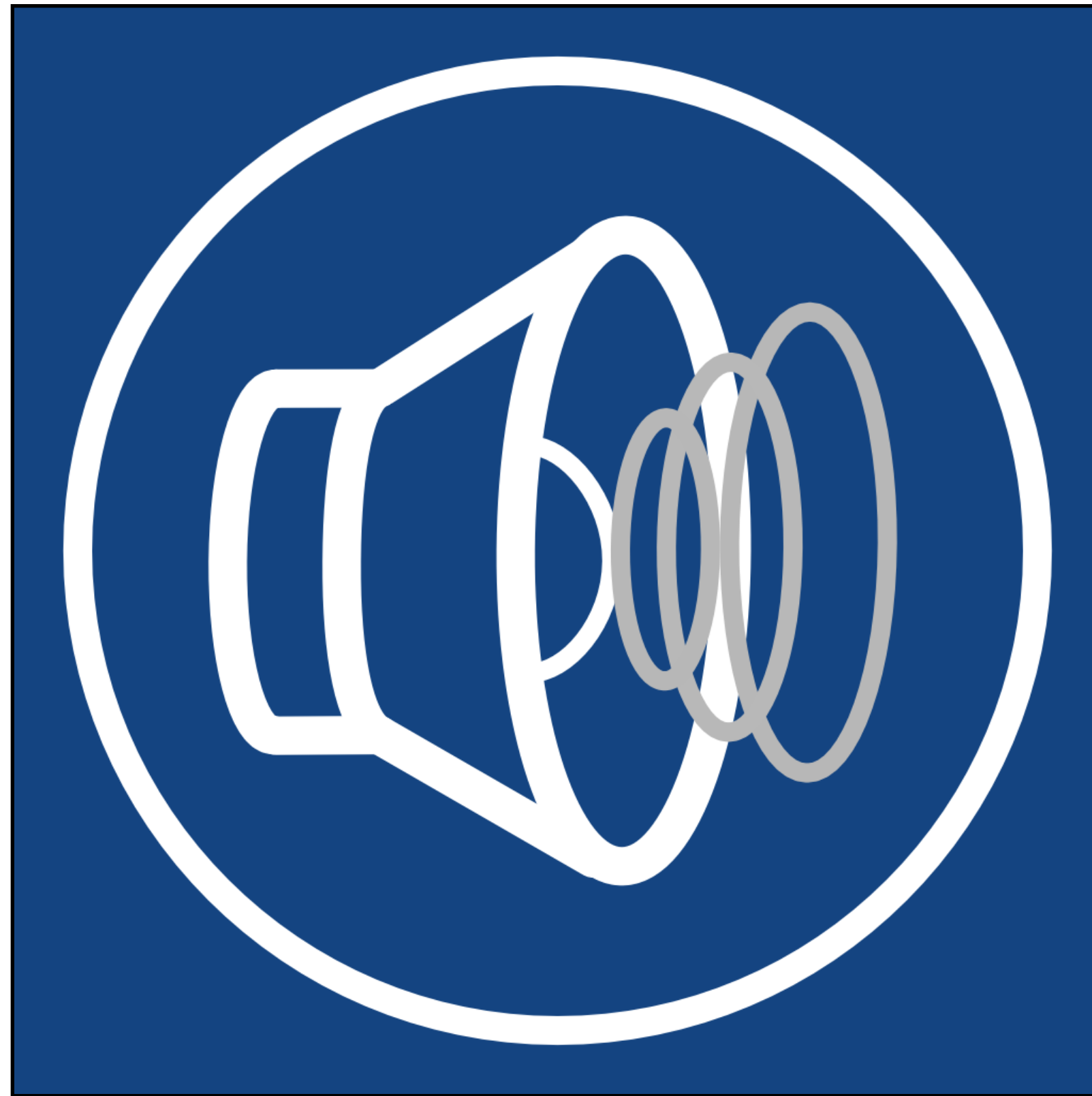
*Astronaut*

ZKM | Hertzlab

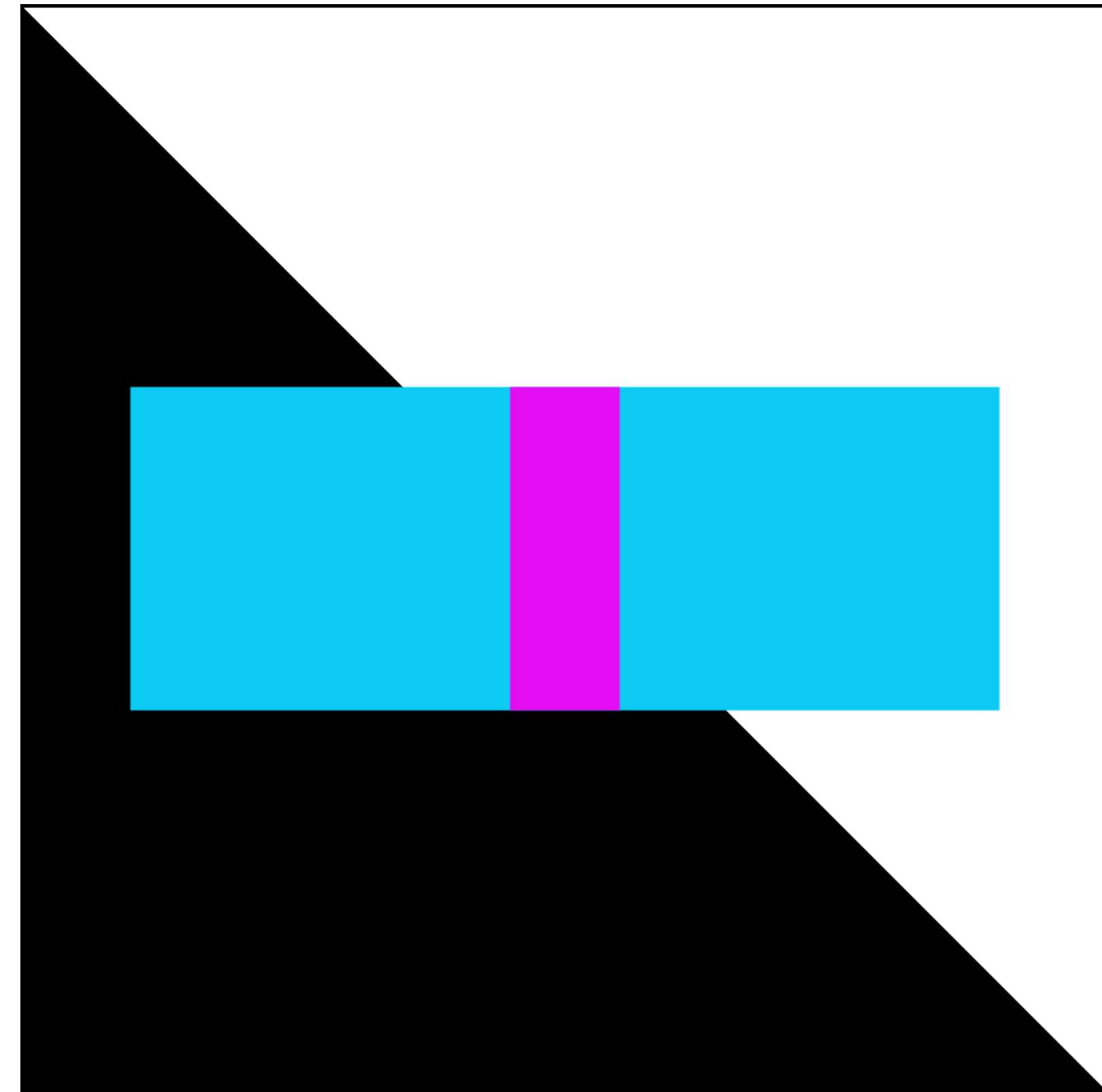




# 2021: Summer of (Silly) Apps



*SpeedPitch*



ShadowPlay



# What are these things, really?

- Media art mobile-device apps (iOS)  
... for bicycles (primarily) & bluetooth speakers
- Each developed as part of a funded public art exhibition
- Free on the iOS AppStore
- Open Source
- Localized: English & German





*Speed*/Pitch



**Augmented sonic reality experiment that  
alters music playback speed based on  
your actual GPS ground speed**



**Concept**











# Analog





# Analog

Turn the crank...





# Initial Sketch

2016-2017

Pure Data patch

in

PdParty

**WARNING**  
shaky cam



**SpeedPitch**



**Videos**



# Implementation

# Implementation Software



Native Interface



AVFoundation  
Camera Input & Audio Playback



# Implementation

## Hardware

- Bicycle
- iOS device
- Smartphone mount
- Bluetooth loudspeaker





# Implementation

## Hardware

- Bicycle
- iOS device
- Smartphone mount
- Bluetooth loudspeaker

**BIG PARTYBOX**

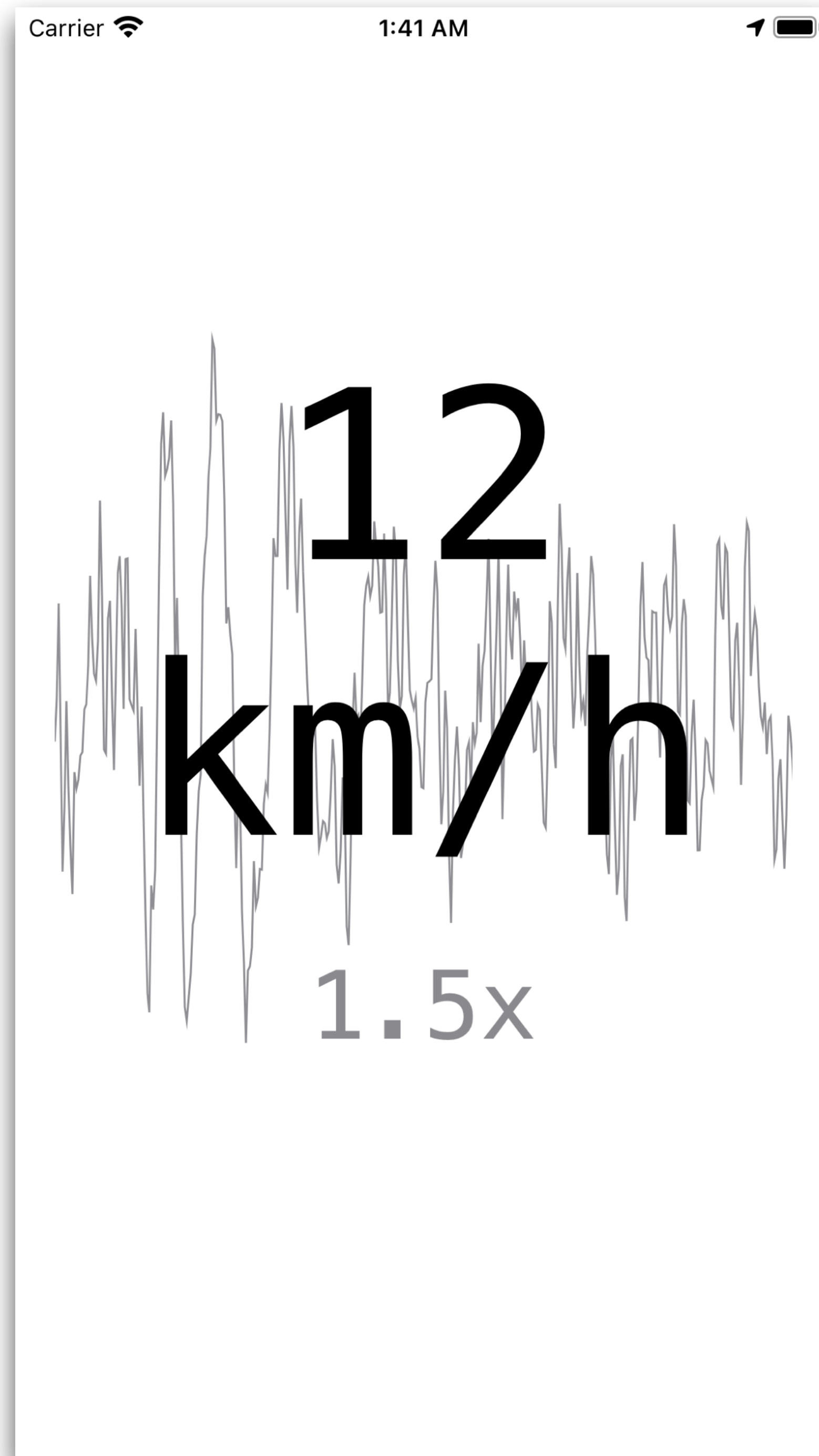




# Speed Playback

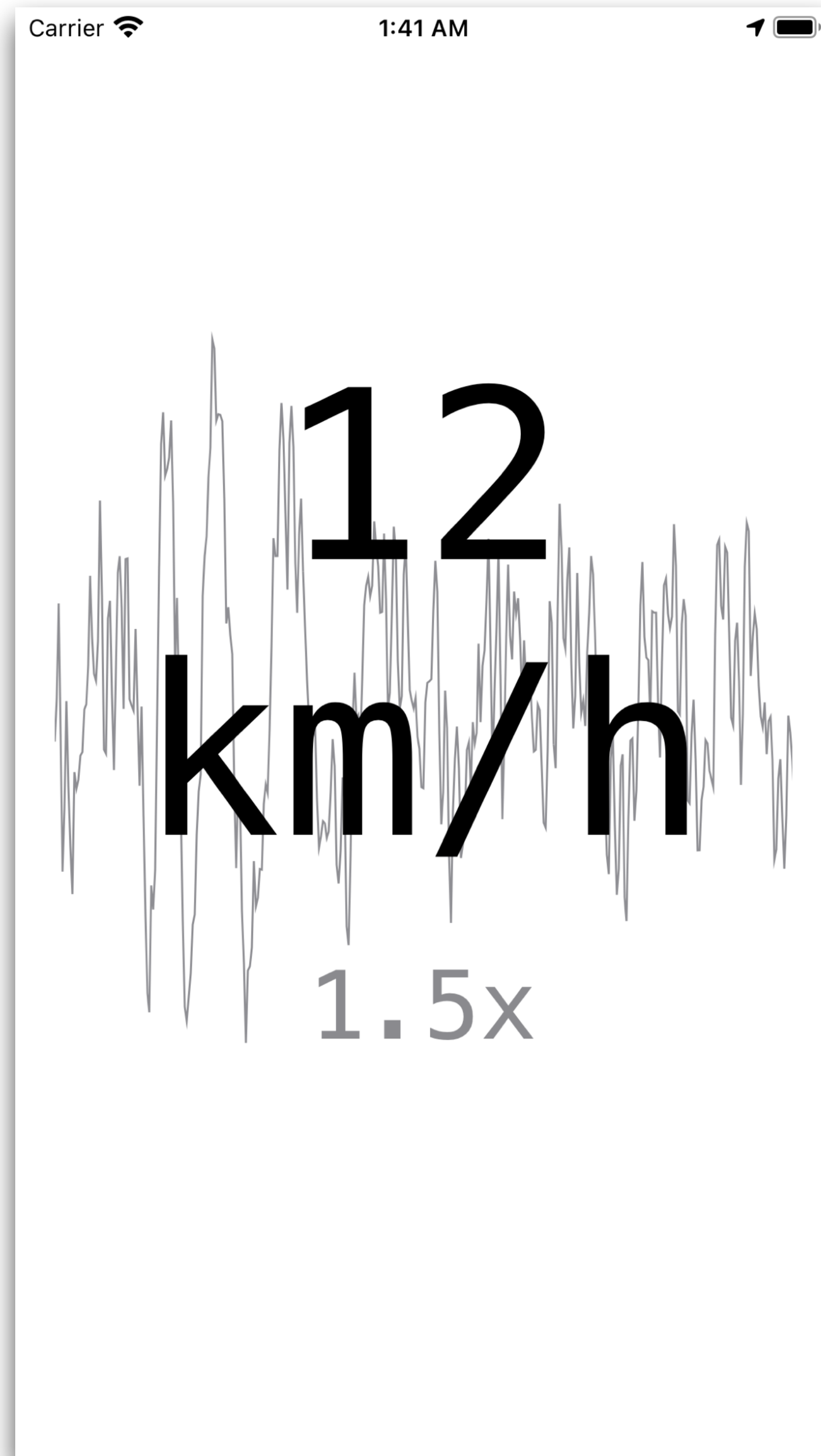
- GPS speed over ground
- Mapped to relative playback speed
- ... aka "pitch"

*Minimal interface shown*



# Speed Playback

- Pitch interpolation modeled after Pure Data concept sketch & reimplemented in Swift
- Quantizable: match speed with friends!
- Live audio waveform





# Speed Limit

- Adjustable on the fly
- Selectable speed range (max kph):

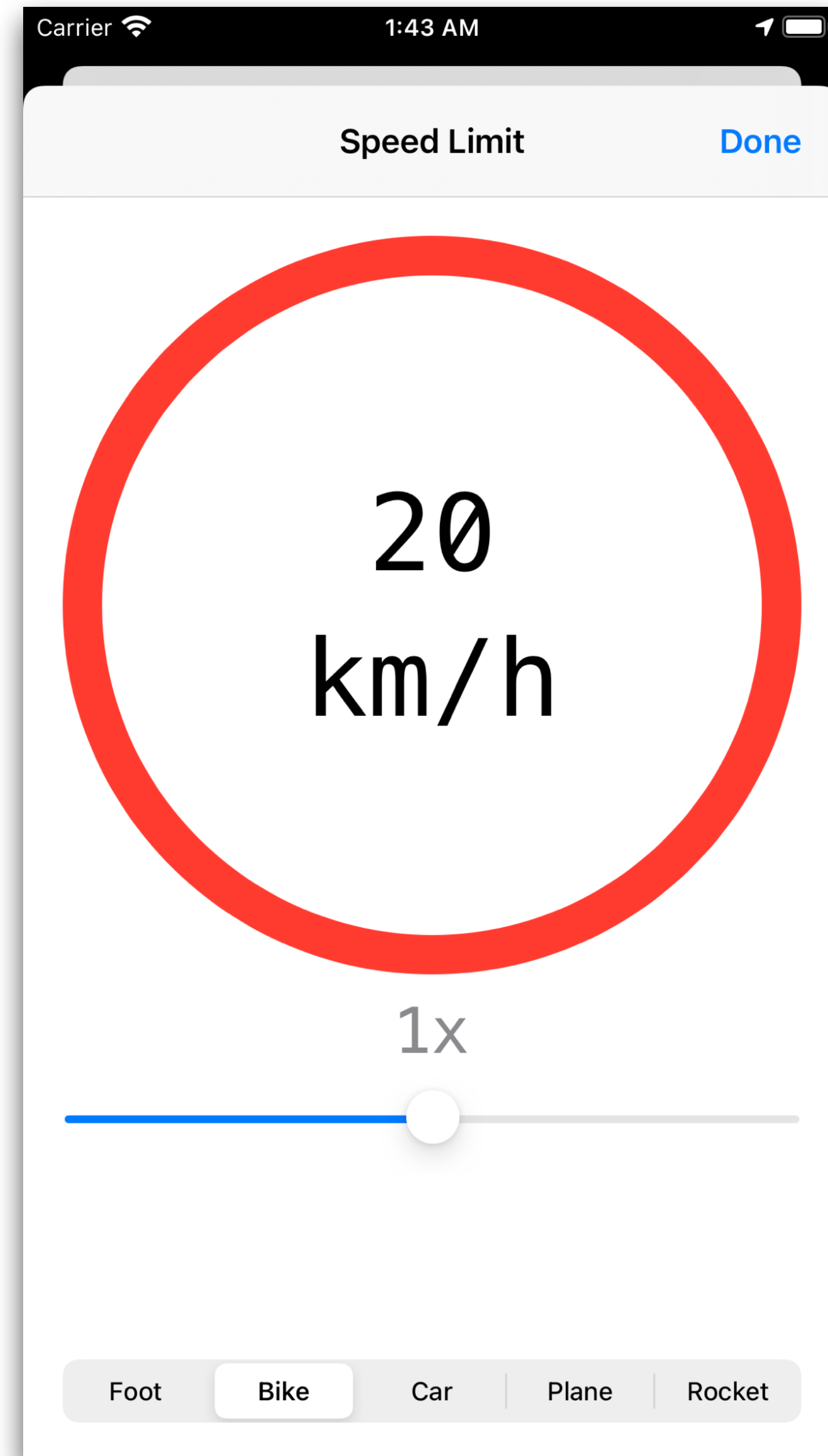
35 Foot: Olympic sprinter

60 Bike: Downhill

200 Car: Autobahn+

1000 Jet: Transatlantic cruise

28000 Rocket: speed needed to reach LEO



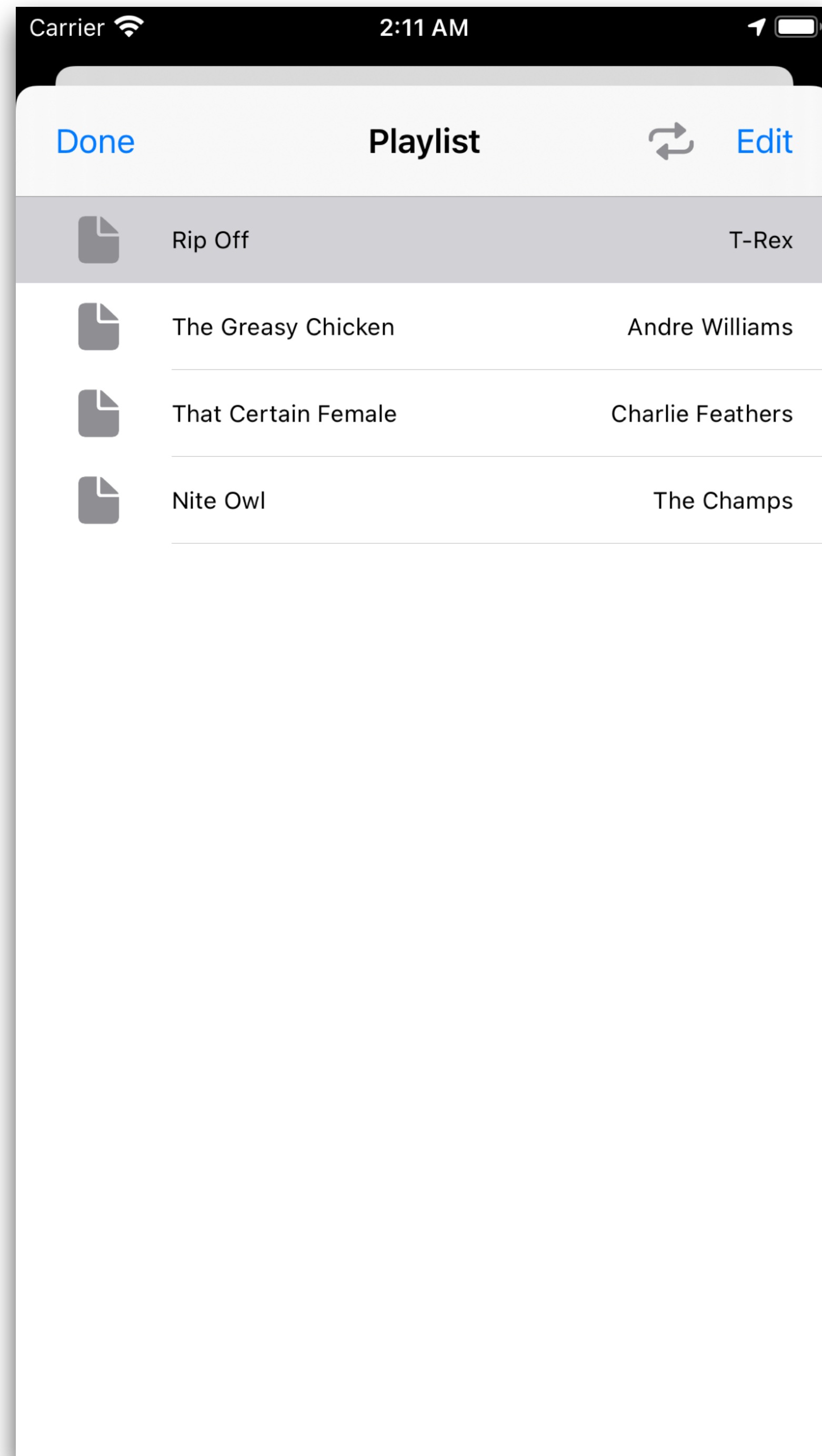
# Sound Playlist

- Build a playlist or loop a single file

- Pick audio from:

Music app library

Files app audio files

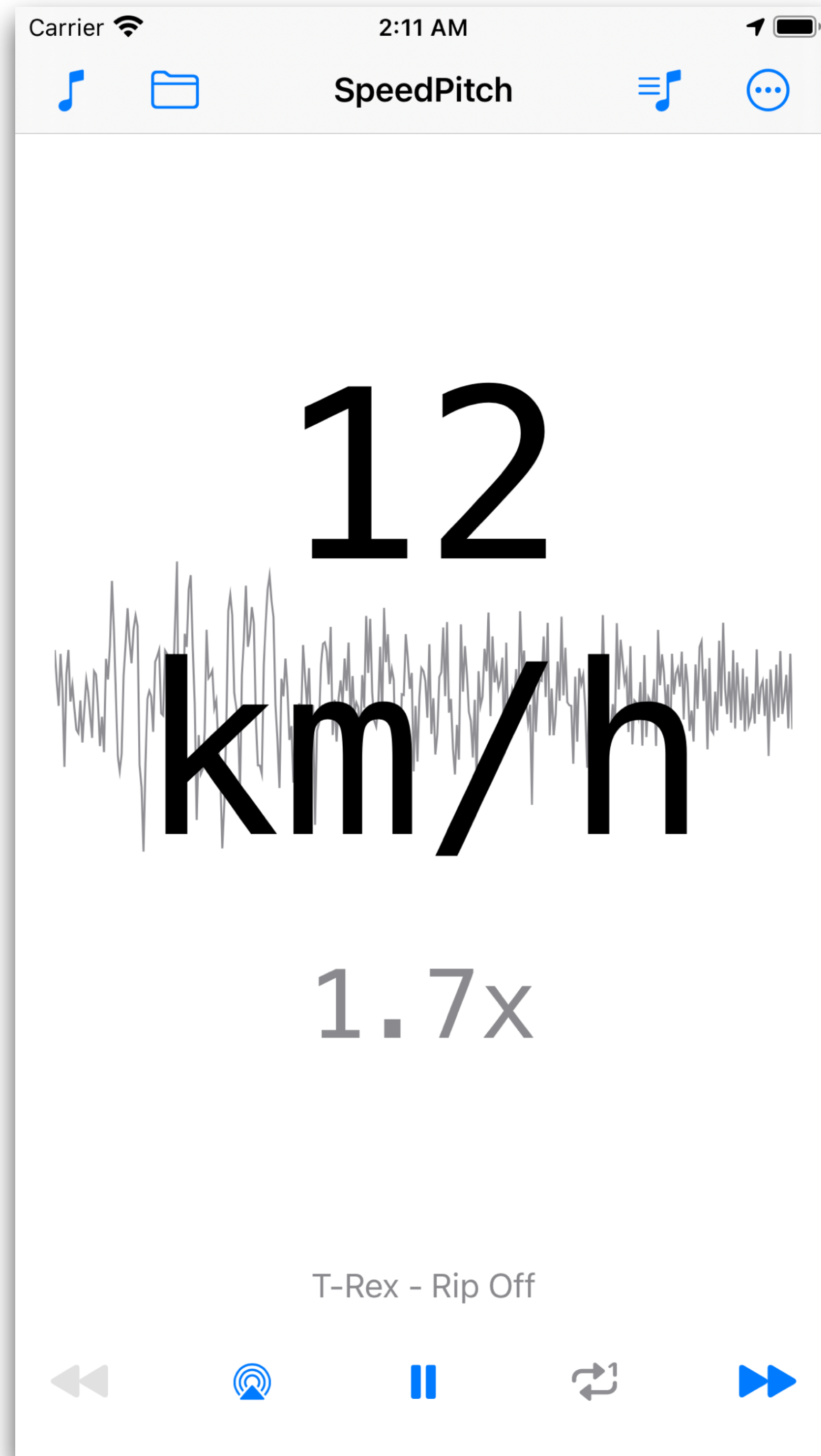




# Sound Playlist

- Media controls on main view
- Current filename or artist-title

*Default interface shown*



# Open Source GitHub Repository



<https://github.com/danomatika/SpeedPitch>



# iOS App Store

Free Download



Search for "SpeedPitch"



NIX    2.-30.7.21  
Karlsruhe

  WIE   

RAUS!   

Fahrrad     Vernissage:  
Kunst Freitag, 2.7.21  
Sommer um 19 Uhr



# Nix Wie Raus!

Jul 2021, Karlsruhe DE

Opening night: Performance

Workshops







BIKE NINJA

Fahrrad  
Kunst  
Sommer

STOFF  
METALL  
HOLZ

druck  
dien





BIKE NINJA

Roland



# Nix Wie Raus!

Jul 2021, Karlsruhe DE

Closing night: Critical Mass







NIX  
Fahrrad  
Kunst  
Sommer  
WIE  
RAUS!

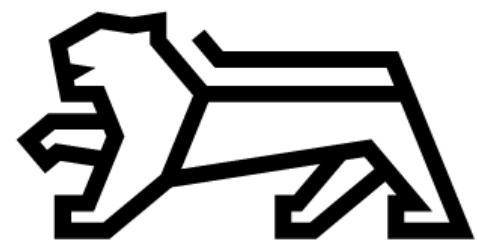
BASS  
BOOST











**MFG**

BADEN-WÜRTTEMBERG



**Stadt Karlsruhe**

Kulturamt | Kulturbüro

Supported through the MFG Media and Film Society Baden-Württemberg as well as through the City of Karlsruhe.  
*Unterstützt durch die MFG Medien- und Filmgesellschaft Baden-Württemberg sowie durch die Stadt Karlsruhe.*



**ShadowPlay**



**An exploration of the architecture and  
light in outdoor spaces through sound**



**Concept**



Körnerstraße  
Weststadt  
Karlsruhe  
16:00



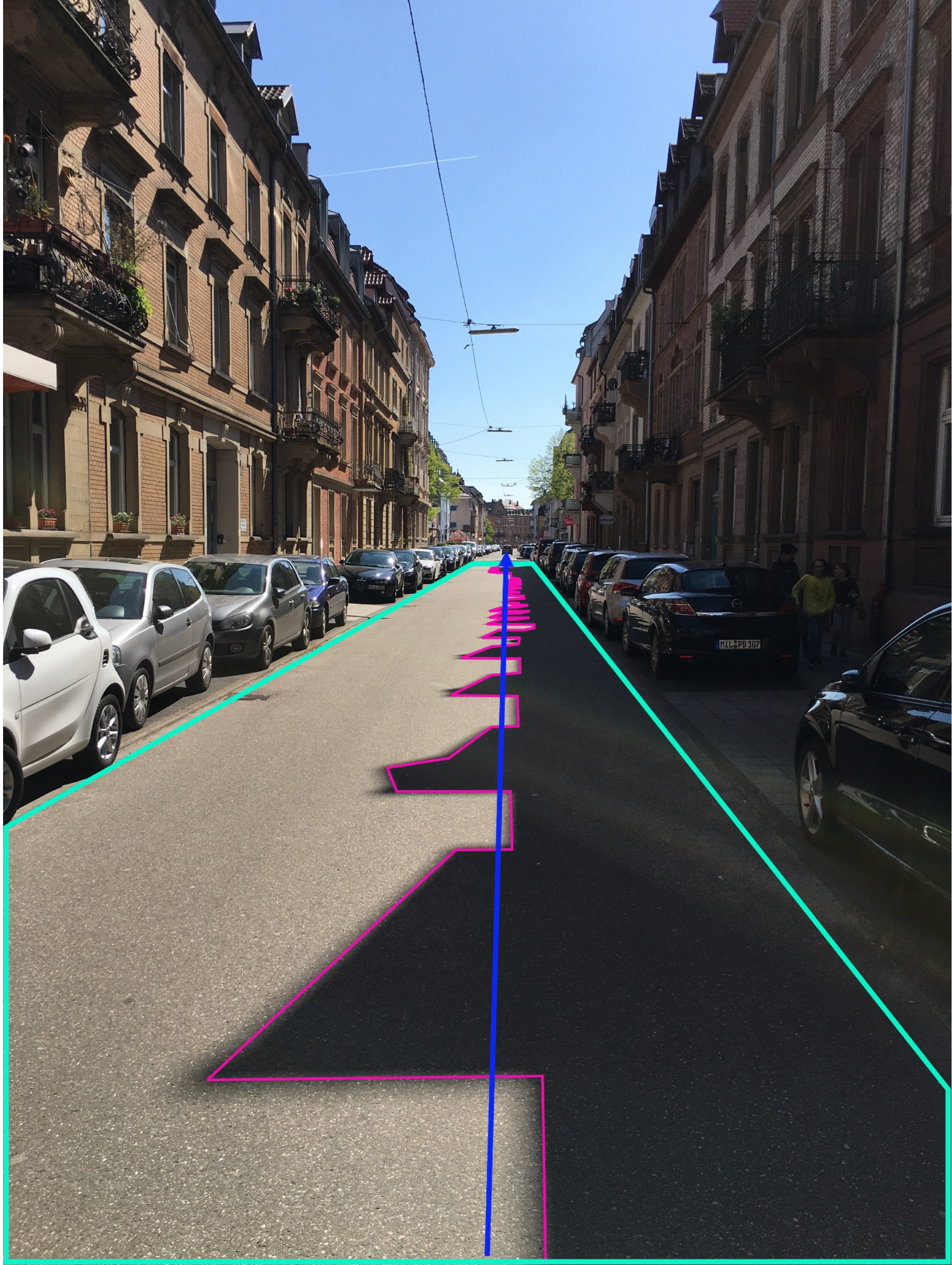


Körnerstraße  
Weststadt  
Karlsruhe  
10:00

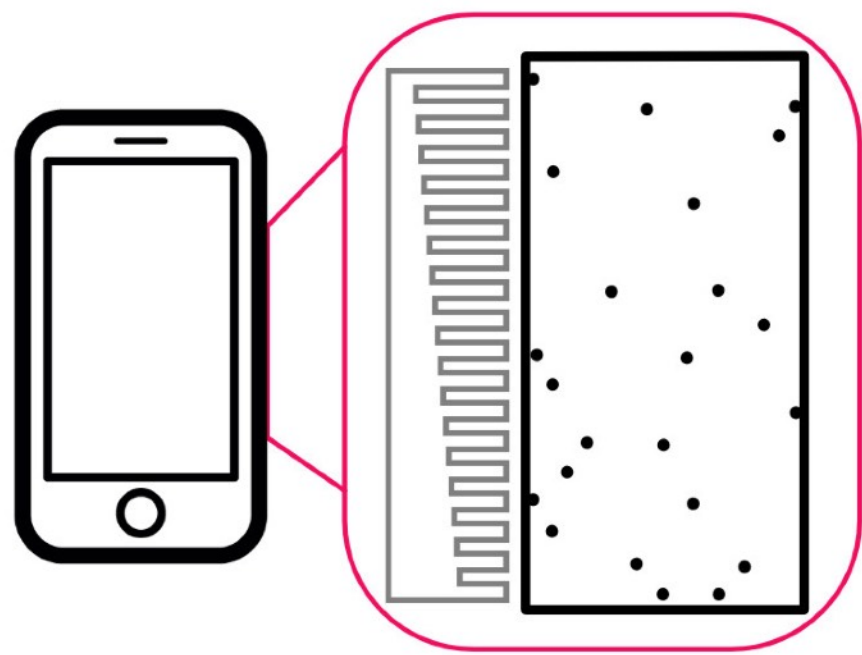
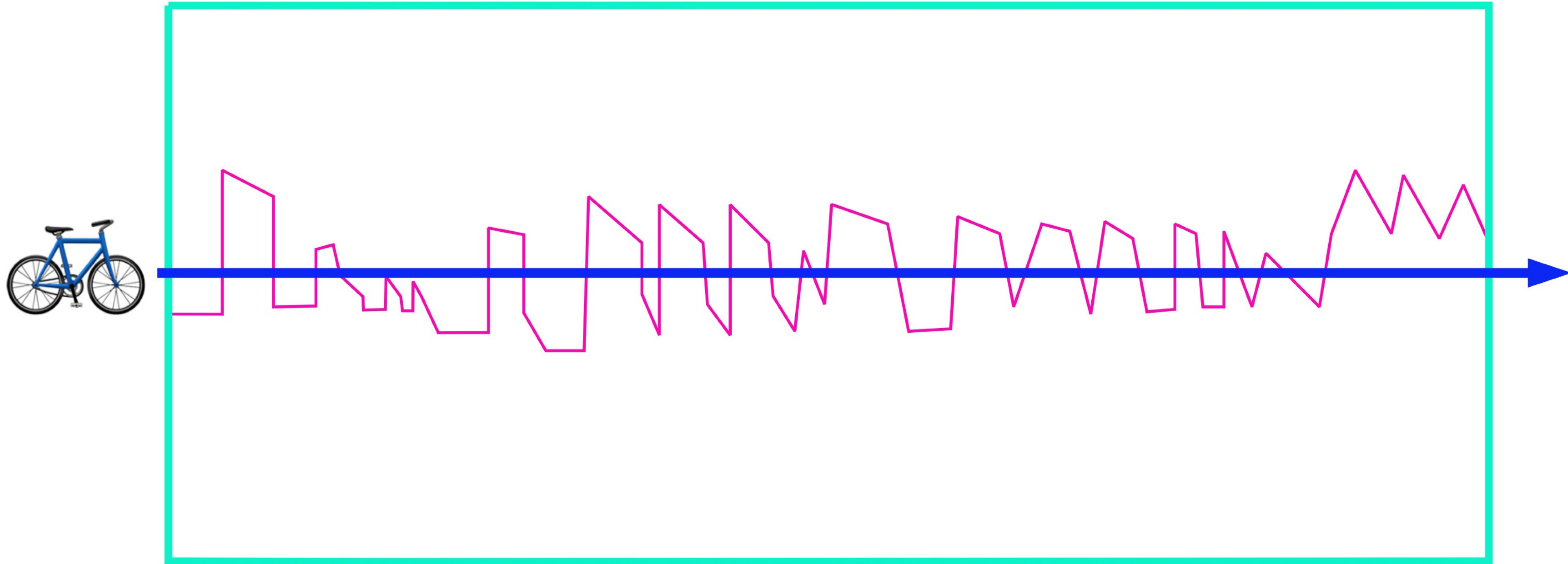




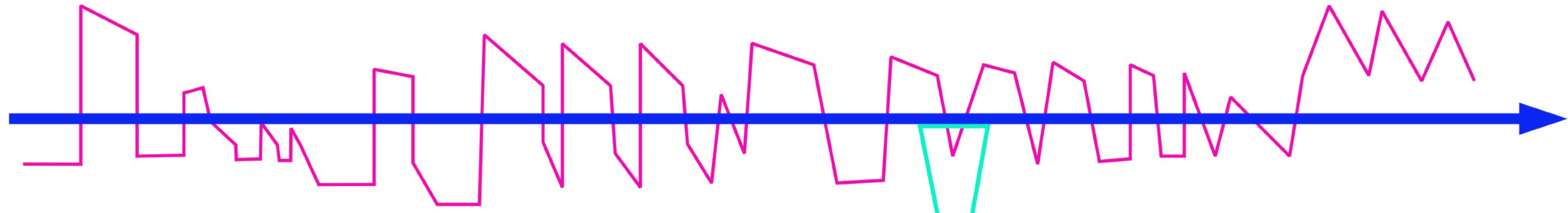
Possibilities...



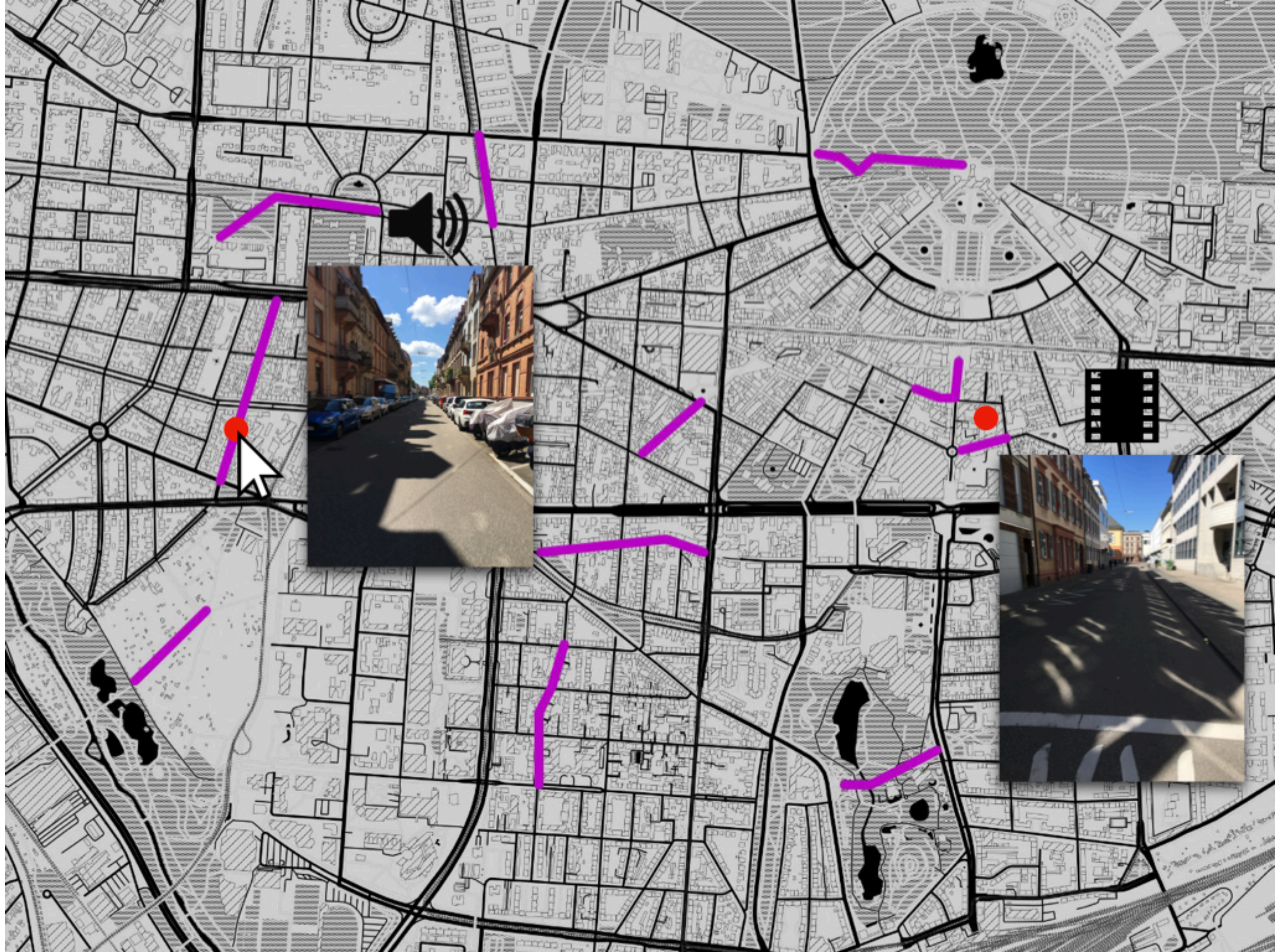


















**Video**



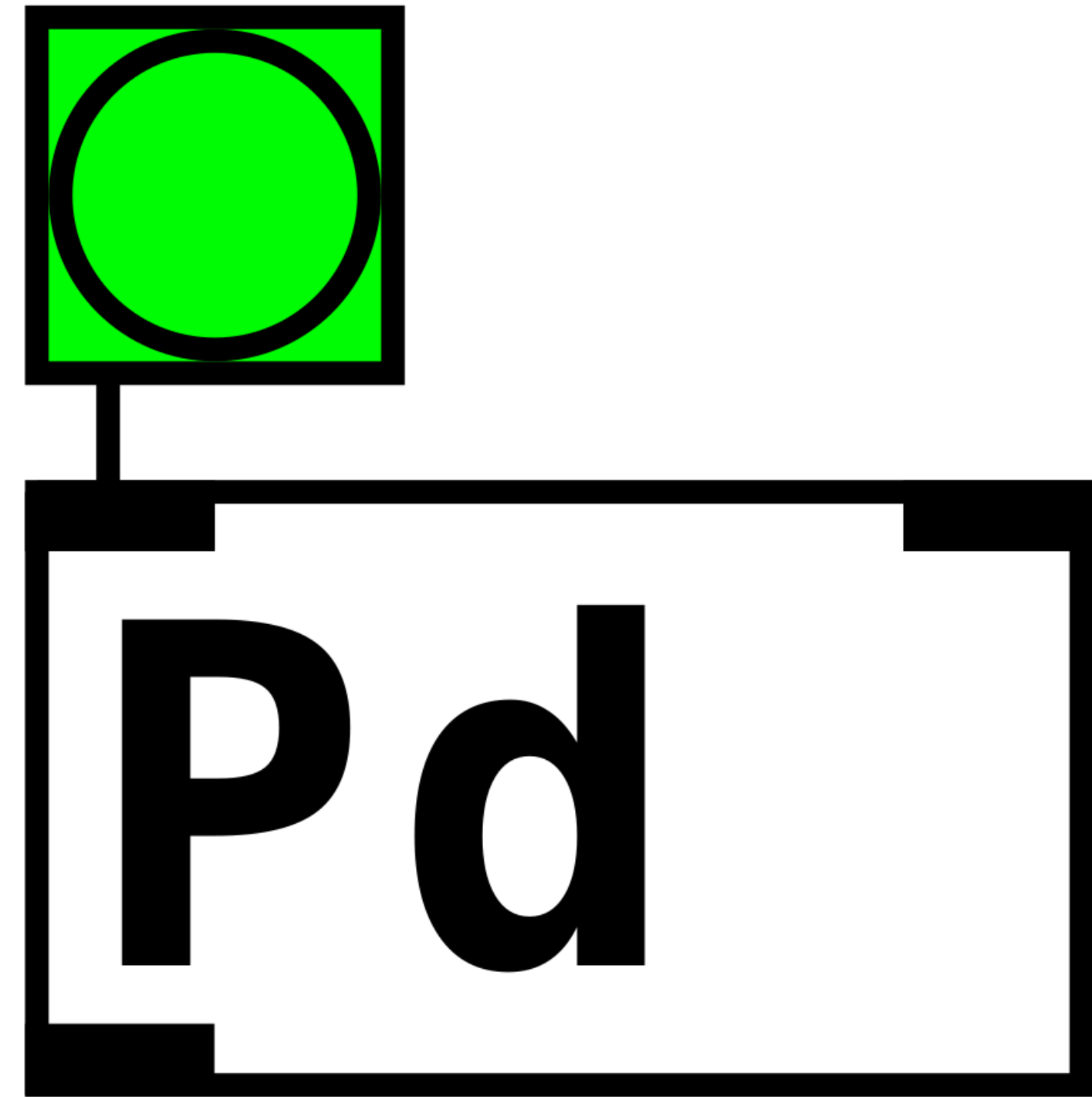
# Implementation



# Implementation Software



Native Interface



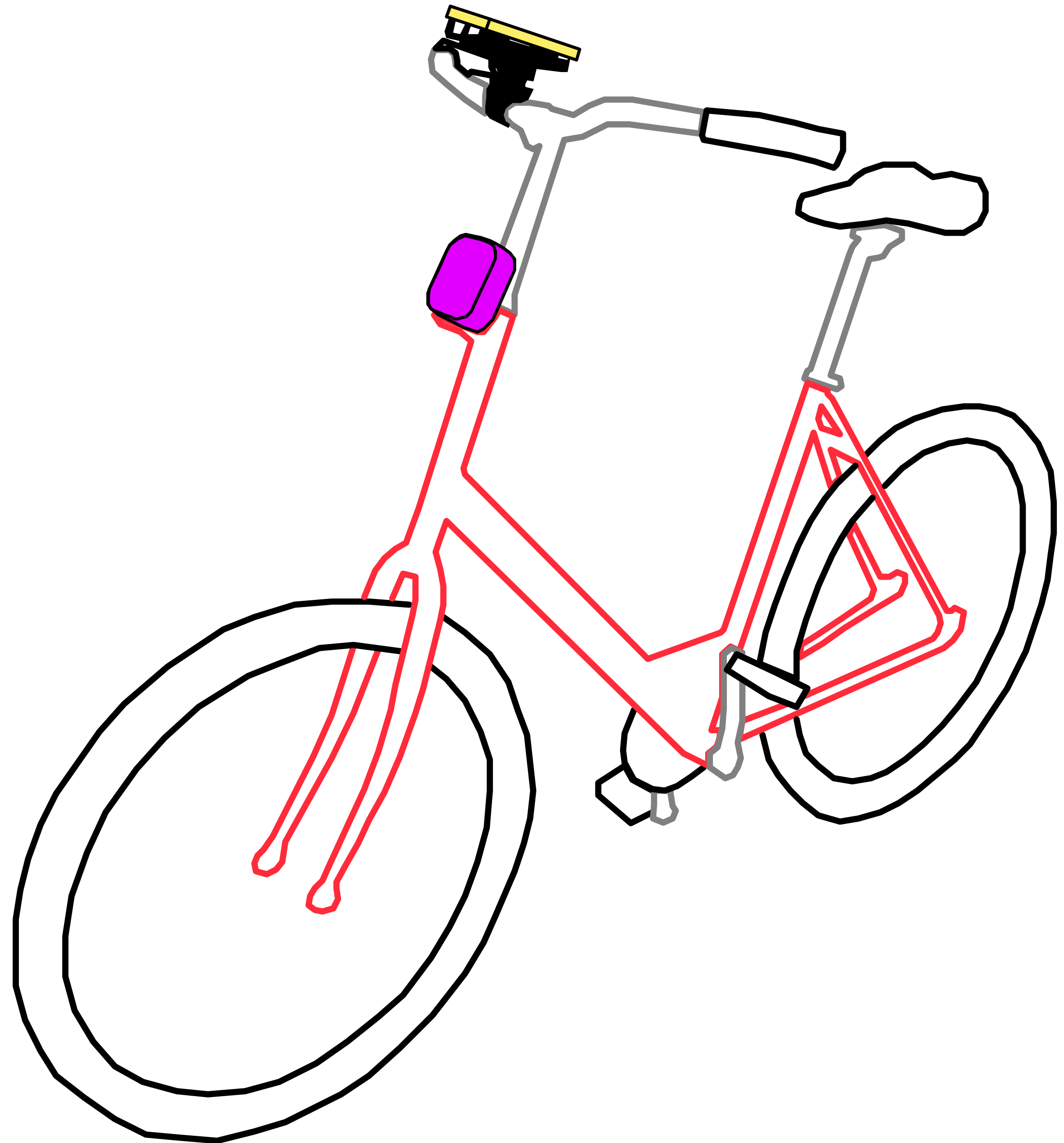
Audio Engine (libpd)  
Scene Format



# Implementation

## Hardware

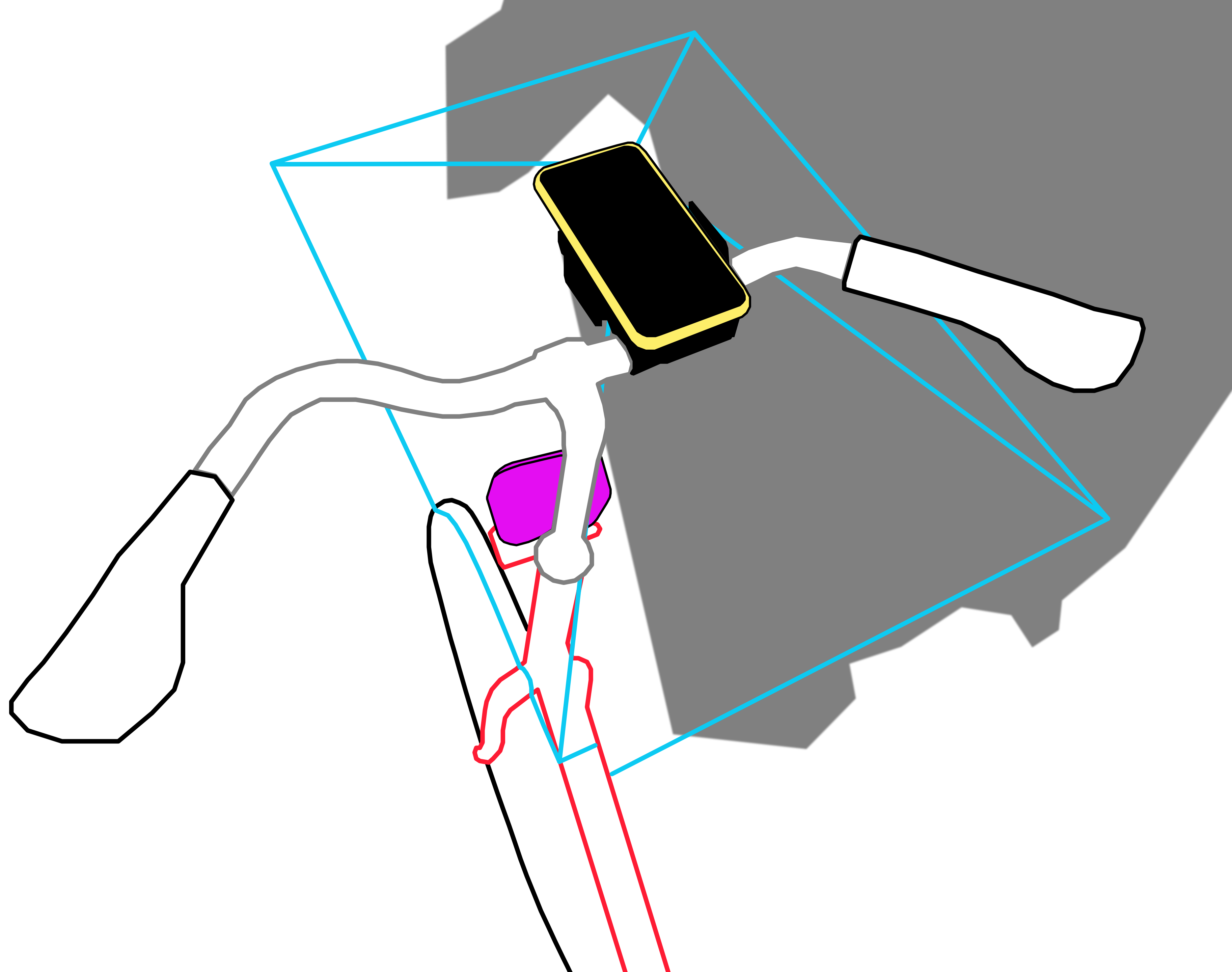
- Bicycle
- iOS device
- Smartphone mount
- Bluetooth loudspeaker





# Brightness Hardware

- Camera as simple light sensor
- Per-frame EXIF brightness level

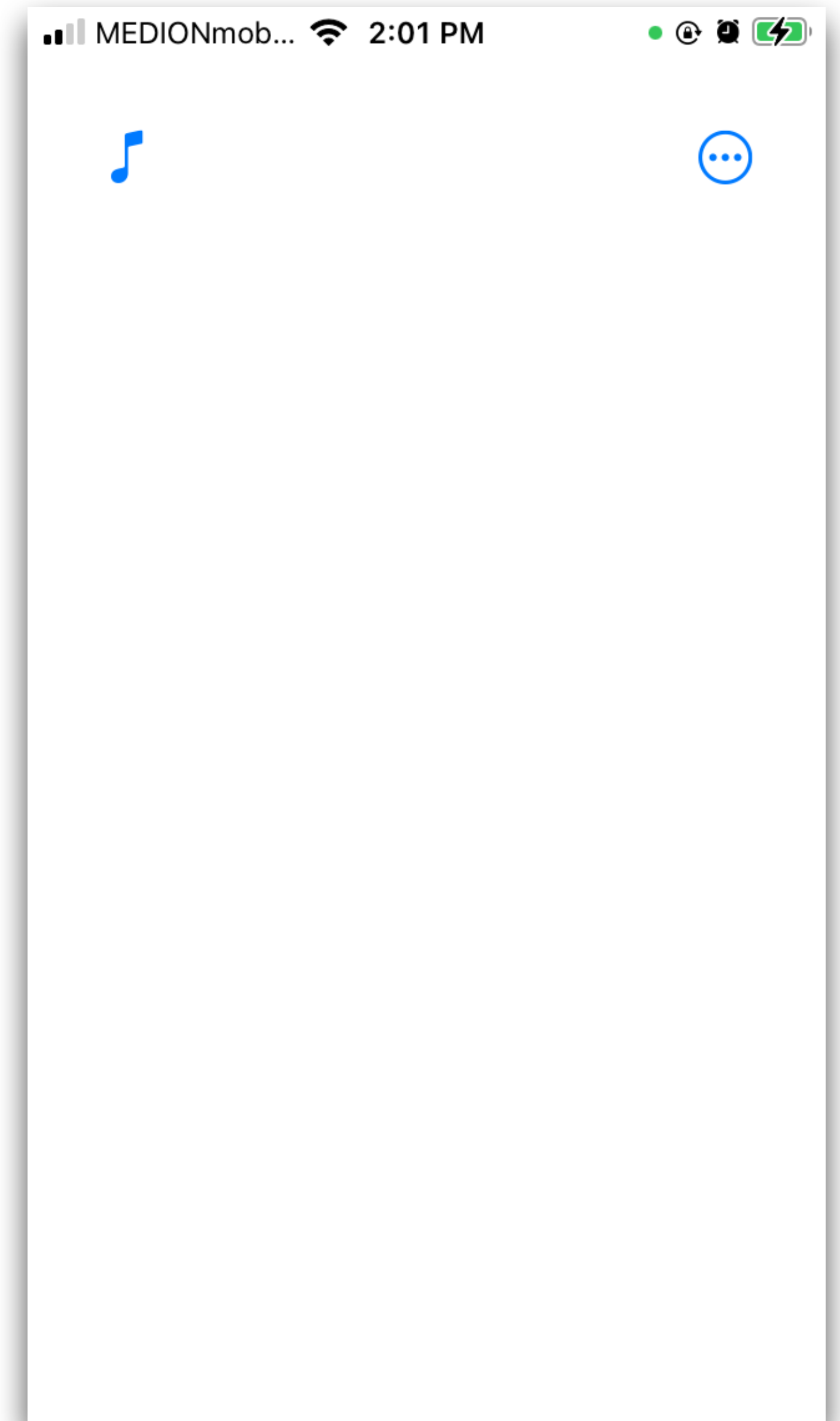




# Brightness

## Main Interface

- Minimal: show averaged brightness only
- Focus on interplay between light & shadow
- Normal camera view "too busy"
- Differentiate from Camera app





# Brightness

## Calibration Calibration Calibration!

- Normalize from EXIF brightness min/max?  
Too wide...
- Normalize to current conditions: the range bar
- Usage: start calibration and point phone at light & shadows
- Future: auto-calibration





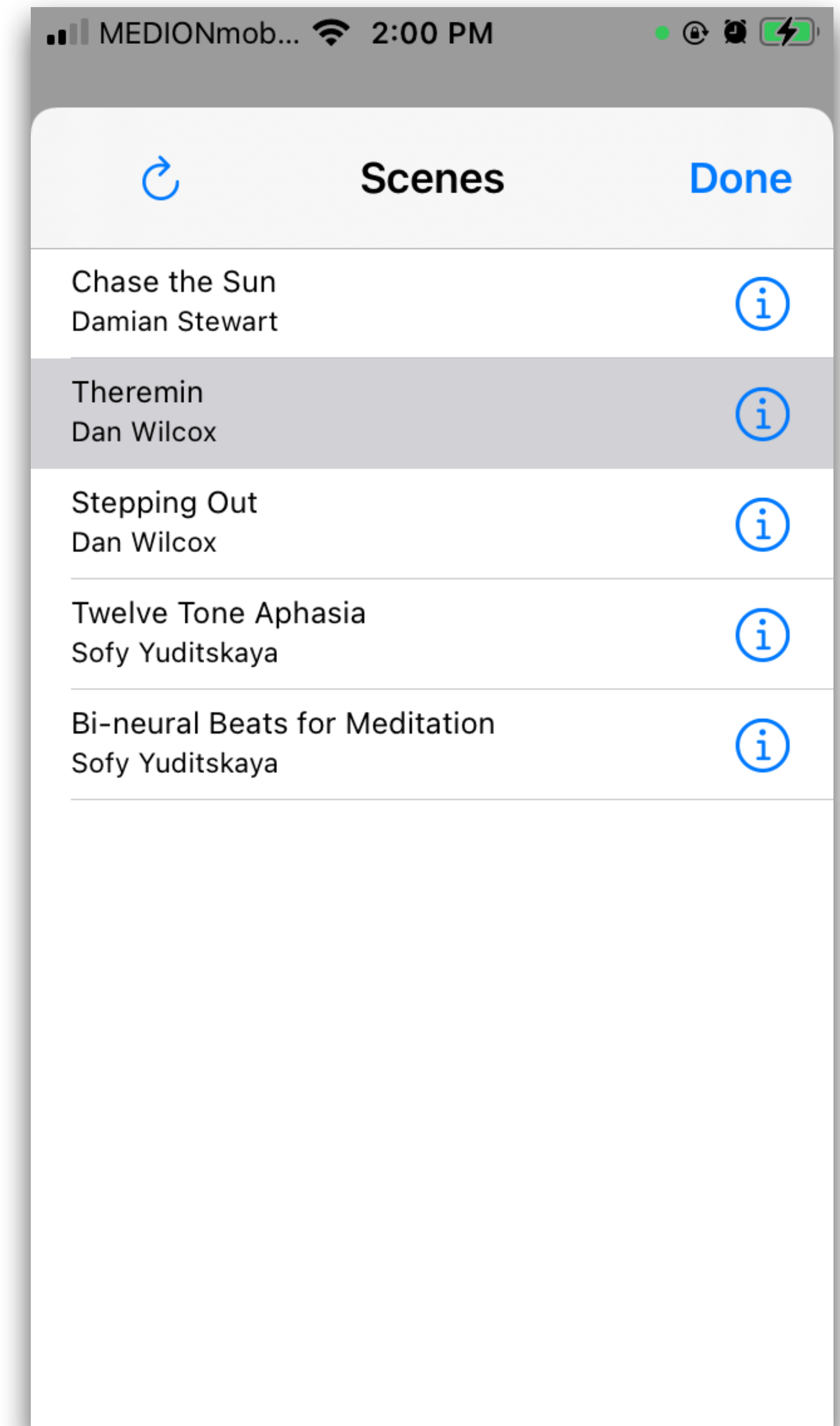
# Sound Scene Selection

- Curated selection of sound scenes
- A scene contains usage & attribution info
- Contributions by:

Sofy Yuditskaya (New York, USA)  
<https://www.yuditskaya.com>

Damian Stewart (Vienna, AT)  
<http://damianstewart.com>

You?





# Open Source GitHub Repository



<https://github.com/danomatika/ShadowPlay>

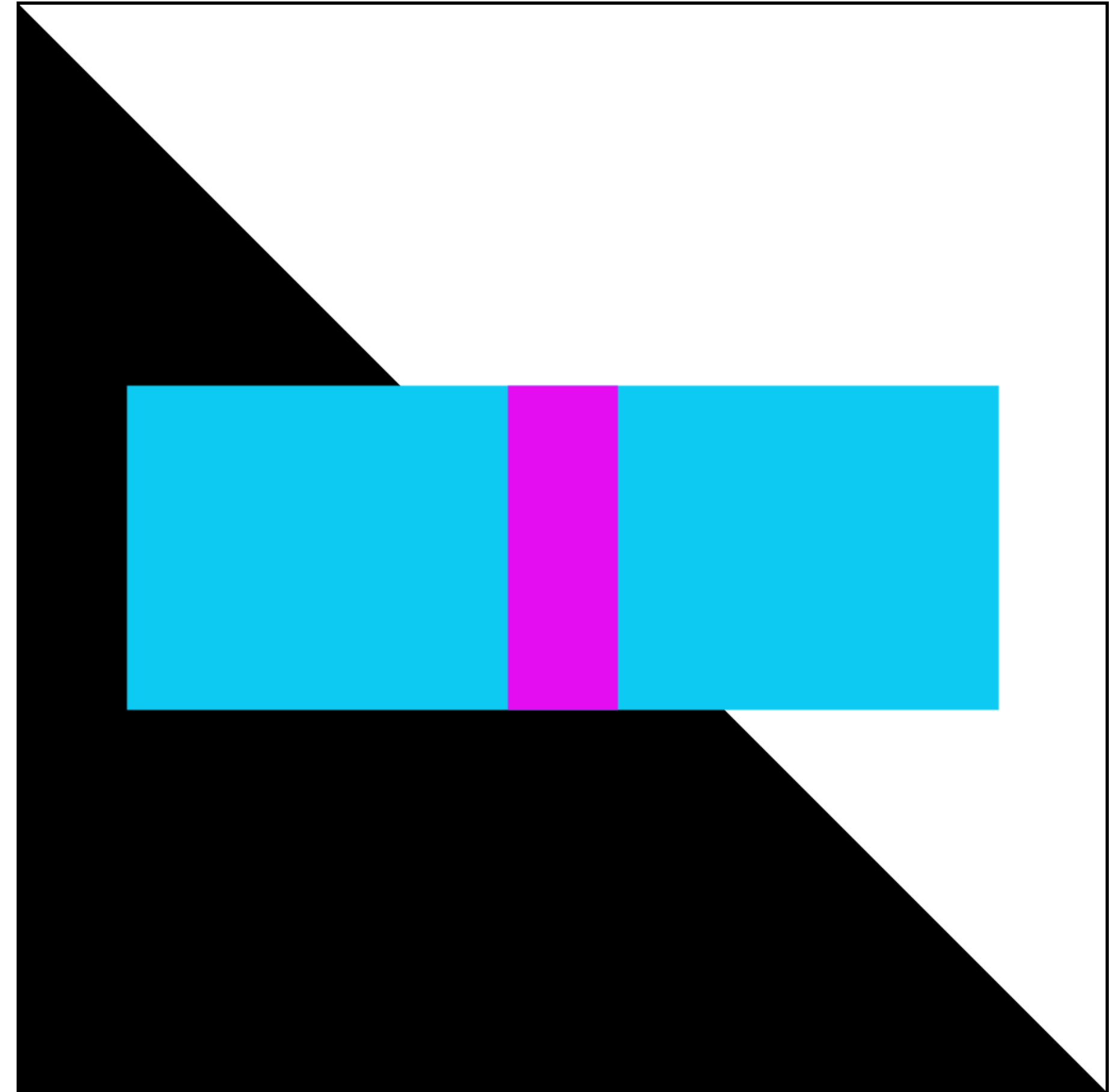


# iOS App Store

Free Download



Search for "ShadowPlay"





**Demo**



Seasons  
of Media  
Arts

Connected  
Future



# Seasons of Media Arts 2021

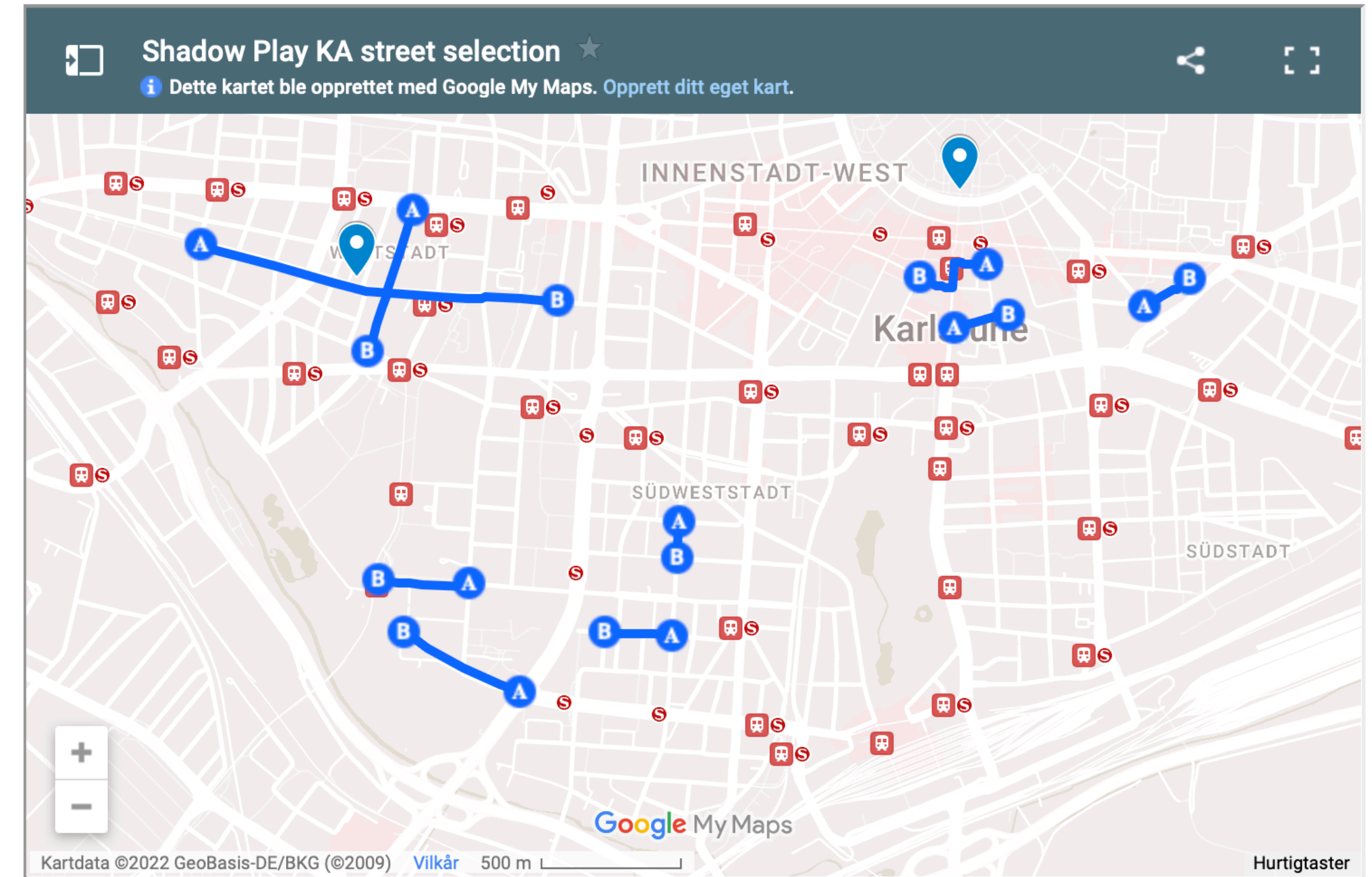
Sep-Oct 2021, Karlsruhe DE

Presentation formats:

- self-guided
- guided bike tours by ZKM staff

Map with marked streets & signs with project info

QR code to project page & download link







KARLSRUHE  
UNESCO CITY OF MEDIA ARTS

Supported through the UNESCO City of Media Arts Karlsruhe as well as through the City of Karlsruhe.  
*Unterstützt durch die UNESCO City of Media Arts Karlsruhe sowie durch die Stadt Karlsruhe.*



# Thanks!

## Questions?

**Demos in front of the ZKM entrance after the talk**

*SpeedPitch*

Project info: <http://danomatika.com/projects/SpeedPitch>

App info: <http://danomatika.com/code/speedpitch>

ShadowPlay

Project info: <http://danomatika.com/projects/ShadowPlay>

App info: <http://danomatika.com/code/shadowplay>

Dan Wilcox 2024

[danomatika.com](http://danomatika.com)