EXPLORING JAVASCRIPT HACKS FOR MODERN ELECTRONIC MUSIC PRODUCTION

XYZZY

ABOUT ME

Xyzzy (ski-zee)

Stack: C + Web + Javascript + Python / Hylang 💙

Gear: Electribe, Guitar

DAWs: Pure Data, Reaper, Renoise

Genres: Techno, Electronic, Post Punk

GOAL

Make music in javascript that sounds as good as the daw

Result - Bitrhythm

80%

Literate Programming ftw!

Docs + Code + Notes

BITRHYTHM OVERVIEW

1. Early Attempts
2. How DAWs work
3. Mapping DAWs to Javascript

DEMO 1 + TUTORIAL

HACKS AND DAW PRIMITIVES

1. Blank Canvas + Code Mirror
2. Music Loop
3. Dials and Samples
4. Patterns
5. State
6. Knobs and Guards
7. Observers
8. Misc

DEMO 2

WHERE DOES THIS FIT IN ?

1. Defining music coding genres
2. Hard Coding
3. Conclusion
4. Version Control

WRAPPING UP

1. Limitations
2. Future
3. Support
4. Questions

ASSUMPTION

I will assume some familiarity with DAW workflows and working knowledge of javascript.

BITRHYTHM OVERVIEW

1. EARLY ATTEMPTS

Python + portmidi

Javascript + osc + renoise

Algorave scripts

2. HOW DO ABLETON/FL STUDIO/LOGIC MAKE MUSIC ?

Mimics hardware - Recording

A Track is a combination of

- Virtual Instrument / Samples and Notes
- Software Effects, Automation and Mastering

3. MAPPING DAW TO WEB AUDIO

Tone JS provides instruments and effects.
Javascript, webmidi provide notes and automation.
Blackhole and Reaper for the final steps

Everything is rendered into the audiocontext, which renders to the sound card


FILE EDIT ADD PATTERNS VIEW OPTIONS TOOLS HELP
check this out.flp
Close
Escape
Pattern 11
Browser - All
Current project
Recent files
Plugin database
Plugin presets
Channel presets
Mixer presets
Scores
Backup
Clipboard files
Demo projects
Envelopes
IL shared data
Impulses
Misc
Music
My projects
Packs
Project bones
Recorded
Rendered
Sliced audio
Soundfonts
Speech
Splice
splice_folder
Templates
Channel rack
CHAMPAGNE_DRIP_snare_one_shot_live_01
dp_snr_pleasuredome
Hyper DoubleBarrel Clap
Hyper HouseParty Clap 02
HouseGen Clap 02
VMS_Kit1_Vocals_142_C#_minor_10 (Master)
Panning
Volume
Mod X
Mod Y
Pitch
Envelope
LFO
Filter
MOD X
MOD Y
Fast LP
Root note: C5
Reset
Enable main pitch
Add to key
Fine tune
Knob
0.2
Attack time
Mixer - Master
Maximus
Fruity parametric EQ 2
Fruity parametric EQ 2
Fruity Limiter
Fruity Limiter
Edison
Slot 7
Slot 8
Slot 9
Slot 10
Equalizer
Out 1 - Out 2
Type here to search
9:55 PM
5/30/2019

Demo 1

Audio Issues ?

Note all the things you see moving

Tutorial
Video
Code

HACKS AND DAW PRIMITIVES

1. CANVAS + CODE MIRROR

Vj with p5 or webgl

2. MUSIC LOOP

```
var delta  = 60 * 1000 / tempo / lines * 4;
setInterval(function () {
    always();
    text = getText();
    for (pattern, track_no in patterns) {
        isHit = parse(pattern, track_no);
        editMode ? eval(oldText) : eval(text);
        if (runTansition) { // once
           transition();
        }
    }
}, delta)
```

3.DIALS

available as a global array `dials` which can be subscribed to

Can daws provide a simpler menu system which can be configured per project ?

4.SAMPLES AS URLS

Sample Browser

5. PATTERNS / DANCE TABS

DSL

Absolute Pitch, no problem!

We still use Roman Numbers!

Roma/Gypsy Decimals > Hexadecimals

```
x[2;^C2;+0.01;_0.1] 0 0 .     *4     x[0.1] 0 x[1] 0     0 0 x[1] 0
- vol, ^pitch, +delay, _pan

`0 ~ a ~ 10 ~ 1100
`1 ~ b ~ 11 ~ 1101
...
```

6. STATE

Use `mem` and simple logic to compose notes relative to other notes

```
if (mem["kick_hit_thrice"]) {
    pn("crash")
}
```

7. AUTOMATION AS ARRAY ROTATION AND GUARDS

MIDI, mouse, XY

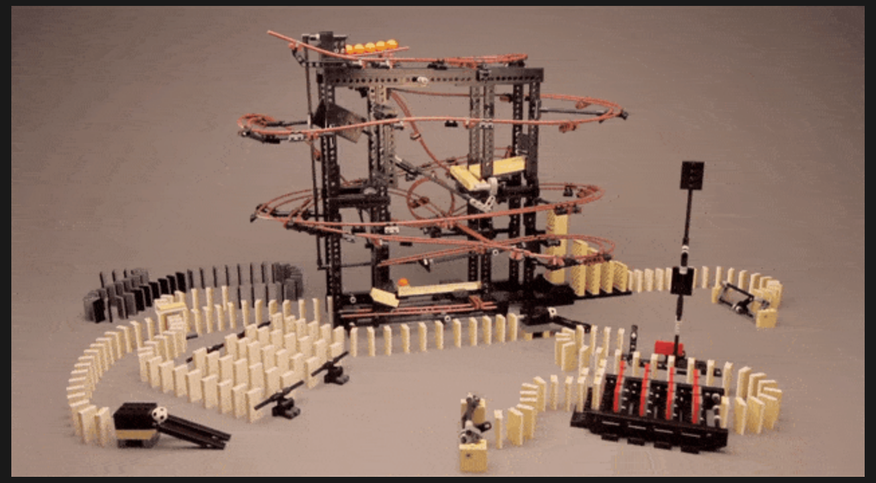
DSL like turtle graphics

Endless Acid Banger convinced me to model knobs directly

```
k1 = knob({
        ramp : [0.525, 0.8, 0.4, 1,
                0.25, 0.75, 1, 0.25, 0.1
               ],
        direction: false,
        step: 0.01,
        "number": dials[2]["cell"]
    });
g = guard([-20,15])
always = function () { // run tweak transition
    stab_filter.frequency.value = g(k1.move() * 10);
}
```

8. OBSERVERS + TIMERS

- bang and spigot from pure data
- sidechain anything
- constraint propagation
- arpegios/chords/progressions/counterpoint are just things tied together



9. MISC HACKS

Alerts

Pads + Keyboard Mapping

BONUS

A basic 303!

Demo 2
Video
Code

WHERE DOES BITRHYTHM FIT IN THE CONTEXT OF EXISTING TOOLS ?

WHAT KIND OF MUSIC CAN YOU DO WITH THIS ?

MUSIC CODING GENRES

INTERACTIVE CODING ✓

Share track as a url

ALGORITHMIC CODING ~

Music as algorithms with experimental patterns
IDM / Ambient / Generative / ML

LIVE CODING ~

Coding itself as performance

ADAPTIVE CODING ☒

Games

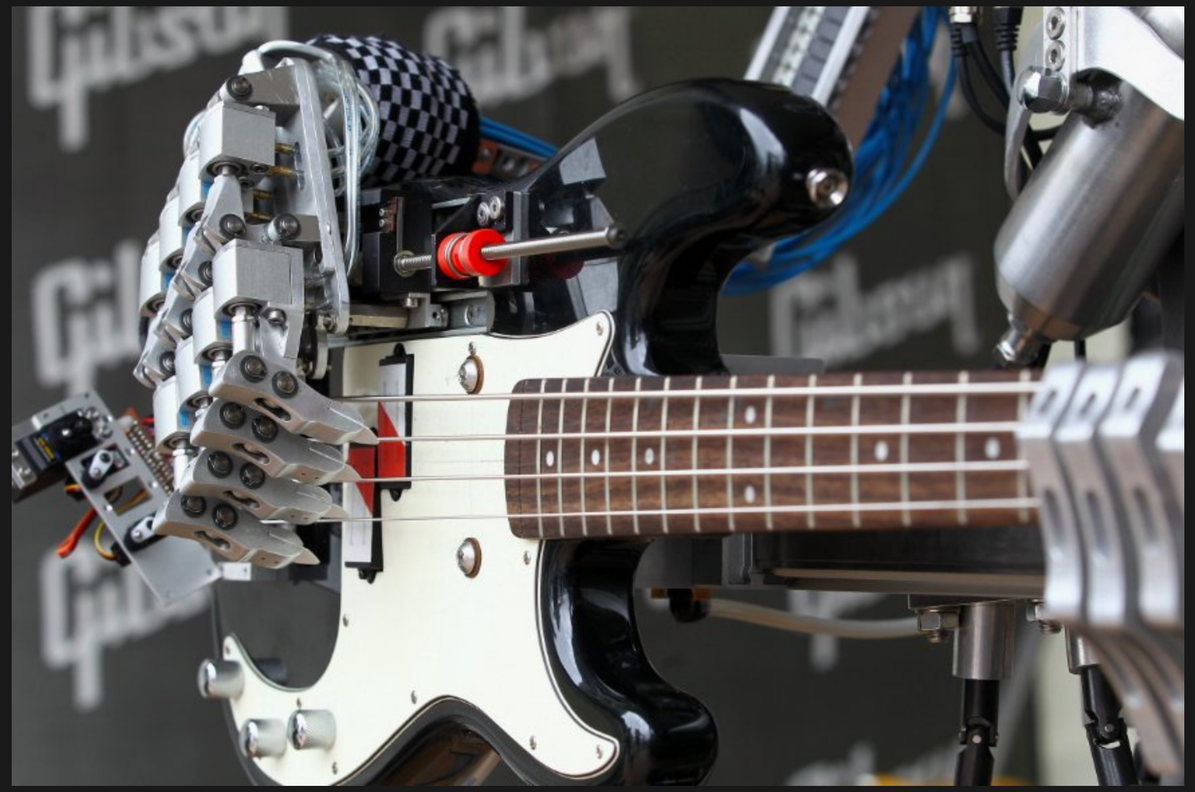
CREATIVE CODING ✓

Demoscene

PHYSICAL CODING ⊠

websocket vs osc

MACHINE CODING ☒



HARD CODING ✓

Music as data with tracker notation or static constraints

No randomness or ML

Chiptune / Tracking / Executable Music

CONCLUSION

Code is the new music sheet!

Can a text-driven interface replace and improve over DAW workflows, without sacrificing quality ?

Yes, but sound design and mastering is better done in UI.

- Copy Paste
- Chunking
- Prototyping

VERSION CONTROL

see diff

WRAPPING UP

LIMITATIONS

Reverb

Gc + GUI

Timer

Big latency while screen recording

FUTURE

90 minute set

Recording audio, performance and automation

websocket based collab

ALTERNATE IMPLEMENTATIONS

C / raylib to avoid latency

Juce based VST ?

Elementary

Csound Web

Gibber

OTHER PROJECTS AND LINKS!

Build your own Data Flow Engine
(inspired by Pure Data)
Twixter

More Apps + Code + My Music + Social

Post Issues on Github

Support me on Gumroad

HARD CODING - A NEWSLETTER ON MUSIC + CODE

Substack

QUESTIONS ?

Credits