

Bitrhythm

Music IDE to make modern electronic music

Harsha M (xyzzapps@gmail.com) – Independent music developer

Introduction

Music is sequencing plus sound design.

Can a text-driven interface replace and improve over DAW workflows, without sacrificing quality ? If DAW primitives were provided as building material to the musician, how easy is it for musicians to program their own workflow ?

Description

Bitrhythm is a tiny Javascript IDE that can work with web using webaudio or DAWs using JUCE. Existing DAWs provide sequencer UIs and staff notation which are far too complex and piano-centric to help with a broad range of music styles. The sequencer notation used in Bitrhythm is inspired by tracker notation but with added changes like allowing unicode and alternate notation for hexadecimals. A programming language is also sufficient in-itself as a sequencer notation, while providing other benefits like allowing the musician to develop custom notation and workflows. While there is a slight learning curve - things like state, constraints, conditionals, loops and timers can greatly aid in sequencing music. Moreover simple containers like arrays can be used to model knobs for doing parameter automation in electronic music.

While Tone.js is useful for sound design, using JUCE to embed a webview can help in other aspects of music like mastering, sampling, sound design and recording.

The approaches taken here are useful to create a new style of music making called Hard Coding, similar to executable music of the demoscene community, which can make music making open source and github the new soundcloud.

Acknowledgments

My work would not have been possible without experiments like Endless Acid Banger by Vitling and libraries like Tone.js and JUCE which provide extensive documentation. I am also grateful for trackers like Renoise, OpenMPT and free DAWs like Reaper which I use daily for my work and inspiration.

Biographies

Harsha M

Harsha M is an independent software developer specialising in tools for poets, writers, designers, musicians, video editors, animators and data/vfx pipeline engineers. He did his masters from BITS Pilani - Rajasthan, India and has extensive experience in architecting web apps and creative apps for startups and corporates alike.

His work in programming and music has been presented at conferences like Clojure Conj 2014, ADC 2021. He has 5 self-published albums so far, has done 3 music videos and is currently working on an animation series.



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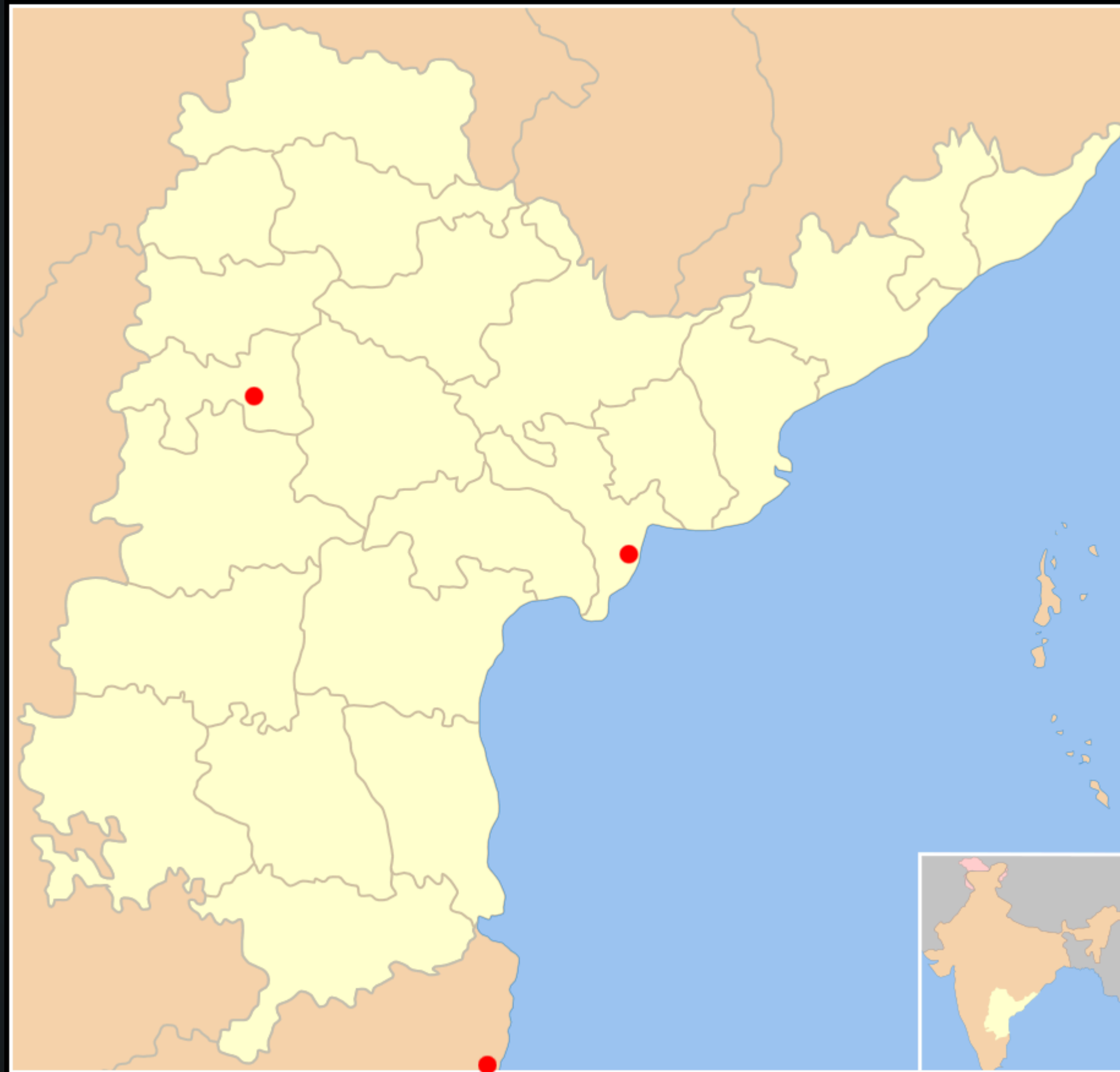
Bitrhythm

About me

- Web dev + Musician
- Early adopter - Fabric, React ...
- Apps for Artists

Music: Electribe, Renoise, Reaper, Guitar + Looper

Genres: Techno, Lo-Fi / Trip Hop, Post Punk





Adi

BROCHEVAREVARE

Sriranjani

Version: Peri Sriramamurthy

- Tyagaraja

22nd Mela Janyam

srgmdnś - śndmgrs

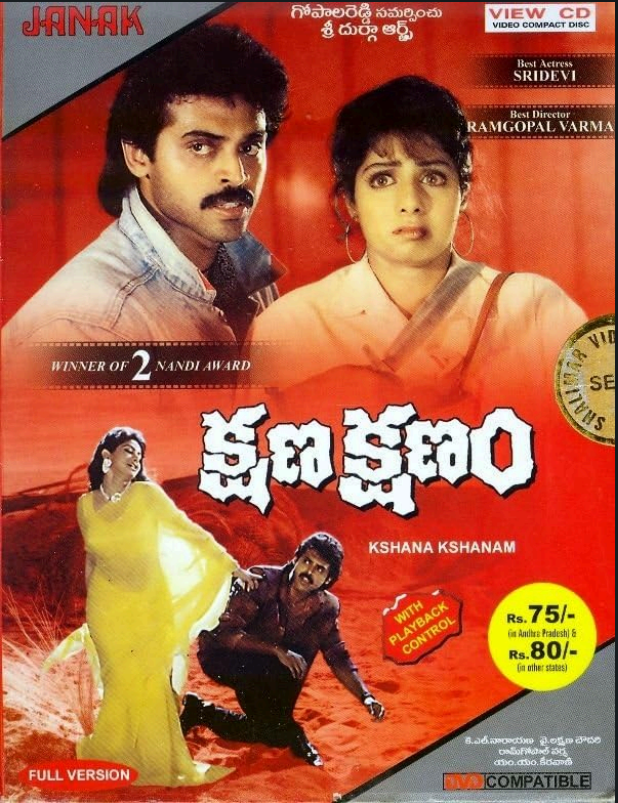
Pallavi

Ⓐ

m , mgr, r g gr r, | s ; ṇ | s r g , ||
bro che vaa re va | re ra | ghupa the ||

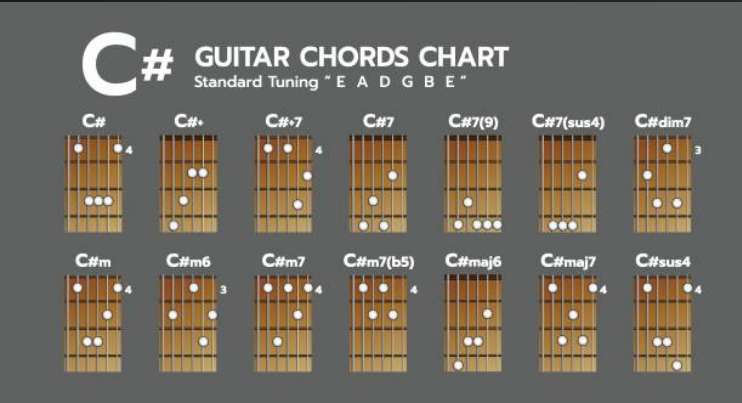
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m ; d mgr, rgmg gr r, | s ; r | g m d n ||
bro che vaa re va | re ni | nu vi naa ||



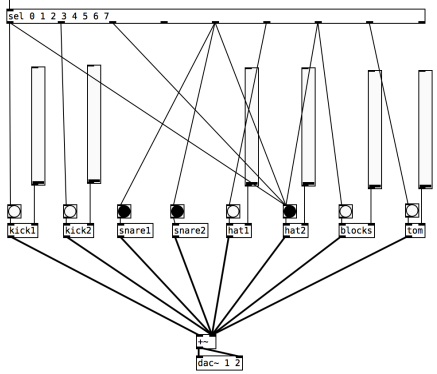
Bitrhythm

- Tabs
- Humming
- Tracker
- Pure Data
- Live Coding
- Samplers



Possible combinations of *Guru* and *Laghu* syllables in a word of length n ^[10]

Word length (n characters)	Possible combinations
1	G L
2	GG LG GL LL
3	GGG LGG GLG LLG GGL LGL GLL LLL



History

- 2016 ~ first scripts
- 2020 ~ first prototype
- 2021 ~ ADC, ICLC
- Tonejs, WAM2 and Sonic Pi - Improve!
- 2024 ~ JUCE
- 2025 ~ JUCE + Duktape, Notebook

Demo

Dance Tabs

Can tracker notation be generalised ?

```
x[2;^C2;+0.01;_0.1] 0 0 . *4 x[0.1] 0 x[1] 0 0 0 x[1] 0
#   #sample;!vol;^pitch;+offset;_pan;@length;:x=y;/slide;~tremlo;%vibrato
#   *. Rest
```

Roma/Gypsy Decimals

`0 ~ a ~ 10 ~ 1100

`1 ~ b ~ 11 ~ 1101

Song

```
intro x 4  
chorus x 2  
middle  
end
```

- Fade

Unicode

(ଧ) (ଧି) (ଧି) (ଧା) | (ଧ) (ଧି) (ଧି) (ଧା) | (ଧ) (ତିନ୍) (ତିନ୍) (ତା) | (ତା) (ଧି) (ଧି) (ତା)
(ଢ) (ଢି) (ଢି) (ଢା) | (ଢ) (ଢି) (ଢି) (ଢା) | (ଢ) (ତ୍ତି) (ତ୍ତି) (ତ୍ତ) | (ତ୍ତ) (ଢି) (ଢି) (ତ୍ତ)

- Greek
- Articulation ୣ
- Romanji

Dials and Knobs

```
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 () {
  stab_filter.frequency.value = g(k1.move() * 10);
}
```


Hitmap + Meta Data + Clock

```
Pattern -> 100000100000100000100000
Meta -> {
    1: {},
    2: {},
    3: {},
    4: ..
}
resetQueue
```

- State
- Side Chain Constraints
- Arbitrary Triggers

Splines and Curves

```
k1 = spline(xs, ys)
```

```
      * (250,2)
     /  \
    /    \
   /      \
  /        \      * (800,1.25)
 * (0,1)    * (500,1) /  \
                  \    /    \
                  \  /      \ * (1000,0.75)
                   \ /
                   * (750,0.25)
```

Articulation

- Per note articulation is better on instruments
- Carnatic is long notes, slow tempo + rapid articulation (frequency, volume)

Carnatic

- Monophonic
- Counter point as signal follower
- Call and reponse as delayed counterpoint

Bonus

- Alerts
- Keyboard Triggers

Music Coding Genres

1. Interactive // Touch Designer
2. Adaptive // Games
3. Physical
4. Neural
5. Network
6. Creative // Demoscene
7. Algorithmic
8. Live
9. Machine // Robot
10. Hard



Hard Coding

Music is sequencing + sound design

Most sequencing is just data

- Trackers
- Tabs
- ControlNets

DIY or DIA ?

Advantages of Web

1. URLs
2. Easy to prototype
3. JS + Web Audio > Sheet music
4. Hyperlink Art
5. Literate Programming is HyperText. Art is a good usecase ?
6. Music as an execution and versionable notebook

See: Javascript Systems Music

JUCE

1. Save plugin state
2. UI->Render / Resize
3. Audio + Midi Callback

Need

1. UI component library
2. Better timer
3. WebKit give C++ api to pull web audio output
4. Encrypted Code
5. Tone js but with WAM support

Credits

1. Endless acid banger
2. Scribbler
3. Tone js

End

<https://xyzzzyapps.link>

<https://github.com/xyzzzyapps>