Hydra: live coding networked visuals

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Note: this is a proposal for a presentation and demo, rather than a paper.

The duration of the presentation and demo is 30 minutes.

ABSTRACT

Hydra (https://hydra-editor-v1.glitch.me) is a browser-based platform for live coding visuals, in which each window of the browser can be used as a node of a modular and distributed video synthesizer.

Most libraries and abstractions for creating graphics computationally are focused on 2D shapes (SVG and canvas) or simulating 3D rendering. The presentation will instead explore generative graphics inspired by modular, analog video synthesizers from the 1970s, in which visuals are created by routing, transforming, and recombining multiple sources and outputs in real time (such as cameras, videos, and application windows).

By using WebRTC (realtime web streaming) to share video peer-to-peer, each browser/device can output a video stream, and receive and modify video streams from other browsers/devices. Transformations to the color, coordinates, and blending of a visual source are abstracted as separate functions which can be chained and composited to create complex visual patterns. The presentation and demo will explore technical, aesthetic, and collaborative possibilities of live coding on the internet, when a website is treated as a series of interconnected and heterogeneous nodes, rather than as a specific “site” or “place”.

Outline of content for presentation and demo

1. *Analog video synthesis and motivation for Hydra*
    a. Sandin Image Processor and Nam June Paik
    b. Demo of replicating historical video synthesizers using live coding
    c. Video feedback as simulation of nonlinear dynamics: chaos and fractals (demo in hydra)
2. *Technical implementation:* brief demo of how functions for color and coordinate transformations are composited together and rendered to the graphics card
3. *Collaboration in live visuals*

a. Networked performance and the Satellite Arts Project
b. Peer-2-peer networking on the web and possibilities for collaboration
c. Similarities between routing signal flow in analog synthesis and on the network
d. Examples of collaboration in hydra using live compositing and modulation of images