Neuromorphic visual computations in Processing

Mishka

`https://github.com/anhinga/fluid`

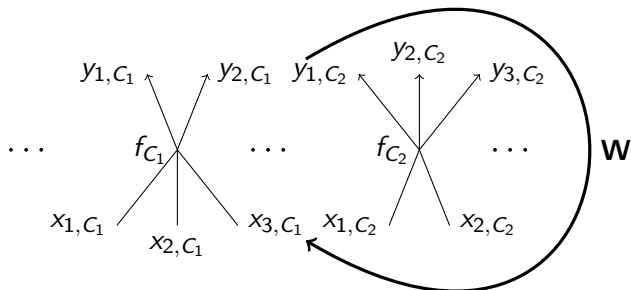January 24, 2019 lightning talk at Processing Community Day

Recurrent neural networks
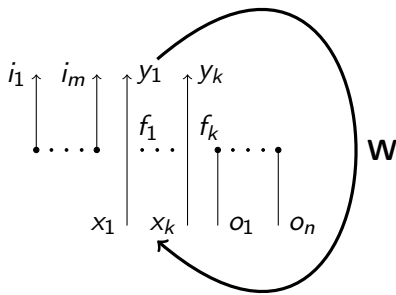
Run them one cycle per frame

Fits well with typical human brain waves frequencies

Dataflow matrix machines

Audio synthesis with unit generators is an example of hand-crafted
and hand-tuned **high speed** neural nets.

Because these patches are sightly unusual
(**hand-tuned, not trained**, with more sophisticated neurons)
people usually don't realize that they are actually neural nets.
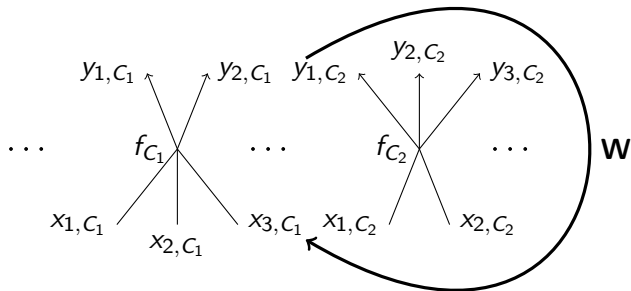
Dataflow matrix machines
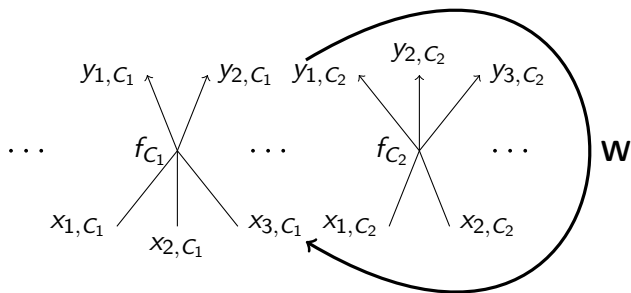
You can send images instead of numbers along the wires.

In fact, you can send any x, y, z, if you know how to add them with coefficients: for example, $0.4x + 0.2y + 0.4(-z)$[1].

And we can add together images with coefficients (that's how VJs mix animations).

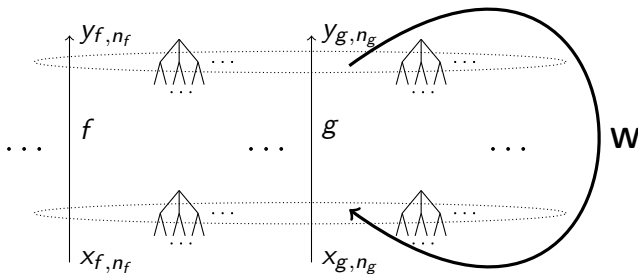[1] $-z$ - color inversion; $0.4(-z) = -0.4z$

Dataflow matrix machines

So you can essentially synthesize animations via unit generators.

And you can have single neurons processing streams of images instead of streams of numbers.

Dataflow matrix machines
in Quil and Clojure

Sister project: Quil-controlled dataflow matrix machines (Clojure):

https://github.com/jsa-aerial/DMM

https://github.com/jsa-aerial/DMM/tree/master/examples/dmm/
quil-controlled

Links

Project Fluid: `https://github.com/anhinga/fluid`

Demos:

`https://github.com/anhinga/fluid/tree/master/may_9_15_experiment`
`https://github.com/anhinga/fluid/tree/master/jun_28_15_experiment`
`https://github.com/anhinga/fluid/tree/master/jun_4_16_experiment`

`https:`
`//github.com/anhinga/fluid/tree/master/atparty-2018/game_of_afterlife`