LargerThanLife

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- like Conway's game of life
- larger than 3x3 neighborhood
- totalistic cellular automaton (outer totalistic)

LargerThanLife - Bugs

- 11x11 square neighborhood
- 34...45 neighbors - generate new center
- 34...58 neighbors - keep center
- has sliders (horizontal, vertical, diagonal, curving)

LargerThanLife implementation

- totalistic rules can be implemented via linear filters
- `uniform_filter` returns "average", so we need to scale up to match bugs
- filters are separable, allowing for faster implementation

```
def bugs(s):
    a = array(s!=0,'f')
    n = floor(0.5+11*11*filters.uniform_filter(a,11,mode='wrap')-a)
    return 1.0*AND(n>=34,OR(n<=45,AND(n<=58,a)))

_=animate(iterate(bugs,random(0.5)),2000)
```

For comparison, here is Conway's Game of Life using linear filters.

```
def life(s):
    a = array(s!=0,'f')
    n = floor(0.5+3*3*filters.uniform_filter(a,3,mode='wrap')-a)
    return AND(n>=2,OR(n==3,AND(n<=3,a)))

_=animate(iterate(life,random(0.5)),2000)
```

RealLife

- further generalization
- let the neighborhood go to infinity
- continuum limit
- Pivato: *RealLife: the continuum limit of Larger Than Life cellular automata*
- http://arxiv.org/abs/math.DS/0503504