PRODUÇÃO ARTÍSTICA

# 2850 interpolações de triângulos v3

**Alexandre Villares**

Arquiteto pela FAU-USP e mestre pela FEC-Unicamp. Pesquisa práticas artísticas que se valem de meios computacionais e o ensino de programação em um contexto visual. E-mail: abav@lugaralgum.com

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PÁGINAS 340 A 344



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# 2850 interpolações de triângulos v3

**Tópicos abordados**

arte algorítmica
processing
python
software Livre

**Lista de imagens**

↘ p. *310*
2850 interpolações de triângulos v3
Alexandre Villares
[obra algorítmica], *2019*

↘ p. *311*
2850 interpolações de triângulos v3 (detalhe)
Alexandre Villares
[obra algorítmica], *2019*

Uma obra de artes visuais no domínio das novas mídias, pode também ser descrita como uma obra algorítmica. Executada no contexto da exploração gráfica da combinatória de elementos por meio da programação. Reflete também preocupações do autor com o compartilhamento do conhecimento, licenciamento de artefatos culturais, uso de ferramentas livres, acesso ao código fonte e desmistificação dos procedimentos algorítmicos.

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# 2850 Triangle Interpolations v3

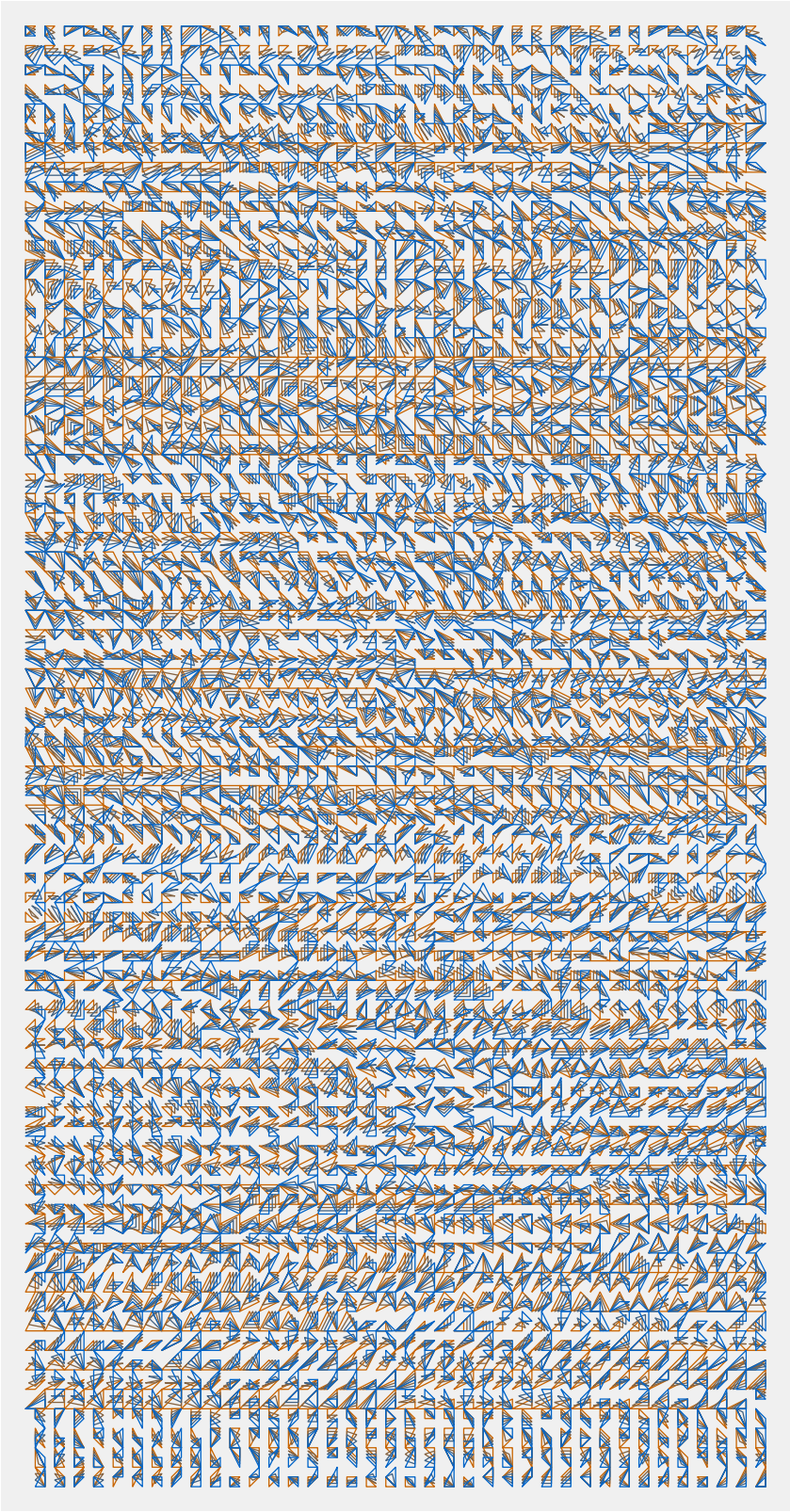
**Tópicos abordados**
algorithmic art
processing
python
open source

**Lista de imagens**

↘ p. *310*
2850 Triangle
Interpolations v3
Alexandre Villares
[algorithmic work], *2019*

↘ p. *311*
2850 Triangle
Interpolations v3 (detalhe)
Alexandre Villares
[algorithmic work], *2019*

A visual arts work in the domain of new media, it can also be described as an algorithmic work. It was executed in the context of exploring graphically combinatorics of elements using code. It also reflects the author's concerns about knowledge sharing, licensing of cultural artifacts, use of free tools, access to source code and demystification of algorithmic procedures.



```
"""
Title: 2850 Triangle Interpolations v3
Author: Alexandre B A Villares - https://abav.lugaralgum.com/
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https://creativecommons.org/licenses/by/4.0/

Submitted to Internet & Sociedade http://revista.internetlab.org.br
in 2019-06-30. Coded with Processing Python Mode
https://py.processing.org (Processing 3.5.3 + Python Mode 3056)
"""

add_library('pdf')
from itertools import product, combinations

SPACE, BORDER = 16, 20

def setup():
    """Prepare screen or SVG and geometry."""
    global two_triangle_combos, W, H
    # size(1240, 648)  # used to debug on screen
    size(648, 1240, PDF, "2850_T_I_v3.pdf") # export
    strokeJoin(ROUND)
    # Calculate all 3-point combinations on a 3x3 grid
    grid_points = product((-1, 0, 1), repeat=2)
    point_triples = combinations(grid_points, 3)
    # Identify triangles (discard colinear points)
    triangles = []
    for pt in point_triples:
        area = (pt[1][0] * (pt[2][1] - pt[0][1]) +
                pt[2][0] * (pt[0][1] - pt[1][1]) +
                pt[0][0] * (pt[1][1] - pt[2][1]))
        if area != 0:
            triangles.append(pt)
    println("Number of possible triangles: {}"
            .format(len(triangles)))
    # Calculate the 2-triangle combinations
    two_triangle_combos = list(combinations(triangles, 2))
    println("Number of 2-triangle combinations: {}"
            .format(len(two_triangle_combos)))
    # Calculate the display grid dimensions
    W = (width - BORDER * 2) // SPACE
    H = (height - BORDER * 2) // SPACE
    println("Cols: {} Rows: {}"
            .format(W, H))


def draw():
    """Draw geometry."""
    background(240)
    i = 0
    for y in range(H):
        for x in range(W):
            if i < len(two_triangle_combos):
                pushMatrix()
                translate(BORDER + SPACE / 2 + SPACE * x,
                          BORDER + SPACE / 2 + SPACE * y)
                draw_combo(two_triangle_combos[i])
                popMatrix()
                i += 1
    exit()


def draw_combo(combo):
    """Draw a combination of 2 triangles, interpolating 2 others."""
    t0, t3 = combo[0], combo[1]
    t1, t2 = lerp_poly(t0, t3, 0.33), lerp_poly(t0, t3, 0.66)
    triangles = (t0, t1, t2, t3)
    # Colors for the triangles
    c0, c3 = color(200, 100, 0), color(0, 100, 200)
    c1, c2 = lerpColor(c0, c3, .33), lerpColor(c0, c3, .66)
    colors = (c0, c1, c2, c3)
    # For each triangle, draw it in a different stroke color.
    noFill()
    half_combo = SPACE * .5  # this size lets the combinations touch
    for i, t in enumerate(triangles):
        stroke(colors[i])
        draw_poly(scale_poly(t, half_combo))


def draw_poly(p_list, closed=True):
    """Draw a polygon from a list of points (vectors or tuples)."""
    beginShape()
    for p in p_list:
        if len(p) == 2 or p[2] == 0:
            vertex(p[0], p[1])
        else:
            vertex(*p)
    if closed:
        endShape(CLOSE)
    else:
        endShape()


def lerp_poly(p0, p1, t):
    """Create interpolated version of poly - using tuples for points ""
    return [tuple(lerp(c0, c1, t) for c0, c1 in zip(sp0, sp1))
            for sp0, sp1 in zip(p0, p1)]


def scale_poly(p_list, s):
    """Return a scaled version of a list of points (as tuples)."""
    return [(p[0] * s, p[1] * s) for p in p_list]
```

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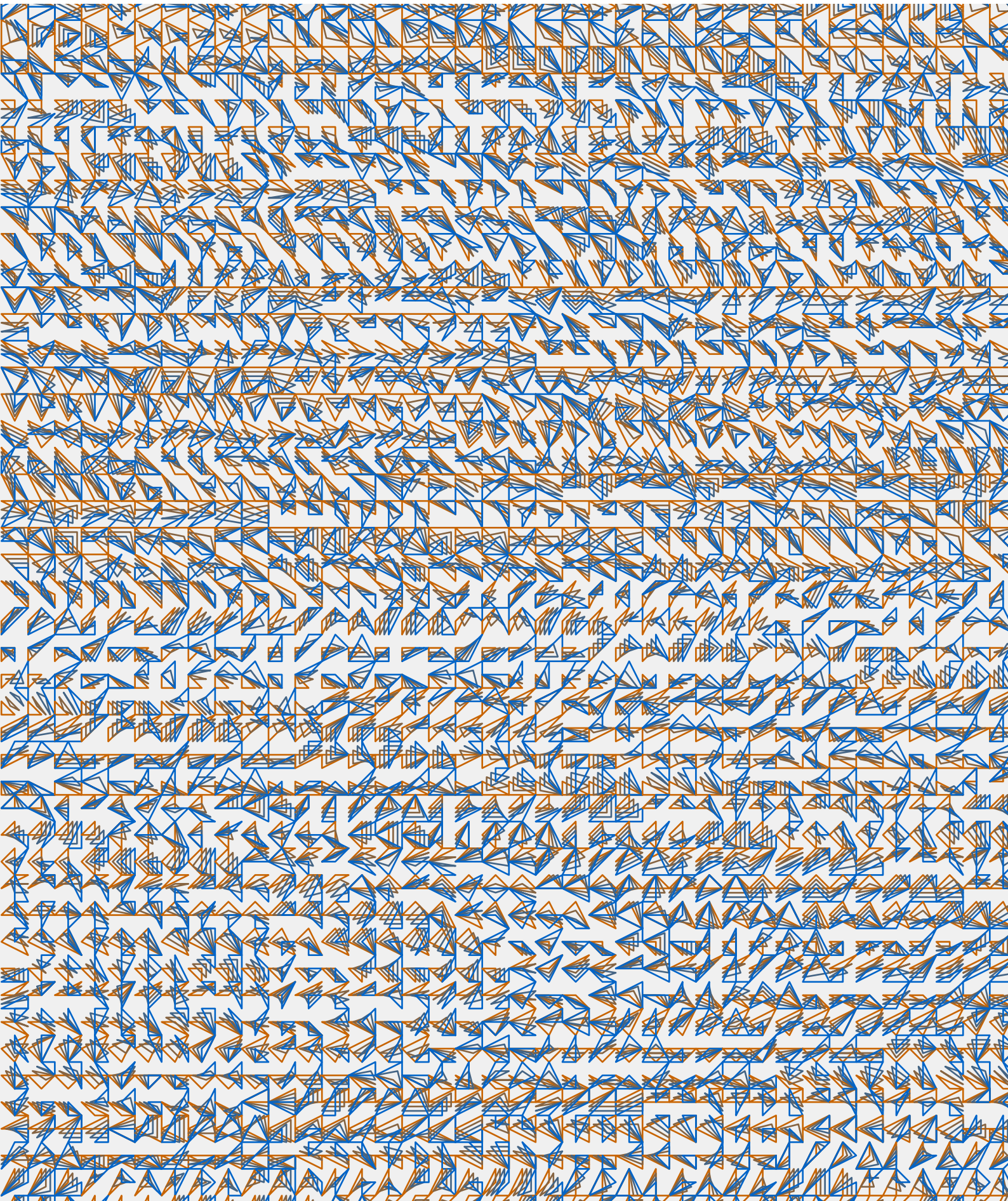
2850 INTERPOLAÇÕES DE TRIÂNGULOS V3

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