
GENER2A1T3IVE

SOFTWARE TOOLS

MOST VERSATILE CREATIVE AND EXPRESSIVE MEANS IN DIGITAL CULTURE

ESP. WHEN COMBINED WITH OTHER MEANS

CODING SKILLS

- Offer huge potential for creative exploration and expression.
- Require procedural fluency.
- Work best when integrated with (analog) artistic skills in visual arts, film, music, performance, etc.

Further reading on general context of digital culture/paradigm:

Charlie Gere, *Digital Culture*, 2005 @ OSS

AROUND 700 PROGRAMMING LANGUAGES

Some popular with the artists (popularity fluctuates)

- Game dev and expanded reality (VR/AR): Unreal Engine, Unity, Godot.
- Visual PL: Touch Designer, vvvv, Pure Data, Max/MSP.
- Scripting Languages: HTML, also software-embedded: MEL.
- Programming Libraries: Processing, p5.js, openFrameworks, FFmpeg.
- Programming Languages: Python, JavaScript, Java, C++.

GAME DEV AND EXPANDED REALITY (VR/AR)

Unreal Engine

- Written in C++, uses C++.
- Powerful, portability, lots of assets, learning resources + SG office.
- Limitations: Steep learning curve.

Unity

- Written in C++, uses C#.
- Powerful, portability, lots of assets, learning resources.
- Limitations: Steep learning curve.

Godot

- Written in C++, uses: C#, GDScript, VisualScript, Python.
- Powerful, portability, Open Source.
- Easier to learn, solid learning resources.
- Limitations: Assets and learning resources compared to U/U.

PROGRAMMING LANGUAGES WITH VISUAL INTERFACE

HIGHER LEVEL OF ABSTRACTION

MORE INTUITIVE LEARNING AND USE THAN CORE PL

Max/MSP/Jitter

- Written in C and C++.
- Interactive programming for music and multimedia.
- Powerful, large user and developer. base, good learning resources.
- Limitations:
  Proprietary.

Pure Data

- Written in C.
- Interactive programming for music and multimedia.
- Powerful, large developer base, good learning resources,
  Open Source
- Limitations:
  Quirky/idiosyncratic concepts

vvvv

- Written in Delphi.
- Plugins development in .NET and C#.
- Motion graphics, A/V synthesis in large media environments with physical interfaces.
- Powerful, fast, strong graphics support (OpenGL), Open Source.
- Limitations:
  Quirky/idiosyncratic.
  Modest user and developer base.
  Lack of learning resources.

TouchDesigner

- Initially based on Houdini, now Python.
- Motion graphics, A/V synthesis with physical interfaces.
- Powerful, fast, strong graphics support (OpenGL), good learning resources, well integrated w. other software/hardware tools,
  good for complex IM projects, and for learning Python.
- Limitations:
  UI complex to learn and maintain understanding.
  Proprietary, w. limited output resolution, and some Ops lacking in free lic.

COMMON LIMITATIONS OF VPL

- Visual interface not suitable for complex projects.
- Pragmaticism (interface) obscures deeper understanding.

PROGRAMMING LIBRARIES

SETS OF FUNCTIONS AND OBJECTS:

- HIGHER LEVEL OF ABSTRACTION (GENERALLY MORE INTUITIVE THAN CORE PL)
- SPECIAL FUNCTIONALITY

Processing

- Java library and PDE.
- Smooth learning curve,

  lots of resources and examples.
- Many ports and spin-off projects.
- Limitations:

  Speed.

  Specific needs lead to Java.

  Selecting good learning resources.

p5.js

- JavaScript library with Processing syntax.
- Works in browser, smooth learning curve.
- Good resources and examples.
- Limitations:

  Speed.

  Specific needs lead to JavaScript.

openFrameworks

- C++ library.
- Powerful, fast, extensible.
- Limitations:

  Steep learning curve,

  Requires knowledge of its basic PL (C++)

  more than other libraries,

  Lack of learning resources and examples.

FFmpeg

- Command-line suite of libraries and programs for multimedia processing.
- Powerful, fast, integrates with other PL.
- Limitations:

  Command-line text syntax less legible than common PL,

  Not suitable for larger project development,

  Assets and learning resources tricky to navigate.

PROGRAMMING LANGUAGES

LOWEST ABSTRACTION

HIGHEST FLEXIBILITY

LONGER LEARNING

C++

- Powerful, fast, modular, extensible.
- Huge number of libraries, platforms and implementations.
- Many learning resources and examples.
- Limitations:

  Vastness and complexity

  (number of libraries, modes and implementation scenarios),

  Selecting good learning resources.

Python

- Powerful, fast, extensible, well readable.
- Lots of platforms and implementations.
- Learning resources and examples.
- Limitations:

  Selecting good learning resources,

  2.x and 3.x branches.

JavaScript

- Powerful language with modest beginnings.
- Versatile, many libraries and implementations.
- Works online or offline.
- Relatively easy to learn.
- Lots of learning resources.
- Limitations:

  Speed relies on the host browser + host hardware,

  Some quirky concepts and syntax,

  Selecting good learning resources.

SuperCollider

- Available in C++.
- Real-time audio synthesis, processing, algorithmic composition and interaction.
- Fast, extensible, powerful.
- Supports live coding.
- Solid knowledge base.
- Limitations:
  Relatively steep learning curve,
  Requires musical knowledge.

TEXT EDITORS

MAIN TOOLS FOR CODING

MANY AVAILABLE

Sublime Text 3

- Fast, stable, high functionality and customization.
- Large user and developer community.
- Limitations:

  Proprietary (can be used for free).

Visual Studio Code

- Fast, stable, high functionality and customization.
- Open Source.
- Large user and developer community.
- Excellent documentation.

ONLINE RESOURCES

Stack Overflow
Learn through Q&A

GitHub
Software development version system
with many resources

TIPS ON CREATIVE CODING

- Understand basic principles of programming, computer architectures and IT.
- Select best tool(s) for specific needs: do your research.
- Learn several PL: best in parallel.
- Select one good manual and one video tutorial per tool.
- Learn continuously.


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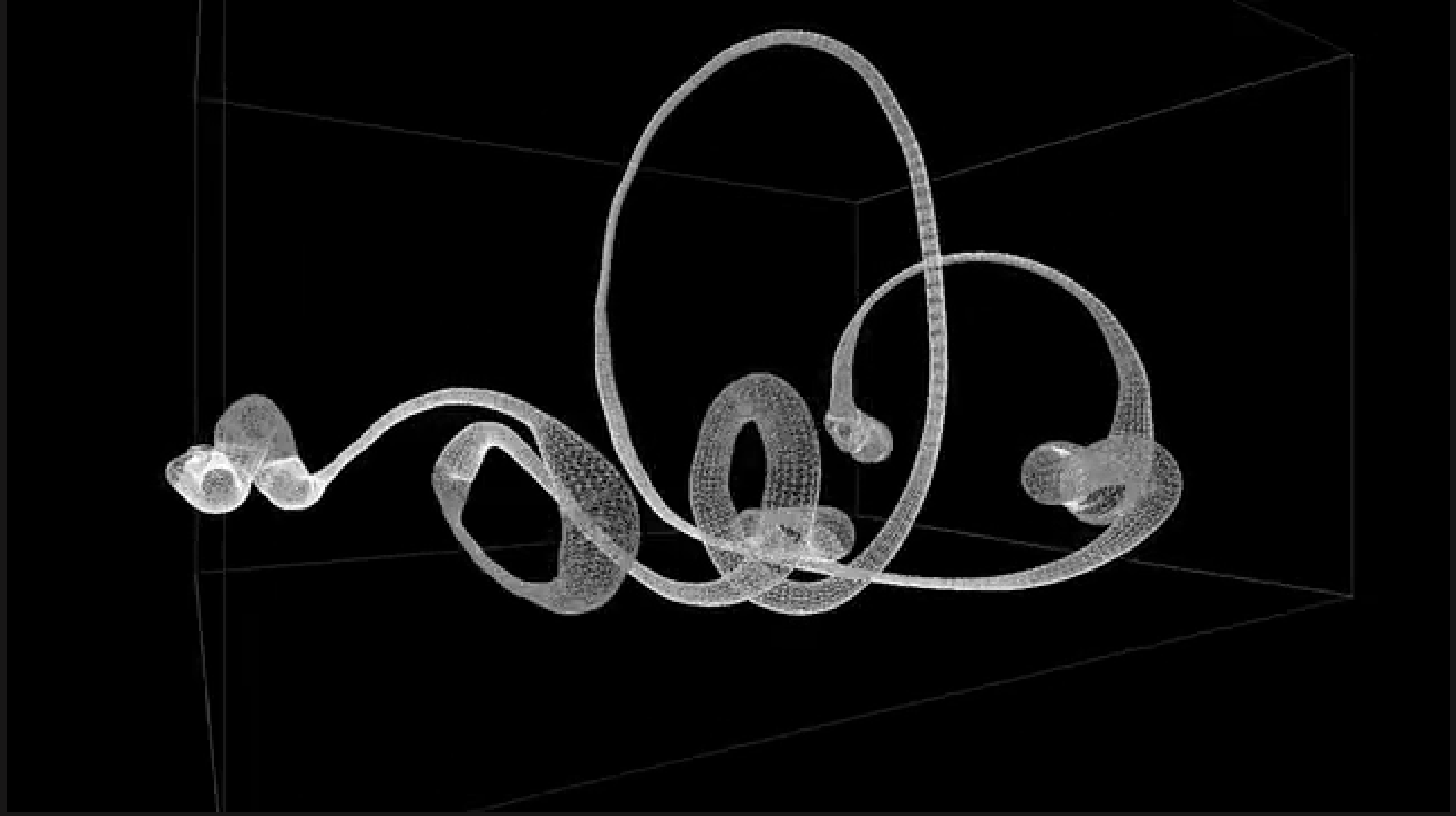

Evan Roth - 2010 - Graffiti Analysis (openFrameworks)

4D dynamics of graffiti writing/drawing converted into a sculpture.

Robert Seidel - 2010 - chiral (TouchDesigner)

Video animation projection-mapped on sculpture (5.1×2.6×3.7 m) and projected conventionally on a screen (2.5×2 m), both in handmade Taiwanese paper.

Luke DuBois - 2016 – Acceptance 2016 (Max/MSP/Jitter)

Nomination speeches Clinton/Trump (70-80% identical, distributed differently).

Speech to text + semantic analysis + matching + real time sync.

Oscar Sharp & Ross Goodwin - 2016 - Sunspring (AI/Python)

Short film screenplay generated by LSTM RNN trained on SciFi movie screenplays available online.

Branger_Briz - 2017 - Muse AI Supercuts (Software Demo) (AI/C++ et al.)

AI generates daily supercut music videos in which the words of the Muse's song Dig Down (2017) are voiced by notable persons from the online videos.

LOOK UP FURTHER @ OSS

· DETAILED LECTURE SYNOPSIS ON SOFTWARE TOOLS

· ROMAN SIGNER:

PROTO-SCIENTIFIC COGNITIVE DRIVE

JOY OF REAL-LIFE EXPERIMENTATION

PERSONAL STORIES BEHIND


THANK YOU!