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**Avant Zero**

Random data-generating algorithm for (experimental)

Quake III Machinima (post)-production

**FUNCTIONAL DESIGN REPORT**

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**List of Terms and Abbreviations**

**Python**

A versatile, high-level, general-purpose programming language; well known for its readability and expansive toolset for machine learning, scripting, algorithms, artificial intelligence, web development, stand-alone web applications and data analysis.

**CLI**

Abbrevation standing for *‘Command Line Interface’*; a piece of software that requires text commands for command/software initialization and execution instead of a graphical interface (containing menu’s, buttons and other graphical representations)

**Algorithm**

Software containing a specific and custom-made set of rules to get data such as media and/or input from point A (input) towards point B (output).

**Machinima**

Combination of the words ‘machine’ and ‘cinema’; a popular artform for participatory media creation since the late 1990’s/early 2000’s. Literal meaning: the creation of digital films inside videogame engines (often by utilizing videogame assets, code adjustments, code execution and game modification programs)

**Avant Garde**

Popular artform that develops new or experimental concepts or techniques; often associated with the arts[[1]](#footnote-1)

**Dominion Algorithm**

A random data generator for experimental Quake III machinima with limited functionality. Predecessor of the Avant algorithm. Initially created in late 2022 – early 2023 with the JavaScript language. Now considered legacy and defunct.

**Proof of Concept**

A version of specific software with limited functionality and scope to prove the feasibility of a concept or idea. AvantZero is considered a ‘proof of concept’ and only provides limited functionality compared to Avant – which is the full version of AvantZero - and currently, as of July 2025, still in active development.

**Quake III Arena**

Videogame released in December 1999 by game-developer *ID Software[[2]](#footnote-2).* Quake III Arena is a multiplayer-based first-person shooter, in which the player is able to compete (often during fast-paced gameplay) against computer-controlled enemies (bots) or other online players in arena-based levels (better known as ‘maps’) throughout a multitude of different game modes, such as, but not limited to: team deathmatch, 1 on 1 duels and Capture the Flag.

**NLE**

Abbrevation of: Non-Linear Editor; Software suite used for video-editing.

**Chapter 1 – Background**

**Chapter 2 – Goals and Objectives**

With the algorithm’s artistic and technical origins in mind, AvantZero aims to fully automate various tasks in Quake III machinima (post)production; tasks that would otherwise need to be done manually, while in tandem achieving specific creative and technical objectives:

Generation of unique, pseudo-randomized and experimental compositions

AvantZero enables users to create pseudo-randomized experimental compositions by reorganizing pre-existing footage in an algorithmic way that defies repetition. Each composition generated by the algorithm is unique (to most extent), even when using the exact same source material. This process of automatically generating new content reflects the algorithm's underlying commitment to avant-garde principles, such as: spontaneity, variation and non-linearity over traditional and narrative-based ways of filmmaking.

Rather than following predetermined editing patterns, AvantZero outputs randomized edit decision data (in formats such as XML and EDL) that can be imported directly into a non-linear editing (NLE) software suite. It acts as a generative and creative partner, proposing unexpected visuals and rhythms that challenge conventional filmmaking logic.

It aligns with experimental filmmaking traditions that focus on abstraction and viewer interpretation. By automating the visual structure and leaving the auditory domain to the user (such as sound design, audioscapes, music and/or dialogue), the algorithm introduces an highly interesting form of collaboration between human and code. Avant-based machinima is a continuously evolving body of work where no two outputs are identical.

Automating the assembly process of structurally diverse montages

In virtually every filmmaking workflow, the act of assembling and trimming raw footage remains a foundational (yet undoubtedly repetitive) process. This is no different in machinima. Creators are often tasked with selecting, sequencing and refining a vast array of gameplay clips and sit through large quantities of videoframes. It must be noted that AvantZero does not seek to replace the manual editing process; neither will it propose automation as a substitute for artistic expression. On the contrary, the manual curation of footage should be valued and preserved as rhythms, contrast and visual leitmotivs appear organically throughout the process. It is within this very hands-on manipulation that a film’s unique style takes shape.

Rather than surpressing, AvantZero serves as a complementary pillar. It is a system of visual experimentation designed to challenge traditional editing conventions by primarily emphasizing focus on experimentation and randomized footage selection alongside the idea of embracing uncertainty and unpredictability. It avoids the familiar pacing found in traditional cinematic convention. It introduces a new audiovisual syntax that privileges experimentation over story, and variation over repetition.

AvantZero supports an exploratory mindset, where the algorithm is a collaborative tool in the editing suite. The user is able to adjust the proposed edits to their liking at any given time, or, if desired, immediately accept the given composition. The algorithm primarily serves as a provocative starting point for further refinement, disruption, reinterpretation and cinematic expression. In a sense, AvantZero both embraces and restructures the creative loop between intuition, tradition and experimentation.

Broadening the roles of the User as Post-Editor and Interpreter

By default in most film post-production processes, the user acts as the author. Within the scope of the AvantZero algorithm, the user gains an additional role: that of interpreter. The editorial agency is shifted from the user towards the algorithm, while preserving the user’s ability to intervene, reinterpret and/or reject. By shifting the roles, the process of editing transforms into a form of dialogue between human and machine; between suggestion and creative desire.

Multi-Format File Compatibility and Integrated Depthmap Generation

AvantZero was designed with flexibility in mind. Thanks to a multitude of external software packages implemented within the algorithm, it accepts both image sequences and traditional video formats, such as, but not limited to .jpg, .png, .tiff,. .dpx (digital negatives), and H264, Apple ProRes, MXF, HEVC and AVI. Its’ wide range of compatibility enables artists to work across a broader spectrum of visual material. While the codecs above exemplify a number of codecs that will enjoy support from the first initial version, it will certainly be possible that support for additional codecs will be added during a later stage (as minor updates considering AvantZero serves as a proof of concept).

AvantZero’s multi-format file compatibility allows for deeper integration into diverse post-production pipelines and, in tandem with its xml/edl generation capabilities, for direct compatibility with a large number of NLE’s as well.

In addition to its compositional functions, AvantZero contains the capability to generate frame-by-frame depth of field image-streams alongside (or standalone) its randomized video output thanks to the DepthAnything framework. These depth maps provide valuable metadata that can be used in a variety of technical workflows (3D compositing and generating depth of field masks) or for experimental and artistic intent[[3]](#footnote-3).

1. Merriam-Webster. (n.d.). *Avant-garde*. In *Merriam-Webster.com dictionary*. Retrieved July 9, 2025, from <https://www.merriam-webster.com/dictionary/avant-garde> [↑](#footnote-ref-1)
2. Altar of Gaming (n.d.). *Quake III Arena*. Altar of Gaming*.* Retrieved July 10, 2025, from <https://altarofgaming.com/game/quake-iii-arena/> [↑](#footnote-ref-2)
3. Veenstra, J. (2020). DEPTHMAP NEXT [Video]. YouTube. <https://www.youtube.com/watch?v=c2FT_a34vw4> [↑](#footnote-ref-3)