

Orchestrating the in-game agency. Towards the inaesthetics of the code in *Doom 3*

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Introduction

This paper examines how the process of assigning playful space within the video game engine prepares it for players' actions. The method will be demonstrated with the case study of *Doom 3* (id Software 2004), which source code has already been the subject of aesthetic evaluation (see McGrath 2016). Research will be presented in two intertwined parts: the first one will focus on the theoretical and methodological background, while the second will examine the selected properties of *Doom 3* code and its practical implementations in organizing the game space in relation to players' actions and their status within the game world.

I propose to use two of the works by French philosopher Alain Badiou as a methodological scaffolding for my analysis: *Logics of Worlds* (2009) and *Handbook of Inaesthetics* (2005a). The first one will provide the necessary definitions of object and space, and their relation to the work of art. The second of my sources, *Handbook of Inaesthetics*, will introduce the titular concept, which purpose is to shrink the gap between the art and philosophy, but with "maintaining that art is itself a producer of truths" (Badiou 2005a, p. 2). Among the inaesthetic toolkit, I will undertake a closer look into the practice of translation, and work with this concept to establish a link between the source code, game play elements it evokes, and the possible actions of the player who wishes to engage in a dialogue with the game rules.

Although the subsequent analysis will inevitably comment on the series of rather abstract transformations from the object-oriented language of game code to the design of playful user experience, it will be designed to answer the following questions: which instances define the aesthetics of the game? Can we speak of the non-visual game aesthetics, and if so, what is its role in defining the in-game space? This paper proposes the reading of a particular game with the help of selected software studies methods as well as elements of Badiou's formal philosophy regarding the area of aesthetics, but it also make some comments on the historical perspective of the FPS genre. Given the vast volume of topics related to the source code and Id Tech 4 engine, in the following paper I will only assess the detailed structure of space in *Doom 3* ("a topological space is given by a distinction, with respect to the subsets of a multiple" [Badiou 2009, p. 411]), and investigate how – through the specific structure of the code – it influences the agency of a default player (and vice versa).

Theoretical framework: Badiou, Bogost, inaesthetics

The works of Alain Badiou are rarely used in the context of game studies, as their formal underpinnings pose certain difficulties for a researcher who wishes to formulate a compelling game analysis based on the theoretical framework provided by the French philosopher. The one notable exception is Ian Bogost book *Unit Operations*, where basic Badiou's concepts, such as *event* and *multiplicity*, are treated as important elements of ontology which helps to assess all texts as configurative entities which are governed by the principles of procedurality (Bogost 2006, p. 13). In this analysis, I will use some traits of the Bogostian interpretation, although the main goal of the paper, which is to pinpoint the transition between the code and aesthetics of the play event, both exceeds and slightly contradicts the *unit operation* paradigm, and especially the specific understanding of procedurality evoked to substantiate this theory.

Bogost uses Badiou as one of the many elements which support the theory of *unit operations*, a discrete “units of meaning” (Bogost 2006, p. 19) which form the basic principles of agency in the works of various media. To fully understand the importance of *unit operations* is to see the media artifact – or, for that matter, any computable and processible action – as a series of procedural transformations rather than parts of the narrative. Thus, *unit operations* would be a specific arrangement of meaning(s) which define the system of a particular medium. Bogost writes that “unlike Lacan, Badiou believes that it is possible to alter situations by reconfiguring their structure; the structure, akin to the power law in set theory, enforces a fundamental reorganization in every multiplicity” (2006, p. 35). However, this multiplicity, as Badiou argues, does not necessarily possess mimetic properties – at the core of the notion of inaesthetics lies the detachment of work of art from a material denotation.

To Badiou (2009), all truth is new, in a sense that when it occurs in the event, it can be negated, but cannot be undone. In my analysis, I will focus on a moment-to-moment gameplay, extensively working with Badiou's (2009) concept of presence as something constantly reduced to the point of choice. For the French philosopher, all that is happening in the realm of on-the-spot decisions, inevitably has a sequential architecture. Having said that, I will try to critically re-frame the notion of sequential architecture against the common notions of procedurality used in game studies. I dare say that the work of Badiou may contribute to the existing notions of agency in game studies the element of precision in regard to the actual existence of particular conditions necessary for an agency to be exerted. While two concepts in Badiou's philosophy are usually regarded as crucial to his philosophical work – the truth and the event – I would argue that they are intertwined in his reflection on the Art. While the truth manifests through the events (which are unpredictable elements of “otherness”), it also is something that “ruptures” the working order of things (Badiou 2005b, xii). Later works of the French philosopher further elaborate on these subjects, stating that a truth is an artistic configuration initiated by an event (in general, an event is understood as a group, a singular multiple of works) and unfolded through chance in the form of the works that serve as its subject points (Badiou, 2005a, p. 12). Recognition of the fact that the agency in video games may be co-constituted by both human and non-human actors (Wood 2012) seem to be rather

non-controversial, but few researches devoted their efforts to look beyond the structure of formal rules of games in this regard.

I have specifically chosen *Doom 3* as an example of the applied inaeconomics of the code and gameworld mainly for two reasons. First, as Bogost observes himself, “the First-person shooter (FPS) has played a fundamental role in founding the industry of game engines, assemblages of common software components and tools used to make other games” (p. 56). This claim is especially true given the legacy of original *Doom*, which in 1993 established a precedent of computer program which basically worked as a collaboration of discernible and transferable parts, in terms of both its engine and assets, allowing the modding community to deconstruct and create based on the toolkit provided by id Software. Second, *Doom 3*, while not critically acclaimed as a product of digital entertainment, nevertheless gained a positive recognition as a particularly intricate work of the software – the inner language of video gaming. I am equally interested in this discrepancy between the simultaneous success and failure of the game given these two contexts, as I believe it further strengthens the argument of the two separate aesthetics – one which is experienced as moment-to-moment gameplay, and one which usually hides between the various events and exerts its agency only in crucial moments of narrative disruption. Academics analyzing the historical legacy of the first-person shooters often refer to the emulation of the visual as the focal area in which the genre really exceeds. If “the FPS genre embodies the dedication of computer engineers to develop and refine a lifelike simulation of visual perception” (Therrien 2015) and “in [FPS] games the subjective perspective is quite common and used to achieve an intuitive sense of motion and action in gameplay” (Galloway 2006, p. 40), then it would be reasonable to expect a AAA title, like *Doom 3*, to follow the core design rules of the genre and offer innovation which is in line with the goals set by the mimetic principles centred around the focalizing subject.

***Doom 3* and C++**

It can be argued that at the time of *Doom 3* premiere, the high-budget segment of FPS games was undergoing a transformation and diversification from the fast-paced, arcade-like to the more narrative and even environment-driven gameplay. Games like *Battlefield 1942* and *Half-Life 2* (Valve Corporation 2004) problematized the act of shooting in the context of a particular storyline, even if moment-to-moment players’ action remained virtually unchanged since the commercial success of FPS games in the middle of ’90s. The further analysis of *Doom 3* must take into consideration the game as a product which at the moment of its premiere was simultaneously a display of programming skills and environmental design as well as the long-awaited continuation of widely renowned series. The original *Doom* was an exercise in fast-paced action, and its modular design was aimed at encouraging the growing modding community to add or replace the existing assets with objects of various esthetical meanings. Even without extensive knowledge about programming, the use of WAD files made it easy for gaming enthusiasts to alter particular parts of the gameplay, and the engine properties as well as source code of *Doom* allowed for relatively smooth incorporation of the new elements into an existing pace of the original game set by the interaction of mechanical and environmental features. The second iteration of the series, *Doom 2*, spawned fans’ projects which far exceeded the artistic vision and aesthetics of the original, including total overhaul of the game mechanics. The most interesting examples in regard to the topic of this article include *Idle Doom* (Albertoni 2017), where the players’ agency is limited to operating

the laboratory in which a simulated deathmatch is conducted according to the modifiable set of rules.

While working on the *Doom 3*, John Carmack worked on a special solution regarding the graphics in terms of dynamic lighting. It was later patented by William Bilodeau and Michael Songy as “method for rendering shadows using a shadow volume and a stencil buffer” (2002¹). I will omit the technical details of this method while focusing on the main idea which allowed to produce dynamic shadows rendered in real-time: operating on a failure. As John Carmack admitted in the e-mail to Mark Kirgard from 23th May 2000, the solution was connected with drawing the back and side sides of an object while incrementing or decrementing the depth fail. The object which is put to the depth test and simultaneously treated with stencil buffers (which determine the selection of visible pixels on the screen) can display a proper shadow volume in relation to the area it is placed in. This solution, applied in the source code of *Doom 3*, inevitably put some stress on the hardware department of PC peripherals, which needed to be alleviated by in-game solutions. One of them was to disallow the simultaneous use of flashlight and a gun, as it will render dynamic shadows defunct or even crash the system. As a result, the player was effectively forced to pay more attention to the non-visual game aesthetics: consider in-game sounds as valuable messages or approach the corridor labyrinths of given levels with care. Thus, lighting in *Doom 3* serves as both pace-maker of the gameplay and as a resource, and that of special kind: it is infinite, but can be applied only as a meaningful choice. The players’ choice remains connected with the game world in a way that is quite strict in defining its possible conditions, but remains open for the multitude of possible actions. Referring back to Badiou’s work, we may look at the formal relation between the object and the world:

A ‘relation’ from an object (A, α) to an object (B, β) is a function ρ of set A towards set B which satisfies, for every $a \in A$:

$$E\rho(a) = Ea,$$

$$\rho(a \uparrow p) = \rho(a) \uparrow p$$

(Badiou 2009, p. 337)

The above excerpt shows the mutual relations between the elements of sets that remain in relation to each other. Badiou argues that if elements from subsets are in relation, it never creates a difference between them, and only has the potential to amplify their properties. Referring this statement to *Doom 3* source code, one may observe an analogy in implementing the .map files, which can spawn a variety of entities. Even if the map itself is the first entity drawn by the software, the monsters, and other objects (including lighting!) are drawn on the same entity level and are subsequently filled with data usually contained in “brushes”, i.e. abstract base classes used to define objects needed to provide the visual feedback for the player.

Doom 3 marks the transition in id Software from C language to C++, now the most popular language for designing large video games. In the object-oriented paradigm, which principles

¹ <https://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=6384822&KC=&FT=E&locale=en> EP

can be implemented in C++, data is structured in the units of meaning, and afterwards, objects are declared in classes. Bogost stresses the importance of the fact that both classes and objects have their own properties which interact with each other regardless of system functions set “above” them. Badiou’s theory of events and Bogostian unit operations seem to function on the similar basis, although as the applied theories juxtaposed with C++ idTech4 engine show the meaningful discrepancies which may pose some interpretative dilemmas. Below I will provide an example of such juxtaposition and “test” the ideas at work.

The aforementioned shadow volume and stencil technique is just one important building block of *Doom 3* digital environment. The second is multi-pass rendering, which allows for additive blending of colors². The effect of real-time blending may result in displaying white patches of light on the objects placed within its scope. Thus, one of the meaningful unit operations can be connected with the interaction of three or more independent light sources, and the truly innovative part of the engine would make them interact in line with the hierarchical principle of action, and not – as the principle of unit operation may suggest – against the higher-level framework. In other words, the novelty of the Id Tech 4 engine in this regard is to actually overwrite the discrete processes with a level effect of higher tier, even taking into consideration the fact that the initial *Doom 3* project lies heavily on the implementation of C instead of C++ (referred by John Carmack himself as “C with classes”).

The next step in the analysis is to look at the rules of the game in relation to the game space. For Bogost *unit operation* is a discrete procedure, detached from the hierarchical and systematic. But at the same time, by observing and analysing unit operations players learn the rules of the game. C++ basically enables to use four major styles (or paradigms): procedural, data abstraction, object-oriented and general programming (Stroustrup 2010, p. 714). Bogost defines procedurality after Janet Murray as “a name for the computer’s special efficiency for formalizing the configuration and behavior” (2006, p. 13). Interestingly, such understanding would have much more in common with data abstraction paradigm than with procedural programming, because the former works with “abstract” data, i.e. types of data which are available through the mediating interface, while the latter focuses on functions and arguments. The usage of matrixes, which helps with prediction of data sets (as in the outcome of games), is also connected with data abstraction. In computer systems, abstraction is also a method invoked when finding the solution of the problem requires focusing only on selected key features of the problem.

That being said, the notion of “procedurality” as the main framework for understanding the ontology of computer games (and other digital media) can be connected with object-oriented programming in a sense that its core definitions, such as functions, arguments, values and references, inevitably appear in the three other paradigms of C++ programming. Bogost claims that Badiou’s situation and its state is analogical to ontology and its procedural implementation in computer science (Bogost 2006, p. 14), which is a statement that I can agree on only with the caveat that it depends on the type of particular computational procedure.

² Examples can be found at <http://fabiensanglard.net/doom3/renderer.php>.

Agency, ontology, topology and topography

The holistic ontology of Alain Badiou can be reconnected with other proposals on that matter, also from the area of game studies. Olli Tapio Leino proposes an ontology based on “the fairly simple distinction: as players we are free to reappropriate or ignore some of the game’s features at will, whereas other features we cannot reappropriate or deny without risking our existence as players” (Leino 2010). Using the Badiou’s notion of equal importance of the world-constituting subsets containing meaningful elements, it can be argued that the potentiality of game-breaking reappropriations form necessary foundations for the player to act as a meaningful agent. As Badiou observes, “there is a ‘point’ when, through an operation that involves a subject and a body, the totality of the world is at stake in a game of heads or tails. Each multiple of the world is then correlated either to a <yes> or to a <no>” (Badiou 2009, p. 400)

When Badiou refers his theory regarding the ontology and space, he uses the example of the city Brasilia. First, he observes that there is a set of properties which define Brasilia as a place. If we want to truthfully claim that we are in Brasilia, we have to subjugate ourselves to the subset of Brasilia’s properties. In a way, being in a place would equal subscribing to a definition of this place itself. So far, this claim is in congruence with both Bogost’s theory of unit operations and most of the games built around the notion of presence of the player. If the agent is not in the vicinity, the units of meaning cannot start their work, as it will only consume the scarce technical resources at the disposition of the computer to put effort in a message without the presence of a desired recipient.

Badiou put it quite succinctly: “it culminates in a very beautiful theorem about appearing: the points of the transcendental of a world define a topological space. In the style of Kierkegaard, albeit secularized, this amounts to saying: where there’s a choice, there’s a place” (2009, p. 401). In a way, the necessity of constructing a block of a “place” requires the presence to be evoked within the given ontological framework.

Coming back to Ian Bogost’s (2006) interpretative framework, the player is primarily confronted with the task of interpreting the unit operations, which constitute a scaffolding for simulation. Therefore, the meaning is constructed according to the outside references constructed and evoked by these operations. Game messages encompass simulation, and the role of the players’ subjectivity can be reduced to the reactionary activities shaped after the individual experiences. Comparing this approach to the *Doom 3* design philosophy, it can be noticed that the position of the player constantly hinges on the dialectic of exclusion and inclusion: perhaps the most shocking levels of *Doom 3* are the two initial areas, where there is no shooting, only walking and responding to the small topological tasks commissioned by the NPS. Such blatantly disruption of the gameplay to be expected from the famously fast-paced shooter only afterwards is alleviated by the dramatic course of events, which are equally unsurprising and well-conducted. This creates a specific rhythm of gameplay and prepares the player to engage in quasi-horror-like endeavors focused on the work of

establishing connection between the new mechanics (such as audio logs as puzzle-solving tools) and new type of FPS gaming experience.

Given the topic of this paper, perhaps the most adequate definition of art (in relation to the artifacts and the work of art) in regard to video games can be attributed to Alain Badiou. Work of art as configuration – this notion resonates well with Ian Bogost theory of unit operations, but only to some extent, and as long as we operate on a relatively high level of abstraction. According to Badiou, among the four essential conditions through which the philosophy can be conducted: science, politics, art and love (Norris 2009, p. 2). The *inaesthetics* aims at linking together philosophy and art; “art produces truths and it is the task of philosophy <to show art as such>” (Badiou 2005a, p. 1).

The idTech4 engine used in *Doom 3*, which code is the subject of analysis in this paper, centers the gameplay and gameworld around the actions of the player, but it does so in a non-direct way, quite similar to the topological ontology proposed by Alain Badiou. The French philosopher treats the human body as the focal “point” and the “topological operator” (Badiou 2009, p. 399) – he claims that “a point is the crystallization of the infinite in the figure” (2009, p. 400).

According to Badiou, there are essentially three possibilities for a body-which-faces-the-point to display its agency: first is the subjugation to the imposed rules of the world and the decision to make the binary, focal decision; second is to reject the opportunity to make a decision, and third is to destroy – to try exerting the power given by the world beyond the expected interpretative frame. The Point also serves as a test of truth. The Point reduces the infinite multiplicity to the Two. If we are to translate this situation into video game, “the point is not just to have agency, but to be acted upon by the game environment, in other words: to be an object among other objects” (Klevjer 2011). *Doom 3* positions the player’s avatar within the game world in a similar fashion, albeit with a few interesting modifications. The storyline requires (and justifies) the use of portals, which in the code are tied to the player spawn locations, which subsequently build a complete sequence of objects drawn in a particular map. Thus, players’ agency is very strongly tied to a specific subset of rules on a given map – technically speaking, the player is not just acted upon by the other objects on the map, but it is the part of the map. The environment is not limited to responding to the players’ actions, it also considers the very being of the player a necessary element for its existence. This fact also refers to yet another distinct feature of the id Tech 4 engine – the possibility to broaden the players agency beyond the usage of the items which must result in activating them. An example of this is the presence of interactive panels in the game world. Contrary to the common trope in fast-paced FPS games, their meaning is not reduced to occasional activation by the players’ avatar (usually by simply pressing functional [E] button on the keyboard). Instead, each of the panels’ presence reminds the player about their possible limitless, playful exploitation – we can dial up countless combination of numbers, but only the right code would open the doors guarded by panels. The second type of panels, aside the dial-up ones, are the monitor screens and graphic display interfaces in the game world. Looking at the code, it can be confirmed that the information on display screens (panels) placed in *Doom 3* environment can be governed by the scrip language connected to the game object. This fact alone makes the famous *Super Turbo Turkey Puncher 3* easter egg an actual

game within a game, not just a simulation through animated sequences. What is more, the mini-game is placed in the first level of *Doom 3*, which – as stated previously – work as the introduction to the inaesthetic concept, the meaning-making beyond the strategy of applied technological mimesis.

Conclusion

In conclusion, I would like to evoke three main propositions regarding my research on *Doom 3* and its formal underpinnings in the source code. I realize most of them require further research to be better documented and proven, especially given the broad scope of philosophical inquiries done by Badiou, among which I touched upon only a selected few.

1.

Simulation understood as the consequence of procedurality (see Bogost 2006, Frasca 2003) is in fact a consequence of data abstraction, not following step-by-step procedure to formulate a “rule-based representations and interactions” (Bogost 2007, ix). In other words, the definition of simulation (“alternative semiotical structure known as simulation” [Frasca 2003, p. 222]) as a “model a source system through a different system” (Frasca 2003, p. 223) refers to data abstraction, not procedurality. Albeit there are studies questioning the universality of (pseudo)procedural-based approaches to the analysis of video games (see Vella 2015), they favor phenomenological or hermeneutics paradigm in favor of ontology. The most innovative among the inaesthetic properties of the C++ code of idTech4 engine were in fact designed against procedurality understood as step-by-step instructions based on subroutines and declarations (including functions). Even though the critique of Ian Bogost’s notion of procedurality in relation to video games has already appeared in academic discourse (see e.g. Sicart 2011), I would claim that it is beneficial to revisit the computational side of said approach – not to dismiss it completely, but rather revise and rethink the intricate relations between the actors in the video game objects.

2.

I would argue that game studies research regarding the subject of agency in relation to software may benefit from the Badiou’s inaesthetics approach, i.e. not referring to the rulesets as mimetic structures aimed at reproducing the coded “system”, but instead try looking at the problem of agency from the perspective of a game as a work of art, which is at its core a “multiple that exposes its own organization in and by the finite framing of its presentation” (Badiou 2005a, p. 11). I dare say that Badiou’s concept of the work of art as a set of infinite possibilities which by its finite qualities (place, time, involvement of particular agents) give us the insight into its intrinsic meanings is a very good approximation of the video game as a “living” structure.

3.

While analyzing the players’ agency in digital worlds it is crucial to include the elements which from the design perspective are aimed to reconcile technology and aesthetics of the in-game objects. *Doom 3* relies heavily on creating compelling visual and sound experience through the use of compacted spaces, where light and architecture act in congruence with the game mechanics. This adds to the relatively slow-paced gameplay in comparison to the previous iterations of the series. The Bogostian units of meaning manifest themselves not so

much in the procedures following a cohesive order of actions, but rather they emerge in interactions which operate at the higher levels of organization, simultaneously and mutually invoking subsets of various data.

Games

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