

The Game FAVR: A Framework for the Analysis of Visual Representation in Video Games

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Abstract

This paper lays out a unified framework of the ergodic animage, the rule-based and interaction-driven part of visual representation in video games. It is the end product of a three-year research project conducted by the INTEGRAE team, and is divided into three parts. Part 1 contextualizes the research on graphics and visuality within game studies, notably through the opposition between fiction and rules and the difficulties in finding common vocabulary to discuss key visual concepts such as perspective and point of view. Part 2 discusses a number of visual traditions through which we frame video game graphics (film, animation, art history, graphical projection and technical drawing), highlighting their relevance and shortcomings in addressing the long history of video games and the very different paradigms of 2D and 3D graphics. Part 3 presents the Game FAVR, a model that allows any game's visual representation to be described and discussed through a common frame and vocabulary. The framework is presented in an accessible manner and is organized as a toolkit, with sample case studies, templates, and a flowchart for using the FAVR provided as an annex¹, so that researchers and students can immediately start using it.

Author Keywords

Video games; visual analysis; graphics; methodology; space.

As Tzvetan Todorov says, 'One cannot verbalize with impunity; to name things is to change them.' Can we not equally say, 'One cannot visualize with impunity; to see things is to see them under one or several aspects and hence to change them'? We are never really finished with a description [...] for [it] is always under adjustment in the ongoing process of conceiving and naming new segments of a world, segments newly seen as kinds and parts of things, in accordance with our present interests.

- Edward Branigan, *Projecting a Camera*

The Frame of the Game

The INTEGRAE team was formed around a research project studying INnovation, TEchnologies, GRaphics and AEsthetics in video games (Arsenault, Côté, Larochelle & Lebel, 2013). Soon the project's focus veered on the need to create a unified framework to analyze videogame images, one that would account for the transformative and historical nature of the practices that brought about our objects of study in the first place. The first step was then to distance ourselves from any dominant paradigm of visuality by electing a hybrid corpus representative of the great variety of video games in terms of their gamespace dimensionality. Our focus on the incremental transition from 2D to 3D graphics during the 1990s helped achieve this first objective. The third and final part of this paper will lay out the unified framework of the *ergodic animage*, and illustrate it through application on a select variety of examples. Before doing so, however, we need to respond to a second objective that soon emerged as a necessary step towards achieving the first: we also needed to clean up the terminology through which game imagery has been appreciated and designated, as its most frequently-used terms have emerged from heterogeneous linguistic nexuses. The second part of this paper discusses a number of visual traditions through which we framed video game graphics: film, animation, art history, graphical projection and technical drawing.

We were certainly not the first to acknowledge the need for a strong, common vocabulary within our field. Among our academic predecessors in that matter, members of the Game Ontology Project (GOP) opened their 2005 introductory paper by pointing out that “game designers have called for a design language, noting that designers currently lack a unified vocabulary for describing existing games and thinking through the design of new ones” (Zagal, Mateas, Fernández-Vara, Hochhalter & Lichti, 2005, p.1). As far as we can tell (the GOP websites are down and all we have is a MindMap with only hierarchically-organized concept names²), the GOP surpassed in systematicity the vernacular, journalistic and technical jargons competing to name videogame design phenomena. Similar calls and projects are routinely put out; for example, Staffan Björk and Jussi Holopainen's *Patterns in Game Design* (2004) makes similar arguments. Such discussions of vocabulary usually have very broad aims, and may attempt to describe game design, game visuals, game spaces, game world structures, etc., which limits the depth to which they can treat any of these aspects. Our decision to focus on a single aspect of video games - studying the visual aspect of video game play - led us to develop another taxonomy to fit this focus. We started exploring this avenue earlier by introducing the concept of graphical regimes, which we defined as “the imaging of gameplay and the gameplay of the image” (Arsenault & Côté, 2013).

Our framework's unique value resides in its capacity to address four problems with all high-level descriptive models:

- 1) A unified framework should be applicable and open a shared conceptual structuring and vocabulary for discussing all types of video games, regardless of platform, control scheme, game genre, historical period, number of players, physical context of play, fictional or narrative aspirations, graphical style, gameworld dimensionality, technical implementation of graphics, or graphical technologies;
- 2) It should clear up terminological confusion through a common vocabulary when discussing image type, graphics style, point of view, perspective, interfaces, game spaces, and how the player interacts with images when playing a video game. It should provide a way to

name and discuss the interesting, novel, or banal features of a game's graphics and gameplay;

- 3) It should account for the varied and hybrid nature of video game graphics within games, and not reduce them to a single description, thereby masking the variety of visual modes that characterizes the vast majority of video games.
- 4) It should be structured in wide, non-technospecific categories that allow for future developments in games to be integrated into the model, regardless of technological paradigms or mutations of game genres (the increasing usage of stereoscopy in games, or the Wii U's exploitation of an asymmetrical display in its Gamepad, provide good examples of such developments that happened during our research).

Film scholar Edward Branigan, whom we cited in our epigraph, did a careful study of the canonical "language-games" to be found in film studies. Astrid Ensslin (2012) and Chris Paul (2013), among others, have engaged in the same kind of work. Though we are not following along in that same path, we recognize the same basic issues: to name something is to construe it in some way, and the elaboration of a terminology almost inevitably calls for an extrinsic purpose (or "present interest"). Our goal here, however, is not to develop a framework so that we can apply it to prove some particular point about video games as a general category (i.e., that their constant mix of interface and fictional world problematizes the concept of *diegesis*, to allude to the work of Kristine Jørgensen), or to develop an in-depth system that can account only for a specific slice of games (say, 3D games). We are pursuing the establishment of a descriptive model as a goal in itself, for its own sake. The sole prescription here is to keep the dynamic context of gameplay as a guide for observing and describing visual content – hence the framework's name, the Game FAVR, points to a certain perspective on game visuals, one which favors their gameness (or their relationship to the game-specific realities of control and intelligibility).

We are not going to use the framework as a basis for discussion of specifics topics here, though that is certainly the next logical step, since we want the framework to be usable by researchers according to their own needs and interests. The appendices to the paper are intended to demonstrate the kind of analysis and discussion that can be had when using the framework, and its broad applicability to a number of very different games. To that end, the paper resituates the logics of game graphics to develop a framework that can be applied to any video game, including categories typically neglected by previous foundational or ontological models, or at odds with each other (including 2D and 3D games, games that don't project a fictional world, games with information displays and on-screen subdivisions, etc.). Moreover, our framework is made to account for the variety of visual modes that a single game can offer (between combat sequences, map screens, inventory and menus, etc.), which is a dimension entirely left aside from other frameworks that are content with describing the "main" mode found in a game. As such, the first part of this paper contextualizes the INTEGRAE project within the field of game studies.

Part I. The Study of Graphics in Game Studies

Perhaps one of the best starting points to situate our framework is to locate it within Michael Nitsche's (2003) analytical planes of game space.

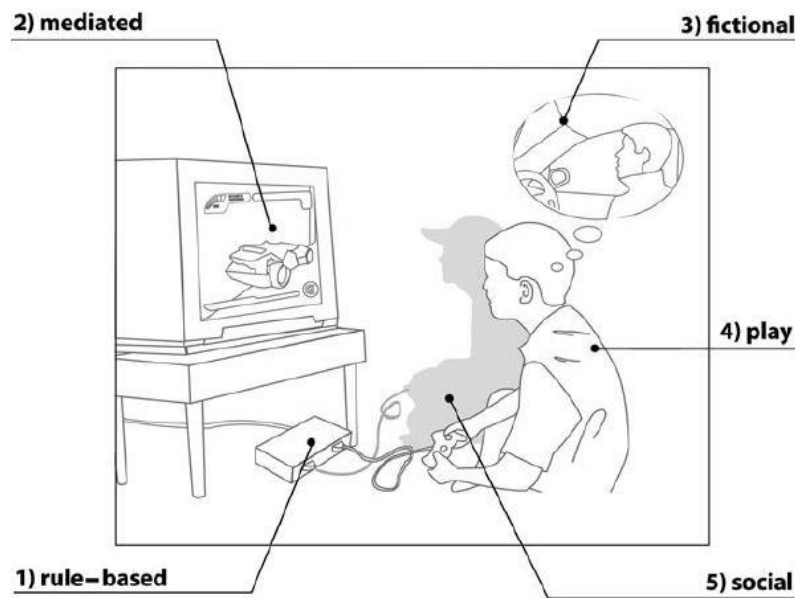


Figure 1: M. Nitsche's five analytical planes. (Nitsche 2003, p.15)

Our approach is formalistic, and we are primarily concerned with the mediated plane. The social and human player's planes, while secondary to our theoretical efforts, are indirectly covered through the historical aspect of our research dealing with video games' promotional and critical discourses during the 1990s.³ Moreover, our interest in the mediated plane specifically targets the ergodic nature of the player's experience, rather than the entire spectrum of video game graphics (which includes ornamental and non-interactive aspects of graphics). Consequently, our research focuses on the *ergodic animage*⁴, an expression that we coined by reframing from the text to the image Aarseth's (1997) ergodicity (the interactive process of working to create a path through the configuration of a textual machine with no guarantee of success (p.1, p.179)) and pairing it with Gaudreault and Marion's (2013) animage (a "type of film image that is born from the expressive potential of the digital and that crystallizes the current spreading of a cultural series formerly neglected by the cinema institution: animation" (p.256)). The ergodic animage is the meeting point and mediating factor between the player's agency and the game's visual representation of its internal state.

Bernadette Flynn (2003) writes that the "satisfaction" or "fun" of the player does not stem from narrative construction, but rather from the sensation of embodiment in the navigational space. Although we do not describe games for their thematic or narrative qualities, it would be counter-productive for us to rule out *fiction* completely, at least as a cognitive facilitator for apprehending the game. This inevitably brings to mind one of the foundational debates in game studies – that of the narratology and ludology divide. We are not going to discuss the underlying subtleties nor go through its history and ramifications here, since our focus on interaction with images means we are sidestepping the crux of the debate anyway. Fiction plays a part in imparting sense and structure into game graphics and gameplay, but we do not wish to study fictional immersion. Similarly, centering the discussion on the rules would miss out on the process of mediation that the images make possible and would exaggerate the instrumentality of graphics to a game's purported gameplay goals; players do enjoy graphical contents above and beyond the minimal requirements of functionality. As Ryan (2001) states, "through the increasing attention devoted to the sensorial

representation of the game-world, the pleasure of modern games is as much a matter of ‘being there’ as a matter of ‘doing things’ (p.309). Consequently, we concentrate on the basic availability for action, the *workability*, that the images can specifically provide.

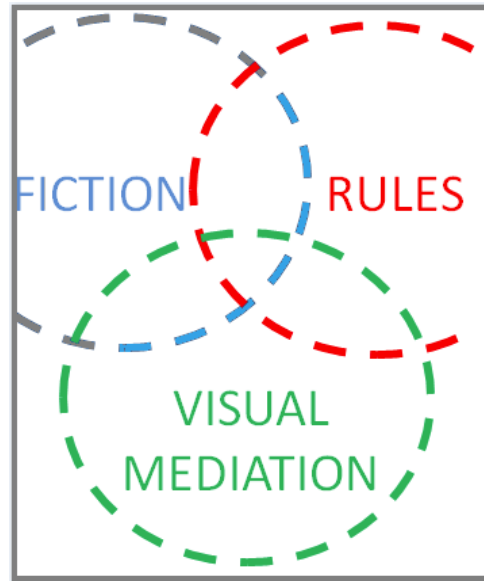


Figure 2: *Visual mediation is being considered as an independent tradition and field of research, but as far as its relationship to videogames, we need to conceptualize it as part of the simulation that enables gameplay experiences.*

Following Juul (2007), players interact with a game through its rules, and while some of these actions and rules may be derived intuitively from the game’s fictional representation, players can (and often do) ignore the game’s fiction, favoring an interpretation focused solely on the game units’ semantic operability as part of game rules or design patterns. Players thus engage in a constant dance between abstract problem-solving and partial suspension of disbelief by deciphering visual information, narrative propositions and game mechanics. This process is accomplished through what we propose to name, as a way of situating ourselves in Nitsche’s model, the *plane of intelligibility*.

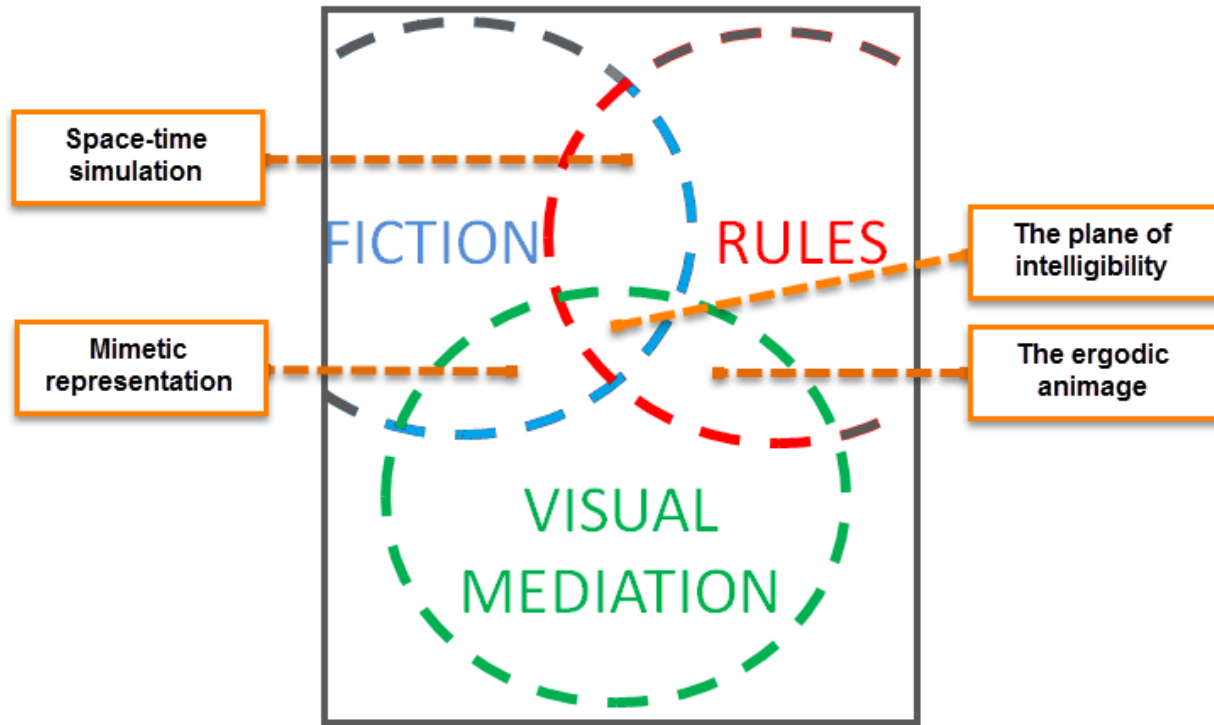


Figure 3: *Visual mediation (in full color) is our primary interest, and we only cover fiction and rules insofar as they are mediated through graphical representation. Moreover, we will focus on the ergodic animage (the meeting of graphics and rules) rather than mimetic representation (the meeting of graphics and fiction).*

As a connection between images and play, *visual ergodicity* is a concept that defines a mode of organization of visual mediation designed to inform the intelligibility of the game. In our terminology, such modes of visual ergodicity are called “graphical regimes” (and are exemplified by terms such as *side-scroller*, *First-Person*, *top-down view*, etc.) Those regimes are pragmatic constructs formulated in natural language, and play a useful role in bridging the specialized and unwieldy terminology that taxonomies and foundational models typically develop with the practical reality of describing games rapidly and approximately using shared and common terms⁵ (Lee *et al.*, 2013). Graphical regimes are meant to describe the relationship between images and the player’s disposition and activity. This means that our framework will never really bother with narrative or fictional content *per se*, but rather account for basic distinctions in the composition of elements on the screen’s surface. Hence, the question of the *diegesis* (the projected fictional world) is relatively secondary to us. Unlike Kristine Jørgensen’s (2013) approach, with whom we otherwise share a lot of preoccupations, we cannot account for a concept like “gameworld”. The assumed player’s intuition of “worldness” will be broken down into visually traceable properties such as mimetic representation or tangibility. Hence, we suggest that graphics, more than a simple representation of the “visual” or “narrative” space of a game, are a ruled-based system of relations that has a direct impact on the way the players perceive and interact with the game.⁶ Echoing Juul (2007), graphics lie somewhere “between real rules and fictional worlds”.

Finally, one of the chief concerns of the project from the very start was to enrich our understanding of visual mediation by revisiting other disciplines, such as film studies and art history. In this

regard, we are treading a path Mark J.P. Wolf has been exploring for some time already. In *The Medium of the Video Game* (2002), he laid out 11 elementary spatial structures, including text-based, single screen (contained), single screen (contained, with wraparound), scrolling on one axis, scrolling on two axes, interactive three-dimensional environment, and more. The two issues with Wolf's work (or rather, the direction he has pursued) that we want to explore are:

- 1) the historically-motivated inequality of treatment between these spatial structures (Wolf's focus on early and 2D games led him to distinguish finely between single-axis and double-axis scrolling, or between wrapping or non-wrapping screens, while 3D environments do not benefit from such a degree of precision);
- 2) the focus on space rather than graphics, which led Wolf to conduct more work on the navigable space and the structuring, links and coherence of spatial cells (Wolf 2011). This latter kind of work on video game spaces has also been pursued by Fernández-Vara, Zagal and Mateas (2005), McGregor (2013), and others.

The direction we are pursuing treats graphics as its main subject, and hence it treats them as “things that get displayed on a screen” rather than “images that display a fictional world”, in colloquial terms. We are closer then to Wolf's discussion of the ways graphics have approximated tridimensional representation (Wolf 2009), and to that effect, one of our objectives is to clear up the terminological confusion that prevails in some academic discussions, but mostly among the press, industry, and gaming fans, who tend to mix up terms drawn from a variety of visual traditions without much method.

The various “perspective” and “point of view” labels we frequently encounter in games discussion, criticism, and analysis exemplify the problems of language that face any substantially precise discussion of games from a formal point of view. Consider, for instance, the use of the term “isometric” in popular discourse around games. The GiantBomb (2014) article on the topic opens with: “The term “isometric” has become a popular word to describe any video game with an angled top-down or off axis viewpoint.”⁷ Mobygames notes that “while the perspective term has traditionally been labeled isometric, in typical use it includes isometric (e.g. Knight Lore, the Immortal), dimetric (e.g. *SimCity 2000*, *Diablo*), and trimetric (eg. *Fallout/Fallout 2*, *SimCity 3* [sic]) projections.”⁸ Perspective and its “persons” also offer a nice example. *Doom* may offer a first-person perspective, but so does all interactive fiction according to MobyGames⁹, which conflates (and confuses) visual and psychological perception. 2D platformers are sometimes referred to as being “in third-person perspective”¹⁰, even though that terminology makes little sense as there often is no actual perspective but rather a parallel projection of the game's environment. Moreover, there is an important difference between the gameplay offered by a “third-person perspective” like this, and the kind found in 3D games with a mobile camera. Confusingly, some people refer to the over-the-shoulder camera style found in *Resident Evil 4* and *Dead Space* as a “second-person point of view”, as a way to indicate that the camera is closer than the usual video game third-person point of view, without being quite as close as first-person. Yet others will fall back on the literary (or grammatical) second-person to discuss games that show the action from the point of view of the antagonist, or by addressing the player as “you”. Sorting through the varying traditions of visuality thus is a necessary step in discussing video game graphics and visual representation.

Part II. Traditions of visuality in studying video game graphics

Framing Games through Film Studies

On a superficial level, considering video games from the perspective of cinema seems like a sound proposition: both make use of moving pictures and sound, use similar display technologies, and result from similar industrial modes of production. But this view is in fact very selective in terms of both history and diversity. Until the 1990s, “cinema” as a visual paradigm for video games was largely alluded to in marketing more than realized and experienced in the game. For example, when Tecmo released *Ninja Gaiden* in the USA, it trademarked its cut-scenes as “cinema screens” and called them “Tecmo Theater” in the instructions manual; but to anyone unaware of these facts, these screens looked like *anime* or comic books more than anything produced by a movie camera. This is simply to show how long it took for video games to actually allow the player to experience something like cinematic *gameplay*. Admittedly, the definition for such a practice is nebulous, because *cinematic* can mean any number of things, but it is safe to say that “*cinematic*” has a much longer history in marketing and cut-scenes (in the overlapping of fiction and visual mediation in figure 2) than in actual gameplay usage (the overlap of rules, fiction and visual mediation).



Figure 4: Left: *Ninja Gaiden*'s back cover, with “unique cinema display” and “movie-like graphics”; right: *Defender of the Crown*'s back cover, “a CinemaWare interactive movie” that’s “more like being in a movie than playing a computer game.”

When did the marketing apparatus’ framing of video games as cinema expand into a full-blown “cinema envy” (Zimmerman, 2002) creeping on the entire industry and affecting gameplay as well

as cut-scenes? Evidence points to the 1990s as the privileged site of this transformation because of two key currents:

- 1) the massively marketed but quickly forgotten movement of Full-Motion Video (FMV) games, which saw in the filmic apparatus a way to push video games to the next level in the long quest towards photorealism¹¹;
- 2) the rise of polygonal 3D graphics, which allowed for unparalleled flexibility in the games' visual mediation and incorporated as a standard gameplay feature the manipulation of the point of view, reflected through the addition of the term "camera" to the gameplay lexicon. In this respect, *Super Mario 64*'s integration of an in-game camera (as seen in figure 5) may have largely contributed to this reframing of game graphics under the mantle of cinema (though ironically, its "live reporting" situation proves to be closer to broadcast television than to film). The strategy worked by implementing the viewpoint into the plane of intelligibility: the camera has certain rules of manipulation, is given a fictional existence (it is held by Lakitu), and the camera's positioning is visually mediated through an icon appearing at the bottom-right of the screen.



Figure 5: *Super Mario 64's framing of a dynamic viewpoint as an in-game camera.*

The point of view is one of the most important concepts to have been developed in film. David Bordwell (1985) has reworked Gérard Genette's literary concept of focalization to account for the fact that in film, we visually *see* things often more than we get to know what people *think* about them (as in literature). Bordwell's analysis works from the scope and range of information afforded to the spectator in comparison with the character. But games often offer information in a different way (through interfaces), and often don't rely on *narrative* information but rather on information geared towards ergodic tasks. François Jost's (1983) concept of ocularization, which describes dynamics between vision, space and fiction, frames the question from the mechanical act of visual perception, rather than a passive, finalized display of results, or a psychologically-oriented act from the spectator. As Stam, Burgoyne & Flitterman-Lewis (1992) describe:

Ocularization indicates the relation between what the camera shows and what a character *sees*. INTERNAL OCULARIZATION would refer to those shots where the camera appears to take the place of the character's eye. EXTERNAL OCULARIZATION (or ZERO OCULARIZATION) would indicate those shots where the field of vision is located outside a character's own.

Jost (1983) distinguishes between two types of zero ocularization – which we have decided to regroup under the larger term “external ocularization” (something Jost prefers to avoid) – for more clarity.

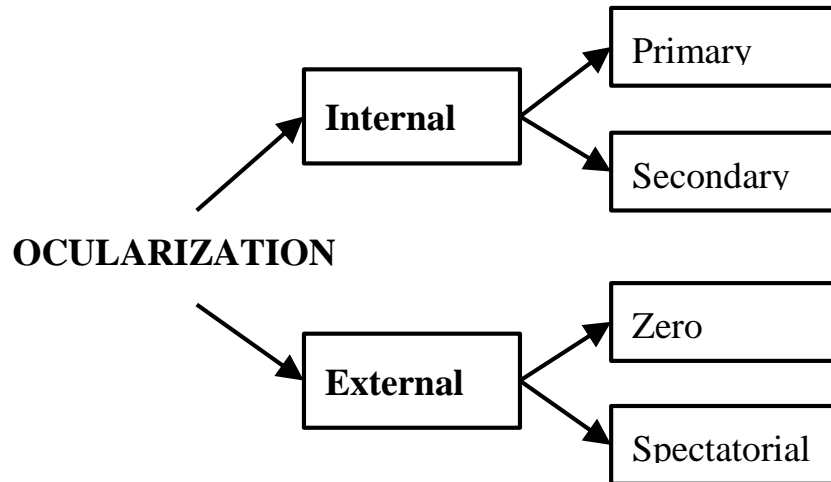


Figure 6: Jost's ocularization concept, deployed from an opposition between internal and external (our choice).

External ocularization implies no link between what the viewer is presented, and what any character present in the diegetic world sees. *Zero ocularization* is the hallmark cinematic point of view, offered by a camera that presents an unmarked viewpoint that is closer to the ideal of transparency. *Spectatorial ocularization*, on the other hand, is experienced when the point of view is marked (through visual effects like a shaky cam, strong travelings, zooms or lens focus, etc.), but still not corresponding to the vision of an in-world character; the shot is clearly made by someone for some purpose, and that someone is the spectator.

Internal ocularization makes an adequation between what is shown on the screen and what one of the characters sees. In *secondary ocularization*, the image has to be seen in a larger context to understand that it offers the viewpoint of a character (either through montage, voice-over narration, or some other filmic convention). In *primary ocularization*, there is some visual cue appearing on-screen that immediately allows the viewer to understand that this view is that of an in-world character, without awareness of the larger context around the shot or image.

Heeding Aarseth's (1997) warning against “theoretical imperialism” (p.16), the question of the point of view needs to be reworked to account for the specificity of games, as the cinematic perspective has its own blind spots. Discussions from the filmic frame may include statements to the effect that video games typically offer a “virtually infinite long take” (Sztulman, 2012, p.21), or that video games present a mobile point of view, from within a universe that the player is free to explore, hence contributing to the sense of inhabiting a world (Boyer, 2012). Other framings may claim that “interactive montage combines the elements of play and visual representation” (Nitsche, 2005). These adaptations from film studies may look interesting on the surface, but fall

short when applied to the diversity of graphical elements in video games. One only needs to consider the scope of visuality covered by video games outside the relatively narrow production of polygonal 3D AAA video games. How does one discuss games such as *Zork*, *Space Invaders*, *Pac-Man*, *SimCity*, *Tetris*, *Bejeweled*, *Rock Band*, *Super Mario Bros.*, *Braid* and countless other games in terms of close-ups and camera work, montage and editing, focus and depth of field, travelings and panning, blocking of actors and *mise en scène*, and so on? Moreover, video game graphics are not only aesthetic pictures made for contemplation, and include interfaces, icons, windows, menus and other data; they are often realized in hybrid media configurations; and most of all, they appear through the results of computation and are overwhelmingly (except for live-action footage or digitized photographs) produced by the hands of artists. In the words of Bernadette Flynn (2003), they “can be seen to borrow more directly from pictorial, navigational and simulation space-medium traditions” (p.4). These differences are enough to look away from the *cinematic image* as a basis (though it may be useful when examining certain types of games), and to develop the *ergodic animage* through a recourse to other disciplinary frameworks.

From Cinematism to Animetism

While video games may not be understood simply in terms of cinema, a large subset of them do share important similarities with a certain kind of film: animation, the practice from which Gaudreault and Marion (2013) derived the term “animage”. The idea of *cinematism*, that is, the peculiar properties of image and movement that cinema has set in place, has been theorized by Paul Virilio (1980), and was used as a contrasting point by Thomas Lamarre (2009), who developed *animetism* as a form of space-time-movement image distinct from cinematism. To a large degree, this difference can be attributed to the difference between 3D and 2D graphics. Even though 3D graphics have conquered a certain period in video game history, the recent multiplication of mobile devices and the rise of independent game development has encouraged artists and designers to reintroduce and reinterpret the classical bi-dimensional conception of space in contemporary video games, which only heightens the need to establish a descriptive dictionary and a framework for visual analysis that can account for 2D as well as 3D graphics. Animetism is an important visual paradigm to understand video games for two converging reasons: the importance of materials, and the composite nature of the image.

Animation film has historically problematized the notion of materials, and how the medium shapes expression through its affordances; animated films have been produced using anything from chalk on blackboards, ink, paint, melted wax, sand, cardboard cut-outs, clay, *papier mâché*, and more. Accordingly, video games have employed a number of differing materials, and often mixed them together, which means that any model that purports to be universal needs to account for this reality. Polygons processed in real-time do not offer the same affordances to the player as vectors, bitmaps, or film clips. In traditional animation, elaborate static backgrounds could be drawn or painted by an artist and photographed time and again underneath the moving characters and animated elements, which were redrawn by other artists for every frame and superimposed over the background for photography. Home video game consoles rapidly went the same route, with graphical processors using separate memory for background and foreground graphics; “sprites” became the term for independently rendered and animated objects composited over a background plane, like celluloid sheets in traditional animation.

A framework for game graphics needs to address this computational reality, and the composite image found in animation film allows this. The layers of celluloid sheets in animation, reprised by

2D video games, construct a type of space that Picard (2010) has qualified as a layered space (p. 252-264), one where the image presents some kind of depth, although that depth functions as a set of discrete units separated by what Lamarre (2009) terms the animetic interval, each of them flat and in principle independent from the others. This means that the animated image can easily become a composite image, that is, an aggregate of different types of visual materials, or of differently-organized images that are composited together to form a coherent whole (though sometimes evidently assembled from strikingly different parts). This kind of case has often appeared in video games; an easy example to demonstrate this can be found in games that have emulated another animation technique, that of pixilation, which consists of shooting human actors on a frame-by-frame basis to subsequently animate them. Many video games from the late 1980s and early 1990s featured digitized photographs and video for characters, integrated with 2D or 3D rendered background graphics. One such high-profile example can be found in *Mortal Kombat*, where footage of filmed martial arts experts was digitized and animated frame-by-frame to provide very realistic graphics and animation (“so real it hurts”). The photorealistic and kinorealistic result of this process undoubtedly played a major role in the moral panic that ensued from the game’s over-the-top violence and gory fatalities (it didn’t help that the advertisement featured young children, either).



Figure 7: *As Mortal Kombat shows, photorealism has always been a shorthand in clamoring for “realism”.*

The move to polygonal 3D graphics has made the practical links between animation films and video games much more explicit, with myriad tools and processes being shared between the two practices. We won’t go in detail over these here for lack of space, but instead turn our attention towards two more visual traditions to get a complete scope of the graphical interdisciplinarity that is at work in video games. The first is perspective, which has been developed, employed and studied through art history, and the second is parallel projection, used in technical drawing, architecture, engineering, geometry, and cartography. Both of these visual traditions deal with the simulation of three-dimensional space on a two-dimensional surface, but in different ways.

Art History and Technical Drawing, from Perspective to Parallel Projection

The long march towards photorealism in video game graphics, a dominant paradigm of visibility due in no small part to technological and marketing forces, is indicative of the hold that perspective has held on Western visual imagery (Wolf, 2003). Ever since its development in the 15th and 16th century, it has become a “default” paradigm in the representation through a simplification of the principles of human vision, and still is the dominant visual logic today (Damisch, 1987). The rise of polygonal 3D graphics simply provides the latest example of the hegemony of perspective as the new technological default point of view. However, while perspective may act as a default visual logic, alternatives do exist, making perspective only one of several possible types of graphical projection. A broad family of these alternatives consists in parallel projection.

While perspective is subject-centered and tries to simulate human vision through a variety of techniques, parallel projection is object-centered and tries to simulate the actual physicality of an object (mainly its volume, proportions and angles in all three dimensions) in its representation, beyond any one view we could have of it. In perspective projection, the lines that are parallel in an object’s structure converge towards the horizon and appear increasingly smaller (and higher up, closer to the horizon line) the farther away they are from the point of view. In parallel projection, on the other hand, the lines that are parallel in an object’s structure are represented as parallel lines, irrespective of any distance effect. Parallel projection has a long and rich history in video games, since beyond technological restrictions, visual design choices are deliberately made in accordance with different types of gameplay, and are achieved through particular spatial dynamics. We already proposed in another article (Arsenault & Larochelle, 2013) that parallel projection calls for a managerial relationship with space, while perspective projection invites an immersive stance toward game space. We would summarize our proposition by saying that perspective and parallel projection (with its different sub-types, into which we won’t go here) offer different ways to structure or offer the illusion of space, and, therefore, each method has a specific visual relationship with the objects they illustrate.



Figure 8: *Railroad tracks in perspective and parallel projection. The former approximates the experience of being there and gazing at the tracks, and favors sensory immersion; the latter sticks to the physical reality of railroad tracks (that always remain parallel), and favors a Cartesian ordering of space as a “grid” or other systems of measurement.*

Though these types of graphical projection are at odds (in absolute terms, lines either do or don't converge towards a point located at infinity) and come from different traditions of visuality, video games will often employ both of them or use tricks and special effects to create highly complex and hybrid visuo-spatial configurations. Many such techniques have been employed to simulate a third dimension out of the bidimensional surface of the screen, using depth cues such as occlusion between objects, scaling of object sizes, and elevation of object positions. More particular examples include motion parallax, achieved through the aforementioned parallax scrolling effect in games with multiple background layers; each background layer may be drawn as a flat surface, or in parallel projection, but the overall composition of these planes attempts to combine different depth cues to create a global perspective effect.

From the mid-2000s and on, a number of independent and experimental games have explored non-Euclidean spaces and a peculiar fusion of 2D and 3D graphics and spaces. We propose to call these XD games, since they have no clear number of dimensions, and they rely on cross-dimensional play that covers both 2D and 3D spatial logics. A short list of these XD games would include *Crush*, *Super Paper Mario*, *Echochrome*, *Fez* (Polytron, 2012) and *Perspective*. These games approach their visual representation without reacting to specific technological restrictions, and illustrate in different ways and visual approaches how today's video games often feature ludic proposals involving plays on game space(s) as well as the viewpoint of their player. These cases clearly mark the need for a more systematized model that goes beyond the oft-repeated terminology and catch-all terms that are thrown around.

Part III. The Game FAVR (Framework for the Analysis of Visual Representation)¹²

Now that we have explored the methodological issues and detailed the disciplinary bases that are the most pertinent to develop a study of the ergodic animage, the rest of the paper will present the outcome of our research: a descriptive framework to analyze graphics in video games. This model relies on 4 parameters: composition, ocularization, framing mechanisms, and plane analysis.

VISUAL MODES

1. Composition	
Tangible space	
Intangible space	
Negative space	
2. Ocularization	
Internal	External
Primary	Player
Secondary	Tangible
	Intangible
	Zero
	Mimetic
	Ergodic
3. Framing Mechanisms	
Anchor	Mobility
Subjective	Unrestrained
Intersubjective	Connected

Objective Anchorless		Authoritarian Fixed
4. Plane Analysis		
Agents	In-game environment	Off-game environment
Graphical materials	Projection method	Angle of projection
Real-time 3D polygons	Orthogonal	Bird's eye
Pre-rendered 3D polygons	Axonometric	Top-down
Raster graphics	Oblique	3/4
Vector graphics	Linear	Horizontal
Digitized images		Overview
		First-person

Table 1: *The Game FAVR's 4 parameters and their components.*

If we are to build a descriptive and analytical framework of video game images, we need to reexamine games in a bottom-up manner. Because our focus is on the actual graphics of video games, we treat the screen as a surface on which graphical elements are displayed, and where the player produces inputs to interact with the images. Facing any image, we ask the question: how can the image itself demonstrate to a player the range of possible actions that she is allowed to do? The question of evaluating the efficiency of particular narrative strategies that aim to produce a diegetic world is not the focus here. This is a key choice since our framework needs to also cover games that don't project a fictional world, such as the famous example of *Tetris* in game studies' earliest controversies. The space, in our model, is thus intelligible or not (rather than simulated or not, diegetic or not, or fictional or simulated (Aarseth, 2007)) because of its communicative nature. In this regard we completely align with Jørgensen (2013) when she writes that the gameworld is "a provider of information that helps the player understand how to interact with the game software" (p.23-24).

The mainstay of our framework is what we call a *visual mode*. When we consider games in their entirety, they often feature a variety of visual modes, which we define as *visual structures of the entire screen*. *Super Mario Bros.* has 3 visual modes: "Title Screen", "Message Screen", and "Gameplay screen". "Message screens" are the all-black screens that appear with the mentions "World 1-1" and number of lives remaining, "Game over", or "Time up". The "Title Screen" is a hybrid visual mode, resembling the gameplay screen but not quite behaving like it: it offers a menu selection ("1 player game" or "2 player game") and various mentions across the usual game space (title, copyright, top score), and after around 7 seconds it starts playing a non-interactive demo (without sound) of Mario advancing through what seems to be "World 1-1". "Gameplay screens" occupy the bulk of screen time in *Super Mario Bros.*, and consist of characters and objects (sprites) being drawn on top of a background color and game environment (all drawn in parallel projection), as well as a data ribbon at the top of the screen (displaying score, number of coins, current world, and time left).

Two important notes should be added on visual modes.

- 1) It is important to note that not all of our 4 parameters, or the components within our parameters, will be present and relevant for analysis in each visual mode. For instance, it would make little sense to analyze the message screens in *Super Mario Bros.* in terms of ocularization, framing mechanisms, and plane analysis. *Tetris* presents no off-game

environment to speak of, instead filling the surface of the screen with ornaments. In *Final Fantasy Tactics* and countless other games, a chessboard-type arena is, literally, floating in front of a visually abstract backdrop, so that only 2 planes are really represented: agents and in-game environment.

- 2) Visual modes are not an inherent reality awaiting discovery in games, but are created by the analyst for the purpose of discussing and analyzing games. Where one identifies two distinct visual modes, another could consider them both to be the same mode with a simple parameter change. This is not problematic insofar as the vocabulary and framework helps us understand each other's conception of how the graphics and gameplay are organized in a particular game or singular effect. For instance, when starting up the "potatosophical platforming adventure" *Potatoman Seeks the Troof*, the player may experience a weird little effect. As the game starts, the title and controls appear on a title screen reminiscent of *Super Mario Bros*. But when the player starts fiddling with the controls, he sees that he is already controlling Potatoman. As he walks to the right, the title gently scrolls by towards the off-screen as if it were a giant title suspended in the diegetic sky, revealing that the title screen is actually shown through the visual mode of gameplay, instead of a specific "title screen" visual mode. Organizing video game graphics as visual modes allows us to discuss such effects.



Figure 7: The title text is shown as part of the usual gameplay visual mode, without transition.

1. Composition

The analysis of a visual mode should begin with the breaking down of the mode's composition, which treats the entire surface of the screen and distinguishes between regions. Whether it is inhabited by abstract forms (tetrominoes) or fictional beings (Potatoman), the space where the sensation of agency is the strongest can be described as the tangible space: this is where player input and in-game visual events are the most immediately connected, mostly through the synchronization of control and image transformations. In the words of Rune Klevjer (2009), "The dynamic modelling of real-time behaviours and real-time player interaction negates the image and puts the player into tangible contact (or potentially tangible) with a world that is co-present rather than projected" (p.8). Hence, the extent of tangible space depends qualitatively on how the environments (to which the fourth parameter of our framework, "plane analysis", is dedicated) are depicted and tied together. The background of a game space can be co-extensive with the game

environment and treated as part of the tangible space, or it can be a mere backdrop projected behind the game environment and understood as a separate, intangible space.

By sheer contrast, it is often the case that interface displays with decisional options and translations of game state in quantifications and otherwise abstract symbols and models can be understood as intangible; when they are derived from player action (like the score or number of coins collected by Mario), they are never visually immanent to the space where the immediate consequences of control unfold.¹³ We can also identify a proportion of negative space, which, in accordance with usage in art and visual design, describes the interstitial space between contents: “The area around the primary objects in a work of art is known as negative space, while the space occupied by the primary objects is known as positive space”¹⁴. As the video game is an interactive media, we will use the term “negative space” to refer to any part of the image whose display is non-interactive, either because it is blank, or because it offers ornaments. Figures 9, 10 and 11 below offer a few examples of composition, with the tangible space in red, intangible space in orange, and negative space in blue.



Figure 9: *TIE Fighter's “in-flight” visual mode has the cockpit of each spacecraft offering the player a unique compositional arrangement, with data interfaces and ornaments shifting around on the screen surface.*

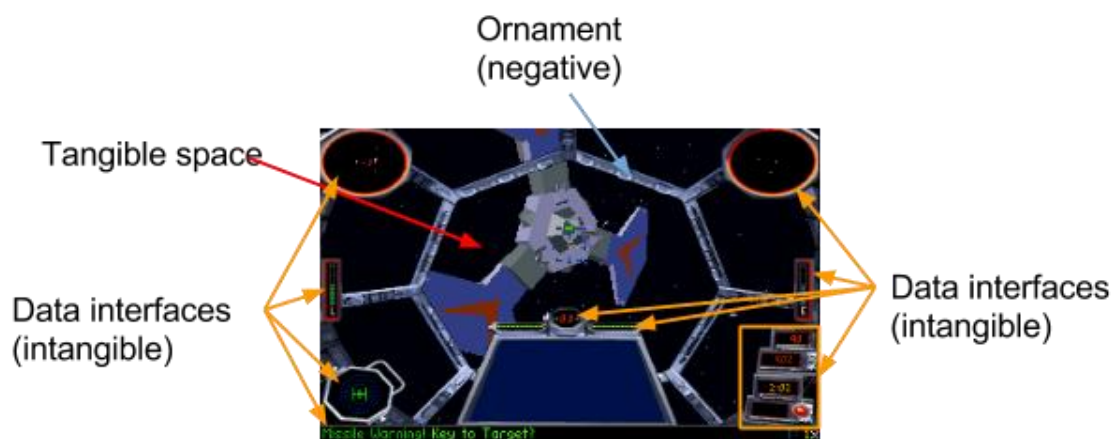


Figure 10: *Analysis of the TIE fighter composition. The tangible space of the gameworld is overlaid with data interfaces (radars, meters, icons, text and number strings) and an open hexagonal frame as ornament.*

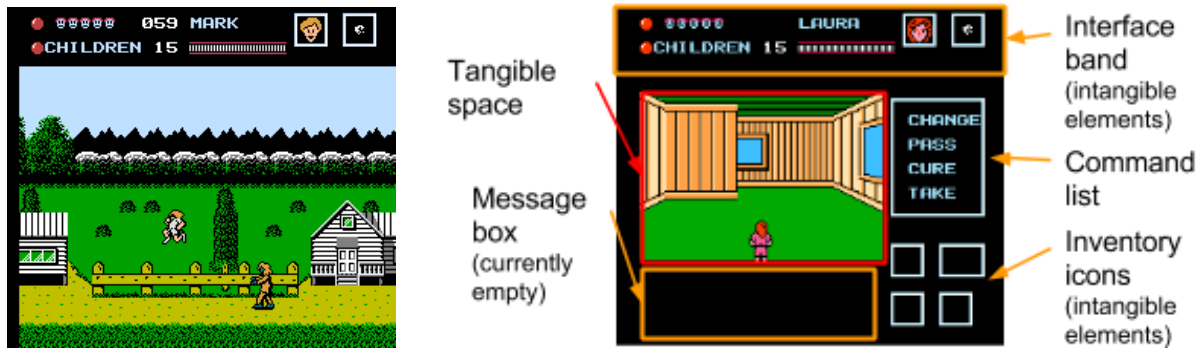


Figure 11: *Friday the 13th* offers two main visual modes, “outdoors” and “indoors”, that differ highly in their composition, except for the interface ribbon at the top of the screen. The indoors mode has strips of negative space all around the on-screen windows.

2. Ocularization

The matter of the point of view is very important in describing the functioning of a video game. Jost’s concept of ocularization, presented earlier, may be applied to video games, but needs a little tweaking. Spectatorial ocularization (with interactivity, resulting in player ocularization) denotes any image produced exclusively for the player. We need to divide this ocularization in two types: intangible player ocularization, which includes all menus, interfaces, map screens, tutorial or system messages, etc; and tangible player ocularization, by which we mean those images that are visually marked with the visual mediation, and so are created exclusively for the player; this rules out any “transparent” subjective or first-person views.



Tangible player ocularization	Intangible player ocularization
Marked visual mediation meant for the player, depicting events or objects present in the game space.	Marked visual mediation meant for the player, depicting information that is not expected to exist as mimetic representation in the game space.
 <p>The “chainsaw shot” in <i>Gears of War</i> is marked through a custom camera angle and blood spatters on the (virtual) lens; it depicts an action taking place in the <i>represented gameworld</i>.</p>	 <p>Menu screens are prototypical cases.</p>

Table 2: *Player Ocularization.*

Zero ocularization has a double meaning in interactive media. As it appeared in figure 2, the process of visual mediation pertains to fiction as well as to rules. Zero ocularization can refer alternately to a *mimetic* transparency effect in the point of view, where events and characters are perceived to be represented directly, without mediation (in this case it is, quite rightly, *spectatorial* ocularization). But it can also refer to an *ergodic* transparency effect following two logics: 1) controlling the point of view when the in-game camera is manipulated by the player in a smooth and regular enough way that it becomes “transparent”, in this other sense; 2) the game’s images are situated in a context that makes the question of “where” the “camera” “is”, ultimately irrelevant, as in the case of abstract, non-mimetic, or non-figurative games, where “doing” and “seeing” are not experienced separately. The first kind of zero ocularization, then, is *mimetic*, while the second is *ergodic*, as per the distinctions we traced in figure 3.

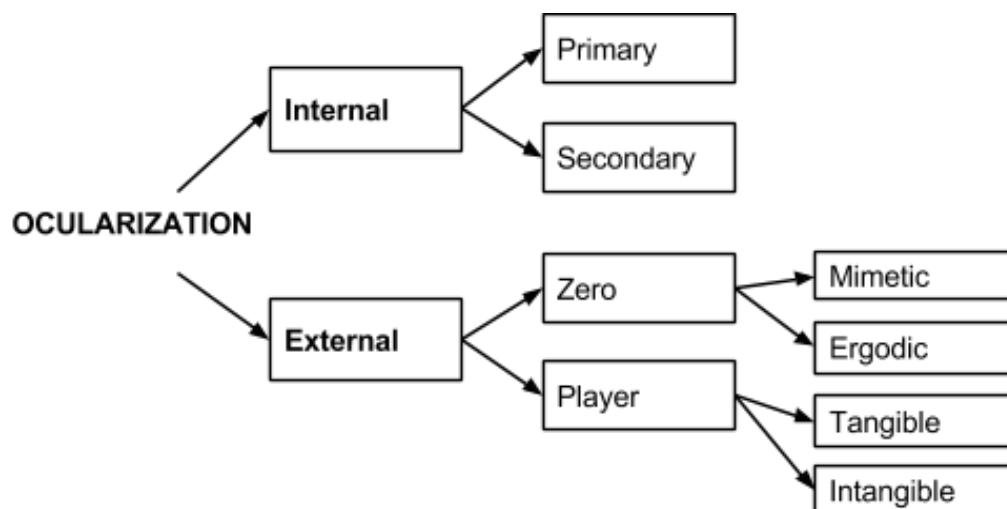


Figure 12: *Our model of ocularization, adapted from Jost for the video game.*

Zero mimetic ocularization is chiefly at work during cut-scenes, or in games occurring in a fixed-screen environment, where nothing points at the act of representation that the screen is hosting. Zero ergodic ocularization characterizes the “default” point of view in modern 3D games where a camera either can be freely rotated around the player-character, or is set to follow his movements; it also describes the typical scrolling point of view in 2D games, where notions of “camera” were never really relevant, and where the world seems to be offered there and then, projected on the flat surface of the screen, instead of being some independently existing reality of which we get a partial look through a virtual camera. In both cases, “transparency” of the viewpoint is at work.



Zero mimetic ocularization	Zero ergodic ocularization
Unmarked visual mediation meant to depict elements in the fictional world as if the spectator was an undefined and disembodied transparent eyeball.	Unmarked visual mediation meant to 1) give the player regular and smooth control over the viewpoint; or 2) offer a game situation where “point of view” is an irrelevant term.
 <p>Unmarked visual mediation of narrative during a cut-scene in <i>Uncharted 2: Among Thieves</i>.</p>	 <p>Unmarked visual mediation of gameplay while playing <i>Max Payne 2: The Fall of Max Payne</i>.</p>

Table 3: Zero ocularization.

Given the prevalence of first-person perspective in games, and its relative scarcity in film (Galloway, 2006), the categories of internal ocularization need quite a makeover. First, to respect the traditions of video game visuals, primary ocularization would gain from being equated with first-person vision, rather than the other way around as in Jost’s model. Given the extensive history of having a gun, weapon, or simply a pair of hands showing up on the bottom half of the screen since *Wolfenstein 3D*, we would argue that these kinds of on-screen cues are as good as invisible to most players (in addition to the fact that the stability of “shots” in video games, if we want to use cinematic terms, has very little in common with the instability of shots in film, so that identifying an image as a first-person viewpoint in a game is a relatively trivial process that can be found out in a few thumbstick presses and will be stable for long minutes, or even hours, of play).

What we would distinguish, then, is whether the viewpoint is set *exactly* in the position occupied by the player-character’s eyes (*primary* ocularization), and an in-game camera that is *very near* that point but still outside, with a part of the character’s larger body beyond his hands appearing on-screen. We can see this in the over-the-shoulder view in *Resident Evil 4*, when we aim in *Gears of War*, and so on.



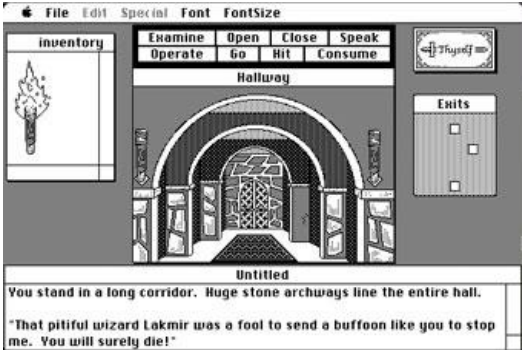

Primary internal ocularization	Secondary internal ocularization
We see what the character sees. “First-person point of view”.	We see <i>almost</i> what the character sees; <i>quasi</i> -first person. The point of view is not that of an in-world character, but neither is it a disembodied non-presence.
 <p>First-person perspective in <i>Doom</i>, regardless of on-screen hands and weapon.</p>	 <p>“Over-the-shoulder camera” in <i>Resident Evil 4</i>.</p>
 <p>First-person perspective in <i>Shadowgate</i>.</p>	 <p>The camera zooms in to approximate the characters' vision when aiming.</p>

Table 4: Internal ocularization.

3. Framing Mechanisms

Whereas composition describes the different regions making up the entirety of the screen's surface, and ocularization describes the player's visual positioning regarding his access to the implied game environment, games also involve extensive play on the frame, and dynamic framing mechanisms that allow the player to control (or not) the framing of events and characters. Two descriptors can account for the variety of such configurations: the anchor and mobility of the frame.

3a. Anchor

The anchor is the object or subject that is targeted by the frame and fixes the position of the point of view.

Anchor	Definition	Typical examples
Subjective	The camera chiefly frames a given subject (usually a character). Characters typically stay centered in the same position on the surface of the screen, while the environment scrolls by as they walk.	<i>The Legend of Zelda: Ocarina of Time</i> ; typical third-person action games (<i>Max Payne</i> , <i>Prince of Persia: The Sands of Time</i> , <i>Diablo</i>); side-scrollers (<i>Super Mario Bros.</i> , <i>Castlevania</i> , ...)
Intersubjective	The camera positions itself to frame together a number of subjects; it may restrict movement that would reach outside the frame.	Fighting games (<i>Street Fighter</i> , <i>Mortal Kombat</i> , <i>Super Smash Bros.</i>); battle scenes in console-style RPGs (<i>Final Fantasy</i>).
Objective	The camera is centered on a given location or environment. Characters typically move across the surface of the screen as they move around the environment.	<i>The Legend of Zelda</i> , <i>Smash TV</i> ; most adventure games in external ocularization (<i>The Curse of Monkey Island</i> , <i>King's Quest</i> , etc.); most scrolling shooters; cinematic platformers (<i>Prince of Persia</i>); fixed-screen games (<i>Pac-Man</i> , <i>Space Invaders</i> , etc.)
Anchorless	The “camera” may move around freely or randomly across a delineated region. Characters and environments may scroll by as they move and enter or exit the frame.	Most strategy games (<i>Civilization</i> , <i>Warcraft</i> , <i>Starcraft</i> , <i>SimCity</i> , <i>Lemmings</i> , etc.); games in first-person perspective.

Table 5: Framing anchor.

3b. Mobility

As video games offer dynamic framings and are based on movement, it is also necessary to ask the question of who is in control of the point of view.

Mobility	Definition	Typical examples
Unrestrained	The player directly controls the framing.	Simulation and strategy games.
Connected	The mobility of the frame depends on the mobility of the anchor point (agent/s or environment).	Racing games, 2D platformers, first-person shooters, most action/adventure games.

Authoritarian	The mobility of the frame is imposed by the game.	Auto-scrolling levels in platformers (airship levels in <i>Super Mario Bros. 3</i>); rail shooters.
Fixed	The framing is immobile.	Fixed-screen games (<i>Space Invaders</i> , <i>Tetris</i> , <i>Tempest</i> , <i>Centipede</i> , etc.).

Table 6: *Framing mobility.*

It is important to note that in some games, there might be more than one since it can be modified for gameplay purposes. For example, in *Double Dragon* and most “beat them all” games, the mobility of the frame is generally *connected* to the agent(s), but freezes (turning to *fixed*) when enemies appear on the screen. The player is then forced to “beat them all” before progressing further in the level.

A touch of precision is in order here. The anchor and mobility of the framing are two major elements of the “regimental” aspect of graphical regimes. This is where “agents” are distributed into classes and fall under categories that transcend their status as purely visuo-kinetic entities. To say that the anchor is “subjective”, for instance, does not mean that agents are subjects out of principle or *at first glance*. It means that agents are *subjectivized* insofar as they are framed through an assessment of the visible transformative potentials in the game situation (which implies the experience of control). This is what justifies the political metaphor of “regimes” and the descriptors that sustain it throughout the model. Control is both exercised and at stake between human and machine, but its visual symptoms are very often kinetic: “what moves when I make it move, what refuses to move or what moves against the entity that I move”, are a few examples of such intuitive categorizations players work from. This is why, in the general visual configuration, *framing anchor* and *mobility* are so crucial to gameplay and tangibility: they are the descriptors of the kinetic qualities of the game’s graphics in relation to player control.

4. The three planes

To pursue the study of the (de)composition of a specific visual mode, we also propose to examine how its game space is composited from three conceptual planes. Regardless of the actual number of background layers afforded by a 2D engine, or of the draw distance of a 3D engine, we deconstruct the game world as shown through graphical representation in three planes: the plane of agents, the in-game environment, and the off-game environment. The distinction between these planes can be straightforward or convoluted, as games often present hybrid constructions such as real-time polygonal 3D characters moving on a pre-rendered background, or bizarre pseudo-perspectivist constructions where side-view characters are superimposed on environments represented from a top-down point of view. Hence, as Donovan *et al.* (2013) have explained: “Characters and objects in video games are often stylistically distinct from the background environment or worlds in which they inhabit, complicating the application of terms” (p.414). This is not only a matter of visual style, but of visual ergodicity as well, as manipulations of the viewpoint or interactions between the environment and characters may be limited by the composite nature of video game images and worlds. The descriptors for the three planes stand on the lowest

part of the model in terms of abstraction levels, and the one that needs the least extrinsic explication from outside of visual technologies or actual methods of graphical representation. In a sense, this is the most strictly “descriptive” part of the framework.

The plane of agents is composed by every character (in its broader sense) or sprite; that is, anything that has agency and can act, or which can be acted upon. The in-game environment is the space into which the player will be able (or authorized) to navigate. The off-game environment often serves a more aesthetic purpose to create an illusion of depth (or fill the “blanks”) as well as to offer a context to the player. This space is understood by the player as out of reach and is considered as background scenery rather than a game space per se; however, it is still part of tangible space when it appears to be coextensive with the in-game environment. In the example of *TMNT IV: Turtles in Time* below, the plane of agents would include Leonardo and his opponents. The environment is separated by the red structural beams: everything in the foreground is part of the in-game environment, while the view of the city and the structure itself is part of the off-game space. Most of the “beat them all” games from the 1990s present a similar spatial organization.

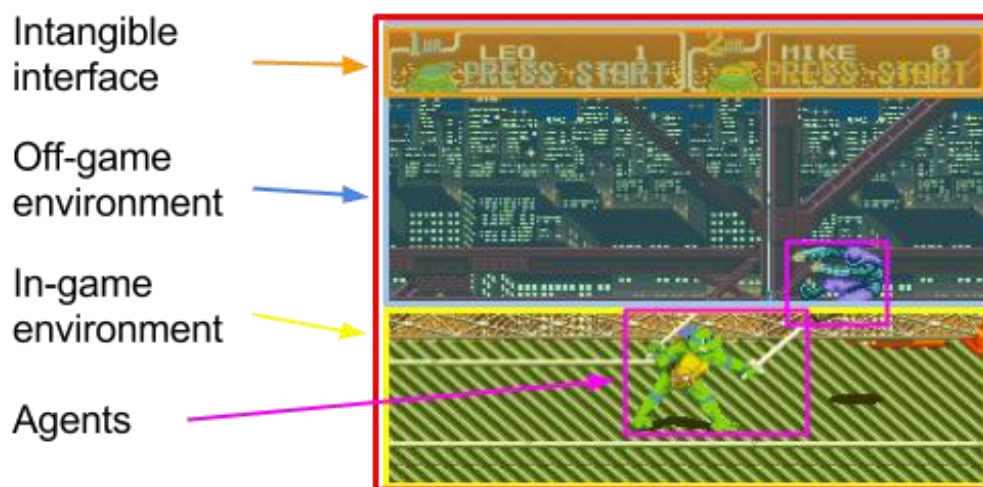


Figure 13: *Composition and tri-planar space in TMNT IV: Turtles in Time. Red: tangible space of the gameworld; orange: intangible data interfaces (overlaid atop the tangible background scenery); blue: off-game environment; yellow: in-game environment; pink: agents.*

For each of the three planes, we propose to identify the type of graphical materials that compose the graphics, the type of spatial projection applied (orthogonal, linear, axonometric or oblique projection), and the viewing angle (bird’s eye, 3/4, top-down, overview, horizontal or perspective). While this may yield a very high number of theoretically possible combinations, the model was not built as a perfectly closed system that could somehow line up every possibility from past, present and future. Some combinations may be outright impossible (axonometric projection in first-person view), and some others will be very, very often tied together (linear projection in first-person view). Some may find this solution aesthetically inelegant, but our work has led us to see the value of a more complex system to account for the myriad cases where things don’t line up

nicely.

4a. Graphical materials

While graphical materials may seem trivial in some cases (e.g. *Super Mario Bros.*'s raster graphics), it is surprising how many attempts at tridimensionality and, inversely, insistence on bidimensionality, are achieved with materials that dimensionally differ from the space that is represented. Moreover, a mix of materials is often found in games, and can impact both gameplay and image.

Graphical materials	Definition	Typical examples
Real-time polygons	Polygons that are rendered in real-time (often by dedicated hardware).	<i>Star Fox</i> , most recent 3D games.
Pre-rendered polygons	Polygons that were previously rendered and whose display is not a computationally intensive process.	<i>Donkey Kong Country</i> , <i>Myst</i> (environments).
Raster graphics	Digital images created as a bitmap (a set of pixels in a grid).	The vast majority of 2D video games.
Vector graphics	Digital images created from mathematical calculations resulting in wireframes.	<i>Asteroids</i> , <i>Tempest</i> , <i>Spacewar!</i> , <i>Lunar Lander</i> .
Digitized images	Captured picture or video, digitized into the game.	<i>Mortal Kombat</i> , <i>Roberta Williams' Phantasmagoria</i>

Table 7: Graphical materials of a spatial plane.

4b. Projection method

Our second category is directly borrowed from art history and technical drawing classifications. We suggest to look at each plane in terms of the projection method that was used to create the graphics. In other words, we propose to systematize the vocabulary with which one can describe the overall “point of view” of a plane by referring to the method underlying its conception: orthogonal, axonometric, oblique or linear projection (or perspective).





Projection method	Definition	Typical example
Orthogonal projection	Method of projection where the axis of the objects is parallel to the projection plane.	 <p><i>Super Mario Bros.</i></p>
Axonometric projection	Method of projection where the object is rotated along one or more of its axes (x, y or z) relative to the plane of projection.	 <p><i>Sim City 2000</i></p>
Oblique projection	As opposed to axonometric projection, oblique projection uses an arbitrary foreshortening scale and angles from the axes.	 <p><i>Paperboy</i></p>
Linear projection (perspective)	Method of projection where a set of projected rays radiate from a given origin point towards a single vanishing point on the projection plane (typically located on the horizon).	 <p><i>Portal</i></p>

Table 8: Projection method of a spatial plane.

4c. Projection angle

This category is more problematic to circumscribe rigorously.¹⁵ First, the distinctions we trace would benefit from methods and protocols used in mathematics and descriptive geometry, a field clearly but unfortunately exceeding our skills. Second, some of these terms are constantly misused, especially *isometric* and *top-down view*. Nevertheless, there is a difference between a $\frac{3}{4}$ view (denoting a precise and fixed angle) and a top-down view (corresponding to a range of possible angles). Furthermore, an isometric projection is in fact very difficult to achieve, especially in older games. Most of the time, “isometric” is used to describe a dimetric projection for which the most common ratio is two pixels on the X axis for one on the Y axis.

Angle of projection	Definition	Typical examples
Bird's eye view	The viewpoint is positioned at a right angle atop the objects to be represented, viewing them straight down from the top.	<i>The Heist 2, Hotline Miami, Grand Theft Auto, Grand Theft Auto 2</i>
Top-down view	This angle shows the agents and the environment from somewhere above and in front of them. The vertical dimension is de-emphasized, but not obscured as with the bird's eye view.	<i>The Legend of Zelda: A Link to the Past, Warcraft, Final Fantasy I-VI</i> and most other 2D console RPGs.
$\frac{3}{4}$ view	This angle of projection is fixed and carefully calculated to faithfully render all three spatial dimensions. It is common in wargames as well as construction, management, and simulation games.	<i>Zaxxon, The Summoning, Diablo, Final Fantasy Tactics, The Sims.</i>
Overview	This angle of projection is the typical “3 rd person” point of view: slightly above the character, usually to allow the player to scan the overall game environment and minimize the occlusion caused by objects in the foreground (such as the player's own character).	<i>Super Mario 64, The Legend of Zelda: Ocarina of Time, Max Payne, Gears of War, God of War, Super Mario Kart</i> and most racing games, <i>Resident Evil 4, Friday the 13th</i> (indoors).
Horizontal view	This angle of projection is a typical side view or rear view; it is low enough to obstruct the horizon and create a blind field behind the character or environmental features.	<i>Super Mario Bros., Prince of Persia, Star Fox, Friday the 13th</i> (outdoors).
"First person" view	The projection angle is constantly recalculated and the graphical elements dynamically adjust themselves to appear linearly projected according to the rules of perspective.	<i>Mirror's Edge</i> , first-person shooters, <i>Myst</i> and other first-person adventure games.

Table 9: Angle of projection of a spatial plane.

In fact, if we take a moment to seriously devote our attention to the tri-planar construction of the tangible space, it soon becomes apparent that what is being caught by a catchall term like “ $\frac{3}{4}$ point of view” is the *result of the comparison between the projection method and angle of the three planes*. This is especially true for a lot of 2D games. The famous “Mode 7” graphics in games like *F-Zero* is a good example of this. The background (or off-game space) and agents are depicted in orthogonal projection (full frontal), while the in-game space is a tilted flat 2D plane that emulates linear perspective. The result may be called an “overview” because we have the impression of viewing the action from above the race car, and it is certainly more practical as a way to start playing with a basic understanding of the rules of spatial simulation. In an informed analysis of visual mediation, though, we would have to make sure that we keep in mind that this is an *effect* of the tri-planar configuration of the graphics. Thoroughly contemplating those images quickly reveals dramatic inconsistencies that, while they imply failure in visual “realism”, have proven successful enough ergodically to make successors like *Mario Kart* massively played again and again. The same kind of effect is at play in *The Legend of Zelda*, where the in-game environment is shown from a bird’s eye angle but the characters and objects are shown from a horizontal angle, creating a bizarre impossible perspective that is nevertheless very functional - as the popularity of the “top-down” view demonstrates.

Conclusion

The last few examples we covered reveal the powers as well as the limitations of video game visuals by drawing attention to the illusion that is our intuitive grasp on spatiality as we apply ourselves to comprehend in-game agency. The phenomenon may be thought of as analogous to the dynamics of diversion and attention control upon which magicians rely. The magician of the animage skillfully crafts a convincing illusion, while the procedural magician diverts our attention on game physics and causality schemes. The concept of graphical regime that we proposed earlier can be seen as an equilibrium point, a shorthand term to refer to a given combination of descriptors. In our opinion, graphical regimes should be envisioned from the classification schemes of prototype theory in cognitive psychology (Rosch, 1975). It makes more sense to think of graphical regimes in terms of typicality gradients, with varying degrees of agreement ranging from prototypicality to atypicality. We hope that researchers will adopt this framework or engage with it to further its precision and explanatory power, and that in doing so, more graphical regimes will emerge as the results of multiple analyses converge toward repeat equilibriums. To that effect, we invite readers to turn their attention to the sample cases appended to the paper, to see how the framework can be used in describing a wide range of game visuals, and to the flowchart meant to help in applying the framework to conduct analysis¹⁶. In the end, we hope to have given substance and provided means to discuss the link between the image and play, following Roger Caillois’(1961) brilliant insight: “All play presupposes the temporary acceptance, if not of an illusion (indeed this last word means nothing less than beginning a game: *in-lusio*), then at least of a closed, conventional, and, in certain respects, imaginary universe” (p.19).

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³ Substantial work has been done in this area at the Université de Montréal's LUDOV group, but remains unpublished. See <http://www.ludov.ca/> for updates.

⁴ Our work follows Arsenault and Perron (2015), who coined the term and detailed the “scholarly series” of film and game studies from Gaudreault and Marion's work.

⁵ Lee *et al.* (2013), for instance, propose to break down the vague and catch-all nature of genre terms into the constitutive elements Purpose, Theme, Type of ending, Gameplay, and Style, before identifying as potential issues the “lack of natural language”, exemplified by (presumed library users asking): “But where's my First Person Shooter?”.

⁶ The concept of graphical regimes is a way to approach this dual nature of graphics, which we approached in an earlier 2013 paper: “Graphical style is what we commonly mean by visual aesthetics, while vision refers to the functional aspects of graphics” (Arsenault & Côté, 2013). See also Lee, J. H., A. Perti, H. Cho, *et al.* (2014) for examples of what is meant by graphical (or “visual”) style; their controlled vocabulary includes “abstract”, “cel-shaded”, “comic book”, “handicraft”, “pixel art”, “realistic”, and so on.

⁷ <http://www.giantbomb.com/isometric-viewpoint/3015-246/>

⁸ <http://www.mobygames.com/genre/sheet/isometric/>. Interestingly, “*SimCity 3*” doesn't actually exist; *Simcity 3000* features dimetric projection, while *SimCity 4* uses trimetric projection.

⁹ See MobyGames' definition for “1st-Person Perspective” (<http://www.mobygames.com/genre/sheet/1st-person-perspective/>): “Displayed from a 1st-person perspective or view; i.e. from the viewer's own eyes (not used in describing interactive fiction, as all interactive fiction is 1st-person by definition).”

¹⁰ At the time of writing, Wikipedia states that “*Super Mario World* is a two-dimensional platform game in which the player controls the on-screen protagonist (either Mario or Luigi) from a third-person perspective.” (http://www.wikiwand.com/en/Super_Mario_World)

¹¹ For more on this, see Perron *et al.* (2008).

¹² Sample cases studies, a flowchart, and templates for applying the framework are all available online @ <http://www.ludov.ca/en/observation/graphical-technologies/game-favr>.

¹³ It is implied here that some games offer a largely intangible visual mode, such as textual adventure games. Of course, such a dichotomy is strictly *visuo-ergodic*, which means that mimetic representation may be less tangible than symbols in certain situations (namely 2D Japanese-style RPGs and *Guitar Hero / Rock Band* games). In these games, fights and music performance are data driven, and the interface display is where most interactions happen; accordingly, data representation forms a tangible space and updates in real-time, whereas mimetic representations of character actions are mostly an after-effects of player input.

¹⁴ Description from the J. Paul Getty Museum website, “Understanding Formal Analysis” (http://www.getty.edu/education/teachers/building_lessons/formal_analysis.html).

¹⁵ See a paper by Audrey Larochelle for more on these questions: <http://www.gamejournal.it/a-new-angle-on-parallel-languages-the-contribution-of-visual-arts-to-a-vocabulary-of-graphical-projection-in-video-games/>.

¹⁶ These are all available online @ <http://www.ludov.ca/en/observation/graphical-technologies/game-favr>