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Augmented Reality Inside VR-games

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AUGMENTED REALITY INSIDE VIDEOGAMES

ABSTRACT

The new media environment brings digital data to real life through augmented reality technologies giving users a new vision, where the binary world interacts directly with the real one. A new age is upon us with challenges, doubts and mainly new ideas that start to take shape. One of these is whether or not McLuhan's theory of a medium integrating another is still a working paradigm should we testify that augmented reality elements appear inside videogames. This article is composed by an analysis of the third stage of the web and how it expands with augmented reality, the origins and concepts of interface design and how entertainment can be a sandbox of new ideas ending with a chapter on the electric environment of hybrid media, augmentation categories and Rancière's theories over the emancipated spectator.
This issue culminates in an object analysis regarding augmented reality inside VR-games, where a videogame analysis is carried out, being followed by a review on the top four best devices. The whole data gathered provides us the framework to analyse McLuhan's theory regarding how virtual technologies' future might be when it comes to virtual outputs inside other virtual media.

Keywords
Virtual reality, augmented, videogame, sci-fi, interface, hardware, spectator, web 3.

RESUMEN

El nuevo entorno de los medios de comunicación aporta datos digitales a la vida real mediante tecnologías de realidad aumentada, lo que proporciona a los usuarios una nueva visión en la que el mundo binario interactúa directamente con el real. Una nueva era está llegando: con desafíos, con dudas y principalmente con ideas nuevas que empiezan a tomar forma. Una de ellas es si la teoría de McLuhan de un medio integrando a otro sigue siendo un paradigma viable, como vemos en los elementos de realidad aumentada que aparecen dentro de los videojuegos. Este artículo está compuesto de un análisis de la tercera etapa de la web y esta se expande con la realidad aumentada; los orígenes y los conceptos de diseño de interfaz y como el entretenimiento puede ser un entorno de pruebas para las nuevas ideas. Sigue un capítulo sobre el ambiente eléctrico de los medios híbridos, las categorías de aumentación y las teorías de Rancière sobre el espectador emancipado.
El tema culmina en un análisis de la realidad aumentada en el interior de VR-juegos, donde se hace un análisis de videojuegos y es seguido por un comentario sobre los cuatro mejores dispositivos. Todos los datos recogidos nos proporcionaron el marco de trabajo para analizar la teoría de McLuhan sobre cómo podría ser el futuro de las tecnologías virtuales cuando se trata de producciones virtuales dentro de otros medios virtuales.

Palabras Clave
Realidad virtual, aumentada, videojuego, ciencia ficción, interface, hardware, espectador, web 3.

INTRODUCTION & PROBLEM

In this day and age, AR (Augmented Reality), a new media form, is not only acknowledged, but trendy as well. It has captured the imagination of game developers, artists, technicians and users who are thus rendered enthusiasts. The issue in this paper is how McLuhan's idea of a medium integrating another medium is still a working paradigm, as AR is also appearing inside VR-games, which stand for videogames as the mainstream version of VR (Virtual Reality), for instance. Due to the evolution of social media, Web 3.0 concepts are becoming more real, and following the same pursuit of the audiences as previous media systems. Right now there is more hardware, smart gear, next-generation game consoles, iAccessories and iDevices stimulating connectivity and cloud computing than before.

This is definitely a new age. Images and data are more intrusive than ever, and if there is a context truly expanding that is that of digital world, in its audiovisual, sensorial, wireless, grid-like, data-structure form. In addition to the information and entertainment dimension, now "things" are also becoming cybernetically tagged. Cyberspace is in every "thing". We should recall that we did not go to live into the digital world. The digital world is overlaying the real world with its tracking systems, labels, locks and bits. We are way beyond geography. This is the age of a "continuous geography in digital media" (Elias, 2013, p.156), as objects, hardware and software are produced to belong to an ecosystem of machines. Hence it is possible to speak of a "technopolia", because we are being indulged by technology. As a result, the off-the-grid world, or the "non-mediated world" became a lost place.

It seems like in the near future, AR will solve some user issues in data-interfacing, in case we speak of cloud computing, driving, fitness, entertainment, guidance, or military applications; not to mention arts and engineering. AR helps expanding data-interfacing with users. It is a new space, yet augmented. Information appears on top of reality. As new fashion items like Google Glass and iWatches are being released, the AR concept meets real propositions. We believe interface design is intertwined with science fiction, not only working on computing devices or software design. A hybrid space is the by-product of the present trend, and smartphones triggered the event since the launch of Blackberry Curve and Apple iPhones.

Unlike previous figures such as speakers, TV viewers, podcasters, VJs, gamers, photographers and directors, the people who use now the new mobile media, entertainment platforms and gaming accessories, are emancipating themselves from the then-already engaging TV culture of the 1960s. They are way ahead of video culture formats. In theory, AR brings new forms of interfacing with data, because the optical relation is different, but in reality it is still either software or hardware-dependent. The interesting part is that in VR-games, where narrative, motion-controller gamepads and high-definition graphics collide, there are AR models being displayed, as a suggestion for interface design to be released for the average consumer products. This is why this article is entitled "Augmented Reality Inside VR-games", because due to the ambiguous, and at the same time progressive nature of images, there is still something at play between the visible and the invisible, as virtualities generate augmentations.

1 WEB 3

The Web in its third stage works mostly in the form of voice interfaces, sensors in every object of everyday life, geomedia, and also, in AR. So, in Web 3.0, the current stage of the Web, augmented realities are a possibility. Much as VR was a brand, a system of ideas, a technological trend and a marriage between hardware and software in the 1990s, Augmented Reality performs something in the same highlight since the first decade of the 21st century. Yet, now it is getting more obvious how easily, bold and fun it could be for any user or enthusiast.

Before Augmented Reality the trend was for all things to migrate at least in the form of data onto Virtual Reality's environments. On today's augmented environments, digital overlays of information are showing up in reality; not otherwise. Daniel Boorstin speaks of a "graphic revolution", as photography and other iconographies established a massive intrusion of imagery on the symbolic environment: photos, flyers, drawings, and ads were just part of the equation (in Postman, 1994, p.66). But right now we're beyond that move. Mass media were upgraded. The digital world expanded, and instead of being just another tool, it became an environment. So reality is being overlaid with digital tags, labels from the age of the Web of things. In the near future it will be weird to find offline things much like finding offline people; anything off the grid, ultimately.

According to this Web 3.0 context, one has to notice, as Gibson did, how a certain "post-geographical feeling" (in Neale, 2000, section 1:5 Television) emerges from today's always online and constant global linkage. Back in 1994, Postman sees it coming up too: "Information became a way of trash" (Postman, p.67, our translation). For the author, we are witnessing "Technopolia", which, in his regard, is a mental state, a stage of culture whenever culture is indulged by technology itself (Idem, Ibidem, p.69). Following this, all we have is a world hard to unplug from digital language, inclusive interfaces, augmented realities, and a constant mediation of media is embracing us in a technopolitical model. As a result, digital environments are overgrowing so much that they manage to expand inside themselves.

As the mediated world grows more and more,

> "The 'Non-Mediated World' has become a lost country. And I think that, in some very real way, it's a country that we cannot find our way back to. The mediated world is now THE WORLD. We are that which perceives a mediated realit" (Gibson in Neale, 2000, section 1:7 Mediated World, our translation).

These are concerns we share and this worldview is by no means not true. How did it all begin? Well, Web 1 introduced us the entanglement of Connected Pages, through the author's hyperlinks and thus we got used to the Search Layer. After such moment, Web 2 came up. It's also mistaken as being the phase of Social Networks. Nothing increases more in this stage as control does. Friends react to brands, for instance, and nobody is locked out of the Social Layer. But Web 3 is something new. It's a Web of Data, where interaction with brands occurs because Semantic Agents are looking for all forms of contents and data, filtering issues and avoiding ambiguities (Huybrechts, 2011, p.2).

Not only are we speaking of the future, but we are speaking of the present as well. It looks futuristic, either way. We were told that the "future" would be when everything would follow in a "web-based environment" (Dennis, DeFleur, 2010, p.ix), and this moment includes the "next big thing" and a yet unimagined media landscape, (Idem, Ibidem). The question is that we are

already living this present-future, so science fiction does not need to anticipate any form of interface design or "imaginary narrative space" (Gibson in Neale, 2000, secção 2.7: Writing), since we are already «interfacing» with AR. And it keeps expanding, through interaction design.

2 INTERFACE DESIGN

"Futurity" (Gibson, 2012, p.8) used to be the word for describing things yet to come. AR's interface elements, "input" and "output" discussions, are not solely for technicians or artists now. The growing fields of information design and interaction design have shared, so far, the taste for "futurism". One thing is sure, regardless of what the future holds for us, it sure saves a place for design and creativity, as challenges will be new and bigger. We are told by Shedroff & Noessel that "Design and science fiction do much the same thing. Sci-fi uses characters in stories to describe a possible future. Similarly, the design process uses personas in scenarios to describe a possible interface. They're both fiction" (2012, p.vi). We may disagree with the argument, but not with the relation. Design and science fiction are connected, especially in organising new forms of presenting information today. The question is that we are already living in "that" time.

It is true that interfaces, especially the ones featured in film and videogames, are "sci-fi interfaces". Regular people don't have access to them. However, as Shedroff & Noessel may notice, these "Sci-fi interfaces help create a reality that is coherent, and makes sense for audiences. In this way, audiences are a class of users" (2012, p.310). A new perspective is at stake here. Since interfaces, especially those of AR, are part of the human/digital world interaction, and are a complex system of elements, we have to define them as being "(...) all parts of a thing that enable its use" (Idem, Ibidem, 3).

What we did not account for was that AR interfaces managed to appear, step by step, in the average user world (outside the screens) and also in the average gamer and film worlds (inside the screens). Somehow, like the existing tension between the spectator and the spectacle, we now have a new problem which solves the issue Rancière stands out as the separation of the "stage" and the "auditorium" as something to be transcended (2009, p.15). Surprisingly, the new smartphones and smart gear trends are set to break any boundaries left on the hybrid sphere of mobile media. And so new grounds appear for AR to expand.

AR is not popping out of nowhere. Computers were plugged to telephones. Then Internet went global. Social media invested on over-connection. Smartphones outselling notebooks, laptops, conventional phones and desktop computers, made them to be the device of choice, the default device for digital media access. Recent product releases, such as Samsung's Galaxy Gear smartwatch are able to implement another trend of the 1990s: "wearable computing". Today we are calling it "smart clothes" and "smart gear".

Should we take into account the Google Report on "The New Multi-Screen World: Understanding Cross-Platform Consumer Behavior," and we will understand how smartphones, tablets and the multi-gear user of today are interacting with the digital world much like as a fully-equipped soldier links up to the military grid. As it is mentioned in the research, "Smartphones are the backbone of our daily media interactions. They have the highest number of user interactions per day and serve as the most common starting point for activities across multiple screens" (Google, 2012, p.3).

We have no doubts regarding this information. The issue is that the study highlights how "90% of all media interactions are all screen-based" (Idem, Ibidem, 8), meaning we are still screen-dependent. Or perhaps we should restate it as being multi-screen-dependent. Another key-finding is that "Context drives device choice. Today, consumers own multiple devices and move seamlessly between them throughout the day" (Idem, Ibidem, p.11). And this is a typical Web 3 effect. Users are surrounded by hardware and all-day-long connections to information. One of the suggestions of sci-fi interfaces, as seen in videogames and films, is that users will access their data through a single smart device triggering links to huge amounts of data clusters.

So far, "Computers keep us productive and informed" (Idem, Ibidem, p.12), which means that the desktop computer for the average user is but a form of keeping up to date. The computer is a tool for research, production and task-oriented duties. When it comes to smartphones, rules change. Not only they keep us connected, they occupy 38% of daily interactions. It is estimated that 40% of interactions occur out of home and as well as 60% of them at home. So smartphones are perfect for 54% communication and 33% of entertainment. All this data comes from the same study conducted by Google (Ibidem, .13). Until this point, nothing mentions sci-fi interfaces or AR. The information provided by the study describes how tablets are also working out a slice of the market's attention span. So, "tablets are for 9% of all media interactions" (Idem, Ibidem, p.14). It is an improvement. Yes, it is.

By connecting the dots between what science fiction proposes, what studies as Google's show us, and considering the release of Samsung Galaxy Gear, and even the advent of the Google Glass project (amidst other hardware we have tested) we may have a glimpse of what AR will look like in the future. For sure, AR will look at least as powerful and aesthetic, and trendy and fashionable, as we have seen in videogames such as *Tom Clancy's Ghost Recon Future Soldier* (2012), *Syndicate* (2012), *Heavy Rain* (Quantic Dream, 2010), and more recently, *Tom Clancy's The Division* (2013). These games present paradigms to thought of future human-computer interactions, since they introduce us to a real world modified by expanding AR interfaces, smart artifacts, grids. Consequently, the users are mostly emancipated subjects.

3 THE ELECTRIC ENVIRONMENT AND THE EMANCIPATED SPECTATOR

We have Rancière (2009, p.49) speaking of a "new topography of the possible". That is exactly the aim of AR. It's about new space, or "dataspace" over real space. But nothing of this would exist deprived of electricity, of course.

Back in 1960s, Marshal McLuhan pioneered several concepts and paradigms as for media would be understood as being extensions from ourselves. One of McLuhan's most evocative definitions is that of an "electric environment". He could not tell how computer, electronics and the Internet would turn out to be, so he explains how media could work by applying a system of different definitions (higher and lower, cool or hot). In return, he describes all things electric as being the beginning of something big. He lacked the words, but by no means the spirit, in trying to anticipate the world to come; our world — the Mediated world (for Gibson). McLuhan's vision considered the automobile, human-machine interaction, clothing, cities, and so much more we now identify as parts of the backbone of the Internet of things (origins of cloud computing, digital media and AR).

Something that in the 1960s was most present was the dichotomy of spectator vs mass media. Thus, one may understand in which waters Mcluhan's "forecasts" were setting sail, triggering new paths to unfold. Still today, authors such as Jacques Rancière, enjoy discussing our relationship with the "spectacle", the model of viewers vs participants. He affirms that we need a theater where the optical relation—implied in the word 'theatron' — would be revolutionary. For him, "What is required is a theatre without spectators, where those in attendance learn from as opposed to being seduced by images; where they become active participants as opposed to passive voyeurs" (2009, p.4).

Though the problem is not just about our optical relation, it is about power and such optical relation. Rancière continues, saying we don›t need:

> "(...) a theatre played out in front of empty seats, but the theatre where the passive optical relationship (...) is subjected to a different relationship — that implied by another word, one which reffers to what is produced on the stage: 'drama'. Drama means actio" (2009, p.3).

As much as Rancière›s «fight» seems to be global issues, philosophy, and left-wing political discourse on emancipation, what takes us to his statement is the evocative power of his words. Here the author calls for action, emancipation on the global scene, declining passive state in the name of action, participation and collective performance. We also notice how he labels media [in our point of view] as «prisons of images». What is in question here is the concept of theater, as context for «seeing», viewing, not as a passive element, but as a node of action. For Rancière, theater is not a spectacle, it is vision and action, emancipated existence, expanded existence.

In order to best understand Rancière›s framework for an «emancipated spectator», one has to remember what McLuhan said about the so-called «electric environment» in 1964. So far, both authors, in different generations, and epochs, criticize media. They criticize, they see it, but media remain developing persuasion and control. What did not exist before was the ability of viewers, spectators or audiences, to control images in these "prisons of images". At least for now, there is a difference. Mass media are not reality. And whatever futuristic media landscape is unfolding now, it is something "augmented", as a mcluhanesque media extension of man.

In other words, despite criticism, in present time, more than ever, we are the "emancipated spectator", because videogames, social media and AR have helped to change the world. And each of these items has produced a fast revolution in the recent past.

When it comes to speaking of this environment, "electric" in McLuhan's lexic, we know, as he did, that "(...) in operational and practical fact, the medium is the message" (1994, p.7). This means that regardless of the media type at stake, the medium always imprints its code on the content, therefore formatting it as itself. It is as if the medium would function as a virus. That is why the real issue is always the medium rather than the content.

McLuhan observed how some media are emerging from other media. It is a never-ending loop. Like he says, "The effect of the medium is made strong and intense just because it is given another medium as 'content'" (1994, p.18). Due to this, we have the situation we are examining in this article: Augmented Reality inside VR-Games [Technically it is not true VR, but videogames instead, though there is a virtual engine performing similarly]. The videogames we were able to

test for the accomplishment of this article are portraying Augmented Reality interfacing scenes in their plots and mîse-en- scène. Again, we have a mcluhanesque loop here. Videogames are inside the TV set [now a "screen"], which is turned on by the electric environment. And inside these videogames the story has AR. Ultimately it is all VR-gaming, but since Google Glass and other sci-fi interfaces are not yet available for the masses, we may observe AR inside VR-games as a model of things to come, like Hollywood works: introducing models. Audiences are users, so they keep absorbing, should we follow previous studies' ideas.

Let's summarize the key-issues, we have participation, massive gaming, electronic entertainment, audiences of users, digital media and, of course, "vivid interaction" [beyond the one mentioned once by McLuhan (1994, p.348)]. The only reason why this AR worlds are moving it is because programmers built the code and the graphics with "reality engines" (Manovich, 2001, p.183). Besides, more and more people are connecting online, and during more time, and with multiple screens, as Google reports depict. If there is any thing remaining the same, since science fiction literature, media critique, interface design, and technology production are renewing, it is "space". The more evolved the medium, the more "real" the "space" they present it is. It happened with TV, videogames, VR, and now with AR. Let's not forget that "for the first time, space becomes a media type" (Manovich, 2001, p.251). This is definitely noticeable in the objects we have analysed.

Like Manovich's terms were not enough, we have AR truly being introduced in the market slowly with new iDevices and Smart Gear. But is it in fact AR? "Augmented Reality (AR) is technology that augments a user's perception of the real world, with useful, additional information" (Shedroff, Noessel, 2012, p.158); meaning that augmentation, expansion, extension and connection are more than fancy words. And let's not forget that user's don't manage to just step into digital worlds. Actually what we have is digital worlds stepping out of screens. McLuhan used to say that "We return to the inclusive form of the icon" (1994, p.12). The power of the image, the driving force of the *theatron* is still unsurpassable. Only screens multiplied. When it comes to the information AR displays, the augmented mode means "the information should 'overlay' reality" (Shedroff, Noessel, 2012, p.159).

Unlike Virtual Reality, AR does not attempt to replace the user's perceived world by hardware and software combination of means. If VR had limits, AR defies them. Data is overlaid, objects acquire tags, real world speaks digital world. There is a blending procedure. So far, there are "four categories of augmentation: sensor display, location awareness, context awareness, and goal awareness" (Shedroff, Noessel, 2012, p.159). Beyond these four categories, a translucid vision is achieved.

4 OBJECT ANALYSIS

4.1 Software: AR Inside VR-Games

More recently, despite the AR interfaces not being focused on typography and easy reading data, we found the contrary. Even in videogames like *Heavy Rain*, there is data labelled as infographics while the main character, a detective officer, uses ARI (Augmented Reality Interface) (see Fig.9) to transform an ugly and opaque police office into a 360 augmented world (see Fig.1). Here we have sensor display, location awareness and context awareness (see Fig.2).

Figure 1. Heavy Rain - The Augmented Office

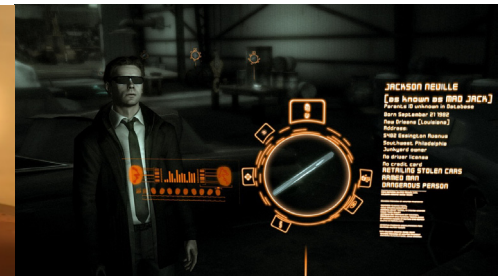

Figure 2. Heavy Rain - The Interface

In Tom Clancy's Ghost Recon Future Soldier, it happens that the future soldiers are capable of looking at the sky and see arrow signs and typographic labels (see Fig.3) displaying instructions regarding mission goals, bearings and geographics. Here we identify sensor display, location awareness, and goal awareness. While the first case recreates AR, the second builds a sort of a "screen-sphere" overlaying everyone on the scenario.

In Tom Clancy's The Division (2013), the player controls a military agent in New York which manages an AR smartwatch to display data, maps and statistics about the mission on course. Like a real world AR device, the player overlays geodata and detailed info on the real world (stunning Hi-definition graphics). Again we notice sensor display, location awareness, and goal awareness. Perhaps here we should recall these arguments of Rancière: "The image is not the duplicate of a thing. It is a complex set of relations between the visible and the invisible (...)" (2009, p.93). Game worlds are also not duplicating, they are becoming originals. And these relations between visible and invisible are already on them, at last as a theme.

In the 1980s, the movie Tron was way ahead of its time. The book novel version of Tron (the motion picture) introduces characters depicting "a rectilineal landscape, incandescent, lit by electricity, [which] was casting its rectangles and edges onto the sky" (Lisberger & Daley, 1982, p.21, Translation is ours). When we look to Tom Clancy's The *Division's* model of AR (see Fig.4) we are seeing the world of *Tron* being assimilated by our real world, and in its turn, the real world being assimilated by the game world. Except that it is not looking like a game anymore. It is a parallel world for many of us, augmented ones.

Maybe what we are witnessing here is a return to the hunting age, and at the same time a return to the "pedestrian scale", as McLuhan would say (1994, p.2). We would rather label the phenomenon as a question of "subjective cyberspace" (Elias, 2009), since the common factor

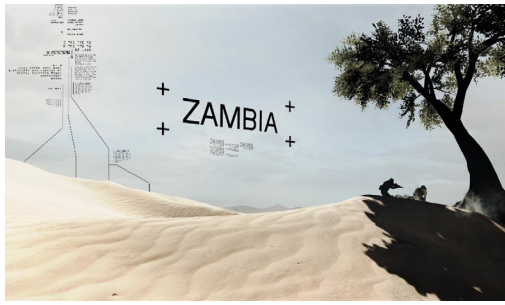

Figure 3. Tom Clancy's Ghost Recon Future Soldier

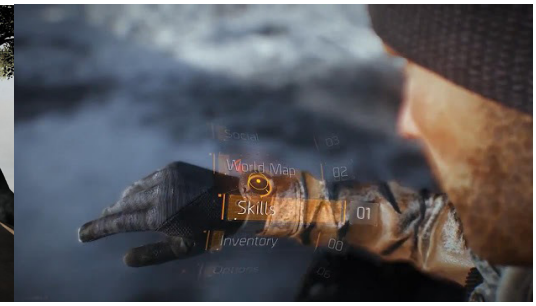

Figure 4. Tom Clancy's The Division

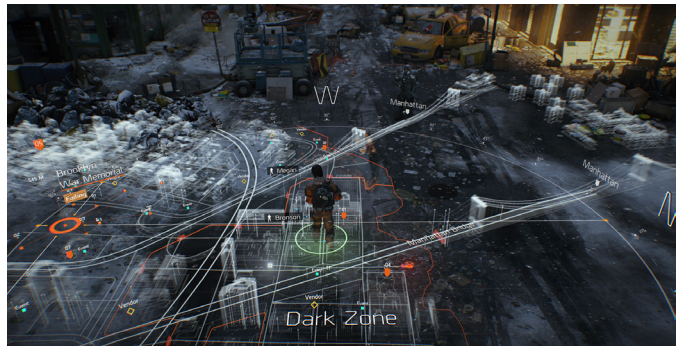

Figure 5. Tom Clancy's The Division

we find in games, especially shooters, is the immersive, first person point of view, enabling the genre First Person Shooter. Games as *Tom Clancy's The Division* (see Fig.5) are displaying a third person character, as we may see the most of the *persona*, but aiming and focusing require a subjective point of view. What we identify too here is what Lipovetsky & Serroy entitle as "a screen-like vision of the world" (2007, p.29, Translation is ours).

On another videogame, a reboot of an older version, *Syndicate* (2012), the cutting-edge graphics are groundbreaking, much of the story is introduced to us, user-players, in the early moments:

> 2032.
> The world population swells into 15 billion. 5% percent are chiped and linked to their preferred corporation. The rest is digitally locked out, out of sight and out of mind. Industrial espionage reaches unparallel heights. Covert agents are mobilized to protect and serve their interests. You are one of the chosen and few, an agent.

The science fiction context of Syndicate is its higher value, altogether with the proposed AR interfaces. The world dominated by skyscraper corporations, military technology and cybernetics, places the user-player in the action context of *Syndicate*. Mission-oriented goals lead the character along impressive scenarios in which deadly force is presented, and answered by us, in a bold and high-tech manner. By using the dartchip interface (see Fig.6) to train in simulations, as well as to manipulate enemy soldiers and objects, the user controls an agent of a syndicate, whose goal is to win by "whatever it takes" motto. The AR interface is relying on wireframe wires (see Fig.7), glowing characters and any object on the screen having a geotag we

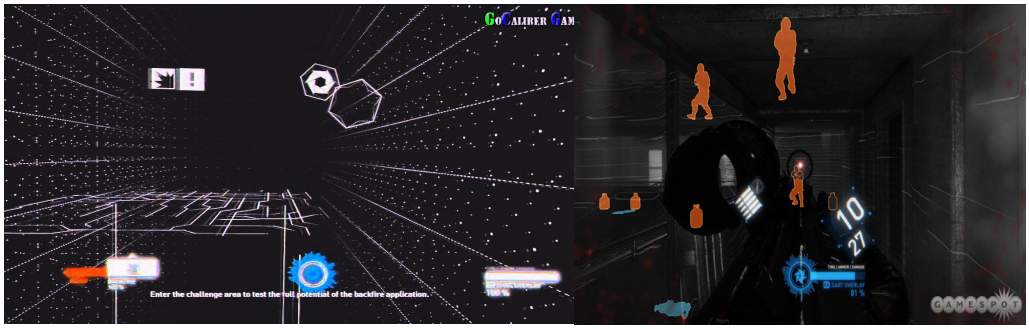

Figure 6 & 7. Syndicate

can see thanks to the dartchip. Whenever the player needs to train a task or a chip-implanted skill, he enables the dartspace. As good example of the concepts we are working here, sensor display, location awareness, context awareness, and goal awareness are crucial.

By playing the world of *Syndicate*, we understand how Rancière makes sense, because he states that «faced with the hyper-theatre that wants to transform representation into presence and passivity into activity" (2009, p.22), we may have conditions to rise an emancipated spectator (see Fig.8). We could aggree no more. But by going back to McLuhan's forecasting thoughts we make key-findings: "what emerges is a total field of inclusive awareness" (1994, p.104). This is exactly what happens in *Heavy Rain* (see Fig.9) and *Tom Clancy's Ghost Recon Future Soldier*, since both AR models presented are inclusive, surrounding, visionary, and look like sci-fi interfaces. We are not playing these games, we are respectively investigating a crime scene or being deployed in a theatre of war. And also we are interfacing with AR.

Rancière›s idea of a «hyper-theatre» is quite interesting. Even when we examine films such as Ironman (Jon Favreau, 2008) we see it in the scenes. The hero in the movie flies a smart military exo-suit, which happens to have all data interfaced inside the helmet's AR holographic projections. Game and film-world ideas are mistaken for one another here. In *Robocop* (Paul Verhoeven, 1987), for example, as an injured police officer is the subject of a cyborg medical procedure, he happens to face reality afterwards through "video-subjectivity". Programming Commands, Interface Graphics and Target Icons are overlaid on his vision. Another major example of AR is *Minority Report* (Steven Spielberg, 2002), a detective story focused on an innocent cop (John Anderton), being blamed for a crime he did not commit at the time officers start the crackdown. The key moment is when John is commutting and AR ads are targetting him directly, speaking to him with tailored messages; and also when he interfaces with geodata related to any object acquired on the grid.

Many are the dialogues established between game worlds and film worlds. It is getting harder and harder to mark a clear boundary between both of them. Science fiction and avant-garde arts seem to be the common ground here. The notion of "spectacle" is definitely being recalled too. One thing Rancière asks is: "what in fact is the essence of spectacle for Guy Debord? It is exteriority. The spectacle is the reign of vision - and vision is exteriority (...)" (2009, p.6). We are glad to accept that the notion of "exteriority" is a key-finding in AR situations. Data overlaid onto the real world and "subjective cyberspace" demands outdoors. Yet the reign of vision is

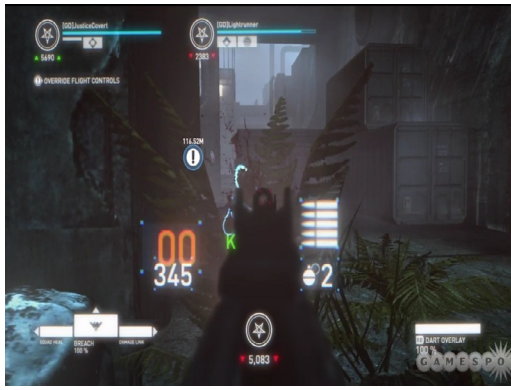

Figure 8. Syndicate

Figure 9. Heavy Rain

also consolidated by the way games, AR, Smart TV, videoculture, VR-Games, seem to have a common ancestor: TV screen. Both the (TV) sets and the station networks, and more recently electronic gaming, have helped to improve the engagement with the (new) screen. Let's see what McLuhan said in the 1960s: "TV will not work as background. It engages you. You have to be with it" (1994, 312) (see Fig.10). This is why we evolved over the 20th century from a "one-screen" situation to an "all-screen" basis (Lipovetsky & Serroy, 2007, p.10).

In case we take a closer look to some of the science fiction films released between 1986 and 2009, we may achieve interesting conclusions. First, in movies such as Aliens (James Cameron, 1986), AR interfaces are already displayed on spaceship cockpits and military goggles and helmets. When Terminator 2 - Judgment Day (James Cameron, 1991) was launched, a key-feature of terminators was the red vision model of overlaying data analysis on top of video-recordings streamed straight from the real world, as we see in Robocop, but more sophisticated. In Predator (John McTiernan, 1987), the original, huge, and alien monster released after his shipwreck in the jungle of tropical Earth is able to see, record and replay his version of coloured data of the real world, as he seeks for prey and tokens and trophies. It seems that these imageries, in film, like the videogame footage, in software, need something more to convince the "audiences of users": hardware to expand these concepts and to emancipate spectators all over the world. Perhaps in the future, people will be capable of interacting with all information on a city space, for example, like the main character of the video game *Watchdogs* (2014) does, by hacking the Chicago city's CTOS (City Operating System), and so connecting to surveillance, databanks and other urban, e-linked "things" (see Fig.11).

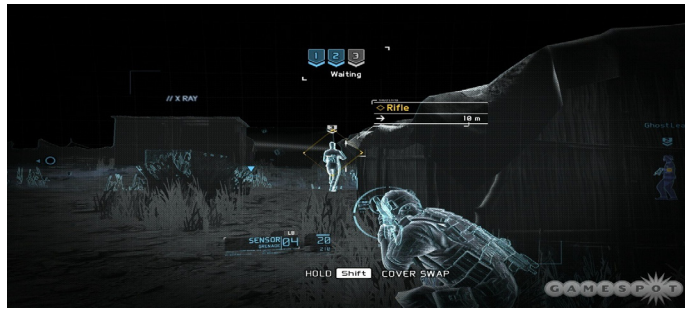

Figure 10. Tom Clancy's Ghost Recon Future Soldier

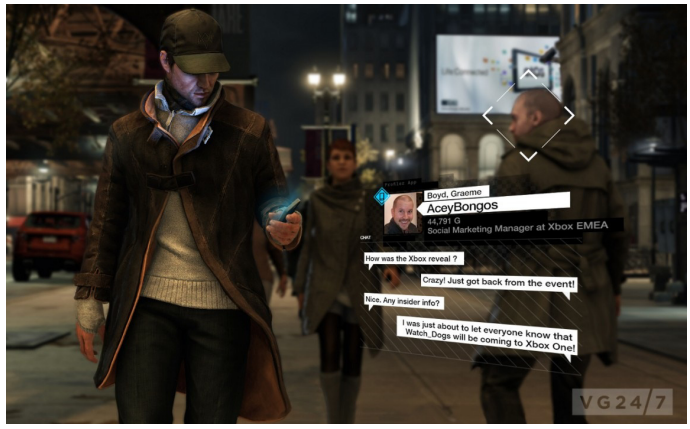

Figure 11. Watchdogs

4.2 Hardware: Expanding

Software is the main stage for AR and VR-Gaming experiments but hardware is also becoming a key-player alongside the digital platform. Within the scope of this article, we examine the hardware at our disposal, by following the four categories of augmentation identified by Shedroff & Noessel (2012, p.159), being "sensor display", "location awareness", "context awareness", and "goal awareness" the concepts to work with. Once we get on track with the authors' work we can acknowledge the devices' limitations. Shedroff & Noessel (2012, p.158), for example, believe that AR is tied to reality, and so one cannot manipulate it in terms of scale, position or state. Also, if we consider Manovich's analysis of the equipment, it makes sense how in the new media image the user actively goes into it (2001, p.183). Some AR elements displayed in VR-games were so captivating that it seemed as if words, images, narratives and performances could actually change the world, as Rancière says so (2009, p.23) in other contexts. A fine example lies in the film *Star Trek: Into Darkness* (JJ Abrams, 2013) on the space-jump sequence where AR tags and circuit lines guide the hero's stunts (see Fig.12 and 13) aiding him in achieving his goal.

As previously denoted, videogames and science fiction can be a birthplace for incoming technologies and since this article focuses on Augmented Reality inside VR-Games we have to talk about an HMD (Head Mounted Displays) called Oculus Rift. It made its debut at Kickstarter website to raise funds for the first prototypes (and currently has John Carmack, creator of the *Doom 3* videogame, working on the team as Chief Technology Officer). The concept behind Oculus Rift is best explained in the words of its founder, Palmer Lucky: "Our visual system is by far the most powerful sense we have; it overrides pretty much everything (...). I was looking for something that made it actually feel like you were inside the game..." (Edge, 2013b, p.75).

Figure 12 & 13. Star Trek Into Darkness

Oculus Rift features a field of vision of 110 degrees, a stereoscopic view of the world and traces our head movements. All of this is in a light-weight device, which the gamer tends to forget he's using. The HMD can be connected to a computer, giving the user the ability to enjoy available demos or to create his own experiments; thus simulating the four categories of augmentation: sensor display, location, context and goal awareness. This makes the Oculus Rift (see Fig.14) the perfect staging area for future Augmented Reality solutions and interactive interfaces. Despite this great features the product has its issues. Motion sickness effect has been reported by some users; it happens whenever we are standing still while sensing movement. Also, as mentioned by article's authors from *Edge* magazine, "It's pretty clear that a keyboard and a mouse are not going to be the most natural interface for VR" (2013b, p.79). Therefore we need an immersive

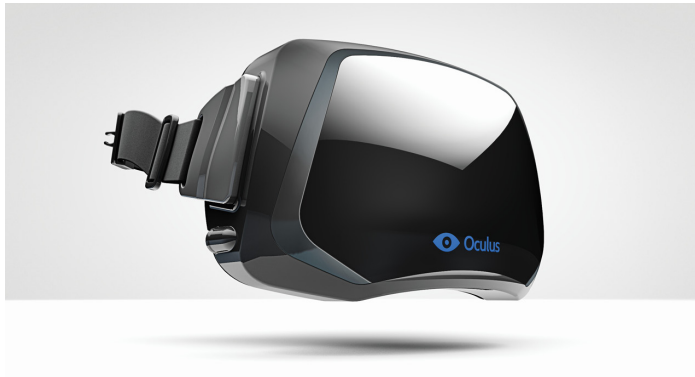

Figure 14. Oculus Rift

device that has the ability to interact with the Virtual Reality world using the users' body movements providing them a "telepresence feeling", as referred by Steuer (pp.73-93, 2003), bridging the gaps between both real and digital worlds.

Directly related to the digital world are the smartphones as backbones of our daily media interactions for some time now. Hence it was only a matter of time until a handier AR-based solution began to be developed. Google's eyeglasses (Glass) allow users to see digital data overlaying real world by the form of visual items, enabling them to perceive reality throughout a translucent vision. The previous denoted local and goal awareness concepts are a default in Glass. Those are put to good use with Google Now and Maps apps, which respectively display information according to the user's location and provide directions for a specific destination.

Under the umbrella of the new media image, Google's eyeglasses (see Fig.15) suggest a "realistic representation of a different reality", should we recall the words of Manovich (2001, p.183). The device interaction is possible via voice commands or touchpad, which is becoming a standard. However, it might attract some undesired attention. For instance, there's the issue of the user's privacy being exploited; as soon as something is digitized, it can barely be considered as being "private" again. As Ranciere once stated "words and images, stories and performances, can change something of the world we live in" (op.cit.). Google's Glass are a way to capture media data, share it, and therefore change the world of those who use it and interact with the device on a daily basis.

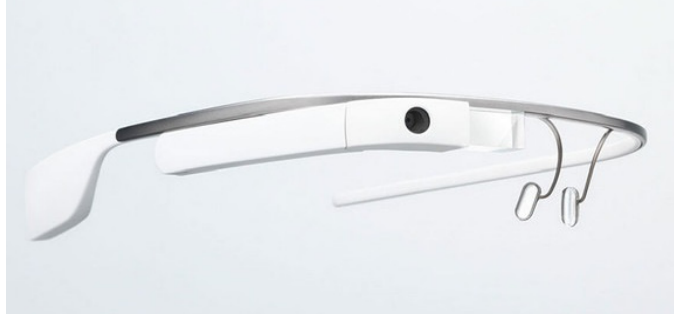

Figure 15. Google Glass

We have analysed a HMD and an AR device. Although vision can be considered as one of the main senses, a true virtual experience cannot be achieved with no motion interaction. The direct control of the digital world by the user is taking place with immersive technologies that now have a key-role in the virtual world environment. The Leap motion (see Fig.16) tracker is a small sensor device that detects the user's ten fingers, allowing the manipulation of virtual elements with a 2 millimetres precision. We might remember this concept from the movie Minority Report (Steven Spielberg, 2002) where the physical interaction with a futuristic interface is achieved by using one's hand movement. Despite this awesome idea, rumour has it that while the sequences were being shot the actor who performed the interaction had to take several breaks since the constant physical interaction was exhausting.

With a concept similar to Leap but within a different context, Microsoft's Kinect, is launched with the new Xbox One game console bundle. It captures the user's body movements, facial expressions, heartbeat and even the direction of the gaze. It embodies Manovich's ideas and meets *Minority Report's* interface style. Surely users have never been so into media as they are nowadays.

These hardware reviews made us realize that Oculus Rift is a landmark in the videogame industry. However, the devices' acceptance by the public is still uncertain. Nevertheless, we believe it might change the way we perceive and interact with videogames. Also in the field of viewing experience, there's Glass, which is a new paradigm in the hybrid sphere of mobile media, boosting the interaction between distant people and giving geo-awareness a substantial gain. Despite its main feature, it is important to remark that Glass might end the multiple screen-dependency by placing digital elements in real space directly in front of the user's eyes. After these two immersive devices' analysis we came to the conclusion that Leap is a device that can be used during short periods of time, being crucial that it comes embodied on the laptop to avoid further wires, setups and accessories. This already happens on a laptop computer model. Kinect's (see Fig.17) goal is to physically leave gamers tired, whereas Leap allows a punctual immersive interaction, thus bringing us to conclude that Leap might be regarded as the handy solution and Kinect as the full-body try-out experience.

Today we can practically go into the media environment and enrich the world around us with binary elements. What used to be reflected only in VR-Games and VR experiments is taking shape and enriching our daily interactions. Although the cinema or videogames' "class of users" can be eluded by a futuristic feature, the daily class needs practical solutions. What could work on the screen may not be useful in real life, therefore the success of any of the reviewed devices will be decided by time and the general criticism of the global consumer.

Figure 16. Leap

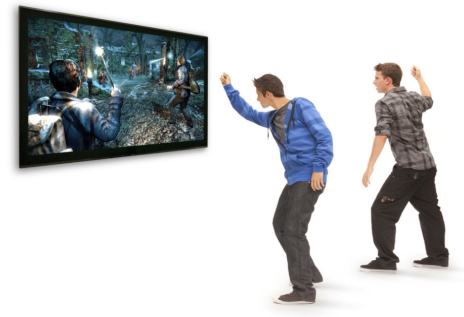

Figure 17. Microsoft Kinect

METHODOLOGY

In order to best organize research, our materials were split into theory, software and hardware. By choosing theories, models and concepts from interface design, science fiction, new media theory, communication sciences and images? studies, we were able to view the object of analysis (Augmented Reality) in a new way. The challenge was to examine all VR-Game items where AR is featured and also today's hardware for interface with AR, ranging from game consoles, motion-detecting accessories, and Web video. Beyond traditional print media, electronic media, online documents, games and sci-fi cinema, documentary films and magazines were also selected for information analysis. The current essay is the product of a closer inspection on games, films, hardware and digital media theory, so the highlight is precisely the connection between object analysis and theory.

RESULTS

When it comes to software, the videogames, apps and programs we have tested are enabling us to conclude how progressive, suggestive and constructive entertainment is nowadays. The imagery displayed in VR-Games makes us think about the future of interfaces, when it comes to human-computer interaction. Like we have foreseen, having AR inside VR-Games looks like a media loop, and it is so, yet there is something more to say about it. An interesting feature presented in both videogames and science fiction films, for instance, is the way AR will be displayed as a sphere of data around the user. It is a suggestion, of course, but it makes us wonder about the "screen-sphere" mentioned by Lipovetsky & Serroy. We are also to identify as a result that hardware is by no means ahead of software, being merely Google Glass (see Fig.14) the only project to seem to be truly futuristic. As far as AR is concerned, we may say that AR shows up in VR-games like a new stage of image: that is to say, as a complex set of relations between the visible and the invisible.

Following a McLuhan's idea, we see when we test AR in videogames, that it is as if some media were emerging from other media. And again an idea from Manovich continues the ground paved by McLuhan, since he believes space became a media type. When players are interacting with these new games they are introduced to the inclusive form of the icon, as data is overlaid on their visual field, defying VR's old boundaries and TV culture's heritage of the screen. As we have said before, real world speaks digital world in both AR software and hardware.

CONCLUSION

Under the framework of the "expanded contexts," we have chosen to work on the subject of having AR inside VR. It is true that only now, due to the latest releases in hardware, smart gear, AR, next-generation videogame consoles, and smartphones, we may have the exact conditions for VR, and the global market for it, as well. However, neither VR nor AR are very much developed. Despite the more contemporary trend of AR, we still don't have the same interfaces as we see in motion pictures or in videogames. The only catch is that the interaction design proposed by entertainment in AR is more likely to become true than we could have imagined.

In theoretical terms, we have noticed that issues such as the intrusion of imagery on the symbolic environment and the digital world expanded environment are becoming big concerns. Details like digital tags, the post-geographical feeling of authors or the surrounding technopolia or consumerism of media goods are something that captures our glance. In fact, culture is indulged by technology since consumer electronics turned into fashion items. The aftermath of this culture is that we are heading towards an always-mediated world, and as Web 3 is undoubtedly something new, as a Web of Data, in the near future authors will find "interfacing" with AR something logical, since it keeps expanding from current media.

In film we have inherited the engaging position, but the electric environment was further developed and spectators met their participation phase in videoculture, videogames, VR, Internet, and all the screens of the post-computer era. Due to VR-games, the fact is that the topography of the possible is clearer than ever. Some call it "dataspace", others say it is a "mediated-world" or a "dart-space", though the concern is our optical relation with the contents. We are emancipating ourselves from standing still, from non-mobile screens, from desktop Internet, from office computers, all the prisons of imagery.

When it comes to AR, VR, VR-games, if the medium is [still] the message, then in that case perhaps we are already in a hyper-theatre. The inclusive awareness proposed by AR in entertainment games and films is proppelled by exteriority. This is to say that, once in an outdoor situation, things that used to look like design or science fiction, are now placing us in a subjective cyberspace. Whenever we are, and wherever we are, "We" are the same carriers of media content, and we are augmented, still inside previous media rules.

Augmented Reality's hardware is still in its first average consumer days, it promises and partially delivers interesting solutions now. It seems to us that an idea might look really good in the blueprint or when it is turned into a simulation, but it needs to be adapted and mainly be useful to the target audience that is going to purchase and use it.

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