Bibliography details	Main arguments	How does this contribute to my topic?	Critical analysis
Agrawal, A., and Auryn (2009). Non-photorealistic Rendering: Unleashing the Artist's Imagination (online). Available at: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5167490 [Accessed 25 April 2023] Cooper, D. (1999). Personal Thoughts on Non-Photorealistic Rendering (online). Available at:		4. e. Non-photorealism in filmmaking to foreground the work of digital effects artists. 4. f. Photorealism costs and workload.	Taking in consideration the amount of work, focus, and knowledge a good photorealistic shot requires, Agrawal and Auryn (2009), and Cooper (1999) explain the challenges and techniques that artists have faced with photorealism (and its issues with the so called 'uncanny valley'). They also explain how some artists have opted for NPR (non-photorealistic rendering) instead, to create a simpler and cartoony style (animation) that gives more creative freedom and more room to use the artist's imagination.
Dinur, E (2017). *The Filmmaker's Guide to Visual Effects: The Arts and Techniques of VFX for Directors, Producers, Editors, and Cinematographers.* New York: Taylor & Francis.		4. d. At what point photorealism starts to become excessive?	Dinur also has a previous book, The Filmmaker's Guide to Visual Effects: The Arts and Techniques of VFX for Directors, Producers, Editors, and Cinematographers, where he speaks about the fact that a convincing photorealistic work is possible as soon as there is a 'respect for the real-world physics and optics' . However, it is also very easy for VFX artists to fall for the desire to use every single VFX available and overload the film with an excess of digital effects that takes off the audience from the story. (pg. 14)
Dinur, E. (2022). *The Complete Guide to Photorealism for Visual Effects, Visualization and Games.* New York: Taylor & Francis.	But it is hard to draw the VFX and games often depict imaginary worlds: alien planets, futuristic cities, fantastic creatures, or environments that do not abide by earthly laws. What role does photorealism serve in the context of fantasy and science fiction? Is it still an important factor, considering that the visuals often depict things we have never seen or experienced? Photorealism is achieved by studying and mimicking the world around us – light, surfaces, atmosphere … but what if these behave very differently in the imaginary environment we want to portray? Can we still maintain believability while creating otherworldly environments? How can we make the unreal look real? With all the digital tools we have at our disposal, we can certainly break every rule. We can create a world where physical laws are upside down, a world that is so different from anything we've ever seen, that it makes no sense visually. But it is hard to draw the viewer into such a world. If you examine prominent sci-fi and fantasy movies, you'll notice that the most visually believable ones do not break all the rules, but instead maintain certain earthly aspects. Take, for example, Avatar's iconic Hallelujah Mountains: while their most striking aspect (giant forested cliffs floating in mid-air) is certainly unreal, specific features like the jungle vegetation, rock surfaces, lighting, clouds, and atmospheric depth all feel familiar and recognizable. This careful balance between real and unreal, combined with meticulous attention to detail, places an otherwise impossible environment deep within the sphere of believability. Handled differently, the concept of floating mountains could have easily succumbed to overly fantastic visuals or poorly done VFX, causing the viewers to distance themselves from the environment. (p. 18) It is important to note, however, that photorealism has little to do with the quality of digital capture and display. The essence of photorealism has not really changed since the first photographs of the 19th century. A grainy, black and white, low-quality 300×200 pixels photo can still look more photoreal than a shiny 8K render. Resolution, number of pixels, bit depth, dynamic range – all these features are critical for creating, capturing, and displaying high-quality, high-	3. b. Importance of VFX to replace impossible to shot environments such as outer space scenes or fictional environments 3. d. Does photorealism quality depend purely on the new digital technologies' high definition? 4. a. Uncanny valley	Eran Dinur in his book, *The Complete guide to Photorealism for Visual Effects, Visualization and Games* , analyses how to implement the physics that apply to the world around us to the visual effects in filmmaking and make them look as photorealistic as possible. Since most of the scenery in filmmaking are not even real like alien planets, fantastic creatures, or impossible environments for our understanding of physics, visual effects artists important job is to observe and study the world around us and try to implement it to these fictional shots. These imaginary worlds have also some Earth like aspects that are kept so the audience can empathise with them. Sometimes these familiar aspects can help make the shots more 'believable' and, therefore, more photorealistic for the viewer. It is important to keep a balance between what is real and unreal, otherwise, the shot could end being an overly fantastic scene that could throw the audience out of the story. Dinur also mentions that the quality of photorealism does not depend entirely on the quality digital capturer and display. While high dynamic range and bit depth are important for a successful photorealistic recreation, there are independent aspects such as light and surface, the sense of depth, richness of textures, characteristics of optical lenses, and many other characteristics that make a shot look as photorealistic in high definition as well as in low definition. These characteristics are more linked to the physics of the world around us and the interaction of surfaces, materials, lights, and other aspects with it.
Failes, I. (2021). WHAT IS PHOTOREALISM? WELL, SOMEONE LITERALLY JUST WROTE THE BOOK ON IT (online). Available at: https://beforesandafters.com/2021/11/30/what-is-photorealism-well-someone-literally-just-wrote-the-book-on-it/ [Accessed 4 June 2023]	Interview to Eran Dinur, author of *The Complete Guide to Photorealism for Visual Effects, Visualization and Games:* *"I then realized that there are artists, not necessarily just in visual effects, but anyone who's using CG or just digital tools to create imagery, where maybe I could delve deeper into the process and look at one big aspect that's important across all levels, and that is, photorealism. And in visual effects, photorealism is crucial because what you do is, you put stuff in the frame and you pretend that it was there in front of the camera.* *If it does not feel like it was shot in front of the camera like the rest of the footage, it looks fake, it doesn't work. So for visual effects artists, the notion of photorealism is embedded into the work. I remember when I was just starting and I worked at a visual effects studio, one of the artists there used to stand behind people, stare at their screen and then suddenly say, 'This doesn't look real', and walk away. And every time he did that to me, even though I knew it was a joke, a repeated joke, it still felt a bit hurtful. And to this day, a lot of time you get those notes from a client that says, 'This looks CG,' or, 'This doesn't look real.'"* "So, I realized that writing about photorealism could be geared to a much wider audience than just visual effects. I mean, practically almost every high level renderer that we use nowadays is physically-based, which means that the renders are now as close as they ever were to actually simulating light behavior rather than faking it. There were times where computer power was just not strong enough to actually simulate light or what really happens to a light photon when it hits a surface and bounces. So, we faked it. We used point lights and spotlights and ambient light emitters. It's actually amazing what quality of work was done before you had true global illumination and shaders at the level that we have now.	Direct opinion of an experienced visual effects artist regarding the importance of photorealism in visual effects in all areas from filmmaking, to games, or architectural and product visualization. He also mentions the problems that visual effects artists are constanly facing when people around them think their work is not realistic enough as it looks 'too CG'. 4.b. Has the audience become more used to photorealism, therefore, more exigent about it?	Eran Dinur, visual effects supervisor, believes that Photorealism is an aspect that is important across all disciplines as it helps simulating a real character, object, environment, or phenomenon that would have been impossible, dangerous, or highly cost to be filmed or photographed in live action. In his interview with the journalist Ian Failes (2021), he defends that if a digital asset does not look like it was shot live in front of a camera and like it is part of the rest of the composition, it will look fake and will not work. This is why photorealism is so important for visual effects artists and why there is also a lot of pressure on their shoulders regarding the so called 'uncanny valley' where the audience's opinion will be stuck in feedbacks such as 'this looks fake' or 'it looks too CG'. Also, since the work pipeline when, for example, creating a CG shot is made by a chain of people in most of the cases like a modeler, a texture artist, a shading/lighting artist, a compositor, and a matte painter, it is difficult to point out which part of the CG shot needs to be improved to make it look more photoreal. Moreover, when we are talking about photoreal, we do not say 'real', as we are refering to the way we see through the lens of a camera not through our eyes. Therefore, so many things such as defocus, dynamic range, or exposure are processed differently through our eyes and brain than through a lens and a camera sensor. If we show CG shots as we would see it through our eyes, we would find it strange.
Jeng, J. (2023). Sidelining Photorealism: 'Speed Racer' and Articulation of Digital Effects. [abour (online). Available at: https://books.google.co.uk/books?hl=en&lr=&id=KLOqEAAAQBAJ&oi=fnd&pg=PA153&dq=photorealism+in+film&ots=rB34RMJY8s&sig=aEhMv5bwORZ1CQ		4. e. Non-photorealism in filmmaking to foreground the work of digital effects artists.	Taking in consideration the amount of work, focus, and knowledge a good photorealistic shot requires, Jeng (2023) explain in their research paper, *Sidelining Photorealism: 'Speed Racer' and Articulation of Digital Effects Labour* , how photorealism has always been the leader in the film industry and how some movies like 'Speed Racer' have opted to sideline this style to help foreground the work of digital visual effects artists.
Kench, S. (2022). What is Photorealism – The Art of the Real Explained (online). Available at: https://www.studiobinder.com/blog/what-is-photorealism-definition/ [Accessed 23 April 2023] Wainwright, L. S. (2019). Photo-realism. Encyclopedia Britannica (online). Available at: https://www.britannica.com/art/Photo-realism [Accessed 30 May 2023] Tate (2023). Photorealism (online). Available at: https://www.tate.org.uk/art/art-terms/p/photorealism [Accessed 30 May 2023]	Photorealism definitions.	1. What is Photorealism?	Photorealism is an art movement that started on 1960s in America, that shows artworks that look photographic. This form of art is defined by being complex, extremely clear, and emotionally neutral. Since this type of art was considered unoriginal and boring, this led to the pop art movement. However, in the beginnings of 1990s, the interest in photorealism resurged again as effect of the development of digital cameras which could offer a more precise image.
Maio, A. (2021). What is VFX? Defining the Term and Creating Impossible Worlds (online). Available at: https://www.studiobinder.com/blog/what-is-vfx/ [Accessed 30 May 2023]		3. a. Importance of photorealistic VFX to replace dangerous live action scenes.	In addition to this, Maio (2021), also reflects in her article What is VFX? Defining the Term and Creating Impossible Worlds about how VFX industries use photorealistic digital assets to create impossible and dangerous scenes such as the scene in The Matrix when the main character dodges bullets shot against him.
Manovich, Lev (2002). *The Language of New Media* . First paperback edn. Cambridge: The MIT Press.	*Terminator 2* and *Jurassic Park* along other films by James Cameron and Steven Spielberg, were responsible for turning Hollywood around: from extreme skepticism about computer animation in the early 1990s to a full embrace by the middle of the decade. These two movies, along with the host of others that followed in their wake, dramatically demonstrated that ttotal synthetic realism seemed to be in sight. Yet they also exemplified the triviality of whatt at firstt may appear to be an outstanding technical achievement - the ability to fake visual reality. For what is faked is, of course, not reality but photographic reality as seen by the camera lens. In other words, what computer graphics have (almost) achieved is not realism, but rather only photorealism - the ability to fake not our perceptual and bodily experience of reality but only its photographic image. [...]the reason we may think that computer graphics has succeeded in faking reality is that, over the course of the last hundred and fifty years, we have come to accept the image of photography and film as reality.	4. a. Uncanny valley	In the beginning of the 21st century, Manovich (2002) explains in their book The Language of New Media, the origins of photorealism and how it has been developing throughout the years. He also analyses how it is a common opinion that CGI will never be as realistic as images gathered by camera lenses. However, he also counter argues that these opinions are mistaken, explaining why he thinks this and how these CGI is in fact becoming more realistic than traditional photographs (hyperrealism). They also mention that photorealism is often mistaken with realism, as people has the tendency that this movement depicts the reality as we see it through our eyes, when what photorealism has always tried to achieve is the look of the reality seen through a camera lens.
Meena, K. B., and Tyagi, V. (2019). A Novel Method to Distinguish Photorealistic Computer Generated Images from Photographic Images (online). Available at: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8985711 [Accessed 25 April 2023]		4. g. Photorealism used for malicious intentions, issues caused, and solutions in place to help avoid this.	Nowadays, photorealism's quality has become so high and polished that it is difficult to differentiate it from real photographs or live action scenes. This could be beneficial and useful when used with good intentions, but it could also be used with malicious intentions. Meena and Tyagi (2019) argue in their paper, *A Novel Method to Distinguish Photorealistic Computer Generated Images from Photographic Images* , how photorealism, despite revolutionising the filmmake and game industry, how it has also been used with malicious intentions and how important it is to learn how to distinguish real assets from computer generated ones.
Melki, H. (2019). An Investigation Into The Creative Processes In Generating Believable Photorealistic Film Characters (online). Available at: https://pure.ulster.ac.uk/ws/portalfiles/portal/78290411/Henry_Melki_Thesis.pdf [Accessed 25 April 2023]		5. Industry professionals case studies.	To understand photorealism practices amongst practitioners in the industry, Melki (2019), in his dissertation called *An Investigation Into The Creative Processes In Generating Believable Photorealistic Film Characters*, focuses on the process to create photorealistic film characters that are credible, as well as its benefits and challenges. The research also extends to interviews made with several industry expert practitioners with the purpose of comparing of all the statements acquired from the participants.
Wadmare, S. (2021). Recent Trends Visitation in VFX and SFX in the Animation World (online). Available at: http://ijkogretim-online.org/fulltext/218-1617213160.pdf?1688242818 [Accessed 25 April 2023]		3. a. Importance of photorealistic VFX to replace dangerous live action scenes.	Photorealism can be used in filmmaking in many scenarios. For example, to add CG elements (characters, objects, environments) or visual effects that would be impossible or dangerous to shot during live action. Wadmare examines in his essay the importance of photorealistic VFX in filmmaking industry as a tool to avoid shooting dangerous or impossible live action scenes, which techniques are being currently followed to achieve this, and which new trends are arising to make the process easier.
Failes, I. (2020). EPIC'S GOAL WITH NEXT-GEN UNREAL ENGINE IS PHOTOREALISM (online). Available at: https://beforesandafters.com/2020/05/14/epics-goal-with-next-gen-unreal-engine-is-photorealism/ [Accessed 4 June 2023]			