

THE EYES HAVE IT. THE PROBLEM OF THE AVATAR GAZE¹

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1. NOTES ON THE FACIALITY MACHINE: ILLUSION OF VERGENCE OF GAZE AS THE ILLUSION OF LIFE?

The synthetic gaze that I call the “avatar gaze” is never boring. How could it be? It is not a true gaze at all but a synthetic media-simulated gaze. There is no gaze if you are rendered sleepless 24/7 (Crary 2014). There is no gaze if there is no rhythm of life and death, sleep and wakefulness, insomnia and awakening, interest and boredom, focus and distraction, selection and election, but an uncanny existence between life and death. There is no gaze if attention is not allowed to fall asleep and be woken up. There is no eternal gaze. A gaze comes to life, gets tired, gets bored, and ends.

A significant Disney study is related to robotics and the creation of immersive technology in which the simulated synthetic gaze plays an important role: the realistic interactive robot is artificially and mechanically programmed *as if having a gaze*. Hereby, the introduction of simulated saccades is meant for an illusion of vergence — the ability to focus on objects both near and far — to simulate the *gaze at you* instead of non-animated “empty” eyes looking “through you” rather than “at you” (Pan et al. 2020).

This also implies research on how to synthetically create the illusion of being looked at by the human counterpart through automatized animatronic a) *breathing movements*, b) *blinking*, c) *gaze following*, and d) *ocular movement*. All these micro-movements have to be

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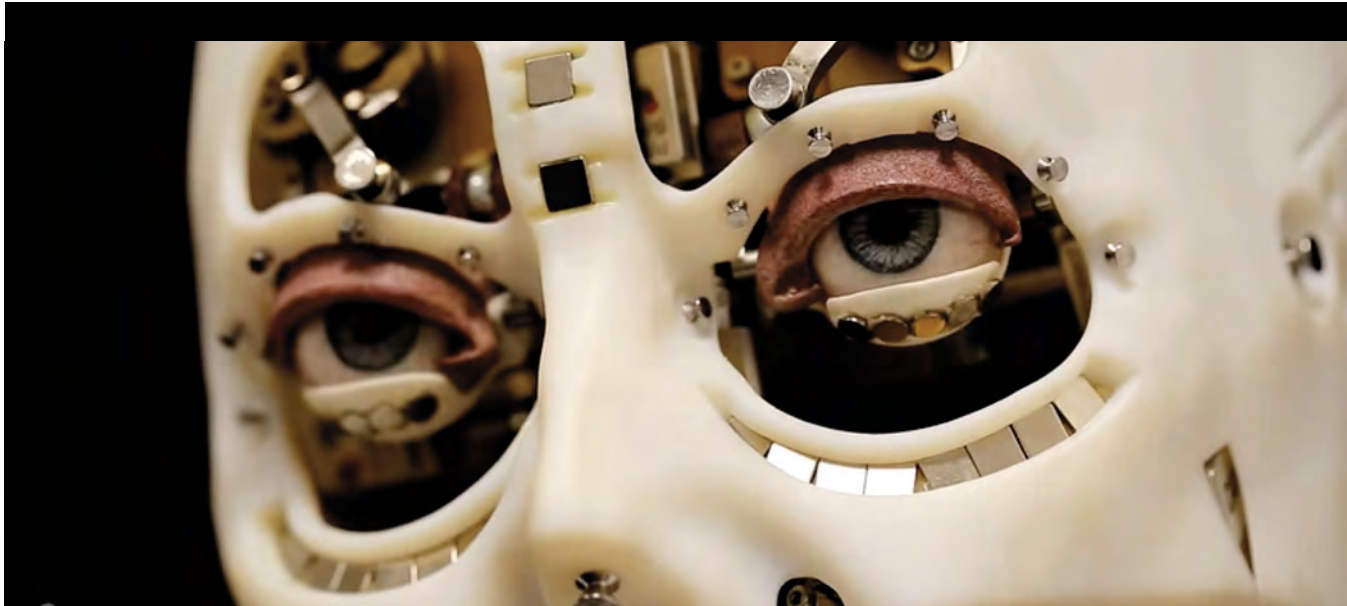


FIG. 1
SCREENSHOT FROM *DISNEYRESEARCHHUB* (OCTOBER 19, 2020).
“REALISTIC AND INTERACTIVE ROBOT GAZE”

YOUTUBE VIDEO RETRIEVED FROM: [HTTPS://WWW.YOUTUBE.COM/WATCH?V=D8_VMWWRJGE](https://www.youtube.com/watch?v=D8_VMWWRJGE)

mechanically reproduced, e.g., by quick motor-redirections, based on mathematical models and their technical implementation for creating the “illusion of life” through animism (Gygi 2018) and animation (Eisenstein 2010). Eisenstein understood the fascination and longing for animism as an *antithesis* to “soulless geometry and metaphysics” (Eisenstein 2010: 118). Do automata ever get bored or fall asleep?

Disney’s research focuses on the analysis of automatic spectator boredom (Deng et al. 2017) and animatronic mimicking of gaze. Disney Research is also tackling the problem of gaze in mathematized digital animations. As each person has different characteristics of the eye—eyeball shape, interocular distance between the two eyes, rotation center (distinct

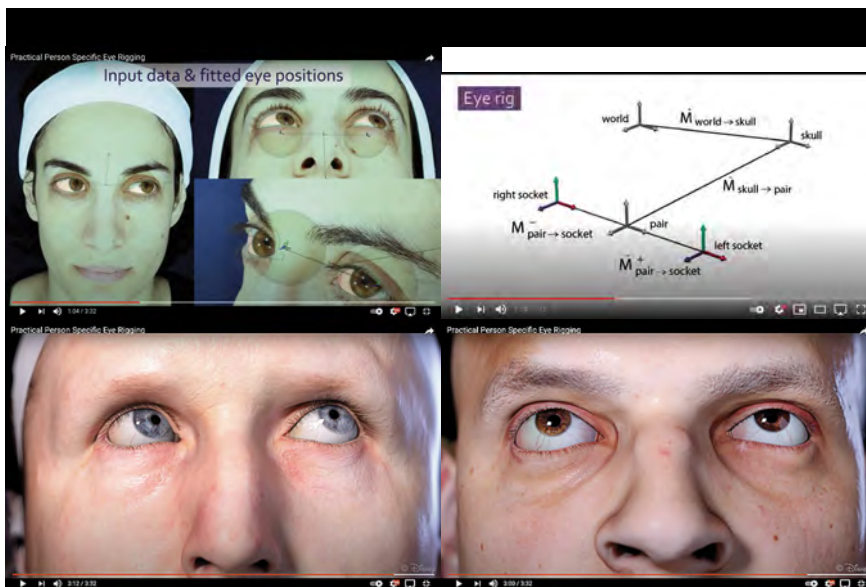


FIG. 2-5
SCREENSHOTS FROM *DISNEYRESEARCHHUB* (MAY 27, 2019).
“PRACTICAL PERSON SPECIFIC EYE RIGGING”

RETRIEVED ONLINE: [HTTPS://WWW.YOUTUBE.COM/WATCH?V=SQGOTUC8R5G](https://www.youtube.com/watch?v=SQGOTUC8R5G).

from the geometric center of the eyeball), and specific visual axis (different from the optical axis)—this animation research concentrates on the eye motion characteristics of each individual that is reproduced as a believable digital character. The approach includes *eye tracking* and gaze estimation, capturing and modeling the eyes, and *eye rigging* estimation (Bérard et al. 2019), using 50 *eye poses* that reconstruct the overlapping averaged eye poses of limbus, eyelid interface, and visual axis—resulting in animation-ready eye motion characteristics of each animated face.

Visual axis defines the gaze and is not identical with the *optical axis*. To neglect this difference results in cross-eyed gazes and uncanny valley effects due to inaccurate eye movement animations. Eye rigging for simulating eye motion characteristics for each Avatar includes taking into account the fact that the eye is not perfectly spherical and therefore does not exhibit rotation around all axes. This means for the accuracy of the eye estimation that a person-specific eyeball shape, rotation center, interocular distance, visual axis, and other rig parameters resulting in an animation-ready eye rig have to be considered:

“a) The eye is controlled by six muscles (two per degree of freedom), which operate in a complex orchestrated way to rotate the eye. b) The gaze direction is not aligned with the optical axis of the eye (...) but corresponds to the visual axis (...), which is formed by the ray passing through the center of the pupil originating from the fovea at the back of the eye, which is the area where the retina has the highest sensitivity.”
(Bérard et al. 2019: 442)

2. WHAT IS IT THAT IS MISSING IN THE COMPUTER-ANIMATED FACIALITY MASK AND SYNTHETIC GAZE? CAN WE PUT IT BACK?

“Let it be assumed that lines drawn directly from the eye pass through a space of great extent (...)” Euclid, *The Optics of Euclid* (1945: 357)

“The radiating gaze /Euclid’s tà optiká (300 BC) can be read as the ethical complement to his much better-known geometry. The book deals with rays emitted by the eye. These rays are something for which both words and sense have been lost.”
Ivan Illich (1995: 52)

The gaze is a phenomenon that awakens and falls asleep; it is based on the surprising and spontaneous *election* (Gerner 2011) of what grabs our attention in the world and cannot be reduced to a programmed, pre-selected set of possible entities. In the gaze, a visible difference exists in the comparative synchronization of the same and the other.

As the avatar moves forward and acts *as if* a human with faciality, it must be critically scrutinized as it transposes our imaginative openness of gaze towards the other into prosthetic concrete movement—and that the gaze of the one meets the gaze of the other. This encounter of regarding in a vis-à-vis means, for Plessner, reciprocity between me and the other in which we can switch to the position of the other and become an other for each other:

(...) the gaze that meets the gaze of the other. In it we have the elementary phenomenon of reciprocity between me and the other. As soon as my gaze meets the other’s eye, I see myself looked at, gazed at – and not only (in the manner of the ophthalmologist) the eye is examined. The other not only has a look, but gazes at me and thus stands in the position of the vis-à-vis, as the one with whom I can exchange positions. In this interchangeability of the point of view, which his gaze testifies to me, he is an Other, I am an Other for him. (Plessner 2016: 384; translation mine)

2.1 THIS GAZE DOES NOT EXIST: ON THE MISSING GRAVITAS OF ATTENTION IN THE AVATAR GAZE

Ethical, aesthetic, and social difficulties derive from normative issues in computer-assisted and modeled *ghosting* of already deceased famous actors in cinema, such as *ghost acting* (Winick 2018). In this case, face tracking, face matching, and face transfer use computer



FIG. 6

DE-AGED CGI SELF-AVATAR FACE OF THE ACTOR ROBERT DE NIRO IN *THE IRISHMAN*.

SCHAEFER, S. (SEPTEMBER 2, 2019) "THE IRISHMAN: DE NIRO RECREATED GOODFELLAS SCENE TO TEST DE-AGING CGI," SCREENRANT. [HTTPS://SCREENRANT.COM/IRISHMAN-ROBERT-DE-NIRO-GOODFELLAS-DE-AGING-TEST/](https://screenrant.com/irishman-robert-de-niro-goodfellas-de-aging-test/)

generation to display the face of a dead actor through a mask as a digital over-coding onto the face of another actor for the digital reenactment of expression, mouth, gaze, pose, or even the whole body. The techniques of deep neural networks using deep fake technology create believable media (Mirsky & Lee 2021) that are applied in digitally altered film acting. Another example is *de-aging*. In this technique, an actor works with a self-mask wearing his or her younger digital face-mask (where the problem of *young face-older body dissonance* is easily noted as uncanny—as was the case for the character played by the actor Robert

DeNiro in Scorsese's *The Irishman* (2019). Scorsese, according to the *Guardian* newspaper, commented that there was a problem with the expressiveness of his actors' eyes, adding: "Does [the technique] change the eyes at all? If that's the case, what was in the eyes that I liked? Was it intensity? Was it gravitas? Was it threat? And then how do we get it back? I don't know." (Scorsese, cit. in Salmon 2019)

As in the case of paintings where an animal's eyes seem to follow us, gazing back on us and stimulating our imagination, we experience the fact that the animal gaze has *gravitas*. In that case, we believe that the animal other's gaze is responsive, weighed by temporality and mortality,

and possibly sparking an interest between estrangement and trusted familiarity, gravitating around awareness, curiosity, seriousness, uncontrollable and unexpected danger, that may surprise us. The sense of face, if the gaze is well captured, provides a sense of rendering the possible other's presence real and visible—inside an anthropological-evolutionary advantage of enhanced human visibility (as a hunter), but as well with an increased risk of counter-violence in becoming visible to the gaze of the other, e.g., as prey.

FIG. 7 ABRAMOVICH'S PERFORMANCE OF THE GAZE, CONSISTING OF NEARLY 750 HOURS OF



SITTING OPPOSITE OVER 1500 MUSEUM VISITORS, OF WHOM PORTRAITS WERE TAKEN: "THE ARTIST IS PRESENT" MOMA, NEW YORK, 2010.

A gaze responds differently in each new scene. The gaze of the other is alterity in action. In the gaze of the other, mere visual-spatial, directional, and textural data as noise becomes social co-resonance with the other. It shows our face to the other and holds the other in our regard, but "with the other's eyes" (Plessner 2017). A stranger can reciprocate a gaze

that becomes an exchange: currency of the social and cultural necessities of perception open up a spontaneous field of modes of possible encounters — sociality is possible. The modality and cultural-historic regimes of gaze prompt responding modes of action. Thus, the gaze endows us with the other’s attention, forcing us to *act accordingly*. In so doing, we hold each other responsible in one another’s gaze.

A gaze without gravitas would be emptied from the possibility of *pairing the gaze with the other* where almost nothing happens—but this “almost nothing” is the gaze that happens face-to-face with the other, hooked on the necessary imagination and mimesis, as the other looks at you. An example of an art of pure gaze would be the Abramovich performance: “The artist is present” that is strictly about pure gaze and the openness of what it possibly could trigger as a response (see fig. 7).

A solipsistic, sleepless, endless *parallel avatar gaze* that fails to create a face-to-face situation, a shameless or riskless gaze: this is a *synthetic* faciality mask that has no face to lose (see fig. 8). A mathematized surface of synthetic faciality looks through you—“withdrawn” into endless infinity. The avatar gaze would be an extinguished gaze from and towards nowhere—one that does not *look at* you but redirects you to the same: the avatar holds a *gaze from nowhere*.

As there are no dreams that the avatar gaze dreams up, we want to look more closely at Scorsese’s statement and the complexity of what he designates as a faulty deal: he wanted a younger actor’s face and got a CGI face with an attentional engine that does not show the temporal experience of its actor, but rather an animated and mathematically constructed faciality mask that exists outside of time.

2.2 THE EYES HAVE IT?

Even animated faces and their eyes become issues in the dispute over their acceptability and their uncanniness. A case was made by fans against the designed (and behavioral) human-like hyperrealism of eyes and the *imitation game of human-likeness* in CGI with the cinematic adaptation of the Sega videogame Sonic in the film *Sonic—The Hedgehog* (2019). In two different versions of test trailers, fans were upset about the appearance—too close to human eyes—of the character and in a subsequently accepted criticism the director Jeff Fowler (@faultown) announced on Twitter on June 2, 2019 in a message that received 175,000 hits: “Thank you for the support. And the criticism. The message is loud and clear... you aren’t happy with the design & you want changes. It’s going to happen. Everyone at Paramount and Sega are fully committed to making this character the BEST he can be...” #sonicmovie #gottafixfast.

If Robert de Niro lends his face to a de-aging CGI treatment, we might want to call his younger digital face a faciality avatar. Algorithmic rationalities (cf. Mersch 2021), including mathematical modeling in the culture of AI, expand machine learning and artificial neural networks that work with statistics and algorithms into (yet) non-mathematical realms, creating among others programmed



FIG. 8
THIS GAZE DOES NOT EXIST: SYNTHETIC IMAGE WITH AVATAR GAZE CREATED BY “GANISM” – A GENERATIVE ADVERSARIAL NETWORK STYLE GAN2 SMILING FACIALITY RECONSTRUCTION CF. WANG 2019; KARRAS ET AL. 2019
RETRIEVED FROM [HTTPS://THISPERSONDOESNOTEXIST.COM](https://thispersondoesnotexist.com), SEPTEMBER 6, 2021, CREATED AT THE TIME OF 15:54 P.M.



FIG. 9
SCREENSHOT OF THE MOVIE *SONIC – THE HEDGEHOG* SHOWS TWO VERSIONS OF THE TRAILER – ABOVE WITH UNCANNY EYES BEFORE THE CRITICISM AND BELOW AFTER THEY WERE CHANGED. SEE: KINOCHECK.COM (2019)
[HTTPS://WWW.YOUTUBE.COM/WATCH?V=FM2SVYAQYFU](https://www.youtube.com/watch?v=FM2SVYAQYFU)

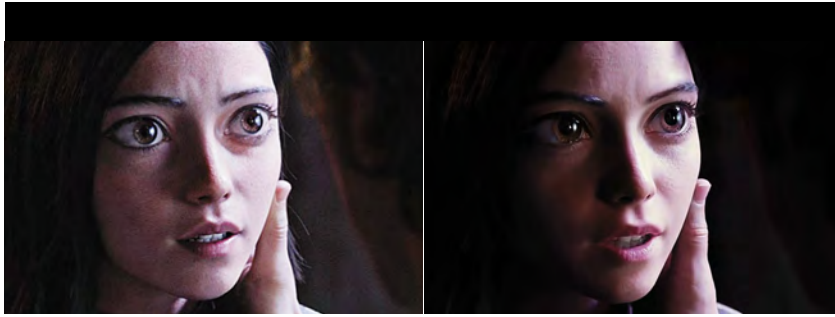


FIG. 10
 FIXING THE UNCANNY EYES
 OF THE CGI CHARACTER IN
 THE FILM *ALINA: BATTLE
 ANGEL* BEFORE (FIG. 10, LEFT)
 (TWENTY CENTURY STUDIO
 SINGAPOR 2017, FIRST TRAILER)
 AND AFTER (FIG. 10, RIGHT) IN
 THE FINAL MOVIE VERSION
 2018 WITH ENLARGED PUPILS
 AND EYEBALLS THAT ARE CON-
 STRUCTED TOPOLOGICALLY AS
 EYE-SPHERES. DO LARGER EYES
 RENDER COMPUTER-GENER-
 ATED EYES MORE “REALISTIC”,
 MORE ACCEPTABLE AND LESS
 UNCANNY IN THEIR DIFFER-
 ENCE TO HUMAN EYES?

sociality (Gerner 2020; Bucher 2018), while at the same time aiming at artificial creativity. Algorithmic rationality in digital faciality, despite producing “similar” faces and deep fake facialities of persons who do not exist, is limited by what cannot be decided by a program.

In this sense the website “This person does not exist” wants to alert us to the existence of non-human human-like images created by AI algorithms, but are these algorithmic facialities able of a human gaze? Might we confuse an animated image with a gaze of another living creature?

Such an algorithmic image could be called an *image singularity*, as it merely comes into existence when the site is clicked

upon; in the next click the algorithmic data is reorganized to become yet another different automated image-output—to create another “person” that does not exist.

The attribution of non-existence lies in the eyes of the spectator who, by his or her technological involvement in the visualization algorithms, actually co-triggers the image that does not refer to any real-life person whose gaze one could meet. However, the biggest problem of social interaction in sharing attention—sometimes called “the eyes have it” (Emery 2000)—remains unresolved by AI. Facebook is currently attempting to tackle this problem with the high-fidelity Codec Avatars that simulate *social presence*, considering faces and using coordinated audio- and gaze-driven animations for photo-realistic real-time relighting of animatable face avatars (Sai et al. 2021).

Facebook’s integrated facial, eye, and speech AI algorithm remains in the realm of the simulation and animation of facial landmarks and facial maps. Physiologically, the white sclera prepares humans (Kobayashi/Koshima 2001) for social attention, known as “joint attention” in social psychology, anthropology and philosophy. Still, the mutual gaze is different from the physiological reality of the eyes as part of a sense of face. The social “other” in this situation of joint attention—a key feature of human social cognition—in a mutual gaze encounter triggers a categorically different social function than the mere physiological biology of visibility of an object provided by the visual organ of the eyes. Joint attention implies cognitive, behavioral, and phenom-

enological aspects including common, mutual and shared attention (Siposova & Carpenter 2019), involving knowledge, goals, and shared affectivity. Can these sensible and fragile situations of joint attention be simulated by an AI model that includes an avatar with a simulated gaze?

If we delve into the question that the filmmaker Martin Scorsese is asking—what precisely it is that we relate to if we look at the eyes of the other, such as the intensity or even “gravitas” of an actor’s gaze—we should look at the interesting empirical research on the issue of the extramissionist attribution of attention to the other as a fundamental problem of the social in social perception of gaze and visual joint attention.

2.3 CAN AVATARS SIMULATE THE EXTRAMISSIONIST ATTENTION BELIEF THAT THE EYES PROJECT LOOKS OR EMIT RAYS OF LIGHT?

Can we think of a folk psychological model we use permanently in a social co-attention and joint attention situation in which the “eyes have it” (Emery 2000)? This hinges on a socially strong condition of attention capture and attention maintenance with the proximity

of the other. A possible, but unorthodox explanation of “the eyes have it” could be an until now unknown fundamental physical force embedded in the eye-gaze—in parallel with the cosmological physics debate on the possible existence of an until now unexplained dark matter of quintessential force that would theoretically push the universe faster apart than contemporary physical explanations. Could it be possible that there exists a special force by which our eyes, through their gaze, emit light on objects in space?

Recently, Arvid Guterstam et al. (2019) showed that despite explicit knowledge of the test-persons that the eyes neither emit light nor any kind of force-carrying beam in an extramissionist sense of attention, we are nevertheless subconsciously prone to the claims of these metaphysical-metaphoric models. Humans believe even subconsciously in the force-emitting capacity of the other’s gaze. We endow the other’s gaze with a power over objects in a commonly perceived world. This nonsensical notion of an attentional emitting gaze able to affect objects at a distance nevertheless has to be read within “the view that the sense of agency relies on causal inferences between actions and effects” (Recht/Grynszpan 2019: 7). Although this specific extramissionist attention beam does not exist, its imaginary-experiential strength reflects how we construct counterfactual—on the physical and physiological level—metaphorical everyday experiential and intentional folk beliefs regarding the social power of proximity and our perception of the gaze of the other, resting not upon a foundation of a third-person physical fact, but on metaphorical experiential-psychological first-person evidence (in our case on the social importance of the gaze and shared attention for our social behavior). As Edward B. Titchener already noted at the end of the 19th century, such beliefs are “based on a misinterpretation of fact” (Titchener 1889: 895) in which *we become susceptible to the attribution of the other actor’s attention* with the interpretation and belief of a force-imposing amplification of the other’s gaze. This means that the constitutive look of the other that constitutes me as a person, the foundational act of becoming an intentional object in the gaze of the other, is related to the sensory imagination of a metaphoric beam or spotlight based on the mere reality of visibility through light.

This imagination of the emission of light through the eyes is a *false* popular belief that may create in the observer an “uncanny feeling” inscribed in a cultural history of invisibility *still to be written*, as the idea of extramissionist eyes emitting light is contrary to the function of the eyes as part of seeing, linked to the visual nerve and the different brain circuits involved primarily in *receiving* and *not emitting* light to form the images seen.

If we think in terms of the experiential field approach of Kurt Lewin, we have to heed the transformation of a peaceful landscape into a battlefield (Lewin 1917: 447) and vice versa. This phenomenological switch indicates how peaceful zones may quickly turn into combat zones of social-psychological danger that suddenly turn from an idle or aesthetic appreciation of open landscape into a hunter’s gaze.

What is crucial in Kurt Lewin’s trailblazing description of the field psychology of the war landscape, published in 1917, is the clear-cut distinction between two different kinds of landscapes: on the one hand, the *mathematical-topological* and *vector-concept of space* that is *open*—principally in all directions/vectors and equally—*to infinity*, and now, on the other hand, the “directed landscape” (*gerichtete Landschaft*) that replaces it. This “directed landscape” is an intentionally and experientially structured landscape or lived and limited space that has to be heeded as a *socially experiential lived place* and contains not light beams, but calculated vectors of the other’s active and open attentional gaze, which we never catch (Finkielkraut 1997: 12–13). Catia Pesquita and colleagues found that “humans are sensitive to subtle differences in bodily cues that occur when someone else’s attention is controlled by an internal choice vs. an external signal” (Pesquita et al. 2016: 1).

The activity and empathetic relation to mathematized actions I call externally “programmed action.” Programmed action is a forced transposition of intentionality: a “programmed other.” This programmed other—paradoxically—suspends the characteristics of alterity. We might observe such a characteristic alterity suspension in the application of DeNiro’s de-aged mathematized facial mask in *The Irishman*. Scorsese calls it a loss of

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