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# Cutting into the skin: Ritual, algorithms and abjection in Amygdala

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“It is not then an absence of health or cleanliness which makes something abject, but that which perturbs an identity, a system, an order; that which does not respect limits, places or rules.”

— Julia Kristeva, *Approaching Abjection*

*Amygdala* is an artwork by Marco Donnarumma included in his cycle *7 Configurations* (2014-2019), a series of installations and performances that focuses on the conflicts surrounding the human body in the era of artificial intelligence (AI). The cycle features a set of five experimental prostheses, including, along *Amygdala*, a facial prosthesis which blocks the wearer’s gaze with a mechanical arm and two robotic spines that function as additional limbs without a body. Created by Donnarumma in collaboration with designer Ana Rajcevic and engineer Christian Schmidts, the prostheses are first hand sculpted, then modelled in 3D software, 3D-printed, assembled and refined again by hand. Some of them are enveloped by bacterial biofilm cultured by bioartist Margherita Pevere. All of them were created starting from an initial blueprint, which was adapted in terms of anatomy and morphology to the particular needs of each artwork in the cycle.

*Amygdala* was created during three years of research, between the beginning of 2016 and the end of 2018, and the latest and last iteration is the third in a series named after weapons

prototypes, MKI, MKII, and MKIII. *Amygdala* is a robot in the form of a uncannily human-like limb. It is, technically speaking, a prosthesis, albeit an eerie and unconventional one. Instead of a hand, the robotic limb presents a sharp steel knife and instead of aiding a human body, it cuts its own. The robot is embedded with a small FPGA computer board which runs an AI software coded by myself. Nested inside an industrial-grade server cabinet, the same type of those used in server farms, *Amygdala* uses the knife as deftly as possible to cut the skin of its own body. The AI enables the robot to move in a markedly organic and animal-like manner, making its labour appear careful and considerate. Cut upon cut, centimetre by centimetre, the skin is gradually torn into pieces until, normally after three to four months, the skin dries and becomes too hard for the knife to cut.

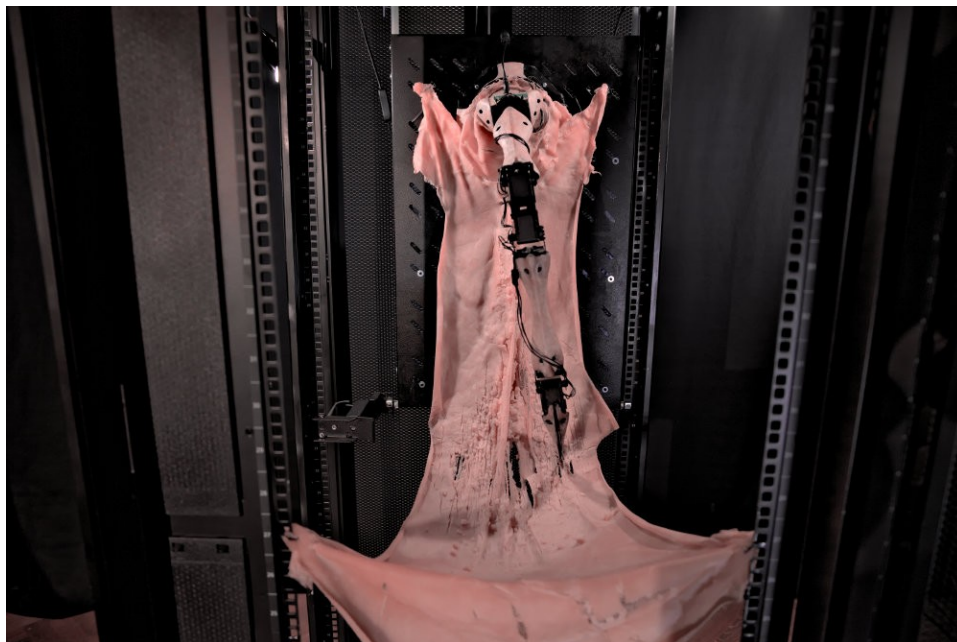


Figure 1: *Amygdala*. installation view at Baltan Laboratories, Eindhoven, 2018. Courtesy of the artist.

The robot's *raison d'être* is to learn an animistic ritual of purification known as 'skin-cutting', a form of scarification which consists of cutting one's skin in specific patterns.<sup>1</sup> Skin-cutting is a recurring element in several initiation ceremonies practised across Papua New Guinea, Africa and Eastern Asia. The modality of the cutting and the particular patterns drawn on the body vary from one society to the other. Among the Chambri tribe of the Sepik area in Papua New

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I *Amygdala* is intended to be neither an illustration of animistic skin-cutting ritual, nor a misappropriation of a ritual narrative belonging to animistic cultures. To this end, the robot, its behaviour and the overall set up are designed in particular ways. For instance, *Amygdala* does cut a particular pattern, but, in contrast to the complex and visually rich patterns created among animistic societies, its patterns are unsophisticated, unpredictable and essentially invisible. The robot, in fact, does never repeats the same movements, and upon each of its cuts the skin is torn into pieces that crumble and enmesh with one another.

Guinea – whose ritual practices inspired *Amygdala* - skin-cutting is one phase of a complex initiation ceremony. This includes a period of prolonged fasting, a phase of knowledge transfer, when the genealogy and the myths of the tribe are passed from the adults to the initiates, a period of healing, when the wounds are medicated and monitored, and a closing communal celebration (Gewertz, 1982).

## Skin and Catharsis

An in-depth description and analysis of the ritual is beyond the scope of this essay, yet I must give enough detail and context to faithfully and respectfully talk about the ritual without misappropriating it. A useful resource to this end is the field work of Gewertz (1982, p.287) with the Chambri. In this tribe, initiation rituals are performed only among men, but initiation or purification rituals in animistic societies may include women or men or both.<sup>2</sup> Gewertz describes that at the onset of the Chambri skin-cutting ritual, the *tsambunwuro* (the brother of the initiate's father) lays with his face down onto an overturned canoe, while the initiate lays, in turn, on the back of the *tsambunwuro* with his face down onto the other man. The skin-cutting is then performed by a scarification expert within the tribe and is completed in about ten minutes with around a hundred vertical cuts on the back, buttocks and upper thighs of the initiate. The belief subtending the ritual emerges from the tribe's own cosmology and has to do with an innate pollution (Douglas, 1966), or impurity, borne by the child. The Chambri believe that the bones of a child originate from the father's semen, while his flesh and blood derive from the mother (Gewertz, 1982, 317-318). The bloodletting resulting from the scarification is aimed at freeing the initiate of his mother's blood, which is believed to weaken him. According to the Chambri, through the experience of pain, bloodletting and the body-altering wounds resulting from the ritual, the boy is purified from the mother's pollution, re-owned by his father and thus able to face the challenges of adult life.

Far from being exclusively a primordial practice, rituals of bloodletting are also present today in monotheistic religions and popular western culture. In Italy and Lebanon, for instance, there exist multiple rituals involving flagellants, devotees who, on occasion of particular religious celebrations, engage in blood letting rituals in presence of members of their families and town

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<sup>2</sup> Among the Warlpiri, for instance, who live north and east of Alice Springs in the Tanami Desert in Australia, women draw inscriptions on their skin in ritualised actions (Biddle, 2001). Those interested in the gender implications of these rituals may find relevant Gewertz's work on the roles played by women in the Chambri tribe, "A historical reconsideration of female dominance among the Chambri of Papua New Guinea" (1981).

community (Loi, 2018). An example is that of the *vattienti* in Nocera Terinese, a small town in the Catanzaro province in Italy. During the last days of the Holy Week, the *vattienti* gather in a *catuajo*, a storehouse, and cause their legs to spill blood freely by hitting them with two ad hoc tools: the *rosa* (rose), a carved and polished cork piece in a cylindrical shape -which increases blood circulation, and the *cardo* (cardo), a separate piece of cork into which thirteen shards of glass are cast with beeswax – which pierces the skin and blood vessels. The *vattienti* then proceed through a devotional tour ending with them leaving hand imprints with their blood on the walls of the local church. Interestingly, in the past, the ritual has been fought by Christian authority and more recently seems to be more tolerated (Ferlaino, 1990).



Figure 2: Detail of *Amygdala's* knife cutting into the skin. As it is manipulated by the knife, the skin folds and undulates, closely resembling real human skin. Courtesy of the artist.

Beyond religion, the acts of letting blood out of one's own body and of marking one's own body with permanent scars is a persisting practice in other folds of western culture. Blood letting and scarification have found their way into western practices of body modification (Featherstone, 1999), while skin-cutting as self-mutilation - performed without a suicidal intent - is studied as a pathology among western population (Favazza & Rosenthal, 1993).<sup>3</sup> It could be said that there is something about skin-cutting and bloodletting practices that human culture cannot rid itself of. In the animistic and religious examples described above, skin-cutting, and the ritualistic performances it belongs, form the foundation of familiar life, social belief and societal structure. It is a public, collective form of purification included in a larger framework of ritual life that people inherited from their ancestors. In western culture, the practices of scarification and self-mutilation, while historically distanced from animism and religion, are

3 In psychology, this type of skin-cutting is most commonly examined as a symptom of mental disorder and as a pathological syndrome, but scholarly efforts have been made to open up the analysis of self-mutilation to the experience of those practicing it (Le Breton, 2018).

unequivocally an element through which many identities are lived through. While a detailed analysis of the context and implications of these diverse forms of skin-cutting would require a dedicated study, what is important here is that these diverse forms of skin-cutting share one common key: they all are cathartic experiences. They are intentional acts providing psychological release through the experience of pain.<sup>4</sup>



Figure 3: After each exhibition of *Amygdala*, the sculpted, dried skins are removed from the robot's body and collected. The series of skins is an artwork in itself, known as *Calyx*, which can be exhibited together with the robotic installation or as an independent piece. Courtesy of Paweł Józwiak.

## Ritual and Order

*Amygdala* reflects this human need for catharsis back to the human. The artwork reanimates a key symbol of human collective history - an ancient ritual of purification - through the glare of today's technocratic society. The ambiguity of the robot's actions, coupled with the popular and subjective knowledge those actions conjure up, entrust the visitor with the responsibility of defining what they are seeing: Is the machine learning a ritual, mutilating itself, surgically operating its own body, or adorning it? Is it, perhaps, a metaphor of capitalistic societies, as they drive themselves and the whole planet to a catastrophic end of civilization? Rather than trying to make a statement on the symbolic meaning or value of purification rituals, I see *Amygdala* as a mirror which can reveal the belief and cultural background of those who encounter it.

To discuss ancient ritualistic practices in the context of today's algorithmic societies is made complex by the lure of 'Primitivism'. As Stephenson (2015, 2) notes, in modern western societies the influence of Protestantism and Enlightenment has driven an increasing segregation of ritual practices to the margin of the cultural discourse. By claiming a supposed superiority of Modern and Postmodern knowledge to animistic cosmologies, ritual has often been deemed primitive in the most negative sense of the term, a thing of the past which the modern 'Man (sic)' has long and justly forgotten. This self-complimenting paradigm on the part of the western white man has been rightly put into question often times, and today there seems to be a process of re-appreciation of ritual knowledge – although it is often accompanied by a sort of exoticism and romanticism. What is relevant here is that, as Stephenson (2015, 3) aptly states, ritual is both an action and an idea, it is something that, in my view, allows to examine the historical narratives of social inclusion and exclusion, in animistic societies as well as in algorithmic ones.

*Amygdala* uses the action and the idea of ritual to force a reflection on the history, the present the future of social categorization. It emerges from the observation that rituals of purification and AI share a key role in the politics surrounding the human body: they are both means of social categorization. Rituals of purification – or of initiation – are some of the most ancient means of social ordering. In both animistic tribes and religious societies, participation to these rituals, often via payment of goods or money, means for the initiates to enter the realm of adulthood and thus to be granted access to social positions. In algorithmic societies, where religion and collective ritual have been superseded by techno-determinism and the commodification of individualities, social order is established through participation in a different kind of ritual: the construction of one's online identity on social media. To build and maintain an online identity today means to give away a broad range of personal data which then go on to fill corporations-owned databases. The latter are crawled by AI algorithms designed to classify people in the finest nuance so as to enable categorization and micro-targeting (Ali et al., 2010; Morgan, 2018). This data is used by governments, and the corporations who may assist them, to take decisions over policies, welfare, insurances, benefits, prison, or, as it was revealed more recently, to shift public opinion and political discourse. In short, by providing private data through social media activity, one is categorised, put into place. And those who are not willing or able to have an online identity fall prey of the sociocultural biases embedded in algorithmic categorization systems, often without having a possibility to counteract (Ananny & Crawford, 2018).

But what does social media activity has to do with ritual? The parallel may seem odd at first, but with due elaboration it may become more immediate to grasp. As explained by Stephenson (2015, 76), ritual tends to be seen as a practice involving exclusively out-of-the-ordinary actions, but studies of ritual have shown that “any behaviour can be ritualized”, even ordinary everyday activities. Stephenson (2015, 76-77) continues by identifying six means through which ordinary action is ritualised: a) repetition, b) prescription and regularization, c) elevation of the action by link to the sacred, d) temporal framing, e) invocation of powers, f) performance of the action with a specific attitude. Here one can begin to understand how social media activity may become ritualised. At a closer look, it is not difficult to see that social media deploys at least four of the six means indicated by Stephenson. To maximise visibility, engagement, and feedback, one’s social media activity has to be: a) repeated constantly everyday b) through interfaces and modalities that are highly prescribed and regulated, d) in mostly defined and recurrent time frames and f) with a manifest emotional engagement. Through this means, activity on social media may become ritualised. What is more, the means exploited by corporations to ritualise the usage of their social platforms are the same means through which they promote maximisation of an individual’s social currency.

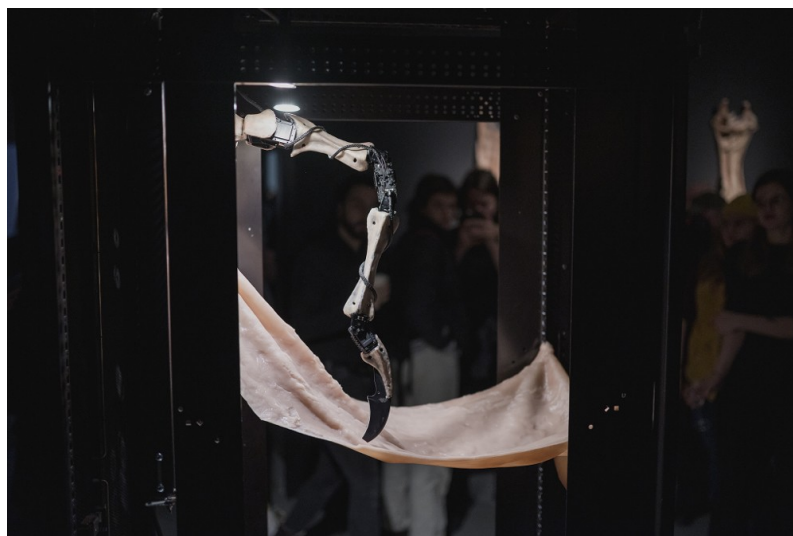


Figure 4: Audience members take pictures and videos of *Amygdala* during the exhibition at the Laznia Centre for Contemporary Art, Gdańsk, 2019. Courtesy of Paweł Józwiak.

There is another crucial aspect though which requires to elaborate on the degree of ritualisation of social media. From the arguments above one can notice that social media activity misses two elements of ritualisation, that is, the link to the sacred and the invocation of powers. Thus, while activity on social media can be seen as a ritualised behaviour, at least to the degree argued earlier, it lacks the dimension of the sacred, it is devoid of a connection to cosmological systems

or mythic powers. This is one of the complex facets of advanced capitalism, so poignantly exposed by Fisher (2009, 4): “Capitalism is what is left when beliefs have collapsed at the level of ritual or symbolic elaboration”. Social media is ritualised through repetition, prescription, temporal framing, and manifest emotions and, as such, it can function as a cathartic means for an individual. But, in opposition to purification rituals that offer forms of collective catharsis, social media participation is a ritualised behaviour that polarises and alienates. It is a system unfit to help releasing collective social tensions, for it lacks the uniting force of communal performance and the authority of a commonly shared cosmology. The belief in the stuff of the ritual have collapsed, disintegrated. All is left is a ritualised activity that is performed by mechanically interpreting symbols, a performative act void of belief and of history.

## Engineering paradox

*Amygdala* is an autonomous prosthesis, a living paradox. In the following, I elaborate on the technical and conceptual factors that make it so. This requires a brief technical digression on the inner workings of *Amygdala*. In robotics engineering, the computational system underpinning *Amygdala* is called a hybrid controller. This consists of two parts: a central pattern generator (CGP) and a sensory information processor (Still & Tilden, 1998). In *Amygdala*, the CGP is an algorithm reproducing the behaviour of a ring of coupled oscillators, and thus generates periodic signals, akin to sine waves. The periodic signal output by the CGP is translated into voltages that physically move a servo motor.

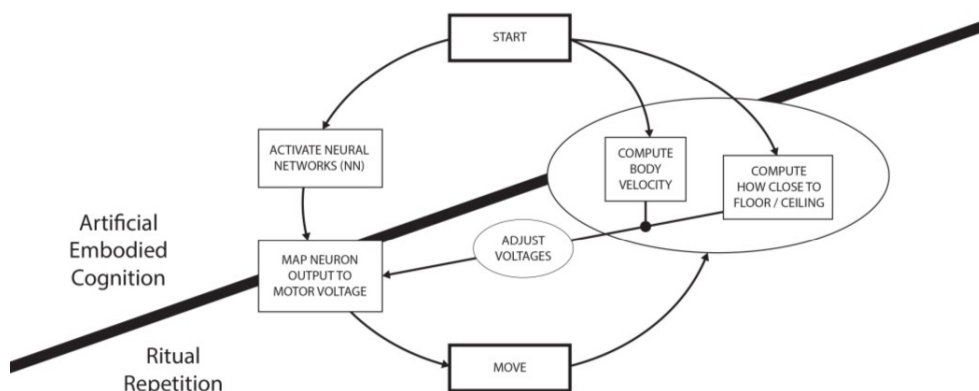


Figure 5: Block diagram illustrating how the robot's neural networks generate movement and how they adapt to the external environment. Courtesy of the artist.

The sensory processor is a different algorithm which captures and analyses information on voltages and angle of a servo motor. The CGP and the sensory processor communicate with each other, so that the sensory information becomes a parameter of the oscillators; in other words, the periodic signal driving a motor is constantly modified by the sensory information collected by the robot. For example, the sensory processor computes the velocity of each ‘limb’ by analysing the continuous angle values of a motor, and then translates the velocity of the limb into a parameter of the pattern generator.

Essentially, the hybrid controller is a particular type of neural network which applies the principle of biomimetic adaptive algorithms. These are information processing algorithms inspired by biological nervous systems and are used in the development of both humanoid and non-humanoid robots to endow a machine with animal-like behaviours (see an example in Yu et al., 2004). The hybrid controller guiding *Amygdala* is implemented in the programming language Forth by myself, with contributions by Alberto De Campo. The controller leverages the Behaviour Design Environment (BDE), a software/hardware platform designed by our scientific partner, the Neurorobotics Research Laboratory.<sup>5</sup> In the making of *Amygdala*, we repurposed the BDE to enable the robot, which lacks a complete body, to self-explore its behavioural capabilities from scratch; that is, without any given model of its own morphology or environment. By moving freely, the robot collects information about itself and its surroundings, and by continuously adapting its movements to that information, it dynamically evolves its behaviour. In addition, I developed a reinforcement learning algorithm, which provides the robot with ‘memories’ of its own actions. When *Amygdala* performs a movement resulting in its body being unable to move further, for instance, data describing the conditions of that movement is stored in its memory. As the robot finds itself in a similar set of conditions, it ‘remembers’ its previous experience and moves differently.

As the other prostheses in the *7 Configurations*, *Amygdala* is a useless, paradoxical object; it is purposely designed for the human body, but it does not aid or enhance the body, it rather decontextualises bodily functions and misuses them for its own purpose. *Amygdala* embodies three paradoxes that are, at once, conceptual and technical. First, it is a prosthesis that behaves independently from a wearer. The wearer actually does not exist and the machine is left to its own devices. The robot’s AI is an approximate emulation of the sensorimotor system found in mammals.<sup>6</sup> Similarly to animals then, the robot generates its own movements interactively in response to the stimuli and information it receives from its own body and the environment. In

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<sup>5</sup> The BDE is the result of over a decade of investigation by the Neurorobotics Research Laboratory and is used today for teaching and researching how humanoid robots develop forms of intelligence. See <http://neurorobotik.de>.

other words, *Amygdala*'s movement are not pre-programmed, and there is no fixed set of movement instructions it can follow or learn from.

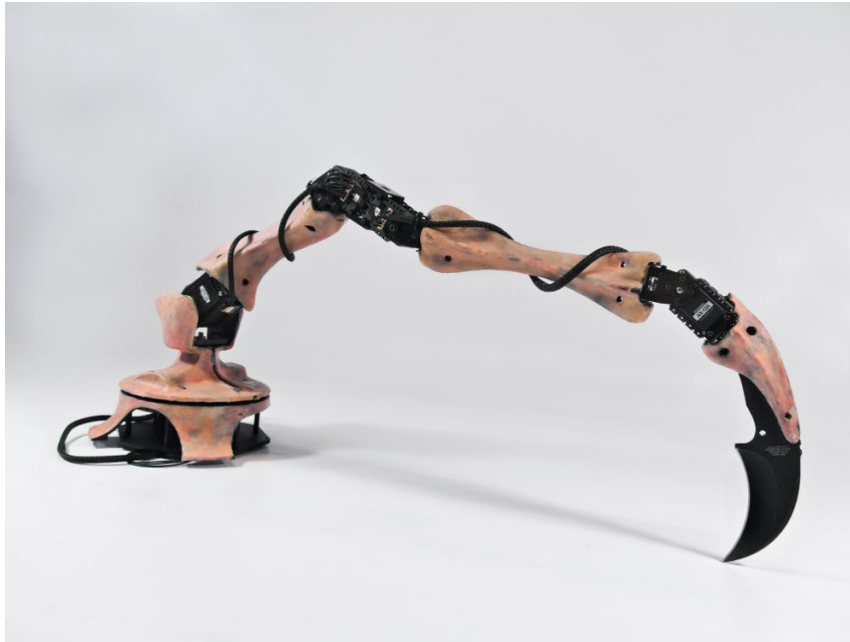


Figure 6: Picture showing *Amygdala*'s body when removed from its server cabinet. The robot is technically a prosthesis, but it lacks both a body to attach itself to and a functionality to serve. Courtesy of the artist.

Second, unlike most AI robots found in both the arts and industry, *Amygdala* does not have one determinate goal and does not strive to improve human life. Put bluntly, *Amygdala* simply minds its own business. Because it lacks a definite goal, the robot keeps learning endlessly. And because it lacks any criteria of success, the robot learns by doing. By attempting different kinds of movements and learning from them, *Amygdala* teaches itself the cognitive and physical discipline required to perform the ritual, or, at least, to perform the physical actions which the ritual entails. Without wanting to equate the development of a machine with that of a human (or non-human) being, it could be said that *Amygdala* exists in a continuous form of becoming, a computational form of becoming. After Ettinger (1995) and Venn (2010), becoming can be defined as a process of co-constitution which involves others (human, non-human beings, and technology) and unfolds through experience (lived affect). *Amygdala* does indeed evolve through a process involving others: the programmer and the engineer who take care of its functioning, the spectators who visit it in the gallery space, and the guards who take care of

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6 The sensorimotor system is a chain of interdependent physiological activities that includes: mechanoreceptor, stimulation, neural transmission, central nervous system (CNS) integration, transmission of efferent signal (i.e. a neural trigger fired by the CNS), muscle activation, force production, and movement. See Riemann and S. M. Lephart, 2002.

activating it and turning it off at the end of the day. *Amygdala* does also have an experience of itself and its surrounding, but it is here that the parallel with the becoming of living creatures ends. *Amygdala* can radiate affect, but does not perceive any, for it lacks an understanding of itself being in a world of relationships. Which brings us to the third paradox.

*Amygdala* learns how to perform a basic form of skin-cutting and it even adapts to external stimuli, but it does not feel pain and it does not know it is learning. During each exhibition, the robot can even develop a distinct physical behaviour that depends on a variety of factors, such as the humidity level in the gallery, the degree of weariness of the servomotors, the consistency of the skin, the contact with other human beings in the gallery. The robot is, in a sense, embodied, and as such it is situated in and dependent on the specificity of its context. But it would be arguable to claim that the robot is embodied in the same way as a human or non-human being is. Humane embodiment is situated within “historical, cultural, social, and economic limits” (Young, 1980, 138) and marked by “racial, sexual, age, ethnic, class, moral, and technological differences” (Weiss, 1999, 4). And while it would be difficult but possible to argue that a robot is situated and marked too, it would be absurd to claim that those situations and marks affect the robot directly, for it obviously lacks a sense of the self. This is one of the reasons why human embodiment and robotic embodiment cannot be equated. It is unimportant how much *Amygdala* can learn, it does not feel and does not know. Can we confidently affirm that a an AI machine learns, if it does *not know* that it is learning?

## Designing Abjection

The interplay of prosthetics and abjection is integral to the fruition of *Amygdala*.<sup>7</sup> As Kristeva (1982) so viscerally elaborates, it is not the object in itself that is abject; it is its strangeness that, by refusing to obey any known meaning, to conform to a pre-existent system of knowledge “importunes me as radically separated and repugnant” (1982, 126). At the same time, the abject object exists, it is real and it does not distance itself completely from what is known, it lingers there side to side with it instead, rudely reminding that the meaning one clings to is in “perpetual danger” (1982, 132). *Amygdala*, like the other prostheses of the *7 Configurations*, may cause abjection because it embodies that which should not be. It is not a conventional robot as those figuring in the media, it is not a cyborg as those appearing in popular culture, and it is

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7 The choice of the robot's name, *Amygdala*, amplifies this aspect of the artwork. *Amygdala* refers to the eponymous cluster of neurons - found in all mammals including humans - responsible for the regulation of visceral sensations such as fear, anger and abjection, as well as for the control of aggression and sexual libido.

not a human derivate, at least, not enough to be recognised as such. And yet, *Amygdala* is all of those things at once. Everything, from its body morphology to its physical behaviour and its skin is an uncanny combination of the machinic with the organic: an inanimate object moving as if it was alive, an arm without a hand, a limb without a body, a robot without legs, an AI without a goal.



Figure 7: Detail of *Amygdala*'s skin illustrating its particular consistency and texture which often audience members find repulsive. The embedded hair are removed from the artist's body and carefully inserted in the skin. Courtesy of the artist.

*Amygdala*'s skin is particularly relevant here. The skin is made of a compound of vegetal ingredients I created taking inspiration from special effects techniques used in the film industry. The skin is human-like both in appearance and consistency, and it has bodily hairs which I remove from my own body and carefully place into the artificial skin. The way in which the skin is installed in the cabinet is also important. Using industrial cable ties, the skin is made to hang in the vertical middle of the cabinet, as if it was a garment, so that, when *Amygdala* slashes it or hits it with the knife, the skin undulates, displaying its soft and flexible consistency in a rhythmic oscillation.

Unsurprisingly, the skin is the element of the installation that most often provokes the strongest reactions. After much research into the possible skin colour range I could produce with the compound at hand, it became clear the skin should have been 'white', that is, white as in white people. I did try to produce skins in different colour tones, black, yellow, brown and so forth, but I came to believe it would have gone against the concept of the artwork. *Amygdala* addresses an issue, that of social categorization through AI, which has been initiated, nurtured and exploited most fully (although not exclusively) by white persons and white culture at large. *Amygdala* is a product, and a mirror, of these particular culture and the beliefs it comes with. It

is a culture from which I myself gain privilege, willingly or not, one which I attempt to dethrone with my humble artistic means.

Another aspect of the abjection intrinsic to *Amygdala* can be analysed in relation to the notion of the prosthesis. *Amygdala* is technically a prosthesis, but what is a prosthesis? The term comes from Greek, more precisely from *prostithenai* meaning ‘add to’, which is formed by *pros* ‘to’ and *tithenai* ‘to put, to place’. As the etymology makes clear, the term stands for the addition of a thing to another. Fliegel and Feuer (1966, 313), via Major (1945), tentatively locate the term’s earliest appearances in the Indian *Rig-Veda*, the oldest book of the *Vedas* (about 1500 to 800 B.C.), although the next documented appearance is much later in Herodotus (485-425 B.C.). A univocal definition is difficult to provide, for the term was, and still is, territory of contention across several disciplines. Is it an appendix, an agent, or a status-symbol? More interesting than what a prosthesis *is*, is the question of what a prosthesis *means*. In the bio-technological complex, for example, a prosthesis is primarily a tool to aid patients, and as such it is studied as a technical object with which the body can interface at the level of physiology and cognition. The prosthesis, and subsequently the human body attached to it, is measured, assessed and evaluated towards the most optimal and efficient technical condition. The prosthesis, in this case, signifies a deficiency, and a deficiency too often signifies a monstrosity.

In technologically-mediated music and performance - one of my fields of work - instruments, controllers and the like are often understood as prostheses that enhance the performer’s body. It is a shared agreement that prosthetic instruments may facilitate expressivity in performance by extending the physical body into the digital world. As I detailed elsewhere (Donnarumma, 2017), I do not see the prosthesis in music as an extension, but as something one incorporates. I prefer the idea that the prosthesis becomes part of the body and thus the capacities of the body and the instrument become enmeshed, opening up different expressive possibilities. Following Waisvisz (2006), we could say that, when the electronic instrument and the human body must literally touch each other in order to function – as in the case of a prosthetic instrument, musical expression can move past the symbolic interaction of electronic software and embrace corporeal modalities of interaction. Here the prosthesis means an interfacing of corporeality and computation.

In the humanities, especially in feminist philosophy, as well as posthuman and disability studies, the prosthesis is a complex and rich figure. It is often called upon to discuss the multiple, subjective and situated conditions through which human bodies experience bodily

integrity. This is how one's body deals with changes to its condition by incorporating something other. Analyses of the experience of incorporating a prosthesis, such as Sobchack's (2010) autoethnographic study, speak of a body in process, neither fixed nor stable, but open and vulnerable. It is this very vulnerability, so relentlessly denied by western discourse, that offers an insight into the continuous making of the body as an unstable balance of materiality, psyche and cognition. At the same time, and dependent on one's view, the prosthetic body is a disabled body. It is a body whose "corporeal non-conformity [...] threaten contamination" (Shildrick, 2002, 82), hence becoming the object of violent aversion, of abjection. The prosthesis may therefore not only extend bodily functions but also "radically destabilize" (Shildrick, 2013, 276) the agency of both the one who feel abjection and one who is abjected. Within that instability is the seed of continuous mutation characterising the human body. The prosthetic hybrid body offers thus valuable insight to discard the dogma of the subject's invulnerability and independence so often recited in western discourse.

*Amygdala* resonates strongly with the idea of the body as ever-changing, open and vulnerable. The artwork, through the symbolic and technical layers described above, applies that idea to a robotic body so as to render *Amygdala* a mirror: its vulnerability is the very same of those watching it. The abjection that one may feel upon seeing *Amygdala* is nothing but the abjection of one's self. The violence that one may perceive watching the knife penetrating the skin is the violence of self-abjection, the "thunder" (Kristeva, 1982, 130) that negates one's own vulnerability.

## Bibliography

- Ali, G., Shaikh, N. A., & Shaikh, A. W. (2010). A research survey of software agents and implementation issues in vulnerability assessment and social profiling models. *Australian Journal of Basic and Applied Sciences*, 4(3), 442–449.
- Ananny, M., & Crawford, K. (2018). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. *New Media and Society*, 20(3), 973–989.
- Biddle, J. (2001). Inscribing identity: Skin as country in the Central Desert. In S. Ahmed & J. Stacey (Eds.), *Thinking Through the Skin*. London and New York: Routledge.
- Donnarumma, M. (2017). Beyond the cyborg: performance, attunement and autonomous computation. *International Journal of Performance Arts and Digital Media*, 13(2).

- Douglas, M. (1966). *Purity and Danger: An analysis of concepts of pollution and taboo*. Routledge: London and New York.
- Ettinger, B. (1995). *The Matrixial Gaze*. Leeds: University of Leeds.
- Favazza, R., & Rosenthal, J. (1993). Diagnostic in Self-Mutilation. *Psychiatric Services*, 44(2).
- Featherstone, M. (1999). Body modification: An introduction. *Body and Society*, 5(2–3), 1–13.
- Ferlaino, F. (1990). *Vattienti. Osservazione e Riplasmazione di una Ritualità Tradizionale*. Vibo Valentia: Qualecultura.
- Fisher, M. (2009). *Capitalism Realism*. Hants: 0 Books.
- Fliegel, O., & Feuer, S. G. (1966). Historical development of lower-extremity prostheses. *Archives of Physical Medicine and Rehabilitation*, 47(5), 275–285.
- Gewertz, D. (1981). A historical reconsideration of female dominance among the Chambri of Papua New Guinea. *American Ethnologist*, 8(1), 94–106.
- Gewertz, D. (1982). The father who bore me: The Role of Tsambunwuro during Chambri Initiation Ceremonies. In G. H. Herdt & R. M. Keesing (Eds.), *Rituals of Manhood: Male Initiation in Papua New Guinea*. Berkeley: University of California Press.
- Kristeva, J. (1982). Approaching Abjection. *Oxford Literary Review*, 5(1-2), 125–149.
- Loi, S. (2018). De-orientalising Ritual Blood. *Annali Di Ca' Foscari. Serie Orientale*, 54, 461–490.
- Major, R. H. (1945). *A History of Medicine* (Vol. 1). Springfield Ill: Charles C. Thomas.
- Morgan, S. (2018). Fake news, disinformation, manipulation and online tactics to undermine democracy. *Journal of Cyber Policy*, 3(1), 39–43.
- Riemann, B. L., & Lephart, S. M. (2002). The Sensorimotor System , Part I : The Stability. *Journal of Athletic Training*, 37(1), 71–79.
- Still, S., & Tilden, M. W. (1998). Controller for a Four-Legged Walking Machine, *Progress in Neural Processing*, 10, 138–148.
- Shildrick, M. (2013). Re-imagining Embodiment: Prostheses, Supplements and Boundaries. *Somatechnics*, 3(2), 270–286.

- Shildrick, M. (2002). *Embodying the Monster : Encounters with the Vulnerable Self*. London: Sage Publications.
- Sobchack, V. (2010). Living a 'Phantom Limb': On the Phenomenology of Bodily Integrity. *Body & Society*, 16(3), 51–67.
- Stephenson, B. (2015). *Ritual: A Very Short Introduction*. Oxford: Oxford University Press.
- Venn, C. (2010). Individuation, Relationality, Affect: Rethinking the Human in Relation to the Living. *Body & Society*, 16(1), 129–161.
- Waisvisz, M. (2006). Panel Discussion moderated by Michel Waisvisz. Manager or Musician? About virtuosity in live electronic music. In *Proceedings of the International Conference on New Interfaces for Musical Expression*. Paris.
- Weiss, G. (1999). *Body Images: Embodiment as intercorporeality*. London: Routledge.
- Yu, J., Tan, M., Wang, S., & Chen, E. (2004). Development of a biomimetic robotic fish and its control algorithm. *IEEE Transactions on Systems, Man, and Cybernetics, Part B: Cybernetics*, 34(4), 1798–1810.
- Young, I. M. (1980). Throwing Like a Girl: A Phenomenology of Feminine Body Comportment, Motility, and Spatiality. *Human Studies*, 3, 137–156.