

Cybernetic Sparks and Philosophical Feedback Loops

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Abstract²

Gregory Bateson observed that cybernetics is not essentially about “exchanging information across lines of discipline, but in discovering patterns common to many disciplines” (Bateson, 1971, p. 23). This paper adopts his line of thought to join the dots between cybernetics and the philosophy of Existentialism, and then interconnect both with contemporary art. It demonstrates that while terminologies may differ, many of the three fields’ primary concerns closely cohere. The world’s most ground-breaking artists are found to apply and fuse cybernetic paradigms and Existentialist themes, from Robert Rauschenberg and Marina Abramović to Damien Hirst, Stelarc and Anish Kapoor.

*The research offers the first detailed comparison between cybernetics and Existentialism, and reveals surprising commonalities. Feedback loops, circular causality and negative entropy are not only central tenets of cybernetics, but also of Existentialism. Autonomy, autopoiesis and interactivity equally unite both fields, and each is visionary and forward looking in seeking radical change and transformations. Both explored artistic endeavours, with Existentialists Jean-Paul Sartre and Albert Camus equally renowned for their powerful novels and plays as their philosophical works, while cybernetic art became a major phenomenon in the 1960s following the landmark exhibition *Cybernetic Serendipity: the Computer in the Arts* (1968), and influenced artistic practices thereafter.*

Keywords: *cybernetic art, cybernetics and philosophy, existentialism, interdisciplinarity, negative entropy, Robert Rauschenberg, Damien Hirst.*

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1. Introduction: Connecting Cybernetics and Existentialism

My latest book *Cybernetic-Existentialism: Freedom, Systems and Being-for-Others in Contemporary Arts and Performance* (Dixon, 2020) offers two original arguments: firstly, that cybernetics and Existentialist philosophy are very closely related and interlinked through common histories, belief systems and themes. Secondly, I contend that by fusing their ideas together, a new and highly illuminating bifocal lens can be peered through to reinterpret iconic contemporary artworks in surprising new ways. This demonstrates that the two disciplinary movements have exerted a profound influence and lasting inspiration that not only continues but may be growing and regenerating.

It is the first book to research and present a detailed analysis of the connections and correspondences between the two fields. The results are striking. Not only do they share common concerns, but their historical journeys are contiguous. They were born in the 1940s following the publications of incendiary, game-changing books by their respective ‘leaders’: Jean-Paul Sartre’s *Being and Nothingness* (1943/2001) and Norbert Wiener’s *Cybernetics, or control and communication in the animal and the machine* (1948/1961).

The movements rose to prominence during the 1950s, and in the 1960s reached heights of fame (and occasional infamy), both capturing the public and popular imagination, and making their leaders household names not only in France (Sartre) and the US (Wiener) but around the world. Cybernetics was ‘seized upon ... like a magic key’ that could not only predict the future but invent it technologically (Hodges, 1992, p. 403), while in parallel Existentialism was held up as a beacon of truth, freedom, revolution and futurology for the various ‘60s countercultures. Thereafter, the influence of both fields gradually declined, as I will discuss further in the conclusion, but it was never extinguished.

Researching the complementarities and overlaps between the two disciplines has been fascinating and remarkable. Both offer a way of conceiving and being in the world: ‘cybernetics is better seen as a *form of life*, a way of going on in the world, even an attitude’ (Pickering, 2010, p. 9), while Existentialism is direct and didactic in its prescriptions on how to live. It calls for people to face up to death and the simultaneous joys and fears of *Being and Nothingness* and respond by asserting their individual freedom through authentic action: ‘done correctly, *all* existentialism is

applied existentialism' (Bakewell, 2016, p. 217). Andrew Pickering argues that British cybernetics was characterized first and foremost by performativity and adaptivity, citing examples from the robots of Grey Walter, Ross Ashby and Gordon Pask to R.D. Laing's distinctive form of psychiatry and Gregory Bateson's explorations of the 'adaptive subject or self' (Pickering, 2010, p.9). The adaptive self is also a cornerstone of Existentialism, which advocates that one should continually reinvent oneself through decisive choices and actions, never staying still.

Sartre argues that "existence precedes essence" and as a consequence, we should not try to *find* ourselves since there is nothing 'essential' there; we have no real kernel, we simply exist. Therefore, instead we should *create* ourselves, writing our own scripts and narratives, and continually rewriting and recreating ourselves like an autopoietic organism: "I *am* my possibilities" says Sartre (1943/2001, p. 223). In doing so, the philosophy advocates a system of *being-for-others*, emphasizing that we should also privilege and care for other people, and see our dynamic interactions with them as paramount in creating who we are. As Sartre puts it: "It is not in some hiding-place that we will discover ourselves; it is on the road, in the town, in the midst of the crowd, a thing among things, a man among men" (Sartre, 1972, p. 5). Just as cybernetics is first and foremost a science of responsive and adaptive systems rather than mechanical ones, the same is true of Existentialism: *evolution* and *malleability* in relation to the environment are shared central concerns. Both are visionary movements that look out to the future, and philosophies and methodologies of *dynamic change* unite them.

So too does the concept of *autonomy*, from the self-sustaining and regulatory aspects of cybernetic organisms to Existentialism's overarching concerns with individual freedom and conscious self-creation. *Relations and relationships* are paramount, from Bateson's the "difference which makes a difference" (Bateson, 1971, p. 381) and Ludwig von Bertalanffy's *General Systems Theory* (1969) with its focus on the "*relation of relations*" (Skrebowski, 2006) to Sartre's concept of *being-for-others*, Gabriel Marcel's of *separation with communion* and Martin Buber's explorations of the profound interconnections between *I And Thou* (Buber, 1958). *Interactivity* is another common theme, with circular causality, feedback loops, and responsiveness to others/the environment core to both. In his play *No Exit* (1944), set in a genteel living room that is soon revealed to be Hell, Sartre uses powerful cybernetic imagery to underline the inescapable loops and connections binding everyone together:

they've laid their snare damned cunningly—like a cobweb. If you make any movement, if you raise your hand to fan yourself, Estelle and I feel a little tug. Alone, none of us can save himself or herself; we're linked together inextricably. (Sartre, 1944)

I argue that while the language and terminologies of both disciplines may have faded from view or transformed into new discourses, many of their central beliefs have remained resonant for decades. Moreover, in recent years they have become increasingly important and prevalent, and a revival of interest is now in progress, as evidenced by numerous books (e.g. on cybernetics: Kline, 2015; Rid 2016; and on Existentialism: Cox, 2011 and 2016) including one on Existentialism that was so popular that it made the New York Times 2016 Top Ten book list (Bakewell, 2016). That resurgence is also underlined globally in the ideas and themes explored in contemporary art. My case studies build to demonstrate that some of the most innovative and acclaimed works of recent years draw on the ideas, ideologies and models of the two fields, and not just generally but quite specifically.

2. Simply, Memorably, Switching On and Off

For example, in the year 2000, the winner of one of the world's most prestigious art awards, the Turner Prize, remediates information theory originator Claude Shannon's famous *The Ultimate Machine—The End of the Line* (1952), where you flick a toggle switch to 'On' on a wooden casket the size of a cigar box. Machinery suddenly whirrs, a lid opens and a metal hand emerges, flicks the switch back to 'Off', retreats under the lid, which closes, and all is silence and stillness once again. Half a century later, Martin Creed's minimalist, Turner Prize-winning *Work No. 227: The lights going on and off* (2000) performs a very similar event, with the lights in an empty gallery switching from on to off in five-second intervals.

They use the cybernetic principle of circular causality, and in both works these simplest of binary feedback loops act as a grander metaphor to trigger a surprisingly profound effect. As sci-fi writer Arthur C. Clarke observed, the lid on Shannon's mysterious box slams shut with "the finality of a closing coffin" and the effect "is devastating. There is something unspeakably sinister about a machine that does nothing—absolutely nothing—except switch itself off" (Clarke, 1959, p. 159). Creed's Dadaist piece provokes us similarly, with the quintessential Existentialist message

that we should confront, head-on, the dark and serious implications of our *Being and Nothingness*, as the title of the philosophy's 'bible' puts it.

Artists have explored death and mortality for centuries, providing a sharp *memento mori* message to their audiences, but it is striking nowadays how many create cybernetic systems to do so. Damien Hirst's *A Thousand Years* (1990) also uses a box, but a large glass one (4 x 2 x 2 meters) in which he places a severed cow's head. As it rots, maggots and hundreds of flies are produced, which fly around briefly before meeting their fates in an Insect-O-Cutor hanging above the head, with their corpses building up grimly on the floor. It uses a cybernetic system of feedback loops to deliver its Existentialist 'remember *you* must die' message in a graphic and authentic performance of the brief and absurd nature of existence.

Anish Kapoor's acclaimed *Descension* (2014-15) delivers a similar message of disappearing into *Nothingness* and the void using a system that activates a 16-foot diameter, violently churning whirlpool of the blackest of black water. For cyberneticians, Wiener's meditative observations when he came upon a whirlpool during a walk, about the continual regeneration of human cells, tissues and organs, comes to mind: "We are whirlpools in a river of ever-flowing water. We are not stuff that abides, but patterns that perpetuate themselves" (Wiener, 1950/1954, p. 96).

3. Evolutionary Cyborgs and the Lure of Negative Entropy

Both fields come from a starting point acknowledging that nothing is fixed and unpredictability is a constant, and both attempt to apply rigor in the face of randomness, seeking to bring about negative entropy. The book examines 50 different artworks to show how the ideas and pulses of both cybernetics and Existentialism not only run through them, but help add significantly to their power and impact. The incorporation of cybernetic systems in contemporary art is self-evident in many technologically-based artworks—from media installations using motion sensing to trigger events in response to the actions of gallery visitors to 'cyborg art' where performance artists harness robotic technologies.

Australian artist Stelarc is a classic example and a quintessential *Cybernetic-Existentialist*. For over three decades he has worn custom-built prosthetics and robotic appendages, and created performances where he appears, for example, wearing a life-size Perspex third arm to write the word 'EVOLUTION' on a piece of glass using his three hands

simultaneously (*Handwriting* 1982). For *Exoskeleton* (1998), he stands on top of a huge, six-legged, hydraulically-operated metal spider construction. Responding to sensor data monitoring the muscle movements of his arms and leg, the robot spider legs extend, rise and fall, as the man-machine entity walks, ominously and deafeningly, around the space. For *Ear on Arm* (since 2006), Stelarc had an Internet-enabled replica of his left ear surgically grafted onto his left arm (the sepsis complications almost killed him); and he speaks the language of the discipline explicitly:

cybernetic corporeality is an extended and extruded embodiment that connects a multiplicity of remote bodies, spatially separated, but electronically connected ... We are all prosthetic bodies with additional circuitry that allows us to perform beyond the boundaries of our skins and beyond the local space we inhabit. (Stelarc quoted in Klitch and Scheer, 2012, p. 168)

In his art and his life, he also adheres closely to the ideals of the Existentialist philosophers, who preached that people must not follow the crowd but instead be *authentic*, have a *grand project* and experience *becoming* through continually reinventing themselves. Stelarc is uncompromising in doing precisely this, and has called himself “an evolutionary guide, extrapolating new trajectories ... a genetic sculptor, restructuring and hypersensitizing the human body” (Stelarc, 1984, p. 76).

However, since the work of technologically-based artists such as Stelarc is cybernetic by default, I focus more on conceptual artists that have made global headlines using analogue methods and materials, but whose work nonetheless employs cybernetic paradigms. I would stress that they may never have taken any interest in, nor have even heard the words cybernetics or Existentialism, but I endeavor to show how the fields’ dual themes permeate these artists’ works and are pivotal to their success. For example, Robert Rauschenberg used only an eraser, a concept, and cybernetic principles to execute his famous *Erased de Kooning Drawing, 1953*.

In an apparent act of vandalism, Rauschenberg took an abstract pencil, ink, crayon and charcoal sketch by one of America’s greatest artists, Willem de Kooning, and applied an eraser to it—or more precisely, dozens of erasers as it took a long time to rub out. When the result was first exhibited, with a few shadowy smudges and indistinct marks remaining, it caused an uproar, but has since taken a revered place in art history.

I suggest that Rauschenberg acted like a cybernetician by performing a negative feedback loop in response to the state of chaos of de Kooning's original abstract drawing. This achieved negative entropy by returning the piece of paper to its original state and reference value, thus realizing the holy grail of cybernetic systems—self-stabilizing *homeostasis*. At the same time, I point out that this “iconic work resonates with all the vibrations of Existentialism, conjuring ideas and posing questions around rebellion, authenticity, the absurd, the uncanny, identity as palimpsest, absence and presence, *being-towards-death*, and *Nothingness's* relationship to *Being*” (Dixon, 2020, p. 13).

Such minimalist artworks are provocative in confronting their audiences with very little, except questions—in particular “is this art?” The piece follows in the footsteps of historic ‘readymade’ works such as Marcel Duchamp's *The Fountain*, when in 1917 he controversially signed (with a pseudonym) and exhibited an actual urinal in an art gallery. He changed the history of art in the process and paved the way for later iconoclast artists using readymade materials such as Andy Warhol. It illustrates that the most ground-breaking artworks challenge, ask questions and make us rethink things: “How an artist functions, and what an artist's role is, the parameters of art, the nature of art. What is the bottom line? What is the least thing you need? What can you get rid of and still have a piece of art? He [Rauschenberg] initiated those things” (Craig-Martin quoted in Scott, 2019).

I draw similar conclusions when analyzing another controversial work, *Rhythm 0* (1974), where Marina Abramović stood in a room with a long table laid out with dozens of objects including large and small knives, a gun and live bullets. She remained entirely impassive and did not resist as gallery visitors did whatever they wanted during a dangerous six-hour performance. This included adorning her with flowers, cutting off her clothes, piercing her skin and drinking her blood, and pointing the loaded gun at her.

She rendered herself, in Existentialist terminology, *disponible* (open and available for Others) and a *being-for-others* through bold and *authentic* action taken *in good faith*. This provided her audience with a very real experience of *being-towards-death*, an acknowledgment of which, the philosophy emphasizes, is an important wake up call to remind us to live our lives to the full. In cybernetic terminology she created a *self-regulating* and *heterarchic* system—Warren McCulloch's term for non-hierarchically ordered neuronal networks—and placed herself *within a second-order cybernetic system* where the scientist has agency as a central participant and

observer.

4. *DAU* ... Reaching for Extremities

I argue that *Cybernetic-Existentialism* is not just a facet of *some* contemporary artworks, but rather many of the world's *most iconic*: in the words of one of the book's reviewers, "art that matters" (Causey, 2020, p. 383). Some of the most high-profile artworks of recent years are examples, from Anne Imhof's Golden Lion-winning *Faust* (2017) at the Venice Biennale to the winner of the 2017 Nasher Prize, Pierre Pierre Huyghe's *After A-Life Ahead* (2017) to one of the most ambitious and expensively produced artworks of all time (an estimated \$100 million), Russian director Ilya Krzhanovsky's *DAU* (2019).

DAU sports the Existentialist-approved subtitle *FREIHEIT* (Freedom) and features music by cybernetics aficionado Brian Eno (educated by cybernetic artist Roy Ascott and a friend of Stafford Beer). It brought together 400 paid volunteers and incarcerated them for months at a time over a three-year period. They lived together within specially constructed buildings in Ukraine that exactly replicated the Kharkiv Institute of Experimental Physics (1938-68) of Nobel Laureate nuclear physicist and atomic bomb pioneer Lev Landau.

The non-actor cast were given hierarchical roles and characters to portray around the clock, but no complete scripts, and strict and punitive rules were imposed to recreate the Stalinist conditions. Like in the famous Stanford Prison psychology experiment (1971), the results led to extreme reactions and behaviors that Krzhanovsky's team filmed and later presented in site-specific installations. Critics have described it as having "monumental, megalomaniacal ambitions" (Donadio, 2019) and being "by turns moving, revolting, violent and extraordinarily pornographic" (Mathews, 2019).

Art and life come together within a specially created autopoietic social system that continually evolves. Its stern, self-regulating rules ostensibly attempted to bring everything into line and achieve a reference value of order and homeostasis. But it actually caused the opposite, entropy and chaos, which is part of the political artistic message behind *DAU*. It led to the deepest of human experiences, arousing Existentialism's trademark themes: anxiety and angst; subject-object and master-slave power relations; the importance of individual freedom; and authenticity. This "Stalinist Truman Show" (Brown, 2018) may have been artificially constructed but it

was extremely visceral and real for its participants, with reports that some suffered breakdowns and PTSD while others found love, with 14 children born during the project. As Michael Foley makes clear, the philosophy encourages a life lived on the edge and at the extremes: “Intensity rather than serenity is the existentialist goal” (Foley, 2010, p. 23).

5. How the Mighty have Fallen ... or Metamorphosed

I noted earlier the commonalities in both chronology and impact of both fields’ phenomenal rises to public consciousness and popularity, which reached a peak in the 1960s. But thereafter, like the fall of once mighty empires, their synchronous disappearances from public consciousness was sudden, their influences evaporating and their lights dimming. Perhaps, to quote sci-fi film *Blade Runner*, it was a case of “the light that burns twice as bright burns half as long”, but in reality, there were numerous reasons. They range from the curtailing of its US military research funding for cybernetics and the shift to more conservative Western politics for Existentialism, to the onset of postmodern mindsets suspicious of meta-disciplines and any idea of universal principles and truths, which both fields espoused.

Both were ideological, larger than life and over-zealous, and thus had potentially fatal flaws. Their visionary natures brought to both a quasi-religious mystique and cultish aspect, attracting the most intense of devotees, but equally repelling others. Their key figures were politicised, with many having far-left as well as anarcho-syndicalism convictions, which went against the grain of the increasingly conservative politics that characterised the 1970s and beyond. Existentialism proved too didactic in how it expected people to live, demanding they change their lives continually by making decisive choices as though standing on the edge of a cliff.

Over-ambition and hyperbole seemed cybernetics’ fatal flaw, by being unrealistic in its “dreams of an error-free world of 100 percent efficiency, accuracy and predictability” (Nunes, 2011, p. 3) and “for switching from an ‘as if’ idiom to the ‘is’ idiom, for treating analogies as reality” (Kline, 2015, p. 46). Internal quarrels and divisions also played their part, with two of the leading figures, Wiener and McCulloch angrily splitting; and Sartre was seemingly pathological in falling out with almost everyone around him, including his best friend, Albert Camus.

Disciplinary boundaries, languages and discourses also evolved, with bifurcations occurring in the sciences through a splintering into new pathways and epistemologies (AI, AL, bio-informatics etc.) together with the coming of the so-called *information age*, where ...

the rich discourse of cybernetics and information theory was flattened in the utopian information narrative. The basic analogy of cybernetics—that all organisms use information-feedback paths to adapt to their environment—is reduced to the adjective *cyber*. The scientific concept of information is reduced to digitized data. (Kline, 2015, p. 7)

6. Cybernetics and Poststructuralism

Meanwhile, new philosophies such as poststructuralism and posthumanism emerged and split off from their phenomenological parent. However, these retained not only many Existentialist principles, but cybernetic ones. Continental philosophy and poststructuralist thought have clear parallels with cybernetics, sharing common concerns for discovering new perspectives and holistic ways of understanding interrelationships and interconnectivities. For example, many of the ideas of the influential philosophers Gilles Deleuze and Félix Guattari echo cybernetic paradigms, as a number of writers have discussed (Mullarkey, 1999; Spiller, 2002), from their metaphor of the non-hierarchical networks of the rhizome as a model of culture to their concept of nomadism. As Andrew Pickering observes in relation to cybernetics in Britain: “Cybernetics was strikingly nomadic in at least three interconnected ways: it grew outside the usual institutions of support; it lacked systemic modes of transmission; and it could thus mutate wildly in its development” (Pickering, 2009, p. 157). For Mark Fisher, cybernetics “is very much parallel to the theoretical direction Deleuze-Guattari have taken. Cybernetics plays a crucial part in the genealogical development of what has been called postmodern theory” (Fisher, 1999, p. 8).

Taking writing as a starting point to discuss wider socio-political issues, Julia Kristeva highlighted an abiding *intertextuality* that referenced and interconnected multimodal concepts, ideas and realities; while Jacques Derrida explored a new theory of *différance*. This was central to his theory of deconstruction, and argued that all writing refers and *defers* to other previous writings yet, simultaneously, it *differs* and is separate from them. His *différance* thus conjoined the concepts of deference and differentiation

to establish a proto-cybernetic approach to literary and philosophical *grammatology*. It significantly altered approaches to the science of interpretation for decades.

The concept has been revisited recently by contemporary philosopher Yak Hui in *Recursivity and Contingency* (2019), who argues that recursivity is characterized “by the looping movement of returning to itself in order to determine itself, while every movement is open to contingency, which in turn determines its singularity” (Hui, 2019, p. x). His philosophical exploration of contemporaneity and digital experience uses cybernetic concepts, and he references Existentialist philosopher Martin Heidegger who, when once asked what would replace philosophy, answered with the single word: “Cybernetics”.

In response to Heidegger, I recontextualize cybernetics within the history of philosophy, with the aim of exposing both its limits and potential. In order to do this, a new language and new concepts are needed. This is why the book focuses on developing the concepts of recursivity and contingency, which I then use to analyze the theoretical foundations of organicism and organology. (Hui quoted in Lovink, 2019)

7. Conclusion: Lasting Legacies and Converging Patterns

Although they have largely faded from view, cybernetics and Existentialism proved highly influential and left lasting legacies. Existentialism spawned a radical new type of personal and social politics that “helped to change the basis of our existence today in fundamental ways” (Bakewell, 2016, p. 282). Simone De Beauvoir’s message of individual freedom in *The Second Sex* (1949) was the catalyst for the modern women’s movement and is considered “the most important feminist book ever written” (Bakewell, 2016, p. 282). *The Guardian* mourned her death with the headline “Women, you owe her everything!” (Appignanesi, 2005, June 10) and Lisa Appignanesi suggests that “no single book of the twentieth century had quite such an impact on individual consciousness” (Appignanesi, 2005).

But while Existentialism changed lives, cybernetics changed the world. Wiener’s light-seeking ‘bedbug’ *Palomilla* (1949) and Grey Walter’s *Machina Speculatrix* tortoises (1949) set the agenda for autonomous robots while Ross Ashby’s *homeostat* (1948), described at the time as “the closest

thing to a synthetic human brain so far designed by man” (Anon, 1949), lay the first foundations for today’s AI. Wiener is

the father of the Information Age ... [whose] footprints are everywhere today, etched in silicon, wandering in cyberspace, and in every corner of daily life. ... His work has shaped the lives of billions of people. (Conway and Siegelman, 2004, p. ix)

John Benthall also argues cybernetics’ influence on the ecological movement, since it developed an interdisciplinary common language that “taught us to think of the biosphere as a single system consisting of hierarchies of subsystems ... new metaphors have always been crucial to scientific advance” (Benthall, 1972, p. 43).

Cybernetics is not essentially about “exchanging information across lines of discipline, but in discovering patterns common to many disciplines” wrote Gregory Bateson (Bateson, 1971, p. 23). I have taken up his line of thought to join the dots and interconnect my two fields of study, and shown that while their terminologies may differ, their primary concerns closely cohere. I offer the following table to marry their parallel themes and perspectives:

<i>Cybernetics</i>	<i>Existentialism</i>
Feedback Loops	Being-for-Others
Homeostasis	Equilibrium
Circularity	Eternal Recurrence
Negative Entropy	Being-towards-Death
Autonomous Organisms	Authentic Action
Emergence	Becoming
Autopoiesis	Self-creation
Synthesis	Freedom (Dixon, 2020, p. 262)

I go on to trace and bring together further Batesonian patterns from the two fields, and to map them onto some of the most notable artworks of the past seventy years. Interestingly too, both disciplines are well known for their artistic endeavors, and this is another area that distinguishes and unites them. Existentialism inspired the Theatre of the Absurd whose writers include Samuel Beckett and Harold Pinter, and Sartre and Camus are renowned as much for their powerful novels and plays as their philosophical works. Cybernetic art became a major phenomenon in the 1950s and 1960s, crowned by the famous *Cybernetic Serendipity: the Computer in the Arts* (1968) exhibition which was a landmark success. Originating in London

and touring to the US, it left its mark indelibly on the development of contemporary art.

Cybernetics had a decisive impact on art. ... Given the emphasis of post-WWII art on the concepts of process, system, environment, and audience participation, cybernetics was able to gain artistic currency as a theoretical model for articulating the systematic relationships and processes among feedback loops including the artist, artwork, audience, and environment. (Shanken, 2002, p. 172)

The patterns of cybernetics and Existentialism not only echo one another but also resonate loudly with many of contemporary art's most pressing themes. My theory of *Cybernetic-Existentialism* celebrates and reanimates the ideas of these largely forgotten fields, and fuses them to offer a new bifocal lens that reveals surprising new perspectives on, and interpretations of, contemporary art.

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