To the Structure of the Tragic Experience of Digital Reality: Interface and Algorithm

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Abstract

The object of this study is the interface as both a technological and an ontological form through which algorithmic procedures are rendered into user experience. This experience is connected to diagnosing a new contour of the tragic within the digital environment – namely, the disproportionality between the "measure of life" and the "measure of procedure" manifested in personalization and access protocols. The methodological framework combines conceptual analysis, an actor-network approach to rationality understood as reproducibility within a network, semiotic examination of the interface, and a hermeneutic interpretation of extra-subjective regimes of meaning. Borges's "Library of Babel" is employed as a thought experiment. Results:(1) A definition of algorithmic predetermination is proposed as a regime in which a principle becomes operationalized into a repeatable procedure and is consolidated through interface infrastructure; (2) a three-stage architecture of predetermination is described: operationalization, network standardization, and interface exposition; (3) it is demonstrated that the interface makes the measure of procedure affectively tangible and translates probabilistic expectations into practical necessity; (4) levels of the tragic are identified – humanity, creator, and the "little man" – each with characteristic modes of recognizing predetermination; (5) the analytical value of Borges's model is substantiated for describing normalized pathways of attention and the loss of surprise. Conclusions: The interface functions as a key mediator between the algorithm and lived experience, while tragedy serves as an analytical operator that clarifies already perceptible yet diffuse problems of digital predetermination.

Keywords: Interface; Algorithm; Subjectivity; the Library of Babel; Digitalization; Identity; Predetermination

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К структуре трагического опыта цифровой реальности: интерфейс и алгоритм

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Аннотация
Объектом исследования выступает интерфейс как технологическая и онтологическая форма, через которую алгоритмические процедуры становятся опытом пользователя. Данный опыт связан с диагностикой нового контура трагического в цифровой среде: несоразмерностью "меры жизни" и "мерой процедуры", проявляющейся в персонализации и протоколах доступа. Метод исследования включает концептуальный анализ, акторно-сетевой подход к рациональности как воспроизводимости в сети, семиотический разбор интерфейса и герменевтическую интерпретацию внесубъектных режимов смысла. В качестве мысленного эксперимента использована "Вавилонская библиотека" Х. Борхеса. Результаты: (1) предложено определение алгоритмической заданности как режима, где принцип операционализируется в повторяемую процедуру и закрепляется инфраструктурой интерфейса; (2) описана трёхступенчатая архитектура заданности: операционализация, сетевая стандартизация, интерфейсная экспозиция; (3) показано, что интерфейс делает меру процедуры аффективно переживаемой и переводит вероятностные ожидания в практическую необходимость; (4) выделены уровни трагического – человечество, творец, "маленький человек" – с типовыми формами узнавания предопределённости; (5) обоснована аналитическая ценность борхесовской модели для описания нормированных маршрутов внимания и утраты неожиданности. Выводы: интерфейс является ключевым посредником между алгоритмом и опытом, а трагедия служит аналитическим оператором, позволяющим яснее увидеть уже заметные, но размытые проблемы цифровой предопределённости.

Ключевые слова: Интерфейс; Алгоритм; Субъектность; Вавилонская библиотека; Цифровизация; Идентичность; Заданность

INTRODUCTION

In Western thought, tragedy has traditionally unfolded along two trajectories: as a promise of salvation and as a premonition of catastrophe. At the same time, it remains an aesthetic category – that is, a mode of experiencing a limit situation. The tragic manifests at various levels: from the fate of humanity that has generated something non-natural (Goethe, 1808/1998), to the tragedy of the creator or the "little man" who becomes a functional option. The notion of the unnatural as a tragic excess finds powerful expression in twentieth-century philosophy of technology, for example in Günther Anders's concept of the "Promethean gap" which points to the disproportion between the human capacity to act and the human capacity to comprehend. This raises the question: can the classical understanding of tragedy as retribution for ὕβρις (hubris) still be applied today?

Contemporary cultural forms suggest that conflict arises not only between the human and a transcendent order, but also between the rhythms of life and the procedural logic of technology. The Japanese Akira demonstrates the rupture between techno-procedures and the urban fabric that "splits at the seams" (Napier, 1993, p. 330). Chinese platforms with hyper-personalization illustrate a situation in which "retention" replaces "understanding" (Liu et al., 2022). Indian digital identification systems simultaneously expand access and produce exclusions: algorithmic procedures multiply, yet their tempo does not coincide with people's life rhythms (Dixon, 2017, p. 542), and their logic does not always lend itself to human understanding, creating the effect of a "black box."

We choose tragedy – rather than alienation or absurdity – because of its structural specificity. Tragedy describes not loss or meaninglessness but a fundamental, unavoidable conflict between forces that are equally justified yet mutually incompatible. In an algorithmically organized reality, such conflict appears as a divergence between the "measure of life" – its rhythms, uncertainty, and contextuality – and the "measure of procedure" expressed in the regularity and reproducibility of algorithmic operations. The algorithm, no longer a neutral instrument, shapes a new rationality by prestructuring the field of choice and the modes in which situations are perceived.

The experience of the algorithm becomes possible through the interface. The algorithm as such remains invisible; it manifests only in the form of steps, routes, priorities, and permitted transitions – that is, in the forms encountered by the user. The interface organizes the accessibility of the world, distributing attention and shaping the probabilities of action. In doing so, it translates procedural predetermination into a mode of lived experience, rendering it affectively and practically real.

Therefore, the key object for analyzing the tragic in the digital environment is not only the algorithm itself, but also the interface as a sign-technical layer that sets the limits of the possible. The interface is simultaneously a technological model and a space of meaning-making in which relations between subject and object are redefined. As McLuhan (1964/2001) noted, "the medium is the message": the medial form itself determines the modes of perception (pp. 3–9). To avoid conflating analytic levels, it is essential to distinguish among several planes of interface operation.

At the technological level, the interface is determined by algorithms and protocols that specify the set of possible operations. At the semiotic level, it is a system of signs

that converts algorithmic structures into readable distinctions and meanings. At this point, the interface becomes an experiential field formed by rhythms, routes, and distributions of attention. Only by considering these levels can one address the ontological dimension of the interface – understood as a regime of existence that determines what becomes accessible to the user and in what form.

The interface thus functions as an invisible mediator that defines the very structure of what appears. In the digital age it ceases to be neutral and becomes a matrix shaping the chronotope of human experience (Bakhtin, 1975). The algorithm determines the measure of procedure; the interface renders this measure experiential – and it is in this transition that a contemporary form of the tragic emerges.

The aim of this study is to conceptually clarify the possibility of a new understanding of tragedy under conditions of algorithmically organized reality and to demonstrate how the misalignment between the measure of life and the measure of procedure structures the tragic today. Here the algorithm is considered as an operator of rationality that determines the pace and predetermination of action, and the interface as the mechanism through which they take shape in lived experience. A related question concerns whether the digital interface can aspire to extra-subjectivity – not as a closed mechanical system, but as a functional circle comparable to Uexküll's *Umwelt*, within which a self-sufficient yet expandable system of meanings is formed.

The methodology is built around distinguishing analytic levels, each revealing a different aspect of the tragic. The nature of the algorithm is examined simultaneously as a formal computational scheme, a dynamic procedure, a model that translates natural, social, and cognitive processes into optimization rules, and as a practice of rationality that sets the measure of procedure – its tempo, discreteness, efficiency criteria, and admissible trajectories of action. In this capacity, the algorithm functions as an operator of the contemporary world, structuring the space of the possible, distributing probabilities, and consolidating norms of behavior through infrastructural repeatability.

The concept of algorithmic predetermination shows how a formally neutral procedure turns into a regime of experience. Principles condense into repeatable steps, steps into standardized routes, and the measurable gradually pushes aside the experiential, so that probability comes to be felt as necessity. What engineering discourse describes as stability, optimality, and control over complexity appears, from a humanities perspective, as a narrowing of the horizon of the possible. In this view, the logic of computability displaces the human measure of life. In this context, the tragic emerges not as catastrophe or punishment for ὕβρις, but as the gradual compression of real choices, when the algorithmic measure begins to substitute for the measure of life – softly, non-violently, through infrastructures and interfaces.

It is precisely at the level of the interface that the algorithm becomes experienceable: it translates abstract predetermination into steps, routes, notifications, and codes. If the algorithm sets the measure of procedure, the interface converts it into a measure of experience, structuring the chronotope of digital reality and forming artificially produced Umwelten. Hence the analytical focus of this study shifts from the algorithm to the interface as a technological, semiotic, and ontological model in which

the tragic disproportion between the rhythmic, contextual measure of human life and the regular, optimizing measure of algorithmic procedure becomes discernible.

To reveal the structure of this predetermination and its tragic dimension, we turn to Borges's metaphor of the "Library of Babel" which allows us to analytically model the interaction of rule, space, and practice: the fixed combinatorial rule corresponds to the algorithmic norm; the architecture of the library to the interface-based organization of accessibility; and the behavior of the librarians to social responses within a world where meanings are distributed infrastructurally. This metaphor demonstrates how, under conditions of complete predetermination, surprise disappears and action loses its cathartic conclusiveness – precisely where a new form of the tragic becomes visible, arising at the intersection of algorithmic measure and interface experience.

Thus, different theoretical traditions are not blended but distributed across analytic levels: formal structure, procedural measure, semiotic organization of experience, dynamics of understanding, and regimes of existence. Such an architecture makes it possible to integrate heterogeneous approaches without eclecticism, since they operate on different analytic "floors" producing a multilayered account of the contemporary tragic.

THE NATURE OF THE ALGORITHM

When we turn to the question of the algorithm, we must first clarify the methodological standpoint from which this study proceeds. One line of research – developed by Kukel (2025a; 2025b; 2025c) – shows that the definition of the algorithm is not merely a technical description but an ontological gesture. In this perspective, the algorithm is not a minimal sequence of operations designed to solve a problem. Instead, it appears as a structured practice that brings together reproducibility, finiteness, and the possibility of formal specification (Schmidhuber, 2009; Porter, 2016; Markov, 1954; Brouwer, 2011). It also includes an internal measure that makes a procedure not only operational but normative (Grosman & Reigeluth, 2019; Martin, 2018; Mittelstadt et al., 2016; Seaver, 2017). The algorithm therefore combines two roles: it is both a method and a principle. It shapes action and also establishes the norm of that action. It organizes thought yet is not reducible to it, because it contains rhythm, order, and measure – elements that are often experienced before they are consciously articulated. This line of reasoning also intersects with reflections on practice as such: practice, as a form of meaningful action, involves transforming the world. Such transformation does not follow from pre-given "human essences" but always emerges through self-overcoming and encounters with limits. This is why action becomes an act of self-formation, a becoming – "a man becomes what he makes of himself" (Sartre, 1946). The algorithm collects this practice into a procedural structure, turning experience into something transmissible, skill into something stable, and the measure of action into something explicitly defined.

This definition may appear excessive at first glance, yet it serves a different purpose in the present argument. It reveals the structural link between the algorithm and the problem of the tragic, which is central to this article. The algorithm is not an external mechanism imposed on human activity. It is a form of practice in which a principle of rationality becomes visible. It is not an accidental tool but a point of condensation within

broader cultural processes that shape how subjects experience the world and how forms of interface interaction become constituted. This expanded definition provides the basis for the next steps of the analysis, allowing us to connect algorithmic normativity with the aesthetic experience of tragedy in the digital age.

When we speak of practice, we refer to a field of action in which knowledge becomes experience, experience becomes skill, and skill becomes a way of transforming the world. In this field, practice shows its deeper structure: it is reproducible, systematic, and open to formalization, yet formalization does not eliminate its living character. For this reason, we cannot claim that the algorithm "replaces" practice with procedure. Rather, it embeds practice within a structure of reproducibility in which the logic of rationality becomes apparent. Practice, once proceduralized, does not lose its orientation toward understanding. Instead, it demonstrates how rationality takes shape through repetition, verification, and consolidation – through the processes that produce what Kuhn (1977) called a paradigm, Foucault (1994) an episteme, and Lakatos (2008) a research programme. The algorithm emerges when practice recognizes its own measure and becomes a norm. This norm, in turn, begins to structure new practices and set the principles of rational action within a given paradigm.

The algorithm thus occupies a unique position between lived action and rational structure. It is a form through which culture reproduces itself, and at the same time an instrument through which new forms emerge. This duality – method and principle, practice and norm, transformation and reproducibility – contains the latent tension that will unfold later in the analysis of the tragic. It is important not to draw conclusions too quickly. At this stage we merely fix the point that the algorithm is a form of human action that has become a structure of rationality, and it is precisely this duality that explains why the algorithmic organization of the world produces new modes of aesthetic experience, including the experience of loss and its possible overcoming.

Turning to the Greek notion of τέχνη, we encounter another duality. Technē refers to art, technique, production, and the capacity to order the world through reproducible practices. In this sense, the algorithm may be regarded as the culmination of technē: a point at which practices reach a high degree of formalizability and become both actions and norms of action. Yet in Greek thought technē never exhausted the human horizon. It was accompanied by cosmos (Tulchinskii, 2013), which implies responsibility and belonging to an ordered world, and by poiesis, the disclosure of being that does not reduce itself to operational steps but opens a different way of existing. Algorithmic rationality, developing on the basis of technē, also shows what remains outside its reach: the non-technē dimensions of experience without which a sense of fullness is impossible. In this opening, the space of experience – and the space of tragedy–begins to appear.

When the algorithm becomes a principle of rationality, that is, when it acquires the status of a structuring norm, the risk arises that these non-technē horizons will be lost. Formalized practice frames more and more areas of life, and although the algorithm does not erase what lies beyond its measure, it often creates the impression that such dimensions are excluded. This effect is not total, but it is perceptible: the subject experiences not threat but loss, and this loss becomes the point at which the tragic emerges. Here we encounter the tension that we will describe as tragic: the measure of

procedure, becoming a dominant form of rationality, enters into disproportion with the measure of life – with its rhythms, dispersion, unpredictability, and openness. The mismatch between these two measures shapes a condition in which experience takes on a tragic tone, and the interface becomes the space in which this disproportion is rendered tangible.

ALGORITHMIC PREDETERMINATION

The tragic in the digital environment does not emerge suddenly; rather, it develops as a gradual displacement of human experience under the influence of procedural norms embedded in algorithmic systems. This displacement arises through the force of predetermination produced by algorithms. By algorithmic predetermination, we refer to a regime in which a principle becomes a repeatable procedure, and a procedure becomes a norm of action embedded and consolidated within an infrastructure. In such a regime, what is measurable takes precedence over what is lived, and what is repeatable persuades more strongly than what is singular. Already at this point, a first contour of the tragic appears: life begins to be experienced as a predetermined trajectory, in which probability gradually hardens into necessity.

Algorithmic predetermination, as a mode of contemporary experience, is not imposed from the outside. It emerges through a gradual shift in how human life is structured: principles are transformed into repeatable procedures, and procedures into norms of action embedded within infrastructures and interfaces. As Ocheretiany and Pogrebnyak (2024) show, the digital revolution has radically altered the conditions of existence, forcing us to reconsider the very coordinates of experience, in which distinctions between natural and cultural, real and phantasmatic blur under the influence of algorithmic systems. In such conditions, a specific post-algorithmic "unease" emerges. Life begins to adjust itself to the logic of computability rather than to its own rhythms, and this adjustment is felt as a diffuse yet persistent displacement of experience. Mikirtumov (2024) argues that the pursuit of coziness in the digital age becomes a reaction to this displacement: as social and existential problems are translated into procedural language, subjectivity attempts to reclaim a space of unpredictability and semantic density, yet finds that even processes of "appropriating the world" increasingly unfold through preconfigured algorithmic forms.

The interface, as Ocheretiany (2024) emphasizes, becomes the key mediator of this predetermination: it not only standardizes behavior but constructs action scenarios in such a way that alternatives remain unnoticed or require disproportionate effort. At this point, the tragic motif of the contemporary digital environment intensifies: the divergence between the rhythmic, contextual, discontinuous character of human life and the regular, optimizing logic of algorithmic procedures becomes experientially central. Whereas classical tragedy grounded necessity in fate, digital tragedy emerges from the infrastructure of predictable behavior; whereas predetermination was once external, it now operates from within – through scoring systems, recommendations, and the interface-level organization of attention. Algorithmic predetermination does not eliminate agency but renders it less visible, dissolving contingency into a sequence of "correct

steps." Therefore, in digital culture the tragic is expressed not through catastrophe but through a gradual shift of measure. In this shift, probabilistic structures come to be experienced as necessity, and infrastructurally embedded norms as the natural order of things (Ocheretiany & Pogrebnyak, 2024; Mikirtumov, 2024; Ocheretiany, 2024).

We have already established that in this study the algorithm is understood not only as a computational scheme. More importantly, it is conceived as a synthetic form of principle and practice – a form that transforms normative ideas of the appropriate into sequences of steps that can be repeated, verified, and scaled (Latour, 2005). In this capacity, the algorithm determines which steps are deemed correct and permissible, and which are excluded. In doing so, it establishes the frame of the possible.

This predetermination unfolds gradually. First comes the operationalization of a principle: meaning is translated into steps that can be repeated and verified. Next comes network standardization, in which steps become linked to the actions of other people and machines, creating an order of compatibility (Latour, 2005). This is followed by the interface exposition: the prescribed route becomes visible and convenient, while alternative paths become obscure or demand additional effort (McLuhan, 1964/2001). In this way, a sense of life's predestination arises – one feels that a decision has already been made, even though nothing has been imposed directly (Gadamer, 2004).

It is at this point that the tragic motif of disproportion emerges: the disproportion between the measure of life – dependent on rhythms, contingencies, and context – and the measure of procedure, which is defined by regularity, repeatability, and normativity. The tragic nerve of the situation lies not in punishment but in the experience of disproportion between the rhythms of life and the tempo of procedure. In classical drama, predetermination came from outside – from fate or the gods. In digital experience, it arises from within the logic of metrics (Latour, 2005). When a metric becomes a goal, it transforms experience itself; when prediction is folded into governance, it becomes a self-fulfilling expectation (Gadamer, 2004). This is experienced as a "shift of measure": the increase in predictive precision narrows the corridor of available meaning.

Taken together, these perspectives allow us to articulate a final understanding of the algorithm as a multilayered phenomenon in which formal computational structure, engineering procedure, heuristic model, and techne-rationality form a unified configuration that sets the norm of contemporary action. Yet it is the interface that makes the algorithm visible, transforming abstract computational rules into sequences of steps, screens, notifications, preferences, and constraints. It structures the accessibility of the world, distributes attention, sets interaction rhythms, and forms artificial Umwelten in which individuals act as if possible trajectories were "naturally" given. Therefore, as we move from the analysis of the nature of the algorithm to the study of the interface, the analytical focus shifts: from the logic of procedure to the logic of experience, from the norm of the step to the norm of perception, from hidden predetermination to the ways in which it becomes tragically perceptible.

FROM ALGORITHM TO INTERFACE: THE TRAGIC AS AN EXPERIENCE OF MEASURE

An algorithm, as an abstract procedure, exists within the space of formal logic, where it appears as a pure norm devoid of any sensual or experiential dimension. The interface, however, renders this abstraction perceptible, translating it into the sphere of lived experience. It not only structures what is accessible but also constitutes a mode of being in the world: it defines regimes of interaction, rhythms of attention, and horizons of possible action. At this point, the algorithm ceases to be a purely conceptual construct and enters into a dialogue with the subject, acquiring a sensible form, while the world itself begins to resemble what scholars of social algorithmization describe (Baudrillard, 1994; Kitchin, 2017; Shtrassberg, 2025). Technical examples – from recommendation systems and moderation algorithms to gaming environments and digital identification platforms – demonstrate that the algorithm is not an abstract speculation but is embedded in engineering practices, optimization models, and nature-inspired algorithms, forming a dense material layer of the contemporary order. In this sense, the interface functions as a theater of the algorithm – a stage on which the subject becomes not only a user but a participant in a procedurally organized world, where the drama of human–machine interaction unfolds.

It is in this intersection of the algorithmic measure and the form of the interface that the structure of the tragic becomes visible. Here an essential tension emerges between different regimes of experience – between the living and the normalized, the human and the constructed, familiar patterns of action and the logic of procedural necessity. In classical tragedy, we witness the fall of a hero determined by the structure of his own character; in Russian literature, we encounter the "little man" confronted with overwhelming forces. As in Pushkin or Dostoevsky, where the protagonist faces powers he cannot understand or influence, the digital-age user likewise cannot affect the decisions of algorithmic systems. He finds himself in a Kafkaesque position before a bureaucratic machine whose logic remains opaque. In the digital world, algorithms and platforms become these impersonal forces, shaping the user's life, rendering him powerless and invisible, reducing him to a functional element of the system and depriving him of autonomy.

In the digital age, these lines of tragic experience converge, producing several distinct trajectories:

– the tragedy of the creator, whose technological artifacts acquire their own weight and autonomy. A tool designed for human purposes begins to obey its own internal logic, imposing its rules of operation. The creator encounters tragic irony: the invention meant to serve humanity begins to define the human itself. This is the tragedy of Prometheus, who gave fire (technology) but could not control the consequences of his gift. The creator becomes both witness and hostage to a system that now follows its own laws.

– the tragedy of humanity, which steps beyond the bounds of the natural and constructs new artificial orders that redefine human existence and social reality. In seeking mastery over the world through technology, humanity becomes subordinated to its immanent rationality. Technology ceases to be a neutral mediator and turns into a total

normative force that structures the very possibility of existence, prefiguring access to resources, freedom, and recognition. Like Faust, who gains power at the cost of entering a pact with forces he cannot ultimately govern, humanity becomes bound to the systems it has created, which now dictate the conditions of being.

– the tragedy of the user, transformed into an option within the interface. This trajectory reveals the existential alienation of the modern subject: instead of being the author of experience, he becomes a configurable element of a procedural world, where agency is reduced to a set of predefined algorithmic actions. The tragic irony of the digital epoch lies in the fact that technologies designed to serve the human become new laws of reality, while the human becomes merely one actor in a procedurally organized world, where his agency is limited by the very systems he has created.

Yet the tragic does not confine the human to a state of hopelessness; it remains a mode of experience that allows for κάθαρσις and therefore opens the possibility of overcoming. It is important to distinguish between catastrophe and tragedy. Algorithmic tragedy is not an apocalyptic vision but an aesthetic regime in which the described tension becomes perceptible. Catastrophic thinking views technology as a threat leading to collapse, dehumanization, or total loss of control – an outlook often rooted in fear of machine autonomy and the erosion of human agency. This perspective, however, overlooks the dialectical nature of technology – its capacity not only to constrain but also to disclose new horizons of being.

Tragic experience, by contrast, is an aesthetic and existential mode in which the tension between human freedom and procedural determination becomes a space for reflection and transformation rather than destruction. In tragedy, the subject is not annihilated; rather, a fundamental contradiction is revealed – one that demands not passive surrender or despair, but active engagement and understanding. The interface, in this context, is not merely an instrument of constraint but a medium through which this tension becomes visible and experienceable. It marks the limits of technē, beyond which the space of poiēsis opens – the space in which the human can rediscover itself as a subject.

This logic leads us from the analysis of algorithmic structure to the examination of interface-based predetermination and, ultimately, to Borges's metaphor of the library as a space of limit, measure, and infinity. Like the books in Borges's Library, algorithms create an illusion of totality–it appears that they encompass all possibilities, while something always remains beyond their reach: human interpretation, creativity, ethical choice. In this respect, Borges's library becomes a metaphor not only of infinity but also of the human capacity to find meaning within chaos. The tragic experience of measure does not trap the human in despair; it opens the path to catharsis–an illumination through understanding and action, where the boundary between human and machine becomes not an obstacle but a threshold for a new mode of being.

THE INTERFACE AS A TECHNOLOGICAL AND SEMIOTIC MODEL

The interface initially emerges as a technological mediator between human and machine. In this sense, it is useful to refer not only to P. Florensky, who understood

technology as a "projection of organs" (Florensky, 1922, pp. 164–166), but also to the earlier and more foundational conception developed by Ernst Kapp. In Grundlinien einer Philosophie der Technik (1877), Kapp introduces the very term organ projection and interprets technical devices as external projections of human organs and functions. It is in Kapp's work that the idea of technological extension of the body receives its first systematic philosophical justification – making its inclusion in this context more than warranted.

Kapp and Florensky allow us to view the interface as a mechanism that not only extends human capacities but also stabilizes a particular structure of perception and action. This is further illustrated by Friedrich Dessauer's approach, for whom technology constitutes a "connection of layers of reality" – natural-scientific, cosmic, spiritual, and metacosmic (Dessauer, 1927). For Dessauer, technology creates a distinct world of artificial habitation, and the interface becomes one of the key modes of entering this world.

Uexküll occupies a more complex position within this framework. The traditional reading of his theory of Umwelt emphasizes that each animal inhabits its own meaningful world without any need for technology, whereas humans, through technology, often disrupt their natural harmonies (Uexküll, 2010, pp. 41–42, 53–54). We do not use Uexküll to claim that technology is necessary for the formation of an Umwelt (pp. 70–72); rather, we employ him to show that technical systems can construct specific, artificially produced Umwelten, within which humans become beings that co-generate themselves and their environment. A technical Umwelt is not a biological given but a cultural-technical assemblage emerging from networks of artifacts, rules, protocols, and interfaces. Following Uexküll (2010), we refer to Umwelt strictly as a biological model of meaning-constitution; our application to digital environments is analytical and metaphorical rather than literal.

In such a world, the interface ceases to be a mere extension of the subject and begins to structure action according to machine logic, relying on "scalable and interoperable networks of three-dimensional virtual environments existing synchronously in real time" (Ball, 2022, p. 94). Consequently, the interface is not an instrument but an environment: not a surface of contact but an architectonics of possible action.

To clarify the concept of the interface, we treat it as a multilayered structure with several levels. First, the technical interface is the zone of coupling between human and machine that provides access to system functions. Second, the semiotic interface translates abstract processes into culturally intelligible forms and makes machine operations interpretable. Third, the practical interface (in the sense of Heidegger and Sloterdijk) defines how an object can be grasped and manipulated, and thus structures possible actions. Finally, the ontological interface is the space in which regimes of action, perception, and presence are formed, and in which a new type of world emerges – one shaped by algorithmic processes and cultural practices.

In this respect, interfaces are necessary not only within ICT but anywhere a transition between regimes of reality occurs; however, in this study we are primarily concerned with the digital interface as a form of algorithmically organized environment.

The key feature of the digital interface as a semiotic system lies in its ability to render abstract machine processes intuitively understandable through cultural metaphors. This is precisely why the graphical user interface (GUI) developed at Xerox PARC was revolutionary – not merely because of its usability, but because it introduced the desktop metaphor, grounded in the three types of signs defined by Charles Sanders Peirce (Peirce, 1998): iconic (visual analogy – icons), indexical (indication and causal relation – cursor), and symbolic (conventional designations of abstract commands – buttons, menus).

Thus, the interface becomes a space of meaning production rather than a simple channel of information transfer. Personalized algorithms of social networks, for example, create for each user a unique "semantic bubble" defined not only by technical preferences but also by attention politics. From this follows another crucial dimension: the interface is also a political, ethical, and economic space in which visibility, significance, time, and attention are distributed. It not only organizes meanings but governs access to them. What appears at the level of interface as a set of constrained possibilities becomes, on the ontological level, a structure of predetermination – a logic that shapes not only action but the very horizon of the possible, as Borges's Library exemplifies.

THE INTERFACE AS AN ONTOLOGICAL SPACE

In the contemporary world, the interface ceases to be merely a technical mediator between human and machine and becomes an ontological space – a self-standing reality in which time, space, sign systems, and cultural meanings are interwoven. Following Philippe Descola's concept of ontological regimes (Descola, 2013), we argue that digital interfaces generate new modes of world-making: hybrid configurations in which the boundaries between subject and object, virtual and real, code and meaning are not fixed but continually renegotiated in the course of interaction. However, unlike Descola – whose focus rests on non-Western cosmologies – we apply this framework to algorithmic environments where ontological categories emerge from the interplay of technical affordances and cultural practices.

A social media profile, for instance, is neither a "subject" (its author) nor an "object" (a dataset), but a hybrid ontological entity whose existence depends simultaneously on the platform's algorithms, user actions, and semiotic conventions. Interfaces, we maintain, function as ontological operators (Descola, 2013) – not in the sense of producing metaphysical systems, but in the sense of forming new regimes of existence in which distinctions between virtual and real, subject and object, code and meaning are constantly redefined.

Descola's ontological regimes originate in anthropological analysis; here we extend his framework analytically to digital environments without claiming a literal equivalence. Unlike the ontological regimes described by Descola (such as animism or totemism), which are grounded in cosmological narratives, algorithmic ontologies arise from the interaction of technical protocols, cultural practices, and user activity. Consider the following examples:

A Fortnite player exists simultaneously as a biological body (offline) and as a data-driven avatar (online), whose abilities are determined by game code and community norms.

A Twitter thread is neither pure "discourse" nor mere "data" but a hybrid ontological artifact: a process of meaning production that simultaneously functions as a commodity of platform capitalism.

A key point here is that such regimes are unstable: they are continually reshaped by software updates, moderation policies, and user preferences. Therefore, the interface cannot be regarded as a neutral tool – it constitutes a site of ontological production, a locus where new modes of being are collectively (albeit unevenly) created. In this context, the term ontology is used not in the classical metaphysical sense (as a doctrine of being), but to denote regimes of existence that emerge within sociotechnical systems. This approach resonates with Lev Manovich's insight that interfaces are mechanisms of cultural modeling within digital reality (Manovich, 2001).

This idea finds further support in Mikhail Bakhtin's concept of the chronotope and Yuri Lotman's concept of the semiosphere (Lotman, 1999, pp. 11–12, 22–23), both of which allow us to understand the interface not as a passive instrument but as an active force shaping new forms of existence, perception, and interaction. In Bakhtin's view, the chronotope denotes the inseparable connection between time and space in a narrative, where they merge into a unified whole that structures events and meaning. Interfaces operate in a similar manner: they create their own chronotopes – virtual spaces where time and action are organized according to specific, often algorithmic, rules.

In game worlds such as Minecraft or The Legend of Zelda, time flows cyclically and is governed by game mechanics, while space is constructed out of blocks or zones with no equivalents in physical reality. Drawing on Bakhtin's definition of the chronotope as the intrinsic linkage of time and space within narrative (Bakhtin, 1975, pp. 84–85, 99–100), one may conclude that digital interfaces function as contemporary chronotopes, generating novel spatiotemporal configurations governed by algorithmic or design logics.

Unlike literary chronotopes, which are fixed in text, interface chronotopes are interactive and procedural: they do not merely depict space and time – they execute them through user actions and system responses. The Legend of Zelda: Breath of the Wild (2017), for example, constructs a chronotope where time is both cyclical and event-driven: the in-game 24-hour cycle depends on the player's actions. Time advances only when the player moves or interacts with the world, while opening the inventory "freezes" time entirely, creating a gap between world-time and game-time. Key events (such as the "Blood Moon") are periodically reactivated, establishing a form of ritualized cyclicality – an algorithmic analogue to Bakhtin's "adventure-time" of folk narratives.

As Bruno Latour (2005) emphasized, modernity is characterized by ontological pluralism – the coexistence of multiple competing regimes of reality. Interfaces, in this context, function as spaces where such regimes intersect and become mutually adjustable.

This line of analysis again invokes Bakhtin's chronotope – the interrelation of time and space that structures eventfulness and meaning-making (Bakhtin, 1975). The interface may be understood as a digital chronotope: a space in which time and action are organized by specific, often algorithmic, rules. Unlike the literary chronotope anchored

in text, the interface chronotope is interactive and procedural: it not only represents space and time, but performs them through system responses.

Similarly, social networks create their own chronotope – the "feed": an amalgamation of past, present, and potential future within a single stream, where linear time is replaced by an algorithmic ranking function. Video-conferencing platforms (Zoom, Telegram Video) generate a chronotope of "shared synchronicity" dissolving physical distance and granting presence the character of digital assembly.

The interface, however, is not only a chronotope but also a semiosphere in Yuri Lotman's sense: a space in which signs generate new signs and cultural meanings form a dynamic system of interactions. Lotman uses the metaphor of a "living organism" figuratively to emphasize the semiosphere's capacity for self-development – and in this figurative sense, the interface can indeed be conceived as a dynamic semiotic ecosystem. Elements of the interface – icons, buttons, emojis, memes, notifications – constitute autonomous cultural practices that extend beyond the platform itself. For example, the "like" has long ceased to be merely a technical button: it has become a sign of social recognition, a unit of symbolic capital, and a component of the attention economy.

Thus, the interface should be understood as an ontological space in which the chronotope and the semiosphere intersect, generating new forms of being, communication, and cultural identity. It does not merely represent reality but constructs it: establishing rules of time and space, generating sign systems, and shaping subjectivity – already unthinkable outside the algorithmic environment. The interface is not simply a mediator between worlds; it becomes a world itself, a space with its own structure, rhythms, and regimes of existence.

THE EXTRA-SUBJECTIVE INTERFACE: POSSIBLE FUTURES & THE TRAGEDY OF THE CONTEMPORARY HUMAN

Traditionally, the interface has been understood as a tool of the subject. Yet with the development of AI, a new question arises: can an interface exist autonomously, without human participation? Actor-network theory, as developed by Bruno Latour, asserts that technology is not passive, but acts as an agent comparable to a human one (Latour, 2005), becoming a self-sufficient system closed upon itself. If the subject is removed from the process of interface formation, the machine becomes trapped within its own hermeneutic circle (Gadamer, 2004). Algorithms trained on large datasets begin to interpret the world through the prism of their own models, resulting in self-referentiality. For example, neural networks generating texts (such as GPT) can produce responses that appear meaningful, yet their "understanding" remains limited to statistical patterns. Thus, if the interface becomes extra-subjective, who is responsible for the meanings it generates? Does it not risk turning into a "black box" inaccessible to critical scrutiny?

The interface is always saturated with cultural context. Carl Jung, speaking of archetypes as universal structures of the collective unconscious, emphasized that these models do not merely reflect human experience but actively shape it, imposing symbolic order upon the chaos of perception (Jung, 1959). Archetypes, therefore, are not static images but dynamic constructs that manifest in myths, religions, art, and – crucially – in

everyday practices, structuring the perception of the world and defining the boundaries of possible individual and collective experience.

In the contemporary world, however, where digital platforms' interfaces have become the primary mediator between human and reality, archetypes cease to be neutral universals and turn into tools of manipulation. Voice assistants and neural networks exploit the archetype of the "wise mentor" cultivating the illusion of personal, even quasi-sacral interaction, fostering dependence on an algorithmically constructed authority. New media and social networks embody the archetype of the "labyrinth" where the user becomes lost in an endless flow of content – not merely consuming information but entering artificially produced realities in which the boundary between personal experience and external manipulation becomes blurred.

Thus, digital interfaces are not neutral tools: they actively construct reality by filtering, ranking, and interpreting information according to embedded algorithms. Jean Baudrillard's theory of simulacra and simulation (Baudrillard, 1994) showed that contemporary media do not reflect reality but replace it with signs lacking referents in the objective world. Social media algorithms, search engines, and generative neural networks all create not an image of the world but its digital projection, where meanings arise not through free choice but within the constraints of predefined parameters. When interacting with the interface, the user finds their perception mediated not only by cultural codes but by technical protocols that determine which information is visible and which remains concealed. This calls into question the very possibility of an autonomous subject: if choices are made within an environment constructed by external forces, to what extent are they genuinely free?

In the digital age, control over the semantic space is distributed among multiple agents, each pursuing its own interests. Corporations that own platforms and algorithms effectively become architects of reality, determining which meanings dominate and which are marginalized. States, by regulating access to information and deploying censorship or propaganda, also shape the semantic field by imposing specific narratives. Users appear to generate content and participate in meaning-making, but they do so within frameworks established by interfaces designed by digital conglomerates. These interfaces dictate the rules of the game, from post formats to virality algorithms..

The poststructuralist philosophical tradition, represented by thinkers such as Jacques Derrida (Derrida, 1978) and Michel Foucault (Foucault, 1975/1999), argues that meaning is always constructed within discourse, and that there is no "pure" subject free from cultural, social, or technological contexts. Foucault showed how power permeates all levels of society, shaping institutions as well as subjects themselves – their desires, representations, and capacities. In the digital era, this power assumes new forms: algorithms become invisible yet ubiquitous agents of control that do not merely limit choice but structure it. Bernard Stiegler, extending the concept of technics as co-constitutive of human existence, emphasized that technologies are active participants in anthropogenesis, reshaping human cognitive and affective structures (Stiegler, 1998). In this context, the question of excluding the subject from meaning-making becomes especially acute: the subject cannot be eliminated entirely, yet their autonomy may be reduced to a minimum when the semantic environment is governed by external forces.

For Stiegler, technics is a process of symbolic exteriorization and individuation rather than a mere technological extension of the human body; our argument relies precisely on this dynamic notion of technicity.

Thus the core ethical and philosophical issue is that digital technologies alter the very mode of information consumption and restructure the foundations of human experience. If meaning is formed by algorithms, where does the boundary lie between personal choice and manipulation? Who bears responsibility for the consequences of such control – for radicalization, social polarization, the spread of misinformation? Is it possible to design interfaces that do not exploit but liberate the user, returning to them control over their own experience? These questions require not only technical solutions but a thorough rethinking of the nature of the subject, autonomy, and freedom in an era when reality is constructed by machines. It may be that we must not merely adapt to new conditions but revise the very foundations of human existence in order to preserve our capacity for critical thought and for autonomous meaning-making.

THE INTERFACE AT THE BOUNDARY BETWEEN HUMAN AND MACHINE

In the age of digital transformation, the interface ceases to be merely a technical mediator between human and machine and becomes an ontological reality – a space in which technology, culture, and meaning are woven into an inseparable whole. This phenomenon demands philosophical reflection, as it calls into question traditional dichotomies: subject/object, human/machine, meaning/algorithm. The interface simultaneously operates as a semiotic model governed by algorithmic logic and as a semantic field in which a chronotope – unity of time and space – is constructed and saturated with cultural narratives.

The key question, however, is whether the interface can exist independently of the subject, or whether its autonomy always remains an illusion that conceals the projection of human meaning. In his famous essay "The Question Concerning Technology" Martin Heidegger argues that technology is not merely an instrument but a mode of revealing – Gestell (enframing) – in which the world appears as a resource to be managed and optimized (Heidegger, 1993, pp. 17–20, 23–24). In this context, the interface becomes not a tool but a new form of existence in which the boundaries between human and machine are blurred. It does not simply display information; it constructs reality by shaping modes of perception, thinking, and even identity. Importantly, in Heidegger's analysis Gestell is not a technical mechanism but a fundamental mode of revealing (Entbergen) that transforms the world into Bestand – a standing-reserve.

Contemporary interfaces – from social networks to neural networks – do not merely transmit data; they create new ontologies. Recommendation algorithms, for example, shape cultural preferences, while virtual assistants model communicative practices. Thus, the interface becomes both mediator and co-author of a reality in which code and meaning are inextricably intertwined. At this point of tension, the question of the degree of interface autonomy becomes tightly linked to the problem of artificial intelligence. Autonomous systems – neural networks, algorithms, robots – demonstrate capacities for

self-organization, learning, and even "creativity." Yet their "understanding" remains derivative of human meanings. Even when the subject is ostensibly removed from the process (as in the case of self-learning algorithms), their logic and goals are inscribed by humans.

Bernard Stiegler noted that technics always carries "prosthetic memory" – a continuation of human reason and culture. The interface, accordingly, cannot be fully autonomous; its autonomy is always relative, operating within parameters specified by humans. Even when an algorithm makes decisions "on its own" it relies on data, models, and objectives originally provided by a subject.

At the same time, in the digital age the human increasingly ceases to be the center and becomes merely one "option" within a system of interfaces. His role is reduced to that of an entry point, a node through which data flows but which no longer determines their meaning. The contemporary subject exists in a regime of constant interaction with interfaces that shape identity, memory, and even desire. This process can be illustrated by social networks, where the user does not simply consume content but becomes part of it, inscribed into algorithmic narratives. The "self" is constructed through likes, reposts, comments – that is, through interface practices. The human thus turns into a function of the system, and subjectivity becomes distributed across a multitude of digital agents.

As a result, the interface cannot (yet) be fully autonomous, since its existence always presupposes a "hidden" subject (developer, user, or cultural context). At the same time, it is not a passive instrument: it actively constructs reality, establishing new modes of being. The contemporary human is therefore no longer so much an autonomous subject as a node in a network of interfaces, where identity and meaning are continuously reassembled. In this sense, the interface is no longer simply a technical device but an ontological reality in which technics, culture, and meaning converge into a single whole. It opens before us a new horizon of being in which the boundaries between human and machine, subject and object, meaning and code become increasingly contingent. It is precisely in this space that a new anthropology unfolds – an anthropology of the interface, in which the human is no longer the center but one of many possible points of entry into the system.

At the same time, algorithmic predetermination does not imply complete determinism. Contingency persists, but is rapidly absorbed by procedural order. Hence the tragic today is linked to the gradual narrowing of real choices, when the algorithmic measure of efficiency starts to substitute for the human measure of life – gently, without coercion, via familiar interfaces. If the algorithm sets the measure of procedure and the interface renders it experienceable, overcoming predetermination requires governing the scale of measure: making norms discussable, explainable, and reconfigurable. The analytic stage of this condition can be usefully described through Jorge Luis Borges's "The Library of Babel" where endless galleries help us to grasp the structure of everyday algorithmic environments and to see how probabilistic structures become necessity once they are fixed in user experience (Borges, 1941/1999).

When predetermination solidifies into a condition rather than a constraint, the disproportion between the procedural and the lived becomes existentially salient, giving rise to the tragic mode of experience.

THE LIBRARY OF BABEL

In our analysis, we draw on Borges's "The Library of Babel" not as a direct model of the algorithm but as an epistemological experiment that reveals structures of predetermination which, in the digital age, are realized through algorithmic models and interface architectures. The story highlights several key mechanisms: a strict rule for generating the world, a spatial organization that makes this rule experientially tangible, and social practices that emerge in response to the imposed order. Taken together, these mechanisms elucidate how predetermination becomes experience, and how the narrowing of the possible takes on a tragic form.

First, Borges (1941/1999) posits a fixed combinatorial rule: an alphabet, number of pages, book format, and a universal grammar of signs (pp. 112–113). This is not yet an algorithm in the strict sense, but it is a model that completely determines the space of the possible. In digital systems, predictive models function in a similar way: they do not merely describe the world but set the contours of admissible actions. In both cases, meaning ceases to follow from novelty and becomes a matter of filtering relevance.

Second, the architecture of the library – repeating hexagons, endless galleries, the central shaft of light – materializes the operation of the rule (Borges, 1999, p. 114). Space itself normalizes search routes and renders procedurality palpable. This allows us to see that the interface is not an external "wrapping" of a system but a continuation of its logic: it defines a set of "natural" moves and obscures the rest, much like contemporary algorithmic interfaces organize attention, choice, and navigation.

Third, the social groups of librarians – "purifiers", "vindicators" "indexers" and so on – embody a spectrum of human reactions to a world deprived of overt meaning: some believe in a perfect catalog, others produce catalogs of catalogs, still others destroy "noise" (Borges, 1941/1999, pp. 117–118). These figures anticipate contemporary attitudes toward algorithms: faith in complete model transparency, endless data ordering, aggressive moderation.

Fourth, Borges (1941/1999) exposes the cost of combinatorial completeness: "for every rational line or forthright statement there are leagues of senseless cacophony" (p. 115). In a world where every variant is possible, novelty loses its eventfulness, and action no longer leads to meaning. This condition is what we call tragic: the procedure exhausts the space of steps but never produces closure. Contemporary algorithmic environments move toward a similar state not through pure combinatorics but through statistical prediction, ranking, and the standardization of routes, where the measure of procedure gradually displaces the measure of life.

Finally, Borges shows the transition from rule to interface: catalogs, labels, search rituals form the "face" of the procedure. The stricter the rule, the stronger the effect of predetermination; yet as "redundant" alternatives disappear, so too does the possibility of the unforeseen. And it is precisely the unforeseen that creates the event of meaning. Here a tragic experience of life without catharsis emerges: action cannot achieve completion, search does not lead to an open-ended revelation, and experiential space is felt as an infinite yet prestructured network of moves.

"The Library of Babel" thus serves not only as an illustration but as a conceptual model of what we call algorithmic predetermination: the interaction of rule, space, and practice, which in contemporary interface environments acquires a techno-cultural form and sets new boundaries of the possible, making the disproportion between the measure of life and the measure of procedure both aesthetically and existentially palpable.

Contemporary sociotechnical systems provide concrete instantiations of this Borgesian structure, where rule, spatial organization, and practice converge into lived predetermination. Large-scale credit scoring infrastructures such as China's Sesame Credit algorithmically rank citizens by transforming heterogeneous behaviours into a unified metric, thereby producing a navigable but highly normalized "architecture of action" in which deviations become increasingly costly or invisible (Creemers, 2018). Automated welfare and immigration decision systems in Europe similarly materialize procedural logic as spatialized pathways: algorithmic risk assessments in the UK welfare system, for instance, routinely predetermine eligibility outcomes, compelling individuals to navigate rigid interface-based routes where contestation requires disproportionate effort (Eubanks, 2018). At the level of creators, autonomous content-moderation pipelines used by platforms such as YouTube compress the horizon of meaning through large-scale automated filtering, generating a combinatorial logic akin to Borges's library: vast semantic spaces become traversable only through predictive classification models whose internal norms supersede human editorial intent (Gillespie, 2018). These examples show that the tragic condition illustrated by Borges is not metaphorical but infrastructurally enacted: rule becomes model, space becomes interface, and practice becomes navigation within a pre-shaped field of possibilities.

It is important to establish once again, before we proceed to the conclusion, that the tragic is not an external addition to the digital state, but the structural effect of how the algorithmic procedure, the form of the interface and the ontological predestination converge.

CONCLUSION

The tragic in the digital age manifests above all in the disproportion between the measure of life and the measure of procedure – between the rhythms, hesitations, and contingencies of human existence and the optimizing logic of algorithmic systems. This disproportion does not erupt suddenly; it unfolds gradually as procedures solidify into norms and norms become infrastructural. Through this shift of measure, algorithmic rationality begins to prestructure experience, not by coercion but by habituation, transforming the background conditions of how situations appear and how choices are made.

Once this dynamic is set in motion, its consequences propagate across multiple layers of experience. What engineering discourse describes as stability, optimality, or controlled complexity appears, from a humanities perspective, as a narrowing of horizons. The corridor of possible actions contracts, the unexpected loses its eventfulness, and the contingent becomes increasingly absorbed into predictive regimes. It is this gradual reconfiguration – not catastrophic failure – that constitutes the contemporary tragic: the

sense that possibility persists, yet the boundaries within which it can manifest grow ever tighter.

At this point, the focus must shift from algorithms to interfaces, because it is the interface that translates abstract procedural norms into lived patterns – routes, screens, notifications, and interaction regimes. Through the interface, the previously described disproportion becomes experientially palpable: the distribution of attention, the architecture of choice, and the choreography of action make the conflict between two normative orders part of everyday perception. The interface thus becomes not only a technical mediator but a stage upon which the tragic is enacted in ordinary life, often quietly, without explicit awareness.

The analysis carried out in this article shows that the algorithm must be understood not merely as a computational artifact but as a compound of principle and practice, and the interface as a multilayered environment where technical, semiotic, experiential, and ontological dimensions intersect. Recognizing this structure allows us to understand why contemporary tragedy is less about confrontation with an external force and more about the internalization of procedural norms that reshape the mode of being-in-the-world. It also clarifies why resistance today cannot simply oppose technics from the outside: it must operate through the very media that shape experience, by reopening space for uncertainty, slowness, and interpretative openness.

Borges's "Library of Babel" used here as an epistemological model, reinforces this conclusion. Its architecture makes visible how rule, space, and practice can form a world in which the foreseeable gradually replaces the unforeseeable, and where action loses its cathartic finality. The library exemplifies the endpoint of the shift we have traced: a reality in which the possible is exhaustive yet unaffective, and where the tragic stems not from limitation but from excessive order. Contemporary algorithmic environments approach this condition not through combinatorial closure but through prediction, ranking, and interface design – processes that render the described conflict of regimes increasingly tangible.

Thus, the tragic in the digital age is not an omen of collapse but an analytic lens that reveals the tension at the core of our technologically mediated existence. It illuminates both the risks of infrastructural predetermination and the spaces where freedom remains viable: in designing interfaces that do not merely optimize but cultivate openness; in maintaining a margin for the uncertain; in recognizing the limits of procedural thinking and preserving those dimensions of experience that resist quantification. If the algorithm sets the procedural norm and the interface translates it into experience, then the task today is not to reject either but to negotiate anew the relation between them – to preserve the human measure within the procedural world.

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