

From the "Fragment on Machines" to the "Fragment on Large Models": Reconsidering the Path Beyond the Crisis of Subjectivity under the Conditions of Artificial Intelligence

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Abstract. This article reactivates Marx's "Fragment on Machines" from the *Grundrisse* to anatomize the contemporary crisis of subjectivity provoked by large language models (LLMs) such as GPT-4. It argues that today's LLMs constitute an algorithmic, centralized form of what Marx termed the "general intellect"—general social knowledge become a direct force of production. Where Marx envisioned a dialectical opening: once the general intellect escapes capital's grip, labor-time ceases to be the measure of wealth and the free development of individuality becomes possible, the current trajectory of AI has paradoxically deepened capital's privatization of the general intellect through computing-power monopolization, data-property regimes, and paywalled APIs. Drawing on historical materialism, the article contends that large models do not autonomously usher in either emancipation or domination; their social effects are determined by the ownership form of the means of production—computing power, data, and algorithms. It introduces the concept of "algorithmic public ownership" as an institutional precondition for restructuring subjectivity in the digital age and situates this concept in dialogue with contemporary movements around digital public goods. The article contributes to Marxist political economy by proposing a theoretical shift from the "Fragment on Machines" to a "Fragment on Large Models" and by demonstrating that the resolution of AI-induced crises of subjectivity requires, in the first instance, a transformation at the level of property relations.

Keywords: general intellect, large language models, historical materialism, algorithmic public ownership, subjectivation

1. Introduction: the crisis of subjectivity under AI

The rapid ascent of large language models—from OpenAI's GPT-4 to Anthropic's Claude and China's DeepSeek—has been heralded as a new wave of productive-force transformation, promising to augment or even replace human cognitive labor at an unprecedented scale. Yet alongside this technological leap, a deepening crisis of human subjectivity is unfolding. Labor displacement is no longer confined to manual tasks but reaches into the cognitive and creative domains long considered the preserve of human distinctiveness. Algorithmic management systems subordinate gig workers to real-time behavioral control, eroding their decisional autonomy [1]. Surveillance capitalism, as

Shoshana Zuboff has documented, "claims human experience as free raw material for translation into behavioral data [2]," transforming subjects into objects of extraction.

The crisis from the standpoint of historical materialism, arguing that its root lies not in the technology itself but in the privatization of what Marx termed the "general intellect [3]". Marx's analysis in the "Fragment on Machines [3]" section of the *Grundrisse (1857–1858)* offers a dialectical framework that remains indispensable: the same technological development that deepens the real subsumption of labor under capital simultaneously creates the material conditions for a society beyond the tyranny of labor-time. This article contends, is the ownership form of the means of production—in today's context, the property regimes governing computing power, data, and algorithmic systems. The core thesis is that the emancipatory possibility Marx identified has not been automatically realized; instead, the algorithmic configuration and centralized privatization of the general intellect have produced a paradox in which subjects, embedded ever more deeply within algorithmic systems, fall into a condition of "systemic stupidity"—the atrophy of cognitive autonomy resulting from asymmetrical algorithmic mediation.

2. Textual reconstruction: the general intellect and subject-emancipation in Marx's "Fragment on Machines"

2.1. The emergence of the general intellect

In the section of the *Grundrisse* titled "Fixed Capital and the Development of the Productive Forces of Society," Marx articulates one of his most striking formulations:

"The development of fixed capital shows the degree to which society's general science, KNOWLEDGE, has become an immediate productive force, and hence the degree to which the conditions of the social life process itself have been brought under the control of the GENERAL INTELLECT and remoulded according to it [3]."

The "general intellect," as this passage makes clear, refers to the accumulated body of general social knowledge—science, technology, craft—that becomes objectified in the machine system. It is not merely the knowledge possessed by individual scientists or engineers; it is a social product, the crystallization of collective human intellectual labor across history. Fixed capital—machinery—is the material form in which this social knowledge confronts the worker as an alien power.

2.2. The dialectic of domination and emancipation

Marx's analysis in the "Fragment" operates on a double register. On one hand, machinery as objectified general intellect realizes the real subsumption of living labor under capital: In machinery, objectified labour materially confronts living labour as a ruling power and as an active subsumption of the latter under itself. The worker is demoted from the director of the production process to its "watchman and regulator." On the other hand, this very development creates the material possibility for a radical rupture in the logic of value. Once direct human labor ceases to be the primary source of wealth, the exchange-value system—which measures wealth by labor-time—is undermined:

"Once this transformation has taken place, it is neither the immediate labour performed by man himself, nor the time for which he works, but the appropriation of his own general productive power, his comprehension of Nature and domination of it by virtue of his being a social entity—in a word, the development of the social individual—that appears as the cornerstone of production and wealth [3]."

The emancipatory implication is radical: when immediate labor-time ceases to be the measure of wealth, "As soon as labour in its immediate form has ceased to be the great source of wealth, labour time ceases and must cease to be its measure, and therefore exchange value [must cease to be the measure] of use value [3]." For Marx, the possibility of liberation is immanent in the development of the productive forces themselves—but the actuality of liberation depends decisively on the transformation of the relations of production within which those forces are embedded.

2.3. Two interpretive lines and the relationship to capital

A significant body of scholarship has debated the relationship between the "Fragment on Machines" and Marx's mature analysis in *Capital*. Italian autonomist Marxists—Antonio Negri, Paolo Virno, Maurizio Lazzarato—have read the "Fragment" as offering a theory of capitalist collapse driven by the contradiction between knowledge-as-wealth and the persistence of the labor-time measure, a line of argument they take to be distinct from, and in some respects more radical than, the analysis of the falling rate of profit in Volume III of *Capital*. Virno, writing in the post-Fordist context, argues that in the "Fragment" the crisis of capitalism is no longer due to the disproportion intrinsic to the mode of production based on the labour time of individuals, nor to the imbalances related to the full workings of the law of value, but to the direct contradiction between science-based production and the persistence of exchange-value [4].

The "Fragment" articulates a real dialectical possibility immanent in technological development, but that possibility can only be realized through the revolutionary transformation of property relations—a point Marx himself makes unequivocally throughout his later work. This synthetic reading underwrites the argument that follows.

2.4. Reactivating the category for the digital age

If Marx's general intellect was objectified in steam engines, railways, and automatic spinning machines, its contemporary form is objectified in neural-network architectures trained on planetary-scale datasets. Matteo Pasquinelli, in *The Eye of the Master: A Social History of Artificial Intelligence* (2023), traces the deep historical connections between Marx's analysis of the division of labor and the algorithmic logic of contemporary AI: "the general intellect of the *Grundrisse* evolves in *Capital* into a machinic collective worker, almost with the features of a proto-cybernetic organism [5]." This insight provides the bridge from Marx's nineteenth-century analysis to the twenty-first-century technological landscape. The theoretical energy contained in the "Fragment" is not exhausted; on the contrary, it acquires new urgency precisely when the general intellect takes the form of large-scale algorithmic systems that model, predict, and increasingly determine human behavior.

3. Contemporary diagnosis: the "Fragment on Large Models"—the algorithmic configuration and centralized privatization of the general intellect

3.1. Large models as the contemporary form of the general intellect

Marx's general intellect was embodied in the machine system—iron, steel, and gear mechanisms that replaced human physical dexterity. Today, the general intellect has assumed a qualitatively new form: large language models are the general intellect in its algorithmic and centralized modality. Three features distinguish this new form.

First, whereas the industrial machine system objectified bodily skills and craft knowledge, large models objectify intellectual activity itself: reasoning, composition, translation, coding, pattern recognition across vast domains. The replacement is no longer of the hand but of the cognitive faculty. Second, the industrial general intellect was materialized in physical infrastructure which, however concentrated, remained geographically dispersed; the algorithmic general intellect is materialized in data centers and cloud architectures that concentrate computing power at levels unimaginable in Marx's era. Third, the training of large models depends on the aggregation of data generated by billions of users—the general intellect, in this sense, is now directly produced by the everyday communicative and behavioral activity of the entire society—yet its ownership is concentrated in a handful of private corporations.

3.2. The internal tension: algorithmic configuration versus privatization

Marx envisioned that once the general intellect escaped the fetters of capital, the door to emancipation would swing open. The contemporary reality confounds this expectation. The general intellect has been advanced to a level of social sharing unprecedented in human history—the collective knowledge of humanity, encoded and aggregated in model weights trained on vast corpora—yet simultaneously subjected to a form of private appropriation that is more thorough and less visible than any that came before. The algorithmic general intellect is, on the one hand, irreducibly social—its training data and its operational intelligence are products of collective human activity—and, on the other hand, privately owned: the weights remain proprietary, the APIs are metered, the inference is paywalled. This is the central paradox of the "Fragment on Large Models."

3.3. A three-dimensional critique of the privatization of the general intellect

First dimension: Computing-power monopoly. The material substrate of the algorithmic general intellect is computing infrastructure, and the ownership of this infrastructure is undergoing a vertiginous concentration. This scale of investment constitutes not merely a competitive advantage but a structural barrier to entry that effectively privatizes the material conditions for advanced AI development. The much-discussed "democratization" of AI through price reductions and open-weight releases, far from reversing this trend, paradoxically accelerates it: only those who command massive computing capacity can sustain inference services at ultra-low margins.

Second dimension: The data-property regime. Data—the raw material from which the algorithmic general intellect is constructed—is produced collectively by billions of users but appropriated privately through terms-of-service agreements that function as instruments of primitive digital accumulation. The production of data is thoroughly socialized; its ownership is radically privatized. The contradiction between the socialization of production and the private appropriation of the means of production—the fundamental contradiction of capitalism identified by Marx—thus reaches a new degree of intensity in the digital age, transposed from the factory floor to the entire sphere of social communication and everyday life.

Third dimension: Knowledge enclosure and systemic stupidity. When the general intellect takes the form of proprietary algorithmic systems, the knowledge it embodies is enclosed. The user relates to the large model not as a tool to be mastered but as an opaque authority whose internal logic remains inaccessible. Alexander Galloway's analysis of protocol as a mode of control "after decentralization" captures part of this dynamic: "The founding principle of the Net is control, not freedom. *Control has existed from the beginning* [6]." The algorithmic general intellect extends this logic from network infrastructure to cognitive infrastructure: the protocols through which

knowledge is accessed, processed, and generated are themselves instruments of control that shape the conditions of subjectivity. The result is what can be termed "systemic stupidity"—a condition in which subjects, dependent on algorithmic systems for cognitive functions previously exercised autonomously, undergo a gradual but cumulative atrophy of their own intellectual capacities.

3.4. The non-arrival of the emancipatory scene

Marx's emancipatory wager—that the general intellect, once freed from capital's grip, would enable a society in which "disposable time" becomes the measure of wealth rather than labor-time—has not been realized. Instead, the algorithmic general intellect, precisely in its most advanced forms, has been captured by the very relations of production that Marx identified as the obstacle to liberation. The displacement of the crisis from the bodily to the cognitive domain represents a deepening of the subjection of living labor, not its alleviation. This diagnosis raises the central question to which the remainder of this article is addressed: why has the emancipatory scene failed to materialize, and under what conditions might it yet be realized?

4. Deciphering the paradox: the divergent paths of large models and the determining role of ownership

4.1. The historical-materialist primacy of production relations

The answer, from the standpoint of historical materialism, is that technology never develops in a social vacuum. The effects of any given productive force are mediated—indeed, determined—by the relations of production within which it is deployed. Marx's formulation in *Capital* is definitive:

"However, capital is not a thing, but rather a definite social production relation, belonging to a definite historical formation of society, which is manifested in a thing and lends this thing a specific social character [7]."

Applied to the present case: large models are not things that bear their social effects inscribed within their technical architecture. They are social relation that assume the form of technical artifacts. The "emancipatory potential" and the "domination potential" of the algorithmic general intellect coexist within the technology; which potential is actualized depends entirely on the ownership form of the relevant means of production: the computing infrastructure, the training data, and the model architectures themselves.

4.2. Theoretical implications of this judgment

This historical-materialist analysis yields a decisive theoretical consequence: the fork in the road between large models leading to emancipation and large models deepening alienation is not a matter of technical design choices, "alignment" research, or ethical guidelines—it is a matter of property relations. The algorithmic public-private ownership divide determines the trajectory of the general intellect's social effects with the force of a structural law. To treat the crisis of AI-induced subjectivity as a problem of "governance," "regulation," or "responsible innovation" without addressing the underlying ownership question is, from a Marxist perspective, to mistake the symptom for the cause.

4.3. A critical examination of contemporary AI development models

The dominant trajectory—AI development within capitalist property relations—exhibits a pattern of deepening contradictions. The socialization of data production proceeds in tandem with the privatization of data ownership. The collective character of knowledge embedded in model weights coexists with proprietary control over inference access. Far from abolishing the exchange-value system, the algorithmic general intellect extends it into new domains: cognition, attention, and social interaction become commodified at an unprecedented granularity.

Particularly instructive is the "techno-feudalism" thesis advanced by Yanis Varoufakis, who argues that the dominant logic of digital capitalism is shifting from the extraction of surplus value through production to the extraction of "cloud rent" through platform ownership: "cloud capital has inflicted on humanity is the conversion of billions of us into willing cloud serfs volunteering to labour for nothing to reproduce cloud capital for the benefit of its owners [8]." Whether or not one accepts Varoufakis's provocative claim that capitalism has been supplanted by a neo-feudal order, his analysis illuminates a real tendency: the rentier logic of cloud and platform capitalism makes the crisis of subjectivity particularly resistant to penetration, because the mechanisms of domination are embedded in infrastructure rather than in the direct labor process.

4.4. Reaffirming historical materialism in the AI era

Large models are inherently neither emancipatory nor oppressive. The direction they take is determined by the ownership form of the means of production—computing power, data, and algorithms. This is the fundamental judgment that historical materialism must reaffirm in the age of artificial intelligence. The transformation that Marx identified as the precondition for realizing the emancipatory potential of the general intellect—the abolition of private ownership of the means of production—remains, in its digitally updated form, the precondition for resolving the contemporary crisis of subjectivity.

5. Toward a solution: algorithmic public ownership as institutional precondition for reconstructing subjectivity

5.1. The concept of algorithmic public ownership

Building on the foregoing diagnosis, this section introduces "algorithmic public ownership" as a concept of Marxist political economy for the digital age. The core means of production have shifted from machines and factories to data, algorithms, and computing power. If, following the basic principle of Marxist political economy, the public ownership of the means of production is the fundamental pathway to overcoming the contradiction between the socialization of production and private appropriation, then the extension of this principle to the digital domain requires that data, algorithms, and critical computing infrastructure be brought under public ownership—rather than allowing the contemporary form of the general intellect, the algorithmic system, to remain monopolized by private capital.

Algorithmic public ownership is conceptually distinct from mere "open-source" licensing or "public data sharing." Open-source models can still be trained and deployed on privately owned computing infrastructure; public datasets can still feed proprietary models that enclose their outputs. Algorithmic public ownership refers specifically to ownership configuration at the level of the means of production: the public ownership of computing infrastructure, the public character of

foundational large models, and the social commons status of data property rights with public-benefit distribution mechanisms. It is, in short, the application of the logic of public ownership to the algorithmic general intellect.

5.2. Potential effects on subjectivity reconstruction

When algorithmic architectures are no longer embedded in capital's valorization logic, large models can genuinely serve the free development of human capacities rather than the production of surplus value. The algorithm would be transformed from an alien force that dominates subjects into a mediating instrument that enhances human capabilities. The subject would no longer be passively defined and driven by algorithmic determinations but would instead become an active agent who deploys and regulates algorithms. This would not entail the abolition of AI but its reappropriation: the general intellect returned to the social body that produces it.

Under algorithmic public ownership, the relationship between human intelligence and machine intelligence would shift from competition and subordination to complementarity and mutual enhancement. Cognitive tasks outsourced to models would not entail the atrophy of human capacities—as occurs under the current "systemic stupidity" dynamic—because the models would be transparent, collectively governed, and directed toward socially determined ends rather than private accumulation.

5.3. Institutional pathways toward algorithmic public ownership

How might the transition to algorithmic public ownership be institutionally realized? Drawing on existing frameworks of public ownership, three axes can be identified: computing infrastructure should be positioned as a strategic public good under state or collective ownership, rather than being left to the investment logic of private hyperscalers; data should be legally constituted as a social commons, with extraction by private platforms subject to strict regulation and public-benefit obligations; and critical algorithmic applications—particularly those affecting labor processes, education, healthcare, and public administration—should be brought under socialized governance, with transparency, auditability, and democratic accountability as mandatory design requirements. These institutional pathways are neither utopian nor unprecedented: they extend the logic of public infrastructure—roads, electricity grids, public education—to the digital domain.

5.4. Theoretical and practical challenges

It would be disingenuous not to acknowledge the significant challenges facing the algorithmic public ownership proposal. Under existing institutional conditions, the concept exhibits a tension between its radical theoretical logic and the gradualism of feasible reform. Concrete institutional designs for public ownership of computing infrastructure remain underdeveloped; the incentive structures for technological innovation under public ownership require sustained theoretical elaboration; and the international coordination problem—how to institute algorithmic public ownership in a global economy characterized by uneven development and geopolitical competition—poses formidable obstacles that no single article can resolve. These are directions for further research, not objections that invalidate the normative direction of the argument. The tension between the radical character of the demand and the gradual character of feasible transitional strategies is, in any case, a familiar feature of Marxist political practice.

6. Conclusion: on the extension line of historical materialism

This article has traced a theoretical arc from the "Fragment on Machines" to the "Fragment on Large Models." It has argued that the category of the general intellect, which Marx developed in the *Grundrisse* on the basis of the industrial machine system, has in the contemporary era assumed a new—algorithmic and centralized—form in large language models. The liberation dialectic contained in Marx's "Fragment" has not been spontaneously realized; its realization is blocked by the private ownership of the means of production in their digital modality—computing power, data, and algorithms. This judgment, far from refuting historical materialism, confirms and extends its explanatory power in the digital age.

The article's argumentative chain has proceeded through four moments: a textual reconstruction demonstrating the enduring theoretical energy of Marx's "Fragment"; a contemporary diagnosis revealing the paradox of the algorithmic general intellect's simultaneous socialization and privatization; an ownership analysis deciphering the mechanism by which this paradox is produced; and a constructive proposal—algorithmic public ownership—as the institutional horizon for its resolution. The theoretical contributions of the article are threefold: it proposes the "Fragment on Large Models" as a contemporary reactivation of Marx's "Fragment on Machines"; it deploys the fixed capital–general intellect analytical framework to dissect the contemporary AI techno-social complex; and it introduces "algorithmic public ownership" as a conceptual innovation of Marxist political economy for the digital age.

The normative position that underlies the entire argument bears restating: the trajectory of AI development is not fated. The path beyond the contemporary crisis of subjectivity is not a technological fix—not "better alignment," not "ethical AI," not "human-in-the-loop" design—but a political choice at the level of the ownership form of the means of production. The crisis of subjectivity under the conditions of artificial intelligence can only be resolved by taking historical materialism as a weapon and making the correct institutional choice regarding the ownership of the algorithmic general intellect. The "Fragment on Large Models" thus stands as both a diagnosis of the present and a directional indicator toward a future in which the general intellect, finally wrested from the grip of capital, becomes the common possession of the social individuals who collectively produce it.

References

- [1] Yu, S., Liu, S., Gong, X., Liu, C.-e., & Cai, W. (2025). Online platform algorithmic control and gig workers' turnover intention in China: The mediating role of relative deprivation. *Journal of Management Science and Engineering*, 10(1), 37–53.
- [2] Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.
- [3] Marx, K. (2010). Economic manuscripts of 1857–58. In K. Marx & F. Engels, *Marx & Engels collected works: Volume 29*. Lawrence&Wishart.
- [4] Virno, P. (2001). General intellect. In M. Zanini & A. Fadini (Eds.), *Lessico postfordista*. Feltrinelli.
- [5] Pasquinelli, M. (2023). *The eye of the master: A social history of artificial intelligence*. Verso.
- [6] Galloway, A. R. (2004). *Protocol: How control exists after decentralization*. MIT Press.
- [7] Marx, K. (2010). Capital: Volume III. In K. Marx & F. Engels, *Marx & Engels collected works: Volume 37*. Lawrence & Wishart.
- [8] Varoufakis, Y. (2023). *Technofeudalism: What killed capitalism*. Vintage.