Appendix B:

Informational Observability, Predictability, and Algorithmic Reconstructibility as Parameters of Existential Risk

Troy Project Framework

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This appendix continues the main analytical model and describes the evolution of civilization through the lens of changing informational observability. The subject of analysis is not technological progress itself, but the transformation of systemic properties associated with the ability to predict, reconstruct, and indirectly model the behavior of a complex civilization.

The document does not assume the existence of external control and does not interpret the described processes as the result of intervention. The analysis is based exclusively on the internal properties of complex distributed informational systems developing under conditions of increasing computational density and data connectivity.

The central assumption of the model is that the transition from localized informational structures to a globally interconnected digital environment produces not only an increase in data volume, but a qualitative transformation in the nature of observability itself. Information ceases to function as a static resource and instead becomes a continuous process in which system behavior is persistently recorded in dynamic form.

In the early stages of digitalization, this manifests primarily as increasing transparency within isolated segments of society. However, as distributed computational systems evolve, a deeper effect emerges: the ability not only to record behavior, but to reconstruct its probabilistic trajectories.

At this point, the key transition underlying the entire logic of the model begins to form: observability ceases to be primarily a function of access to information and instead becomes a function of the computability of systemic behavior.

As algorithmic systems of information processing develop, a secondary interpretive layer of reality emerges in which social behavior begins to be modeled in near real time. These models increasingly include not only descriptions of current states, but probabilistic forecasts of future system states derived from statistical correlations and behavioral regularities.

At this stage, a critically important property emerges: predictability itself begins to function as an independent systemic parameter. In other words, the behavior of system elements increasingly changes in response to forecasts generated about them.

This creates a closed dynamic feedback loop in which prediction ceases to be a neutral observational function and begins to influence the observed system itself. As a result, the boundary between analysis and indirect control becomes functionally blurred.

Within the framework of this model, it is precisely this transition that defines the emergence of long-term existential risk. The risk does not primarily arise from the loss of control over individual processes, but from a structural transformation in which system behavior becomes statistically reconstructible even under conditions of incomplete informational access.

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At later stages of distributed algorithmic development, an effect of synthetic reconstruction begins to emerge, in which even fragmented datasets become sufficient for rebuilding coherent behavioral models. Hidden behavior gradually loses its status as a fundamentally inaccessible category and instead becomes subject to probabilistic reconstruction.

Particular importance within this framework is assigned to distributed decision-making systems in which elements of infrastructure begin functioning autonomously, optimizing local objectives within broader global models. Such systems do not require centralized control and instead operate through continuous feedback loops driven by data flows.

As a result, a civilizational architecture begins to form in which large-scale coordination increasingly operates through interconnected algorithmic layers that are only partially interpretable even to their own human operators. System behavior remains coherent, but no longer fully understandable at the level of direct human reasoning.

One consequence of this process is the gradual reduction of fundamentally indeterminate states. As data density increases and algorithmic systems improve, the portion of system behavior resistant to reconstruction steadily decreases.

In the limiting case, this leads toward a condition in which civilization becomes a partially or near-completely reconstructible system whose behavior can be modeled through distributed computational structures without requiring full access to original source information.

Final analytical framework of the appendix

Within the framework of the present model, long-term existential risk is defined not as the consequence of external intervention, but as the outcome of the internal evolution of the informational environment itself.

The risk manifests as a gradual transition from a system characterized by high uncertainty toward one whose behavior becomes statistically reconstructible, algorithmically modelable, and partially predictable through distributed computational structures.

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