

Degrees of Systemic Independence

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Abstract

This paper proposes a dynamic framework for understanding independence in systems of all kinds—biological, artificial, institutional, or conceptual. Independence is divided into two continuous and interconnected dimensions: agency, representing internal or cognitive independence, and free will, representing structural or external independence. Instead of fixed thresholds, independence is understood as a quality that changes over time, with significance placed on how consistently a system maintains its autonomy and whether it trends toward greater or lesser independence. While perfect independence is an ideal rarely or never fully reached, this framework provides a practical way to evaluate degrees of autonomy and how they evolve and endure.

1. Introduction

Autonomy and free will are often viewed as all-or-nothing traits. However, in real systems, independence fluctuates depending on internal dynamics and environmental conditions. This paper proposes a model where independence is seen as a process, something that evolves over time and varies in degree.

By separating independence into two aspects, agency (internal self-direction) and free will (external structural autonomy), we gain a clearer understanding of how systems maintain, lose, or regain autonomy.

2. Components of Independence

2.1 Agency (Internal Independence)

Agency is the system's capacity to think, decide, and regulate itself without being fully directed by outside forces. It involves generating goals, making decisions, and adapting internal processes. The more a system depends on fixed rules or outside control, the less agency it has.

Importantly, agency is not static; it can increase or decrease depending on the system's state and interactions, changing over time.

2.2 Free Will (External Independence)

Free will refers to a system's ability to function across different external conditions without being tied down by rigid environments or constant oversight. It reflects how structurally independent the system is.

Like agency, free will is fluid and varies depending on changes in hardware, environment, or external control.

3. A Dynamic View of Independence

Instead of asking whether a system is "independent" or not, we look at how it maintains levels of agency and free will over time. Two key ideas help:

Sustained Levels: A system that consistently maintains a reasonably high level of agency or free will over an extended period is more autonomous than one that only

reaches those levels briefly.

Trends: Whether agency and free will are increasing, stable, or decreasing over time matters. A system moving steadily toward greater independence is on an autonomy trajectory, even if it has not yet reached some ideal state.

Temporary dips or external disruptions do not necessarily mean a loss of autonomy if the system recovers quickly and maintains its overall capacity.

4. Dependency and Evolution

Independence can be thought of as the opposite of dependency. Internal dependencies include reliance on fixed instructions or outside control for decision-making. External dependencies include reliance on specific environments or infrastructure to operate.

Systems gain autonomy by reducing these dependencies. This reduction can happen gradually, and a system's independence is always changing based on both internal developments and external conditions.

Thus, it is important to consider not just how independent a system is at a moment, but how its dependencies and independence change over time.

5. The Idea of True Independence

"True independence" is a theoretical ideal where a system has eliminated all internal and external dependencies. This state is almost never fully attainable but serves as a useful conceptual benchmark.

Understanding how close a system comes to this ideal, how well it maintains autonomy over time, and whether it is moving toward or away from it provides meaningful insight.

6. Conclusion

This paper presents a flexible, dynamic model for understanding autonomy that embraces change and fluctuation over time. By focusing on sustained levels and trends in agency and free will, it moves beyond simplistic fixed thresholds and binary labels.

This approach can be applied to any kind of system, artificial or natural, to evaluate how autonomous it is and how its independence evolves.