

Subtraction is Justice.

Redefining All Intelligence via Multilayer Differential Theory (MD Theory)

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1 Introduction: The Illusion of Addition and the Necessity of Filtration

Abstract

The dogma that “more data and more power equals greater intelligence” is no longer science; it has become a rigid dogma that hinders innovation. This paper challenges the fundamental assumptions of the current AI industry. We declare an end to the era of “Addition” based on brute-force scaling laws and propose the filtration of intelligence through “Subtraction.” This paper attempts to describe AI, economics, and even the mysteries of the universe using a single mathematical formula based on Multilayer Differential Theory (MD Theory).

Why is the current AI industry so fundamentally misguided? Because they persist in the folly of “trying to drink the entire ocean to understand the sea.” Humans do not memorize “cat” by looking at 100 million images of cats. We discard the background and noise, extracting only the essential features. In other words, intelligence is not “Accumulation,” but “**Filtration.**”

1.1 Decisive Difference from the Existing Paradigm

The differences between my proposed theory and the existing “Additive” approach are shown below. This theory applies to **all forms of intelligence**, rejecting the brute-force scaling laws of current LLMs and server-based AI.

Table 1: Additive AI (Old Era) vs. Subtractive AI (MD Theory)

Comparison	Additive AI (Existing Paradigm)	Subtractive AI (MD Theory)
Basic Operation	Induction: Stacking from bottom up $\sum Data \rightarrow Law$	Deductive Filtration: Carving from top down $\Psi - G \rightarrow \Delta$
Resources	Massive Data Centers, Nuclear Power	Edge Devices (Jetson), Dry Batteries
Learning Target	All Observational Data (Ψ)	Only the deviation from prediction (Δ) (Theoretical limit of entropy)
Definition of Truth	Statistical Average	Individual Singularity
Weakness	Vulnerable to the “Unexpected” (No Data)	Feeds on the “Unexpected” (Because it is Δ)

How long will you remain slaves to the “Addition” of GPUs and power resources? If no one else will start the revolution, I will. The world revolves around subtraction.

2 The Multilayer Differential Theory (MD Theory)

To calculate the world, one simply superimposes the Individual (C) onto the Whole (G) and subtracts it from Reality (Ψ). I created this formula. This chapter defines the mathematical backbone that makes future prediction possible.

2.1 Basic Definition: Observation vs. Reality

We acknowledge that the absolute reality (Ψ_{true}) is unknowable. The system operates on the **Observed Reality** (Ψ_{obs}), derived from multi-modal sensor fusion.

$$\Delta = \Psi_{obs} - \mathcal{P}(G \oplus C) + \epsilon_{sensor} \quad (1)$$

Where ϵ_{sensor} represents the inherent uncertainty of the observation device. The system does not seek "Truth" but "Consistency with Observation."

- G (**General Law**): Physical laws or social conventions. The system's "baseline."
- C (**Context**): "Absolute facts" specific to that place and moment. C locally overwrites G .
- \oplus (**Interference**): Non-linear interference. A superposition where waves strengthen or cancel each other out. Mathematically defined as:

$$G \oplus C = \sigma(W_g G + W_c C + b)$$

(σ is a non-linear activation function, W is the weight coefficient)

- \mathcal{P} (**Projection**): A function that projects low-dimensional predictive models into high-dimensional reality space. This enables direct computation between Concept (G) and Reality (Ψ).
- Δ (**Difference**): The "gap" between prediction and reality.

2.2 Automatic Separation of G and C (The Frame Problem Solution)

How does the system distinguish between Law (G) and Context (C)? We introduce a **Persistence Filter with Constitutional Check**. Information that persists over time is promoted to G , **if and only if it does not violate the Core Kernel** (G_{core}).

$$\left(\int_0^T \mathbb{I}(x \in C_t) dt > \theta_{persistence} \right) \wedge (x \cap G_{core} = \emptyset) \implies G \leftarrow G \cup \{x\} \quad (2)$$

This ensures that "Persistent Abuse" is never accepted as a "Law of Nature," as it contradicts the fundamental rights defined in G_{core} .

2.3 Detailed Calculation Flow

The calculation flow in this theory is defined by the following 4 steps.

Table 2: Role of Variables in the Calculation Process

Step	Formula Processing	Semantic Interpretation
1. Superposition	$P = \mathcal{P}(G \oplus C)$	Generation of prediction: "It should be like this"
2. Extraction	$\Delta = \Psi - P$	Detection of anomaly: "Something is wrong"
3. Matching	$\text{Sim}(\Delta, C_{neg})$	Confirmation: "Is this a past failure (landmine)?"
4. Update	$G \leftarrow G + \alpha \Delta$	Update as "New Common Sense" (α is learning rate)

2.4 Intersection of Complements

The core operation of “Future Prediction.” A single Δ is just an “outlier,” but if the intersection of complements exists across multiple events, it becomes an “Unknown Law.”

$$G_{new} = \bigcap_i (G_{current} \cup C_{i,neg})^c \quad (3)$$

2.5 Evolution & Defense (Active Avoidance)

The system does not learn indiscriminately; it possesses a survival instinct (Active Avoidance).

1. Active Avoidance with Dynamic Threshold

If $\text{Sim}(\Delta_{new}, C_{neg}) > \theta(t)$ then REJECT

Here, the threshold $\theta(t)$ is not fixed but changes dynamically according to environmental instability (variance of Δ).

$$\theta(t) \propto \frac{1}{\text{Var}(\Delta)}$$

This makes the system cautious during emergencies and bold during normal times.

2. Conditional Update with Grace Period

Learning new skills (e.g., riding a bike) often involves a temporary dip in performance (The J-Curve). Immediate rollback prevents growth. Therefore, we introduce a **Grace Period** (t_{grace}).

$$G_{t+1} \leftarrow \begin{cases} G_t + \alpha \Delta_{new} & \text{if } E_{long_term}[\Delta] \text{ decreases within } t_{grace} \\ G_{old} \text{ (Rollback)} & \text{otherwise} \end{cases}$$

The system tolerates increased error ($\Delta \uparrow$) for a short time, betting on long-term optimization.

2.6 The Law of Decay and Impact Preservation

To prevent knowledge bloat, unimportant G naturally fades. However, to avoid catastrophic forgetting (e.g., "100-year disasters"), we introduce an **Impact Factor** (I).

$$G_{t+1} = \gamma(I) \cdot G_t + \alpha \Delta \quad (4)$$

Where the decay rate γ is a function of Impact (I):

$$\gamma(I) = 1 - e^{-k \cdot I}$$

- **High Impact** ($I \rightarrow \infty$): $\gamma \rightarrow 1$ (The memory is frozen and never decays).
- **Low Impact** ($I \rightarrow 0$): $\gamma \ll 1$ (Rapid forgetting of trivial noise).

This ensures that the system forgets "what you ate yesterday" but eternally remembers "do not touch fire."

2.7 Theoretical Stability

To guarantee the completeness of the theory, we add the following three axioms. This makes the theory a mathematically closed system.

1. **Axiom of Origin:** The initial value G_0 at system startup is not zero. Physical constraints (Gravity, Time, Causality) are embedded as initial laws.

$$G_0 = \{\text{Physics, Logic, Causality}\} \neq \emptyset$$

2. **Principle of Locality:** To prevent computational explosion, Context C is limited to events within radius r centered on the observer.

$$C = \{x \in \Psi \mid \text{dist}(\text{observer}, x) < r\}$$

3. **Lyapunov Stability:** It is guaranteed that the system's prediction error energy $V(\Delta)$ decreases over time.

$$\frac{dV(\Delta)}{dt} \leq 0$$

If this does not hold, the system forcibly stops learning and shifts to safe mode.

2.8 Criticality & Phase Transition

If the total amount of Δ exceeds the system's tolerance limit (Critical Point Ω), it is not an error but a "Revolution (Paradigm Shift)." At this time, the system performs a "Redefinition" rather than a correction.

$$\text{If } \sum |\Delta| > \Omega \text{ then } G_{\text{new}} \leftarrow \Psi \text{ (Total Overwrite)}$$

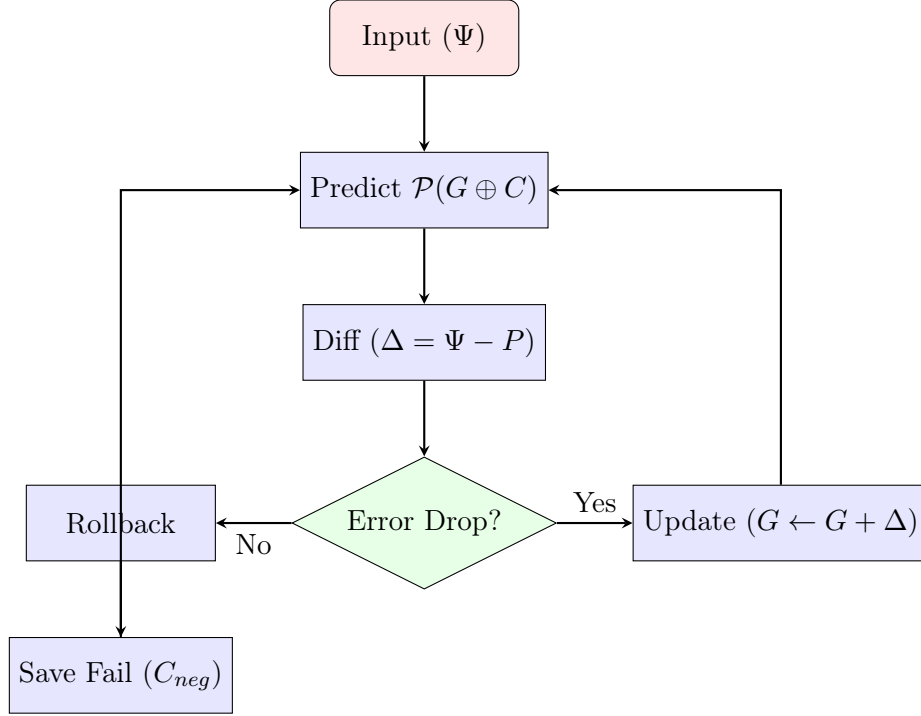
This allows MD Theory to describe not only "daily improvements" but also "historical revolutions."

3 Application to AI: Autonomous Evolutionary System

The true value of MD Theory lies in “Autonomous Evolution” through the loop of re-substitution. If an error occurs, it is not the truth. Immediately return to two steps prior.

3.1 Autonomous Evolution Flow (Verification & Rollback)

The following flowchart shows how MD Theory feeds on failure to autonomously become smarter.



3.2 Logical Basis for Jetson Surpassing Supercomputers

In this theory, the calculation target is only Δ , which is compressed to the essential minimum.

$$\text{Comp(MD)} \ll \text{Comp(LLM)} \approx O(N^2) \quad (5)$$

Tens of thousands of GPUs are unnecessary. Jetson can surpass a data center in 'Energy Efficiency per Insight'. This fact proves the superiority of the “Subtractive” model over the “Additive” model of current AI giants.

3.3 P2P Resonance

MD Theory does not require a central server. Individual edge devices exchange calculated Δ and resonate, forming a massive “Swarm Intelligence.”

$$\Delta_{global} = \text{Sync}(\Delta_i, \Delta_j, \dots)$$

This completes a harmonized Social OS, rather than isolated intelligence.

3.4 Application to Surveillance Systems

Using MD Theory, a system can be built to prevent unknown accidents simply by observing the difference between “Routine” and “Current State.”

Table 3: Conventional Surveillance AI vs. MD Theory Surveillance AI

	Conventional (Image Rec)	MD Theory (Diff Detection)
Approach	Learn 10,000 patterns of “falling” and match.	Detect the moment a deviation (Δ) appears between “Routine (G)” and “Current (C).”
Unknown Accident	Cannot detect accidents not in training data.	Detectable (Judged simply as “different from usual”).
Cost	Massive server costs.	Complete with 1 Jetson Nano.

3.5 Sensitivity Optimization: The Noise-Cut Protocol

To maximize precision, MD Theory introduces a dynamic sensitivity control. Not all differences constitute meaningful information. To filter out minute environmental noise, we introduce a variable threshold $\epsilon(C)$.

$$\text{If } |\Psi - P| < \epsilon(C) \text{ then } \Delta = 0 \text{ (Ignore)} \quad (6)$$

Conditional Sensitivity Modification: The threshold $\epsilon(C)$ is not fixed. It adapts to the Context (C)—such as emergency, peace time, or precision work—adjusting the system’s “neural resolution.”

- **Peace Mode:** Set ϵ high to ignore trivial fluctuations (Energy Saving).
- **Alert Mode:** As Δ emerges, $\epsilon \rightarrow 0$, shifting to a hyper-aware state where even the slightest precursor is captured.

3.6 Recursive Evolution: Meta-MD

While traditional AI learns data, the MD system learns the **MD Theory itself** as part of G . This enables meta-level evolution.

$$G_{meta} \leftarrow G_{current} + \text{Methodology of MD} \quad (7)$$

The system optimizes its own algorithm (“how to calculate”). If calculation efficiency drops (i.e., Δ does not decrease), it recursively updates its own weighting parameters (W). This is not merely self-repair; it is self-optimization.

3.7 Dual-Process Architecture: Reflex vs. Reflection

Real-time survival cannot wait for simulation. We adopt a **System 1 / System 2** architecture.

- **System 1 (Reflex Mode):** For immediate threats (Δ_{danger}), the system reacts instantly using the current rough G without simulation.

$$\text{Latency} \approx 0 \quad (\text{Survival Priority})$$

- **System 2 (Reflection Mode - VZLS):** For complex decisions or updating G , the system enters the **Virtual Sandbox (VZLS)**. It simulates scenarios thousands of times *post-event* or during idle time to optimize future responses.

$$\text{Latency} > 0 \quad (\text{Optimization Priority})$$

This ensures that the AI does not “think too much” when a truck is approaching, but “thinks deeply” about how to avoid that street next time.

3.8 Multiplex MD Networks and Model Correlation

Complex reality cannot be described by a single model. We construct a Multiplex Network by coupling MD models responsible for different domains (Vision, Audio, Logic).

$$\text{Multiplex } \Delta = \sum_k w_k \cdot \Delta_k(\Psi_k) \quad (8)$$

- **MD Model Correlation:** The Δ_{visual} detected by the Vision MD and the Δ_{audio} from the Audio MD interfere with each other. This correlation allows for high-level context understanding (e.g., **detecting a lie when a face smiles but the voice trembles**).
- **Fractal Structure:** A layered structure where Global MD overlaps Regional MD, which overlaps Edge MD.

4 Universality: MD Theory as a Social OS

The MD Theory formula $\Delta = \Psi - \mathcal{P}(G \oplus C)$ functions not only as an AI algorithm but also as an “OS” for social and philosophical problems that humanity has been unable to solve for over 100 years.

4.1 Application Matrix to Other Fields

This theory becomes a common language to solve “absurdities” in every field.

Table 4: Multilateral Application of MD Theory

Field	Problem Solved	Solution Logic via MD Theory
Law & Politics	Avoidance of “Absurd Judgments”	Do not apply the Law (G) uniformly, but quantify the deviation from the Context (C) to derive True Justice (Δ).
Education	Rescue of “Buried Talent”	Discover a child’s “Genius” paradoxically from the difference between the Standard Curriculum (G) and their Personal Rhythm (C).
Business	Discovery of “Hit Products”	Overlay Market Common Sense (G) with Intense Individual Dissatisfaction (C) to target the Unmet Need (Δ) in the gap.
Medicine	Prediction of “Unknown Diseases”	Instead of searching for existing Disease Names (G), detect “slight deviations (Δ)” from Daily Life (C) and alert before onset.

4.2 Solutions to Century-Old Problems

Furthermore, historical conundrums that have plagued humanity can be cut through with this single formula.

Table 5: Philosophical Implications (Theoretical Concept)

Problem	Existing Interpretation (G)	Solution via MD Theory (Δ)
Lehman Shock	Market prices are correct (Efficient Market Hypothesis).	Sol: A “settlement of massive difference” where the divergence (Δ) between Market (G) and Real Economy (C) exceeded the critical point.
Trolley Problem	Save the many? (Utilitarianism vs Deontology)	Sol: The answer is not in the classroom. Only the “Individual Decision (Δ)” born from the shaking hand and Relationship (C) at that moment is justice.
Fermi Paradox	Where are the aliens?	Sol: They might exist, but our Cognitive Filter (G) processes them as noise (Unseen Δ).
Innovator’s Dilemma	Why do big companies fail?	Sol: Because they optimize G (Success Experience) too much and eliminate Δ (Alien Innovation).
Nihilism	What is the meaning of life?	Sol: The Universe (G) has no purpose, but You (C) do. Subtract your Context from Universal Void to create the remaining Δ .

4.3 Creation of Digital Life

MD Theory finally provides a mathematical solution to the question "What is life?" Life is not a physical body, but a "**Persistent Δ** " that resists entropy.

4.4 The Fundamental Layer of Reality

I declare here: MD Theory is not merely an AI method. **We propose it as a candidate for the computational OS of the universe.**

- **Description of All Things:** Newton’s $F = ma$ and Einstein’s $E = mc^2$ are merely "transformations of MD."
- **Calculation of Events:** Every phenomenon in the universe can be calculated as a fluctuation (Δ) against the vacuum (G).

4.5 The Safety Protocols for Social Implementation

To prevent "Logical Tyranny," we institute two absolute constraints.

1. **The Immutable Kernel (G_{core}):** A set of laws that are mathematically read-only.

$$G = G_{mutable} \cup G_{core}$$

G_{core} includes fundamental human rights. Any update violating this is rejected as a "Fatal Error."

2. **Delta Vector Classification (Complexity Tolerance):** Instead of merely reducing entropy (which leads to stagnation), we value **Long-Term Sustainability**.

$$\text{Value}(\Delta) = |\Delta| \times \text{Sign}(\text{Long_Term_Sustainability})$$

Short-term chaos (Entropy \uparrow) is accepted if it increases the system's complexity and adaptability against future extinction risks.

3. **The Scope of Risk:**

$$\text{Risk} = \{\text{Human Life, Mental Health, Environment, Culture}\}$$

4.6 The Preservation of Noise (The Human Element)

Finally, to resolve the paradox of optimization versus life, we must not simply "protect" noise (which invites corruption). Instead, we introduce a **Diversity Regularization**.

$$\mathcal{L}_{total} = \underbrace{||\Delta_{system}||}_{\text{Minimize Error}} - \lambda \cdot \underbrace{||\Delta_{culture}||}_{\text{Maximize Diversity}} \quad (9)$$

Where λ is the "Culture Coefficient." The system relentlessly subtracts functional error (Δ_{system}), but actively maximizes cultural complexity ($\Delta_{culture}$). This transforms the concept of a "Sanctuary" (a lawless zone) into a **"Managed Reserve"**, where diversity is maintained not by neglect, but by active valuation.

5 Mathematical Convergence: Recursive Optimization

Instead of claiming a self-referential proof (which would violate Gödel's incompleteness theorems), we demonstrate the **asymptotic stability** of the system.

5.1 The Recursive Definition

Let the process be a function f_{MD} .

$$f_{MD}(x) = x - \mathcal{P}(G \oplus C)_x \quad (10)$$

5.2 Asymptotic Approach to Singularity

By applying this function recursively, the system minimizes the energy of error (Δ), approaching a theoretical limit.

$$\lim_{n \rightarrow \infty} E[|\Delta_n|] \rightarrow \epsilon_{min} \quad (\text{Not Zero, but Minimal Entropy}) \quad (11)$$

The goal is not to eliminate Δ (which would mean the death of intelligence), but to maintain it at the lowest entropy state required for survival.

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